CIMT study
Ultrasound and metabolic data

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Contents

Chapter 1

Construction of data

In this chapter we construct the analysis dataset that we shall be using for analysis of the primary outcome and the the two secondary ones.

```
> library( Epi )
> library( foreign )
```

1.1 Baseline dataset

We first construct a basline-dataset, `base`, with one record per person.

1.1.1 Randomization data

We first read the randomization codes for those actually randomized, and also devise a list with the names for the groups to be used for annotation:

```
> rnd <- read.csv2("./data/PTNR_MetforminCode_InsulinTypeCode.csv" )
> rnd <- transform( rnd, subjid = PTNR,
+                        grp = factor(MetforminCode,
+                                     labels=c("Plc","Met")),
+                        igr = factor(InsulinTypeCode,
+                                     levels=c(3,1,2),
+                                     labels=c("Biph","AspD","Detm")) )
> rnd <- rnd[,c("subjid","grp","igr")]
> str( rnd )
 'data.frame':        412 obs. of  3 variables:
  $ subjid: int  70002 70001 70004 70005 70006 70007 70010 70008 70009 70011 ...
  $ grp   : Factor w/ 2 levels "Plc","Met": 2 2 1 1 1 1 1 2 1 1 ...
  $ igr   : Factor w/ 3 levels "Biph","AspD",..: 1 1 1 3 3 1 3 3 3 2 ...
> addmargins( with( rnd, table( Ins=igr, Met=grp ) ) )
       Met
 Ins    Plc Met Sum
   Biph  67  70 137
   AspD  73  65 138
   Detm  66  71 137
   Sum  206 206 412
```

For graphing and annotation purposes we define long sensible names for the groups and color schemes for groups:

```
>   gN <- c("Placebo+Insulin","Metformin+Insulin")
>   iN <- c("Biphasic","Aspart+Detemir","Detemir")
>  clr <- c("red","blue","orange","black")
> iclr <- c("limegreen","red","blue","black")
```

1.1.2 Including stratification variables

Then we attach the stratification variables, groom the variable names to something slightly more handy, and define the stratification variables so that the largest stratum is defined by the first level of the three varaibles — this will facilitate reporting of the statistical models:

```
> st <- read.csv2( "./data/strata.csv" )[,-2]
> names( st )[2:4] <- c("over.65","pre.ins","sdc")
> st <- transform( st, sdc = factor( sdc, levels=1:0,
+                                     labels=c("SDC","notSDC") ),
+                   over.65 = factor( over.65, levels=0:1,
+                                     labels=c("<65",">65") ),
+                   pre.ins = factor( pre.ins, levels=1:0,
+                                     labels=c("preIns","noIns") ) )
> rnd <- merge( rnd, st, by.x="subjid", by.y="ptnr" )
```

We now have the identification of persons randomized by randomization group and stratification varible:

```
> head( rnd )
  subjid grp  igr over.65 pre.ins    sdc
1  10001 Met Biph     >65   noIns notSDC
2  10002 Plc Biph     >65   noIns notSDC
3  10003 Plc AspD     <65  preIns notSDC
4  10004 Plc Biph     <65   noIns notSDC
5  10005 Plc Biph     <65  preIns notSDC
6  10006 Plc Biph     <65   noIns notSDC
```

```
> with( rnd, ftable( addmargins(table(grp,igr,sdc,over.65,pre.ins),1:2),
+                    row.vars=1:2 ) )
         sdc     SDC                         notSDC
         over.65 <65          >65            <65          >65
         pre.ins preIns noIns preIns noIns preIns noIns preIns noIns
grp igr
Plc Biph            17     6      9     2     15    13      3     2
    AspD            20     5      9     1     17     9      5     7
    Detm            17     7      9     0     13    10      8     2
    Sum             54    18     27     3     45    32     16    11
Met Biph            18     5      9     2     15     8      8     5
    AspD            16     7      9     1     13    12      7     0
    Detm            18     5      9     2     18    11      3     5
    Sum             52    17     27     5     46    31     18    10
Sum Biph            35    11     18     4     30    21     11     7
    AspD            36    12     18     2     30    21     12     7
    Detm            35    12     18     2     31    21     11     7
    Sum            106    35     54     8     91    63     34    21
```

1.1.3 Drop-out information

Some patients left the study early, so we merge the information on the date of drop-out, from the file `ud.csv`:

```
> ud <- read.csv2( "./data/ud.csv", header=TRUE, as.is=TRUE )
> ud <- transform( ud,
+               xdate = as.Date(ud01,format="%d-%m-%Y"),
+              subjid = ptnr,
+               xtype = factor( ud03,
+                             labels = c("Adverse",
+                                        "Other dis.",
+                                        "Excl. crit.",
```

```
+                                      "Abnormal lab.",
+                                      "Non-compl",
+                                      "Admin pr.",
+                                      "Other") ) )[,c("subjid","xdate","xtype")]
> str( ud )
  'data.frame':        105 obs. of  3 variables:
   $ subjid: int  70003 70005 70011 70021 70030 70036 70013 70038 70041 40001 ...
   $ xdate : Date, format: "2009-01-22" "2009-03-19" ...
   $ xtype : Factor w/ 7 levels "Adverse","Other dis.",..: 1 1 7 1 7 7 7 7 7 3 ...
> cbind( table( ud$xtype ) )
                [,1]
  Adverse         19
  Other dis.       6
  Excl. crit.      7
  Abnormal lab.   10
  Non-compl       11
  Admin pr.        1
  Other           51
```

This information will be merged into the base dataset shortly.

1.1.4 Baseline variables

We now retrieve the baseline measurements from a SAS-file:

```
> base <- read.ssd("./data","baseline")
> names( base ) <- gsub( "_", ".", tolower( names(base) ) )
```

Then we recode and groom the dataset, specifically we create categorical variable for GAD, one for any value over 0, and one for the usual definintion of GAD-positivity, as well as properly coded date variables:

```
> base <- transform( base, dob = cal.yr( as.Date( birthdat, origin="1960-01-01" ) ),
+                          dov = cal.yr( as.Date( visitdat, origin="1960-01-01" ) ),
+                         dodm = cal.yr( as.Date( diabetes, origin="1960-01-01" ) ),
+                          dor = cal.yr( as.Date( substr(as.character(randdate),1,10 ),
+                                                 format="%d-%m-%Y" ) ),
+                       caucas = 1-etnicity,
+                        gad.0 = gad65.b1==0,
+                      gad.pos = gad65.b1 > 24,
+                        retin = factor( retinopa, levels=0:2,
+                                        labels=c("None","Simplex","Prolif") ),
+                          cvd = pmax( ami, heartsur, ihd, heartins, vascsurg, apopl, tci, amp,
+                                      0, na.rm=TRUE ) == 1,
+                          ras = pmax( acei, acei.thi, arb, arbcomb, arb.ccb,
+                                      0, na.rm=TRUE ) == 1,
+                          oah = pmax( loop, ccb, bblock, thiazid, spiron, aht,
+                                      0, na.rm=TRUE ) == 1,
+                          oad = pmax( rosiglit, glp1, dpp4, repaglin, glucagon,
+                                      0, na.rm=TRUE ) == 1 )
```

Note that in this recoding, missing values (`NA`) for any of the components of `cvd`, `ras`, `oah` or `oad` are taken as negative, that is as *not* being present in the person.

Then we thow out variables not needed:

```
> base <- transform( base, aav = dov-dob,
+                       dmdurav = dov-dodm )
> ( skip <- match( c("metform2","insulint","above.si","prior.in","sdc","insulin",
+                    "etnicity","retinopa","randdate",
+                    "ami","heartsur","ihd","heartins","vascsurg","apopl","tci","amp",
+                    "acei","acei.thi","arb","arbcomb","arb.ccb",
+                    "loop","ccb","bblock","thiazid","spiron","aht",
+                    "rosiglit","glp1","dpp4","repaglin","glucagon"),
+                names( base ) ) )
```

```
 [1] 106 107 109 110 111  60   5   8 108  11  12  13  14  17  15  16  18  67 101  69  70
[22] 105  68  71  72  73  74  75  62  63  64  65  66
```

```
> base <- base[,-skip]
```

1.1.4.1 Merging with randomization and drop-out data

We merge in the randomization and stratification variables, using the `all.x=TRUE` to make sure that we only include patients actually randomized:

```
> intersect( names(base), names(rnd) )
[1] "subjid"
> dim( base )
[1] 464  92
> base <- merge( rnd, base, all.x=TRUE )
> base <- merge( base, ud, all.x=TRUE )
> dim( base )
[1] 412  99
```

1.1.5 Hypoglycaemia and seroius adverse event data

We read the data from the SAS-file:

```
> hypo <- read.ssd("./data","hypo")[,-c(2:3,11:13)]
> names( hypo ) <- gsub( "_", ".", tolower( names(hypo) ) )
> str( hypo )
'data.frame':       415 obs. of  12 variables:
 $ subjid  : num  91200 91204 91218 10003 10007 ...
 $ total.sa: num  NA 2 NA 0 0 0 0 0 0 0 ...
 $ any.sae.: num  NA 1 NA 0 0 0 0 0 0 0 ...
 $ allhypos: num  0 1 0 0 26 4 1 6 5 3 ...
 $ sum.klar: num  0 0 0 0 26 4 1 6 5 3 ...
 $ sevhypos: num  0 1 0 0 0 0 0 0 0 0 ...
 $ any.hypo: num  0 1 0 0 1 1 1 1 1 1 ...
 $ any.seve: num  0 1 0 0 0 0 0 0 0 0 ...
 $ nonsevhy: num  0 0 0 0 26 4 1 6 5 3 ...
 $ sae.sevh: num  0 3 0 0 0 0 0 0 0 0 ...
 $ any.sae2: num  0 1 0 0 0 0 0 0 0 0 ...
 $ any.nons: num  0 0 0 0 1 1 1 1 1 1 ...
```

Although there are not strictly baseline variables, these are variables with only one value per person, so we include them with the `base` data frame.

```
> intersect( names(base), names(hypo) )
[1] "subjid"
> dim( base )
[1] 412  99
> base <- merge( base, hypo, all.x=TRUE )
> dim( base )
[1] 412 110
```

This concludes the construction of the `base` dataframe, however we also want to include an indicator of whether a person completed the study per protocol or not. This however depends on the follow-up data, so we wait with the saving of the base data set till the per protocol indicator has been derived.

1.2 Ultrasound data

Then we read the ultrasound data for *all* participants. Note that some of the numerical variables are with "." as decimal separator, even if we have a file from a Danish locale. We also rescale `csc2` ti readable units ():

```
> imt <- read.csv2("./data/imt.csv")
> names( imt ) <- gsub(  "cca_", "", names(imt) )
> names( imt ) <- gsub( "mean_", "", names(imt) )
> str( imt )

 'data.frame':        1544 obs. of  20 variables:
  $ subjid           : int  10002 70032 10002 10002 91089 60001 60001 80010 91081 91118 ...
  $ visit            : Factor w/ 2 levels "1a","7a": 1 2 1 2 1 1 1 2 1 1 ...
  $ side             : Factor w/ 2 levels "L","R": 1 1 2 2 1 1 2 2 2 1 ...
  $ datescanned      : Factor w/ 805 levels "2008/05/06 - 10:45:19",..: 24 726 24 320 177 8 8 569 1
  $ fimtavg          : Factor w/ 85 levels "0.44","0.46",..: 56 38 39 31 43 40 31 14 64 61 ...
  $ fimtmin          : num  0.91 0.69 0.68 0.58 0.63 0.69 0.6 0.45 0.94 0.86 ...
  $ fimtmax          : num  1.14 0.94 1 0.93 1.08 0.99 0.97 0.71 1.28 1.23 ...
  $ minvesseldia     : num  NA NA NA NA NA NA NA NA NA NA ...
  $ maxvesseldia     : Factor w/ 368 levels "","10","10.03",..: 1 1 1 1 1 1 1 1 1 1 ...
  $ vesselareal      : num  NA NA NA NA NA NA NA NA NA NA ...
  $ lumenareal       : num  NA NA NA NA NA NA NA NA NA NA ...
  $ imtareal         : Factor w/ 1120 levels "","10.27300798",..: 1 1 1 1 1 1 1 1 1 1 ...
  $ systolicpressure : int  115 163 115 140 119 145 145 151 145 124 ...
  $ diastolicpressure: int  69 84 69 72 73 89 89 97 68 69 ...
  $ ddpct            : num  NA NA NA NA NA NA NA NA NA NA ...
  $ csdpct           : num  NA NA NA NA NA NA NA NA NA NA ...
  $ dc               : num  NA NA NA NA NA NA NA NA NA NA ...
  $ csc1             : num  NA NA NA NA NA NA NA NA NA NA ...
  $ csc2             : num  NA NA NA NA NA NA NA NA NA NA ...
  $ iem              : num  NA NA NA NA NA NA NA NA NA NA ...

> wdp <- c(5,9,12) # variables Where Decimal Point was used instead of comma
> names( imt )[wdp]

 [1] "fimtavg"      "maxvesseldia" "imtareal"

> for( i in wdp ) imt[,i] <- as.numeric(as.character(imt[,i]))
> imt$dosc <- cal.yr( as.Date( substr(imt$datescanned,1,10) ) )
> imt$csc2 <- imt$csc2*1000
> levels( imt$visit ) <- c("v1","v7")
```

We now have records for all patients scanned, *including* some that were never randomized. The dataset has one observation for each laterality and per visit 1 and 7:

```
> subset( imt, subjid==10001 )

   subjid visit side           datescanned fimtavg fimtmin fimtmax minvesseldia
17  10001    v1    R 2008/09/22 - 11:42:06    0.80    0.54    1.00           NA
32  10001    v1    L 2008/09/22 - 11:42:06    0.85    0.65    0.96        10.86
33  10001    v7    L 2010/03/22 - 11:47:32    0.84    0.63    1.03        10.76
34  10001    v7    R 2010/03/22 - 11:47:32    0.88    0.71    1.03           NA
   maxvesseldia vesselareal lumenareal imtareal systolicpressure diastolicpressure ddpct
17           NA          NA         NA       NA              142                86    NA
32        11.46    103.1476   74.81514 28.33245              142                86  5.51
33        11.52    104.2305   76.04665 28.18386              124                73  7.05
34           NA          NA         NA       NA              124                73    NA
   csdpct     dc csc1 csc2     iem     dosc
17     NA     NA   NA   NA      NA 2008.724
32  11.33 0.0107 0.19 2.02 2680.31 2008.724
33  14.60 0.0149 0.26 2.86 1913.97 2010.219
34     NA     NA   NA   NA      NA 2010.219
```

1.2.1 Merging with randomization data

By merging with the randomization dataset using `all.x=TRUE`, we ensure that only those from the randomization set are included:

```
> dim( imt )
  [1] 1544   21
> rimt <- merge( rnd, imt, all.x=TRUE )
> dim( rimt )
  [1] 1498   26
> with( rimt, addmargins(table(table(subjid))) )

    1   2   3   4 Sum
    5  60  15 332 412
```

Fishily enough there is one person with 4 observations in `imt` that is not randomized:

```
> tt <- with( imt, table( subjid ) )
> has4i <- names( tt[tt==4] )
> isrnd <- rnd$subjid
> setdiff( has4i, isrnd )
  [1] "91218"
```

This person is not included in the dataset `rimt`, excluded by the `all.x=TRUE` clause.

1.2.2 Data check and reshape for ultrasound measurements

We can now check how the three different measurements of the IMT relate across persons — as seen from figure 1.1, they do not differ much:

```
> with( rimt, pairs( cbind( avg = fimtavg,
+                           min = fimtmin,
+                           max = fimtmax,
+                            mn = (fimtmin+fimtmax)/2 ),
+                    gap=0, pch=16, cex=0.5, col=c("red","limegreen")[side],
+                    xlim=c(0.3,1.5), ylim=c(0.3,1.5), las=1,
+                    panel = function(x,y,...){points(x,y,...);abline(0,1)} ) )
```

Figure 1.1: *Pairwise comparison of far wall intima media thickness (*`fimt`*) as the average, min, max and the mean of min and max measurements. There are two points for each participant, one from left (red) and one from right side (green).*

We now take the average for left and right-sided measurements, but also merge in the left and right side measurements as separate variables:

```
> qvar <- 10:25 # Quantitative varaibles
> cvar <- c(1:7,9) # Classification variables
> names( rimt )[qvar]
   [1] "fimtavg"          "fimtmin"          "fimtmax"          "minvesseldia"
   [5] "maxvesseldia"     "vesselareal"      "lumenareal"       "imtareal"
   [9] "systolicpressure" "diastolicpressure" "ddpct"            "csdpct"
  [13] "dc"               "csc1"             "csc2"             "iem"
> names( rimt )[cvar]
  [1] "subjid"      "grp"         "igr"         "over.65"     "pre.ins"     "sdc"
  [7] "visit"       "datescanned"
```

```
> mimt <- aggregate( rimt[,qvar],
+                    rimt[,cvar],
+                    FUN=mean,
+                    na.rm=TRUE )
> lvar <- c(10:17,23:25) # Laterality variables
> ( lvar <- names( rimt )[lvar] )

 [1] "fimtavg"      "fimtmin"      "fimtmax"      "minvesseldia" "maxvesseldia"
 [6] "vesselareal"  "lumenareal"   "imtareal"     "csc1"         "csc2"
[11] "iem"

> wimt <- reshape( rimt[,c("subjid","visit","side",lvar)],
+                  direction = "wide",
+                    v.names = lvar,
+                    timevar = "side",
+                      idvar = c("subjid","visit") )
> cbind( sort( names( wimt ) ) )

      [,1]
 [1,] "csc1.L"
 [2,] "csc1.R"
 [3,] "csc2.L"
 [4,] "csc2.R"
 [5,] "fimtavg.L"
 [6,] "fimtavg.R"
 [7,] "fimtmax.L"
 [8,] "fimtmax.R"
 [9,] "fimtmin.L"
[10,] "fimtmin.R"
[11,] "iem.L"
[12,] "iem.R"
[13,] "imtareal.L"
[14,] "imtareal.R"
[15,] "lumenareal.L"
[16,] "lumenareal.R"
[17,] "maxvesseldia.L"
[18,] "maxvesseldia.R"
[19,] "minvesseldia.L"
[20,] "minvesseldia.R"
[21,] "subjid"
[22,] "vesselareal.L"
[23,] "vesselareal.R"
[24,] "visit"

> mimt <- merge( mimt, wimt, all.x=TRUE )
> subset( rimt, subjid==10001 )

  subjid grp  igr over.65 pre.ins    sdc visit side           datescanned fimtavg fimtmin
1  10001 Met Biph     >65   noIns notSDC    v1    R 2008/09/22 - 11:42:06    0.80    0.54
2  10001 Met Biph     >65   noIns notSDC    v7    L 2010/03/22 - 11:47:32    0.84    0.63
3  10001 Met Biph     >65   noIns notSDC    v1    L 2008/09/22 - 11:42:06    0.85    0.65
4  10001 Met Biph     >65   noIns notSDC    v7    R 2010/03/22 - 11:47:32    0.88    0.71
  fimtmax minvesseldia maxvesseldia vesselareal lumenareal imtareal systolicpressure
1    1.00           NA           NA          NA         NA       NA              142
2    1.03        10.76        11.52    104.2305   76.04665 28.18386              124
3    0.96        10.86        11.46    103.1476   74.81514 28.33245              142
4    1.03           NA           NA          NA         NA       NA              124
  diastolicpressure ddpct csdpct     dc csc1 csc2     iem     dosc
1                86    NA     NA     NA   NA   NA      NA 2008.724
2                73  7.05  14.60 0.0149 0.26 2.86 1913.97 2010.219
3                86  5.51  11.33 0.0107 0.19 2.02 2680.31 2008.724
4                73    NA     NA     NA   NA   NA      NA 2010.219

> subset( mimt, subjid==10001 )

  subjid visit grp  igr over.65 pre.ins    sdc           datescanned fimtavg fimtmin
1  10001    v1 Met Biph     >65   noIns notSDC 2008/09/22 - 11:42:06   0.825   0.595
2  10001    v7 Met Biph     >65   noIns notSDC 2010/03/22 - 11:47:32   0.860   0.670
  fimtmax minvesseldia maxvesseldia vesselareal lumenareal imtareal systolicpressure
1    0.98        10.86        11.46    103.1476   74.81514 28.33245              142
```

```
2    1.03         10.76         11.52     104.2305    76.04665 28.18386              124
  diastolicpressure ddpct csdpct      dc csc1 csc2     iem fimtavg.R fimtmin.R fimtmax.R
1                86  5.51  11.33 0.0107 0.19 2.02 2680.31      0.80      0.54      1.00
2                73  7.05  14.60 0.0149 0.26 2.86 1913.97      0.88      0.71      1.03
  minvesseldia.R maxvesseldia.R vesselareal.R lumenareal.R imtareal.R csc1.R csc2.R iem.R
1             NA             NA            NA           NA         NA     NA     NA    NA
2             NA             NA            NA           NA         NA     NA     NA    NA
  fimtavg.L fimtmin.L fimtmax.L minvesseldia.L maxvesseldia.L vesselareal.L lumenareal.L
1      0.85      0.65      0.96          10.86          11.46      103.1476     74.81514
2      0.84      0.63      1.03          10.76          11.52      104.2305     76.04665
  imtareal.L csc1.L csc2.L   iem.L
1   28.33245   0.19   2.02 2680.31
2   28.18386   0.26   2.86 1913.97
```

The resulting data set has one observation per visit (`v1` and `v7`) among the randomized patients:

```
> with( mimt, ftable(addmargins(table(Met=grp, Ins=igr, visit ))) )
          visit  v1  v7 Sum
Met Ins
Plc Biph         67  61 128
    AspD         73  66 139
    Detm         66  55 121
    Sum         206 182 388
Met Biph         70  65 135
    AspD         65  59 124
    Detm         71  65 136
    Sum         206 189 395
Sum Biph        137 126 263
    AspD        138 125 263
    Detm        137 120 257
    Sum         412 371 783
```

1.2.3 Plaques data

We now read the plaques data:

```
> pl <- read.csv2( "./data/plaquesprgebet.csv" )[,-5]
> names( pl )[5] <- "n"
> levels( pl$visit ) <- c("v1","v7")
> levels( pl$side  ) <- c("L","R")
> pl$tp <- interaction( pl$gebet, pl$side )
> str( pl )
'data.frame':        1255 obs. of  6 variables:
 $ subjid: int  10001 10001 10001 10001 10002 10002 10002 10002 10002 10004 ...
 $ visit : Factor w/ 2 levels "v1","v7": 1 1 1 1 1 1 1 1 1 1 ...
 $ gebet : Factor w/ 3 levels "BIF","CCA","ICA": 1 1 2 2 1 1 2 2 3 1 ...
 $ side  : Factor w/ 2 levels "L","R": 1 2 1 2 1 2 1 2 1 1 ...
 $ n     : int  1 1 1 1 5 5 1 1 5 2 ...
 $ tp    : Factor w/ 6 levels "BIF.L","CCA.L",..: 1 4 2 5 1 4 2 5 3 1 ...
```

We then reshape the data to have only one observation per subject and visit:

```
> wpl <- reshape( pl[,-(3:4)],
+          direction = "wide",
+            v.names = "n",
+            timevar = "tp",
+              idvar = c("subjid","visit") )
> names( wpl ) <- gsub( "n.", "", names( wpl ) )
> wpl$n.pl <- apply( wpl[,3:8], 1, sum, na.rm=TRUE )
> str( wpl )
```

```
'data.frame':        587 obs. of  9 variables:
 $ subjid: int  10001 10002 10004 10006 10007 10009 10010 10012 10016 10017 ...
 $ visit : Factor w/ 2 levels "v1","v7": 1 1 1 1 1 1 1 1 1 1 ...
 $ BIF.L : int  1 5 2 1 2 1 1 1 1 1 ...
 $ BIF.R : int  1 5 1 2 2 1 1 NA 1 1 ...
 $ CCA.L : int  1 1 NA NA NA NA NA NA NA NA ...
 $ CCA.R : int  1 1 2 NA 1 NA NA NA NA NA ...
 $ ICA.L : int  NA 5 NA NA NA NA NA NA NA NA ...
 $ ICA.R : int  NA NA NA NA NA NA NA NA NA NA ...
 $ n.pl  : int  4 17 5 3 5 2 2 1 2 2 ...
 - attr(*, "reshapeWide")=List of 5
  ..$ v.names: chr "n"
  ..$ timevar: chr "tp"
  ..$ idvar  : chr  "subjid" "visit"
  ..$ times  : Factor w/ 6 levels "BIF.L","CCA.L",..: 1 4 2 5 3 6
  ..$ varying: chr [1, 1:6] "n.BIF.L" "n.BIF.R" "n.CCA.L" "n.CCA.R" ...
```

The plaques data are now merged into the `mimt` dataset:

```
> intersect( names(wpl), names(mimt) )

 [1] "subjid" "visit"

> dim( mimt )

 [1] 783  46

> mimt <- merge( mimt, wpl, all.x=TRUE )
> dim( mimt )

 [1] 783  53
```

1.2.4 Saving ultrasound data

Finally, we write the data frame both in `Rda` format and as a SAS data-file with corresponding script:

```
> save( mimt, file="./data/mimt.Rda" )
> write.foreign( mimt,
+             datafile = "./sas/mimt.dat",
+             codefile = "./sas/mimt.sas",
+              package = "SAS" )
```

1.3 Follow-up variables

We then retrieve the glucose-related measurements in an expanded data frame which will contain data for each of 7 visits, and not only the first (`v1`) and the last (`v7`) as `mimt`.

We start by reading the SAS-file:

```
> outc <- read.ssd("./data","outcome")
> names( outc ) <- gsub( "_", ".", tolower( names(outc) ) )
> str( outc )

'data.frame':        2639 obs. of  26 variables:
 $ subjid  : num  10001 10001 10001 10001 10001 ...
 $ visit   : num  1 2 3 4 5 6 7 1 2 3 ...
 $ weight  : num  122 122 121 124 125 ...
 $ bmi     : num  33 33.1 32.8 33.7 34 ...
 $ whr     : num  1.1 1.04 1.08 1.07 1.07 ...
 $ hba1c   : num  7.9 7.1 6.3 5.9 6.1 6.8 6.3 7.6 7.5 6.9 ...
 $ gluc    : num  12.6 6.7 4.8 3.4 8.8 9.3 8.9 10.4 NA 9.9 ...
 $ ins     : num  60 NA NA NA NA NA 132 56 NA NA ...
```

```
 $ insdose.: num  14 54 64 64 64 70 NA 14 38 40 ...
 $ insdose2: num  0.115 0.442 0.53 0.515 0.51 ...
 $ cpep    : num  1192 NA NA NA NA ...
 $ chol    : num  4.4 NA 4 NA 5.1 NA 4 3.8 NA 4 ...
 $ ldl     : num  2.3 NA 2.2 NA 3 NA 2.3 1.7 NA 2 ...
 $ hdl     : num  1.3 NA 1.3 NA 1.4 NA 1.22 1.66 NA 1.6 ...
 $ vldl    : num  0.8 NA 0.5 NA 0.7 NA 0.5 0.5 NA 0.4 ...
 $ trig    : num  1.82 NA 1.1 NA 1.6 NA 1.03 1.03 NA 0.9 ...
 $ sys     : num  149 136 136 132 137 ...
 $ dia     : num  86 65.5 69.5 69 78.5 76 77.5 75.5 72.5 65 ...
 $ pulse   : num  89 98 85 87 82 95 87 77 68 77 ...
 $ b2dato  : num  17902 17902 17902 17902 17902 ...
 $ b3dato  : num  17990 17990 17990 17990 17990 ...
 $ b4dato  : num  18067 18067 18067 18067 18067 ...
 $ b5dato  : num  18169 18169 18169 18169 18169 ...
 $ b6dato  : num  18267 18267 18267 18267 18267 ...
 $ visitdat: num  17797 17797 17797 17797 17797 ...
 $ visitda2: num  18343 18343 18343 18343 18343 ...
```

First we get the visit-dates from the dataset:

```
> names( outc )
  [1] "subjid"   "visit"    "weight"   "bmi"      "whr"      "hba1c"    "gluc"
  [8] "ins"      "insdose." "insdose2" "cpep"     "chol"     "ldl"      "hdl"
 [15] "vldl"     "trig"     "sys"      "dia"      "pulse"    "b2dato"   "b3dato"
 [22] "b4dato"   "b5dato"   "b6dato"   "visitdat" "visitda2"
> vdates <- aggregate( outc[,c(25,20:24,26)], outc[,"subjid",drop=F], mean )
> names( vdates )[2:8] <- paste("v",1:7,sep="")
> head( vdates )
  subjid    v1    v2    v3    v4    v5    v6    v7
1  10001 17797 17902 17990 18067 18169 18267 18343
2  10002 17798 17885 17982 18136 18164 18253 18347
3  10003 17806 17903    NA    NA    NA    NA 18051
4  10004 17820 17932 18009 18107 18191 18282 18366
5  10005 17848 17946 18037 18128 18219 18318 18394
6  10006 17874 17967 18059 18150 18241 18338 18422
> vdat <- reshape( vdates,
+               direction = "long",
+                 varying = 2:8,
+                 v.names = "vdate",
+                   times = 1:7,
+                 timevar = "visit",
+                   idvar = "subjid" )
> vdat <- vdat[order(vdat$subjid,vdat$visit),]
> head( vdat )
        subjid visit vdate
10001.1  10001     1 17797
10001.2  10001     2 17902
10001.3  10001     3 17990
10001.4  10001     4 18067
10001.5  10001     5 18169
10001.6  10001     6 18267
> vdat <- transform( vdat, visit = factor(visit,labels=paste("v",1:7,sep="")),
+                          vdate = as.Date(vdate,origin="1960-01-01") )
> vdat$dov <- cal.yr( vdat$vdate )
> head( vdat, 8 )
        subjid visit      vdate      dov
10001.1  10001    v1 2008-09-22 2008.724
10001.2  10001    v2 2009-01-05 2009.012
10001.3  10001    v3 2009-04-03 2009.253
10001.4  10001    v4 2009-06-19 2009.463
10001.5  10001    v5 2009-09-29 2009.743
10001.6  10001    v6 2010-01-05 2010.011
10001.7  10001    v7 2010-03-22 2010.219
10002.1  10002    v1 2008-09-23 2008.727
```

We then remove the date variables from `outc` too, notably the stratification variables, that we will get from the `rnd` dataset, in order to make sure that the coding of these is consistent throughout; and we rename the insulin variables to something sensible, `idos` for (total) insulin dose and `ipkg` for insulin per kg:

```
> outc <- outc[,1:19]
> outc$visit <- factor( outc$visit, levels=1:7, labels=paste("v",1:7,sep="") )
> outc <- merge( outc, vdat )
> names( outc )[grep("insdose2",names(outc))] <- "ipkg"
> names( outc )[grep("insdose.",names(outc))] <- "idos"
> head( outc, 7 )
  subjid visit weight      bmi      whr hba1c gluc ins idos      ipkg cpep chol ldl  hdl
1  10001    v1  121.7 33.01324 1.103448   7.9 12.6  60   14 0.1150370 1192  4.4 2.3 1.30
2  10001    v2  122.1 33.12174 1.042017   7.1  6.7  NA   54 0.4422604   NA   NA  NA   NA
3  10001    v3  120.8 32.76910 1.081545   6.3  4.8  NA   64 0.5298013   NA  4.0 2.2 1.30
4  10001    v4  124.2 33.69141 1.067797   5.9  3.4  NA   64 0.5152979   NA   NA  NA   NA
5  10001    v5  125.4 34.01693 1.075000   6.1  8.8  NA   64 0.5103668   NA  5.1 3.0 1.40
6  10001    v6  121.9 33.06749 1.081545   6.8  9.3  NA   70 0.5742412   NA   NA  NA   NA
7  10001    v7  124.2 33.69141 1.057851   6.3  8.9 132   NA        NA 1017  4.0 2.3 1.22
  vldl trig   sys  dia pulse      vdate      dov
1  0.8 1.82 149.0 86.0    89 2008-09-22 2008.724
2   NA   NA 135.5 65.5    98 2009-01-05 2009.012
3  0.5 1.10 135.5 69.5    85 2009-04-03 2009.253
4   NA   NA 132.0 69.0    87 2009-06-19 2009.463
5  0.7 1.60 137.0 78.5    82 2009-09-29 2009.743
6   NA   NA 125.0 76.0    95 2010-01-05 2010.011
7  0.5 1.03 148.0 77.5    87 2010-03-22 2010.219
```

1.3.1 Merging with randomization data

Then we merge with the randomization data set, so that we have the correct grouping of the patients:

```
> intersect( names(outc), names(rnd) )
 [1] "subjid"
> dim( outc )
 [1] 2587   21
> outc <- merge( rnd, outc, all.x=TRUE )
> dim( outc )
 [1] 2587   26
```

1.3.2 Adding actual insulin doses during study

We read the datset with the actually prescribed insulin doses

```
> ins <- read.ssd( "./data", "ins" )
> names( ins ) <- tolower( names(ins) )
> ins <- ins[,c(1,3,2,4:12)]
> ins$visit <- factor( ins$visit, levels=1:7, labels=paste("v",1:7,sep="") )
> names( ins ) <- gsub( "instype", "typ", names(ins) )
> names( ins ) <- gsub( "insdose", "dos", names(ins) )
> names( ins )[3:12] <- paste( substr( names(ins)[3:12], 1, 3 ),
+                              rep(c("mor","lch","din","bed","ext"),each=2),
+                              sep="." )
> for( i in grep("typ",names(ins)) )
+    {
+    ins[is.na(ins[,i]),i] <- 0
```

```
+    ins[,i] <- factor( ins[,i],
+                       levels = 0:3,
+                       labels = c("non","Bip","Asp","Det") )
+    }
> str( ins )
  'data.frame':        2478 obs. of  12 variables:
   $ subjid : num  10001 10001 10001 10001 10001 ...
   $ visit  : Factor w/ 7 levels "v1","v2","v3",..: 1 2 3 4 5 6 1 2 3 4 ...
   $ typ.mor: Factor w/ 4 levels "non","Bip","Asp",..: 1 2 2 2 2 2 1 2 2 2 ...
   $ dos.mor: num  NA 30 38 38 38 44 NA 18 20 20 ...
   $ typ.lch: Factor w/ 4 levels "non","Bip","Asp",..: 1 1 1 1 1 1 1 1 1 1 ...
   $ dos.lch: num  NA NA NA NA NA NA NA NA NA NA ...
   $ typ.din: Factor w/ 4 levels "non","Bip","Asp",..: 2 2 2 2 2 2 2 2 2 2 ...
   $ dos.din: num  14 24 26 26 26 26 14 20 20 20 ...
   $ typ.bed: Factor w/ 4 levels "non","Bip","Asp",..: 1 1 1 1 1 1 1 1 1 1 ...
   $ dos.bed: num  NA NA NA NA NA NA NA NA NA NA ...
   $ typ.ext: Factor w/ 4 levels "non","Bip","Asp",..: 1 1 1 1 1 1 1 1 1 1 ...
   $ dos.ext: num  NA NA NA NA NA NA NA NA NA NA ...
```

Having read these data we merge them into the outcomes dataset:

```
> outc <- merge( outc, ins, all.x=TRUE )
> save( outc, file="./data/outc.Rda" )
```

1.4 Construction of total analysis data set

We will construct a dataset with all secondary outcomes, of which most are measured at all visits, but a few only at visits 1, 3, 5, and 7. The structure of the datasets will be with `subjid` and `visit` as key variables, that is with one record for each combination of these. There will be no records for visits where a person did not attend, and only persons randomized are included.

1.4.1 The intention to treat data

The intention to treat data is basically just the entire dataset with the relevant randomization as the primary explanatory variable.

How many persons with how many measurements, and what visits they attended:

```
> addmargins( with( outc, table( grp, visit ) ), 1 )
     visit
  grp    v1  v2  v3  v4  v5  v6  v7
    Plc 206 189 180 175 167 158 184
    Met 206 194 191 187 183 177 190
    Sum 412 383 371 362 350 335 374
> pattn <- data.frame( as.table( apply( with( outc, table( grp, subjid, visit ) ),
+                                        1:2, paste, collapse="-" ) ) )
> tpt <- addmargins( with( subset( pattn, Freq!="0-0-0-0-0-0-0" ),
+                          table( Visit.pattern=Freq, grp )[-1,] ) )
> cbind( tpt, round( 100*sweep(tpt,2,tpt["Sum",],"/"), 1 ) )

                Plc Met Sum  Plc  Met  Sum
  1-0-0-0-0-0-0  13   8  21  6.3  3.9  5.1
  1-0-0-0-0-0-1   4   4   8  1.9  1.9  1.9
  1-1-0-0-0-0-0   5   3   8  2.4  1.5  1.9
  1-1-0-0-0-0-1   4   0   4  1.9  0.0  1.0
  1-1-1-0-0-0-0   1   1   2  0.5  0.5  0.5
  1-1-1-0-0-0-1   4   3   7  1.9  1.5  1.7
  1-1-1-1-0-0-1   8   4  12  3.9  1.9  2.9
```

```
  1-1-1-1-1-1-0-0   2   2   4   1.0   1.0   1.0
  1-1-1-1-1-1-0-1   7   4  11   3.4   1.9   2.7
  1-1-1-1-1-1-1-0   1   2   3   0.5   1.0   0.7
  1-1-1-1-1-1-1-1 157 175 332  76.2  85.0  80.6
  Sum             206 206 412 100.0 100.0 100.0
```

1.4.2 The per protocol data

We also point out the patients with follow-up at least 3 visits (the per protocol analysis), that is the patients *not* in the 3 first lines of the above table, thus excluding 22 patients from the placebo group and 15 from the metformin group:

```
> vv <- with( outc, table(subjid) )
> base$pp <- base$subjid %in% names( vv[vv>2] )
> with( base, ftable( grp, igr, pp, col.vars=3 ) )
           pp FALSE TRUE
  grp igr
  Plc Biph        5   62
      AspD        5   68
      Detm       12   54
  Met Biph        3   67
      AspD        5   60
      Detm        7   64
```

1.4.3 Saving the base data set

We save the long versions of the group names and the color scemes along the base data:

```
> save( base, gN, iN, clr, iclr, file="./data/base.Rda" )
```

1.4.4 Merging it all together

Finally we construct the total analysis data set, `AD`, to be used in all subsequent analyses.

```
> names(base)[85] <- "doV"
> intersect( names(outc), names(base) )

  [1] "subjid"  "grp"     "igr"     "over.65" "pre.ins" "sdc"

> rbind( base=dim(base), outc=dim(outc) )

       [,1]  [,2]
  base  412   111
  outc 2587    36

> AD <- merge( outc, base, all.x = TRUE )
> dim( AD )

  [1] 2587  141

> intersect( names(AD), names(mimt) )

  [1] "subjid"  "grp"     "igr"     "over.65" "pre.ins" "sdc"     "visit"

> AD <- merge( AD, mimt, all.x=TRUE )
> dim( AD )

  [1] 2587  187

> c(       names( AD )[  1:6 ],
+    sort( names( AD )[-(1:6)] ) )
```

```
  [1] "subjid"            "grp"               "igr"               "over.65"
  [5] "pre.ins"           "sdc"               "alcohol."          "alendr"
  [9] "allhypos"          "antibiot"          "antidep"           "any.hypo"
 [13] "any.nons"          "any.sae."          "any.sae2"          "any.seve"
 [17] "apurin"            "asa"               "auto.neu"          "avgnatu2"
 [21] "avgnatua"          "b1bdato"           "BIF.L"             "BIF.R"
 [25] "birthdat"          "bmi"               "bvit"              "bvit.iro"
 [29] "calc"              "caucas"            "CCA.L"             "CCA.R"
 [33] "chol"              "chol.b1a"          "chol.b7a"          "contrace"
 [37] "cpep"              "cpep.b1a"          "cpep.b7a"          "csc1"
 [41] "csc1.L"            "csc1.R"            "csc2"              "csc2.L"
 [45] "csc2.R"            "csdpct"            "cvd"               "datescanned"
 [49] "dc"                "ddpct"             "dia"               "dia1.b0"
 [53] "dia2.b0"           "diabetes"          "diastolicpressure" "dmdurav"
 [57] "dob"               "dodm"              "dor"               "dos.bed"
 [61] "dos.din"           "dos.ext"           "dos.lch"           "dos.mor"
 [65] "dov"               "doV"               "dvit"              "dvit.cal"
 [69] "e.gfr"             "fibrat"            "fimtavg"           "fimtavg.L"
 [73] "fimtavg.R"         "fimtmax"           "fimtmax.L"         "fimtmax.R"
 [77] "fimtmin"           "fimtmin.L"         "fimtmin.R"         "fishoil"
 [81] "gaba"              "gad.0"             "gad.pos"           "gad65.b1"
 [85] "gastro"            "gluc"              "gluc.b1a"          "gluc.b7a"
 [89] "hba1c"             "hba1c.b1"          "hba1c.b7"          "hdl"
 [93] "hdlc.b1a"          "hdlc.b7a"          "height.2"          "height.b"
 [97] "hofte.b1"          "hofte.b7"          "ICA.L"             "ICA.R"
[101] "idos"              "iem"               "iem.L"             "iem.R"
[105] "impo"              "imtareal"          "imtareal.L"        "imtareal.R"
[109] "ins"               "ins.b1a"           "ins.b7a"           "ipkg"
[113] "iron"              "laserbeh"          "ldl"               "ldl.b1a"
[117] "ldl.b7a"           "lipids"            "loop.ccb"          "lumenareal"
[121] "lumenareal.L"      "lumenareal.R"      "lung"              "macroalb"
[125] "maxvesseldia"      "maxvesseldia.L"    "maxvesseldia.R"    "metformi"
[129] "microalb"          "minvesseldia"      "minvesseldia.L"    "minvesseldia.R"
[133] "n.pl"              "nonsevhy"          "nsaid"             "ntg"
[137] "oad"               "oah"               "other"             "othernat"
[141] "painkill"          "peri.neu"          "plataggr"          "pp"
[145] "pulse"             "pulse.b0"          "ras"               "retin"
[149] "sae.sevh"          "sevhypos"          "sex"               "smoking."
[153] "statin"            "su"                "sum.klar"          "sys"
[157] "sys1.b0"           "sys2.b0"           "systolicpressure"  "talje.b1"
[161] "talje.b7"          "thyre"             "total.sa"          "trig"
[165] "trig.b1a"          "trig.b7a"          "typ.bed"           "typ.din"
[169] "typ.ext"           "typ.lch"           "typ.mor"           "vdate"
[173] "vesselareal"       "vesselareal.L"     "vesselareal.R"     "visit"
[177] "visitdat"          "vldl"              "vldl.b1a"          "vldl.b7a"
[181] "weight"            "weight.2"          "weight.b"          "whr"
[185] "xdate"             "xtype"             "aav"
> save( AD, gN, iN, clr, iclr, file="./data/AD.Rda" )
```

Chapter 2

Base tables for the study

2.1 Descriptive tables by Met / Plc

These descriptive tables are based on two datsets, `base` and `AD`.

```
> load( file="./data/AD.Rda" )
> load( file="./data/base.Rda" )
> addmargins( with( base, table(table(subjid)) ) )
   1 Sum
 412 412
> names( base )
  [1] "subjid"   "grp"      "igr"      "over.65"  "pre.ins"  "sdc"      "birthdat"
  [8] "visitdat" "sex"      "diabetes" "peri.neu" "auto.neu" "laserbeh" "sys1.b0"
 [15] "dia1.b0"  "sys2.b0"  "dia2.b0"  "pulse.b0" "microalb" "macroalb" "e.gfr"
 [22] "b1bdato"  "smoking." "alcohol." "hba1c.b1" "hba1c.b7" "gluc.b1a" "gluc.b7a"
 [29] "cpep.b1a" "cpep.b7a" "ins.b1a"  "ins.b7a"  "chol.b1a" "chol.b7a" "trig.b1a"
 [36] "trig.b7a" "ldl.b1a"  "ldl.b7a"  "vldl.b1a" "vldl.b7a" "hdlc.b1a" "hdlc.b7a"
 [43] "gad65.b1" "weight.b" "weight.2" "height.b" "height.2" "talje.b1" "talje.b7"
 [50] "hofte.b1" "hofte.b7" "avgnatua" "avgnatu2" "metformi" "su"       "statin"
 [57] "fibrat"   "lipids"   "asa"      "thyre"    "apurin"   "nsaid"    "painkill"
 [64] "antidep"  "gaba"     "impo"     "ntg"      "gastro"   "contrace" "antibiot"
 [71] "dvit"     "calc"     "alendr"   "bvit"     "lung"     "other"    "plataggr"
 [78] "iron"     "fishoil"  "othernat" "loop.ccb" "dvit.cal" "bvit.iro" "dob"
 [85] "dov"      "dodm"     "dor"      "caucas"   "gad.0"    "gad.pos"  "retin"
 [92] "cvd"      "ras"      "oah"      "oad"      "aav"      "dmdurav"  "xdate"
 [99] "xtype"    "total.sa" "any.sae." "allhypos" "sum.klar" "sevhypos" "any.hypo"
[106] "any.seve" "nonsevhy" "sae.sevh" "any.sae2" "any.nons" "pp"
```

2.1.1 Table 1

This is a table of patient characteristics at entry into the study on variables that are not measured (or of any particular interst) at follow-up. We now set up a table to hold the values in the baseline table, first defining what variables to use:

```
> base <- transform( base, s.ret = (retin=="Simplex"),
+                          p.ret = (retin=="Prolif"),
+                        ini.ins = pre.ins=="preIns" )
> bvars <- c( "aav",
+             "sex",
+        "smoking.",
+        "alcohol.",
+          "caucas",
+         "dmdurav",
```

```
+        "gad65.b1", "gad.0", "gad.pos",
+             "cvd",
+        "microalb", "macroalb","avgnatua","e.gfr",
+           "s.ret","p.ret","laserbeh","auto.neu","peri.neu",
+        "metformi","ini.ins","su","oad","ras","oah","statin","asa" )
> bin <- rep( 1, length(bvars) )
> wh.cont <- c(1,4,6,7,13,14)
> bin[wh.cont] <- 0
> dec <- c(1,0,1,1,1,0)
> dig <- bin*0
> dig[bin==0] <- dec
> data.frame( bin, dig, bvars )
   bin dig    bvars
1    0   1      aav
2    1   0      sex
3    1   0 smoking.
4    0   0 alcohol.
5    1   0   caucas
6    0   1  dmdurav
7    0   1 gad65.b1
8    1   0    gad.0
9    1   0  gad.pos
10   1   0      cvd
11   1   0 microalb
12   1   0 macroalb
13   0   1 avgnatua
14   0   0    e.gfr
15   1   0    s.ret
16   1   0    p.ret
17   1   0 laserbeh
18   1   0 auto.neu
19   1   0 peri.neu
20   1   0 metformi
21   1   0  ini.ins
22   1   0       su
23   1   0      oad
24   1   0      ras
25   1   0      oah
26   1   0   statin
27   1   0      asa
```

Once we have defined the variables, which of them that are categorical and the number of digits after the decimal point to use for printing we can set up the array to hold the relevant numbers:

```
> QQ <- NArray( list( bvars,
+                     levels(base$grp),
+                     c( paste( c(2,1,3)/4), "mean", "sd" ) ) )
> str( QQ )
   logi [1:27, 1:2, 1:5] NA NA NA NA NA NA ...
   - attr(*, "dimnames")=List of 3
    ..$ : chr [1:27] "aav" "sex" "smoking." "alcohol." ...
    ..$ : chr [1:2] "Plc" "Met"
    ..$ : chr [1:5] "0.5" "0.25" "0.75" "mean" ...

> for( vv in 1:dim(QQ)[1] )
+ for( gg in dimnames(QQ)[[2]] )
+ {
+ if( bin[vv] == 0 )
+ QQ[vv,gg,] <- c( quantile( base[base$grp==gg,bvars[vv]],
+                            probs=c(2,1,3)/4, na.rm=TRUE ),
+                     mean( base[base$grp==gg,bvars[vv]], na.rm=TRUE ),
+                       sd( base[base$grp==gg,bvars[vv]], na.rm=TRUE ) )
+ else
+ QQ[vv,gg,1:2] <-
```

```
+ QQ[vv,gg,4:5] <- c( sum( base[base$grp==gg,bvars[vv]], na.rm=TRUE ),
+                     mean( base[base$grp==gg,bvars[vv]], na.rm=TRUE )*100 )
+ }
```

Then we print out the median and IQR from this array for the continuous variables and the number and percentage of the categorical ones:

```
> round( tt <- ftable( QQ[,,1:3], col.vars=2:3), 3 )
             Plc                     Met
             0.5    0.25    0.75     0.5    0.25    0.75

  aav         62.479  54.119  66.287  62.449  55.699  66.632
  sex        141.000  68.447      NA 140.000  67.961      NA
  smoking.    27.000  13.171      NA  36.000  17.561      NA
  alcohol.     1.000   0.000   5.250   2.000   0.000   6.000
  caucas     201.000  97.573      NA 201.000  97.573      NA
  dmdurav     11.209   7.366  15.341  12.537   8.747  17.985
  gad65.b1     0.000   0.000   0.000   0.000   0.000   0.000
  gad.0      174.000  84.466      NA 173.000  83.981      NA
  gad.pos     11.000   5.340      NA  19.000   9.223      NA
  cvd         55.000  26.699      NA  45.000  21.845      NA
  microalb    40.000  19.802      NA  48.000  24.000      NA
  macroalb     8.000   3.941      NA  12.000   6.000      NA
  avgnatua    10.783   6.044  19.834  11.871   6.475  32.863
  e.gfr      117.500  93.000 156.750 121.000 101.000 145.750
  s.ret       63.000  31.188      NA  59.000  29.500      NA
  p.ret       10.000   4.950      NA  15.000   7.500      NA
  laserbeh    16.000   7.882      NA  21.000  10.345      NA
  auto.neu    36.000  17.647      NA  33.000  16.098      NA
  peri.neu    78.000  38.049      NA  76.000  37.073      NA
  metformi   176.000  85.854      NA 167.000  81.068      NA
  ini.ins    142.000  68.932      NA 143.000  69.417      NA
  su          55.000  26.829      NA  61.000  29.612      NA
  oad         27.000  13.107      NA  32.000  15.534      NA
  ras        149.000  72.330      NA 159.000  77.184      NA
  oah        111.000  53.883      NA 122.000  59.223      NA
  statin     181.000  87.864      NA 170.000  82.524      NA
  asa        119.000  57.767      NA 112.000  54.369      NA
> row.names(tt) <- attr(tt,"row.vars")[[1]]
> cat( "; Plc ;     ; Met ;     \n",
+      "; Med ; IQR ; Med ; IQR \n",
+      ";   N ;   % ;   N ;   % \n",
+      file="./results/LLCh-Tab1.csv" )
> for( i in 1:nrow(tt) )
+ write.table( if( bin[i]==1 ) cbind( tt[i,1],
+                                     formatC( tt[i,2], format="f", dig=1 ),
+                                     tt[i,4],
+                                     formatC( tt[i,5], format="f", dig=1 ) )
+              else cbind( formatC( tt[i,1,drop=F], format="f", digits=dig[i] ),
+              paste( "(", formatC( tt[i,2,drop=F], format="f", digits=dig[i] ), ",",
+                          formatC( tt[i,3,drop=F], format="f", digits=dig[i] ), ")" ),
+                          formatC( tt[i,4,drop=F], format="f", digits=dig[i] ),
+              paste( "(", formatC( tt[i,5,drop=F], format="f", digits=dig[i] ), ",",
+                          formatC( tt[i,6,drop=F], format="f", digits=dig[i] ), ")" ) ),
+              file="./results/LLCh-Tab1.csv", append=TRUE, row.names=TRUE, col.names=FALSE,
+              quote=F, sep=";", dec=",")
```

Then we print the table with mean and sd of the continuous baseline-variables:

```
> round( tt <- ftable( QQ[,,4:5], col.vars=2:3), 2 )
            Plc           Met
           mean     sd   mean     sd

  aav       60.31   9.13  60.95   8.67
```

```
sex        141.00  68.45 140.00  67.96
smoking.    27.00  13.17  36.00  17.56
alcohol.     4.20  12.46   4.76   7.35
caucas     201.00  97.57 201.00  97.57
dmdurav     12.23   6.52  13.53   6.22
gad65.b1    10.21  44.59   9.64  38.36
gad.0      174.00  84.47 173.00  83.98
gad.pos     11.00   5.34  19.00   9.22
cvd         55.00  26.70  45.00  21.84
microalb    40.00  19.80  48.00  24.00
macroalb     8.00   3.94  12.00   6.00
avgnatua    50.29 184.57  84.73 364.96
e.gfr      125.71  44.73 130.02  43.94
s.ret       63.00  31.19  59.00  29.50
p.ret       10.00   4.95  15.00   7.50
laserbeh    16.00   7.88  21.00  10.34
auto.neu    36.00  17.65  33.00  16.10
peri.neu    78.00  38.05  76.00  37.07
metformi   176.00  85.85 167.00  81.07
ini.ins    142.00  68.93 143.00  69.42
su          55.00  26.83  61.00  29.61
oad         27.00  13.11  32.00  15.53
ras        149.00  72.33 159.00  77.18
oah        111.00  53.88 122.00  59.22
statin     181.00  87.86 170.00  82.52
asa        119.00  57.77 112.00  54.37
```

```
> row.names(tt) <- attr(tt,"row.vars")[[1]]
> cat( "; Plc ;      ; Met ;      \n",
+      "; Mean ; SD ; Mean ; SD \n",
+      ";    N ;   % ;    N ;   % \n",
+      file="./results/LLCh-Tab1m.csv" )
> for( i in 1:nrow(tt) )
+ write.table( if( bin[i]==1 ) cbind( tt[i,1],
+                                     formatC( tt[i,2], format="f", dig=1 ),
+                                     tt[i,3],
+                                     formatC( tt[i,4], format="f", dig=1 ) )
+              else formatC( tt[i,,drop=F], format="f", digits=dig[i] ),
+              file="./results/LLCh-Tab1m.csv", append=TRUE, row.names=TRUE, col.names=FALSE,
+              quote=F, sep=";", dec=",")
>
```

2.1.2 Table 2

We first retrieve the outcome data, and produce an overview of the number of records per visit and randomization group:

```
> load( file="./data/AD.Rda" )
> with( AD, addmargins( table( grp, visit ) ) )
     visit
grp     v1   v2   v3   v4   v5   v6   v7  Sum
  Plc  206  189  180  175  167  158  184 1259
  Met  206  194  191  187  183  177  190 1328
  Sum  412  383  371  362  350  335  374 2587
```

```
> ftable( with( AD,
+         addmargins( table( grp, visit, hb7=hba1c<=7, useNA="ifany" ),
+                     3 ) ), col.vars=2 )

          visit  v1  v2  v3  v4  v5  v6  v7
grp hb7
Plc FALSE       201 174 144 142 134 123 155
    TRUE          5  13  33  31  32  31  28
    NA            0   2   3   2   1   4   1
```

```
     Sum          206 189 180 175 167 158 184
 Met FALSE        202 160 139 135 131 121 137
     TRUE           4  33  51  51  51  54  53
     NA             0   1   1   1   1   2   0
     Sum          206 194 191 187 183 177 190
```

```
> ftable( with( AD,
+         addmargins( table( pp, grp, visit, hb7=hba1c<=7, useNA="ifany" ),
+                     4 ) ), col.vars=3 )
                  visit  v1  v2  v3  v4  v5  v6  v7
 pp    grp hb7
 FALSE Plc FALSE         20   4   0   0   0   0   3
           TRUE           2   0   0   0   0   0   1
           NA             0   1   0   0   0   0   0
           Sum           22   5   0   0   0   0   4
       Met FALSE         14   2   0   0   0   0   4
           TRUE           1   0   0   0   0   0   0
           NA             0   1   0   0   0   0   0
           Sum           15   3   0   0   0   0   4
 TRUE  Plc FALSE        181 170 144 142 134 123 152
           TRUE           3  13  33  31  32  31  27
           NA             0   1   3   2   1   4   1
           Sum          184 184 180 175 167 158 180
       Met FALSE        188 158 139 135 131 121 133
           TRUE           3  33  51  51  51  54  53
           NA             0   0   1   1   1   2   0
           Sum          191 191 191 187 183 177 186

>
```

Since we want to use the insulin dose at visit 6 to be used as the final insulin dose, and since insulin dose at visit 7 is always NA, we substitute insulin values from time 6 to time 7:

```
> wh <- match( c("idos","ipkg"), names(AD) )
> for( ii in unique(AD$subjid) )
+ if( all( dim(AD[AD$subjid==ii & AD$visit %in% c("v6","v7"),wh] )==c(2,2) ) )
+               AD[AD$subjid==ii & AD$visit  ==         "v7" ,wh] <-
+               AD[AD$subjid==ii & AD$visit  ==    "v6"      ,wh]
```

The we define the variables we want to show at visit 1 and visit 7:

```
> vars <- c( "fimtavg",
+            "fimtmax",
+               "csc2",
+                "iem",
+           "imtareal",
+               "n.pl",
+             "weight",
+                "bmi",
+                "whr",
+              "hba1c",
+               "gluc",
+                "ins",
+               "cpep",
+               "idos",
+               "ipkg",
+                "sys",
+                "dia",
+              "pulse",
+               "chol",
+                "ldl",
+                "hdl",
+               "vldl",
+               "trig" )
> dig <- c(3,3,4,0,1,0,1,1,2,1,1,0,0,0,2,0,0,0,1,1,1,2,1)
> data.frame( vars, dig )
```

```
       vars dig
1   fimtavg   3
2   fimtmax   3
3      csc2   4
4       iem   0
5  imtareal   1
6      n.pl   0
7    weight   1
8       bmi   1
9       whr   2
10    hba1c   1
11     gluc   1
12      ins   0
13     cpep   0
14     idos   0
15     ipkg   2
16      sys   0
17      dia   0
18    pulse   0
19     chol   1
20      ldl   1
21      hdl   1
22     vldl   2
23     trig   1
```

```
> QQ <- NArray( list( vars,
+                     levels(AD$grp),
+                     levels(AD$visit),
+                     c( paste( c(2,1,3)/4), "mean", "sd" ) ) )
> str( QQ )
```

```
 logi [1:23, 1:2, 1:7, 1:5] NA NA NA NA NA NA ...
 - attr(*, "dimnames")=List of 4
  ..$ : chr [1:23] "fimtavg" "fimtmax" "csc2" "iem" ...
  ..$ : chr [1:2] "Plc" "Met"
  ..$ : chr [1:7] "v1" "v2" "v3" "v4" ...
  ..$ : chr [1:5] "0.5" "0.25" "0.75" "mean" ...
```

```
> for( vv in dimnames(QQ)[[1]] )
+ for( gg in dimnames(QQ)[[2]] )
+ for( tt in dimnames(QQ)[[3]] )
+ QQ[vv,gg,tt,] <- c( quantile( AD[AD$grp==gg & AD$visit==tt,vv],
+                               probs=c(2,1,3)/4, na.rm=TRUE ),
+                     mean( AD[AD$grp==gg & AD$visit==tt,vv], na.rm=TRUE ),
+                       sd( AD[AD$grp==gg & AD$visit==tt,vv], na.rm=TRUE ) )
```

Then we can print the median and IQR for these variables to a `.csv`-file:

```
> round( ftable( QQ[,,,1:3], col.vars=3  ), 3 )
```

```
                      v1      v2      v3      v4      v5      v6      v7

fimtavg  Plc 0.5     0.785    NA      NA      NA      NA      NA    0.758
             0.25    0.700    NA      NA      NA      NA      NA    0.675
             0.75    0.884    NA      NA      NA      NA      NA    0.865
         Met 0.5     0.778    NA      NA      NA      NA      NA    0.780
             0.25    0.691    NA      NA      NA      NA      NA    0.685
             0.75    0.870    NA      NA      NA      NA      NA    0.875
fimtmax  Plc 0.5     0.950    NA      NA      NA      NA      NA    0.928
             0.25    0.855    NA      NA      NA      NA      NA    0.836
             0.75    1.045    NA      NA      NA      NA      NA    1.044
         Met 0.5     0.942    NA      NA      NA      NA      NA    0.940
             0.25    0.851    NA      NA      NA      NA      NA    0.835
             0.75    1.035    NA      NA      NA      NA      NA    1.040
csc2     Plc 0.5     2.473    NA      NA      NA      NA      NA    2.540
             0.25    1.865    NA      NA      NA      NA      NA    1.990
             0.75    3.196    NA      NA      NA      NA      NA    3.310
         Met 0.5     2.348    NA      NA      NA      NA      NA    2.393
```

		0.25	1.771	NA	NA	NA	NA	NA	1.789
		0.75	3.015	NA	NA	NA	NA	NA	3.115
iem	Plc	0.5	2086.383	NA	NA	NA	NA	NA	2005.258
		0.25	1629.700	NA	NA	NA	NA	NA	1512.266
		0.75	2798.068	NA	NA	NA	NA	NA	2482.720
	Met	0.5	2190.363	NA	NA	NA	NA	NA	2131.930
		0.25	1722.326	NA	NA	NA	NA	NA	1575.994
		0.75	2871.215	NA	NA	NA	NA	NA	2847.847
imtareal	Plc	0.5	18.737	NA	NA	NA	NA	NA	18.227
		0.25	15.928	NA	NA	NA	NA	NA	15.646
		0.75	21.702	NA	NA	NA	NA	NA	21.169
	Met	0.5	18.409	NA	NA	NA	NA	NA	18.180
		0.25	15.403	NA	NA	NA	NA	NA	15.351
		0.75	21.797	NA	NA	NA	NA	NA	22.071
n.pl	Plc	0.5	3.000	NA	NA	NA	NA	NA	3.000
		0.25	2.000	NA	NA	NA	NA	NA	2.000
		0.75	5.000	NA	NA	NA	NA	NA	5.000
	Met	0.5	3.000	NA	NA	NA	NA	NA	3.000
		0.25	1.000	NA	NA	NA	NA	NA	2.000
		0.75	4.000	NA	NA	NA	NA	NA	5.000
weight	Plc	0.5	95.700	97.100	98.100	99.650	98.800	100.300	99.500
		0.25	86.525	87.800	88.600	89.450	89.700	89.800	90.050
		0.75	106.225	107.350	107.900	109.925	109.500	108.900	110.000
	Met	0.5	96.550	96.200	97.100	97.600	96.550	97.250	97.100
		0.25	86.100	86.600	86.600	86.425	87.000	87.325	86.925
		0.75	105.800	106.800	107.250	108.525	107.950	109.125	108.600
bmi	Plc	0.5	31.771	32.010	32.187	32.499	32.583	32.783	32.824
		0.25	29.129	29.383	29.712	30.058	29.971	29.931	30.188
		0.75	34.705	34.973	35.963	36.255	36.502	36.499	36.475
	Met	0.5	31.964	32.454	32.039	32.297	32.077	32.519	32.408
		0.25	29.389	29.152	29.298	29.295	29.005	29.100	29.024
		0.75	35.062	35.361	35.605	35.188	35.276	35.921	35.803
whr	Plc	0.5	1.009	1.000	1.009	1.009	1.009	1.009	1.018
		0.25	0.962	0.962	0.958	0.958	0.951	0.949	0.962
		0.75	1.057	1.047	1.059	1.057	1.049	1.059	1.062
	Met	0.5	1.000	1.000	1.000	0.998	1.000	1.000	1.000
		0.25	0.949	0.942	0.941	0.949	0.957	0.951	0.959
		0.75	1.051	1.054	1.051	1.055	1.059	1.056	1.059
hba1c	Plc	0.5	8.300	8.500	8.200	8.100	8.000	7.800	7.900
		0.25	7.725	7.800	7.200	7.300	7.200	7.300	7.250
		0.75	9.100	9.500	9.000	8.900	8.900	8.775	8.700
	Met	0.5	8.300	7.900	7.600	7.600	7.500	7.600	7.500
		0.25	7.800	7.300	7.000	7.000	7.000	6.900	7.000
		0.75	9.400	8.600	8.200	8.300	8.275	8.200	8.400
gluc	Plc	0.5	9.400	8.350	8.400	8.100	8.100	7.700	8.100
		0.25	7.900	6.625	6.800	6.300	6.500	6.400	6.400
		0.75	11.600	11.175	10.500	10.000	10.150	9.825	9.800
	Met	0.5	9.800	8.300	7.700	7.500	7.600	7.500	7.650
		0.25	7.900	6.700	6.500	5.775	6.400	6.200	6.500
		0.75	12.600	10.000	9.275	9.400	9.300	9.300	10.125
ins	Plc	0.5	72.500	NA	NA	NA	NA	NA	47.000
		0.25	44.000	NA	NA	NA	NA	NA	23.000
		0.75	127.500	NA	NA	NA	NA	NA	91.250
	Met	0.5	65.000	NA	NA	NA	NA	NA	45.000
		0.25	37.250	NA	NA	NA	NA	NA	19.500
		0.75	107.000	NA	NA	NA	NA	NA	81.500
cpep	Plc	0.5	861.000	NA	NA	NA	NA	NA	522.000
		0.25	484.500	NA	NA	NA	NA	NA	317.250
		0.75	1257.500	NA	NA	NA	NA	NA	858.500
	Met	0.5	746.000	NA	NA	NA	NA	NA	564.000
		0.25	451.250	NA	NA	NA	NA	NA	339.500
		0.75	1186.500	NA	NA	NA	NA	NA	869.500
idos	Plc	0.5	40.000	90.000	100.000	110.000	113.000	112.000	112.000
		0.25	20.000	60.000	68.000	70.000	68.000	64.000	64.000
		0.75	66.000	125.000	152.000	167.250	174.500	165.750	166.000
	Met	0.5	40.000	70.000	80.000	80.000	82.000	82.000	82.000

```
               0.25     22.000   44.000   50.000   48.000   50.000   51.000   51.000
               0.75     66.000  100.000  110.000  118.000  120.000  130.000  128.500
ipkg      Plc 0.5        0.415    0.915    1.001    1.087    1.114    1.097    1.098
               0.25      0.214    0.641    0.752    0.726    0.697    0.688    0.700
               0.75      0.662    1.234    1.493    1.627    1.585    1.596    1.606
          Met 0.5        0.427    0.708    0.798    0.807    0.824    0.832    0.831
               0.25      0.227    0.486    0.525    0.545    0.551    0.562    0.559
               0.75      0.656    1.027    1.124    1.146    1.174    1.261    1.251
sys       Plc 0.5      137.000  135.750  132.500  132.500  132.500  133.000  131.250
               0.25    128.000  125.625  123.250  122.875  125.000  123.000  122.375
               0.75    147.875  148.375  143.750  143.625  142.500  140.500  142.000
          Met 0.5      138.500  134.000  135.000  133.500  132.500  131.500  134.000
               0.25    129.500  122.500  125.250  124.000  124.000  124.375  124.250
               0.75    151.000  144.500  145.750  142.750  143.500  142.000  144.000
dia       Plc 0.5       82.000   82.000   80.000   80.500   81.000   80.000   78.500
               0.25     75.625   75.625   74.000   75.000   74.000   75.000   73.875
               0.75     86.875   87.500   86.250   86.625   85.375   85.750   85.625
          Met 0.5       82.500   79.500   80.500   81.000   79.000   79.000   78.500
               0.25     76.000   74.000   74.000   74.000   73.500   72.875   72.500
               0.75     88.500   85.000   86.000   86.500   85.000   86.000   85.000
pulse     Plc 0.5       77.000   75.000   73.000   74.000   72.000   72.000   73.000
               0.25     69.000   67.000   67.000   66.000   65.000   65.250   67.000
               0.75     83.000   82.000   81.000   81.000   80.000   79.000   80.000
          Met 0.5       75.000   75.000   75.000   75.000   75.000   73.000   74.000
               0.25     68.000   68.000   67.000   67.000   67.000   67.000   67.000
               0.75     83.000   83.000   82.000   81.000   82.000   81.000   84.000
chol      Plc 0.5        4.000       NA    4.200       NA    4.200       NA    4.100
               0.25      3.500       NA    3.700       NA    3.700       NA    3.650
               0.75      4.675       NA    4.700       NA    4.800       NA    4.800
          Met 0.5        4.100       NA    4.200       NA    4.100       NA    4.100
               0.25      3.500       NA    3.600       NA    3.600       NA    3.600
               0.75      4.700       NA    4.800       NA    4.800       NA    4.700
ldl       Plc 0.5        2.100       NA    2.200       NA    2.300       NA    2.300
               0.25      1.700       NA    1.800       NA    1.800       NA    1.800
               0.75      2.600       NA    2.700       NA    2.800       NA    2.750
          Met 0.5        2.050       NA    2.200       NA    2.100       NA    2.100
               0.25      1.500       NA    1.800       NA    1.600       NA    1.700
               0.75      2.600       NA    2.700       NA    2.575       NA    2.600
hdl       Plc 0.5        1.080       NA    1.100       NA    1.100       NA    1.100
               0.25      0.912       NA    0.950       NA    0.900       NA    0.915
               0.75      1.397       NA    1.433       NA    1.400       NA    1.385
          Met 0.5        1.085       NA    1.110       NA    1.115       NA    1.100
               0.25      0.930       NA    0.947       NA    0.942       NA    0.920
               0.75      1.350       NA    1.400       NA    1.400       NA    1.340
vldl      Plc 0.5        0.700       NA    0.600       NA    0.700       NA    0.600
               0.25      0.500       NA    0.500       NA    0.500       NA    0.500
               0.75      0.900       NA    0.900       NA    0.900       NA    0.900
          Met 0.5        0.800       NA    0.700       NA    0.800       NA    0.700
               0.25      0.500       NA    0.500       NA    0.500       NA    0.500
               0.75      1.000       NA    1.000       NA    1.000       NA    1.000
trig      Plc 0.5        1.485       NA    1.400       NA    1.480       NA    1.430
               0.25      1.100       NA    1.030       NA    1.042       NA    1.035
               0.75      2.072       NA    2.150       NA    2.002       NA    2.080
          Met 0.5        1.710       NA    1.550       NA    1.640       NA    1.630
               0.25      1.162       NA    1.200       NA    1.170       NA    1.190
               0.75      2.300       NA    2.198       NA    2.170       NA    2.345
> round( tt <- ftable( QQ[,,c(1,7),1:3], col.vars=2:4), 3 )
               Plc                                                    Met
                v1                          v7                         v1                            v
               0.5     0.25     0.75      0.5     0.25     0.75      0.5     0.25     0.75      0.

fimtavg      0.785    0.700    0.884    0.758    0.675    0.865    0.778    0.691    0.870    0.78
fimtmax      0.950    0.855    1.045    0.928    0.836    1.044    0.942    0.851    1.035    0.94
csc2         2.473    1.865    3.196    2.540    1.990    3.310    2.348    1.771    3.015    2.39
iem       2086.383 1629.700 2798.068 2005.258 1512.266 2482.720 2190.363 1722.326 2871.215 2131.93
imtareal    18.737   15.928   21.702   18.227   15.646   21.169   18.409   15.403   21.797   18.18
```

```
  n.pl        3.000    2.000    5.000    3.000    2.000    5.000    3.000    1.000    4.000    3.00
  weight     95.700   86.525  106.225   99.500   90.050  110.000   96.550   86.100  105.800   97.10
  bmi        31.771   29.129   34.705   32.824   30.188   36.475   31.964   29.389   35.062   32.40
  whr         1.009    0.962    1.057    1.018    0.962    1.062    1.000    0.949    1.051    1.00
  hba1c       8.300    7.725    9.100    7.900    7.250    8.700    8.300    7.800    9.400    7.50
  gluc        9.400    7.900   11.600    8.100    6.400    9.800    9.800    7.900   12.600    7.65
  ins        72.500   44.000  127.500   47.000   23.000   91.250   65.000   37.250  107.000   45.00
  cpep      861.000  484.500 1257.500  522.000  317.250  858.500  746.000  451.250 1186.500  564.00
  idos       40.000   20.000   66.000  112.000   64.000  166.000   40.000   22.000   66.000   82.00
  ipkg        0.415    0.214    0.662    1.098    0.700    1.606    0.427    0.227    0.656    0.83
  sys       137.000  128.000  147.875  131.250  122.375  142.000  138.500  129.500  151.000  134.00
  dia        82.000   75.625   86.875   78.500   73.875   85.625   82.500   76.000   88.500   78.50
  pulse      77.000   69.000   83.000   73.000   67.000   80.000   75.000   68.000   83.000   74.00
  chol        4.000    3.500    4.675    4.100    3.650    4.800    4.100    3.500    4.700    4.10
  ldl         2.100    1.700    2.600    2.300    1.800    2.750    2.050    1.500    2.600    2.10
  hdl         1.080    0.912    1.397    1.100    0.915    1.385    1.085    0.930    1.350    1.10
  vldl        0.700    0.500    0.900    0.600    0.500    0.900    0.800    0.500    1.000    0.70
  trig        1.485    1.100    2.072    1.430    1.035    2.080    1.710    1.162    2.300    1.63
```

```
> row.names(tt) <- attr(tt,"row.vars")[[1]]
> cat( "; Plc ; ; ; ; Met ; ; ; \n",
+      "; V1 ; ; V7 ; ; V1 ; ; V7 ; \n",
+      "; Med ; IQR ; Med ; IQR ; Med ; IQR ; Med ; IQR \n",
+      file="./results/LLCh-Tab2.csv" )
> for( i in 1:nrow(tt) )
+ write.table(      cbind( formatC( tt[i,1,drop=F], format="f", digits=dig[i] ),
+            paste( "(", formatC( tt[i,2,drop=F], format="f", digits=dig[i] ), ",",
+                        formatC( tt[i,3,drop=F], format="f", digits=dig[i] ), ")" ),
+                        formatC( tt[i,4,drop=F], format="f", digits=dig[i] ),
+            paste( "(", formatC( tt[i,5,drop=F], format="f", digits=dig[i] ), ",",
+                        formatC( tt[i,6,drop=F], format="f", digits=dig[i] ), ")" ),
+                        formatC( tt[i,7,drop=F], format="f", digits=dig[i] ),
+            paste( "(", formatC( tt[i,8,drop=F], format="f", digits=dig[i] ), ",",
+                        formatC( tt[i,9,drop=F], format="f", digits=dig[i] ), ")" ),
+                        formatC( tt[i,10,drop=F], format="f", digits=dig[i] ),
+            paste( "(", formatC( tt[i,11,drop=F], format="f", digits=dig[i] ), ",",
+                        formatC( tt[i,12,drop=F], format="f", digits=dig[i] ), ")" )),
+            file="./results/LLCh-Tab2.csv", append=TRUE, row.names=TRUE, col.names=FALSE,
+            quote=F, sep=";", dec=",")
```

Print the mean and the sd instead

```
> round( ftable( QQ[,,,4:5], col.vars=3  ), 3 )
                             v1       v2       v3       v4       v5       v6       v7

  fimtavg  Plc mean       0.799      NaN      NaN      NaN      NaN      NaN    0.785
               sd         0.139       NA       NA       NA       NA       NA    0.138
           Met mean       0.788      NaN      NaN      NaN      NaN      NaN    0.785
               sd         0.135       NA       NA       NA       NA       NA    0.136
  fimtmax  Plc mean       0.959      NaN      NaN      NaN      NaN      NaN    0.944
               sd         0.156       NA       NA       NA       NA       NA    0.155
           Met mean       0.953      NaN      NaN      NaN      NaN      NaN    0.948
               sd         0.151       NA       NA       NA       NA       NA    0.159
  csc2     Plc mean       2.606      NaN      NaN      NaN      NaN      NaN    2.698
               sd         1.000       NA       NA       NA       NA       NA    0.907
           Met mean       2.539      NaN      NaN      NaN      NaN      NaN    2.545
               sd         1.075       NA       NA       NA       NA       NA    1.031
  iem      Plc mean    2307.172      NaN      NaN      NaN      NaN      NaN 2120.009
               sd      1079.673       NA       NA       NA       NA       NA  796.594
           Met mean    2386.637      NaN      NaN      NaN      NaN      NaN 2345.254
               sd       978.223       NA       NA       NA       NA       NA 1055.920
  imtareal Plc mean      19.377      NaN      NaN      NaN      NaN      NaN   18.939
               sd         4.794       NA       NA       NA       NA       NA    4.310
           Met mean      18.875      NaN      NaN      NaN      NaN      NaN   18.898
               sd         4.660       NA       NA       NA       NA       NA    4.609
  n.pl     Plc mean       3.935      NaN      NaN      NaN      NaN      NaN    4.289
```

		sd	3.403	NA	NA	NA	NA	NA	3.838
	Met	mean	3.353	NaN	NaN	NaN	NaN	NaN	3.987
		sd	2.981	NA	NA	NA	NA	NA	3.772
weight	Plc	mean	97.149	98.460	99.821	100.798	100.688	100.755	101.405
		sd	14.749	15.140	15.888	16.187	15.987	15.920	16.315
	Met	mean	97.183	97.262	97.868	98.017	98.007	98.070	98.387
		sd	15.242	15.352	15.992	16.271	16.525	16.644	16.865
bmi	Plc	mean	32.061	32.389	32.762	33.069	33.092	33.108	33.341
		sd	4.189	4.264	4.462	4.610	4.630	4.755	4.743
	Met	mean	32.258	32.437	32.596	32.568	32.573	32.651	32.679
		sd	4.230	4.340	4.547	4.457	4.576	4.553	4.649
whr	Plc	mean	1.011	1.001	1.007	1.004	1.000	1.003	1.013
		sd	0.082	0.074	0.079	0.077	0.079	0.081	0.078
	Met	mean	0.996	0.998	0.998	0.997	1.004	1.001	1.007
		sd	0.080	0.083	0.082	0.079	0.079	0.078	0.081
hba1c	Plc	mean	8.492	8.719	8.214	8.168	8.138	7.999	8.086
		sd	0.999	1.293	1.160	1.172	1.177	1.075	1.180
	Met	mean	8.608	8.031	7.728	7.717	7.727	7.671	7.829
		sd	1.101	1.069	1.080	0.994	1.035	0.974	1.185
gluc	Plc	mean	10.081	8.918	8.858	8.490	8.683	8.246	8.368
		sd	3.249	3.228	2.864	3.065	3.425	3.042	2.936
	Met	mean	10.513	8.524	8.033	7.922	7.978	8.077	8.369
		sd	3.254	2.669	2.613	3.013	2.591	3.105	2.964
ins	Plc	mean	103.225	NaN	NaN	NaN	NaN	NaN	69.086
		sd	103.211	NA	NA	NA	NA	NA	73.710
	Met	mean	83.466	NaN	NaN	NaN	NaN	NaN	80.799
		sd	70.282	NA	NA	NA	NA	NA	284.162
cpep	Plc	mean	916.718	NaN	NaN	NaN	NaN	NaN	642.846
		sd	565.616	NA	NA	NA	NA	NA	436.037
	Met	mean	849.806	NaN	NaN	NaN	NaN	NaN	639.620
		sd	555.119	NA	NA	NA	NA	NA	450.410
idos	Plc	mean	47.356	103.674	120.576	128.080	128.976	129.228	129.936
		sd	30.321	62.456	77.196	80.758	81.053	86.252	86.066
	Met	mean	48.712	81.503	91.453	95.011	96.071	98.989	98.552
		sd	36.452	51.627	59.507	63.031	63.205	68.190	68.273
ipkg	Plc	mean	0.481	1.035	1.190	1.251	1.249	1.247	1.254
		sd	0.291	0.589	0.702	0.726	0.742	0.775	0.774
	Met	mean	0.497	0.827	0.918	0.948	0.963	0.990	0.987
		sd	0.346	0.482	0.541	0.578	0.581	0.612	0.613
sys	Plc	mean	138.173	136.901	133.913	134.073	133.590	132.706	132.348
		sd	15.465	15.773	15.142	16.131	13.883	13.385	14.922
	Met	mean	140.517	134.824	136.537	135.091	134.099	134.142	134.851
		sd	15.138	16.147	15.637	15.430	15.146	14.882	16.385
dia	Plc	mean	81.953	81.790	80.313	80.532	80.012	80.090	79.327
		sd	9.192	9.070	8.759	8.258	8.659	8.684	8.929
	Met	mean	82.234	79.756	80.490	80.199	78.995	79.179	78.517
		sd	9.386	9.312	9.914	9.848	9.212	10.155	9.270
pulse	Plc	mean	76.734	74.692	73.942	74.300	72.594	72.591	73.554
		sd	11.760	12.250	11.578	12.307	10.979	10.938	12.384
	Met	mean	75.927	75.437	74.805	75.263	74.811	74.377	75.485
		sd	11.996	11.809	11.457	12.974	11.950	12.374	12.817
chol	Plc	mean	4.121	NaN	4.264	NaN	4.275	NaN	4.279
		sd	0.905	NA	0.950	NA	0.886	NA	0.941
	Met	mean	4.208	NaN	4.291	NaN	4.202	NaN	4.271
		sd	0.979	NA	0.943	NA	0.875	NA	0.928
ldl	Plc	mean	2.167	NaN	2.328	NaN	2.333	NaN	2.358
		sd	0.799	NA	0.855	NA	0.800	NA	0.840
	Met	mean	2.168	NaN	2.276	NaN	2.137	NaN	2.207
		sd	0.824	NA	0.825	NA	0.707	NA	0.728
hdl	Plc	mean	1.166	NaN	1.212	NaN	1.190	NaN	1.162
		sd	0.350	NA	0.361	NA	0.379	NA	0.326
	Met	mean	1.164	NaN	1.200	NaN	1.220	NaN	1.166
		sd	0.334	NA	0.346	NA	0.400	NA	0.330
vldl	Plc	mean	0.762	NaN	0.735	NaN	0.718	NaN	0.738
		sd	0.373	NA	0.343	NA	0.350	NA	0.366
	Met	mean	0.821	NaN	0.776	NaN	0.858	NaN	0.817

```
               sd       0.404       NA     0.343       NA     0.637       NA     0.399
 trig      Plc mean     1.771      NaN     1.639      NaN     1.736      NaN     1.677
               sd       1.112       NA     0.769       NA     1.169       NA     0.973
           Met mean     1.991      NaN     1.864      NaN     1.956      NaN     1.989
               sd       1.266       NA     1.274       NA     1.558       NA     1.312
> round( ( tt <- ftable( QQ[,,c(1,7),4:5], col.vars=2:4) ), 3 )
                 Plc                                Met
                  v1                 v7              v1                 v7
                mean       sd      mean       sd   mean       sd      mean       sd

 fimtavg       0.799    0.139     0.785    0.138   0.788    0.135     0.785    0.136
 fimtmax       0.959    0.156     0.944    0.155   0.953    0.151     0.948    0.159
 csc2          2.606    1.000     2.698    0.907   2.539    1.075     2.545    1.031
 iem        2307.172 1079.673  2120.009  796.594 2386.637  978.223  2345.254 1055.920
 imtareal     19.377    4.794    18.939    4.310  18.875    4.660    18.898    4.609
 n.pl          3.935    3.403     4.289    3.838   3.353    2.981     3.987    3.772
 weight       97.149   14.749   101.405   16.315  97.183   15.242    98.387   16.865
 bmi          32.061    4.189    33.341    4.743  32.258    4.230    32.679    4.649
 whr           1.011    0.082     1.013    0.078   0.996    0.080     1.007    0.081
 hba1c         8.492    0.999     8.086    1.180   8.608    1.101     7.829    1.185
 gluc         10.081    3.249     8.368    2.936  10.513    3.254     8.369    2.964
 ins         103.225  103.211    69.086   73.710  83.466   70.282    80.799  284.162
 cpep        916.718  565.616   642.846  436.037 849.806  555.119   639.620  450.410
 idos         47.356   30.321   129.936   86.066  48.712   36.452    98.552   68.273
 ipkg          0.481    0.291     1.254    0.774   0.497    0.346     0.987    0.613
 sys         138.173   15.465   132.348   14.922 140.517   15.138   134.851   16.385
 dia          81.953    9.192    79.327    8.929  82.234    9.386    78.517    9.270
 pulse        76.734   11.760    73.554   12.384  75.927   11.996    75.485   12.817
 chol          4.121    0.905     4.279    0.941   4.208    0.979     4.271    0.928
 ldl           2.167    0.799     2.358    0.840   2.168    0.824     2.207    0.728
 hdl           1.166    0.350     1.162    0.326   1.164    0.334     1.166    0.330
 vldl          0.762    0.373     0.738    0.366   0.821    0.404     0.817    0.399
 trig          1.771    1.112     1.677    0.973   1.991    1.266     1.989    1.312
> row.names(tt) <- attr(tt,"row.vars")[[1]]
> cat( "; Plc ; ; ; ; Met ; ; ; \n",
+      "; V1 ; ; V7 ; ; V1 ; ; V7 ; \n",
+      "; Mean ; SD ; Mean ; SD ; Mean ; SD ; Mean ; SD \n",
+      file="./results/LLCh-Tab2m.csv" )
> for( i in 1:nrow(tt) )
+ write.table( formatC( tt[i,,drop=F], format="f", digits=dig[i] ),
+              file="./results/LLCh-Tab2m.csv", append=TRUE, row.names=TRUE, col.names=FALSE,
+              quote=F, sep=";", dec=",")
```

2.2 Descriptive tables by insulin regimen

2.2.1 Table 1

This is a table of patient characteristics at entry into the study on variables that are not measured (or of any particular interst) at follow-up. We now set up a table to hold the values in the baseline table, first defining what variables to use:

```
> base <- transform( base, s.ret = (retin=="Simplex"),
+                          p.ret = (retin=="Prolif"),
+                        ini.ins = pre.ins=="preIns" )
> bvars <- c( "aav",
+                "sex",
+           "smoking.",
+           "alcohol.",
+             "caucas",
+            "dmdurav",
```

```
+        "gad65.b1", "gad.0", "gad.pos",
+             "cvd",
+        "microalb", "macroalb","avgnatua","e.gfr",
+           "s.ret","p.ret","laserbeh","auto.neu","peri.neu",
+        "metformi","ini.ins","su","oad","ras","oah","statin","asa" )
> bin <- rep( 1, length(bvars) )
> wh.cont <- c(1,4,6,7,13,14)
> bin[wh.cont] <- 0
> dec <- c(1,0,1,1,1,0)
> dig <- bin*0
> dig[bin==0] <- dec
> data.frame( bin, dig, bvars )
   bin dig    bvars
1    0   1      aav
2    1   0      sex
3    1   0 smoking.
4    0   0 alcohol.
5    1   0   caucas
6    0   1  dmdurav
7    0   1 gad65.b1
8    1   0    gad.0
9    1   0  gad.pos
10   1   0      cvd
11   1   0 microalb
12   1   0 macroalb
13   0   1 avgnatua
14   0   0    e.gfr
15   1   0    s.ret
16   1   0    p.ret
17   1   0 laserbeh
18   1   0 auto.neu
19   1   0 peri.neu
20   1   0 metformi
21   1   0  ini.ins
22   1   0       su
23   1   0      oad
24   1   0      ras
25   1   0      oah
26   1   0   statin
27   1   0      asa
```

Once we have defined the variables, which of them that are categorical and the number of digits after the decimal point to use for printing we can set up the array to hold the relevant numbers:

```
> QQ <- NArray( list( bvars,
+                     levels(base$igr),
+                     c( paste( c(2,1,3)/4), "mean", "sd" ) ) )
> str( QQ )
 logi [1:27, 1:3, 1:5] NA NA NA NA NA NA ...
 - attr(*, "dimnames")=List of 3
  ..$ : chr [1:27] "aav" "sex" "smoking." "alcohol." ...
  ..$ : chr [1:3] "AspD" "Detm" "Biph"
  ..$ : chr [1:5] "0.5" "0.25" "0.75" "mean" ...

> for( vv in 1:dim(QQ)[1] )
+ for( gg in dimnames(QQ)[[2]] )
+ {
+ if( bin[vv] == 0 )
+ QQ[vv,gg,] <- c( quantile( base[base$igr==gg,bvars[vv]],
+                            probs=c(2,1,3)/4, na.rm=TRUE ),
+                     mean( base[base$igr==gg,bvars[vv]], na.rm=TRUE ),
+                       sd( base[base$igr==gg,bvars[vv]], na.rm=TRUE ) )
+ else
+ QQ[vv,gg,1:2] <-
```

```
+ QQ[vv,gg,4:5] <- c( sum( base[base$igr==gg,bvars[vv]], na.rm=TRUE ),
+                    mean( base[base$igr==gg,bvars[vv]], na.rm=TRUE )*100 )
+ }
```

Then we print out the median and IQR from this array for the continuous variables and the number and percentage of the categorical ones:

```
> round( tt <- ftable( QQ[,,1:3], col.vars=2:3), 3 )
               AspD                    Detm                    Biph
                0.5    0.25    0.75     0.5    0.25    0.75     0.5    0.25    0.75

  aav        62.263  54.294  66.446  62.650  56.413  66.081  62.779  55.195  66.856
  sex        96.000  69.565      NA  95.000  69.343      NA  90.000  65.693      NA
  smoking.   19.000  13.768      NA  17.000  12.593      NA  27.000  19.708      NA
  alcohol.    2.000   0.000   5.000   2.000   0.000   6.000   2.000   0.000   5.000
  caucas    133.000  96.377      NA 136.000  99.270      NA 133.000  97.080      NA
  dmdurav    12.056   8.038  16.958  11.933   8.197  17.220  11.335   8.238  16.780
  gad65.b1    0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000
  gad.0     116.000  84.058      NA 116.000  84.672      NA 115.000  83.942      NA
  gad.pos     9.000   6.522      NA  11.000   8.029      NA  10.000   7.299      NA
  cvd        29.000  21.014      NA  36.000  26.277      NA  35.000  25.547      NA
  microalb   23.000  17.037      NA  30.000  22.222      NA  35.000  26.515      NA
  macroalb    8.000   5.926      NA   7.000   5.185      NA   5.000   3.759      NA
  avgnatua    9.911   5.433  17.815  13.052   7.018  31.440  12.017   5.880  25.270
  e.gfr     121.500  98.250 156.250 117.000  91.000 144.000 119.000  99.000 151.000
  s.ret      42.000  31.343      NA  42.000  31.343      NA  38.000  28.358      NA
  p.ret       6.000   4.478      NA   9.000   6.716      NA  10.000   7.463      NA
  laserbeh    7.000   5.072      NA  14.000  10.526      NA  16.000  11.852      NA
  auto.neu   22.000  16.058      NA  24.000  17.647      NA  23.000  16.912      NA
  peri.neu   46.000  33.577      NA  60.000  44.118      NA  48.000  35.036      NA
  metformi  114.000  82.609      NA 118.000  86.765      NA 111.000  81.022      NA
  ini.ins    96.000  69.565      NA  95.000  69.343      NA  94.000  68.613      NA
  su         40.000  28.986      NA  37.000  27.206      NA  39.000  28.467      NA
  oad        17.000  12.319      NA  25.000  18.248      NA  17.000  12.409      NA
  ras       102.000  73.913      NA 100.000  72.993      NA 106.000  77.372      NA
  oah        73.000  52.899      NA  81.000  59.124      NA  79.000  57.664      NA
  statin    116.000  84.058      NA 119.000  86.861      NA 116.000  84.672      NA
  asa        79.000  57.246      NA  72.000  52.555      NA  80.000  58.394      NA
> row.names(tt) <- attr(tt,"row.vars")[[1]]
> cat( "; Asp+Det ;      ; Detemir ;      ; Biphasic ;      \n",
+      "; Med ; IQR ; Med ; IQR ; Med ; IQR \n",
+      ";   N ;   % ;   N ;   % ;   N ;   % \n",
+      file="./results/LLCh-Tab1i.csv" )
> for( i in 1:nrow(tt) )
+ write.table( if( bin[i]==1 ) cbind( tt[i,1],
+                                     formatC( tt[i,2], format="f", dig=1 ),
+                                     tt[i,4],
+                                     formatC( tt[i,5], format="f", dig=1 ) )
+              else cbind( formatC( tt[i,1,drop=F], format="f", digits=dig[i] ),
+              paste( "(", formatC( tt[i,2,drop=F], format="f", digits=dig[i] ), ",",
+                          formatC( tt[i,3,drop=F], format="f", digits=dig[i] ), ")" ),
+                          formatC( tt[i,4,drop=F], format="f", digits=dig[i] ),
+              paste( "(", formatC( tt[i,5,drop=F], format="f", digits=dig[i] ), ",",
+                          formatC( tt[i,6,drop=F], format="f", digits=dig[i] ), ")" ) ),
+              file="./results/LLCh-Tab1i.csv", append=TRUE, row.names=TRUE, col.names=FALSE,
+              quote=F, sep=";", dec=",")
```

Then we print the table with mean and sd of the continuous baseline-variables:

```
> round( tt <- ftable( QQ[,,4:5], col.vars=2:3), 2 )
              AspD          Detm          Biph
              mean     sd   mean     sd   mean     sd

  aav        60.23   9.32  60.52   8.85  61.14   8.55
```

```
sex         96.00  69.57  95.00  69.34  90.00  65.69
smoking.    19.00  13.77  17.00  12.59  27.00  19.71
alcohol.     3.74  14.11   4.98   8.04   4.75   6.99
caucas     133.00  96.38 136.00  99.27 133.00  97.08
dmdurav     12.90   6.51  12.85   6.23  12.90   6.49
gad65.b1     9.00  40.01   9.89  39.50  10.89  45.17
gad.0      116.00  84.06 116.00  84.67 115.00  83.94
gad.pos      9.00   6.52  11.00   8.03  10.00   7.30
cvd         29.00  21.01  36.00  26.28  35.00  25.55
microalb    23.00  17.04  30.00  22.22  35.00  26.52
macroalb     8.00   5.93   7.00   5.19   5.00   3.76
avgnatua    47.65 188.45  85.08 426.94  69.02 176.85
e.gfr      130.76  45.02 123.86  43.07 128.94  44.93
s.ret       42.00  31.34  42.00  31.34  38.00  28.36
p.ret        6.00   4.48   9.00   6.72  10.00   7.46
laserbeh     7.00   5.07  14.00  10.53  16.00  11.85
auto.neu    22.00  16.06  24.00  17.65  23.00  16.91
peri.neu    46.00  33.58  60.00  44.12  48.00  35.04
metformi   114.00  82.61 118.00  86.76 111.00  81.02
ini.ins     96.00  69.57  95.00  69.34  94.00  68.61
su          40.00  28.99  37.00  27.21  39.00  28.47
oad         17.00  12.32  25.00  18.25  17.00  12.41
ras        102.00  73.91 100.00  72.99 106.00  77.37
oah         73.00  52.90  81.00  59.12  79.00  57.66
statin     116.00  84.06 119.00  86.86 116.00  84.67
asa         79.00  57.25  72.00  52.55  80.00  58.39
```

```
> row.names(tt) <- attr(tt,"row.vars")[[1]]
> cat( "; Asp+Det ;      ; Detemir ;      ; Biphasic ;      \n",
+      "; Mean ; SD ; Mean ; SD ; Mean ; SD \n",
+      ";    N ;    % ;    N ;    % ;    N ;    % \n",
+      file="./results/LLCh-Tab1mi.csv" )
> for( i in 1:nrow(tt) )
+ write.table( if( bin[i]==1 ) cbind( tt[i,1],
+                                    formatC( tt[i,2], format="f", dig=1 ),
+                                    tt[i,3],
+                                    formatC( tt[i,4], format="f", dig=1 ) )
+              else formatC( tt[i,,drop=F], format="f", digits=dig[i] ),
+              file="./results/LLCh-Tab1mi.csv", append=TRUE, row.names=TRUE, col.names=FALSE,
+              quote=F, sep=";", dec=",")
>
```

2.2.2 Table 2

We first retrieve the outcome data, and produce an overview of the number of records per visit and randomization group:

```
> load( file="./data/AD.Rda" )
> with( AD, addmargins( table( igr, visit ) ) )
      visit
igr     v1  v2  v3  v4  v5  v6  v7  Sum
  AspD 138 130 126 120 116 109 127  866
  Detm 137 122 117 114 107 103 120  820
  Biph 137 131 128 128 127 123 127  901
  Sum  412 383 371 362 350 335 374 2587
```

```
> ftable( with( AD,
+         addmargins( table( igr, visit, hb7=hba1c<=7, useNA="ifany" ),
+                     3 ) ), col.vars=2 )

           visit  v1  v2  v3  v4  v5  v6  v7
igr  hb7
AspD FALSE       136 104  93  85  77  74  96
     TRUE          2  24  32  34  38  33  31
```

```
      NA            0   2   1   1   1   2   0
      Sum         138 130 126 120 116 109 127
 Detm FALSE       134 115 102 100  93  83 108
      TRUE          3   6  15  14  13  16  12
      NA            0   1   0   0   1   4   0
      Sum         137 122 117 114 107 103 120
 Biph FALSE       133 115  88  92  95  87  88
      TRUE          4  16  37  34  32  36  38
      NA            0   0   3   2   0   0   1
      Sum         137 131 128 128 127 123 127
```

```
> ftable( with( AD,
+         addmargins( table( pp, igr, visit, hb7=hba1c<=7, useNA="ifany" ),
+                     4 ) ), col.vars=3 )
                  visit  v1  v2  v3  v4  v5  v6  v7
 pp    igr  hb7
 FALSE AspD FALSE        10   1   0   0   0   0   3
            TRUE          0   0   0   0   0   0   0
            NA            0   1   0   0   0   0   0
            Sum          10   2   0   0   0   0   3
       Detm FALSE        17   3   0   0   0   0   4
            TRUE          2   0   0   0   0   0   0
            NA            0   1   0   0   0   0   0
            Sum          19   4   0   0   0   0   4
       Biph FALSE         7   2   0   0   0   0   0
            TRUE          1   0   0   0   0   0   1
            NA            0   0   0   0   0   0   0
            Sum           8   2   0   0   0   0   1
 TRUE  AspD FALSE       126 103  93  85  77  74  93
            TRUE          2  24  32  34  38  33  31
            NA            0   1   1   1   1   2   0
            Sum         128 128 126 120 116 109 124
       Detm FALSE       117 112 102 100  93  83 104
            TRUE          1   6  15  14  13  16  12
            NA            0   0   0   0   1   4   0
            Sum         118 118 117 114 107 103 116
       Biph FALSE       126 113  88  92  95  87  88
            TRUE          3  16  37  34  32  36  37
            NA            0   0   3   2   0   0   1
            Sum         129 129 128 128 127 123 126
```

Since we want to use the insulin dose at visit 6 to be used as the final insulin dose, and since insulin dose at visit 7 is always `NA`, we substitute insulin values from time 6 to time 7:

```
> wh <- match( c("idos","ipkg"), names(AD) )
> for( ii in unique(AD$subjid) )
+ if( all( dim(AD[AD$subjid==ii & AD$visit %in% c("v6","v7"),wh] )==c(2,2) ) )
+              AD[AD$subjid==ii & AD$visit  ==         "v7" ,wh] <-
+              AD[AD$subjid==ii & AD$visit  ==    "v6"      ,wh]
```

The we define the variables we want to show at visit 1 and visit 7:

```
> vars <- c( "fimtavg",
+            "fimtmax",
+               "csc2",
+                "iem",
+          "imtareal",
+               "n.pl",
+             "weight",
+                "bmi",
+                "whr",
+              "hba1c",
+               "gluc",
+                "ins",
+               "cpep",
```

```
+              "idos",
+              "ipkg",
+               "sys",
+               "dia",
+             "pulse",
+              "chol",
+               "ldl",
+               "hdl",
+              "vldl",
+              "trig" )
> dig <- c(3,3,4,0,1,0,1,1,2,1,1,0,0,0,2,0,0,0,1,1,1,2,1)
> data.frame( vars, dig )
       vars dig
1   fimtavg   3
2   fimtmax   3
3      csc2   4
4       iem   0
5  imtareal   1
6      n.pl   0
7    weight   1
8       bmi   1
9       whr   2
10    hba1c   1
11     gluc   1
12      ins   0
13     cpep   0
14     idos   0
15     ipkg   2
16      sys   0
17      dia   0
18    pulse   0
19     chol   1
20      ldl   1
21      hdl   1
22     vldl   2
23     trig   1
> QQ <- NArray( list( vars,
+                     levels(AD$igr),
+                     levels(AD$visit),
+                     c( paste( c(2,1,3)/4), "mean", "sd" ) ) )
> str( QQ )
 logi [1:23, 1:3, 1:7, 1:5] NA NA NA NA NA NA ...
 - attr(*, "dimnames")=List of 4
  ..$ : chr [1:23] "fimtavg" "fimtmax" "csc2" "iem" ...
  ..$ : chr [1:3] "AspD" "Detm" "Biph"
  ..$ : chr [1:7] "v1" "v2" "v3" "v4" ...
  ..$ : chr [1:5] "0.5" "0.25" "0.75" "mean" ...
> for( vv in dimnames(QQ)[[1]] )
+ for( gg in dimnames(QQ)[[2]] )
+ for( tt in dimnames(QQ)[[3]] )
+ QQ[vv,gg,tt,] <- c( quantile( AD[AD$igr==gg & AD$visit==tt,vv],
+                               probs=c(2,1,3)/4, na.rm=TRUE ),
+                     mean( AD[AD$igr==gg & AD$visit==tt,vv], na.rm=TRUE ),
+                       sd( AD[AD$igr==gg & AD$visit==tt,vv], na.rm=TRUE ) )
```

Then we can print the median and IQR for these variables to a `.csv`-file:

```
> round( ftable( QQ[,,,1:3], col.vars=3  ), 3 )
                           v1       v2       v3       v4       v5       v6       v7

 fimtavg  AspD 0.5      0.778       NA       NA       NA       NA       NA    0.780
               0.25     0.690       NA       NA       NA       NA       NA    0.685
               0.75     0.874       NA       NA       NA       NA       NA    0.880
          Detm 0.5      0.790       NA       NA       NA       NA       NA    0.768
```

		0.25	0.700	NA	NA	NA	NA	NA	0.684
		0.75	0.870	NA	NA	NA	NA	NA	0.866
	Biph	0.5	0.780	NA	NA	NA	NA	NA	0.765
		0.25	0.700	NA	NA	NA	NA	NA	0.691
		0.75	0.870	NA	NA	NA	NA	NA	0.874
fimtmax	AspD	0.5	0.940	NA	NA	NA	NA	NA	0.925
		0.25	0.836	NA	NA	NA	NA	NA	0.835
		0.75	1.034	NA	NA	NA	NA	NA	1.055
	Detm	0.5	0.970	NA	NA	NA	NA	NA	0.938
		0.25	0.865	NA	NA	NA	NA	NA	0.834
		0.75	1.045	NA	NA	NA	NA	NA	1.041
	Biph	0.5	0.935	NA	NA	NA	NA	NA	0.933
		0.25	0.855	NA	NA	NA	NA	NA	0.836
		0.75	1.045	NA	NA	NA	NA	NA	1.035
csc2	AspD	0.5	2.400	NA	NA	NA	NA	NA	2.420
		0.25	1.838	NA	NA	NA	NA	NA	1.990
		0.75	3.270	NA	NA	NA	NA	NA	3.175
	Detm	0.5	2.425	NA	NA	NA	NA	NA	2.350
		0.25	1.780	NA	NA	NA	NA	NA	1.900
		0.75	3.075	NA	NA	NA	NA	NA	3.255
	Biph	0.5	2.390	NA	NA	NA	NA	NA	2.610
		0.25	1.806	NA	NA	NA	NA	NA	1.890
		0.75	3.010	NA	NA	NA	NA	NA	3.174
iem	AspD	0.5	2125.370	NA	NA	NA	NA	NA	2061.485
		0.25	1587.483	NA	NA	NA	NA	NA	1519.065
		0.75	2822.757	NA	NA	NA	NA	NA	2572.135
	Detm	0.5	2122.635	NA	NA	NA	NA	NA	2144.210
		0.25	1687.640	NA	NA	NA	NA	NA	1551.470
		0.75	2849.805	NA	NA	NA	NA	NA	2634.580
	Biph	0.5	2161.050	NA	NA	NA	NA	NA	1935.722
		0.25	1712.285	NA	NA	NA	NA	NA	1515.717
		0.75	2839.812	NA	NA	NA	NA	NA	2848.595
imtareal	AspD	0.5	18.564	NA	NA	NA	NA	NA	17.774
		0.25	15.444	NA	NA	NA	NA	NA	15.057
		0.75	22.346	NA	NA	NA	NA	NA	22.778
	Detm	0.5	18.872	NA	NA	NA	NA	NA	18.226
		0.25	15.840	NA	NA	NA	NA	NA	15.750
		0.75	21.771	NA	NA	NA	NA	NA	21.114
	Biph	0.5	18.354	NA	NA	NA	NA	NA	18.738
		0.25	15.897	NA	NA	NA	NA	NA	15.882
		0.75	21.009	NA	NA	NA	NA	NA	21.295
n.pl	AspD	0.5	2.000	NA	NA	NA	NA	NA	3.000
		0.25	1.000	NA	NA	NA	NA	NA	2.000
		0.75	4.000	NA	NA	NA	NA	NA	5.000
	Detm	0.5	3.000	NA	NA	NA	NA	NA	3.000
		0.25	2.000	NA	NA	NA	NA	NA	2.000
		0.75	5.000	NA	NA	NA	NA	NA	6.000
	Biph	0.5	3.000	NA	NA	NA	NA	NA	3.000
		0.25	2.000	NA	NA	NA	NA	NA	2.000
		0.75	4.000	NA	NA	NA	NA	NA	5.000
weight	AspD	0.5	96.150	98.000	99.550	100.700	99.600	99.700	99.600
		0.25	86.125	88.100	88.275	89.500	89.700	88.300	86.900
		0.75	104.575	107.200	107.175	109.000	108.500	107.100	108.200
	Detm	0.5	97.700	96.600	97.400	97.000	97.800	98.100	98.500
		0.25	87.700	86.000	86.400	87.600	87.300	88.100	89.350
		0.75	107.700	106.800	107.475	108.300	108.200	108.700	110.200
	Biph	0.5	93.500	94.900	95.350	96.550	96.900	97.800	97.000
		0.25	85.200	87.425	87.800	87.775	89.300	89.300	88.100
		0.75	104.300	106.625	107.425	109.425	110.950	111.650	109.100
bmi	AspD	0.5	32.014	32.606	32.537	33.143	32.625	32.606	32.824
		0.25	29.523	30.046	30.253	30.266	30.248	30.097	30.009
		0.75	34.691	35.382	35.893	35.923	35.480	35.932	35.917
	Detm	0.5	31.965	31.686	31.889	31.774	32.250	32.402	32.429
		0.25	29.436	28.886	28.901	28.780	28.756	28.784	29.140
		0.75	35.511	35.156	35.600	36.179	36.131	36.157	36.229
	Biph	0.5	31.508	32.070	32.004	32.312	32.237	32.809	32.948

		0.25	28.597	29.091	29.233	29.303	29.091	29.425	29.608
		0.75	34.412	34.846	35.896	36.002	36.211	36.697	36.763
whr	AspD	0.5	1.009	1.009	1.009	1.009	1.014	1.009	1.009
		0.25	0.955	0.953	0.958	0.956	0.965	0.960	0.958
		0.75	1.059	1.055	1.052	1.064	1.059	1.059	1.064
	Detm	0.5	1.009	1.007	1.010	1.000	1.000	1.000	1.022
		0.25	0.951	0.950	0.951	0.958	0.951	0.951	0.965
		0.75	1.054	1.052	1.062	1.059	1.055	1.064	1.066
	Biph	0.5	0.993	0.991	0.992	1.000	1.008	1.000	1.000
		0.25	0.954	0.944	0.935	0.951	0.945	0.947	0.952
		0.75	1.051	1.034	1.043	1.048	1.049	1.050	1.053
hba1c	AspD	0.5	8.200	7.900	7.700	7.600	7.500	7.500	7.700
		0.25	7.800	7.200	7.000	6.950	6.950	6.900	7.100
		0.75	9.300	8.700	8.300	8.400	8.500	8.200	8.700
	Detm	0.5	8.300	8.700	8.200	8.300	8.100	8.000	8.100
		0.25	7.700	8.000	7.500	7.700	7.500	7.400	7.400
		0.75	9.200	9.500	9.200	8.975	8.975	8.700	8.900
	Biph	0.5	8.500	8.000	7.600	7.500	7.500	7.500	7.400
		0.25	7.900	7.450	6.900	7.000	7.050	7.000	6.900
		0.75	9.300	8.800	8.300	8.300	8.300	8.400	8.200
gluc	AspD	0.5	9.400	8.150	8.000	8.000	7.900	7.650	7.900
		0.25	7.700	6.600	6.700	6.325	6.700	6.325	6.600
		0.75	11.600	10.325	9.900	10.400	9.800	9.750	9.900
	Detm	0.5	10.000	8.000	7.700	7.400	7.100	6.900	7.200
		0.25	8.300	6.300	6.300	5.400	5.575	6.150	6.100
		0.75	12.000	10.100	9.500	9.125	8.700	9.050	9.475
	Biph	0.5	9.700	8.500	8.300	7.850	8.400	8.050	8.300
		0.25	7.900	7.200	6.900	6.300	6.850	6.400	6.725
		0.75	12.400	10.700	10.000	9.725	10.250	10.325	9.975
ins	AspD	0.5	75.500	NA	NA	NA	NA	NA	43.000
		0.25	45.250	NA	NA	NA	NA	NA	19.000
		0.75	132.000	NA	NA	NA	NA	NA	101.000
	Detm	0.5	65.000	NA	NA	NA	NA	NA	36.500
		0.25	37.000	NA	NA	NA	NA	NA	15.750
		0.75	114.000	NA	NA	NA	NA	NA	65.500
	Biph	0.5	68.000	NA	NA	NA	NA	NA	56.500
		0.25	38.000	NA	NA	NA	NA	NA	35.500
		0.75	103.000	NA	NA	NA	NA	NA	92.250
cpep	AspD	0.5	828.000	NA	NA	NA	NA	NA	499.000
		0.25	507.000	NA	NA	NA	NA	NA	297.000
		0.75	1217.250	NA	NA	NA	NA	NA	961.000
	Detm	0.5	877.000	NA	NA	NA	NA	NA	467.000
		0.25	466.000	NA	NA	NA	NA	NA	270.000
		0.75	1280.000	NA	NA	NA	NA	NA	751.250
	Biph	0.5	782.000	NA	NA	NA	NA	NA	638.500
		0.25	418.000	NA	NA	NA	NA	NA	436.750
		0.75	1150.000	NA	NA	NA	NA	NA	851.750
idos	AspD	0.5	42.500	88.000	94.000	98.000	98.000	96.000	96.000
		0.25	22.000	60.000	64.000	67.750	64.000	64.000	64.000
		0.75	64.000	120.000	130.000	142.000	150.500	148.000	145.000
	Detm	0.5	38.000	90.000	107.000	114.000	116.000	114.000	118.000
		0.25	20.000	60.000	65.750	70.000	67.500	73.000	74.000
		0.75	61.500	128.000	160.000	180.000	182.000	195.000	196.000
	Biph	0.5	40.000	63.000	72.000	72.000	72.000	70.000	70.000
		0.25	20.000	43.250	47.250	46.000	47.000	46.500	46.500
		0.75	70.000	99.250	105.000	108.500	117.500	127.250	127.250
ipkg	AspD	0.5	0.448	0.879	0.923	0.984	0.978	0.951	0.944
		0.25	0.261	0.635	0.693	0.715	0.657	0.653	0.653
		0.75	0.621	1.138	1.239	1.269	1.398	1.364	1.354
	Detm	0.5	0.392	0.945	1.110	1.139	1.181	1.168	1.185
		0.25	0.229	0.616	0.728	0.758	0.772	0.797	0.801
		0.75	0.626	1.311	1.654	1.696	1.768	1.852	1.857
	Biph	0.5	0.466	0.661	0.742	0.729	0.726	0.754	0.754
		0.25	0.209	0.457	0.528	0.529	0.534	0.543	0.543
		0.75	0.720	0.945	0.990	1.013	1.090	1.157	1.157
sys	AspD	0.5	138.000	135.000	133.000	132.000	132.000	131.500	133.750

		0.25	128.375	123.500	124.500	124.625	125.000	124.000	122.625
		0.75	151.000	146.000	142.750	141.875	143.250	140.125	143.000
	Detm	0.5	139.000	135.000	135.000	133.750	132.250	132.000	133.500
		0.25	130.000	124.000	124.500	122.625	124.000	121.750	126.000
		0.75	149.000	146.000	144.500	143.375	143.000	139.625	142.500
	Biph	0.5	136.500	135.250	134.500	132.750	133.000	133.500	131.000
		0.25	127.750	123.750	125.500	124.125	123.500	124.500	121.375
		0.75	149.500	145.500	146.250	140.875	143.750	142.250	140.000
dia	AspD	0.5	82.250	81.000	81.000	80.500	79.500	79.000	78.500
		0.25	75.500	75.000	74.125	75.250	73.500	73.375	74.500
		0.75	88.125	86.625	85.500	85.500	85.000	87.000	86.000
	Detm	0.5	82.000	80.000	80.500	81.500	80.000	77.500	77.000
		0.25	75.500	74.500	74.500	73.250	73.000	72.500	72.500
		0.75	88.000	86.000	87.000	87.500	85.500	84.625	84.500
	Biph	0.5	82.500	82.000	80.000	80.250	80.500	81.000	78.500
		0.25	76.500	75.000	74.000	74.625	73.750	75.500	72.500
		0.75	87.500	87.375	86.000	86.375	84.500	86.000	84.625
pulse	AspD	0.5	75.500	74.000	75.000	74.000	72.000	72.000	73.000
		0.25	68.000	67.000	67.000	65.250	65.500	65.250	67.000
		0.75	84.000	83.500	81.000	82.000	81.000	79.000	82.500
	Detm	0.5	77.000	74.500	74.000	73.500	74.000	73.000	74.000
		0.25	70.000	65.000	64.750	65.000	66.750	64.000	64.000
		0.75	82.500	81.000	82.000	80.000	81.250	81.000	80.000
	Biph	0.5	76.000	76.500	74.000	75.000	74.000	73.000	74.000
		0.25	69.000	71.000	67.000	69.000	68.000	68.000	69.000
		0.75	83.000	83.000	81.000	80.750	80.750	80.000	82.000
chol	AspD	0.5	4.100	NA	4.200	NA	4.100	NA	4.100
		0.25	3.500	NA	3.700	NA	3.600	NA	3.650
		0.75	4.800	NA	4.900	NA	4.700	NA	4.700
	Detm	0.5	4.000	NA	4.100	NA	4.100	NA	4.100
		0.25	3.400	NA	3.500	NA	3.400	NA	3.600
		0.75	4.700	NA	4.700	NA	4.800	NA	4.800
	Biph	0.5	4.000	NA	4.200	NA	4.200	NA	4.200
		0.25	3.600	NA	3.700	NA	3.700	NA	3.700
		0.75	4.500	NA	4.700	NA	4.800	NA	4.800
ldl	AspD	0.5	2.100	NA	2.200	NA	2.200	NA	2.100
		0.25	1.600	NA	1.800	NA	1.700	NA	1.800
		0.75	2.700	NA	2.800	NA	2.700	NA	2.650
	Detm	0.5	2.000	NA	2.200	NA	2.100	NA	2.200
		0.25	1.500	NA	1.800	NA	1.700	NA	1.700
		0.75	2.600	NA	2.700	NA	2.775	NA	2.600
	Biph	0.5	2.100	NA	2.200	NA	2.100	NA	2.200
		0.25	1.600	NA	1.700	NA	1.600	NA	1.700
		0.75	2.500	NA	2.600	NA	2.600	NA	2.700
hdl	AspD	0.5	1.045	NA	1.105	NA	1.100	NA	1.070
		0.25	0.920	NA	0.947	NA	0.900	NA	0.920
		0.75	1.350	NA	1.400	NA	1.400	NA	1.330
	Detm	0.5	1.080	NA	1.100	NA	1.100	NA	1.080
		0.25	0.910	NA	0.900	NA	0.900	NA	0.885
		0.75	1.290	NA	1.400	NA	1.300	NA	1.325
	Biph	0.5	1.150	NA	1.210	NA	1.190	NA	1.160
		0.25	0.930	NA	1.000	NA	1.000	NA	0.960
		0.75	1.480	NA	1.470	NA	1.510	NA	1.482
vldl	AspD	0.5	0.700	NA	0.700	NA	0.700	NA	0.700
		0.25	0.500	NA	0.500	NA	0.600	NA	0.500
		0.75	0.925	NA	1.000	NA	0.900	NA	0.950
	Detm	0.5	0.700	NA	0.700	NA	0.700	NA	0.700
		0.25	0.500	NA	0.500	NA	0.500	NA	0.500
		0.75	1.000	NA	1.000	NA	1.000	NA	1.000
	Biph	0.5	0.700	NA	0.600	NA	0.600	NA	0.600
		0.25	0.500	NA	0.500	NA	0.500	NA	0.500
		0.75	1.000	NA	0.800	NA	0.900	NA	0.900
trig	AspD	0.5	1.630	NA	1.605	NA	1.580	NA	1.610
		0.25	1.175	NA	1.170	NA	1.263	NA	1.155
		0.75	2.143	NA	2.200	NA	2.088	NA	2.275
	Detm	0.5	1.630	NA	1.530	NA	1.600	NA	1.630

```
          0.25      1.150       NA    1.200       NA    1.100       NA    1.185
          0.75      2.400       NA    2.225       NA    2.100       NA    2.190
     Biph 0.5       1.480       NA    1.365       NA    1.445       NA    1.420
          0.25      1.030       NA    1.000       NA    1.053       NA    1.030
          0.75      2.280       NA    1.900       NA    2.067       NA    2.130
> round( ftable( QQ[,,c(1,7),1:3], col.vars=3:4), 3 )
                 v1                            v7
                0.5     0.25     0.75      0.5     0.25     0.75

 fimtavg  AspD    0.778    0.690    0.874    0.780    0.685    0.880
          Detm    0.790    0.700    0.870    0.768    0.684    0.866
          Biph    0.780    0.700    0.870    0.765    0.691    0.874
 fimtmax  AspD    0.940    0.836    1.034    0.925    0.835    1.055
          Detm    0.970    0.865    1.045    0.938    0.834    1.041
          Biph    0.935    0.855    1.045    0.933    0.836    1.035
 csc2     AspD    2.400    1.838    3.270    2.420    1.990    3.175
          Detm    2.425    1.780    3.075    2.350    1.900    3.255
          Biph    2.390    1.806    3.010    2.610    1.890    3.174
 iem      AspD 2125.370 1587.483 2822.757 2061.485 1519.065 2572.135
          Detm 2122.635 1687.640 2849.805 2144.210 1551.470 2634.580
          Biph 2161.050 1712.285 2839.812 1935.722 1515.717 2848.595
 imtareal AspD   18.564   15.444   22.346   17.774   15.057   22.778
          Detm   18.872   15.840   21.771   18.226   15.750   21.114
          Biph   18.354   15.897   21.009   18.738   15.882   21.295
 n.pl     AspD    2.000    1.000    4.000    3.000    2.000    5.000
          Detm    3.000    2.000    5.000    3.000    2.000    6.000
          Biph    3.000    2.000    4.000    3.000    2.000    5.000
 weight   AspD   96.150   86.125  104.575   99.600   86.900  108.200
          Detm   97.700   87.700  107.700   98.500   89.350  110.200
          Biph   93.500   85.200  104.300   97.000   88.100  109.100
 bmi      AspD   32.014   29.523   34.691   32.824   30.009   35.917
          Detm   31.965   29.436   35.511   32.429   29.140   36.229
          Biph   31.508   28.597   34.412   32.948   29.608   36.763
 whr      AspD    1.009    0.955    1.059    1.009    0.958    1.064
          Detm    1.009    0.951    1.054    1.022    0.965    1.066
          Biph    0.993    0.954    1.051    1.000    0.952    1.053
 hba1c    AspD    8.200    7.800    9.300    7.700    7.100    8.700
          Detm    8.300    7.700    9.200    8.100    7.400    8.900
          Biph    8.500    7.900    9.300    7.400    6.900    8.200
 gluc     AspD    9.400    7.700   11.600    7.900    6.600    9.900
          Detm   10.000    8.300   12.000    7.200    6.100    9.475
          Biph    9.700    7.900   12.400    8.300    6.725    9.975
 ins      AspD   75.500   45.250  132.000   43.000   19.000  101.000
          Detm   65.000   37.000  114.000   36.500   15.750   65.500
          Biph   68.000   38.000  103.000   56.500   35.500   92.250
 cpep     AspD  828.000  507.000 1217.250  499.000  297.000  961.000
          Detm  877.000  466.000 1280.000  467.000  270.000  751.250
          Biph  782.000  418.000 1150.000  638.500  436.750  851.750
 idos     AspD   42.500   22.000   64.000   96.000   64.000  145.000
          Detm   38.000   20.000   61.500  118.000   74.000  196.000
          Biph   40.000   20.000   70.000   70.000   46.500  127.250
 ipkg     AspD    0.448    0.261    0.621    0.944    0.653    1.354
          Detm    0.392    0.229    0.626    1.185    0.801    1.857
          Biph    0.466    0.209    0.720    0.754    0.543    1.157
 sys      AspD  138.000  128.375  151.000  133.750  122.625  143.000
          Detm  139.000  130.000  149.000  133.500  126.000  142.500
          Biph  136.500  127.750  149.500  131.000  121.375  140.000
 dia      AspD   82.250   75.500   88.125   78.500   74.500   86.000
          Detm   82.000   75.500   88.000   77.000   72.500   84.500
          Biph   82.500   76.500   87.500   78.500   72.500   84.625
 pulse    AspD   75.500   68.000   84.000   73.000   67.000   82.500
          Detm   77.000   70.000   82.500   74.000   64.000   80.000
          Biph   76.000   69.000   83.000   74.000   69.000   82.000
 chol     AspD    4.100    3.500    4.800    4.100    3.650    4.700
          Detm    4.000    3.400    4.700    4.100    3.600    4.800
          Biph    4.000    3.600    4.500    4.200    3.700    4.800
```

```
  ldl       AspD     2.100     1.600     2.700     2.100     1.800     2.650
            Detm     2.000     1.500     2.600     2.200     1.700     2.600
            Biph     2.100     1.600     2.500     2.200     1.700     2.700
  hdl       AspD     1.045     0.920     1.350     1.070     0.920     1.330
            Detm     1.080     0.910     1.290     1.080     0.885     1.325
            Biph     1.150     0.930     1.480     1.160     0.960     1.482
  vldl      AspD     0.700     0.500     0.925     0.700     0.500     0.950
            Detm     0.700     0.500     1.000     0.700     0.500     1.000
            Biph     0.700     0.500     1.000     0.600     0.500     0.900
  trig      AspD     1.630     1.175     2.143     1.610     1.155     2.275
            Detm     1.630     1.150     2.400     1.630     1.185     2.190
            Biph     1.480     1.030     2.280     1.420     1.030     2.130
> round( tt <- ftable( QQ[,,c(1,7),1:3], col.vars=2:4), 3 )
                AspD                                                        Detm
                  v1                          v7                              v1                          v
                 0.5     0.25      0.75      0.5     0.25      0.75      0.5     0.25      0.75      0.

  fimtavg      0.778     0.690     0.874     0.780     0.685     0.880     0.790     0.700     0.870     0.76
  fimtmax      0.940     0.836     1.034     0.925     0.835     1.055     0.970     0.865     1.045     0.93
  csc2         2.400     1.838     3.270     2.420     1.990     3.175     2.425     1.780     3.075     2.35
  iem       2125.370  1587.483  2822.757  2061.485  1519.065  2572.135  2122.635  1687.640  2849.805  2144.21
  imtareal    18.564    15.444    22.346    17.774    15.057    22.778    18.872    15.840    21.771    18.22
  n.pl         2.000     1.000     4.000     3.000     2.000     5.000     3.000     2.000     5.000     3.00
  weight      96.150    86.125   104.575    99.600    86.900   108.200    97.700    87.700   107.700    98.50
  bmi         32.014    29.523    34.691    32.824    30.009    35.917    31.965    29.436    35.511    32.42
  whr          1.009     0.955     1.059     1.009     0.958     1.064     1.009     0.951     1.054     1.02
  hba1c        8.200     7.800     9.300     7.700     7.100     8.700     8.300     7.700     9.200     8.10
  gluc         9.400     7.700    11.600     7.900     6.600     9.900    10.000     8.300    12.000     7.20
  ins         75.500    45.250   132.000    43.000    19.000   101.000    65.000    37.000   114.000    36.50
  cpep       828.000   507.000  1217.250   499.000   297.000   961.000   877.000   466.000  1280.000   467.00
  idos        42.500    22.000    64.000    96.000    64.000   145.000    38.000    20.000    61.500   118.00
  ipkg         0.448     0.261     0.621     0.944     0.653     1.354     0.392     0.229     0.626     1.18
  sys        138.000   128.375   151.000   133.750   122.625   143.000   139.000   130.000   149.000   133.50
  dia         82.250    75.500    88.125    78.500    74.500    86.000    82.000    75.500    88.000    77.00
  pulse       75.500    68.000    84.000    73.000    67.000    82.500    77.000    70.000    82.500    74.00
  chol         4.100     3.500     4.800     4.100     3.650     4.700     4.000     3.400     4.700     4.10
  ldl          2.100     1.600     2.700     2.100     1.800     2.650     2.000     1.500     2.600     2.20
  hdl          1.045     0.920     1.350     1.070     0.920     1.330     1.080     0.910     1.290     1.08
  vldl         0.700     0.500     0.925     0.700     0.500     0.950     0.700     0.500     1.000     0.70
  trig         1.630     1.175     2.143     1.610     1.155     2.275     1.630     1.150     2.400     1.63
> row.names(tt) <- attr(tt,"row.vars")[[1]]
> cat( "; Asp+Det ; ; ; ; Detemir ; ; ; ; Biphasic ; ; ; \n",
+      "; V1 ; ; V7 ; ; V1 ; ; V7 ; \n",
+      "; Med ; IQR ; Med ; IQR ; Med ; IQR ; Med ; IQR \n",
+      file="./results/LLCh-Tab2i.csv" )
> for( i in 1:nrow(tt) )
+ write.table(       cbind( formatC( tt[i,1,drop=F], format="f", digits=dig[i] ),
+              paste( "(", formatC( tt[i,2,drop=F], format="f", digits=dig[i] ), ",",
+                           formatC( tt[i,3,drop=F], format="f", digits=dig[i] ), ")" ),
+                           formatC( tt[i,4,drop=F], format="f", digits=dig[i] ),
+              paste( "(", formatC( tt[i,5,drop=F], format="f", digits=dig[i] ), ",",
+                           formatC( tt[i,6,drop=F], format="f", digits=dig[i] ), ")" ),
+                           formatC( tt[i,7,drop=F], format="f", digits=dig[i] ),
+              paste( "(", formatC( tt[i,8,drop=F], format="f", digits=dig[i] ), ",",
+                           formatC( tt[i,9,drop=F], format="f", digits=dig[i] ), ")" ),
+                           formatC( tt[i,10,drop=F], format="f", digits=dig[i] ),
+              paste( "(", formatC( tt[i,11,drop=F], format="f", digits=dig[i] ), ",",
+                           formatC( tt[i,12,drop=F], format="f", digits=dig[i] ), ")" )),
+              file="./results/LLCh-Tab2i.csv", append=TRUE, row.names=TRUE, col.names=FALSE,
+              quote=F, sep=";", dec=",")
```

Print the mean and the sd instead

```
> round( ftable( QQ[,,,4:5], col.vars=3  ), 3 )
```

			v1	v2	v3	v4	v5	v6	v7
fimtavg	AspD	mean	0.796	NaN	NaN	NaN	NaN	NaN	0.795
		sd	0.148	NA	NA	NA	NA	NA	0.150
	Detm	mean	0.798	NaN	NaN	NaN	NaN	NaN	0.778
		sd	0.139	NA	NA	NA	NA	NA	0.129
	Biph	mean	0.786	NaN	NaN	NaN	NaN	NaN	0.781
		sd	0.121	NA	NA	NA	NA	NA	0.130
fimtmax	AspD	mean	0.954	NaN	NaN	NaN	NaN	NaN	0.954
		sd	0.165	NA	NA	NA	NA	NA	0.170
	Detm	mean	0.965	NaN	NaN	NaN	NaN	NaN	0.940
		sd	0.155	NA	NA	NA	NA	NA	0.149
	Biph	mean	0.949	NaN	NaN	NaN	NaN	NaN	0.943
		sd	0.140	NA	NA	NA	NA	NA	0.151
csc2	AspD	mean	2.626	NaN	NaN	NaN	NaN	NaN	2.654
		sd	1.103	NA	NA	NA	NA	NA	0.992
	Detm	mean	2.575	NaN	NaN	NaN	NaN	NaN	2.649
		sd	1.053	NA	NA	NA	NA	NA	0.992
	Biph	mean	2.518	NaN	NaN	NaN	NaN	NaN	2.558
		sd	0.956	NA	NA	NA	NA	NA	0.939
iem	AspD	mean	2314.408	NaN	NaN	NaN	NaN	NaN	2188.873
		sd	1012.908	NA	NA	NA	NA	NA	858.809
	Detm	mean	2348.003	NaN	NaN	NaN	NaN	NaN	2192.966
		sd	1009.038	NA	NA	NA	NA	NA	867.971
	Biph	mean	2376.867	NaN	NaN	NaN	NaN	NaN	2321.016
		sd	1073.070	NA	NA	NA	NA	NA	1086.385
imtareal	AspD	mean	19.277	NaN	NaN	NaN	NaN	NaN	19.071
		sd	5.144	NA	NA	NA	NA	NA	5.151
	Detm	mean	19.493	NaN	NaN	NaN	NaN	NaN	18.752
		sd	4.885	NA	NA	NA	NA	NA	4.074
	Biph	mean	18.638	NaN	NaN	NaN	NaN	NaN	18.939
		sd	4.103	NA	NA	NA	NA	NA	4.117
n.pl	AspD	mean	3.511	NaN	NaN	NaN	NaN	NaN	4.056
		sd	3.573	NA	NA	NA	NA	NA	4.171
	Detm	mean	3.938	NaN	NaN	NaN	NaN	NaN	4.273
		sd	3.284	NA	NA	NA	NA	NA	3.691
	Biph	mean	3.437	NaN	NaN	NaN	NaN	NaN	4.059
		sd	2.714	NA	NA	NA	NA	NA	3.569
weight	AspD	mean	97.454	98.816	99.818	100.590	100.324	99.547	100.176
		sd	14.957	15.258	15.751	16.426	16.405	16.151	17.021
	Detm	mean	98.468	97.559	98.361	98.883	98.429	98.851	100.208
		sd	15.113	15.312	16.217	16.260	15.886	16.284	16.642
	Biph	mean	95.572	97.168	98.232	98.638	99.043	99.547	99.282
		sd	14.831	15.223	15.979	16.192	16.627	16.667	16.370
bmi	AspD	mean	32.234	32.754	33.025	33.202	33.112	32.925	33.101
		sd	3.929	4.077	4.283	4.335	4.414	4.370	4.546
	Detm	mean	32.399	32.148	32.389	32.487	32.490	32.649	32.868
		sd	4.291	4.372	4.625	4.551	4.526	4.656	4.685
	Biph	mean	31.845	32.322	32.592	32.732	32.828	32.994	33.046
		sd	4.396	4.448	4.607	4.696	4.845	4.904	4.899
whr	AspD	mean	1.003	1.004	1.006	1.006	1.008	1.007	1.010
		sd	0.078	0.074	0.079	0.077	0.075	0.078	0.075
	Detm	mean	1.008	1.002	1.008	1.002	1.001	1.006	1.022
		sd	0.090	0.084	0.085	0.084	0.087	0.081	0.087
	Biph	mean	0.999	0.993	0.993	0.994	0.997	0.995	0.998
		sd	0.075	0.077	0.077	0.075	0.076	0.080	0.076
hba1c	AspD	mean	8.497	8.041	7.790	7.796	7.810	7.750	8.024
		sd	1.023	1.085	1.134	1.141	1.177	1.095	1.321
	Detm	mean	8.531	8.918	8.444	8.325	8.239	8.084	8.266
		sd	1.119	1.342	1.168	1.112	1.080	1.031	1.190
	Biph	mean	8.622	8.185	7.683	7.711	7.761	7.680	7.590
		sd	1.012	1.092	0.986	0.971	1.060	0.948	0.928
gluc	AspD	mean	9.861	8.527	8.467	8.613	8.444	8.065	8.537
		sd	3.082	2.789	2.598	3.126	2.600	2.704	3.349
	Detm	mean	10.375	8.503	8.114	7.837	7.387	7.569	7.944
		sd	3.085	3.223	2.780	3.221	2.624	2.569	2.863

	Biph	mean	10.653	9.098	8.685	8.132	8.990	8.708	8.603
		sd	3.549	2.838	2.893	2.781	3.507	3.621	2.544
ins	AspD	mean	104.600	NaN	NaN	NaN	NaN	NaN	67.408
		sd	94.633	NA	NA	NA	NA	NA	66.371
	Detm	mean	94.956	NaN	NaN	NaN	NaN	NaN	80.588
		sd	101.143	NA	NA	NA	NA	NA	351.195
	Biph	mean	80.399	NaN	NaN	NaN	NaN	NaN	77.311
		sd	65.171	NA	NA	NA	NA	NA	79.639
cpep	AspD	mean	925.971	NaN	NaN	NaN	NaN	NaN	684.880
		sd	591.349	NA	NA	NA	NA	NA	508.924
	Detm	mean	903.146	NaN	NaN	NaN	NaN	NaN	561.075
		sd	544.527	NA	NA	NA	NA	NA	390.283
	Biph	mean	820.358	NaN	NaN	NaN	NaN	NaN	674.742
		sd	543.249	NA	NA	NA	NA	NA	410.797
idos	AspD	mean	48.486	94.884	102.683	108.575	110.603	106.651	105.935
		sd	30.975	48.661	53.889	59.334	62.898	59.653	59.459
	Detm	mean	47.110	108.661	131.810	139.062	137.425	143.272	145.040
		sd	36.025	75.788	93.147	94.326	91.422	101.039	101.117
	Biph	mean	48.500	74.838	84.359	88.359	91.291	93.918	93.918
		sd	33.552	41.178	49.026	55.772	59.732	63.574	63.574
ipkg	AspD	mean	0.494	0.957	1.019	1.068	1.076	1.054	1.048
		sd	0.304	0.480	0.510	0.549	0.580	0.558	0.557
	Detm	mean	0.470	1.086	1.307	1.364	1.361	1.406	1.423
		sd	0.325	0.693	0.819	0.824	0.812	0.877	0.877
	Biph	mean	0.504	0.755	0.845	0.879	0.903	0.920	0.920
		sd	0.330	0.383	0.461	0.525	0.560	0.576	0.576
sys	AspD	mean	139.754	136.426	135.091	134.919	133.448	133.106	133.864
		sd	14.808	16.136	14.924	15.275	12.864	12.939	16.573
	Detm	mean	139.820	135.764	135.043	134.518	133.038	132.335	135.429
		sd	16.120	17.130	17.380	17.210	14.536	16.118	15.550
	Biph	mean	138.481	135.342	135.650	134.381	134.909	134.711	131.879
		sd	15.097	14.768	14.084	14.926	15.953	13.596	14.959
dia	AspD	mean	82.404	81.008	80.135	80.242	79.378	79.148	79.276
		sd	9.272	9.818	8.920	8.951	9.047	10.171	9.258
	Detm	mean	81.801	80.074	80.808	80.355	79.222	78.630	78.529
		sd	9.443	9.169	9.883	9.570	8.932	9.593	8.960
	Biph	mean	82.078	81.138	80.299	80.472	79.787	80.801	78.907
		sd	9.181	8.736	9.356	8.894	8.950	8.710	9.132
pulse	AspD	mean	75.836	75.087	74.352	74.119	72.991	72.443	74.495
		sd	11.441	12.312	11.011	12.169	11.949	10.951	12.109
	Detm	mean	76.570	73.850	73.750	74.304	73.788	73.950	73.379
		sd	11.328	12.681	11.741	14.453	12.673	13.475	13.349
	Biph	mean	76.563	76.195	75.032	75.889	74.413	74.154	75.537
		sd	12.857	11.028	11.815	11.341	10.123	10.883	12.467
chol	AspD	mean	4.246	NaN	4.374	NaN	4.207	NaN	4.256
		sd	0.958	NA	0.931	NA	0.766	NA	0.903
	Detm	mean	4.121	NaN	4.267	NaN	4.239	NaN	4.297
		sd	0.997	NA	1.114	NA	1.057	NA	1.050
	Biph	mean	4.126	NaN	4.196	NaN	4.261	NaN	4.273
		sd	0.870	NA	0.770	NA	0.812	NA	0.847
ldl	AspD	mean	2.256	NaN	2.398	NaN	2.239	NaN	2.315
		sd	0.826	NA	0.890	NA	0.658	NA	0.803
	Detm	mean	2.155	NaN	2.324	NaN	2.287	NaN	2.287
		sd	0.847	NA	0.927	NA	0.904	NA	0.842
	Biph	mean	2.093	NaN	2.185	NaN	2.173	NaN	2.246
		sd	0.753	NA	0.679	NA	0.705	NA	0.726
hdl	AspD	mean	1.142	NaN	1.184	NaN	1.174	NaN	1.133
		sd	0.323	NA	0.301	NA	0.335	NA	0.291
	Detm	mean	1.133	NaN	1.151	NaN	1.171	NaN	1.117
		sd	0.330	NA	0.356	NA	0.415	NA	0.307
	Biph	mean	1.221	NaN	1.278	NaN	1.265	NaN	1.241
		sd	0.367	NA	0.386	NA	0.410	NA	0.368
vldl	AspD	mean	0.776	NaN	0.772	NaN	0.839	NaN	0.778
		sd	0.351	NA	0.344	NA	0.733	NA	0.365
	Detm	mean	0.814	NaN	0.804	NaN	0.799	NaN	0.807
		sd	0.415	NA	0.360	NA	0.393	NA	0.411

```
          Biph mean      0.783       NaN     0.695       NaN     0.739       NaN     0.748
               sd        0.400        NA     0.319        NA     0.373        NA     0.377
trig      AspD mean      1.924       NaN     1.820       NaN     1.785       NaN     1.851
               sd        1.325        NA     0.987        NA     0.921        NA     1.205
          Detm mean      1.898       NaN     1.766       NaN     1.838       NaN     1.906
               sd        1.158        NA     0.860        NA     1.146        NA     1.226
          Biph mean      1.821       NaN     1.685       NaN     1.923       NaN     1.749
               sd        1.096        NA     1.295        NA     1.860        NA     1.065
> round( ftable( QQ[,,c(1,7),4:5], col.vars=3:4), 3 )
                      v1                 v7
                    mean       sd      mean       sd

 fimtavg  AspD     0.796    0.148     0.795    0.150
          Detm     0.798    0.139     0.778    0.129
          Biph     0.786    0.121     0.781    0.130
 fimtmax  AspD     0.954    0.165     0.954    0.170
          Detm     0.965    0.155     0.940    0.149
          Biph     0.949    0.140     0.943    0.151
 csc2     AspD     2.626    1.103     2.654    0.992
          Detm     2.575    1.053     2.649    0.992
          Biph     2.518    0.956     2.558    0.939
 iem      AspD  2314.408 1012.908  2188.873  858.809
          Detm  2348.003 1009.038  2192.966  867.971
          Biph  2376.867 1073.070  2321.016 1086.385
 imtareal AspD    19.277    5.144    19.071    5.151
          Detm    19.493    4.885    18.752    4.074
          Biph    18.638    4.103    18.939    4.117
 n.pl     AspD     3.511    3.573     4.056    4.171
          Detm     3.938    3.284     4.273    3.691
          Biph     3.437    2.714     4.059    3.569
 weight   AspD    97.454   14.957   100.176   17.021
          Detm    98.468   15.113   100.208   16.642
          Biph    95.572   14.831    99.282   16.370
 bmi      AspD    32.234    3.929    33.101    4.546
          Detm    32.399    4.291    32.868    4.685
          Biph    31.845    4.396    33.046    4.899
 whr      AspD     1.003    0.078     1.010    0.075
          Detm     1.008    0.090     1.022    0.087
          Biph     0.999    0.075     0.998    0.076
 hba1c    AspD     8.497    1.023     8.024    1.321
          Detm     8.531    1.119     8.266    1.190
          Biph     8.622    1.012     7.590    0.928
 gluc     AspD     9.861    3.082     8.537    3.349
          Detm    10.375    3.085     7.944    2.863
          Biph    10.653    3.549     8.603    2.544
 ins      AspD   104.600   94.633    67.408   66.371
          Detm    94.956  101.143    80.588  351.195
          Biph    80.399   65.171    77.311   79.639
 cpep     AspD   925.971  591.349   684.880  508.924
          Detm   903.146  544.527   561.075  390.283
          Biph   820.358  543.249   674.742  410.797
 idos     AspD    48.486   30.975   105.935   59.459
          Detm    47.110   36.025   145.040  101.117
          Biph    48.500   33.552    93.918   63.574
 ipkg     AspD     0.494    0.304     1.048    0.557
          Detm     0.470    0.325     1.423    0.877
          Biph     0.504    0.330     0.920    0.576
 sys      AspD   139.754   14.808   133.864   16.573
          Detm   139.820   16.120   135.429   15.550
          Biph   138.481   15.097   131.879   14.959
 dia      AspD    82.404    9.272    79.276    9.258
          Detm    81.801    9.443    78.529    8.960
          Biph    82.078    9.181    78.907    9.132
 pulse    AspD    75.836   11.441    74.495   12.109
          Detm    76.570   11.328    73.379   13.349
          Biph    76.563   12.857    75.537   12.467
```

```
chol     AspD    4.246    0.958    4.256    0.903
         Detm    4.121    0.997    4.297    1.050
         Biph    4.126    0.870    4.273    0.847
ldl      AspD    2.256    0.826    2.315    0.803
         Detm    2.155    0.847    2.287    0.842
         Biph    2.093    0.753    2.246    0.726
hdl      AspD    1.142    0.323    1.133    0.291
         Detm    1.133    0.330    1.117    0.307
         Biph    1.221    0.367    1.241    0.368
vldl     AspD    0.776    0.351    0.778    0.365
         Detm    0.814    0.415    0.807    0.411
         Biph    0.783    0.400    0.748    0.377
trig     AspD    1.924    1.325    1.851    1.205
         Detm    1.898    1.158    1.906    1.226
         Biph    1.821    1.096    1.749    1.065
```

```
> tt <- ftable( QQ[,,c(1,7),4:5], col.vars=2:4)
> row.names(tt) <- attr(tt,"row.vars")[[1]]
> cat( "; Asp+Det ; ; ; ; Detemir ; ; ; ; Biphasic ; ; ; \n",
+      "; V1 ; ; V7 ; ; V1 ; ; V7 ; \n",
+      "; Mean ; SD ; Mean ; SD ; Mean ; SD ; Mean ; SD \n",
+      file="./results/LLCh-Tab2mi.csv" )
> for( i in 1:nrow(tt) )
+ write.table( formatC( tt[i,,drop=F], format="f", digits=dig[i] ),
+              file="./results/LLCh-Tab2mi.csv", append=TRUE, row.names=TRUE, col.names=FALSE,
+              quote=F, sep=";", dec=",")
```

2.3 Dropouts during the study

In the baseline file we have the drop-out date for those that did not compete the study:

```
> with( base, ftable( addmargins( table( grp, igr, is.na(xdate) ) ) ) )
            FALSE TRUE Sum
grp igr
Plc AspD       15   58  73
    Detm       25   41  66
    Biph        9   58  67
    Sum        49  157 206
Met AspD       13   52  65
    Detm       13   58  71
    Biph        5   65  70
    Sum        31  175 206
Sum AspD       28  110 138
    Detm       38   99 137
    Biph       14  123 137
    Sum        80  332 412
```

2.3.1 Drop-out by Metformin status

This is a simple binomial regression, using log-link, so that we both get the estimated probabilities of drop-out and the relevant tests. Since the Metformin/Placebo classification only has 2 levels we could also use a simple 2×2-table approach:

```
> with( base, twoby2( table(grp,is.na(xdate))[2:1,] ) )
2 by 2 table analysis:
------------------------------------------------------
Outcome   : FALSE
Comparing : Met vs. Plc
```

```
     FALSE TRUE    P(FALSE) 95% conf. interval
Met     31  175      0.1505    0.1079    0.2061
Plc     49  157      0.2379    0.1847    0.3008

                                     95% conf. interval
             Relative Risk:  0.6327    0.4214    0.9497
         Sample Odds Ratio:  0.5676    0.3447    0.9346
Conditional MLE Odds Ratio:  0.5684    0.3324    0.9604
    Probability difference: -0.0874   -0.1630   -0.0109

             Exact P-value: 0.0338
        Asymptotic P-value: 0.026
------------------------------------------------------
```

```
> mm <- glm( !is.na(xdate) ~ grp-1, family=binomial(link=log), data=base )
> CM <- rbind( diag(2), c(-1,1) )
> rownames( CM ) <- c(levels(base$grp),
+              paste( levels(base$grp)[2], "vs.",
+                     levels(base$grp)[1] ) )
> CM
```

```
            [,1] [,2]
Plc            1    0
Met            0    1
Met vs. Plc   -1    1
```

```
> cbind( round( ci.exp( mm, ctr.mat=CM ), 2 ),
+      P=round( ci.lin( mm, ctr.mat=CM )[,"P"], 3 ) )
```

```
            exp(Est.) 2.5% 97.5%     P
Plc              0.24 0.19  0.30 0.000
Met              0.15 0.11  0.21 0.000
Met vs. Plc      0.63 0.42  0.95 0.027
```

2.3.2 Drop-out by Insulin group

This is again a simple binomial regression, using log-link, so that we both get the estimated drop-out rates and the differences. But there is no simple table approach here:

```
> mi <- glm( !is.na(xdate) ~ igr-1, family=binomial(link=log), data=base )
> ci.exp( mi )
```

```
        exp(Est.)       2.5%     97.5%
igrAspD 0.2028986 0.14576745 0.2824212
igrDetm 0.2773723 0.21168106 0.3634495
igrBiph 0.1021898 0.06220883 0.1678661
```

```
> CM <- rbind( diag(3), c(0,1,-1), c(-1,1,0), c(1,0,-1) )
> colnames( CM ) <-  levels(base$igr)
> rownames( CM ) <- c(levels(base$igr),
+              paste( levels(base$igr)[2], "vs.",
+                     levels(base$igr)[3] ),
+              paste( levels(base$igr)[2], "vs.",
+                     levels(base$igr)[1] ),
+              paste( levels(base$igr)[1], "vs.",
+                     levels(base$igr)[3] ) )
> CM
```

```
             AspD Detm Biph
AspD            1    0    0
Detm            0    1    0
Biph            0    0    1
Detm vs. Biph   0    1   -1
Detm vs. AspD  -1    1    0
AspD vs. Biph   1    0   -1
```

```
> cbind( round( ci.exp( mi, ctr.mat=CM ), 2 ),
+      P=round( ci.lin( mi, ctr.mat=CM )[,"P"], 3 ) )
```

```
               exp(Est.) 2.5% 97.5%     P
AspD                0.20 0.15  0.28 0.000
Detm                0.28 0.21  0.36 0.000
Biph                0.10 0.06  0.17 0.000
Detm vs. Biph       2.71 1.54  4.78 0.001
Detm vs. AspD       1.37 0.89  2.10 0.151
AspD vs. Biph       1.99 1.09  3.60 0.024
```

2.3.3 Drop-out by randomization group

It would be of interest to see how the drop-out rate depends on *both* randomizations simultaneously:

```
> m2 <- glm( !is.na(xdate) ~ grp + relevel(igr,2),
+            family=binomial(link=log), data=base )
> round( ci.exp( m2 ), 2 )
                     exp(Est.) 2.5% 97.5%
(Intercept)               0.35 0.26  0.47
grpMet                    0.62 0.42  0.93
relevel(igr, 2)AspD       0.70 0.46  1.07
relevel(igr, 2)Biph       0.36 0.21  0.64

> m2i <- glm( !is.na(xdate) ~ grp:igr-1,
+             family=binomial(link=log), data=base )
> round( 100*ci.exp( m2i ), 1 )

               exp(Est.) 2.5% 97.5%
grpPlc:igrAspD      20.5 13.1  32.3
grpMet:igrAspD      20.0 12.3  32.5
grpPlc:igrDetm      37.9 27.8  51.6
grpMet:igrDetm      18.3 11.2  29.9
grpPlc:igrBiph      13.4  7.3  24.7
grpMet:igrBiph       7.1  3.1  16.6

> anova( m2i, m2, test="Chisq" )

Analysis of Deviance Table

Model 1: !is.na(xdate) ~ grp:igr - 1
Model 2: !is.na(xdate) ~ grp + relevel(igr, 2)
  Resid. Df Resid. Dev Df Deviance Pr(>Chi)
1       406     383.28
2       408     385.82 -2  -2.5421   0.2805
```

Even if there is clearly no evidence for differential effect of Metformin in the different insulin groups, we could evaluate the Metformin vs. Placebo relative risk of dropout in the three insulin groups, using the interaction model:

```
> CI <- rbind( c(-1,1,0,0,0,0),
+              c(0,0,-1,1,0,0),
+              c(0,0,0,0,-1,1) )
> rownames( CI ) <- levels( base$igr )
> cbind( round( ci.exp( m2i, ctr.mat=CI ), 2 ),
+        P=round( ci.lin( m2i, ctr.mat=CI )[,"P"], 3 ) )
     exp(Est.) 2.5% 97.5%     P
AspD      0.97 0.50  1.89 0.936
Detm      0.48 0.27  0.86 0.014
Biph      0.53 0.19  1.51 0.234
```

2.4 Insulin doses during study

We load the outcones datset which included the actually prescribed insulin doses

```
> load( file="./data/outc.Rda" )
> str( outc )
'data.frame':       2587 obs. of  36 variables:
 $ subjid : int  10001 10001 10001 10001 10001 10001 10001 10002 10002 10002 ...
 $ visit  : Factor w/ 7 levels "v1","v2","v3",..: 1 2 3 4 5 6 7 1 2 3 ...
 $ grp    : Factor w/ 2 levels "Plc","Met": 2 2 2 2 2 2 2 1 1 1 ...
 $ igr    : Factor w/ 3 levels "AspD","Detm",..: 3 3 3 3 3 3 3 3 3 3 ...
 $ over.65: Factor w/ 2 levels "<65",">65": 2 2 2 2 2 2 2 2 2 2 ...
 $ pre.ins: Factor w/ 2 levels "preIns","noIns": 2 2 2 2 2 2 2 2 2 2 ...
 $ sdc    : Factor w/ 2 levels "SDC","notSDC": 2 2 2 2 2 2 2 2 2 2 ...
 $ weight : num  122 122 121 124 125 ...
 $ bmi    : num  33 33.1 32.8 33.7 34 ...
 $ whr    : num  1.1 1.04 1.08 1.07 1.07 ...
 $ hba1c  : num  7.9 7.1 6.3 5.9 6.1 6.8 6.3 7.6 7.5 6.9 ...
 $ gluc   : num  12.6 6.7 4.8 3.4 8.8 9.3 8.9 10.4 NA 9.9 ...
 $ ins    : num  60 NA NA NA NA NA 132 56 NA NA ...
 $ idos   : num  14 54 64 64 64 70 NA 14 38 40 ...
 $ ipkg   : num  0.115 0.442 0.53 0.515 0.51 ...
 $ cpep   : num  1192 NA NA NA NA ...
 $ chol   : num  4.4 NA 4 NA 5.1 NA 4 3.8 NA 4 ...
 $ ldl    : num  2.3 NA 2.2 NA 3 NA 2.3 1.7 NA 2 ...
 $ hdl    : num  1.3 NA 1.3 NA 1.4 NA 1.22 1.66 NA 1.6 ...
 $ vldl   : num  0.8 NA 0.5 NA 0.7 NA 0.5 0.5 NA 0.4 ...
 $ trig   : num  1.82 NA 1.1 NA 1.6 NA 1.03 1.03 NA 0.9 ...
 $ sys    : num  149 136 136 132 137 ...
 $ dia    : num  86 65.5 69.5 69 78.5 76 77.5 75.5 72.5 65 ...
 $ pulse  : num  89 98 85 87 82 95 87 77 68 77 ...
 $ vdate  : Date, format: "2008-09-22" "2009-01-05" ...
 $ dov    : num  2009 2009 2009 2009 2010 ...
 $ typ.mor: Factor w/ 4 levels "non","Bip","Asp",..: 1 2 2 2 2 2 NA 1 2 2 ...
 $ dos.mor: num  NA 30 38 38 38 44 NA NA 18 20 ...
 $ typ.lch: Factor w/ 4 levels "non","Bip","Asp",..: 1 1 1 1 1 1 NA 1 1 1 ...
 $ dos.lch: num  NA NA NA NA NA NA NA NA NA NA ...
 $ typ.din: Factor w/ 4 levels "non","Bip","Asp",..: 2 2 2 2 2 2 NA 2 2 2 ...
 $ dos.din: num  14 24 26 26 26 26 NA 14 20 20 ...
 $ typ.bed: Factor w/ 4 levels "non","Bip","Asp",..: 1 1 1 1 1 1 NA 1 1 1 ...
 $ dos.bed: num  NA NA NA NA NA NA NA NA NA NA ...
 $ typ.ext: Factor w/ 4 levels "non","Bip","Asp",..: 1 1 1 1 1 1 NA 1 1 1 ...
 $ dos.ext: num  NA NA NA NA NA NA NA NA NA NA ...
```

We want to know how nay persons are on each treatment at each point in time. Since the analyses here only relate to vists 1-6, we make a version of the data where visit 7 is not included:

```
> out6 <- transform( subset( outc, visit != "v7" ), visit=factor(visit) )
```

With this we can make a quick overview of howmany patients that at a given time is on a given type of insulin in the morning, and at the other times too — this should give a sanity check on the derived dataset.

```
> with( out6, print( ftable( addmargins( table( grp, igr, visit, typ.mor ),
+                                        margin = 1:2 ),
+                            col.vars=c(1,3) ),
+                    zero.print="." ) )
             grp   Plc                     Met                     Sum
             visit  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6
igr  typ.mor
AspD non             2   .   2   .   .   1   1   1   1   .   .   .   3   1   3   .   .   1
     Bip             .   1   2   1   3   3   .   .   .   2   .   1   .   1   2   3   3   4
```

```
       Asp             71  68  62  61  58  53  64  60  59  56  55  51 135 128 121 117 113 104
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  Detm non             56  16   7   4   3   2  53  22  14  13   9   7 109  38  21  17  12   9
       Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
       Asp              .   1   3   3   4   4   .   .   .   .   .   .   .   1   3   3   4   4
       Det             10  40  43  45  39  37  17  43  50  49  52  53  27  83  93  94  91  90
  Biph non             22   6   1   1   1   1  19   9   8   6   6   6  41  15   9   7   7   7
       Bip             44  56  60  60  59  57  50  59  59  61  61  59  94 115 119 121 120 116
       Asp              .   .   .   .   .   .   1   .   .   .   .   .   1   .   .   .   .   .
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  Sum  non             80  22  10   5   4   4  73  32  23  19  15  13 153  54  33  24  19  17
       Bip             44  57  62  61  62  60  50  59  59  63  61  60  94 116 121 124 123 120
       Asp             71  69  65  64  62  57  65  60  59  56  55  51 136 129 124 120 117 108
       Det             10  40  43  45  39  37  17  43  50  49  52  53  27  83  93  94  91  90
> with( out6, print( ftable( addmargins( table( grp, igr, visit, typ.lch ),
+                                       margin = 1:2 ),
+                           col.vars=c(1,3) ),
+                    zero.print="." ) )
```

```
                grp   Plc                     Met                     Sum
                visit  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6
  igr  typ.lch
  AspD non              1   .   2   .   .   .   1   1   1   .   .   .   2   1   3   .   .   .
       Bip              .   2   1   1   3   3   .   1   .   2   .   3   .   3   1   3   3   6
       Asp             72  67  63  61  58  54  64  59  59  56  55  49 136 126 122 117 113 103
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  Detm non             66  55  50  46  39  34  69  64  63  60  60  58 135 119 113 106  99  92
       Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
       Asp              .   2   3   6   7   9   1   1   1   2   1   2   1   3   4   8   8  11
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  Biph non             60  42  33  30  28  25  66  50  46  44  43  39 126  92  79  74  71  64
       Bip              6  20  28  31  32  33   4  18  21  23  24  26  10  38  49  54  56  59
       Asp              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  Sum  non            127  97  85  76  67  59 136 115 110 104 103  97 263 212 195 180 170 156
       Bip              6  22  29  32  35  36   4  19  21  25  24  29  10  41  50  57  59  65
       Asp             72  69  66  67  65  63  65  60  60  58  56  51 137 129 126 125 121 114
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
> with( out6, print( ftable( addmargins( table( grp, igr, visit, typ.din ),
+                                       margin = 1:2 ),
+                           col.vars=c(1,3) ),
+                    zero.print="." ) )
```

```
                grp   Plc                     Met                     Sum
                visit  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6
  igr  typ.din
  AspD non              1   .   2   .   .   .   1   1   1   .   .   .   2   1   3   .   .   .
       Bip              .   .   1   3   4   3   .   .   .   2   .   2   .   .   1   5   4   5
       Asp             72  69  63  59  57  54  64  60  59  56  55  50 136 129 122 115 112 104
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  Detm non             66  55  48  40  31  27  69  63  62  59  55  53 135 118 110  99  86  80
       Bip              .   .   .   .   .   .   1   .   .   .   .   .   1   .   .   .   .   .
       Asp              .   2   5  12  15  16   .   2   2   3   6   7   .   4   7  15  21  23
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  Biph non              4   .   1   1   2   3   5   .   .   .   1   2   9   .   1   1   3   5
       Bip             62  62  60  60  58  55  65  68  67  67  66  63 127 130 127 127 124 118
       Asp              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
  Sum  non             71  55  51  41  33  30  75  64  63  59  56  55 146 119 114 100  89  85
       Bip             62  62  61  63  62  58  66  68  67  69  66  65 128 130 128 132 128 123
       Asp             72  71  68  71  72  70  64  62  61  59  61  57 136 133 129 130 133 127
       Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
> with( out6, print( ftable( addmargins( table( grp, igr, visit, typ.bed ),
+                                       margin = 1:2 ),
+                           col.vars=c(1,3) ),
+                    zero.print="." ) )
```

```
             grp   Plc                     Met                     Sum
             visit  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6
igr  typ.bed
AspD non              .   .   2   .   .   .   .   1   1   .   .   .   .   1   3   .   .   .
     Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Asp              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Det             73  69  64  62  61  57  65  60  59  58  55  52 138 129 123 120 116 109
Detm non              .   1   3   4   4   2   4   1   2   1   2   2   4   2   5   5   6   4
     Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Asp              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Det             66  56  50  48  42  41  66  64  62  61  59  58 132 120 112 109 101  99
Biph non             66  62  61  61  60  58  70  68  67  67  67  65 136 130 128 128 127 123
     Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Asp              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
Sum  non             66  63  66  65  64  60  74  70  70  68  69  67 140 133 136 133 133 127
     Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Asp              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Det            139 125 114 110 103  98 131 124 121 119 114 110 270 249 235 229 217 208
> with( out6, print( ftable( addmargins( table( grp, igr, visit, typ.ext ),
+                                        margin = 1:2 ),
+                            col.vars=c(1,3) ),
+                    zero.print="." ) )
             grp   Plc                     Met                     Sum
             visit  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6  v1  v2  v3  v4  v5  v6
igr  typ.ext
AspD non             73  69  66  61  61  56  65  60  59  57  54  50 138 129 125 118 115 106
     Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Asp              .   .   .   1   .   1   .   1   1   1   1   2   .   1   1   2   1   3
     Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
Detm non             66  56  51  50  43  38  70  64  64  59  60  58 136 120 115 109 103  96
     Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Asp              .   1   2   2   3   5   .   1   .   3   1   2   .   2   2   5   4   7
     Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
Biph non             66  62  61  61  60  58  70  68  67  67  67  65 136 130 128 128 127 123
     Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Asp              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
Sum  non            205 187 178 172 164 152 205 192 190 183 181 173 410 379 368 355 345 325
     Bip              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
     Asp              .   1   2   3   3   6   .   2   1   4   2   4   .   3   3   7   5  10
     Det              .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .
```

If we want to know how many persons have had more than once per day Detemir at a given visit, we derive this variable on the fly:

```
> with( out6, ftable( table( grp, igr, visit,
+                          nDet2 = ( (typ.mor=="Det") +
+                                    (typ.lch=="Det") +
+                                    (typ.din=="Det") +
+                                    (typ.bed=="Det") +
+                                    (typ.ext=="Det") ) > 1, useNA="ifany" ),
+                    col.vars=c(1,3) ) )
           grp   Plc                Met
           visit v1 v2 v3 v4 v5 v6 v1 v2 v3 v4 v5 v6
igr  nDet2
AspD FALSE       73 69 66 62 61 57 65 61 60 58 55 52
     TRUE         0  0  0  0  0  0  0  0  0  0  0  0
     NA           0  0  0  0  0  0  0  0  0  0  0  0
Detm FALSE       56 17 12 10 10  8 57 23 16 14 11  9
     TRUE        10 40 41 42 36 35 13 42 48 48 50 51
     NA           0  0  0  0  0  0  1  0  0  0  0  0
Biph FALSE       66 62 61 61 60 58 70 68 67 67 67 65
     TRUE         0  0  0  0  0  0  0  0  0  0  0  0
     NA           1  1  0  0  0  0  0  0  0  0  0  0
```

But we actually want to know how many persons that at *any* time during the follow-up has been on a given type of insulin. Thus for each type of insulin we want to classify persons by the maximal no of times a day of this type of insulin they get. To this end we first compute how many times each person at each visit gets a given type of insulin:

```
> out6 <- transform( out6,
+                    nBip = ( (typ.mor=="Bip") +
+                             (typ.lch=="Bip") +
+                             (typ.din=="Bip") +
+                             (typ.bed=="Bip") +
+                             (typ.ext=="Bip") ),
+                    nAsp = ( (typ.mor=="Asp") +
+                             (typ.lch=="Asp") +
+                             (typ.din=="Asp") +
+                             (typ.bed=="Asp") +
+                             (typ.ext=="Asp") ),
+                    nDet = ( (typ.mor=="Det") +
+                             (typ.lch=="Det") +
+                             (typ.din=="Det") +
+                             (typ.bed=="Det") +
+                             (typ.ext=="Det") ) )
> names( out6 )
 [1] "subjid"  "visit"   "grp"     "igr"     "over.65" "pre.ins" "sdc"     "weight"
 [9] "bmi"     "whr"     "hba1c"   "gluc"    "ins"     "idos"    "ipkg"    "cpep"
[17] "chol"    "ldl"     "hdl"     "vldl"    "trig"    "sys"     "dia"     "pulse"
[25] "vdate"   "dov"     "typ.mor" "dos.mor" "typ.lch" "dos.lch" "typ.din" "dos.din"
[33] "typ.bed" "dos.bed" "typ.ext" "dos.ext" "nBip"    "nAsp"    "nDet"
```

Then we aggregate over visits, computing the maximum number of doses of a given type across visits within each person. We take the randomization groupings into the the classification in order to have these for tabulation of the resulting datset

```
> wh <- c(1,3,4,37:39)
> names( out6 )[wh]
[1] "subjid" "grp"    "igr"    "nBip"   "nAsp"   "nDet"
> Nmax <- aggregate( out6[,37:39],
+                    out6[,c(1,3,4)],
+                    FUN = max )
> str( Nmax )
'data.frame':        412 obs. of  6 variables:
 $ subjid: int  10003 10007 10022 10028 20012 20014 20029 20037 20041 40010 ...
 $ grp   : Factor w/ 2 levels "Plc","Met": 1 1 1 1 1 1 1 1 1 1 ...
 $ igr   : Factor w/ 3 levels "AspD","Detm",..: 1 1 1 1 1 1 1 1 1 1 ...
 $ nBip  : int  0 3 0 0 0 0 0 0 0 0 ...
 $ nAsp  : int  3 3 3 3 3 3 3 3 3 3 ...
 $ nDet  : int  1 1 1 1 1 1 1 1 1 1 ...
> summary( Nmax )
     subjid         grp          igr            nBip            nAsp            nDet       
 Min.   :10001   Plc:206   AspD:138   Min.   :0.000   Min.   :0.000   Min.   :0.0000  
 1st Qu.:60015   Met:206   Detm:137   1st Qu.:0.000   1st Qu.:0.000   1st Qu.:0.0000  
 Median :90015             Biph:137   Median :0.000   Median :0.000   Median :1.0000  
 Mean   :70154                        Mean   :0.878   Mean   :1.141   Mean   :0.9366  
 3rd Qu.:91107                        3rd Qu.:2.000   3rd Qu.:3.000   3rd Qu.:2.0000  
 Max.   :91231                        Max.   :3.000   Max.   :4.000   Max.   :2.0000  
                                      NA's   :2       NA's   :2       NA's   :2       
> with( Nmax, ftable( addmargins( table( grp, igr, maxBip=nBip ), margin=1:3 ) ) )
           maxBip   0   1   2   3 Sum
grp igr                              
Plc AspD           64   4   0   5  73
    Detm           66   0   0   0  66
```

```
     Biph          0   3  30  33  66
     Sum         130   7  30  38 205
 Met AspD         58   4   0   3  65
     Detm         69   1   0   0  70
     Biph          0   5  35  30  70
     Sum         127  10  35  33 205
 Sum AspD        122   8   0   8 138
     Detm        135   1   0   0 136
     Biph          0   8  65  63 136
     Sum         257  17  65  71 410
```

```
> with( Nmax, ftable( addmargins( table( grp, igr, maxAsp=nAsp ), margin=1:3 ) ) )
```

```
          maxAsp   0   1   2   3   4 Sum
 grp igr
 Plc AspD          0   0   1  71   1  73
     Detm         45   9   6   6   0  66
     Biph         66   0   0   0   0  66
     Sum         111   9   7  77   1 205
 Met AspD          1   0   0  62   2  65
     Detm         59   8   2   1   0  70
     Biph         69   1   0   0   0  70
     Sum         129   9   2  63   2 205
 Sum AspD          1   0   1 133   3 138
     Detm        104  17   8   7   0 136
     Biph        135   1   0   0   0 136
     Sum         240  18   9 140   3 410
```

```
> with( Nmax, ftable( addmargins( table( grp, igr, maxDet=nDet ), margin=1:3 ) ) )
```

```
          maxDet   0   1   2 Sum
 grp igr
 Plc AspD          0  73   0  73
     Detm          0  13  53  66
     Biph         66   0   0  66
     Sum          66  86  53 205
 Met AspD          0  65   0  65
     Detm          0  13  57  70
     Biph         70   0   0  70
     Sum          70  78  57 205
 Sum AspD          0 138   0 138
     Detm          0  26 110 136
     Biph        136   0   0 136
     Sum         136 164 110 410
```

Chapter 3

Serious adverse events

The adverse events are part of the `base` dataset, so we retieve this:

```
> library(Epi)
> load( file="./data/base.Rda" )
> wh <- c(102,105,98,106)
> names( base )[wh]
  [1] "sevhypos" "nonsevhy" "total.sa" "sae.sevh"
```

These variables are all counts of number of episodes for each person.

Analyses of adverse events between patient groups is done by using

1. a Poisson model for the rate of events for each person
2. a logistic regression for the odds-ratio of any event

Both models are controlled for the stratification variables.

3.1 Analysis by Metformin/Placebo group

```
> for( i in wh )
+    {
+    cat( "\n-------------------------------------------------\n",
+         names(base)[i],"\n" )
+    tt <- table(base[,i], base[,"grp"] )
+    tt <- rbind( tt, apply( tt[-1,], 2, sum ),
+                apply( tt*as.numeric(dimnames(tt)[[1]]), 2, sum ) )
+    rownames(tt)[nrow(tt)-1:0] <- c("n.Ptt","n.Epi")
+    print( t(tt)[2:1,] )
+    cat ("\n")
+    RR <- ci.lin( glm( base[,i] ~ grp + pre.ins + over.65 + sdc,
+                      family=poisson, data=base ), E=T )[2,c(5:7,4),drop=FALSE]
+    OR <- ci.lin( glm( (base[,i]>0) ~ grp + pre.ins + over.65 + sdc,
+                      family=binomial, data=base ), E=T )[2,c(5:7,4),drop=FALSE]
+    est <- rbind( RR, OR )
+    rownames( est ) <- c("RR (N events)","OR (Any event)")
+    colnames( est )[1] <- "Met vs. Plc"
+    print( round( est, 4 ) )
+    }
  -------------------------------------------------
   sevhypos
       0 1 2 4 6 n.Ptt n.Epi
  Met 199 3 2 2 0     7    15
```

```
  Plc 199 6 0 0 1     7    12

                Met vs. Plc   2.5%  97.5%      P
  RR (N events)      1.2494 0.5848 2.6694 0.5654
  OR (Any event)     0.9972 0.3432 2.8970 0.9958

  ------------------------------------------------
   nonsevhy
       0  1  2  3  4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
  Met 49 15 12 10 12 3 3 7 6 5  4  3  3  1  3  1  2  3  1  5  0  0  2  2  2  2  1  3  1  0
  Plc 50 15 12 16  6 9 3 6 5 2  7  4  3  2  3  4  2  2  1  2  3  2  1  2  2  0  3  1  2  1
      30 31 32 33 34 35 36 37 38 40 42 43 44 48 51 52 53 54 56 57 59 64 66 68 70 71 72 74
  Met  2  2  3  0  1  2  0  3  3  0  2  2  0  2  0  1  0  1  0  0  1  2  0  0  2  0  0  0
  Plc  1  2  1  1  1  4  1  1  0  1  0  1  1  1  1  0  1  0  1  2  0  0  1  1  0  1  1  1
      75 77 78 82 83 86 87 95 96 101 102 107 116 124 125 132 135 181 184 199 209 250 n.Ptt
  Met  0  2  2  0  0  0  1  0  0   1   0   2   1   0   1   0   1   1   1   1   1   1   157
  Plc  1  0  0  1  1  1  0  1  1   0   1   0   0   1   0   1   0   0   0   0   0   0   156
      n.Epi
  Met  4347
  Plc  3161

                Met vs. Plc   2.5% 97.5%      P
  RR (N events)      1.3726 1.3112 1.437 0.0000
  OR (Any event)     1.0185 0.6444 1.610 0.9374

  ------------------------------------------------
   total.sa
        0  1 2 3 4 9 12 n.Ptt n.Epi
  Met 152 41 9 2 1 0  1    54    81
  Plc 161 33 6 2 3 1  0    45    72

                Met vs. Plc   2.5%  97.5%      P
  RR (N events)      1.1146 0.8114 1.5312 0.5029
  OR (Any event)     1.2627 0.7994 1.9943 0.3173

  ------------------------------------------------
   sae.sevh
        0  1  2 3 4 6 10 12 n.Ptt n.Epi
  Met 148 40 10 4 3 0  0  1    58    96
  Plc 157 35  7 1 4 1  1  0    49    84

                Met vs. Plc   2.5%  97.5%      P
  RR (N events)      1.1338 0.8460 1.5196 0.4007
  OR (Any event)     1.2472 0.7989 1.9473 0.3311
```

3.2 Analysis by Insulin group

```
> CM <- rbind( c(1,0), c(0,1), c(1,-1) )
> rownames( CM ) <- paste( levels( base$igr )[c(2,3,2)], "vs.",
+                          levels( base$igr )[c(1,1,3)] )
> CM

                [,1] [,2]
  Detm vs. AspD    1    0
  Biph vs. AspD    0    1
  Detm vs. Biph    1   -1

> for( i in wh )
+    {
+    cat( "\n-----------------------------------------------\n",
+         names(base)[i],"\n" )
+    tt <- table(base[,i], base[,"igr"] )
+    tt <- rbind( tt, apply( tt[-1,], 2, sum ),
```

```
+                 apply( tt*as.numeric(dimnames(tt)[[1]]), 2, sum ) )
+    rownames(tt)[nrow(tt)-1:0] <- c("n.Ptt","n.Epi")
+    print( t(tt) )
+    cat ("\n")
+    RR <- ci.lin( p1 <- glm( base[,i] ~ igr + pre.ins + over.65 + sdc,
+                             family=poisson, data=base ),
+                  subset="igr", ctr.mat=CM, E=T )[,c(5:7,4),drop=FALSE]
+    OR <- ci.lin( b1 <- glm( (base[,i]>0) ~ igr + pre.ins + over.65 + sdc,
+                             family=binomial, data=base ),
+                  subset="igr", ctr.mat=CM, E=T )[,c(5:7,4),drop=FALSE]
+    est <- rbind( RR,
+                  "RR=1" = c(NA,NA,NA,anova(p1,update(p1,.~.-igr),test="Chisq")[2,5]),
+                  OR,
+                  "OR=1" = c(NA,NA,NA,anova(b1,update(b1,.~.-igr),test="Chisq")[2,5]) )
+    rownames( est ) <- paste( c("RR (N events) ",
+                                "OR (Any event)",
+                                "              ")[c(1,3,3,3,2,3,3,3)],
+                              rownames(est) )
+    colnames( est )[1] <- "Estimate"
+    print( round( est, 4 ) )
+    }
```

```
 -------------------------------------------------
  sevhypos
        0 1 2 4 6 n.Ptt n.Epi
 AspD 133 2 0 2 1     5    16
 Detm 131 5 1 0 0     6     7
 Biph 134 2 1 0 0     3     4

                              Estimate  2.5%  97.5%      P
 RR (N events)  Detm vs. AspD   0.4408 0.1814 1.0715 0.0707
                Biph vs. AspD   0.2534 0.0847 0.7579 0.0141
                Detm vs. Biph   1.7397 0.5093 5.9431 0.3770
                RR=1                NA     NA     NA 0.0162
 OR (Any event) Detm vs. AspD   1.2178 0.3625 4.0905 0.7500
                Biph vs. AspD   0.5968 0.1397 2.5487 0.4859
                Detm vs. Biph   2.0405 0.4996 8.3347 0.3205
                OR=1                NA     NA     NA 0.5840

 -------------------------------------------------
  nonsevhy
       0  1 2  3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
 AspD 30  9 9 14 5 4 2 3 4 2  3  2  1  1  3  1  1  2  1  3  0  2  0  3  2  1  3  1  1  0
 Detm 42 11 7  7 8 2 0 6 5 0  4  2  3  1  2  1  1  1  1  2  1  0  1  0  0  1  1  0  0  0
 Biph 27 10 8  5 5 6 4 4 2 5  4  3  2  1  1  3  2  2  0  2  2  0  2  1  2  0  0  3  2  1
      30 31 32 33 34 35 36 37 38 40 42 43 44 48 51 52 53 54 56 57 59 64 66 68 70 71 72 74
 AspD  1  1  1  1  2  1  0  0  1  0  0  0  1  0  0  0  1  0  1  1  0  1  1  0  1  0  0  0
 Detm  1  1  1  0  0  3  0  3  1  1  1  1  0  2  1  0  0  0  0  0  1  1  0  1  0  1  1  1
 Biph  1  2  2  0  0  2  1  1  1  0  1  2  0  1  0  1  0  1  0  1  0  0  0  0  1  0  0  0
      75 77 78 82 83 86 87 95 96 101 102 107 116 124 125 132 135 181 184 199 209 250 n.Ptt
 AspD  0  1  2  0  1  1  0  1  1   1   0   0   0   0   0   0   0   1   0   0   0   1   108
 Detm  1  1  0  0  0  0  0  0  0   0   0   1   0   1   0   0   0   0   0   1   0   0    95
 Biph  0  0  0  1  0  0  1  0  0   0   1   1   1   0   1   1   1   0   1   0   1   0   110
      n.Epi
 AspD  2570
 Detm  2115
 Biph  2823

                              Estimate  2.5%  97.5%      P
 RR (N events)  Detm vs. AspD   0.8328 0.7862 0.8821 0.0000
                Biph vs. AspD   1.1065 1.0489 1.1672 0.0002
                Detm vs. Biph   0.7526 0.7114 0.7963 0.0000
                RR=1                NA     NA     NA 0.0000
 OR (Any event) Detm vs. AspD   0.6233 0.3592 1.0815 0.0927
                Biph vs. AspD   1.1334 0.6278 2.0460 0.6778
                Detm vs. Biph   0.5499 0.3131 0.9661 0.0375
                OR=1                NA     NA     NA 0.0814
```

```
------------------------------------------------
 total.sa
       0  1 2 3 4 9 12 n.Ptt n.Epi
AspD 107 23 4 2 2 0  0    31    45
Detm 106 26 3 1 0 1  0    31    44
Biph 100 25 8 1 2 0  1    37    64

                             Estimate   2.5%  97.5%      P
RR (N events)  Detm vs. AspD   0.9882 0.6522 1.4974 0.9555
               Biph vs. AspD   1.4309 0.9772 2.0951 0.0656
               Detm vs. Biph   0.6907 0.4705 1.0139 0.0588
               RR=1                NA     NA     NA 0.0900
OR (Any event) Detm vs. AspD   1.0125 0.5725 1.7906 0.9658
               Biph vs. AspD   1.2801 0.7354 2.2280 0.3826
               Detm vs. Biph   0.7910 0.4544 1.3771 0.4072
               OR=1                NA     NA     NA 0.6137

------------------------------------------------
 sae.sevh
       0  1 2 3 4 6 10 12 n.Ptt n.Epi
AspD 103 23 5 2 4 1  0  0    35    61
Detm 104 26 4 1 1 0  1  0    33    51
Biph  98 26 8 2 2 0  0  1    39    68

                             Estimate   2.5%  97.5%      P
RR (N events)  Detm vs. AspD   0.8446 0.5823 1.2251 0.3735
               Biph vs. AspD   1.1230 0.7948 1.5867 0.5107
               Detm vs. Biph   0.7521 0.5231 1.0814 0.1241
               RR=1                NA     NA     NA 0.3013
OR (Any event) Detm vs. AspD   0.9357 0.5383 1.6264 0.8137
               Biph vs. AspD   1.1729 0.6845 2.0096 0.5617
               Detm vs. Biph   0.7978 0.4629 1.3749 0.4159
               OR=1                NA     NA     NA 0.7026
```

Chapter 4

Primary outcome (CIMT)

4.1 Analysis as repeated measures

We load the data and the two necessary packages from R, and convert the subject indicator to a factor as is needed for use in `lmer`:

```
> library( lme4 )
> library( Epi )
> load( file="./data/AD.Rda" )
> AD$subjid <- factor( AD$subjid )
```

4.1.1 Model with baseline difference

We analyze data with a random effects model, for the CIMT-mean y_{it} on individual i at time $t = 1, 7$ (`fimtavg`), randomized to treatment $m =$ Met,Plc using subject as random, and with a separate metformin by time (`visit`) interaction:

$$\begin{aligned} y_{it} &= \mu + \beta_t + \gamma_{mt} \\ &\quad + \alpha_1 \texttt{over.65} + \alpha_2 \texttt{pre.ins} + \alpha_1 \texttt{sdc} \\ &\quad + a_i + e_{it}, \quad t = 1, 7 \\ a_i &\sim \mathcal{N}(0, \tau^2), \quad e_{it} \sim \mathcal{N}(0, \sigma^2), \quad \text{all independent} \end{aligned} \tag{4.1}$$

The model states that persons have an average baseline level of CIMT depending on randomization and stratification group; the mean at baseline and follow-up are:

$$\begin{aligned} \text{baseline:} &\quad \mu + \beta_1 + \gamma_{m1} + \alpha_1 \texttt{over.65} + \alpha_2 \texttt{pre.ins} + \alpha_3 \texttt{sdc} \\ \text{follow-up:} &\quad \mu + \beta_7 + \gamma_{m7} + \alpha_1 \texttt{over.65} + \alpha_2 \texttt{pre.ins} + \alpha_3 \texttt{sdc} \\ \text{change:} &\quad \beta_7 - \beta_1 + (\gamma_{m7} - \gamma_{m1}) \end{aligned}$$

So in the changes in CIMT are:

$$\begin{aligned} \text{metformin:} &\quad \beta_7 - \beta_1 + (\gamma_{\text{Met},7} - \gamma_{\text{Met},1}) \\ \text{placebo:} &\quad \beta_7 - \beta_1 + (\gamma_{\text{Plc},7} - \gamma_{\text{Plc},1}) \end{aligned}$$

The model as stated here is overparametrized, it can be identified if all parameters relating to baseline (β_1, γ_{m1}) and placebo ($\gamma_{\text{Plc},7}$) were set to 0, the changes in CIMT over the follow-up will then be

$$\begin{aligned}
\text{Metformin:} &\quad \beta_7 + \gamma_{\text{Met},v7} \\
\text{Placebo:} &\quad \beta_7 \\
\text{difference (Met−Plc):} &\quad \gamma_{\text{Met},v7}
\end{aligned}$$

These three parameters are those of interest which should be extracted.

The model is a random effects model that is very close to using the baseline (y_{i1}) as covariate in an analysis of the follow-up (y_{i7}) as outcome, as we shall see below:

```
> m0 <- lmer( fimtavg ~ -1  + visit + visit:grp + over.65 + pre.ins + sdc +(1|subjid),
+              data = AD )
> summary( m0 )
  Linear mixed model fit by REML ['lmerMod']
  Formula: fimtavg ~ -1 + visit + visit:grp + over.65 + pre.ins + sdc +      (1 | subjid)
     Data: AD

  REML criterion at convergence: -1383.079

  Random effects:
   Groups   Name        Variance Std.Dev.
   subjid   (Intercept) 0.014486 0.12036
   Residual             0.002639 0.05137
  Number of obs: 783, groups: subjid, 412

  Fixed effects:
                   Estimate Std. Error t value
  visitv1          0.7651115  0.0122561   62.43
  visitv7          0.7515577  0.0123754   60.73
  over.65>65       0.0897483  0.0138468    6.48
  pre.insnoIns     0.0061575  0.0138009    0.45
  sdcnotSDC        0.0140605  0.0127182    1.11
  visitv1:grpMet -0.0120250  0.0128962   -0.93
  visitv7:grpMet  0.0007237  0.0130987    0.06

  Correlation of Fixed Effects:
              vistv1 vistv7 o.65>6 pr.nsI sdcSDC vst1:M
  visitv7      0.905
  over.65>65  -0.355 -0.351
  pre.insnIns -0.267 -0.266  0.075
  sdcnotSDC   -0.462 -0.456  0.031 -0.204
  vstv1:grpMt -0.520 -0.434 -0.015  0.005 -0.006
  vstv7:grpMt -0.432 -0.526 -0.017  0.008 -0.007  0.833

> round( ee <- ci.lin( m0, subset="visit" ), 4 )

                 Estimate StdErr       z      P    2.5%  97.5%
  visitv1          0.7651 0.0123 62.4268 0.0000  0.7411 0.7891
  visitv7          0.7516 0.0124 60.7298 0.0000  0.7273 0.7758
  visitv1:grpMet  -0.0120 0.0129 -0.9324 0.3511 -0.0373 0.0133
  visitv7:grpMet   0.0007 0.0131  0.0552 0.9559 -0.0249 0.0264

> C0 <- rbind(rbind(cbind(diag(2),0,0),
+                    cbind(diag(2),diag(2))),
+                     c(-1,1,-1,1),
+                     c(-1,1, 0,0),
+                     c( 0,0,-1,1) )
> row.names(C0) <- c( paste( gN[c(1,1,2,2,2,1)],
+                            c(c("v1","v7")[c(1,2,1,2)],
+                              rep("18m - baseline",2) ) ),
+                     paste( gN[2], "vs.", gN[1] ) )
> colnames(C0) <- row.names(ee)
> C0
```

```
                                      visitv1 visitv7 visitv1:grpMet
  Placebo+Insulin v1                        1       0              0
  Placebo+Insulin v7                        0       1              0
  Metformin+Insulin v1                      1       0              1
  Metformin+Insulin v7                      0       1              0
  Metformin+Insulin 18m - baseline         -1       1             -1
  Placebo+Insulin 18m - baseline           -1       1              0
  Metformin+Insulin vs. Placebo+Insulin     0       0             -1
                                      visitv7:grpMet
  Placebo+Insulin v1                               0
  Placebo+Insulin v7                               0
  Metformin+Insulin v1                             0
  Metformin+Insulin v7                             1
  Metformin+Insulin 18m - baseline                 1
  Placebo+Insulin 18m - baseline                   0
  Metformin+Insulin vs. Placebo+Insulin            1
> e0 <- ci.lin( m0, subset="visit", ctr.mat=C0 )
> round( e0, 4 )
                                      Estimate StdErr       z      P    2.5%
  Placebo+Insulin v1                    0.7651 0.0123 62.4268 0.0000  0.7411
  Placebo+Insulin v7                    0.7516 0.0124 60.7298 0.0000  0.7273
  Metformin+Insulin v1                  0.7531 0.0123 61.0270 0.0000  0.7289
  Metformin+Insulin v7                  0.7523 0.0124 60.6012 0.0000  0.7280
  Metformin+Insulin 18m - baseline     -0.0008 0.0053 -0.1529 0.8785 -0.0111
  Placebo+Insulin 18m - baseline       -0.0136 0.0054 -2.5283 0.0115 -0.0241
  Metformin+Insulin vs. Placebo+Insulin  0.0127 0.0075  1.6963 0.0898 -0.0020
                                        97.5%
  Placebo+Insulin v1                   0.7891
  Placebo+Insulin v7                   0.7758
  Metformin+Insulin v1                 0.7773
  Metformin+Insulin v7                 0.7766
  Metformin+Insulin 18m - baseline     0.0095
  Placebo+Insulin 18m - baseline      -0.0030
  Metformin+Insulin vs. Placebo+Insulin  0.0275
```

The model fitted here gives a separate mean CIMT value for each of the randomization groups at each of the two timepoints. This allows derivation of the goup-specific changes and the difference between these changes as shown above.

The assumption introduced in order to get these baseline-values is that the between-person-variation in CIMT is the same in the two randomization groups. So only the population-*means* at baseline are assumed different between the two randomization groups.

Note that the between-person-SD is 0.0144 mm whereas the the mean difference between the groups at baseline is $0.7531 - 0.7651 = -0.0120$mm, in the same order of magnitude as the between-person SD, but with a SE of the same order too (0.0129).

4.1.2 Assuming identical mean baseline

Since the study is randomized, we might argue that it woud be equally sensible to assume the the population means were identical at baseline too[1].

If we want to fit this model, we must hand-code the interaction at the follow-up visit:

```
> mm <- model.matrix( ~ visit:grp-1, data = AD )
> m7 <- mm[,xx <- grep("v7",colnames(mm))]
> head( m7 )
```

[1]This is a rare example of a model with group×visit interaction but no corresponding group intercept, violating the socalled “principle of marginality”. But in this case there is an explicit argument for the model, namely the randomization at baseline.

```
  visitv7:grpPlc visitv7:grpMet
1              0              0
2              0              0
3              0              0
4              0              0
5              0              0
6              0              0
```

The model matrix `m7` thus generated only has the indicators of randomization group at follow-up, so we need the intercept in this model to take care of the overall mean:

```
> m1 <- lmer( fimtavg ~ m7 + over.65 + pre.ins + sdc + (1|subjid),
+             data = AD )
> summary( m1 )
  Linear mixed model fit by REML ['lmerMod']
  Formula: fimtavg ~ m7 + over.65 + pre.ins + sdc + (1 | subjid)
     Data: AD

  REML criterion at convergence: -1389.073

  Random effects:
   Groups   Name        Variance Std.Dev.
   subjid   (Intercept) 0.014482 0.12034
   Residual             0.002639 0.05137
  Number of obs: 783, groups: subjid, 412

  Fixed effects:
                    Estimate Std. Error t value
  (Intercept)       0.759174   0.010470   72.51
  m7visitv7:grpPlc -0.012628   0.005268   -2.40
  m7visitv7:grpMet -0.001732   0.005173   -0.33
  over.65>65        0.089549   0.013843    6.47
  pre.insnoIns      0.006222   0.013799    0.45
  sdcnotSDC         0.013985   0.012716    1.10

  Correlation of Fixed Effects:
              (Intr) m7v7:P m7v7:M o.65>6 pr.nsI
  m7vstv7:grP -0.119
  m7vstv7:grM -0.120  0.036
  over.65>65  -0.425  0.006 -0.005
  pre.insnIns -0.309 -0.007  0.004  0.075
  sdcnotSDC   -0.545  0.006  0.003  0.031 -0.204
> round( ee <- ci.lin( m1, subset=1:3 ), 4 )
                   Estimate StdErr       z      P    2.5%   97.5%
  (Intercept)        0.7592 0.0105 72.5063 0.0000  0.7387  0.7797
  m7visitv7:grpPlc  -0.0126 0.0053 -2.3971 0.0165 -0.0230 -0.0023
  m7visitv7:grpMet  -0.0017 0.0052 -0.3347 0.7378 -0.0119  0.0084
> C1 <- rbind( c(1,0,0),
+              c(1,1,0),
+              c(1,0,0),
+              c(1,0,1),
+              c(0,0,1),
+              c(0,1,0),
+              c(0,-1,1) )
> colnames(C1) <- row.names(ee)
> C1
       (Intercept) m7visitv7:grpPlc m7visitv7:grpMet
  [1,]           1                0                0
  [2,]           1                1                0
  [3,]           1                0                0
  [4,]           1                0                1
  [5,]           0                0                1
  [6,]           0                1                0
  [7,]           0               -1                1
```

```
> round( e1 <- ci.lin( m1, subset=1:3, ctr.mat=C1 ), 4 )
     Estimate StdErr       z      P    2.5%   97.5%
[1,]   0.7592 0.0105 72.5063 0.0000  0.7387  0.7797
[2,]   0.7465 0.0111 66.9806 0.0000  0.7247  0.7684
[3,]   0.7592 0.0105 72.5063 0.0000  0.7387  0.7797
[4,]   0.7574 0.0111 68.1777 0.0000  0.7357  0.7792
[5,]  -0.0017 0.0052 -0.3347 0.7378 -0.0119  0.0084
[6,]  -0.0126 0.0053 -2.3971 0.0165 -0.0230 -0.0023
[7,]   0.0109 0.0072  1.5033 0.1328 -0.0033  0.0251

> rownames( e1 ) <- rownames( e0 )
> round( e1, 4 )
                                   Estimate StdErr       z      P    2.5%
Placebo+Insulin v1                   0.7592 0.0105 72.5063 0.0000  0.7387
Placebo+Insulin v7                   0.7465 0.0111 66.9806 0.0000  0.7247
Metformin+Insulin v1                 0.7592 0.0105 72.5063 0.0000  0.7387
Metformin+Insulin v7                 0.7574 0.0111 68.1777 0.0000  0.7357
Metformin+Insulin 18m - baseline    -0.0017 0.0052 -0.3347 0.7378 -0.0119
Placebo+Insulin 18m - baseline      -0.0126 0.0053 -2.3971 0.0165 -0.0230
Metformin+Insulin vs. Placebo+Insulin  0.0109 0.0072  1.5033 0.1328 -0.0033
                                     97.5%
Placebo+Insulin v1                  0.7797
Placebo+Insulin v7                  0.7684
Metformin+Insulin v1                0.7797
Metformin+Insulin v7                0.7792
Metformin+Insulin 18m - baseline    0.0084
Placebo+Insulin 18m - baseline     -0.0023
Metformin+Insulin vs. Placebo+Insulin  0.0251
```

We can compare the estimated changes within groups under the two different assumptions:

```
> round( cbind( e0[,1:2], e1[,1:2] ), 4 )
                                   Estimate StdErr Estimate StdErr
Placebo+Insulin v1                   0.7651 0.0123   0.7592 0.0105
Placebo+Insulin v7                   0.7516 0.0124   0.7465 0.0111
Metformin+Insulin v1                 0.7531 0.0123   0.7592 0.0105
Metformin+Insulin v7                 0.7523 0.0124   0.7574 0.0111
Metformin+Insulin 18m - baseline    -0.0008 0.0053  -0.0017 0.0052
Placebo+Insulin 18m - baseline      -0.0136 0.0054  -0.0126 0.0053
Metformin+Insulin vs. Placebo+Insulin  0.0127 0.0075   0.0109 0.0072
```

If we are going to present the effect measure as derived from the conditional model (*i.e.* using baseline as covariate, then we should use the estimated changes from the model `m1` without allowance for baseline imbalance.

4.1.3 Plotting results

For plotting convenience we need the `cnr` function:

```
> source( "cnr.R" )
> cnr
function (xf, yf)
{
    cn <- par()$usr
    xf <- ifelse(xf > 1, xf/100, xf)
    yf <- ifelse(yf > 1, yf/100, yf)
    xx <- (1 - xf) * cn[1] + xf * cn[2]
    yy <- (1 - yf) * cn[3] + yf * cn[4]
    if (par()$xlog)
        xx <- 10^xx
```

```
    if (par()$ylog)
        yy <- 10^yy
    list(x = xx, y = yy)
}
> ppclr <- rgb( t(col2rgb(clr)+255)/2, max=255 )
```

We first produce an overview of the estimates of the absolute levels (in this case in the reference group, which is the largest: under 65, previous insulin, from SDC):

Note that the dramatically looking differences are of the same magnitude as the between person variation. The two lines represent the between-person SD from the two different models.

From the figure **??** it is clear that the changes in each group (and hence the difference between the changes) are pretty similar under the two models, it is the absolute levels in the groups that differ.

```
> par( mar=c(3,1,1,1), mgp=c(3,1,0)/1.6 )
> plotEst( e0[5:7,c(1,5,6)], lwd=4, cex=1.5,
+          xlab="", col=ppclr, vref=0, y=3:1+0.1,
+          restore.par=FALSE )
> linesEst( e1[5:7,c(1,5,6)], lwd=4, lty=3, cex=1.5,
+           xlab="", col=clr, vref=0, y=3:1-0.1,
+           restore.par=FALSE )
> axis( side=1 )
> mtext( "Mean carotid IMT (mm)", side=1, line=3/1.6, col=clr[4] )
```

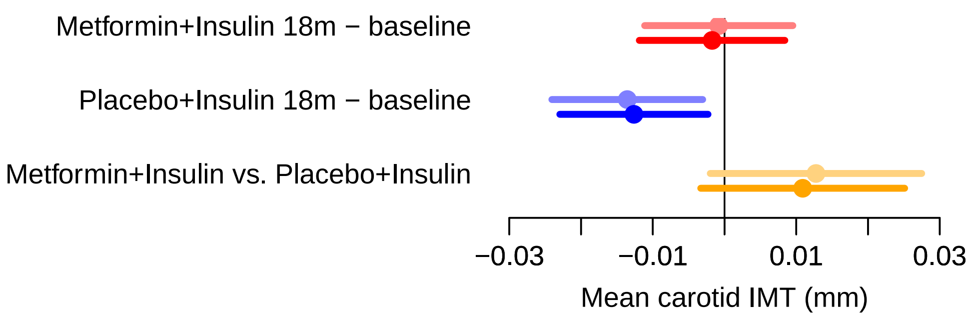

Figure 4.1: *Estimated changes and treatment effect on CIMT, full colors are from the model assuming common means at baseline, pale colors from the model allowing baseline imbalance.*

For the sake of showing the effects in slides we start out by defining the colors to be used for Metformin, Placebo, differences and the axes etc. on the transparent plots:

```
> win.metafile( "./results/forest1.emf", width=10, height=5, pointsize=24 )
> par( mar=c(3,1,1,1), mgp=c(3,1,0)/1.6,
+      bg=#"black",
+         "transparent",
+      col.axis=clr[4], col.lab=clr[4] )
> plotEst( e0[5:7,c(1,5,6)], lwd=7,cex=1.5,
+          xlab="", col.txt="transparent", col=clr,
+          restore.par=FALSE )
> for( i in 1:3 ) axis( side=2, at=4-i, labels=rownames(e0)[4+i], col="transparent",
+                       col.axis= clr[i], las=1 )
> abline( v=0, col=clr[4] )
> axis( side=1, col=clr[4] )
> mtext( "Carotid intima-media thickness (mm)", side=1, line=3/1.6, col=clr[4] )
> dev.off()
  null device
            1
```

4.2 Analysis using baseline as covariate

Another way of looking at the analysis is to use the measurement at the second occasion using the baseline measurement as covariate. The regression on the baseline-value is effectively making an analysis *conditional* on this value for each person. This means that we are not making any assumptions about the population distribution of baseline-CIMT between the two randomization groups, that is, taking a step in the `opposite` direction from the initial model of the model assuming equal baseline means in the two groups.

But because of this lack of assumptions about the distribution of baseline CIMT measurements, the model does not address the change in CIMT in each treatment group, simply because the expected CIMT at baseline for a given person is not a parameter in the model.

4.2.1 Model

The main difference is that the absolute change in the response from baseline to follow-up in each of the groups does not appear as a parameter in this approach. The model is (for 7—follow-up and 1—baseline):

$$\begin{aligned} y_{i7} &= \mu + \theta y_{i1} + \gamma_m \\ &\quad + \alpha_1 \texttt{o.65} + \alpha_2 \texttt{pre.ins} + \alpha_1 \texttt{SDC} \\ &\quad + e_i, \\ e_i &\sim \mathcal{N}(0, \sigma^2) \end{aligned} \tag{4.2}$$

The parameter of interest here is γ_m, the *difference* between the changes in the Met and the Plc groups.

In order to use this approach we restructure the data set so that we have only one row per person with follow-up and baseline as separate variables:

```
> names( AD )
 [1] "subjid"      "grp"         "igr"
 [4] "over.65"     "pre.ins"     "sdc"
 [7] "visit"       "weight"      "bmi"
[10] "whr"         "hba1c"       "gluc"
[13] "ins"         "idos"        "ipkg"
[16] "cpep"        "chol"        "ldl"
[19] "hdl"         "vldl"        "trig"
[22] "sys"         "dia"         "pulse"
[25] "vdate"       "dov"         "typ.mor"
[28] "dos.mor"     "typ.lch"     "dos.lch"
[31] "typ.din"     "dos.din"     "typ.bed"
[34] "dos.bed"     "typ.ext"     "dos.ext"
[37] "birthdat"    "visitdat"    "sex"
[40] "diabetes"    "peri.neu"    "auto.neu"
[43] "laserbeh"    "sys1.b0"     "dia1.b0"
[46] "sys2.b0"     "dia2.b0"     "pulse.b0"
[49] "microalb"    "macroalb"    "e.gfr"
[52] "b1bdato"     "smoking."    "alcohol."
[55] "hba1c.b1"    "hba1c.b7"    "gluc.b1a"
[58] "gluc.b7a"    "cpep.b1a"    "cpep.b7a"
[61] "ins.b1a"     "ins.b7a"     "chol.b1a"
[64] "chol.b7a"    "trig.b1a"    "trig.b7a"
[67] "ldl.b1a"     "ldl.b7a"     "vldl.b1a"
[70] "vldl.b7a"    "hdlc.b1a"    "hdlc.b7a"
[73] "gad65.b1"    "weight.b"    "weight.2"
```

```
 [76] "height.b"          "height.2"          "talje.b1"
 [79] "talje.b7"          "hofte.b1"          "hofte.b7"
 [82] "avgnatua"          "avgnatu2"          "metformi"
 [85] "su"                "statin"            "fibrat"
 [88] "lipids"            "asa"               "thyre"
 [91] "apurin"            "nsaid"             "painkill"
 [94] "antidep"           "gaba"              "impo"
 [97] "ntg"               "gastro"            "contrace"
[100] "antibiot"          "dvit"              "calc"
[103] "alendr"            "bvit"              "lung"
[106] "other"             "plataggr"          "iron"
[109] "fishoil"           "othernat"          "loop.ccb"
[112] "dvit.cal"          "bvit.iro"          "dob"
[115] "doV"               "dodm"              "dor"
[118] "caucas"            "gad.0"             "gad.pos"
[121] "retin"             "cvd"               "ras"
[124] "oah"               "oad"               "aav"
[127] "dmdurav"           "xdate"             "xtype"
[130] "total.sa"          "any.sae."          "allhypos"
[133] "sum.klar"          "sevhypos"          "any.hypo"
[136] "any.seve"          "nonsevhy"          "sae.sevh"
[139] "any.sae2"          "any.nons"          "pp"
[142] "datescanned"       "fimtavg"           "fimtmin"
[145] "fimtmax"           "minvesseldia"      "maxvesseldia"
[148] "vesselareal"       "lumenareal"        "imtareal"
[151] "systolicpressure"  "diastolicpressure" "ddpct"
[154] "csdpct"            "dc"                "csc1"
[157] "csc2"              "iem"               "fimtavg.R"
[160] "fimtmin.R"         "fimtmax.R"         "minvesseldia.R"
[163] "maxvesseldia.R"    "vesselareal.R"     "lumenareal.R"
[166] "imtareal.R"        "csc1.R"            "csc2.R"
[169] "iem.R"             "fimtavg.L"         "fimtmin.L"
[172] "fimtmax.L"         "minvesseldia.L"    "maxvesseldia.L"
[175] "vesselareal.L"     "lumenareal.L"      "imtareal.L"
[178] "csc1.L"            "csc2.L"            "iem.L"
[181] "BIF.L"             "BIF.R"             "CCA.L"
[184] "CCA.R"             "ICA.L"             "ICA.R"
[187] "n.pl"
```

```
> wimt <- reshape( AD[AD$visit %in% c("v1","v7"),
+                     c("fimtavg","visit","subjid","grp","over.65","pre.ins","sdc")],
+                  direction = "wide",
+                    v.names = "fimtavg",
+                    timevar = "visit",
+                      idvar = "subjid" )
> subset( AD[,c("fimtavg","visit","subjid","grp","over.65","pre.ins","sdc")],
+         subjid=="10002" )
```

```
   fimtavg visit subjid grp over.65 pre.ins    sdc
8    0.925    v1  10002 Plc     >65   noIns notSDC
9       NA    v2  10002 Plc     >65   noIns notSDC
10      NA    v3  10002 Plc     >65   noIns notSDC
11      NA    v4  10002 Plc     >65   noIns notSDC
12      NA    v5  10002 Plc     >65   noIns notSDC
13      NA    v6  10002 Plc     >65   noIns notSDC
14   0.760    v7  10002 Plc     >65   noIns notSDC
```

```
> subset( wimt, subjid=="10002" )
```

```
  subjid grp over.65 pre.ins    sdc fimtavg.v1 fimtavg.v7
8  10002 Plc     >65   noIns notSDC      0.925       0.76
```

We now have a dataset with the relevant variables, where we can estimate the difference in changes between the two groups:

```
> mf <- lm( fimtavg.v7 ~ fimtavg.v1 + grp + over.65 + pre.ins + sdc,
+           data = wimt )
> summary( mf )
```

```
Call:
lm(formula = fimtavg.v7 ~ fimtavg.v1 + grp + over.65 + pre.ins +
    sdc, data = wimt)

Residuals:
      Min        1Q    Median        3Q       Max
-0.246178 -0.039118  0.000996  0.042370  0.218314

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.105199   0.022289   4.720 3.37e-06
fimtavg.v1    0.839373   0.027631  30.378  < 2e-16
grpMet        0.010418   0.007252   1.437   0.1517
over.65>65    0.020962   0.008412   2.492   0.0132
pre.insnoIns -0.005352   0.008056  -0.664   0.5069
sdcnotSDC     0.011232   0.007432   1.511   0.1316

Residual standard error: 0.06966 on 365 degrees of freedom
  (41 observations deleted due to missingness)
Multiple R-squared:  0.7439,       Adjusted R-squared:  0.7404
F-statistic:   212 on 5 and 365 DF,  p-value: < 2.2e-16
```

```
> mm <- lm( fimtavg.v7 ~ fimtavg.v1 + grp,
+            data = wimt )
> summary( mm )
```

```
Call:
lm(formula = fimtavg.v7 ~ fimtavg.v1 + grp, data = wimt)

Residuals:
      Min        1Q    Median        3Q       Max
-0.259533 -0.038533  0.000097  0.042784  0.218626

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 0.098472   0.021941   4.488 9.63e-06
fimtavg.v1  0.859657   0.026706  32.190  < 2e-16
grpMet      0.011424   0.007296   1.566    0.118

Residual standard error: 0.07018 on 368 degrees of freedom
  (41 observations deleted due to missingness)
Multiple R-squared:  0.7379,       Adjusted R-squared:  0.7365
F-statistic: 518.1 on 2 and 368 DF,  p-value: < 2.2e-16
```

```
> round( cf <- ci.lin( mf, subset=c("fimt","Met") ), 4 )
```

```
           Estimate StdErr       z      P    2.5%  97.5%
fimtavg.v1   0.8394 0.0276 30.3782 0.0000  0.7852 0.8935
grpMet       0.0104 0.0073  1.4366 0.1508 -0.0038 0.0246
```

```
> round( cm <- ci.lin( mm, subset=c("fimt","Met") ), 4 )
```

```
           Estimate StdErr       z      P    2.5%  97.5%
fimtavg.v1   0.8597 0.0267 32.1899 0.0000  0.8073 0.9120
grpMet       0.0114 0.0073  1.5658 0.1174 -0.0029 0.0257
```

These estimates can now be compared with those from the random effects model, where the relevant quantities to compare are the additive effects of treatment:

```
> round( rbind( "Base-simple" = cm[2,],
+               "Base-contrl" = cf[2,],
+                "RanEff-dif" = e0[7,],
+                "RanEff-eql" = e1[7,] ), 4 )
```

```
            Estimate StdErr      z      P    2.5%  97.5%
Base-simple   0.0114 0.0073 1.5658 0.1174 -0.0029 0.0257
Base-contrl   0.0104 0.0073 1.4366 0.1508 -0.0038 0.0246
RanEff-dif    0.0127 0.0075 1.6963 0.0898 -0.0020 0.0275
RanEff-eql    0.0109 0.0072 1.5033 0.1328 -0.0033 0.0251
```

Clearly, the conclusion for the models are not substantially different; CIMT difference is some 0.01 mm larger between the groups at follow-up; in favor of the Placebo group.

```
> par( mar=c(3,1,1,1), mgp=c(3,1,0)/1.6 )
> plotEst( e0[5:7,c(1,5,6)], lwd=4, cex=1.5,
+          xlab="", col=ppclr, vref=0, y=3:1-0.1, ylim=c(0,3.5),
+          restore.par=FALSE )
> linesEst( e1[5:7,c(1,5,6)], lwd=4, lty=3, cex=1.5,
+           xlab="", col=clr, vref=0, y=3:1+0.1 )
> linesEst( cf[2,c(1,5,6),drop=FALSE], lwd=4, lty=3, cex=1.5,
+           xlab="", col=clr[4], vref=0, y=1+0.3 )
> axis( side=1 )
> mtext( "Mean carotid IMT (mm)", side=1, line=3/1.6, col=clr[4] )
```

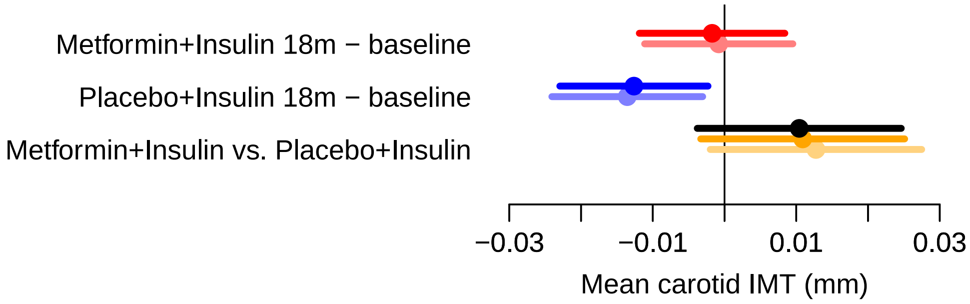

Figure 4.2: *Estimated changes and treatment effect on CIMT, full colors are from the model assuming common means at baseline, pale colors from the model allowing baseline imbalance. The top (black) estimate for the difference is the effect estimate from the conditional model using the baseline as covariate.*

4.3 Multiple imputation

```
> load( file="./data/AD.Rda" )
```

We see that there are some missing values in the follow-up values. Therefore we make a multiple imputation using a rich model to predict the outcome for additional analyses.

Hence we are using the multiple imputation on a wide dataset, expanded with the variables to be used in the imputation

```
> v.names <- c("fimtavg","hba1c","bmi","weight","sys","dia",
+              "chol","trig","ldl","hdl","idos","n.pl")
> wimt <- reshape( AD[,c("subjid","visit","grp","igr","over.65","pre.ins","sdc",
+                        "sex","cvd","statin",
+                        v.names)],
+                  direction = "wide",
+                    v.names = v.names,
+                    timevar = "visit",
+                      idvar = "subjid" )
> subset( AD[,c("fimtavg","visit","subjid","grp","igr","over.65","pre.ins","sdc","sex","cvd","statin
+         subjid=="10002" )
   fimtavg visit subjid grp  igr over.65 pre.ins    sdc sex   cvd statin
8    0.925    v1  10002 Plc Biph     >65   noIns notSDC   0 FALSE      1
9       NA    v2  10002 Plc Biph     >65   noIns notSDC   0 FALSE      1
10      NA    v3  10002 Plc Biph     >65   noIns notSDC   0 FALSE      1
11      NA    v4  10002 Plc Biph     >65   noIns notSDC   0 FALSE      1
12      NA    v5  10002 Plc Biph     >65   noIns notSDC   0 FALSE      1
13      NA    v6  10002 Plc Biph     >65   noIns notSDC   0 FALSE      1
14   0.760    v7  10002 Plc Biph     >65   noIns notSDC   0 FALSE      1
> subset( wimt, subjid=="10002" )
  subjid grp  igr over.65 pre.ins    sdc sex   cvd statin fimtavg.v1 hba1c.v1
8  10002 Plc Biph     >65   noIns notSDC   0 FALSE      1      0.925      7.6
    bmi.v1 weight.v1 sys.v1 dia.v1 chol.v1 trig.v1 ldl.v1 hdl.v1 idos.v1
8 25.14208      66.8    128   75.5     3.8    1.03    1.7   1.66      14
  n.pl.v1 fimtavg.v2 hba1c.v2   bmi.v2 weight.v2 sys.v2 dia.v2 chol.v2 trig.v2
8      17         NA      7.5 25.44319      67.6    123   72.5      NA      NA
  ldl.v2 hdl.v2 idos.v2 n.pl.v2 fimtavg.v3 hba1c.v3   bmi.v3 weight.v3 sys.v3
8     NA     NA      38      NA         NA      6.9 26.00775      69.1  115.5
  dia.v3 chol.v3 trig.v3 ldl.v3 hdl.v3 idos.v3 n.pl.v3 fimtavg.v4 hba1c.v4
8     65       4     0.9      2    1.6      40      NA         NA      6.3
    bmi.v4 weight.v4 sys.v4 dia.v4 chol.v4 trig.v4 ldl.v4 hdl.v4 idos.v4
8 26.00775      69.1  131.5   71.5      NA      NA     NA     NA      40
  n.pl.v4 fimtavg.v5 hba1c.v5   bmi.v5 weight.v5 sys.v5 dia.v5 chol.v5 trig.v5
8      NA         NA      6.6 25.78193      68.5    133     68     4.7     0.6
  ldl.v5 hdl.v5 idos.v5 n.pl.v5 fimtavg.v6 hba1c.v6   bmi.v6 weight.v6 sys.v6
8    2.4      2      40      NA         NA      6.4 26.23358      69.7  142.5
  dia.v6 chol.v6 trig.v6 ldl.v6 hdl.v6 idos.v6 n.pl.v6 fimtavg.v7 hba1c.v7
8     76      NA      NA     NA     NA      40      NA       0.76      6.1
    bmi.v7 weight.v7 sys.v7 dia.v7 chol.v7 trig.v7 ldl.v7 hdl.v7 idos.v7
8 26.72287        71    107   66.5     4.2    1.05    1.6   2.08      NA
  n.pl.v7
8      23
```

Naturally, some of the generated variables in `ximt` have all missing values, so we exclude these from the dataset:

```
> wh.use <- names(wimt)[apply( wimt, 2, function(x) mean(is.na(x)) )<1]
> wimt <- wimt[,wh.use]
```

We then take a look at the missingness pattern of the outcome variable, since we will include this in the multipple imputaion too:

```
> library( mice )
> library( foreign )
> mm <- cbind( 1:ncol(wimt),
+              t( apply( wimt, 2, function(x) c(sum(is.na(x)),
+                                                length(unique(x))) ) ) )
> colnames( mm ) <- c("no.","N.miss","N.values")
> mm
```

```
            no. N.miss N.values
 subjid       1      0      412
 grp          2      0        2
 igr          3      0        3
 over.65      4      0        2
 pre.ins      5      0        2
 sdc          6      0        2
 sex          7      0        2
 cvd          8      0        2
 statin       9      0        2
 fimtavg.v1  10      0      118
 hba1c.v1    11      0       49
 bmi.v1      12      0      404
 weight.v1   13      0      299
 sys.v1      14      5      119
 dia.v1      15      5       88
 chol.v1     16      0       46
 trig.v1     17      0      228
 ldl.v1      18     14       43
 hdl.v1      19      0      129
 idos.v1     20      2       79
 n.pl.v1     21    118       18
 hba1c.v2    22     32       61
 bmi.v2      23     32      377
 weight.v2   24     32      269
 sys.v2      25     33      122
 dia.v2      26     33       89
 idos.v2     27     32      130
 hba1c.v3    28     45       57
 bmi.v3      29     42      370
 weight.v3   30     42      273
 sys.v3      31     42      124
 dia.v3      32     42       87
 chol.v3     33     66       49
 trig.v3     34     69      179
 ldl.v3      35     75       42
 hdl.v3      36     66       95
 idos.v3     37     45      142
 hba1c.v4    38     53       55
 bmi.v4      39     54      354
 weight.v4   40     54      278
 sys.v4      41     54      123
 dia.v4      42     54       79
 idos.v4     43     51      144
 hba1c.v5    44     64       54
 bmi.v5      45     65      344
 weight.v5   46     65      263
 sys.v5      47     64      112
 dia.v5      48     64       80
 chol.v5     49     74       44
 trig.v5     50     75      187
 ldl.v5      51     86       40
 hdl.v5      52     75      107
 idos.v5     53     63      146
 hba1c.v6    54     83       46
 bmi.v6      55     79      331
 weight.v6   56     79      265
 sys.v6      57     81      109
 dia.v6      58     81       82
```

```
  idos.v6      59     78      143
  fimtavg.v7   60     41      105
  hba1c.v7     61     39       56
  bmi.v7       62     43      366
  weight.v7    63     43      286
  sys.v7       64     69      119
  dia.v7       65     69       82
  chol.v7      66     42       52
  trig.v7      67     42      214
  ldl.v7       68     55       40
  hdl.v7       69     42      118
  n.pl.v7      70    133       22
```

We must define the variables `sex`, `cvd` and `statin` as factors in order to get the imputation running properly:

```
> wimt <- transform( wimt, sex = factor(sex,labels=c("F","M")),
+                          cvd = factor(cvd,labels=c("No","Yes")),
+                       statin = factor(statin,labels=c("No","Yes")) )
> str( wimt )
  'data.frame':        412 obs. of  70 variables:
   $ subjid     : int  10001 10002 10003 10004 10005 10006 10007 10008 10009 10010 ...
   $ grp        : Factor w/ 2 levels "Plc","Met": 2 1 1 1 1 1 1 1 1 2 ...
   $ igr        : Factor w/ 3 levels "Biph","AspD",..: 1 1 2 1 1 1 2 1 3 3 ...
   $ over.65    : Factor w/ 2 levels "<65",">65": 2 2 1 1 1 1 2 1 1 1 ...
   $ pre.ins    : Factor w/ 2 levels "preIns","noIns": 2 2 1 2 1 2 2 2 2 1 ...
   $ sdc        : Factor w/ 2 levels "SDC","notSDC": 2 2 2 2 2 2 2 2 2 2 ...
   $ sex        : Factor w/ 2 levels "F","M": 2 1 1 1 2 2 1 1 1 2 ...
   $ cvd        : Factor w/ 2 levels "No","Yes": 1 1 1 1 1 2 2 1 1 1 ...
   $ statin     : Factor w/ 2 levels "No","Yes": 1 2 2 2 2 2 2 2 2 2 ...
   $ fimtavg.v1: num  0.825 0.925 0.94 1.02 0.71 0.805 0.78 0.96 0.585 0.7 ...
   $ hba1c.v1  : num  7.9 7.6 9.3 8.9 8.7 8.6 8.5 10.7 10.2 8.3 ...
   $ bmi.v1    : num  33 25.1 34.2 25.1 30.4 ...
   $ weight.v1 : num  121.7 66.8 98.8 77.8 96.4 ...
   $ sys.v1    : num  149 128 156 125 97.5 ...
   $ dia.v1    : num  86 75.5 93 83.5 60 70.5 79.5 89 93.5 76.5 ...
   $ chol.v1   : num  4.4 3.8 3.6 2.6 4.6 4.5 3.5 6.3 6.4 5.1 ...
   $ trig.v1   : num  1.82 1.03 1.61 3.31 2.28 1.93 1.74 4.36 2.48 4.29 ...
   $ ldl.v1    : num  2.3 1.7 1.9 0.6 2.8 2.1 1.2 3.4 4.2 2.2 ...
   $ hdl.v1    : num  1.3 1.66 1.01 0.5 0.81 1.5 1.55 0.95 1.03 0.95 ...
   $ idos.v1   : num  14 14 40 14 70 20 30 20 44 44 ...
   $ n.pl.v1   : int  4 17 NA 5 NA 3 5 NA 2 2 ...
   $ hba1c.v2  : num  7.1 7.5 10.5 10.6 9.2 8.2 8.6 9.4 11.1 7.7 ...
   $ bmi.v2    : num  33.1 25.4 34.7 27.2 31.6 ...
   $ weight.v2 : num  122.1 67.6 100.3 84.4 100 ...
   $ sys.v2    : num  136 123 145 128 136 ...
   $ dia.v2    : num  65.5 72.5 87 83.5 79 89.5 74.5 75.5 86 74.5 ...
   $ idos.v2   : num  54 38 86 146 156 66 52 170 90 66 ...
   $ hba1c.v3  : num  6.3 6.9 NA 8.7 8.1 6.8 6.9 7.3 10.7 8.2 ...
   $ bmi.v3    : num  32.8 26 NA 27.7 32 ...
   $ weight.v3 : num  120.8 69.1 NA 85.7 101.3 ...
   $ sys.v3    : num  136 116 NA 126 121 ...
   $ dia.v3    : num  69.5 65 NA 79 69.5 70 73.5 82 91.5 80 ...
   $ chol.v3   : num  4 4 NA 4.3 4.8 4.8 4.1 5.1 4.1 5 ...
   $ trig.v3   : num  1.1 0.9 NA 2.7 1.3 1.2 1.5 2.3 0.8 3.4 ...
   $ ldl.v3    : num  2.2 2 NA 2.3 3.3 2.9 2 3.1 2.6 2.5 ...
   $ hdl.v3    : num  1.3 1.6 NA 0.8 0.9 1.4 1.4 1 1.1 1 ...
   $ idos.v3   : num  64 40 NA 216 250 88 70 180 90 64 ...
   $ hba1c.v4  : num  5.9 6.3 NA 7.4 7.2 6.9 6.9 7.3 9.8 7.9 ...
   $ bmi.v4    : num  33.7 26 NA 28.3 32.5 ...
   $ weight.v4 : num  124.2 69.1 NA 87.8 102.9 ...
   $ sys.v4    : num  132 132 NA 120 130 ...
   $ dia.v4    : num  69 71.5 NA 79 77 77 71 81.5 93.5 82 ...
   $ idos.v4   : num  64 40 NA 292 306 88 70 160 146 62 ...
   $ hba1c.v5  : num  6.1 6.6 NA 6.6 6.8 6.8 6.9 7.1 10.3 8.3 ...
```

```
 $ bmi.v5    : num  34 25.8 NA 27.8 32.8 ...
 $ weight.v5 : num  125.4 68.5 NA 86.2 104 ...
 $ sys.v5    : num  137 133 NA 110 131 ...
 $ dia.v5    : num  78.5 68 NA 66.5 80.5 82 70 84 90.5 85.5 ...
 $ chol.v5   : num  5.1 4.7 NA 3.5 4.5 4.8 4 6.1 5.1 4.3 ...
 $ trig.v5   : num  1.6 0.6 NA 1.4 1.4 1 1.6 3.1 1.7 2.9 ...
 $ ldl.v5    : num  3 2.4 NA 2.3 3 3.1 2 3.6 3 2.1 ...
 $ hdl.v5    : num  1.4 2 NA 0.6 0.9 1.3 1.3 1.1 1.3 0.9 ...
 $ idos.v5   : num  64 40 NA 292 330 88 70 180 148 66 ...
 $ hba1c.v6  : num  6.8 6.4 NA 7.5 7.3 7.4 7.3 7.5 8.4 7.9 ...
 $ bmi.v6    : num  33.1 26.2 NA 29 33.3 ...
 $ weight.v6 : num  121.9 69.7 NA 89.8 105.6 ...
 $ sys.v6    : num  125 142 NA 140 144 ...
 $ dia.v6    : num  76 76 NA 98 80.5 82 76 86 91 75.5 ...
 $ idos.v6   : num  70 40 NA 292 330 70 92 180 182 60 ...
 $ fimtavg.v7: num  0.86 0.76 0.95 1.01 0.695 0.755 0.735 0.98 0.645 0.805 ...
 $ hba1c.v7  : num  6.3 6.1 7.9 7.4 7.2 7.1 6.9 7.7 8.4 7.7 ...
 $ bmi.v7    : num  33.7 26.7 33.8 29 33.4 ...
 $ weight.v7 : num  124.2 71 97.8 89.7 105.8 ...
 $ sys.v7    : num  148 107 NA 115 110 ...
 $ dia.v7    : num  77.5 66.5 NA 81 72.5 ...
 $ chol.v7   : num  4 4.2 5 3.9 4.9 4.4 3.7 5.2 4.5 4.7 ...
 $ trig.v7   : num  1.03 1.05 1.27 2.1 3.09 1.3 1.11 2.57 0.96 3.01 ...
 $ ldl.v7    : num  2.3 1.6 3.3 2.2 2.7 2.5 1.8 3.1 2.8 2.4 ...
 $ hdl.v7    : num  1.22 2.08 1.17 0.75 0.83 1.31 1.43 0.96 1.24 0.92 ...
 $ n.pl.v7   : int  3 23 NA 4 NA 11 5 NA 2 2 ...
```

```
> ftable( addmargins( xtabs( cbind( "Baseline"=!is.na(fimtavg.v1),
+                                    "FU18mth"=!is.na(fimtavg.v7),
+                                      "Diff."=!is.na(fimtavg.v1)-
+                                              !is.na(fimtavg.v7),
+                                  "MissingFU"= is.na(fimtavg.v7) ) ~ sex + grp,
+                             data=wimt ),
+                     margin=1:2 ) )
```

```
           Baseline FU18mth Diff. MissingFU
 sex grp
 F   Plc         65      55    10        10
     Met         66      59     7         7
     Sum        131     114    17        17
 M   Plc        141     127    14        14
     Met        140     130    10        10
     Sum        281     257    24        24
 Sum Plc        206     182    24        24
     Met        206     189    17        17
     Sum        412     371    41        41
```

So we see that there is about 10% missing follow-up measurements (41 out of 412). The pattern of missing values is:

```
> zz <- md.pattern( wimt )
> t( zz )
```

```
             181   4  10   2   2   2   3   1   1   2   1   1   1   1   1   1   1
 subjid        1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 grp           1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 igr           1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 over.65       1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 pre.ins       1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 sdc           1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 sex           1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 cvd           1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 statin        1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 fimtavg.v1    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
 hba1c.v1      1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
```

bmi.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
weight.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
chol.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
trig.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hdl.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
idos.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
dia.v1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
ldl.v1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
hba1c.v2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
weight.v2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
idos.v2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
dia.v2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hba1c.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
fimtavg.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
weight.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v3	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
dia.v3	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
chol.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
trig.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hdl.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
weight.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
hba1c.v3	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
idos.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
idos.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hba1c.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v4	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
weight.v4	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
sys.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
dia.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ldl.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
idos.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hba1c.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
dia.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
weight.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
chol.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hdl.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
trig.v3	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
sys.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
dia.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
chol.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ldl.v3	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1
trig.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hdl.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
idos.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
weight.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
dia.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
hba1c.v6	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
ldl.v5	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1
n.pl.v1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1
n.pl.v7	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
	3	1	1	1	60	1	1	1	3	1	1	1	8	1	3	3	1
subjid	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
grp	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
igr	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
over.65	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
pre.ins	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

sdc	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sex	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
cvd	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
statin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
fimtavg.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hba1c.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
weight.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
chol.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
trig.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hdl.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
idos.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
dia.v1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
ldl.v1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
hba1c.v2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v2	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
weight.v2	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
idos.v2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v2	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
dia.v2	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
hba1c.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
fimtavg.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v3	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
weight.v3	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
sys.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
dia.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
chol.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
trig.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
hdl.v7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
bmi.v7	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
weight.v7	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
hba1c.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
idos.v3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
idos.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hba1c.v4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
bmi.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
weight.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
sys.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
dia.v4	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
ldl.v7	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
idos.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hba1c.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
dia.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
weight.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
chol.v3	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
hdl.v3	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
trig.v3	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
sys.v7	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
dia.v7	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
chol.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
ldl.v3	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1
trig.v5	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1
hdl.v5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
idos.v6	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
bmi.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
weight.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
sys.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
dia.v6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
hba1c.v6	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1
ldl.v5	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0	1
n.pl.v1	1	0	1	1	0	1	1	0	0	0	1	1	1	1	1	1	1
n.pl.v7	1	1	1	1	0	1	1	0	0	0	0	1	1	1	1	1	1
	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4

```
             1  3  1  1  1  1  1  1  1  3  1  5  1  1  1  1  1
subjid       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
grp          1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
igr          1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
over.65      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
pre.ins      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sdc          1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sex          1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
cvd          1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
statin       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
fimtavg.v1   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v1     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
bmi.v1       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
weight.v1    1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
chol.v1      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
trig.v1      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hdl.v1       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
idos.v1      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sys.v1       1  1  1  1  1  1  1  1  1  1  1  1  0  1  1  1  1
dia.v1       1  1  1  1  1  1  1  1  1  1  1  1  0  1  1  1  1
ldl.v1       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v2     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
bmi.v2       1  1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  1
weight.v2    1  1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  1
idos.v2      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sys.v2       1  1  1  1  1  0  1  1  1  1  0  1  1  1  1  1  1
dia.v2       1  1  1  1  1  0  1  1  1  1  0  1  1  1  1  1  1
hba1c.v7     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
fimtavg.v7   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
bmi.v3       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
weight.v3    1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sys.v3       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
dia.v3       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
chol.v7      1  1  1  1  1  1  1  1  1  1  1  1  1  0  1  1  1
trig.v7      1  1  1  1  1  1  1  1  1  1  1  1  1  0  1  1  1
hdl.v7       1  1  1  1  1  1  1  1  1  1  1  1  1  0  1  1  1
bmi.v7       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
weight.v7    1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v3     1  1  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1
idos.v3      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
idos.v4      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v4     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
bmi.v4       1  1  1  1  1  1  1  0  1  1  1  1  1  1  1  1  1
weight.v4    1  1  1  1  1  1  1  0  1  1  1  1  1  1  1  1  1
sys.v4       0  1  1  1  1  1  1  1  0  1  1  1  1  1  1  1  1
dia.v4       0  1  1  1  1  1  1  1  0  1  1  1  1  1  1  1  1
ldl.v7       1  1  1  1  1  1  1  1  1  1  0  1  1  0  1  1  1
idos.v5      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v5     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sys.v5       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
dia.v5       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
bmi.v5       1  1  1  1  1  1  1  1  1  1  1  1  0  1  1  1  1
weight.v5    1  1  1  1  1  1  1  1  1  1  1  1  0  1  1  1  1
chol.v3      1  1  0  1  1  1  0  0  0  1  1  0  1  1  1  0  1
hdl.v3       1  1  0  1  1  1  0  0  0  1  1  0  1  1  1  0  1
trig.v3      1  1  0  1  1  0  0  0  0  1  1  0  1  1  1  0  1
sys.v7       1  0  1  1  0  1  1  1  1  1  1  1  1  1  1  1  0
dia.v7       1  0  1  1  0  1  1  1  1  1  1  1  1  1  1  1  0
chol.v5      1  1  1  0  1  1  1  1  1  1  1  1  1  1  1  0  1
ldl.v3       1  1  0  1  1  1  0  0  0  1  0  0  1  1  1  0  1
trig.v5      1  1  1  0  1  1  1  1  1  1  1  1  1  1  1  0  1
hdl.v5       1  1  1  0  1  1  1  1  1  1  1  1  1  1  1  0  1
idos.v6      1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  1  0
bmi.v6       1  1  1  1  1  1  1  1  1  0  1  1  1  1  0  1  0
weight.v6    1  1  1  1  1  1  1  1  1  0  1  1  1  1  0  1  0
sys.v6       1  1  1  1  0  1  1  1  1  0  1  1  1  1  0  1  0
```

```
dia.v6        1  1  1  1  0  1  1  1  1  0  1  1  1  1  0  1  0
hba1c.v6      1  1  1  1  0  1  1  1  1  0  1  1  1  1  0  1  0
ldl.v5        1  1  1  0  1  1  1  1  1  1  1  1  1  1  1  0  1
n.pl.v1       0  0  1  0  1  0  1  1  1  1  1  0  0  0  0  1  1
n.pl.v7       0  0  1  1  1  0  0  1  1  1  1  0  0  0  0  1  1
              4  4  5  5  5  5  5  6  6  6  6  6  6  6  7  8  8
              1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  5  1
subjid        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
grp           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
igr           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
over.65       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
pre.ins       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sdc           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sex           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
cvd           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
statin        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
fimtavg.v1    1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v1      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
bmi.v1        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
weight.v1     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
chol.v1       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
trig.v1       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hdl.v1        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
idos.v1       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sys.v1        1  1  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1
dia.v1        1  1  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1
ldl.v1        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v2      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
bmi.v2        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
weight.v2     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
idos.v2       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sys.v2        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
dia.v2        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v7      1  1  1  1  1  0  1  1  1  0  1  1  0  1  0  1  1
fimtavg.v7    1  1  1  0  1  0  1  1  1  0  1  1  0  1  0  1  1
bmi.v3        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
weight.v3     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
sys.v3        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
dia.v3        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
chol.v7       1  1  1  1  1  0  1  1  1  0  1  1  0  1  0  1  1
trig.v7       1  1  1  1  1  0  1  1  1  0  1  1  0  1  0  1  1
hdl.v7        1  1  1  1  1  0  1  1  1  0  1  1  0  1  0  1  1
bmi.v7        1  1  1  1  1  0  1  1  1  0  1  1  0  1  0  1  1
weight.v7     1  1  1  1  1  0  1  1  1  0  1  1  0  1  0  1  1
hba1c.v3      1  1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  1
idos.v3       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
idos.v4       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
hba1c.v4      1  1  0  1  1  1  1  1  1  1  1  1  1  1  1  1  1
bmi.v4        1  1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  1
weight.v4     1  1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  1
sys.v4        1  1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  1
dia.v4        1  1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  1
ldl.v7        1  1  1  1  0  0  0  1  1  0  0  0  0  1  0  1  0
idos.v5       1  1  1  1  1  1  1  1  0  1  1  1  1  1  1  0  0
hba1c.v5      1  1  1  1  1  1  0  1  1  1  1  1  1  1  1  0  0
sys.v5        1  1  1  1  1  1  0  1  1  1  1  1  1  1  1  0  0
dia.v5        1  1  1  1  1  1  0  1  1  1  1  1  1  1  1  0  0
bmi.v5        1  1  1  1  1  1  0  1  1  1  1  1  1  1  1  0  0
weight.v5     1  1  1  1  1  1  0  1  1  1  1  1  1  1  1  0  0
chol.v3       1  0  1  1  1  1  1  1  1  1  0  0  1  1  0  1  1
hdl.v3        1  0  1  1  1  1  1  1  1  1  0  0  1  1  0  1  1
trig.v3       1  0  1  1  1  1  1  1  1  1  0  0  1  1  0  1  1
sys.v7        1  1  1  1  1  1  1  1  0  0  0  0  0  0  0  1  1
dia.v7        1  1  1  1  1  1  1  1  0  0  0  0  0  0  0  1  1
chol.v5       1  0  1  1  1  1  0  0  1  1  1  1  1  0  1  0  0
ldl.v3        1  0  1  1  1  1  1  1  1  1  0  0  0  1  0  1  0
```

```
trig.v5        1   0   1   1   1   1   0   0   1   1   1   1   1   0   1   0   0
hdl.v5         1   0   1   1   1   1   0   0   1   1   1   1   1   0   1   0   0
idos.v6        0   1   0   0   0   1   1   0   0   1   1   1   1   0   1   0   0
bmi.v6         0   1   0   0   0   1   1   0   0   1   1   0   1   0   1   0   0
weight.v6      0   1   0   0   0   1   1   0   0   1   1   0   1   0   1   0   0
sys.v6         0   1   0   0   0   1   1   0   0   1   1   0   1   0   1   0   0
dia.v6         0   1   0   0   0   1   1   0   0   1   1   0   1   0   1   0   0
hba1c.v6       0   1   0   0   0   1   1   0   0   1   1   0   1   0   1   0   0
ldl.v5         1   0   1   1   1   1   0   0   1   1   1   1   1   0   1   0   0
n.pl.v1        0   0   1   0   0   1   1   0   0   1   1   1   1   0   1   1   1
n.pl.v7        0   1   1   0   0   0   1   1   0   0   1   1   0   0   0   1   1
               8   9   9   9   9   9  10  11  11  11  12  12  12  14  15  16  18
               1   1   1   1   2   2   1   1   1   1   2   1   1   1   1   1   1
subjid         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
grp            1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
igr            1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
over.65        1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
pre.ins        1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
sdc            1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
sex            1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
cvd            1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
statin         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
fimtavg.v1     1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
hba1c.v1       1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
bmi.v1         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
weight.v1      1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
chol.v1        1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
trig.v1        1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
hdl.v1         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
idos.v1        1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
sys.v1         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
dia.v1         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
ldl.v1         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
hba1c.v2       1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
bmi.v2         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
weight.v2      1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
idos.v2        1   0   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
sys.v2         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
dia.v2         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
hba1c.v7       1   1   0   1   1   0   1   1   1   1   1   1   0   1   0   1   0
fimtavg.v7     1   1   0   1   1   0   1   1   1   1   1   1   0   1   0   1   0
bmi.v3         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   0   1
weight.v3      1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   0   1
sys.v3         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   0   1
dia.v3         1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   0   1
chol.v7        1   1   0   1   1   0   1   1   1   1   1   1   0   1   0   1   0
trig.v7        1   1   0   1   1   0   1   1   1   1   1   1   0   1   0   1   0
hdl.v7         1   1   0   1   1   0   1   1   1   1   1   1   0   1   0   1   0
bmi.v7         1   1   0   1   1   0   1   1   1   1   1   1   0   1   0   1   0
weight.v7      1   1   0   1   1   0   1   1   1   1   1   1   0   1   0   1   0
hba1c.v3       1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   0   1
idos.v3        1   0   1   1   1   1   1   1   1   1   0   0   1   1   1   0   1
idos.v4        1   0   1   1   1   1   0   1   0   0   0   0   1   0   0   0   0
hba1c.v4       1   1   0   1   1   1   0   1   0   0   0   0   1   0   0   0   0
bmi.v4         1   1   1   1   1   1   0   1   0   0   0   0   1   0   0   0   0
weight.v4      1   1   1   1   1   1   0   1   0   0   0   0   1   0   0   0   0
sys.v4         1   1   1   1   1   1   0   1   0   0   0   0   1   0   0   0   0
dia.v4         1   1   1   1   1   1   0   1   0   0   0   0   1   0   0   0   0
ldl.v7         1   1   0   1   1   0   1   1   1   1   1   0   0   1   0   1   0
idos.v5        0   0   1   0   0   1   0   0   0   0   0   0   1   0   0   0   0
hba1c.v5       0   0   1   0   0   1   0   0   0   0   0   0   0   0   0   0   0
sys.v5         0   0   1   0   0   1   0   0   0   0   0   0   0   0   0   0   0
dia.v5         0   0   1   0   0   1   0   0   0   0   0   0   0   0   0   0   0
bmi.v5         0   0   1   0   0   1   0   0   0   0   0   0   0   0   0   0   0
weight.v5      0   0   1   0   0   1   0   0   0   0   0   0   0   0   0   0   0
chol.v3        1   1   1   0   1   1   1   0   1   1   1   1   1   0   1   0   1
```

```
hdl.v3        1  1  1  0  1  1  1  0  1  1  1  1  1  0  1  0  1
trig.v3       1  1  1  0  1  1  1  0  1  1  1  1  1  0  1  0  1
sys.v7        1  1  0  1  0  0  1  0  1  0  0  0  0  0  0  0  0
dia.v7        1  1  0  1  0  0  1  0  1  0  0  0  0  0  0  0  0
chol.v5       0  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
ldl.v3        1  1  1  0  1  1  1  0  1  1  1  1  1  0  1  0  1
trig.v5       0  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
hdl.v5        0  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
idos.v6       0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
bmi.v6        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
weight.v6     0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
sys.v6        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
dia.v6        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
hba1c.v6      0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
ldl.v5        0  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
n.pl.v1       0  1  0  1  0  1  1  1  0  1  1  1  1  1  1  1  0
n.pl.v7       0  1  0  1  0  0  1  1  1  1  1  1  0  1  0  1  0
             18 19 19 20 20 21 22 22 23 24 25 26 26 28 33 34 34
              1  1  1  4  2  4  1  1  1  1  1  1 12  2  6  1
subjid        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
grp           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
igr           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
over.65       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
pre.ins       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
sdc           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
sex           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
cvd           1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
statin        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
fimtavg.v1    1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
hba1c.v1      1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
bmi.v1        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
weight.v1     1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
chol.v1       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
trig.v1       1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
hdl.v1        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   0
idos.v1       1  1  1  1  1  1  1  1  1  0  1  1  1  1  1  0   2
sys.v1        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   5
dia.v1        1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1   5
ldl.v1        1  0  1  1  1  1  1  0  1  0  0  1  1  0  1  1  14
hba1c.v2      1  0  1  0  0  1  0  1  0  1  0  0  0  0  0  0  32
bmi.v2        1  1  1  0  0  1  0  1  0  1  1  0  0  0  0  0  32
weight.v2     1  1  1  0  0  1  0  1  0  1  1  0  0  0  0  0  32
idos.v2       1  1  1  0  0  1  0  1  0  0  0  1  0  0  0  0  32
sys.v2        1  1  1  0  0  1  0  1  0  1  1  0  0  0  0  0  33
dia.v2        1  1  1  0  0  1  0  1  0  1  1  0  0  0  0  0  33
hba1c.v7      1  1  1  1  1  0  1  0  1  0  0  0  0  0  0  0  39
fimtavg.v7    1  1  1  1  1  0  0  0  1  0  0  0  0  0  0  0  41
bmi.v3        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  42
weight.v3     0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  42
sys.v3        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  42
dia.v3        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  42
chol.v7       1  1  1  1  1  0  1  0  0  0  0  0  0  0  0  0  42
trig.v7       1  1  1  1  1  0  1  0  0  0  0  0  0  0  0  0  42
hdl.v7        1  1  1  1  1  0  1  0  0  0  0  0  0  0  0  0  42
bmi.v7        1  1  1  1  1  0  0  0  0  0  0  0  0  0  0  0  43
weight.v7     1  1  1  1  1  0  0  0  0  0  0  0  0  0  0  0  43
hba1c.v3      0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  45
idos.v3       0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  45
idos.v4       0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  51
hba1c.v4      0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  53
bmi.v4        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  54
weight.v4     0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  54
sys.v4        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  54
dia.v4        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  54
ldl.v7        1  1  1  1  1  0  1  0  0  0  0  0  0  0  0  0  55
idos.v5       0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  63
```

```
hba1c.v5    0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   64
sys.v5      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   64
dia.v5      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   64
bmi.v5      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   65
weight.v5   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   65
chol.v3     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   66
hdl.v3      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   66
trig.v3     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   69
sys.v7      0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0   69
dia.v7      0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0   69
chol.v5     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   74
ldl.v3      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   75
trig.v5     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   75
hdl.v5      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   75
idos.v6     0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   78
bmi.v6      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   79
weight.v6   0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   79
sys.v6      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   81
dia.v6      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   81
hba1c.v6    0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   83
ldl.v5      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   86
n.pl.v1     0 0 0 1 0 1 1 1 1 0 0 1 1 1 0 0  118
n.pl.v7     1 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0  133
           35 36 36 40 42 43 44 44 46 47 47 48 49 50 50 51 2986
```

```
> pairs( wimt[,8:22], gap=0, pch=16, cex=0.2 )
```

```
> pairs( wimt[,23:37], gap=0, pch=16, cex=0.2 )
```

```
> pairs( wimt[,38:53], gap=0, pch=16, cex=0.2 )
```

```
> pairs( wimt[,54:69], gap=0, pch=16, cex=0.2 )
```

With this in place we can now make a multiple imputation of the missing values, including those on the outcome variable:

```
> set.seed( 876528358 )
> mi.time <- system.time( imp <- mice( wimt[,-1], m=50 ) )
```

```
> mi.time
     user  system elapsed
   873.70    0.70  892.36
> save( imp, file="./data/imp" )
```

4.4 Analysis of multiply imputed data

Once we have done the imputation we can make the analyses based on the imputed data one with the Metformin / Placebo comparison, and one with the comparisons between the insulin groups.

```
> library( mice )
> load( file="./data/imp" )
> class( imp )
[1] "mids"
```

```
> mf <- with( imp, lm( fimtavg.v7 ~ fimtavg.v1 + grp + over.65 + pre.ins + sdc ) )
> round( summary( pool( mf) ), 4 )

                 est     se       t       df Pr(>|t|)   lo 95  hi 95 nmis    fmi
(Intercept)   0.1016 0.0230  4.4093 332.6742   0.0000  0.0563 0.1469   NA 0.1124
fimtavg.v1    0.8431 0.0287 29.4023 325.2795   0.0000  0.7867 0.8995    0 0.1213
grp2          0.0118 0.0074  1.5958 339.5838   0.1115 -0.0028 0.0264   NA 0.1039
over.652      0.0214 0.0089  2.4067 291.5830   0.0167  0.0039 0.0389   NA 0.1618
pre.ins2     -0.0045 0.0083 -0.5377 323.6307   0.5911 -0.0208 0.0119   NA 0.1233
sdc2          0.0098 0.0077  1.2762 316.8374   0.2028 -0.0053 0.0250   NA 0.1315
             lambda
(Intercept) 0.1071
fimtavg.v1  0.1160
grp2        0.0987
over.652    0.1560
pre.ins2    0.1179
sdc2        0.1260

> round( smf <- ci.lin( pool( mf), subset="grp" ), 4 )

     Estimate StdErr      z      P    2.5%  97.5%
grp2   0.0118 0.0074 1.5958 0.1105 -0.0027 0.0264

> rownames( smf ) <- paste( gN[2],"vs.",gN[1] )
```

With the estimate for the metformin effect in `smm` (which is the relevant one) we can now re-do the forest plot using the “old” estimates of the corrected changes estimated from the random-effects model:

```
> round( rbind( e1[5:6,c(1,5,6)],
+              smf[   ,c(1,5,6)]), 3 )
                                   Estimate   2.5%  97.5%
Metformin+Insulin 18m - baseline     -0.002 -0.012  0.008
Placebo+Insulin 18m - baseline       -0.013 -0.023 -0.002
                                      0.012 -0.003  0.026

> tmpl <-
+ function()
+ {
+ par( mar=c(3,1,1,1), mgp=c(3,1,0)/1.6 )
+ plotEst( rbind(e1[5:6,c(1,5,6)],smf[,c(1,5,6)]),
+          ylim=c(0,3.5),
+          txt=rownames(e0)[5:7], lwd=3, cex=1.5, col=clr,
+          restore.par=FALSE )
+ abline( v=0 )
+ axis( side=1 )
+ text( -0.03, 0.2, "Improvement"  , adj=0, col=clr[4], cex=0.8 )
+ text(  0.03, 0.2, "Deterioration", adj=1, col=clr[4], cex=0.8 )
+ mtext( "Mean carotid IMT (mm)", side=1, line=3/1.6 )
+ }
> tmpl()


> win.metafile( "./results/forest-met-imp.emf", width=10, height=6, pointsize=20 )
> tmpl()
> dev.off()

null device
          1
```

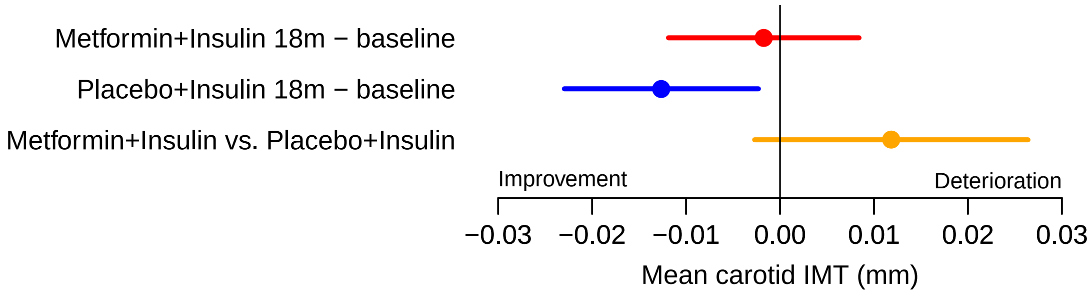

Figure 4.3: *Estimated changes in each treatment group from the random effects model with identical baseline. The difference in changes between treatments is the estimate from the model with baseline as covariate, using multiply imputed data, adjusted for stratification variables. Bars indicate 95% c.i.*

Chapter 5

Primary outcome (CIMT) by insulin type

5.1 Analysis of CIMT by insulin group

We now do the analysis of CIMT by insulin group, first by a random effects model *with* baseline differences between groups: First we fit the random effects model that allows different baseline means between the randomization groups, and from that model extract both the individual changes in each of the three groups, and the differences in chnages between them:

```
> m0 <- lmer( fimtavg ~ -1  + visit + visit:igr + over.65 + pre.ins + sdc +(1|subjid),
+             data = AD )
> summary( m0 )
```

```
Linear mixed model fit by REML ['lmerMod']
Formula: fimtavg ~ -1 + visit + visit:igr + over.65 + pre.ins + sdc +      (1 | subjid)
   Data: AD

REML criterion at convergence: -1369.156

Random effects:
 Groups   Name        Variance Std.Dev.
 subjid   (Intercept) 0.014475 0.12031
 Residual             0.002654 0.05152
Number of obs: 783, groups: subjid, 412

Fixed effects:
                Estimate Std. Error t value
visitv1         0.750871   0.013932   53.90
visitv7         0.742022   0.014021   52.92
over.65>65      0.089815   0.013845    6.49
pre.insnoIns    0.006249   0.013800    0.45
sdcnotSDC       0.013905   0.012717    1.09
visitv1:igrAspD 0.011096   0.015786    0.70
visitv7:igrAspD 0.019900   0.016000    1.24
visitv1:igrDetm 0.013664   0.015815    0.86
visitv7:igrDetm 0.010015   0.016073    0.62

Correlation of Fixed Effects:
            vistv1 vistv7 o.65>6 pr.nsI sdcSDC vs1:AD vs7:AD vst1:D
visitv7      0.893
over.65>65  -0.328 -0.326
pre.insnIns -0.239 -0.238  0.075
sdcnotSDC   -0.405 -0.399  0.031 -0.204
vstv1:grAsD -0.572 -0.481  0.009  0.010 -0.004
```

```
  vstv7:grAsD -0.476 -0.573  0.008  0.009 -0.007  0.834
  vstv1:grDtm -0.571 -0.480  0.013  0.009 -0.007  0.501  0.418
  vstv7:grDtm -0.474 -0.571  0.014  0.007 -0.009  0.417  0.499  0.832
> round( ee <- ci.lin( m0, subset="visit" ), 4 )
                Estimate StdErr       z      P    2.5%  97.5%
  visitv1         0.7509 0.0139 53.8958 0.0000  0.7236 0.7782
  visitv7         0.7420 0.0140 52.9232 0.0000  0.7145 0.7695
  visitv1:igrAspD   0.0111 0.0158  0.7029 0.4821 -0.0198 0.0420
  visitv7:igrAspD   0.0199 0.0160  1.2437 0.2136 -0.0115 0.0513
  visitv1:igrDetm   0.0137 0.0158  0.8640 0.3876 -0.0173 0.0447
  visitv7:igrDetm   0.0100 0.0161  0.6231 0.5332 -0.0215 0.0415
> CO <- rbind( cbind(diag(2),     0,0,   0,0 ),
+             cbind(diag(2),diag(2),   0,0 ),
+             cbind(diag(2),     0,0,diag(2)) )
> CO <- rbind( CO, CO[2,]-CO[1,],
+                  CO[4,]-CO[3,],
+                  CO[6,]-CO[5,] )
> CO <- rbind( CO, CO[8,]-CO[7,],
+                  CO[9,]-CO[7,],
+                  CO[9,]-CO[8,] )
> row.names(CO) <- c(
+ as.vector( outer( c("v1","v7"), levels(AD$igr), function(x,y) paste(y,x) ) ),
+ paste( levels(AD$igr), "v7-v1" ),
+ paste(   "d", levels(AD$igr)[c(2,3,3)],
+        "- d", levels(AD$igr)[c(1,1,2)] ) )
> colnames(CO) <- row.names(ee)
> CO
                visitv1 visitv7 visitv1:igrAspD visitv7:igrAspD visitv1:igrDetm
  Biph v1             1       0               0               0               0
  Biph v7             0       1               0               0               0
  AspD v1             1       0               1               0               0
  AspD v7             0       1               0               1               0
  Detm v1             1       0               0               0               1
  Detm v7             0       1               0               0               0
  Biph v7-v1         -1       1               0               0               0
  AspD v7-v1         -1       1              -1               1               0
  Detm v7-v1         -1       1               0               0              -1
  d AspD - d Biph     0       0              -1               1               0
  d Detm - d Biph     0       0               0               0              -1
  d Detm - d AspD     0       0               1              -1              -1
                visitv7:igrDetm
  Biph v1                     0
  Biph v7                     0
  AspD v1                     0
  AspD v7                     0
  Detm v1                     0
  Detm v7                     1
  Biph v7-v1                  0
  AspD v7-v1                  0
  Detm v7-v1                  1
  d AspD - d Biph             0
  d Detm - d Biph             1
  d Detm - d AspD             1
> e0 <- ci.lin( m0, subset="visit", ctr.mat=CO )
> inames <- c("Biphasic","Asp+Det","Detemir")
> cbind( levels( AD$igr ), inames )
              inames
  [1,] "Biph" "Biphasic"
  [2,] "AspD" "Asp+Det"
  [3,] "Detm" "Detemir"
> elab <- c( paste(inames,"18m - baseline"),
+            paste(inames[c(2,3,3)], "vs.",
+                  inames[c(1,1,2)], "change") )
```

```
> rownames( e0 )[7:12] <- elab
> round( e0[7:12,c(1,5,6,4)], 4 )
                             Estimate    2.5%  97.5%      P
  Biphasic 18m - baseline     -0.0088 -0.0215 0.0038 0.1715
  Asp+Det 18m - baseline       0.0000 -0.0128 0.0127 0.9945
  Detemir 18m - baseline      -0.0125 -0.0255 0.0005 0.0590
  Asp+Det vs. Biphasic change  0.0088 -0.0092 0.0268 0.3369
  Detemir vs. Biphasic change -0.0036 -0.0218 0.0145 0.6934
  Detemir vs. Asp+Det change  -0.0125 -0.0306 0.0057 0.1793
```

We can make a plot of this:

```
> par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6 )
> plotEst( e0[7:12,c(1,5,6)], lwd=3, vref=0, y=rev(c(1:3,5:7))+1,
+          xlab="", ylim=c(0,8), xlim=c(-0.03,0.03),
+                   col.lines =iclr[c(1:3,1,1,2)],
+                   col.points=iclr[c(1:3,2,3,3)], cex=1.5 )
> axis( side=1 )
> text( -0.03, 0.2, "Improvement"  , adj=0, col=clr[4], cex=0.8 )
> text(  0.03, 0.2, "Deterioration", adj=1, col=clr[4], cex=0.8 )
> mtext( "Mean carotid IMT (mm)", side=1, line=3/1.6 )
```

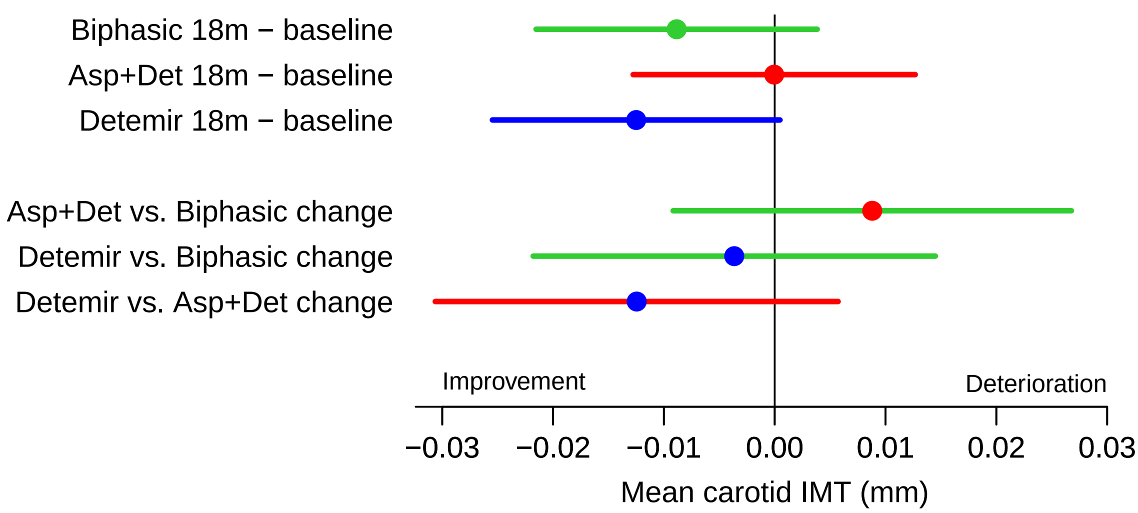

Figure 5.1: *Estimates of insulin regimen effects from a random effects model with baseline differences for complete ITT data, adjusted for stratification variables.*

Analysis with identical baseline values

We also fit a model with identical baselines for the three groups; and again it is necessary to hand-code the effects:

```
> mm <- model.matrix( ~ visit:igr-1, data = AD )
> m7 <- mm[,xx <- grep("v7",colnames(mm))]
> head( m7 )
  visitv7:igrBiph visitv7:igrAspD visitv7:igrDetm
1               0               0               0
2               0               0               0
3               0               0               0
4               0               0               0
5               0               0               0
6               0               0               0
```

The model matrix m7 thus generated only has the indicators of randomization group at follow-up, so we need the intercept in this model to take care of the overall mean:

```
> m1 <- lmer( fimtavg ~ m7 + over.65 + pre.ins + sdc + (1|subjid),
+             data = AD )
> summary( m1 )
  Linear mixed model fit by REML ['lmerMod']
  Formula: fimtavg ~ m7 + over.65 + pre.ins + sdc + (1 | subjid)
     Data: AD

  REML criterion at convergence: -1381.517

  Random effects:
   Groups   Name        Variance Std.Dev.
   subjid   (Intercept) 0.014433 0.12014
   Residual             0.002654 0.05152
  Number of obs: 783, groups: subjid, 412

  Fixed effects:
                      Estimate Std. Error t value
  (Intercept)        0.7591776  0.0104583   72.59
  m7visitv7:igrBiph -0.0101292  0.0063133   -1.60
  m7visitv7:igrAspD  0.0003949  0.0063375    0.06
  m7visitv7:igrDetm -0.0116614  0.0064651   -1.80
  over.65>65         0.0896469  0.0138254    6.48
  pre.insnoIns       0.0061213  0.0137808    0.44
  sdcnotSDC          0.0139843  0.0127003    1.10

  Correlation of Fixed Effects:
              (Intr) m7v7:B m77:AD m7v7:D o.65>6 pr.nsI
  m7vstv7:grB -0.101
  m7vstv7:gAD -0.098  0.025
  m7vstv7:grD -0.097  0.024  0.024
  over.65>65  -0.425 -0.003 -0.001  0.006
  pre.insnIns -0.309 -0.003  0.001 -0.002  0.075
  sdcnotSDC   -0.545  0.010  0.001  0.000  0.031 -0.204
> round( ee <- ci.lin( m1, subset=1:4 ), 4 )
                    Estimate StdErr       z      P    2.5%  97.5%
  (Intercept)         0.7592 0.0105 72.5906 0.0000  0.7387 0.7797
  m7visitv7:igrBiph  -0.0101 0.0063 -1.6044 0.1086 -0.0225 0.0022
  m7visitv7:igrAspD   0.0004 0.0063  0.0623 0.9503 -0.0120 0.0128
  m7visitv7:igrDetm  -0.0117 0.0065 -1.8037 0.0713 -0.0243 0.0010
> C1 <- rbind( c(1,0,0,0),
+              c(1,1,0,0),
+              c(1,0,0,0),
+              c(1,0,1,0),
+              c(1,0,0,0),
+              c(1,0,0,1) )
> C1 <- rbind( C1, C1[2,]-C1[1,],
+                  C1[4,]-C1[3,],
+                  C1[6,]-C1[5,] )
> C1 <- rbind( C1, C1[8,]-C1[7,],
+                  C1[9,]-C1[7,],
+                  C1[9,]-C1[8,] )
> rownames(C1) <- row.names(C0)
> colnames(C1) <- row.names(ee)
> C1
                 (Intercept) m7visitv7:igrBiph m7visitv7:igrAspD
  Biph v1                  1                 0                 0
  Biph v7                  1                 1                 0
  AspD v1                  1                 0                 0
  AspD v7                  1                 0                 1
  Detm v1                  1                 0                 0
  Detm v7                  1                 0                 0
```

```
  Biph v7-v1                  0                 1                 0
  AspD v7-v1                  0                 0                 1
  Detm v7-v1                  0                 0                 0
  d AspD - d Biph             0                -1                 1
  d Detm - d Biph             0                -1                 0
  d Detm - d AspD             0                 0                -1
                m7visitv7:igrDetm
  Biph v1                           0
  Biph v7                           0
  AspD v1                           0
  AspD v7                           0
  Detm v1                           0
  Detm v7                           1
  Biph v7-v1                        0
  AspD v7-v1                        0
  Detm v7-v1                        1
  d AspD - d Biph                   0
  d Detm - d Biph                   1
  d Detm - d AspD                   1
> round( e1 <- ci.lin( m1, subset=1:4, ctr.mat=C1 ), 4 )
                Estimate StdErr       z      P    2.5%  97.5%
  Biph v1         0.7592 0.0105 72.5906 0.0000  0.7387 0.7797
  Biph v7         0.7490 0.0117 64.2646 0.0000  0.7262 0.7719
  AspD v1         0.7592 0.0105 72.5906 0.0000  0.7387 0.7797
  AspD v7         0.7596 0.0117 64.9889 0.0000  0.7367 0.7825
  Detm v1         0.7592 0.0105 72.5906 0.0000  0.7387 0.7797
  Detm v7         0.7475 0.0118 63.6095 0.0000  0.7245 0.7705
  Biph v7-v1     -0.0101 0.0063 -1.6044 0.1086 -0.0225 0.0022
  AspD v7-v1      0.0004 0.0063  0.0623 0.9503 -0.0120 0.0128
  Detm v7-v1     -0.0117 0.0065 -1.8037 0.0713 -0.0243 0.0010
  d AspD - d Biph  0.0105 0.0088  1.1915 0.2335 -0.0068 0.0278
  d Detm - d Biph -0.0015 0.0089 -0.1717 0.8637 -0.0190 0.0160
  d Detm - d AspD -0.0121 0.0089 -1.3483 0.1776 -0.0296 0.0055
> rownames( e1 ) <- rownames( e0 )
```

We can compare the estimated changes within groups under the two different assumptions:

```
> round( cbind( e0[,1:2], e1[,1:2] ), 4 )
                            Estimate StdErr Estimate StdErr
  Biph v1                     0.7509 0.0139   0.7592 0.0105
  Biph v7                     0.7420 0.0140   0.7490 0.0117
  AspD v1                     0.7620 0.0138   0.7592 0.0105
  AspD v7                     0.7619 0.0140   0.7596 0.0117
  Detm v1                     0.7645 0.0139   0.7592 0.0105
  Detm v7                     0.7520 0.0141   0.7475 0.0118
  Biphasic 18m - baseline    -0.0088 0.0065  -0.0101 0.0063
  Asp+Det 18m - baseline      0.0000 0.0065   0.0004 0.0063
  Detemir 18m - baseline     -0.0125 0.0066  -0.0117 0.0065
  Asp+Det vs. Biphasic change  0.0088 0.0092   0.0105 0.0088
  Detemir vs. Biphasic change -0.0036 0.0093  -0.0015 0.0089
  Detemir vs. Asp+Det change  -0.0125 0.0093  -0.0121 0.0089
```

If we are going to present the effect measure as derived from the conditional model (*i.e.* using baseline as covariate, then we should use the estimated changes from the model `m1` without allowance for baseline imbalance.

5.1.1 Multiple imputation analysis

Once we have done the imputation we can make the analyses based on the imputed data with the insulin comparisons too.

```
> library( mice )
> load( file="./data/imp" )
> class( imp )
  [1] "mids"
> mif <- with( imp, lm( fimtavg.v7 ~ fimtavg.v1 + igr + over.65 + pre.ins + sdc ) )
> round( smif <- summary( pool( mif) ), 4 )
                  est     se       t       df Pr(>|t|)   lo 95  hi 95 nmis    fmi
  (Intercept)  0.1066 0.0231  4.6244 329.5136   0.0000  0.0613 0.1520   NA 0.1153
  fimtavg.v1   0.8407 0.0286 29.3856 330.5100   0.0000  0.7844 0.8970    0 0.1141
  igr2         0.0100 0.0091  1.0984 343.2165   0.2728 -0.0079 0.0278   NA 0.0984
  igr3        -0.0021 0.0092 -0.2311 319.0870   0.8174 -0.0203 0.0160   NA 0.1279
  over.652     0.0218 0.0089  2.4554 294.1692   0.0146  0.0043 0.0393   NA 0.1579
  pre.ins2    -0.0045 0.0083 -0.5356 323.0410   0.5926 -0.0209 0.0119   NA 0.1232
  sdc2         0.0099 0.0077  1.2877 316.6005   0.1988 -0.0052 0.0251   NA 0.1309
              lambda
  (Intercept) 0.1100
  fimtavg.v1  0.1088
  igr2        0.0932
  igr3        0.1225
  over.652    0.1522
  pre.ins2    0.1178
  sdc2        0.1255
> mim <- with( imp, lm( fimtavg.v7 ~ fimtavg.v1 + igr ) )
> round( smim <- summary( pool( mim ) ), 4 )
                  est     se       t       df Pr(>|t|)   lo 95  hi 95 nmis    fmi
  (Intercept)  0.0999 0.0226  4.4279 339.3884   0.0000  0.0555 0.1443   NA 0.1061
  fimtavg.v1   0.8619 0.0273 31.5819 350.6084   0.0000  0.8082 0.9156    0 0.0922
  igr2         0.0096 0.0091  1.0534 346.8200   0.2929 -0.0083 0.0276   NA 0.0969
  igr3        -0.0026 0.0093 -0.2807 321.6481   0.7792 -0.0209 0.0157   NA 0.1274
              lambda
  (Intercept) 0.1008
  fimtavg.v1  0.0870
  igr2        0.0917
  igr3        0.1220
> CI <- rbind( c(1,0), c(0,1), c(-1,1) )
> rownames( CI ) <- elab[4:6]
> CI
                              [,1] [,2]
  Asp+Det vs. Biphasic change    1    0
  Detemir vs. Biphasic change    0    1
  Detemir vs. Asp+Det change    -1    1
> round( i0 <- ci.lin( pool( mif ), subset="igr", ctr.mat=CI ), 4 )
                              Estimate StdErr       z      P    2.5%  97.5%
  Asp+Det vs. Biphasic change   0.0100 0.0091  1.0984 0.2720 -0.0078 0.0277
  Detemir vs. Biphasic change  -0.0021 0.0092 -0.2311 0.8173 -0.0202 0.0160
  Detemir vs. Asp+Det change   -0.0121 0.0092 -1.3193 0.1871 -0.0301 0.0059
```

With the estimate for the insulin effects in `smif` (which is the relevant one) we can now re-do the forest plot using the "old" estimates of the corrected changes estimated from the random-effects model:

```
> round( rbind( e1[7:9,c(1,5,6)],
+               i0[   ,c(1,5,6)] ), 3 )
                              Estimate   2.5% 97.5%
  Biphasic 18m - baseline       -0.010 -0.023 0.002
  Asp+Det 18m - baseline         0.000 -0.012 0.013
  Detemir 18m - baseline        -0.012 -0.024 0.001
  Asp+Det vs. Biphasic change    0.010 -0.008 0.028
  Detemir vs. Biphasic change   -0.002 -0.020 0.016
  Detemir vs. Asp+Det change    -0.012 -0.030 0.006
```

```
> tmpl <-
+ function(xtra=FALSE)
+ {
+ par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6 )
+ piclr <- rgb(t(col2rgb( iclr ))/3 + 255*2/3,max=255)
+ plotEst(  rbind( e1[7:9,c(1,5,6)],
+                  i0[   ,c(1,5,6)] ),
+           xlab="", ylim=c(0.3,8), xlim=c(-0.03,0.03),
+           lwd=3, vref=0, y=c(8:6,4:2),
+           col.lines =c(iclr[c(1:3,1,1,2)]),
+           col.points=c(iclr[c(1:3,2,3,3)]),
+           cex=1.5 )
+ if( xtra )
+   {
+ linesEst(  e0[10:12,c(1,5,6)],
+           lwd=3, vref=0, y=c(4:2-0.1),
+           col.lines =piclr[c(1,1,2)],
+           col.points=piclr[c(2,3,3)],
+           cex=1.5 )
+ linesEst(  i0[,c(1,5,6)],
+           lwd=3, vref=0, y=c(4:2),
+           col.lines =iclr[c(1,1,2)],
+           col.points=iclr[c(2,3,3)],
+           cex=1.5 )
+    }
+ axis( side=1 )
+ text( -0.03, 0.4, "Improvement"  , adj=0, col=clr[4], cex=0.8 )
+ text(  0.03, 0.4, "Deterioration", adj=1, col=clr[4], cex=0.8 )
+ mtext( "Mean carotid IMT (mm)", side=1, line=3/1.6 )
+ }
> tmpl(TRUE)
```

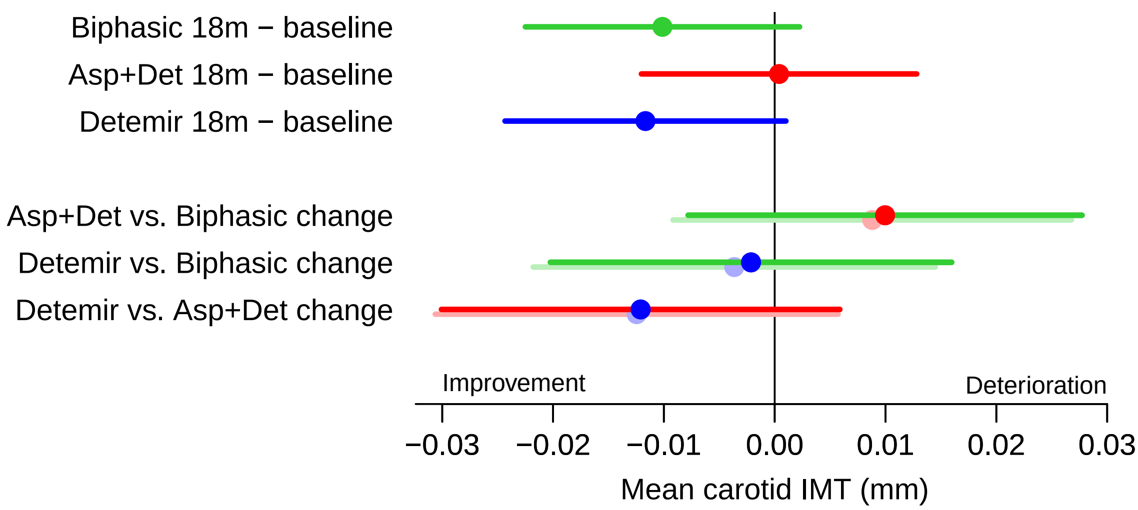

Figure 5.2: *Estimated changes in each treatment group from the random effects model with identical baseline. The difference in changes between treatments are from the model with baseline as covariate, using multiply imputed data, adjusted for stratification variables. Pale colors indicate the contrasts from the random effects model. Bars indicate 95% c.i.*

```
> tmpl(FALSE)
```

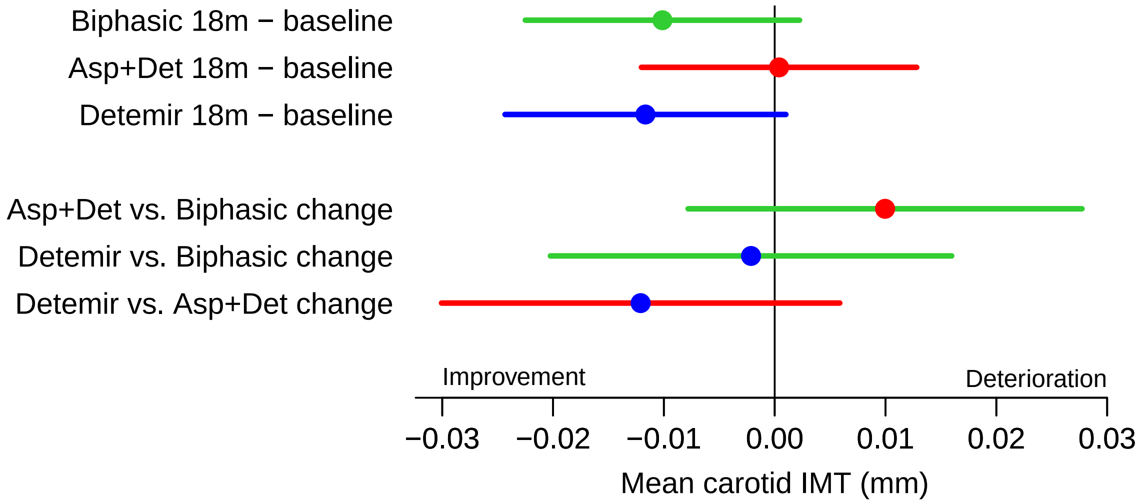

Figure 5.3: *Estimated changes in each treatment group from the random effects model with idential baseline. The difference in changes between treatments are from the model with baseline as covariate, using multiply imputed data, adjusted for stratification variables. Bars indicate 95% c.i.*

```
> win.metafile( "./results/forest-ins-imp.emf", width=7, height=4, pointsize=20 )
> tmpl(FALSE)
> dev.off()
```

```
null device
          1
```

Chapter 6

Interaction analyses of primary outcome (CIMT)

First we fit the random effects model that allows different baseline means between the (six) randomization groups, and from that model extract both the individual changes in each of the three groups, and the differences in changes between them. Also we make tests comparing the different models, testing whether there are

```
> AD$subjid <- factor( AD$subjid )
> m0 <- lmer( fimtavg ~ -1 + visit +
+                     + over.65 + pre.ins + sdc +(1|subjid), data = AD )
> mM <- lmer( fimtavg ~ -1 + visit + visit:grp
+                     + over.65 + pre.ins + sdc +(1|subjid), data = AD )
> mI <- lmer( fimtavg ~ -1 + visit + visit:igr
+                     + over.65 + pre.ins + sdc +(1|subjid), data = AD )
> mA <- lmer( fimtavg ~ -1 + visit + visit:grp + visit:igr
+                     + over.65 + pre.ins + sdc +(1|subjid), data = AD )
> mi <- lmer( fimtavg ~ -1 + visit + visit:interaction(igr,grp)
+                     + over.65 + pre.ins + sdc +(1|subjid), data = AD )
> round( ci.lin( m0 ), 3 )
               Estimate StdErr      z     P   2.5% 97.5%
  visitv1         0.759  0.010 72.567 0.000  0.739 0.780
  visitv7         0.752  0.011 71.543 0.000  0.731 0.773
  over.65>65      0.090  0.014  6.486 0.000  0.063 0.117
  pre.insnoIns    0.006  0.014  0.440 0.660 -0.021 0.033
  sdcnotSDC       0.014  0.013  1.105 0.269 -0.011 0.039
```

```
> round( ci.lin( mi ), 3 )
                                        Estimate StdErr      z     P   2.5% 97.5%
  visitv1                                  0.754  0.018 42.116 0.000  0.719 0.789
  visitv7                                  0.724  0.018 40.062 0.000  0.689 0.760
  over.65>65                               0.089  0.014  6.395 0.000  0.062 0.116
  pre.insnoIns                             0.007  0.014  0.490 0.624 -0.020 0.034
  sdcnotSDC                                0.013  0.013  1.051 0.293 -0.012 0.038
  visitv1:interaction(igr, grp)AspD.Plc    0.020  0.022  0.898 0.369 -0.024 0.063
  visitv7:interaction(igr, grp)AspD.Plc    0.050  0.023  2.215 0.027  0.006 0.094
  visitv1:interaction(igr, grp)Detm.Plc    0.014  0.023  0.636 0.525 -0.030 0.059
  visitv7:interaction(igr, grp)Detm.Plc    0.031  0.023  1.354 0.176 -0.014 0.077
  visitv1:interaction(igr, grp)Biph.Met   -0.005  0.022 -0.224 0.823 -0.049 0.039
  visitv7:interaction(igr, grp)Biph.Met    0.035  0.023  1.541 0.123 -0.010 0.080
  visitv1:interaction(igr, grp)AspD.Met   -0.004  0.023 -0.187 0.851 -0.049 0.040
  visitv7:interaction(igr, grp)AspD.Met    0.025  0.023  1.069 0.285 -0.021 0.070
  visitv1:interaction(igr, grp)Detm.Met    0.008  0.022  0.356 0.722 -0.036 0.052
  visitv7:interaction(igr, grp)Detm.Met    0.025  0.023  1.110 0.267 -0.019 0.069
```

```
> mod <- rbind( anova( m0, mM, mA     )[-1,],
+               anova( m0, mI, mA, mi )[-1,] )
```

```
> rownames( mod ) <- c("Met|0","Ins|Met","Ins|0","Met|Ins","Interact")
> attr( mod, "heading" ) <- NULL
> round( mod, 4 )[c(1,3,4,2,5),]
```

```
         Df     AIC     BIC logLik deviance  Chisq Chi Df Pr(>Chisq)
Met|0     9 -1418.0 -1376.1 718.02  -1436.0 3.1344      2     0.2086
Ins|0    11 -1414.0 -1362.7 717.98  -1436.0 3.0489      4     0.5497
Met|Ins  13 -1413.4 -1352.7 719.68  -1439.4 3.4016      2     0.1825
Ins|Met  13 -1413.4 -1352.7 719.68  -1439.4 3.3161      4     0.5064
Interact 17 -1413.5 -1334.3 723.77  -1447.5 8.1830      4     0.0851
```

Comparing the models with each of the randomization varibles and with interaction between these show that there is no effect of any of the interventions seprately, and no interaction either. However the interaction test, even if quite unspecific has a somewhat smaller p-value than the other tests.

We therefore look at the estimated effects in the interaction model:

```
> round( ee <- ci.lin( mi, subset="visit" ), 4 )
```

```
                                    Estimate StdErr       z      P    2.5%  97.5%
visitv1                               0.7538 0.0179 42.1160 0.0000  0.7187 0.7889
visitv7                               0.7243 0.0181 40.0620 0.0000  0.6889 0.7597
visitv1:interaction(igr, grp)AspD.Plc  0.0199 0.0222  0.8977 0.3693 -0.0236 0.0634
visitv7:interaction(igr, grp)AspD.Plc  0.0498 0.0225  2.2145 0.0268  0.0057 0.0939
visitv1:interaction(igr, grp)Detm.Plc  0.0145 0.0227  0.6360 0.5248 -0.0301 0.0590
visitv7:interaction(igr, grp)Detm.Plc  0.0314 0.0232  1.3543 0.1757 -0.0141 0.0769
visitv1:interaction(igr, grp)Biph.Met -0.0050 0.0224 -0.2243 0.8226 -0.0490 0.0390
visitv7:interaction(igr, grp)Biph.Met  0.0350 0.0227  1.5412 0.1233 -0.0095 0.0795
visitv1:interaction(igr, grp)AspD.Met -0.0043 0.0228 -0.1872 0.8515 -0.0490 0.0404
visitv7:interaction(igr, grp)AspD.Met  0.0247 0.0231  1.0692 0.2850 -0.0206 0.0700
visitv1:interaction(igr, grp)Detm.Met  0.0080 0.0223  0.3564 0.7216 -0.0358 0.0517
visitv7:interaction(igr, grp)Detm.Met  0.0251 0.0226  1.1099 0.2670 -0.0192 0.0694
```

```
> CO <- diag(12)
> CO[,1] <- rep(1:0,6)
> CO[,2] <- rep(0:1,6)
> igrps <- as.vector( outer( iN, gN, FUN=function(x,y) paste(x,y,sep=", ") ) )
> for( i in 1:6 ) CO <- rbind( CO, CO[2*i,]-CO[2*i-1,] )
> rownames( CO ) <- c( as.vector( outer( levels( AD$visit )[c(1,7)],
+                                        igrps,
+                                        paste ) ),
+                      paste( igrps, "18m - baseline") )
> CO
```

```
                                               [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8]
v1 Biphasic, Placebo+Insulin                      1    0    0    0    0    0    0    0
v7 Biphasic, Placebo+Insulin                      0    1    0    0    0    0    0    0
v1 Aspart+Detemir, Placebo+Insulin                1    0    1    0    0    0    0    0
v7 Aspart+Detemir, Placebo+Insulin                0    1    0    1    0    0    0    0
v1 Detemir, Placebo+Insulin                       1    0    0    0    1    0    0    0
v7 Detemir, Placebo+Insulin                       0    1    0    0    0    1    0    0
v1 Biphasic, Metformin+Insulin                    1    0    0    0    0    0    1    0
v7 Biphasic, Metformin+Insulin                    0    1    0    0    0    0    0    1
v1 Aspart+Detemir, Metformin+Insulin              1    0    0    0    0    0    0    0
v7 Aspart+Detemir, Metformin+Insulin              0    1    0    0    0    0    0    0
v1 Detemir, Metformin+Insulin                     1    0    0    0    0    0    0    0
v7 Detemir, Metformin+Insulin                     0    1    0    0    0    0    0    0
Biphasic, Placebo+Insulin 18m - baseline         -1    1    0    0    0    0    0    0
Aspart+Detemir, Placebo+Insulin 18m - baseline   -1    1   -1    1    0    0    0    0
Detemir, Placebo+Insulin 18m - baseline          -1    1    0    0   -1    1    0    0
Biphasic, Metformin+Insulin 18m - baseline       -1    1    0    0    0    0   -1    1
Aspart+Detemir, Metformin+Insulin 18m - baseline -1    1    0    0    0    0    0    0
Detemir, Metformin+Insulin 18m - baseline        -1    1    0    0    0    0    0    0
                                               [,9] [,10] [,11] [,12]
v1 Biphasic, Placebo+Insulin                      0     0     0     0
v7 Biphasic, Placebo+Insulin                      0     0     0     0
```

```
  v1 Aspart+Detemir, Placebo+Insulin                 0     0     0     0
  v7 Aspart+Detemir, Placebo+Insulin                 0     0     0     0
  v1 Detemir, Placebo+Insulin                        0     0     0     0
  v7 Detemir, Placebo+Insulin                        0     0     0     0
  v1 Biphasic, Metformin+Insulin                     0     0     0     0
  v7 Biphasic, Metformin+Insulin                     0     0     0     0
  v1 Aspart+Detemir, Metformin+Insulin               1     0     0     0
  v7 Aspart+Detemir, Metformin+Insulin               0     1     0     0
  v1 Detemir, Metformin+Insulin                      0     0     1     0
  v7 Detemir, Metformin+Insulin                      0     0     0     1
  Biphasic, Placebo+Insulin 18m - baseline           0     0     0     0
  Aspart+Detemir, Placebo+Insulin 18m - baseline     0     0     0     0
  Detemir, Placebo+Insulin 18m - baseline            0     0     0     0
  Biphasic, Metformin+Insulin 18m - baseline         0     0     0     0
  Aspart+Detemir, Metformin+Insulin 18m - baseline  -1     1     0     0
  Detemir, Metformin+Insulin 18m - baseline          0     0    -1     1
```

```
> dim( CO )

  [1] 18 12

> CO <- rbind( CO, CO[15+1:3     ,]-CO[12+1:3     ,],
+                  CO[12+c(2,3,3),]-CO[12+c(1,1,2),],
+                  CO[15+c(2,3,3),]-CO[15+c(1,1,2),] )
> rownames( CO )[18+1:9] <- c( paste( iN, ":", gN[2], "vs", gN[1] ),
+                              paste( rep(gN,each=3), ":",
+                                     iN[c(2,3,3)], "vs", iN[c(1,1,2)] ) )
> CO

                                                      [,1] [,2] [,3] [,4] [,5] [,6] [,7]
  v1 Biphasic, Placebo+Insulin                           1    0    0    0    0    0    0
  v7 Biphasic, Placebo+Insulin                           0    1    0    0    0    0    0
  v1 Aspart+Detemir, Placebo+Insulin                     1    0    1    0    0    0    0
  v7 Aspart+Detemir, Placebo+Insulin                     0    1    0    1    0    0    0
  v1 Detemir, Placebo+Insulin                            1    0    0    0    1    0    0
  v7 Detemir, Placebo+Insulin                            0    1    0    0    0    1    0
  v1 Biphasic, Metformin+Insulin                         1    0    0    0    0    0    1
  v7 Biphasic, Metformin+Insulin                         0    1    0    0    0    0    0
  v1 Aspart+Detemir, Metformin+Insulin                   1    0    0    0    0    0    0
  v7 Aspart+Detemir, Metformin+Insulin                   0    1    0    0    0    0    0
  v1 Detemir, Metformin+Insulin                          1    0    0    0    0    0    0
  v7 Detemir, Metformin+Insulin                          0    1    0    0    0    0    0
  Biphasic, Placebo+Insulin 18m - baseline              -1    1    0    0    0    0    0
  Aspart+Detemir, Placebo+Insulin 18m - baseline        -1    1   -1    1    0    0    0
  Detemir, Placebo+Insulin 18m - baseline               -1    1    0    0   -1    1    0
  Biphasic, Metformin+Insulin 18m - baseline            -1    1    0    0    0    0   -1
  Aspart+Detemir, Metformin+Insulin 18m - baseline      -1    1    0    0    0    0    0
  Detemir, Metformin+Insulin 18m - baseline             -1    1    0    0    0    0    0
  Biphasic : Metformin+Insulin vs Placebo+Insulin        0    0    0    0    0    0   -1
  Aspart+Detemir : Metformin+Insulin vs Placebo+Insulin  0    0    1   -1    0    0    0
  Detemir : Metformin+Insulin vs Placebo+Insulin         0    0    0    0    1   -1    0
  Placebo+Insulin : Aspart+Detemir vs Biphasic           0    0   -1    1    0    0    0
  Placebo+Insulin : Detemir vs Biphasic                  0    0    0    0   -1    1    0
  Placebo+Insulin : Detemir vs Aspart+Detemir            0    0    1   -1   -1    1    0
  Metformin+Insulin : Aspart+Detemir vs Biphasic         0    0    0    0    0    0    1
  Metformin+Insulin : Detemir vs Biphasic                0    0    0    0    0    0    1
  Metformin+Insulin : Detemir vs Aspart+Detemir          0    0    0    0    0    0    0
                                                      [,8] [,9] [,10] [,11] [,12]
  v1 Biphasic, Placebo+Insulin                           0    0     0     0     0
  v7 Biphasic, Placebo+Insulin                           0    0     0     0     0
  v1 Aspart+Detemir, Placebo+Insulin                     0    0     0     0     0
  v7 Aspart+Detemir, Placebo+Insulin                     0    0     0     0     0
  v1 Detemir, Placebo+Insulin                            0    0     0     0     0
  v7 Detemir, Placebo+Insulin                            0    0     0     0     0
  v1 Biphasic, Metformin+Insulin                         0    0     0     0     0
  v7 Biphasic, Metformin+Insulin                         1    0     0     0     0
  v1 Aspart+Detemir, Metformin+Insulin                   0    1     0     0     0
  v7 Aspart+Detemir, Metformin+Insulin                   0    0     1     0     0
```

```
  v1 Detemir, Metformin+Insulin                           0    0     0     1     0
  v7 Detemir, Metformin+Insulin                           0    0     0     0     1
  Biphasic, Placebo+Insulin 18m - baseline                0    0     0     0     0
  Aspart+Detemir, Placebo+Insulin 18m - baseline          0    0     0     0     0
  Detemir, Placebo+Insulin 18m - baseline                 0    0     0     0     0
  Biphasic, Metformin+Insulin 18m - baseline              1    0     0     0     0
  Aspart+Detemir, Metformin+Insulin 18m - baseline        0   -1     1     0     0
  Detemir, Metformin+Insulin 18m - baseline               0    0     0    -1     1
  Biphasic : Metformin+Insulin vs Placebo+Insulin         1    0     0     0     0
  Aspart+Detemir : Metformin+Insulin vs Placebo+Insulin   0   -1     1     0     0
  Detemir : Metformin+Insulin vs Placebo+Insulin          0    0     0    -1     1
  Placebo+Insulin : Aspart+Detemir vs Biphasic            0    0     0     0     0
  Placebo+Insulin : Detemir vs Biphasic                   0    0     0     0     0
  Placebo+Insulin : Detemir vs Aspart+Detemir             0    0     0     0     0
  Metformin+Insulin : Aspart+Detemir vs Biphasic         -1   -1     1     0     0
  Metformin+Insulin : Detemir vs Biphasic                -1    0     0    -1     1
  Metformin+Insulin : Detemir vs Aspart+Detemir           0    1    -1    -1     1
> e0 <- ci.lin( mi, subset="visit", ctr.mat=C0 )
> round( e0, 4 )
                                                       Estimate StdErr       z      P
  v1 Biphasic, Placebo+Insulin                           0.7538 0.0179 42.1160 0.0000
  v7 Biphasic, Placebo+Insulin                           0.7243 0.0181 40.0620 0.0000
  v1 Aspart+Detemir, Placebo+Insulin                     0.7737 0.0175 44.1682 0.0000
  v7 Aspart+Detemir, Placebo+Insulin                     0.7741 0.0177 43.6408 0.0000
  v1 Detemir, Placebo+Insulin                            0.7683 0.0181 42.5581 0.0000
  v7 Detemir, Placebo+Insulin                            0.7557 0.0184 41.0094 0.0000
  v1 Biphasic, Metformin+Insulin                         0.7488 0.0179 41.8297 0.0000
  v7 Biphasic, Metformin+Insulin                         0.7593 0.0180 42.1173 0.0000
  v1 Aspart+Detemir, Metformin+Insulin                   0.7495 0.0181 41.4297 0.0000
  v7 Aspart+Detemir, Metformin+Insulin                   0.7490 0.0183 40.9793 0.0000
  v1 Detemir, Metformin+Insulin                          0.7618 0.0176 43.1682 0.0000
  v7 Detemir, Metformin+Insulin                          0.7494 0.0178 42.0145 0.0000
  Biphasic, Placebo+Insulin 18m - baseline              -0.0295 0.0092 -3.2026 0.0014
  Aspart+Detemir, Placebo+Insulin 18m - baseline         0.0004 0.0089  0.0449 0.9642
  Detemir, Placebo+Insulin 18m - baseline               -0.0126 0.0097 -1.2973 0.1945
  Biphasic, Metformin+Insulin 18m - baseline             0.0105 0.0089  1.1783 0.2387
  Aspart+Detemir, Metformin+Insulin 18m - baseline      -0.0005 0.0094 -0.0557 0.9556
  Detemir, Metformin+Insulin 18m - baseline             -0.0124 0.0089 -1.3853 0.1659
  Biphasic : Metformin+Insulin vs Placebo+Insulin        0.0400 0.0128  3.1197 0.0018
  Aspart+Detemir : Metformin+Insulin vs Placebo+Insulin -0.0009 0.0129 -0.0713 0.9431
  Detemir : Metformin+Insulin vs Placebo+Insulin         0.0002 0.0132  0.0139 0.9889
  Placebo+Insulin : Aspart+Detemir vs Biphasic           0.0299 0.0128  2.3401 0.0193
  Placebo+Insulin : Detemir vs Biphasic                  0.0170 0.0134  1.2692 0.2044
  Placebo+Insulin : Detemir vs Aspart+Detemir           -0.0130 0.0131 -0.9872 0.3235
  Metformin+Insulin : Aspart+Detemir vs Biphasic        -0.0110 0.0129 -0.8534 0.3934
  Metformin+Insulin : Detemir vs Biphasic               -0.0229 0.0126 -1.8127 0.0699
  Metformin+Insulin : Detemir vs Aspart+Detemir         -0.0118 0.0129 -0.9154 0.3600
                                                          2.5%   97.5%
  v1 Biphasic, Placebo+Insulin                          0.7187  0.7889
  v7 Biphasic, Placebo+Insulin                          0.6889  0.7597
  v1 Aspart+Detemir, Placebo+Insulin                    0.7394  0.8081
  v7 Aspart+Detemir, Placebo+Insulin                    0.7394  0.8089
  v1 Detemir, Placebo+Insulin                           0.7329  0.8037
  v7 Detemir, Placebo+Insulin                           0.7196  0.7918
  v1 Biphasic, Metformin+Insulin                        0.7137  0.7839
  v7 Biphasic, Metformin+Insulin                        0.7240  0.7946
  v1 Aspart+Detemir, Metformin+Insulin                  0.7141  0.7850
  v7 Aspart+Detemir, Metformin+Insulin                  0.7132  0.7848
  v1 Detemir, Metformin+Insulin                         0.7272  0.7963
  v7 Detemir, Metformin+Insulin                         0.7144  0.7844
  Biphasic, Placebo+Insulin 18m - baseline             -0.0476 -0.0115
  Aspart+Detemir, Placebo+Insulin 18m - baseline       -0.0170  0.0178
  Detemir, Placebo+Insulin 18m - baseline              -0.0315  0.0064
  Biphasic, Metformin+Insulin 18m - baseline           -0.0070  0.0280
  Aspart+Detemir, Metformin+Insulin 18m - baseline     -0.0189  0.0178
  Detemir, Metformin+Insulin 18m - baseline            -0.0299  0.0051
```

```
Biphasic : Metformin+Insulin vs Placebo+Insulin        0.0149  0.0652
Aspart+Detemir : Metformin+Insulin vs Placebo+Insulin -0.0262  0.0244
Detemir : Metformin+Insulin vs Placebo+Insulin        -0.0256  0.0260
Placebo+Insulin : Aspart+Detemir vs Biphasic           0.0049  0.0550
Placebo+Insulin : Detemir vs Biphasic                 -0.0092  0.0432
Placebo+Insulin : Detemir vs Aspart+Detemir           -0.0387  0.0128
Metformin+Insulin : Aspart+Detemir vs Biphasic        -0.0364  0.0143
Metformin+Insulin : Detemir vs Biphasic               -0.0477  0.0019
Metformin+Insulin : Detemir vs Aspart+Detemir         -0.0372  0.0135
```

We can make a plot of this:

```
> par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6 )
> plotEst( e0[13:27,c(1,5,6)], lwd=3, vref=0,
+          y = 18-c(1:3,
+                   1:3+3.5,
+                   1:3+7.5,
+                   1:3+11.1,
+                   1:3+14.5),
+          xlab="", ylim=c(0,17), xlim=c(-0.06,0.06) )
> abline( h=18-7.5, col=gray(0.7), lty=2 )
> axis( side=1 )
> text( -0.06, -0.2, "Improvement"  , adj=0, cex=0.8 )
> text(  0.06, -0.2, "Deterioration", adj=1, cex=0.8 )
> mtext( "Mean carotid IMT (mm)", side=1, line=3/1.6 )
```

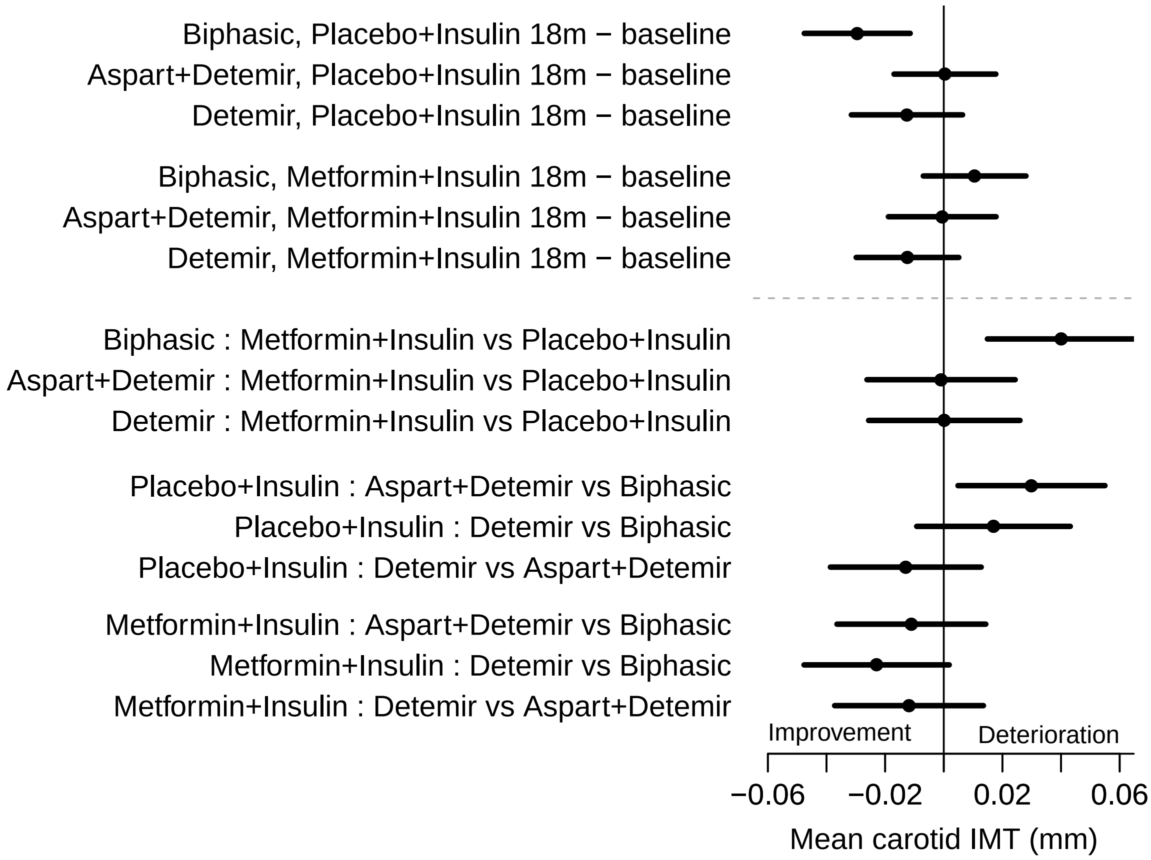

Figure 6.1: *Estimates of insulin regimen effects from a random effects model for complete ITT data, adjusted for stratification variables.*

6.0.2 Multiple imputation analysis

We can make the same analysis in the model with baseline as covariate, using multiply imputed data:

```
> library( mice )
> load( file="./data/imp" )
> class( imp )
  [1] "mids"
> mii <- with( imp, lm( fimtavg.v7 ~ fimtavg.v1 + interaction(igr,grp) + over.65 + pre.ins + sdc ) )
> round( smii <- summary( pool( mii) ), 4 )
                                   est     se       t       df Pr(>|t|)   lo 95  hi 95
  (Intercept)                   0.0875 0.0238  3.6729 329.1274   0.0003  0.0406 0.1343
  fimtavg.v1                    0.8413 0.0285 29.5248 323.9575   0.0000  0.7852 0.8973
  interaction(igr, grp)AspD.Plc 0.0306 0.0128  2.3967 326.7959   0.0171  0.0055 0.0557
  interaction(igr, grp)Detm.Plc 0.0159 0.0133  1.1964 303.3143   0.2325 -0.0102 0.0420
  interaction(igr, grp)Biph.Met 0.0376 0.0128  2.9385 336.3923   0.0035  0.0124 0.0628
  interaction(igr, grp)AspD.Met 0.0276 0.0130  2.1242 337.6848   0.0344  0.0020 0.0532
  interaction(igr, grp)Detm.Met 0.0182 0.0128  1.4213 329.7788   0.1562 -0.0070 0.0433
  over.652                      0.0202 0.0088  2.2879 293.4225   0.0229  0.0028 0.0376
  pre.ins2                     -0.0037 0.0083 -0.4422 320.5923   0.6586 -0.0199 0.0126
  sdc2                          0.0094 0.0077  1.2256 312.3481   0.2213 -0.0057 0.0245
                               nmis    fmi lambda
  (Intercept)                    NA 0.1131 0.1077
  fimtavg.v1                      0 0.1194 0.1140
  interaction(igr, grp)AspD.Plc  NA 0.1159 0.1105
  interaction(igr, grp)Detm.Plc  NA 0.1445 0.1389
  interaction(igr, grp)Biph.Met  NA 0.1040 0.0987
  interaction(igr, grp)AspD.Met  NA 0.1024 0.0971
  interaction(igr, grp)Detm.Met  NA 0.1123 0.1069
  over.652                       NA 0.1565 0.1508
  pre.ins2                       NA 0.1235 0.1181
  sdc2                           NA 0.1336 0.1280
> ci.lin( pool( mii ), subset="igr" )
                                 Estimate     StdErr        z           P         2.5%
  interaction(igr, grp)AspD.Plc 0.03057046 0.01275524 2.396699 0.016543528  0.005570654
  interaction(igr, grp)Detm.Plc 0.01588586 0.01327765 1.196436 0.231526529 -0.010137861
  interaction(igr, grp)Biph.Met 0.03763734 0.01280832 2.938507 0.003297972  0.012533492
  interaction(igr, grp)AspD.Met 0.02761767 0.01300126 2.124230 0.033650926  0.002135664
  interaction(igr, grp)Detm.Met 0.01818059 0.01279166 1.421285 0.155233880 -0.006890594
                                    97.5%
  interaction(igr, grp)AspD.Plc 0.05557027
  interaction(igr, grp)Detm.Plc 0.04190958
  interaction(igr, grp)Biph.Met 0.06274118
  interaction(igr, grp)AspD.Met 0.05309967
  interaction(igr, grp)Detm.Met 0.04325177
> ( CI <- -CO[19:27,1:5*2+1] )
                                                     [,1] [,2] [,3] [,4] [,5]
  Biphasic : Metformin+Insulin vs Placebo+Insulin       0    0    1    0    0
  Aspart+Detemir : Metformin+Insulin vs Placebo+Insulin -1   0    0    1    0
  Detemir : Metformin+Insulin vs Placebo+Insulin        0   -1    0    0    1
  Placebo+Insulin : Aspart+Detemir vs Biphasic          1    0    0    0    0
  Placebo+Insulin : Detemir vs Biphasic                 0    1    0    0    0
  Placebo+Insulin : Detemir vs Aspart+Detemir          -1    1    0    0    0
  Metformin+Insulin : Aspart+Detemir vs Biphasic        0    0   -1    1    0
  Metformin+Insulin : Detemir vs Biphasic               0    0   -1    0    1
  Metformin+Insulin : Detemir vs Aspart+Detemir         0    0    0   -1    1
> round( i0 <- ci.lin( pool( mii ), subset="igr", ctr.mat=CI ), 4 )
                                                    Estimate StdErr       z      P
  Biphasic : Metformin+Insulin vs Placebo+Insulin     0.0376 0.0128  2.9385 0.0033
  Aspart+Detemir : Metformin+Insulin vs Placebo+Insulin -0.0030 0.0129 -0.2292 0.8187
```

```
Detemir : Metformin+Insulin vs Placebo+Insulin          0.0023 0.0130  0.1768 0.8597
Placebo+Insulin : Aspart+Detemir vs Biphasic            0.0306 0.0128  2.3967 0.0165
Placebo+Insulin : Detemir vs Biphasic                   0.0159 0.0133  1.1964 0.2315
Placebo+Insulin : Detemir vs Aspart+Detemir            -0.0147 0.0130 -1.1253 0.2605
Metformin+Insulin : Aspart+Detemir vs Biphasic         -0.0100 0.0129 -0.7740 0.4389
Metformin+Insulin : Detemir vs Biphasic                -0.0195 0.0126 -1.5411 0.1233
Metformin+Insulin : Detemir vs Aspart+Detemir          -0.0094 0.0128 -0.7395 0.4596
                                                         2.5%  97.5%
Biphasic : Metformin+Insulin vs Placebo+Insulin         0.0125 0.0627
Aspart+Detemir : Metformin+Insulin vs Placebo+Insulin -0.0282 0.0223
Detemir : Metformin+Insulin vs Placebo+Insulin        -0.0231 0.0277
Placebo+Insulin : Aspart+Detemir vs Biphasic           0.0056 0.0556
Placebo+Insulin : Detemir vs Biphasic                 -0.0101 0.0419
Placebo+Insulin : Detemir vs Aspart+Detemir           -0.0403 0.0109
Metformin+Insulin : Aspart+Detemir vs Biphasic        -0.0354 0.0154
Metformin+Insulin : Detemir vs Biphasic               -0.0442 0.0053
Metformin+Insulin : Detemir vs Aspart+Detemir         -0.0345 0.0156
```

With the estimate for the insulin effects in `smif` (which is the relevant one) we can now re-do the forest plot using the "old" estimates of the corrected changes estimated from the random-effects model:

```
> par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6 )
> plotEst( e0[13:27,c(1,5,6)], lwd=3, vref=0,
+          y = 18-c(1:3,
+                   1:3+ 3.5,
+                   1:3+ 7.5-0.1,
+                   1:3+11.1-0.1,
+                   1:3+14.5-0.1),
+          xlab="", ylim=c(0,17), xlim=c(-0.06,0.06) )
> linesEst( i0[,c(1,5,6)], lwd=3, vref=0,
+          y = 18-c(1:3+ 7.5+0.1,
+                   1:3+11.1+0.1,
+                   1:3+14.5+0.1),
+          col=gray(0.6) )
> abline( h=18-7.5, col=gray(0.7), lty=2 )
> axis( side=1 )
> text( -0.06, -0.2, "Improvement"  , adj=0, cex=0.8 )
> text(  0.06, -0.2, "Deterioration", adj=1, cex=0.8 )
> mtext( "Mean carotid IMT (mm)", side=1, line=3/1.6 )
```

```
> par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6 )
> plotEst( e0[13:27,c(1,5,6)], lwd=3, vref=0,
+          y = 18-c(1:3,
+                   1:3+ 3.5,
+                   1:3+ 7.5,
+                   1:3+11.1,
+                   1:3+14.5), col=rep(c("black","transparent"),
+                                      c(6,9) ),
+          xlab="", ylim=c(0,17), xlim=c(-0.06,0.06) )
> linesEst( i0[,c(1,5,6)], lwd=3, vref=0,
+          y = 18-c(1:3+ 7.5,
+                   1:3+11.1,
+                   1:3+14.5),
+          col=gray(0.0) )
> abline( h=18-7.5, col=gray(0.0), lty=2 )
> axis( side=1 )
> text( -0.06, -0.2, "Improvement"  , adj=0, cex=0.8 )
> text(  0.06, -0.2, "Deterioration", adj=1, cex=0.8 )
> mtext( "Mean carotid IMT (mm)", side=1, line=3/1.6 )
```

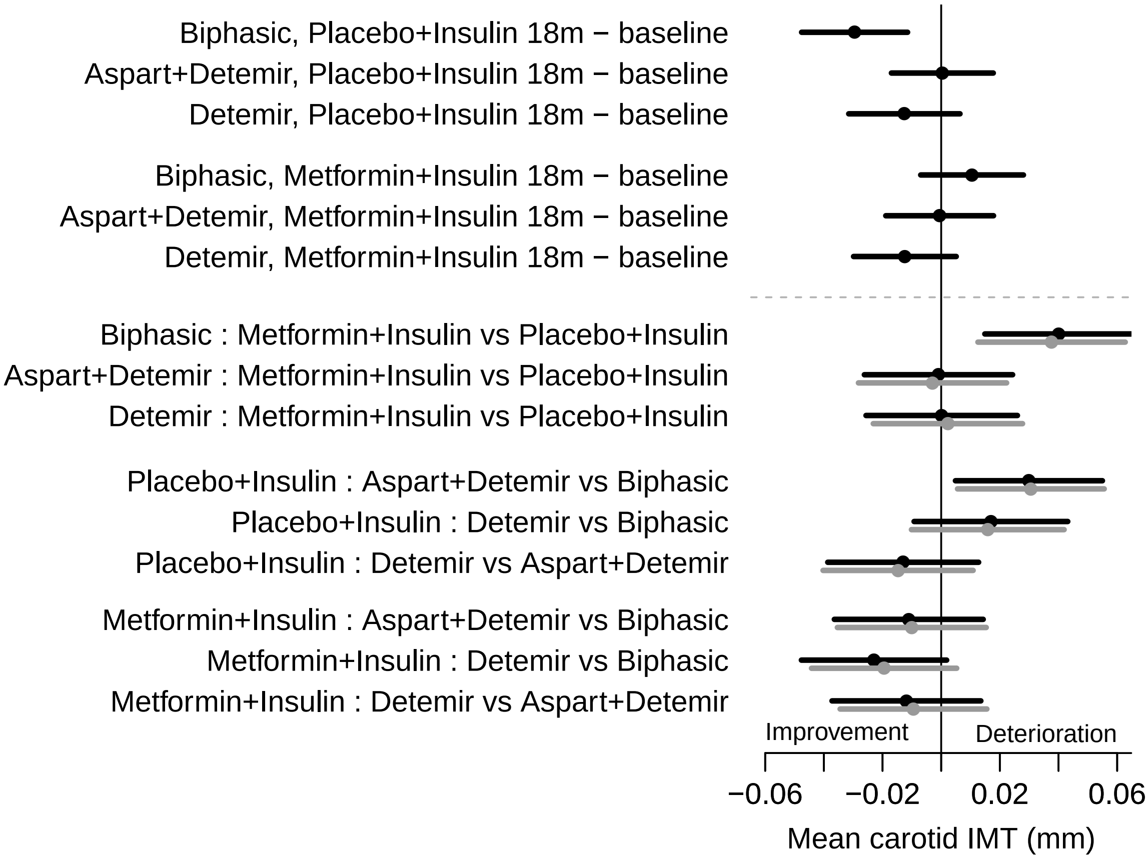

Figure 6.2: *Estimated changes in each treatment group from the random effects model, adjusted for stratification variables. Pale colors indicate the difference in changes between treatments from the model with baseline as covariate, using multiply imputed data. Bars indicate 95% c.i.*

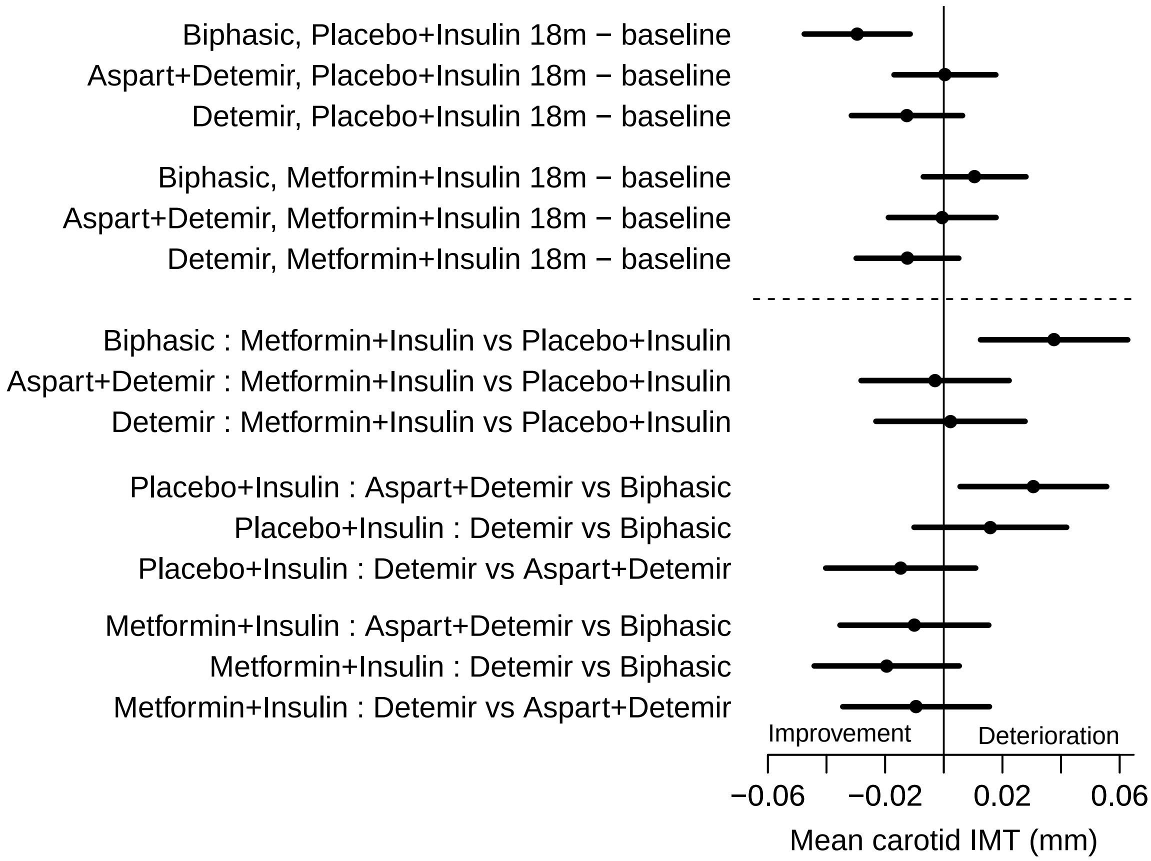

Figure 6.3: *Estimated changes in each treatment group from the random effects model. The difference in changes between treatments are from the model with baseline as covariate, using multiply imputed data, adjusted for stratification variables. Bars indicate 95% c.i.*

Chapter 7

Secondary outcome: Met/Plc

Initially we load the collected analysis dataset, and tabulate records and persons by randomization status and per protocol status:

```
> library( Epi )
> library( lme4 )
> library( abind )
> load( file="./data/AD.Rda" )
> with( AD, ftable( addmargins( table(grp,igr,PP=pp),
+                               2:3 ) ) )
           PP FALSE TRUE  Sum
  grp igr
  Plc Biph        7  425  432
      AspD        7  448  455
      Detm       17  355  372
      Sum        31 1228 1259
  Met Biph        4  465  469
      AspD        8  403  411
      Detm       10  438  448
      Sum        22 1306 1328
```

```
> with( AD, ftable( addmargins( tapply( subjid,
+                                       list(grp,igr,PP=pp),
+                                       function(x) length(unique(x) ) ),
+                               2:3 ) ) )
           PP FALSE TRUE Sum

  Plc Biph        5   62  67
      AspD        5   68  73
      Detm       12   54  66
      Sum        22  184 206
  Met Biph        3   67  70
      AspD        5   60  65
      Detm        7   64  71
      Sum        15  191 206
```

7.1 HbA_{1c}

7.1.1 HbA_{1c}at end of study

Initially we make a simple tabulation of the patients that achieve a $\text{HbA}_{1c} \leq 7.0\%$:

```
> load( file="./data/base.Rda" )
> tt <- addmargins( with( base, table( grp, hba1c.b7>7.0 )[2:1,] ) )
> cbind( tt, round( 100*tt/tt[,3], 1 ) )[,-6]
```

```
    FALSE TRUE Sum FALSE TRUE
Met    53  137 190  27.9 72.1
Plc    28  155 183  15.3 84.7
Sum    81  292 373  21.7 78.3
```

```
> twoby2( tt )
```

```
2 by 2 table analysis:
------------------------------------------------------
Outcome   : FALSE
Comparing : Met vs. Plc

    FALSE TRUE    P(FALSE) 95% conf. interval
Met    53  137      0.2789    0.2198   0.3469
Plc    28  155      0.1530    0.1078   0.2127

                                   95% conf. interval
             Relative Risk: 1.8231    1.2094   2.7483
         Sample Odds Ratio: 2.1416    1.2830   3.5747
Conditional MLE Odds Ratio: 2.1372    1.2486   3.7190
    Probability difference: 0.1259    0.0424   0.2072

             Exact P-value: 0.0038
        Asymptotic P-value: 0.0036
------------------------------------------------------
```

We see that 12% more patients on Metformin achieve an $HbA_{1c}$of 7.0% or less.

A more formal test which also generalizes to three groups is achieved by using a binomial model, in this case with a log-link:

```
> m1 <- glm( hba1c.b7<=7.0 ~ grp -1, family=binomial(link="log"), data=base )
> round( 100*ci.exp( m1 ), 1 )
```

```
         exp(Est.) 2.5% 97.5%
grpPlc        15.3 10.9  21.5
grpMet        27.9 22.2  35.1
```

```
> anova( m1, update( m1, . ~ 1 ), test="Chisq" )
```

```
Analysis of Deviance Table

Model 1: hba1c.b7 <= 7 ~ grp - 1
Model 2: hba1c.b7 <= 7 ~ 1
  Resid. Df Resid. Dev Df Deviance Pr(>Chi)
1       371     381.55
2       372     390.37 -1  -8.8224 0.002976
```

So we can choose to give the p-value as 0.003 or 0.004, depending on what test we use.

The effect is also present if we control for insulin group:

```
> mi <- update( m1, . ~ . + 1 )
> mx <- update( mi, . ~ . + igr )
> round( rbind( ci.exp( mi ),
+               ci.exp( mx ) ), 2 )
```

```
            exp(Est.) 2.5% 97.5%
(Intercept)      0.15 0.11  0.22
grpMet           1.82 1.21  2.75
(Intercept)      0.21 0.14  0.31
grpMet           1.88 1.26  2.81
igrAspD          0.83 0.56  1.23
igrDetm          0.32 0.18  0.59
```

So without control for insulin, 82% more om Metformin achieve the goal, and controlling for insulin it is 88% —- in both cases with quite large confidence intervals.

7.1.2 HbA_{1c}trajectories

We shall use the analysis of HbA_{1c} to set up the model for analyzing the other glucose related outcomes.

We set up a random effects model using `lmer`, first fitted to the entire dataset (intention to treat) and then to the restricted (per protocol) — analysis I.

```
> ITa <- lmer( hba1c ~ grp + grp:factor(visit) - 1 +
+                      sdc + over.65 + pre.ins +
+                      (1|subjid),
+                      data = AD )
> round( ci.lin( ITa ), 3 )
                         Estimate StdErr       z     P   2.5%  97.5%
  grpPlc                    8.631  0.097  89.225 0.000  8.441  8.820
  grpMet                    8.750  0.097  89.950 0.000  8.559  8.941
  sdcnotSDC                 0.116  0.091   1.264 0.206 -0.064  0.295
  over.65>65               -0.337  0.099  -3.389 0.001 -0.532 -0.142
  pre.insnoIns             -0.335  0.099  -3.376 0.001 -0.529 -0.141
  grpPlc:factor(visit)v2    0.240  0.071   3.358 0.001  0.100  0.380
  grpMet:factor(visit)v2   -0.585  0.071  -8.302 0.000 -0.724 -0.447
  grpPlc:factor(visit)v3   -0.252  0.073  -3.470 0.001 -0.395 -0.110
  grpMet:factor(visit)v3   -0.886  0.071 -12.504 0.000 -1.025 -0.747
  grpPlc:factor(visit)v4   -0.267  0.073  -3.648 0.000 -0.411 -0.124
  grpMet:factor(visit)v4   -0.876  0.071 -12.278 0.000 -1.016 -0.736
  grpPlc:factor(visit)v5   -0.269  0.074  -3.623 0.000 -0.414 -0.123
  grpMet:factor(visit)v5   -0.841  0.072 -11.706 0.000 -0.982 -0.700
  grpPlc:factor(visit)v6   -0.371  0.076  -4.882 0.000 -0.520 -0.222
  grpMet:factor(visit)v6   -0.858  0.073 -11.808 0.000 -1.001 -0.716
  grpPlc:factor(visit)v7   -0.356  0.072  -4.956 0.000 -0.497 -0.215
  grpMet:factor(visit)v7   -0.781  0.071 -11.027 0.000 -0.920 -0.642

> # Per protocol analysis
> PPa <- update( ITa, data = subset( AD, pp ) )
```

We the do the parallel analyses not adjusted for the stratification variables (II)

```
> ITr <- update( ITa, . ~ grp + grp:factor(visit) - 1 + (1|subjid) )
> PPr <- update( ITr, data = subset( AD, pp ) )
```

Finally we expand the first analysis by including further potential confounders (III):

```
> ITc <- update( ITa, . ~ . + sex + statin + gad.pos + cvd )
> PPc <- update( ITc, data = subset( AD, pp ) )
```

So now we have 6 different models for the same outcome, which either will show approximately the same, or in the case they show slightly different results, enables us to pick the results that suits or prejudices best.

7.1.3 Extraction of estimated effects

From this model we want to extract first the average level of HbA_{1c} at each visit, and additionally the estimated change from visit 1 to visit 7, so we set up the corresponding contrast matrix, which will extract these from the models

```
> eM <- rbind( cbind(1,rbind(0,diag(6))), rep(0:1,c(6,1)) )
> rownames( eM ) <- c( paste( "Vis", 1:7, sep="" ), "v7-v1" )
> eM
       [,1] [,2] [,3] [,4] [,5] [,6] [,7]
  Vis1    1    0    0    0    0    0    0
  Vis2    1    1    0    0    0    0    0
  Vis3    1    0    1    0    0    0    0
```

```
  Vis4     1    0    0    1    0    0    0
  Vis5     1    0    0    0    1    0    0
  Vis6     1    0    0    0    0    1    0
  Vis7     1    0    0    0    0    0    1
  v7-v1    0    0    0    0    0    0    1
```

With a first look at the entire parameter vector for the model we can see what subset to extract to get the desired estimates:

```
> round( ci.exp( ITa, Exp=F ), 3 )
                          Estimate   2.5%  97.5%
  grpPlc                     8.631  8.441  8.820
  grpMet                     8.750  8.559  8.941
  sdcnotSDC                  0.116 -0.064  0.295
  over.65>65                -0.337 -0.532 -0.142
  pre.insnoIns              -0.335 -0.529 -0.141
  grpPlc:factor(visit)v2     0.240  0.100  0.380
  grpMet:factor(visit)v2    -0.585 -0.724 -0.447
  grpPlc:factor(visit)v3    -0.252 -0.395 -0.110
  grpMet:factor(visit)v3    -0.886 -1.025 -0.747
  grpPlc:factor(visit)v4    -0.267 -0.411 -0.124
  grpMet:factor(visit)v4    -0.876 -1.016 -0.736
  grpPlc:factor(visit)v5    -0.269 -0.414 -0.123
  grpMet:factor(visit)v5    -0.841 -0.982 -0.700
  grpPlc:factor(visit)v6    -0.371 -0.520 -0.222
  grpMet:factor(visit)v6    -0.858 -1.001 -0.716
  grpPlc:factor(visit)v7    -0.356 -0.497 -0.215
  grpMet:factor(visit)v7    -0.781 -0.920 -0.642
> round( ci.exp( ITa, subset="Met", Exp=F ), 3 )
                          Estimate   2.5%  97.5%
  grpMet                     8.750  8.559  8.941
  grpMet:factor(visit)v2    -0.585 -0.724 -0.447
  grpMet:factor(visit)v3    -0.886 -1.025 -0.747
  grpMet:factor(visit)v4    -0.876 -1.016 -0.736
  grpMet:factor(visit)v5    -0.841 -0.982 -0.700
  grpMet:factor(visit)v6    -0.858 -1.001 -0.716
  grpMet:factor(visit)v7    -0.781 -0.920 -0.642
> round( ci.exp( ITa, subset="Plc", Exp=F ), 3 )
                          Estimate   2.5%  97.5%
  grpPlc                     8.631  8.441  8.820
  grpPlc:factor(visit)v2     0.240  0.100  0.380
  grpPlc:factor(visit)v3    -0.252 -0.395 -0.110
  grpPlc:factor(visit)v4    -0.267 -0.411 -0.124
  grpPlc:factor(visit)v5    -0.269 -0.414 -0.123
  grpPlc:factor(visit)v6    -0.371 -0.520 -0.222
  grpPlc:factor(visit)v7    -0.356 -0.497 -0.215
> round( ci.lin( ITa, subint=c("Met","v7"), Exp=F ), 3 )
                          Estimate StdErr       z P  2.5%  97.5%
  grpMet:factor(visit)v7    -0.781  0.071 -11.027 0 -0.92 -0.642

> c.plc <- ci.exp( ITa, ctr.mat=eM, subset="Plc", Exp=F )
> c.met <- ci.exp( ITa, ctr.mat=eM, subset="Met", Exp=F )
> c.dif <- ci.exp( ITa, ctr.mat=cbind(eM,-eM),
+                  subset=c("Met","Plc"), Exp=F )
> round( cbind( c.met, c.plc, c.dif), 3 )
        Estimate   2.5%  97.5% Estimate   2.5%  97.5% Estimate   2.5%  97.5%
  Vis1     8.750  8.559  8.941    8.631  8.441  8.820    0.119 -0.094  0.332
  Vis2     8.164  7.971  8.358    8.871  8.677  9.064   -0.706 -0.924 -0.488
  Vis3     7.864  7.670  8.057    8.378  8.184  8.573   -0.515 -0.735 -0.294
  Vis4     7.874  7.679  8.068    8.363  8.168  8.559   -0.490 -0.712 -0.268
  Vis5     7.909  7.714  8.104    8.362  8.165  8.559   -0.453 -0.676 -0.229
  Vis6     7.892  7.695  8.088    8.260  8.060  8.460   -0.368 -0.595 -0.141
  Vis7     7.969  7.776  8.162    8.275  8.081  8.468   -0.306 -0.525 -0.086
  v7-v1   -0.781 -0.920 -0.642   -0.356 -0.497 -0.215   -0.425 -0.623 -0.227
```

We also want to test whether the trajectories of the outcome (HbA_{1c}) is the same in the two randomization groups, whether the values at the last visit is the same, and whether the change from first to last vsit is the same. These three tests are accomplished by using the same contrats matric that we just set up:

```
> test <- rbind( Wald( ITa, subset=c("Met","Plc"), ctr.mat=cbind(-eM,eM)[-8,] ),
+                Wald( ITa, subset=c("Met","Plc"), ctr.mat=cbind(-eM,eM)[7,,drop=F] ),
+                Wald( ITa, subset=c("Met","Plc"), ctr.mat=cbind(-eM,eM)[8,,drop=F] ),
+                Wald( ITa, subint=c("Met","v7" ) ),
+                Wald( ITa, subint=c("Plc","v7" ) ) )
> rownames( test ) <- c("    All equal",
+                       "Visit 7 equal",
+                       " Change equal",
+                       "  Met chg = 0",
+                       "  Plc chg = 0")
> round( test, 4 )
                 Chisq d.f.      P
    All equal  94.8066    7 0.0000
Visit 7 equal   7.4532    1 0.0063
 Change equal  17.7260    1 0.0000
  Met chg = 0 121.5922    1 0.0000
  Plc chg = 0  24.5619    1 0.0000
```

For conveience we pack these extractors and tests in a function, that takes a particular model as argument:

```
> resfun <-
+ function( ITa )
+ {
+ c.plc <- ci.exp( ITa, ctr.mat=eM, subset="Plc", Exp=F )
+ c.met <- ci.exp( ITa, ctr.mat=eM, subset="Met", Exp=F )
+ c.dif <- ci.exp( ITa, subset=c("Met","Plc"), Exp=F, ctr.mat=cbind(eM,-eM) )
+
+ test <- rbind( Wald( ITa, subset=c("Met","Plc"), ctr.mat=cbind(-eM,eM)[-8,] ),
+                Wald( ITa, subset=c("Met","Plc"), ctr.mat=cbind(-eM,eM)[7,,drop=F] ),
+                Wald( ITa, subset=c("Met","Plc"), ctr.mat=cbind(-eM,eM)[8,,drop=F] ),
+                Wald( ITa, subint=c("Met","v7" ) ),
+                Wald( ITa, subint=c("Plc","v7" ) ) )
+ rownames( test ) <- c("    All equal",
+                       "Visit 7 equal",
+                       " Change equal",
+                       "  Met chg = 0",
+                       "  Plc chg = 0")
+ eff <- cbind( c.met, c.plc, c.dif )
+ colnames( eff )[1+0:2*3] <- c("Met","Plc","M-P")
+ print( round( eff, 3 ) )
+ print( round( test, 4 ) )
+ invisible( list( eff=eff, test=test ) )
+ }
```

This can now be applied to all fitted models

```
> cat( "\nIntention to treat, stratum variables:\n----------------------\n" )
Intention to treat, stratum variables:
----------------------

> hbr <- resfun( ITa )
        Met  2.5% 97.5%   Plc  2.5% 97.5%    M-P   2.5%  97.5%
Vis1  8.750 8.559 8.941 8.631 8.441 8.820  0.119 -0.094  0.332
Vis2  8.164 7.971 8.358 8.871 8.677 9.064 -0.706 -0.924 -0.488
Vis3  7.864 7.670 8.057 8.378 8.184 8.573 -0.515 -0.735 -0.294
Vis4  7.874 7.679 8.068 8.363 8.168 8.559 -0.490 -0.712 -0.268
Vis5  7.909 7.714 8.104 8.362 8.165 8.559 -0.453 -0.676 -0.229
Vis6  7.892 7.695 8.088 8.260 8.060 8.460 -0.368 -0.595 -0.141
```

```
Vis7   7.969  7.776  8.162  8.275  8.081  8.468 -0.306 -0.525 -0.086
v7-v1 -0.781 -0.920 -0.642 -0.356 -0.497 -0.215 -0.425 -0.623 -0.227
                 Chisq d.f.      P
    All equal  94.8066    7 0.0000
Visit 7 equal   7.4532    1 0.0063
 Change equal  17.7260    1 0.0000
  Met chg = 0 121.5922    1 0.0000
  Plc chg = 0  24.5619    1 0.0000
```

```
> cat( "\nIntention to treat, no stratum variables:\n----------------------\n" )
```

```
Intention to treat, no stratum variables:
----------------------
```

```
> resfun( ITr )
```

```
         Met   2.5%  97.5%    Plc   2.5%  97.5%    M-P   2.5%  97.5%
Vis1   8.608  8.455  8.761  8.492  8.339  8.645  0.117 -0.100  0.333
Vis2   8.021  7.865  8.177  8.730  8.573  8.888 -0.709 -0.931 -0.487
Vis3   7.720  7.564  7.877  8.239  8.080  8.399 -0.519 -0.743 -0.295
Vis4   7.731  7.573  7.888  8.225  8.064  8.385 -0.494 -0.719 -0.269
Vis5   7.766  7.607  7.924  8.223  8.060  8.385 -0.457 -0.684 -0.230
Vis6   7.749  7.589  7.908  8.121  7.956  8.287 -0.373 -0.603 -0.143
Vis7   7.826  7.670  7.983  8.135  7.977  8.293 -0.309 -0.532 -0.086
v7-v1 -0.782 -0.921 -0.643 -0.357 -0.498 -0.216 -0.425 -0.623 -0.228
                 Chisq d.f.      P
    All equal  94.5153    7 0.0000
Visit 7 equal   7.3928    1 0.0065
 Change equal  17.7738    1 0.0000
  Met chg = 0 121.9614    1 0.0000
  Plc chg = 0  24.6403    1 0.0000
```

```
> cat( "\nIntention to treat, stratum variables + confounders:\n----------------------\n" )
```

```
Intention to treat, stratum variables + confounders:
----------------------
```

```
> resfun( ITc )
```

```
         Met   2.5%  97.5%    Plc   2.5%  97.5%    M-P   2.5%  97.5%
Vis1   8.901  8.588  9.214  8.790  8.469  9.111  0.111 -0.104  0.325
Vis2   8.316  8.001  8.631  9.030  8.707  9.354 -0.715 -0.934 -0.495
Vis3   8.015  7.700  8.330  8.538  8.213  8.863 -0.524 -0.745 -0.302
Vis4   8.025  7.709  8.340  8.523  8.198  8.849 -0.499 -0.722 -0.275
Vis5   8.060  7.744  8.376  8.522  8.195  8.848 -0.462 -0.686 -0.237
Vis6   8.043  7.726  8.360  8.420  8.092  8.748 -0.377 -0.605 -0.149
Vis7   8.120  7.805  8.436  8.435  8.110  8.759 -0.314 -0.535 -0.094
v7-v1 -0.781 -0.919 -0.642 -0.355 -0.496 -0.214 -0.425 -0.623 -0.227
                 Chisq d.f.      P
    All equal  95.3386    7 0.0000
Visit 7 equal   7.7967    1 0.0052
 Change equal  17.7458    1 0.0000
  Met chg = 0 121.4348    1 0.0000
  Plc chg = 0  24.4352    1 0.0000
```

```
> cat( "\nPer protocol, stratum variables:\n----------------------\n" )
```

```
Per protocol, stratum variables:
----------------------
```

```
> resfun( PPa )
```

```
         Met   2.5%  97.5%    Plc   2.5%  97.5%    M-P   2.5%  97.5%
Vis1   8.807  8.609  9.005  8.650  8.454  8.847  0.157 -0.067  0.380
Vis2   8.179  7.982  8.377  8.841  8.644  9.038 -0.661 -0.885 -0.438
Vis3   7.889  7.692  8.087  8.373  8.175  8.571 -0.483 -0.708 -0.259
Vis4   7.900  7.701  8.098  8.358  8.159  8.557 -0.458 -0.684 -0.233
Vis5   7.935  7.736  8.134  8.357  8.156  8.557 -0.421 -0.649 -0.194
Vis6   7.918  7.717  8.118  8.255  8.052  8.458 -0.337 -0.568 -0.106
Vis7   7.980  7.781  8.178  8.253  8.055  8.450 -0.273 -0.498 -0.048
v7-v1 -0.827 -0.967 -0.687 -0.398 -0.541 -0.255 -0.429 -0.629 -0.229
                 Chisq d.f.      P
```

```
     All equal  90.6987    7 0.0000
 Visit 7 equal   5.6615    1 0.0173
  Change equal  17.6808    1 0.0000
   Met chg = 0 133.8320    1 0.0000
   Plc chg = 0  29.8134    1 0.0000
```

```
> cat( "\nPer protocol, no stratum variables:\n----------------------\n" )

 Per protocol, no stratum variables:
 ----------------------

> resfun( PPr )
          Met   2.5%  97.5%    Plc   2.5%  97.5%    M-P   2.5%  97.5%
 Vis1   8.643  8.484  8.802  8.494  8.332  8.656  0.149 -0.078  0.376
 Vis2   8.015  7.856  8.174  8.684  8.522  8.846 -0.669 -0.896 -0.442
 Vis3   7.725  7.566  7.885  8.217  8.053  8.380 -0.491 -0.720 -0.263
 Vis4   7.736  7.576  7.896  8.202  8.037  8.366 -0.466 -0.695 -0.236
 Vis5   7.771  7.610  7.932  8.200  8.034  8.366 -0.429 -0.661 -0.198
 Vis6   7.754  7.592  7.916  8.099  7.930  8.268 -0.345 -0.579 -0.110
 Vis7   7.816  7.656  7.976  8.096  7.933  8.259 -0.280 -0.508 -0.051
 v7-v1 -0.827 -0.967 -0.687 -0.398 -0.541 -0.255 -0.429 -0.629 -0.229
                  Chisq d.f.      P
     All equal  90.5797    7 0.0000
 Visit 7 equal   5.7585    1 0.0164
  Change equal  17.6339    1 0.0000
   Met chg = 0 133.7395    1 0.0000
   Plc chg = 0  29.8560    1 0.0000

> cat( "\nPer protocol, stratum variables + confounders:\n----------------------\n" )

 Per protocol, stratum variables + confounders:
 ----------------------

> resfun( PPc )
          Met   2.5%  97.5%    Plc   2.5%  97.5%    M-P   2.5%  97.5%
 Vis1   8.931  8.604  9.257  8.784  8.446  9.123  0.146 -0.078  0.371
 Vis2   8.303  7.976  8.629  8.974  8.636  9.313 -0.671 -0.896 -0.447
 Vis3   8.013  7.687  8.340  8.507  8.168  8.846 -0.494 -0.719 -0.268
 Vis4   8.023  7.696  8.350  8.492  8.153  8.831 -0.468 -0.696 -0.241
 Vis5   8.059  7.731  8.387  8.490  8.150  8.831 -0.431 -0.660 -0.203
 Vis6   8.042  7.713  8.370  8.388  8.047  8.730 -0.347 -0.579 -0.115
 Vis7   8.103  7.776  8.431  8.386  8.048  8.725 -0.283 -0.509 -0.057
 v7-v1 -0.827 -0.967 -0.687 -0.398 -0.541 -0.255 -0.429 -0.629 -0.229
                  Chisq d.f.      P
     All equal  91.2269    7 0.0000
 Visit 7 equal   6.0132    1 0.0142
  Change equal  17.6734    1 0.0000
   Met chg = 0 133.8161    1 0.0000
   Plc chg = 0  29.8196    1 0.0000
```

We now have the results from all 6 analyses analysis, so we can plot the estimated trajectories of the HbA_{1c} over the seven visits:

```
> plt <-
+ function()
+ {
+     matplot( 0:6*3, hbr$eff[1:7,],
+          xlab="Months since trial entry", xaxt="n", xlim=c(0,19.5),
+          ylim=c(7,9.5),  yaxs="i", yaxt="n",
+          ylab=expression( "Hb"*A[1][c]*" (%)  [Mean (95% CI)]" ),
+          type="n", lwd=c(4,1,1), lty=1, col=rep(clr[1:2],each=3) )
+ abline( h=seq(7,9.5,0.2), col=gray(0.8) )
+ matlines( 0:6*3, hbr$eff[1:7,],
+          type="l", lwd=c(5,1,1), lty=1, col=rep(clr[1:2],each=3) )
+ axis( side=1, at=0:6*3, col=clr[4] )
+ axis( side=2, at=7:9, col=clr[4] )
+ text( c(20,20), c(9.3,9.1), c("Metformin","Placebo"), col=clr[1:2],
```

```
+       font=2, adj=1, cex=1 )
+ text( 20, 8.9, substitute( "Equal change in Hb"*A[1][c]*" 0-18 mth: P ="*pval,
+                            list(pval = formatC( hbr$test[3,3], format="f", digits=4 )) ),
+       col=clr[4], adj=1 )
+ text( 19.9, 8.7, "HbA1c change\n from baseline", col=clr[4], adj=c(1,0.5) )
+ text( c(20,20), hbr$eff[7,c(1,4)],
+       paste( formatC( hbr$eff[8,c(1,4)],
+                       format="f", digits=1 ), "%", sep="" ),
+       col=clr[1:2], adj=1 )
+ }
> oldpar <- par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, las=1, bty="n" )
> plt()
```

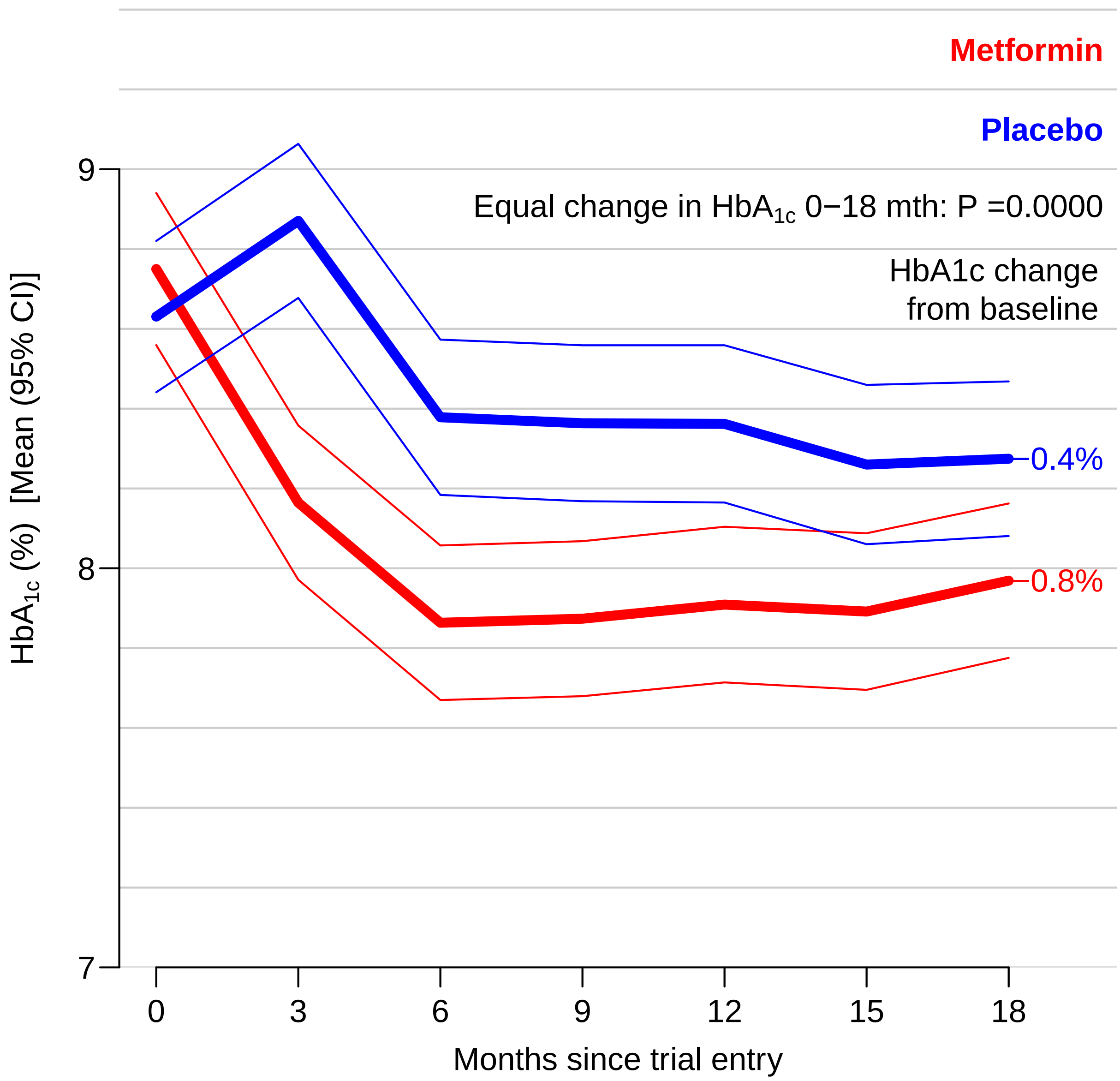

Figure 7.1: *Fitted mean $HbA_{1c}$from a mixed model with 95% c.i.*

7.2 A general lay-out of the analysis

The above analysis of HbA_{1c} can be groomed into a single function that does all analyses, shows the tables and ultimately give a result that can be used as input for a graph.

Some computer programs produce means correponding to population means for a population with the same stratum composition as the study population. If we were to produce estimates (essentially just adding some fixed quantity, namely a suitably weighted sum of the stratum effects) corresponding to some population composition we would have to argue *a priori* exactly which population composition would be of interest. This would of course be totally arbitray, so we have chosen the largest group of patients as reference group, that is we report the estimated means in a population of patients from Steno Diabetes Center, under 65 with previous insulin use — a particular, yet still totally arbitray choice.

First the analysis function, that basically only takes the name of the variable as input. It should return a list of 3 arrays, one with mean estimates, one with standard deviation esitmates and one with tests:

```
> var <- "hba1c"
```

First we define a few useful structures

```
> # Names of tests performed
> ( tnames <- rownames( test ) )

[1] "    All equal" "Visit 7 equal" " Change equal" "  Met chg = 0" "  Plc chg = 0"
```

Then a function to generate a contrast matrix to *either* get the effects or the test statistics. This is called from `eFUN` and `tFUN`:

```
> CM <-
+ function( mod, eff )
+ {
+ # Contrast matrix to fish out the estimates, resp tests
+ cM <- cbind(1,rbind(0,diag(6)))
+ rownames( cM ) <- paste( "Vis", 1:7 )
+ # Find missing visits for the variable, make two versions of the matrix
+ tp <- sapply( strsplit(rownames(ci.exp(mod,subset="Met")), "" ),
+               function(x) x[length(x)] )
+ tp[1] <- 1
+ tp <- as.numeric( tp )
+ # The contrast row should be between the last existing measurement and
+ # the first:
+ cM <- rbind( cM, cM[tp[length(tp)],]-cM[1,] )
+ # Are there any missing timepoints in this analysis?
+ mv <- setdiff(1:7,tp)
+ if( length(mv) > 0 )
+   {
+   # If used to extract effects keep rows for all timepoints, but
+   # return NAs for timepoints with no measurements:
+   cM[mv,] <- NA
+   cM <- if(eff) cM[,-mv] else cM[-mv,-mv]
+   }
+ cM
+ }
```

Then we need a function to get the mean value estimates from a model

```
> eFUN <-
+ function( mod )
+ {
+ eM <- CM( mod, eff=TRUE )
+ # Insert some NA-rows to get results in right dimension
+ met <- ci.exp( mod, ctr.mat=      eM,      subset=  "Met",        Exp=F )
+ plc <- ci.exp( mod, ctr.mat=      eM,      subset=        "Plc",   Exp=F )
+ dif <- ci.exp( mod, ctr.mat=cbind(eM,-eM), subset=c("Met","Plc"), Exp=F )
+ abind( list(Met=met, Plc=plc, Dif=dif), rev.along=0 )
+ }
```

A function to get the between person and the residual sd from a model:

```
> sFUN <-
+ function( mod )
+ {
+ res <- c( attr( VarCorr( mod )$subjid, "stddev" ),
+           attr( VarCorr( mod ), "sc" ) )
+ names( res ) <- c("Btw","Res")
+ res
+ }
```

A function to compute the relevant tests from a fitted model

```
> tFUN <-
+ function( mod )
+ {
+ eX <- CM( mod, eff=FALSE )
+ np <- nrow( eX )
+ lastM <- grep( "Met", rownames(ci.exp(mod)) ) ; lastM <- lastM[length(lastM)]
+ lastP <- grep( "Plc", rownames(ci.exp(mod)) ) ; lastP <- lastP[length(lastP)]
+ test <- rbind( Wald( mod, subset=c("Met","Plc"), ctr.mat=cbind(-eX,eX)[-np,] ),
+                Wald( mod, subset=c("Met","Plc"), ctr.mat=cbind(-eX,eX)[ np-1,,drop=F] ),
+                Wald( mod, subset=c("Met","Plc"), ctr.mat=cbind(-eX,eX)[ np  ,,drop=F] ),
+                Wald( mod, subset=lastM ),
+                Wald( mod, subset=lastP ) )
+ rownames( test ) <- tnames
+ test
+ }
```

Then we can define the function to use, including a few useful arrays that will be filled out:

```
> # Names of variable to be used in repeated measures analyses
> vnam <- c("hba1c","weight","bmi","whr","gluc","ins","cpep",
+           "idos","ipkg","sys","dia","pulse",
+           "chol","ldl","hdl","vldl","trig",
+           "fimtavg","fimtmax","iem","csc2","imtareal","n.pl")
> match( vnam, names(AD) )
 [1]  11   8   9  10  12  13  16  14  15  22  23  24  17  18  19  20  21 143 145 158 157
[22] 150 187
```

We then produce an overview of the pairwise distribution of the variables in order to see if some of them are very strongly correlated and thus will give the same results:

```
> pairs( AD[,c("visit",vnam)], gap=0, pch=16, cex=0.3 )
```

This gives a very large plot in terms of space, so we will not include it in this document. Moreover, we also want to inspect the marginal distributions of each, as a preliminary guide to which of the variables to log-transform:

```
> par( mfrow=c(6,4), mar=c(2,1,1,1), mgp=c(3,1,0)/1.6 )
> for( vv in vnam ) hist( AD[,vv], breaks=50, border="black",
+                         col="black", main=vv, xlab="",ylab="",yaxt="n" )
> hist( log10(AD[,"ins"]), breaks=50, border="black",
+                          col="black", main="log10(ins)", xlab="",ylab="",yaxt="n" )
```

It looks as if the insulin variables and `vldl`, `trig` and the no. of plaques need a log transform, so that will be the initial approach. For overview we also tabulate how manu non-missing values there are for each visit:

```
> ltrf <- rep( FALSE, length(vnam) )
> ltrf[c(6:9,16,17,23)] <- TRUE
> cbind( vnam, ltrf )
      vnam       ltrf
 [1,] "hba1c"    "FALSE"
 [2,] "weight"   "FALSE"
 [3,] "bmi"      "FALSE"
 [4,] "whr"      "FALSE"
 [5,] "gluc"     "FALSE"
 [6,] "ins"      "TRUE"
 [7,] "cpep"     "TRUE"
 [8,] "idos"     "TRUE"
 [9,] "ipkg"     "TRUE"
[10,] "sys"      "FALSE"
[11,] "dia"      "FALSE"
[12,] "pulse"    "FALSE"
[13,] "chol"     "FALSE"
[14,] "ldl"      "FALSE"
[15,] "hdl"      "FALSE"
[16,] "vldl"     "TRUE"
[17,] "trig"     "TRUE"
[18,] "fimtavg"  "FALSE"
[19,] "fimtmax"  "FALSE"
[20,] "iem"      "FALSE"
[21,] "csc2"     "FALSE"
[22,] "imtareal" "FALSE"
[23,] "n.pl"     "TRUE"
> for( vv in vnam )
+    {
+ cat( "-----------------------------------\n",vv )
+ print( table( !is.na(AD[,vv]), AD$visit ) )
+    }
 -----------------------------------
 hba1c
        v1  v2  v3  v4  v5  v6  v7
  FALSE  0   3   4   3   2   6   1
  TRUE 412 380 367 359 348 329 373
 -----------------------------------
 weight
        v1  v2  v3  v4  v5  v6  v7
  FALSE  0   3   1   4   3   2   5
  TRUE 412 380 370 358 347 333 369
 -----------------------------------
 bmi
        v1  v2  v3  v4  v5  v6  v7
  FALSE  0   3   1   4   3   2   5
  TRUE 412 380 370 358 347 333 369
 -----------------------------------
 whr
        v1  v2  v3  v4  v5  v6  v7
  FALSE  7   9   6   6   6   8  12
  TRUE 405 374 365 356 344 327 362
 -----------------------------------
 gluc
```

```
         v1  v2  v3  v4  v5  v6  v7
  FALSE   1  25  30  24  15  20   1
  TRUE  411 358 341 338 335 315 373
------------------------------------
 ins
         v1  v2  v3  v4  v5  v6  v7
  FALSE   0 383 371 362 350 335   5
  TRUE  412   0   0   0   0   0 369
------------------------------------
 cpep
         v1  v2  v3  v4  v5  v6  v7
  FALSE   0 383 371 362 350 335   5
  TRUE  412   0   0   0   0   0 369
------------------------------------
 idos
         v1  v2  v3  v4  v5  v6  v7
  FALSE   2   3   4   1   1   1 374
  TRUE  410 380 367 361 349 334   0
------------------------------------
 ipkg
         v1  v2  v3  v4  v5  v6  v7
  FALSE   2   6   5   5   4   3 374
  TRUE  410 377 366 357 346 332   0
------------------------------------
 sys
         v1  v2  v3  v4  v5  v6  v7
  FALSE   5   4   1   4   2   4  31
  TRUE  407 379 370 358 348 331 343
------------------------------------
 dia
         v1  v2  v3  v4  v5  v6  v7
  FALSE   5   4   1   4   2   4  31
  TRUE  407 379 370 358 348 331 343
------------------------------------
 pulse
         v1  v2  v3  v4  v5  v6  v7
  FALSE   8   8   8   6   5   6  39
  TRUE  404 375 363 356 345 329 335
------------------------------------
 chol
         v1  v2  v3  v4  v5  v6  v7
  FALSE   0 383  25 362  12 335   4
  TRUE  412   0 346   0 338   0 370
------------------------------------
 ldl
         v1  v2  v3  v4  v5  v6  v7
  FALSE  14 383  34 362  24 335  17
  TRUE  398   0 337   0 326   0 357
------------------------------------
 hdl
         v1  v2  v3  v4  v5  v6  v7
  FALSE   0 383  25 362  13 335   4
  TRUE  412   0 346   0 337   0 370
------------------------------------
 vldl
         v1  v2  v3  v4  v5  v6  v7
  FALSE  13 383  77 362  74 335  14
  TRUE  399   0 294   0 276   0 360
------------------------------------
 trig
         v1  v2  v3  v4  v5  v6  v7
  FALSE   0 383  28 362  13 335   4
  TRUE  412   0 343   0 337   0 370
------------------------------------
 fimtavg
         v1  v2  v3  v4  v5  v6  v7
```

```
  FALSE   0 383 371 362 350 335   3
  TRUE  412   0   0   0   0   0 371
 -----------------------------------
 fimtmax
         v1  v2  v3  v4  v5  v6  v7
  FALSE   0 383 371 362 350 335   3
  TRUE  412   0   0   0   0   0 371
 -----------------------------------
 iem
         v1  v2  v3  v4  v5  v6  v7
  FALSE  36 383 371 362 350 335  54
  TRUE  376   0   0   0   0   0 320
 -----------------------------------
 csc2
         v1  v2  v3  v4  v5  v6  v7
  FALSE  36 383 371 362 350 335  54
  TRUE  376   0   0   0   0   0 320
 -----------------------------------
 imtareal
         v1  v2  v3  v4  v5  v6  v7
  FALSE  36 383 371 362 350 335  54
  TRUE  376   0   0   0   0   0 320
 -----------------------------------
 n.pl
         v1  v2  v3  v4  v5  v6  v7
  FALSE 118 383 371 362 350 335  95
  TRUE  294   0   0   0   0   0 279
```

Now we can set up arrays to hold the results from the analyses — for each variable we do 6 analyses in order to 1) make the confusion complete 2) be able to choose the results that fits our prejudices better 3) and make the p-values smaller.

First, we set up a couple of arrays to hold the results from the analyses:

```
> # Arrays to hold results over variables
> # Variance components
> Std <- NArray( list( var = paste( vnam, ifelse(ltrf,"(l)",""), sep="" ),
+                      ana = c("IT","PP"),
+                      mod = c("Prim","Rest","Conf"),
+                      std = c("Btw","Res") ) )
> # Estimates
> Eff <- NArray( c( dimnames(Std)[-4],
+                   list( par = c(paste("Vis",1:7),"V7-V1"),
+                               c("Est","lo","hi"),
+                               c("Met","Plc","Dif") ) ) )
> # Tests
> Tst <- NArray( c( dimnames(Std)[-4],
+                   list( test = tnames,
+                         what = c("Chisq","df","Pval") ) ) )
> # Smaller versions of the arrys to be used inside the function that
> # does the calculations for each response variable
> std <- NArray( dimnames(Std)[-1] )
> eff <- NArray( dimnames(Eff)[-1] )
> tst <- NArray( dimnames(Tst)[-1] )
```

With these structures in place we can se up a function that fits the relevant models and extracts the results. The only argument is the name of the response variable, and an indicator of whether it should be log-transformed before analysis. We first define a log-function that returns `NA` instead of `-Inf`, since the variables we want to log-transform logically cannot have a 0 value.

```
> # Function to do PPplots for residuals
> PPplot <-
+ function( x, xl )
```

```
+ {
+ n <- length(x)
+ plot( pnorm( sort(x/sd(x)) ), (1:n-0.5)/n,
+       pch=16, cex=0.4,
+       xlim=0:1, ylim=0:1,
+       xlab="", ylab="",
+       xaxt="n", yaxt="n" )
+ text( 0, 1, xl, adj=c(0,1) )
+ abline( 0, 1 )
+ }
> # A function that returns NA instead of -Inf for 0 argument
> logI <- function(x) ifelse(x>0,log(x),NA)
> # Function that makes all analyses for one response variable
> ana.fun <-
+ function( var, log.tr=FALSE, respl=FALSE )
+ {
+ # We need a single name of the response variable
+ AD$Y <- if(log.tr) logI(AD[,var]) else AD[,var]
+ # Fit models to total and PP part of dataset:
+ # r: Reduced model
+ # a: Primary model
+ # c: Confounder-expanded model
+ ITr <- lmer( Y ~ grp + grp:factor(visit) - 1 + (1|subjid), data = AD )
+ ITa <- lmer( Y ~ grp + grp:factor(visit) - 1 + sdc + over.65 + pre.ins
+                                              + (1|subjid), data = AD )
+ ITc <- lmer( Y ~ grp + grp:factor(visit) - 1 + sdc + over.65 + pre.ins
+                                              + sex + statin + gad.pos + cvd
+                                              + (1|subjid), data = AD )
+ # ITa <- update( ITr, . ~ . + sdc + over.65 + pre.ins )
+ # ITc <- update( ITa, . ~ . + sex + statin + gad.pos + cvd )
+ PPa <- update( ITa, data = subset( AD, pp ) )
+ PPr <- update( ITr, data = subset( AD, pp ) )
+ PPc <- update( ITc, data = subset( AD, pp ) )
+
+ # Plots if specified - but only for ITa analysis - note the S4 way of
+ # extracting slots from the objects, does not work for medMod objects
+ # if( respl )
+ # {
+ # PPplot( ITa@ranef, paste(var,if(log.tr)"(log-tr)","\nptt") )
+ # PPplot( ITa@resid, paste(var,if(log.tr)"(log-tr)","\nres") )
+ # }
+
+ # Fixed effects
+ eff["IT","Prim",,,] <- eFUN( ITa )
+ eff["IT","Rest",,,] <- eFUN( ITr )
+ eff["IT","Conf",,,] <- eFUN( ITc )
+ eff["PP","Prim",,,] <- eFUN( PPa )
+ eff["PP","Rest",,,] <- eFUN( PPr )
+ eff["PP","Conf",,,] <- eFUN( PPc )
+ if( log.tr ) eff <- exp( eff )
+ # Variance components
+ std["IT","Prim",] <- sFUN( ITa )
+ std["IT","Rest",] <- sFUN( ITr )
+ std["IT","Conf",] <- sFUN( ITc )
+ std["PP","Prim",] <- sFUN( PPa )
+ std["PP","Rest",] <- sFUN( PPr )
+ std["PP","Conf",] <- sFUN( PPc )
+ # Tests
+ tst["IT","Prim",,] <- tFUN( ITa )
+ tst["IT","Rest",,] <- tFUN( ITr )
+ tst["IT","Conf",,] <- tFUN( ITc )
+ tst["PP","Prim",,] <- tFUN( PPa )
+ tst["PP","Rest",,] <- tFUN( PPr )
+ tst["PP","Conf",,] <- tFUN( PPc )
+ # Return all in a list
+ list( eff=eff, std=std, tst=tst )
```

```
+ }
```

With this specification of models we can now fill in the arrays and also show the residual plots:

```
> par( mfrow=c(8,6), mar=c(0,0,0,0), omi=c(3,3,1,1)/4 )
> for( i in 1:length(vnam) )
+    {
+ cat( vnam[i], "\n" )
+    res <- ana.fun( vnam[i], ltrf[i], respl=TRUE )
+    Eff[i,,,,,] <- res$eff
+    Std[i,,,]   <- res$std
+    Tst[i,,,,]  <- res$tst
+ #   mtext( expression(Phi^-1*"[sort(std. res.)]"),
+ #          side=1, line=2, outer=TRUE )
+ #   mtext( "Uniform[0,1]", side=2, line=2, outer=TRUE )
+    }
  hba1c
  weight
  bmi
  whr
  gluc
  ins
  cpep
  idos
  ipkg
  sys
  dia
  pulse
  chol
  ldl
  hdl
  vldl
  trig
  fimtavg
  fimtmax
  iem
  csc2
  imtareal
  n.pl
> apply( Eff, 1:2, FUN=function(x) mean(is.na(x)) )
           ana
  var          IT    PP
    hba1c    0.000 0.000
    weight   0.000 0.000
    bmi      0.000 0.000
    whr      0.000 0.000
    gluc     0.000 0.000
    ins(l)   0.625 0.625
    cpep(l)  0.625 0.625
    idos(l)  0.125 0.125
    ipkg(l)  0.125 0.125
    sys      0.000 0.000
    dia      0.000 0.000
    pulse    0.000 0.000
    chol     0.375 0.375
    ldl      0.375 0.375
    hdl      0.375 0.375
    vldl(l)  0.375 0.375
    trig(l)  0.375 0.375
    fimtavg  0.625 0.625
    fimtmax  0.625 0.625
    iem      0.625 0.625
    csc2     0.625 0.625
    imtareal 0.625 0.625
    n.pl(l)  0.625 0.625
```

Once this has been accomplished we can list the estimated parameters, the values for visit 1–7 are estimated means in a certain group:

`Prim` for the primary amalysis it is the estimated means for the reference group which is patients from Steno, under 65 and with previous insulin use.

`Rest` restricted analysis, it is the estimated overall mean in each treatment group, assuming no differences between strata.

`Conf` conforunter controlled, here we have the estimated mean in the reference stratum, among GAD-negative females not on statins and with no heartfailure.

For the differences between the treatment groups, these are for all three models estimated nder the assumption that the differences only depend on time (at visit).

The results for the intention to treat analysis is for all variables laid out in this table:

```
> round( ftable( Eff[,"IT","Prim",,,], col.vars=4:3 ), 3 )
                    Met                     Plc                     Dif
                    Est      lo      hi     Est      lo      hi     Est      lo      hi
var      par
hba1c    Vis 1    8.750   8.559   8.941   8.631   8.441   8.820   0.119  -0.094   0.332
         Vis 2    8.164   7.971   8.358   8.871   8.677   9.064  -0.706  -0.924  -0.488
         Vis 3    7.864   7.670   8.057   8.378   8.184   8.573  -0.515  -0.735  -0.294
         Vis 4    7.874   7.679   8.068   8.363   8.168   8.559  -0.490  -0.712  -0.268
         Vis 5    7.909   7.714   8.104   8.362   8.165   8.559  -0.453  -0.676  -0.229
         Vis 6    7.892   7.695   8.088   8.260   8.060   8.460  -0.368  -0.595  -0.141
         Vis 7    7.969   7.776   8.162   8.275   8.081   8.468  -0.306  -0.525  -0.086
         V7-V1   -0.781  -0.920  -0.642  -0.356  -0.497  -0.215  -0.425  -0.623  -0.227
weight   Vis 1   98.457  95.589 101.325  98.308  95.461 101.156   0.149  -2.815   3.112
         Vis 2   98.827  95.957 101.698  99.626  96.775 102.477  -0.799  -3.769   2.171
         Vis 3   99.399  96.528 102.270 100.863  98.010 103.716  -1.464  -4.436   1.508
         Vis 4   99.902  97.030 102.774 101.670  98.817 104.524  -1.768  -4.742   1.206
         Vis 5   99.773  96.900 102.645 102.132  99.277 104.988  -2.359  -5.335   0.617
         Vis 6  100.015  97.142 102.889 102.527  99.670 105.385  -2.512  -5.491   0.466
         Vis 7  100.041  97.169 102.913 102.457  99.605 105.309  -2.416  -5.387   0.556
         V7-V1    1.584   1.060   2.108   4.148   3.619   4.677  -2.564  -3.309  -1.820
bmi      Vis 1   32.453  31.636  33.270  32.230  31.419  33.041   0.223  -0.622   1.069
         Vis 2   32.585  31.767  33.404  32.658  31.845  33.471  -0.073  -0.921   0.776
         Vis 3   32.772  31.954  33.590  33.063  32.250  33.877  -0.291  -1.140   0.558
         Vis 4   32.931  32.113  33.750  33.336  32.523  34.150  -0.405  -1.255   0.445
         Vis 5   32.889  32.070  33.708  33.490  32.675  34.304  -0.601  -1.451   0.250
         Vis 6   32.960  32.140  33.779  33.627  32.812  34.442  -0.667  -1.519   0.184
         Vis 7   32.906  32.088  33.725  33.594  32.781  34.407  -0.688  -1.537   0.161
         V7-V1    0.453   0.279   0.627   1.364   1.189   1.540  -0.911  -1.158  -0.665
whr      Vis 1    0.998   0.983   1.012   1.013   0.999   1.027  -0.015  -0.030   0.000
         Vis 2    0.998   0.983   1.012   1.001   0.987   1.016  -0.004  -0.019   0.012
         Vis 3    0.999   0.984   1.013   1.007   0.993   1.021  -0.008  -0.024   0.007
         Vis 4    0.997   0.983   1.012   1.005   0.990   1.019  -0.007  -0.023   0.008
         Vis 5    1.005   0.991   1.020   1.005   0.990   1.019   0.000  -0.016   0.016
         Vis 6    1.000   0.985   1.014   1.007   0.992   1.022  -0.007  -0.023   0.009
         Vis 7    1.006   0.992   1.020   1.015   1.000   1.029  -0.009  -0.025   0.007
         V7-V1    0.008   0.000   0.016   0.002  -0.006   0.010   0.006  -0.005   0.018
gluc     Vis 1   10.513  10.037  10.988  10.073   9.600  10.546   0.440  -0.136   1.016
         Vis 2    8.522   8.030   9.014   8.951   8.453   9.450  -0.430  -1.043   0.183
         Vis 3    8.086   7.589   8.584   8.890   8.381   9.398  -0.804  -1.430  -0.178
         Vis 4    7.975   7.476   8.474   8.513   8.003   9.023  -0.538  -1.166   0.091
         Vis 5    8.087   7.587   8.587   8.763   8.249   9.276  -0.676  -1.306  -0.045
         Vis 6    8.254   7.746   8.763   8.373   7.847   8.900  -0.119  -0.767   0.529
         Vis 7    8.373   7.886   8.860   8.401   7.909   8.892  -0.028  -0.630   0.574
         V7-V1   -2.140  -2.643  -1.636  -1.672  -2.181  -1.163  -0.467  -1.184   0.249
ins(l)   Vis 1   60.247  50.865  71.360  70.290  59.441  83.120   0.857   0.713   1.031
         Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
```

	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	40.366	33.938	48.012	44.147	37.081	52.560	0.914	0.753	1.111
	V7-V1	0.670	0.581	0.773	0.628	0.544	0.725	1.067	0.871	1.306
cpep(l)	Vis 1	562.296	482.417	655.401	623.081	535.210	725.378	0.902	0.767	1.061
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	411.738	352.639	480.742	429.593	368.052	501.423	0.958	0.811	1.132
	V7-V1	0.732	0.670	0.800	0.689	0.631	0.754	1.062	0.937	1.204
idos(l)	Vis 1	47.576	42.560	53.183	46.958	42.043	52.448	1.013	0.898	1.143
	Vis 2	85.419	76.340	95.577	109.645	98.050	122.611	0.779	0.689	0.880
	Vis 3	94.696	84.619	105.973	127.013	113.508	142.124	0.746	0.659	0.843
	Vis 4	98.406	87.920	110.143	134.136	119.843	150.134	0.734	0.648	0.830
	Vis 5	100.569	89.829	112.592	136.966	122.298	153.392	0.734	0.648	0.831
	Vis 6	102.410	91.435	114.702	138.205	123.326	154.879	0.741	0.654	0.840
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.153	2.020	2.294	2.943	2.754	3.145	0.731	0.667	0.802
ipkg(l)	Vis 1	0.488	0.442	0.540	0.483	0.437	0.534	1.011	0.907	1.128
	Vis 2	0.873	0.789	0.967	1.113	1.006	1.232	0.784	0.701	0.877
	Vis 3	0.965	0.871	1.068	1.273	1.150	1.410	0.758	0.677	0.848
	Vis 4	0.998	0.901	1.105	1.335	1.205	1.478	0.748	0.668	0.837
	Vis 5	1.023	0.923	1.133	1.349	1.217	1.495	0.758	0.677	0.849
	Vis 6	1.039	0.937	1.151	1.361	1.227	1.509	0.763	0.681	0.856
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.127	1.999	2.263	2.818	2.641	3.006	0.755	0.690	0.826
sys	Vis 1	138.056	135.490	140.622	135.797	133.238	138.357	2.259	-0.705	5.223
	Vis 2	132.365	129.755	134.974	134.516	131.902	137.131	-2.151	-5.202	0.899
	Vis 3	134.326	131.710	136.942	131.847	129.212	134.482	2.479	-0.599	5.557
	Vis 4	132.950	130.321	135.578	131.841	129.181	134.500	1.109	-2.003	4.221
	Vis 5	131.665	129.022	134.308	131.354	128.669	134.040	0.311	-2.831	3.452
	Vis 6	131.636	128.974	134.298	130.539	127.811	133.268	1.097	-2.098	4.292
	Vis 7	132.377	129.716	135.039	130.446	127.774	133.117	1.932	-1.223	5.086
	V7-V1	-5.679	-7.953	-3.405	-5.351	-7.672	-3.031	-0.328	-3.576	2.921
dia	Vis 1	83.355	81.878	84.831	83.003	81.531	84.475	0.352	-1.336	2.040
	Vis 2	80.954	79.454	82.454	82.645	81.144	84.147	-1.691	-3.426	0.044
	Vis 3	81.742	80.239	83.246	81.084	79.572	82.597	0.658	-1.092	2.408
	Vis 4	81.468	79.958	82.978	81.395	79.869	82.920	0.074	-1.695	1.842
	Vis 5	80.337	78.819	81.854	80.923	79.384	82.462	-0.586	-2.370	1.198
	Vis 6	80.646	79.118	82.174	80.968	79.406	82.529	-0.322	-2.134	1.490
	Vis 7	79.837	78.310	81.364	80.044	78.512	81.576	-0.207	-1.997	1.583
	V7-V1	-3.518	-4.763	-2.272	-2.959	-4.231	-1.687	-0.559	-2.339	1.221
pulse	Vis 1	76.400	74.326	78.474	77.042	74.973	79.111	-0.642	-2.932	1.648
	Vis 2	75.991	73.889	78.092	75.121	73.026	77.217	0.869	-1.471	3.210
	Vis 3	75.290	73.188	77.392	74.498	72.385	76.612	0.792	-1.568	3.152
	Vis 4	75.910	73.802	78.017	74.693	72.573	76.812	1.217	-1.153	3.588
	Vis 5	75.628	73.511	77.745	73.358	71.227	75.488	2.271	-0.116	4.657
	Vis 6	75.136	73.011	77.261	73.429	71.277	75.580	1.707	-0.705	4.120
	Vis 7	76.096	73.964	78.229	74.074	71.949	76.199	2.023	-0.378	4.423
	V7-V1	-0.304	-1.724	1.116	-2.968	-4.417	-1.519	2.665	0.636	4.693
chol	Vis 1	4.236	4.071	4.400	4.145	3.981	4.309	0.090	-0.090	0.271
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.316	4.147	4.484	4.318	4.149	4.488	-0.003	-0.192	0.187
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.265	4.096	4.434	4.350	4.179	4.520	-0.085	-0.275	0.106
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.306	4.139	4.473	4.347	4.180	4.514	-0.041	-0.228	0.145
	V7-V1	0.070	-0.043	0.184	0.202	0.088	0.317	-0.132	-0.293	0.029
ldl	Vis 1	2.217	2.074	2.361	2.208	2.066	2.349	0.009	-0.147	0.166
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.288	2.141	2.434	2.372	2.226	2.518	-0.084	-0.248	0.079
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA

	Vis 5	2.192	2.045	2.338	2.377	2.229	2.525	-0.186	-0.351	-0.021
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.254	2.108	2.400	2.422	2.277	2.566	-0.168	-0.329	-0.007
	V7-V1	0.037	-0.059	0.133	0.214	0.119	0.310	-0.178	-0.313	-0.042
hdl	Vis 1	1.117	1.053	1.180	1.121	1.058	1.184	-0.004	-0.071	0.063
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.158	1.094	1.222	1.164	1.100	1.228	-0.006	-0.074	0.063
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.180	1.116	1.245	1.135	1.071	1.199	0.046	-0.023	0.115
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.128	1.064	1.191	1.116	1.053	1.180	0.011	-0.057	0.080
	V7-V1	0.011	-0.018	0.041	-0.005	-0.035	0.025	0.016	-0.026	0.058
vldl(l)	Vis 1	0.751	0.690	0.818	0.702	0.646	0.763	1.070	0.976	1.174
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.731	0.670	0.798	0.706	0.647	0.771	1.035	0.936	1.145
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.780	0.714	0.852	0.694	0.635	0.759	1.123	1.014	1.244
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.765	0.702	0.833	0.684	0.628	0.745	1.118	1.016	1.229
	V7-V1	1.018	0.960	1.079	0.975	0.920	1.033	1.044	0.962	1.134
trig(l)	Vis 1	1.737	1.584	1.906	1.577	1.439	1.730	1.101	0.996	1.218
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.667	1.516	1.832	1.575	1.432	1.731	1.058	0.953	1.176
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.728	1.572	1.900	1.598	1.452	1.758	1.082	0.973	1.203
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.759	1.602	1.933	1.549	1.411	1.702	1.136	1.024	1.259
	V7-V1	1.013	0.955	1.074	0.982	0.926	1.042	1.031	0.948	1.121
fimtavg	Vis 1	0.753	0.729	0.777	0.765	0.741	0.789	-0.012	-0.037	0.013
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.752	0.728	0.777	0.752	0.727	0.776	0.001	-0.025	0.026
	V7-V1	-0.001	-0.011	0.010	-0.014	-0.024	-0.003	0.013	-0.002	0.027
fimtmax	Vis 1	0.915	0.887	0.942	0.923	0.895	0.950	-0.008	-0.037	0.021
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.912	0.884	0.940	0.908	0.881	0.936	0.003	-0.026	0.033
	V7-V1	-0.003	-0.015	0.010	-0.014	-0.026	-0.002	0.011	-0.006	0.029
iem	Vis 1	2075.153	1901.945	2248.361	2029.019	1859.321	2198.717	46.134	-138.828	231.096
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2028.121	1850.602	2205.640	1858.558	1682.232	2034.885	169.563	-25.472	364.598
	V7-V1	-47.032	-173.147	79.083	-170.461	-296.495	-44.426	123.429	-54.875	301.733
csc2	Vis 1	2.852	2.675	3.030	2.887	2.712	3.061	-0.034	-0.223	0.155
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.866	2.684	3.048	2.966	2.785	3.146	-0.100	-0.299	0.098
	V7-V1	0.013	-0.109	0.135	0.079	-0.043	0.201	-0.066	-0.239	0.107
imtareal	Vis 1	17.671	16.815	18.528	18.278	17.436	19.120	-0.607	-1.497	0.283
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA

```
         Vis 7   17.834  16.969  18.699  18.033  17.179  18.887 -0.199 -1.108  0.711
         V7-V1    0.163  -0.197   0.523  -0.245  -0.605   0.114  0.408 -0.101  0.917
n.pl(l)  Vis 1    2.093   1.782   2.457   2.427   2.055   2.867  0.862  0.728  1.021
         Vis 2       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 3       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 4       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 5       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 6       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 7    2.524   2.149   2.966   2.701   2.285   3.194  0.935  0.788  1.108
         V7-V1    1.206   1.131   1.287   1.113   1.037   1.194  1.084  0.985  1.193
> round( ftable( Eff[,"IT","Prim",,,], col.vars=4:3 ), 3 )
                Met                     Plc                      Dif
                Est      lo      hi     Est      lo      hi    Est     lo     hi
var      par
hba1c    Vis 1    8.750   8.559   8.941   8.631   8.441   8.820  0.119 -0.094  0.332
         Vis 2    8.164   7.971   8.358   8.871   8.677   9.064 -0.706 -0.924 -0.488
         Vis 3    7.864   7.670   8.057   8.378   8.184   8.573 -0.515 -0.735 -0.294
         Vis 4    7.874   7.679   8.068   8.363   8.168   8.559 -0.490 -0.712 -0.268
         Vis 5    7.909   7.714   8.104   8.362   8.165   8.559 -0.453 -0.676 -0.229
         Vis 6    7.892   7.695   8.088   8.260   8.060   8.460 -0.368 -0.595 -0.141
         Vis 7    7.969   7.776   8.162   8.275   8.081   8.468 -0.306 -0.525 -0.086
         V7-V1   -0.781  -0.920  -0.642  -0.356  -0.497  -0.215 -0.425 -0.623 -0.227
weight   Vis 1   98.457  95.589 101.325  98.308  95.461 101.156  0.149 -2.815  3.112
         Vis 2   98.827  95.957 101.698  99.626  96.775 102.477 -0.799 -3.769  2.171
         Vis 3   99.399  96.528 102.270 100.863  98.010 103.716 -1.464 -4.436  1.508
         Vis 4   99.902  97.030 102.774 101.670  98.817 104.524 -1.768 -4.742  1.206
         Vis 5   99.773  96.900 102.645 102.132  99.277 104.988 -2.359 -5.335  0.617
         Vis 6  100.015  97.142 102.889 102.527  99.670 105.385 -2.512 -5.491  0.466
         Vis 7  100.041  97.169 102.913 102.457  99.605 105.309 -2.416 -5.387  0.556
         V7-V1    1.584   1.060   2.108   4.148   3.619   4.677 -2.564 -3.309 -1.820
bmi      Vis 1   32.453  31.636  33.270  32.230  31.419  33.041  0.223 -0.622  1.069
         Vis 2   32.585  31.767  33.404  32.658  31.845  33.471 -0.073 -0.921  0.776
         Vis 3   32.772  31.954  33.590  33.063  32.250  33.877 -0.291 -1.140  0.558
         Vis 4   32.931  32.113  33.750  33.336  32.523  34.150 -0.405 -1.255  0.445
         Vis 5   32.889  32.070  33.708  33.490  32.675  34.304 -0.601 -1.451  0.250
         Vis 6   32.960  32.140  33.779  33.627  32.812  34.442 -0.667 -1.519  0.184
         Vis 7   32.906  32.088  33.725  33.594  32.781  34.407 -0.688 -1.537  0.161
         V7-V1    0.453   0.279   0.627   1.364   1.189   1.540 -0.911 -1.158 -0.665
whr      Vis 1    0.998   0.983   1.012   1.013   0.999   1.027 -0.015 -0.030  0.000
         Vis 2    0.998   0.983   1.012   1.001   0.987   1.016 -0.004 -0.019  0.012
         Vis 3    0.999   0.984   1.013   1.007   0.993   1.021 -0.008 -0.024  0.007
         Vis 4    0.997   0.983   1.012   1.005   0.990   1.019 -0.007 -0.023  0.008
         Vis 5    1.005   0.991   1.020   1.005   0.990   1.019  0.000 -0.016  0.016
         Vis 6    1.000   0.985   1.014   1.007   0.992   1.022 -0.007 -0.023  0.009
         Vis 7    1.006   0.992   1.020   1.015   1.000   1.029 -0.009 -0.025  0.007
         V7-V1    0.008   0.000   0.016   0.002  -0.006   0.010  0.006 -0.005  0.018
gluc     Vis 1   10.513  10.037  10.988  10.073   9.600  10.546  0.440 -0.136  1.016
         Vis 2    8.522   8.030   9.014   8.951   8.453   9.450 -0.430 -1.043  0.183
         Vis 3    8.086   7.589   8.584   8.890   8.381   9.398 -0.804 -1.430 -0.178
         Vis 4    7.975   7.476   8.474   8.513   8.003   9.023 -0.538 -1.166  0.091
         Vis 5    8.087   7.587   8.587   8.763   8.249   9.276 -0.676 -1.306 -0.045
         Vis 6    8.254   7.746   8.763   8.373   7.847   8.900 -0.119 -0.767  0.529
         Vis 7    8.373   7.886   8.860   8.401   7.909   8.892 -0.028 -0.630  0.574
         V7-V1   -2.140  -2.643  -1.636  -1.672  -2.181  -1.163 -0.467 -1.184  0.249
ins(l)   Vis 1   60.247  50.865  71.360  70.290  59.441  83.120  0.857  0.713  1.031
         Vis 2       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 3       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 4       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 5       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 6       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 7   40.366  33.938  48.012  44.147  37.081  52.560  0.914  0.753  1.111
         V7-V1    0.670   0.581   0.773   0.628   0.544   0.725  1.067  0.871  1.306
cpep(l)  Vis 1  562.296 482.417 655.401 623.081 535.210 725.378  0.902  0.767  1.061
         Vis 2       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 3       NA      NA      NA      NA      NA      NA     NA     NA     NA
         Vis 4       NA      NA      NA      NA      NA      NA     NA     NA     NA
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	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	411.738	352.639	480.742	429.593	368.052	501.423	0.958	0.811	1.132
	V7-V1	0.732	0.670	0.800	0.689	0.631	0.754	1.062	0.937	1.204
idos(l)	Vis 1	47.576	42.560	53.183	46.958	42.043	52.448	1.013	0.898	1.143
	Vis 2	85.419	76.340	95.577	109.645	98.050	122.611	0.779	0.689	0.880
	Vis 3	94.696	84.619	105.973	127.013	113.508	142.124	0.746	0.659	0.843
	Vis 4	98.406	87.920	110.143	134.136	119.843	150.134	0.734	0.648	0.830
	Vis 5	100.569	89.829	112.592	136.966	122.298	153.392	0.734	0.648	0.831
	Vis 6	102.410	91.435	114.702	138.205	123.326	154.879	0.741	0.654	0.840
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.153	2.020	2.294	2.943	2.754	3.145	0.731	0.667	0.802
ipkg(l)	Vis 1	0.488	0.442	0.540	0.483	0.437	0.534	1.011	0.907	1.128
	Vis 2	0.873	0.789	0.967	1.113	1.006	1.232	0.784	0.701	0.877
	Vis 3	0.965	0.871	1.068	1.273	1.150	1.410	0.758	0.677	0.848
	Vis 4	0.998	0.901	1.105	1.335	1.205	1.478	0.748	0.668	0.837
	Vis 5	1.023	0.923	1.133	1.349	1.217	1.495	0.758	0.677	0.849
	Vis 6	1.039	0.937	1.151	1.361	1.227	1.509	0.763	0.681	0.856
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.127	1.999	2.263	2.818	2.641	3.006	0.755	0.690	0.826
sys	Vis 1	138.056	135.490	140.622	135.797	133.238	138.357	2.259	-0.705	5.223
	Vis 2	132.365	129.755	134.974	134.516	131.902	137.131	-2.151	-5.202	0.899
	Vis 3	134.326	131.710	136.942	131.847	129.212	134.482	2.479	-0.599	5.557
	Vis 4	132.950	130.321	135.578	131.841	129.181	134.500	1.109	-2.003	4.221
	Vis 5	131.665	129.022	134.308	131.354	128.669	134.040	0.311	-2.831	3.452
	Vis 6	131.636	128.974	134.298	130.539	127.811	133.268	1.097	-2.098	4.292
	Vis 7	132.377	129.716	135.039	130.446	127.774	133.117	1.932	-1.223	5.086
	V7-V1	-5.679	-7.953	-3.405	-5.351	-7.672	-3.031	-0.328	-3.576	2.921
dia	Vis 1	83.355	81.878	84.831	83.003	81.531	84.475	0.352	-1.336	2.040
	Vis 2	80.954	79.454	82.454	82.645	81.144	84.147	-1.691	-3.426	0.044
	Vis 3	81.742	80.239	83.246	81.084	79.572	82.597	0.658	-1.092	2.408
	Vis 4	81.468	79.958	82.978	81.395	79.869	82.920	0.074	-1.695	1.842
	Vis 5	80.337	78.819	81.854	80.923	79.384	82.462	-0.586	-2.370	1.198
	Vis 6	80.646	79.118	82.174	80.968	79.406	82.529	-0.322	-2.134	1.490
	Vis 7	79.837	78.310	81.364	80.044	78.512	81.576	-0.207	-1.997	1.583
	V7-V1	-3.518	-4.763	-2.272	-2.959	-4.231	-1.687	-0.559	-2.339	1.221
pulse	Vis 1	76.400	74.326	78.474	77.042	74.973	79.111	-0.642	-2.932	1.648
	Vis 2	75.991	73.889	78.092	75.121	73.026	77.217	0.869	-1.471	3.210
	Vis 3	75.290	73.188	77.392	74.498	72.385	76.612	0.792	-1.568	3.152
	Vis 4	75.910	73.802	78.017	74.693	72.573	76.812	1.217	-1.153	3.588
	Vis 5	75.628	73.511	77.745	73.358	71.227	75.488	2.271	-0.116	4.657
	Vis 6	75.136	73.011	77.261	73.429	71.277	75.580	1.707	-0.705	4.120
	Vis 7	76.096	73.964	78.229	74.074	71.949	76.199	2.023	-0.378	4.423
	V7-V1	-0.304	-1.724	1.116	-2.968	-4.417	-1.519	2.665	0.636	4.693
chol	Vis 1	4.236	4.071	4.400	4.145	3.981	4.309	0.090	-0.090	0.271
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.316	4.147	4.484	4.318	4.149	4.488	-0.003	-0.192	0.187
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.265	4.096	4.434	4.350	4.179	4.520	-0.085	-0.275	0.106
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.306	4.139	4.473	4.347	4.180	4.514	-0.041	-0.228	0.145
	V7-V1	0.070	-0.043	0.184	0.202	0.088	0.317	-0.132	-0.293	0.029
ldl	Vis 1	2.217	2.074	2.361	2.208	2.066	2.349	0.009	-0.147	0.166
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.288	2.141	2.434	2.372	2.226	2.518	-0.084	-0.248	0.079
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.192	2.045	2.338	2.377	2.229	2.525	-0.186	-0.351	-0.021
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.254	2.108	2.400	2.422	2.277	2.566	-0.168	-0.329	-0.007
	V7-V1	0.037	-0.059	0.133	0.214	0.119	0.310	-0.178	-0.313	-0.042
hdl	Vis 1	1.117	1.053	1.180	1.121	1.058	1.184	-0.004	-0.071	0.063
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.158	1.094	1.222	1.164	1.100	1.228	-0.006	-0.074	0.063
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.180	1.116	1.245	1.135	1.071	1.199	0.046	-0.023	0.115
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA

	Vis 7	1.128	1.064	1.191	1.116	1.053	1.180	0.011	-0.057	0.080
	V7-V1	0.011	-0.018	0.041	-0.005	-0.035	0.025	0.016	-0.026	0.058
vldl(l)	Vis 1	0.751	0.690	0.818	0.702	0.646	0.763	1.070	0.976	1.174
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.731	0.670	0.798	0.706	0.647	0.771	1.035	0.936	1.145
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.780	0.714	0.852	0.694	0.635	0.759	1.123	1.014	1.244
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.765	0.702	0.833	0.684	0.628	0.745	1.118	1.016	1.229
	V7-V1	1.018	0.960	1.079	0.975	0.920	1.033	1.044	0.962	1.134
trig(l)	Vis 1	1.737	1.584	1.906	1.577	1.439	1.730	1.101	0.996	1.218
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.667	1.516	1.832	1.575	1.432	1.731	1.058	0.953	1.176
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.728	1.572	1.900	1.598	1.452	1.758	1.082	0.973	1.203
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.759	1.602	1.933	1.549	1.411	1.702	1.136	1.024	1.259
	V7-V1	1.013	0.955	1.074	0.982	0.926	1.042	1.031	0.948	1.121
fimtavg	Vis 1	0.753	0.729	0.777	0.765	0.741	0.789	-0.012	-0.037	0.013
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.752	0.728	0.777	0.752	0.727	0.776	0.001	-0.025	0.026
	V7-V1	-0.001	-0.011	0.010	-0.014	-0.024	-0.003	0.013	-0.002	0.027
fimtmax	Vis 1	0.915	0.887	0.942	0.923	0.895	0.950	-0.008	-0.037	0.021
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.912	0.884	0.940	0.908	0.881	0.936	0.003	-0.026	0.033
	V7-V1	-0.003	-0.015	0.010	-0.014	-0.026	-0.002	0.011	-0.006	0.029
iem	Vis 1	2075.153	1901.945	2248.361	2029.019	1859.321	2198.717	46.134	-138.828	231.096
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2028.121	1850.602	2205.640	1858.558	1682.232	2034.885	169.563	-25.472	364.598
	V7-V1	-47.032	-173.147	79.083	-170.461	-296.495	-44.426	123.429	-54.875	301.733
csc2	Vis 1	2.852	2.675	3.030	2.887	2.712	3.061	-0.034	-0.223	0.155
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.866	2.684	3.048	2.966	2.785	3.146	-0.100	-0.299	0.098
	V7-V1	0.013	-0.109	0.135	0.079	-0.043	0.201	-0.066	-0.239	0.107
imtareal	Vis 1	17.671	16.815	18.528	18.278	17.436	19.120	-0.607	-1.497	0.283
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	17.834	16.969	18.699	18.033	17.179	18.887	-0.199	-1.108	0.711
	V7-V1	0.163	-0.197	0.523	-0.245	-0.605	0.114	0.408	-0.101	0.917
n.pl(l)	Vis 1	2.093	1.782	2.457	2.427	2.055	2.867	0.862	0.728	1.021
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.524	2.149	2.966	2.701	2.285	3.194	0.935	0.788	1.108
	V7-V1	1.206	1.131	1.287	1.113	1.037	1.194	1.084	0.985	1.193

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> round( ftable( Eff[,"IT","Rest",,,], col.vars=4:3 ), 3 )
                      Met                        Plc                         Dif
                      Est       lo       hi      Est       lo       hi       Est       lo       hi
 var      par
 hba1c    Vis 1     8.608    8.455    8.761    8.492    8.339    8.645    0.117   -0.100    0.333
          Vis 2     8.021    7.865    8.177    8.730    8.573    8.888   -0.709   -0.931   -0.487
          Vis 3     7.720    7.564    7.877    8.239    8.080    8.399   -0.519   -0.743   -0.295
          Vis 4     7.731    7.573    7.888    8.225    8.064    8.385   -0.494   -0.719   -0.269
          Vis 5     7.766    7.607    7.924    8.223    8.060    8.385   -0.457   -0.684   -0.230
          Vis 6     7.749    7.589    7.908    8.121    7.956    8.287   -0.373   -0.603   -0.143
          Vis 7     7.826    7.670    7.983    8.135    7.977    8.293   -0.309   -0.532   -0.086
          V7-V1    -0.782   -0.921   -0.643   -0.357   -0.498   -0.216   -0.425   -0.623   -0.228
 weight   Vis 1    97.183   95.026   99.339   97.149   94.992   99.305    0.034   -3.015    3.083
          Vis 2    97.552   95.392   99.712   98.466   96.304  100.627   -0.914   -3.969    2.142
          Vis 3    98.123   95.962  100.283   99.703   97.539  101.866   -1.580   -4.638    1.477
          Vis 4    98.626   96.464  100.787  100.510   98.345  102.676   -1.885   -4.944    1.175
          Vis 5    98.496   96.334  100.658  100.972   98.805  103.139   -2.476   -5.537    0.585
          Vis 6    98.739   96.575  100.902  101.368   99.198  103.537   -2.629   -5.692    0.435
          Vis 7    98.766   96.604  100.927  101.297   99.135  103.459   -2.531   -5.589    0.526
          V7-V1     1.583    1.059    2.107    4.149    3.620    4.677   -2.565   -3.310   -1.821
 bmi      Vis 1    32.258   31.648   32.868   32.061   31.451   32.671    0.197   -0.666    1.060
          Vis 2    32.390   31.778   33.001   32.489   31.877   33.101   -0.099   -0.964    0.766
          Vis 3    32.576   31.964   33.188   32.895   32.282   33.507   -0.318   -1.184    0.547
          Vis 4    32.735   32.123   33.347   33.167   32.554   33.781   -0.432   -1.299    0.434
          Vis 5    32.693   32.080   33.305   33.321   32.706   33.935   -0.628   -1.495    0.240
          Vis 6    32.763   32.151   33.376   33.458   32.843   34.073   -0.694   -1.563    0.174
          Vis 7    32.710   32.098   33.322   33.425   32.813   34.038   -0.715   -1.581    0.151
          V7-V1     0.452    0.279    0.626    1.364    1.189    1.540   -0.912   -1.159   -0.665
 whr      Vis 1     0.995    0.984    1.006    1.010    1.000    1.021   -0.015   -0.031    0.000
          Vis 2     0.995    0.984    1.006    0.999    0.988    1.010   -0.004   -0.019    0.012
          Vis 3     0.996    0.985    1.007    1.005    0.993    1.016   -0.009   -0.024    0.007
          Vis 4     0.995    0.984    1.006    1.002    0.991    1.014   -0.008   -0.024    0.008
          Vis 5     1.003    0.992    1.014    1.003    0.991    1.014    0.000   -0.016    0.016
          Vis 6     0.997    0.986    1.008    1.005    0.993    1.016   -0.008   -0.024    0.009
          Vis 7     1.004    0.992    1.015    1.012    1.001    1.024   -0.009   -0.025    0.007
          V7-V1     0.008    0.000    0.016    0.002   -0.006    0.010    0.006   -0.005    0.018
 gluc     Vis 1    10.513   10.100   10.926   10.081    9.669   10.493    0.432   -0.151    1.016
          Vis 2     8.511    8.078    8.944    8.952    8.508    9.396   -0.441   -1.061    0.178
          Vis 3     8.069    7.631    8.508    8.888    8.432    9.344   -0.819   -1.452   -0.186
          Vis 4     7.967    7.526    8.408    8.514    8.057    8.972   -0.547   -1.183    0.088
          Vis 5     8.073    7.630    8.515    8.771    8.311    9.231   -0.698   -1.336   -0.060
          Vis 6     8.239    7.788    8.689    8.377    7.902    8.852   -0.138   -0.793    0.516
          Vis 7     8.365    7.937    8.792    8.404    7.970    8.839   -0.040   -0.649    0.570
          V7-V1    -2.149   -2.652   -1.645   -1.677   -2.186   -1.167   -0.472   -1.188    0.244
 ins(l)   Vis 1    60.962   53.422   69.567   71.436   62.636   81.472    0.853    0.708    1.028
          Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7    40.857   35.585   46.909   44.923   39.068   51.655    0.909    0.747    1.107
          V7-V1     0.670    0.581    0.773    0.629    0.545    0.726    1.066    0.870    1.305
 cpep(l)  Vis 1   645.505  572.334  728.030  718.305  637.068  809.901    0.899    0.758    1.065
          Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7   471.955  417.412  533.626  496.210  438.595  561.394    0.951    0.799    1.132
          V7-V1     0.731    0.669    0.799    0.691    0.632    0.755    1.058    0.933    1.200
 idos(l)  Vis 1    38.051   34.794   41.614   37.710   34.482   41.241    1.009    0.889    1.145
          Vis 2    68.297   62.381   74.775   88.058   80.381   96.468    0.776    0.682    0.882
          Vis 3    75.726   69.149   82.928  102.072   93.091  111.919    0.742    0.652    0.844
          Vis 4    78.702   71.850   86.206  107.778   98.271  118.206    0.730    0.641    0.831
          Vis 5    80.419   73.397   88.113  110.059  100.281  120.791    0.731    0.641    0.832
          Vis 6    81.898   74.708   89.781  111.060  101.120  121.977    0.737    0.647    0.841
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	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.152	2.019	2.294	2.945	2.756	3.147	0.731	0.667	0.801
ipkg(l)	Vis 1	0.396	0.365	0.430	0.393	0.362	0.426	1.009	0.898	1.132
	Vis 2	0.708	0.651	0.769	0.905	0.832	0.984	0.782	0.695	0.880
	Vis 3	0.782	0.720	0.850	1.036	0.952	1.128	0.755	0.670	0.850
	Vis 4	0.809	0.744	0.880	1.086	0.997	1.182	0.745	0.662	0.840
	Vis 5	0.829	0.763	0.902	1.098	1.008	1.196	0.755	0.670	0.852
	Vis 6	0.842	0.774	0.916	1.107	1.016	1.207	0.761	0.674	0.858
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.127	1.998	2.263	2.820	2.642	3.009	0.754	0.689	0.825
sys	Vis 1	140.488	138.385	142.590	138.185	136.073	140.297	2.302	-0.678	5.283
	Vis 2	134.802	132.649	136.954	136.884	134.701	139.067	-2.083	-5.149	0.984
	Vis 3	136.759	134.598	138.920	134.203	131.990	136.417	2.556	-0.538	5.649
	Vis 4	135.375	133.195	137.555	134.197	131.954	136.440	1.178	-1.950	4.306
	Vis 5	134.091	131.896	136.286	133.724	131.455	135.993	0.367	-2.790	3.524
	Vis 6	134.063	131.845	136.282	132.909	130.589	135.230	1.154	-2.056	4.364
	Vis 7	134.790	132.568	137.012	132.794	130.534	135.054	1.996	-1.173	5.166
	V7-V1	-5.698	-7.972	-3.423	-5.392	-7.713	-3.070	-0.306	-3.556	2.944
dia	Vis 1	82.267	81.009	83.525	82.019	80.756	83.282	0.248	-1.534	2.031
	Vis 2	79.841	78.557	81.126	81.644	80.343	82.944	-1.802	-3.630	0.026
	Vis 3	80.627	79.338	81.916	80.086	78.770	81.403	0.541	-1.301	2.383
	Vis 4	80.351	79.053	81.650	80.399	79.067	81.730	-0.047	-1.907	1.813
	Vis 5	79.220	77.914	80.526	79.925	78.580	81.270	-0.705	-2.580	1.170
	Vis 6	79.532	78.213	80.850	79.975	78.604	81.346	-0.443	-2.345	1.459
	Vis 7	78.714	77.394	80.034	79.051	77.711	80.391	-0.337	-2.218	1.544
	V7-V1	-3.553	-4.800	-2.306	-2.968	-4.242	-1.694	-0.585	-2.368	1.198
pulse	Vis 1	75.954	74.323	77.586	76.654	75.013	78.295	-0.700	-3.014	1.614
	Vis 2	75.532	73.868	77.196	74.732	73.054	76.410	0.800	-1.564	3.163
	Vis 3	74.830	73.165	76.496	74.111	72.407	75.815	0.720	-1.663	3.102
	Vis 4	75.446	73.773	77.119	74.304	72.592	76.015	1.142	-1.251	3.536
	Vis 5	75.164	73.479	76.848	72.969	71.246	74.692	2.195	-0.214	4.604
	Vis 6	74.674	72.979	76.368	73.044	71.295	74.793	1.630	-0.806	4.065
	Vis 7	75.630	73.923	77.336	73.687	71.967	75.407	1.943	-0.481	4.366
	V7-V1	-0.325	-1.745	1.095	-2.967	-4.416	-1.518	2.642	0.613	4.671
chol	Vis 1	4.208	4.079	4.337	4.121	3.992	4.250	0.087	-0.095	0.270
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.286	4.153	4.420	4.294	4.157	4.431	-0.008	-0.199	0.184
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.236	4.102	4.370	4.326	4.188	4.464	-0.090	-0.282	0.102
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.278	4.146	4.411	4.323	4.190	4.456	-0.045	-0.233	0.143
	V7-V1	0.070	-0.043	0.184	0.202	0.088	0.317	-0.132	-0.293	0.029
ldl	Vis 1	2.169	2.057	2.281	2.164	2.053	2.275	0.005	-0.153	0.163
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.238	2.123	2.354	2.329	2.212	2.445	-0.090	-0.255	0.074
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.143	2.027	2.259	2.334	2.215	2.452	-0.191	-0.357	-0.025
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.206	2.091	2.320	2.378	2.264	2.493	-0.173	-0.335	-0.011
	V7-V1	0.037	-0.059	0.132	0.214	0.119	0.310	-0.178	-0.313	-0.043
hdl	Vis 1	1.164	1.116	1.212	1.166	1.119	1.214	-0.002	-0.070	0.065
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.206	1.157	1.255	1.209	1.159	1.258	-0.003	-0.072	0.067
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.228	1.179	1.277	1.180	1.130	1.230	0.048	-0.022	0.118
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.175	1.127	1.224	1.161	1.113	1.210	0.014	-0.055	0.083
	V7-V1	0.011	-0.018	0.041	-0.005	-0.035	0.025	0.016	-0.026	0.058
vldl(l)	Vis 1	0.730	0.683	0.780	0.685	0.641	0.732	1.066	0.971	1.171
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.710	0.661	0.763	0.689	0.641	0.741	1.030	0.930	1.140
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.757	0.704	0.813	0.678	0.630	0.730	1.116	1.006	1.238
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.743	0.694	0.795	0.668	0.624	0.715	1.112	1.010	1.224
	V7-V1	1.018	0.960	1.079	0.975	0.920	1.034	1.043	0.961	1.133

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trig(l)  Vis 1     1.690    1.573    1.816    1.539    1.432    1.654    1.098    0.992    1.216
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3     1.620    1.503    1.745    1.538    1.425    1.659    1.053    0.947    1.172
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5     1.680    1.559    1.810    1.560    1.445    1.684    1.077    0.968    1.199
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7     1.711    1.590    1.842    1.513    1.404    1.629    1.131    1.019    1.256
         V7-V1     1.013    0.955    1.074    0.983    0.926    1.043    1.030    0.948    1.120
fimtavg  Vis 1     0.788    0.770    0.807    0.799    0.780    0.818   -0.011   -0.037    0.016
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7     0.788    0.769    0.806    0.785    0.766    0.804    0.002   -0.025    0.029
         V7-V1    -0.001   -0.011    0.010   -0.014   -0.024   -0.003    0.013   -0.002    0.028
fimtmax  Vis 1     0.953    0.931    0.974    0.959    0.938    0.980   -0.007   -0.036    0.023
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7     0.950    0.929    0.972    0.945    0.923    0.967    0.005   -0.025    0.036
         V7-V1    -0.003   -0.015    0.010   -0.014   -0.027   -0.002    0.012   -0.006    0.029
iem      Vis 1  2380.505 2240.531 2520.480 2313.666 2174.403 2452.928   66.839 -130.612  264.291
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7  2332.882 2187.003 2478.762 2142.933 1995.801 2290.066  189.949  -17.244  397.142
         V7-V1   -47.623 -174.233   78.987 -170.732 -297.213  -44.251  123.110  -55.853  302.072
csc2     Vis 1     2.541    2.398    2.684    2.597    2.454    2.739   -0.055   -0.257    0.147
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7     2.555    2.407    2.704    2.676    2.527    2.826   -0.121   -0.332    0.090
         V7-V1     0.014   -0.109    0.136    0.080   -0.042    0.202   -0.066   -0.239    0.107
imtareal Vis 1    18.795   18.139   19.452   19.332   18.676   19.988   -0.536   -1.464    0.391
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    18.960   18.292   19.627   19.090   18.419   19.761   -0.130   -1.077    0.816
         V7-V1     0.164   -0.196    0.525   -0.242   -0.602    0.117    0.406   -0.103    0.915
n.pl(l)  Vis 1     2.433    2.164    2.735    2.844    2.512    3.221    0.855    0.721    1.015
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7     2.937    2.611    3.303    3.165    2.792    3.589    0.928    0.781    1.102
         V7-V1     1.207    1.131    1.288    1.113    1.037    1.194    1.085    0.986    1.193
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> round( ftable( Eff[,"IT","Rest",,,], col.vars=4:3 ), 3 )
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                   Met                         Plc                         Dif
                   Est       lo       hi       Est       lo       hi       Est       lo       hi
var      par
hba1c    Vis 1     8.608    8.455    8.761    8.492    8.339    8.645    0.117   -0.100    0.333
         Vis 2     8.021    7.865    8.177    8.730    8.573    8.888   -0.709   -0.931   -0.487
         Vis 3     7.720    7.564    7.877    8.239    8.080    8.399   -0.519   -0.743   -0.295
         Vis 4     7.731    7.573    7.888    8.225    8.064    8.385   -0.494   -0.719   -0.269
         Vis 5     7.766    7.607    7.924    8.223    8.060    8.385   -0.457   -0.684   -0.230
         Vis 6     7.749    7.589    7.908    8.121    7.956    8.287   -0.373   -0.603   -0.143
```

	Vis 7	7.826	7.670	7.983	8.135	7.977	8.293	-0.309	-0.532	-0.086
	V7-V1	-0.782	-0.921	-0.643	-0.357	-0.498	-0.216	-0.425	-0.623	-0.228
weight	Vis 1	97.183	95.026	99.339	97.149	94.992	99.305	0.034	-3.015	3.083
	Vis 2	97.552	95.392	99.712	98.466	96.304	100.627	-0.914	-3.969	2.142
	Vis 3	98.123	95.962	100.283	99.703	97.539	101.866	-1.580	-4.638	1.477
	Vis 4	98.626	96.464	100.787	100.510	98.345	102.676	-1.885	-4.944	1.175
	Vis 5	98.496	96.334	100.658	100.972	98.805	103.139	-2.476	-5.537	0.585
	Vis 6	98.739	96.575	100.902	101.368	99.198	103.537	-2.629	-5.692	0.435
	Vis 7	98.766	96.604	100.927	101.297	99.135	103.459	-2.531	-5.589	0.526
	V7-V1	1.583	1.059	2.107	4.149	3.620	4.677	-2.565	-3.310	-1.821
bmi	Vis 1	32.258	31.648	32.868	32.061	31.451	32.671	0.197	-0.666	1.060
	Vis 2	32.390	31.778	33.001	32.489	31.877	33.101	-0.099	-0.964	0.766
	Vis 3	32.576	31.964	33.188	32.895	32.282	33.507	-0.318	-1.184	0.547
	Vis 4	32.735	32.123	33.347	33.167	32.554	33.781	-0.432	-1.299	0.434
	Vis 5	32.693	32.080	33.305	33.321	32.706	33.935	-0.628	-1.495	0.240
	Vis 6	32.763	32.151	33.376	33.458	32.843	34.073	-0.694	-1.563	0.174
	Vis 7	32.710	32.098	33.322	33.425	32.813	34.038	-0.715	-1.581	0.151
	V7-V1	0.452	0.279	0.626	1.364	1.189	1.540	-0.912	-1.159	-0.665
whr	Vis 1	0.995	0.984	1.006	1.010	1.000	1.021	-0.015	-0.031	0.000
	Vis 2	0.995	0.984	1.006	0.999	0.988	1.010	-0.004	-0.019	0.012
	Vis 3	0.996	0.985	1.007	1.005	0.993	1.016	-0.009	-0.024	0.007
	Vis 4	0.995	0.984	1.006	1.002	0.991	1.014	-0.008	-0.024	0.008
	Vis 5	1.003	0.992	1.014	1.003	0.991	1.014	0.000	-0.016	0.016
	Vis 6	0.997	0.986	1.008	1.005	0.993	1.016	-0.008	-0.024	0.009
	Vis 7	1.004	0.992	1.015	1.012	1.001	1.024	-0.009	-0.025	0.007
	V7-V1	0.008	0.000	0.016	0.002	-0.006	0.010	0.006	-0.005	0.018
gluc	Vis 1	10.513	10.100	10.926	10.081	9.669	10.493	0.432	-0.151	1.016
	Vis 2	8.511	8.078	8.944	8.952	8.508	9.396	-0.441	-1.061	0.178
	Vis 3	8.069	7.631	8.508	8.888	8.432	9.344	-0.819	-1.452	-0.186
	Vis 4	7.967	7.526	8.408	8.514	8.057	8.972	-0.547	-1.183	0.088
	Vis 5	8.073	7.630	8.515	8.771	8.311	9.231	-0.698	-1.336	-0.060
	Vis 6	8.239	7.788	8.689	8.377	7.902	8.852	-0.138	-0.793	0.516
	Vis 7	8.365	7.937	8.792	8.404	7.970	8.839	-0.040	-0.649	0.570
	V7-V1	-2.149	-2.652	-1.645	-1.677	-2.186	-1.167	-0.472	-1.188	0.244
ins(l)	Vis 1	60.962	53.422	69.567	71.436	62.636	81.472	0.853	0.708	1.028
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	40.857	35.585	46.909	44.923	39.068	51.655	0.909	0.747	1.107
	V7-V1	0.670	0.581	0.773	0.629	0.545	0.726	1.066	0.870	1.305
cpep(l)	Vis 1	645.505	572.334	728.030	718.305	637.068	809.901	0.899	0.758	1.065
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	471.955	417.412	533.626	496.210	438.595	561.394	0.951	0.799	1.132
	V7-V1	0.731	0.669	0.799	0.691	0.632	0.755	1.058	0.933	1.200
idos(l)	Vis 1	38.051	34.794	41.614	37.710	34.482	41.241	1.009	0.889	1.145
	Vis 2	68.297	62.381	74.775	88.058	80.381	96.468	0.776	0.682	0.882
	Vis 3	75.726	69.149	82.928	102.072	93.091	111.919	0.742	0.652	0.844
	Vis 4	78.702	71.850	86.206	107.778	98.271	118.206	0.730	0.641	0.831
	Vis 5	80.419	73.397	88.113	110.059	100.281	120.791	0.731	0.641	0.832
	Vis 6	81.898	74.708	89.781	111.060	101.120	121.977	0.737	0.647	0.841
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.152	2.019	2.294	2.945	2.756	3.147	0.731	0.667	0.801
ipkg(l)	Vis 1	0.396	0.365	0.430	0.393	0.362	0.426	1.009	0.898	1.132
	Vis 2	0.708	0.651	0.769	0.905	0.832	0.984	0.782	0.695	0.880
	Vis 3	0.782	0.720	0.850	1.036	0.952	1.128	0.755	0.670	0.850
	Vis 4	0.809	0.744	0.880	1.086	0.997	1.182	0.745	0.662	0.840
	Vis 5	0.829	0.763	0.902	1.098	1.008	1.196	0.755	0.670	0.852
	Vis 6	0.842	0.774	0.916	1.107	1.016	1.207	0.761	0.674	0.858
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.127	1.998	2.263	2.820	2.642	3.009	0.754	0.689	0.825

sys	Vis 1	140.488	138.385	142.590	138.185	136.073	140.297	2.302	-0.678	5.283
	Vis 2	134.802	132.649	136.954	136.884	134.701	139.067	-2.083	-5.149	0.984
	Vis 3	136.759	134.598	138.920	134.203	131.990	136.417	2.556	-0.538	5.649
	Vis 4	135.375	133.195	137.555	134.197	131.954	136.440	1.178	-1.950	4.306
	Vis 5	134.091	131.896	136.286	133.724	131.455	135.993	0.367	-2.790	3.524
	Vis 6	134.063	131.845	136.282	132.909	130.589	135.230	1.154	-2.056	4.364
	Vis 7	134.790	132.568	137.012	132.794	130.534	135.054	1.996	-1.173	5.166
	V7-V1	-5.698	-7.972	-3.423	-5.392	-7.713	-3.070	-0.306	-3.556	2.944
dia	Vis 1	82.267	81.009	83.525	82.019	80.756	83.282	0.248	-1.534	2.031
	Vis 2	79.841	78.557	81.126	81.644	80.343	82.944	-1.802	-3.630	0.026
	Vis 3	80.627	79.338	81.916	80.086	78.770	81.403	0.541	-1.301	2.383
	Vis 4	80.351	79.053	81.650	80.399	79.067	81.730	-0.047	-1.907	1.813
	Vis 5	79.220	77.914	80.526	79.925	78.580	81.270	-0.705	-2.580	1.170
	Vis 6	79.532	78.213	80.850	79.975	78.604	81.346	-0.443	-2.345	1.459
	Vis 7	78.714	77.394	80.034	79.051	77.711	80.391	-0.337	-2.218	1.544
	V7-V1	-3.553	-4.800	-2.306	-2.968	-4.242	-1.694	-0.585	-2.368	1.198
pulse	Vis 1	75.954	74.323	77.586	76.654	75.013	78.295	-0.700	-3.014	1.614
	Vis 2	75.532	73.868	77.196	74.732	73.054	76.410	0.800	-1.564	3.163
	Vis 3	74.830	73.165	76.496	74.111	72.407	75.815	0.720	-1.663	3.102
	Vis 4	75.446	73.773	77.119	74.304	72.592	76.015	1.142	-1.251	3.536
	Vis 5	75.164	73.479	76.848	72.969	71.246	74.692	2.195	-0.214	4.604
	Vis 6	74.674	72.979	76.368	73.044	71.295	74.793	1.630	-0.806	4.065
	Vis 7	75.630	73.923	77.336	73.687	71.967	75.407	1.943	-0.481	4.366
	V7-V1	-0.325	-1.745	1.095	-2.967	-4.416	-1.518	2.642	0.613	4.671
chol	Vis 1	4.208	4.079	4.337	4.121	3.992	4.250	0.087	-0.095	0.270
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.286	4.153	4.420	4.294	4.157	4.431	-0.008	-0.199	0.184
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.236	4.102	4.370	4.326	4.188	4.464	-0.090	-0.282	0.102
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.278	4.146	4.411	4.323	4.190	4.456	-0.045	-0.233	0.143
	V7-V1	0.070	-0.043	0.184	0.202	0.088	0.317	-0.132	-0.293	0.029
ldl	Vis 1	2.169	2.057	2.281	2.164	2.053	2.275	0.005	-0.153	0.163
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.238	2.123	2.354	2.329	2.212	2.445	-0.090	-0.255	0.074
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.143	2.027	2.259	2.334	2.215	2.452	-0.191	-0.357	-0.025
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.206	2.091	2.320	2.378	2.264	2.493	-0.173	-0.335	-0.011
	V7-V1	0.037	-0.059	0.132	0.214	0.119	0.310	-0.178	-0.313	-0.043
hdl	Vis 1	1.164	1.116	1.212	1.166	1.119	1.214	-0.002	-0.070	0.065
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.206	1.157	1.255	1.209	1.159	1.258	-0.003	-0.072	0.067
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.228	1.179	1.277	1.180	1.130	1.230	0.048	-0.022	0.118
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.175	1.127	1.224	1.161	1.113	1.210	0.014	-0.055	0.083
	V7-V1	0.011	-0.018	0.041	-0.005	-0.035	0.025	0.016	-0.026	0.058
vldl(l)	Vis 1	0.730	0.683	0.780	0.685	0.641	0.732	1.066	0.971	1.171
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.710	0.661	0.763	0.689	0.641	0.741	1.030	0.930	1.140
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.757	0.704	0.813	0.678	0.630	0.730	1.116	1.006	1.238
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.743	0.694	0.795	0.668	0.624	0.715	1.112	1.010	1.224
	V7-V1	1.018	0.960	1.079	0.975	0.920	1.034	1.043	0.961	1.133
trig(l)	Vis 1	1.690	1.573	1.816	1.539	1.432	1.654	1.098	0.992	1.216
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.620	1.503	1.745	1.538	1.425	1.659	1.053	0.947	1.172
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.680	1.559	1.810	1.560	1.445	1.684	1.077	0.968	1.199
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.711	1.590	1.842	1.513	1.404	1.629	1.131	1.019	1.256
	V7-V1	1.013	0.955	1.074	0.983	0.926	1.043	1.030	0.948	1.120
fimtavg	Vis 1	0.788	0.770	0.807	0.799	0.780	0.818	-0.011	-0.037	0.016
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA

```
         Vis 3        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 4        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 5        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 6        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 7     0.788    0.769    0.806    0.785    0.766    0.804   0.002  -0.025   0.029
         V7-V1    -0.001   -0.011    0.010   -0.014   -0.024   -0.003   0.013  -0.002   0.028
fimtmax  Vis 1     0.953    0.931    0.974    0.959    0.938    0.980  -0.007  -0.036   0.023
         Vis 2        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 3        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 4        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 5        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 6        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 7     0.950    0.929    0.972    0.945    0.923    0.967   0.005  -0.025   0.036
         V7-V1    -0.003   -0.015    0.010   -0.014   -0.027   -0.002   0.012  -0.006   0.029
iem      Vis 1  2380.505 2240.531 2520.480 2313.666 2174.403 2452.928  66.839 -130.612 264.291
         Vis 2        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 3        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 4        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 5        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 6        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 7  2332.882 2187.003 2478.762 2142.933 1995.801 2290.066 189.949 -17.244 397.142
         V7-V1   -47.623 -174.233   78.987 -170.732 -297.213  -44.251 123.110 -55.853 302.072
csc2     Vis 1     2.541    2.398    2.684    2.597    2.454    2.739  -0.055  -0.257   0.147
         Vis 2        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 3        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 4        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 5        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 6        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 7     2.555    2.407    2.704    2.676    2.527    2.826  -0.121  -0.332   0.090
         V7-V1     0.014   -0.109    0.136    0.080   -0.042    0.202  -0.066  -0.239   0.107
imtareal Vis 1    18.795   18.139   19.452   19.332   18.676   19.988  -0.536  -1.464   0.391
         Vis 2        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 3        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 4        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 5        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 6        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 7    18.960   18.292   19.627   19.090   18.419   19.761  -0.130  -1.077   0.816
         V7-V1     0.164   -0.196    0.525   -0.242   -0.602    0.117   0.406  -0.103   0.915
n.pl(l)  Vis 1     2.433    2.164    2.735    2.844    2.512    3.221   0.855   0.721   1.015
         Vis 2        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 3        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 4        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 5        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 6        NA       NA       NA       NA       NA       NA      NA      NA      NA
         Vis 7     2.937    2.611    3.303    3.165    2.792    3.589   0.928   0.781   1.102
         V7-V1     1.207    1.131    1.288    1.113    1.037    1.194   1.085   0.986   1.193
> round( ftable( Eff[,"IT","Conf",,,], col.vars=4:3 ), 3 )
                   Met                        Plc                        Dif
                   Est       lo       hi      Est       lo       hi     Est      lo      hi
var      par
hba1c    Vis 1     8.901    8.588    9.214    8.790    8.469    9.111   0.111  -0.104   0.325
         Vis 2     8.316    8.001    8.631    9.030    8.707    9.354  -0.715  -0.934  -0.495
         Vis 3     8.015    7.700    8.330    8.538    8.213    8.863  -0.524  -0.745  -0.302
         Vis 4     8.025    7.709    8.340    8.523    8.198    8.849  -0.499  -0.722  -0.275
         Vis 5     8.060    7.744    8.376    8.522    8.195    8.848  -0.462  -0.686  -0.237
         Vis 6     8.043    7.726    8.360    8.420    8.092    8.748  -0.377  -0.605  -0.149
         Vis 7     8.120    7.805    8.436    8.435    8.110    8.759  -0.314  -0.535  -0.094
         V7-V1    -0.781   -0.919   -0.642   -0.355   -0.496   -0.214  -0.425  -0.623  -0.227
weight   Vis 1    89.743   84.978   94.507   89.485   84.598   94.372   0.258  -2.578   3.094
         Vis 2    90.113   85.347   94.879   90.798   85.907   95.688  -0.685  -3.527   2.158
         Vis 3    90.684   85.917   95.450   92.033   87.142   96.925  -1.350  -4.195   1.495
         Vis 4    91.186   86.419   95.953   92.842   87.950   97.734  -1.656  -4.503   1.191
         Vis 5    91.057   86.289   95.824   93.303   88.411   98.196  -2.247  -5.095   0.602
         Vis 6    91.299   86.531   96.067   93.698   88.804   98.592  -2.399  -5.251   0.452
         Vis 7    91.326   86.560   96.093   93.627   88.736   98.518  -2.301  -5.145   0.544
         V7-V1     1.584    1.060    2.108    4.142    3.614    4.671  -2.559  -3.303  -1.814
```

bmi	Vis 1	32.822	31.414	34.230	32.521	31.077	33.965	0.301	-0.539	1.141
	Vis 2	32.954	31.546	34.362	32.950	31.505	34.395	0.004	-0.838	0.847
	Vis 3	33.141	31.732	34.549	33.355	31.910	34.800	-0.214	-1.058	0.629
	Vis 4	33.300	31.891	34.708	33.628	32.182	35.073	-0.328	-1.172	0.516
	Vis 5	33.258	31.849	34.666	33.781	32.335	35.227	-0.523	-1.368	0.321
	Vis 6	33.328	31.919	34.737	33.918	32.472	35.365	-0.590	-1.436	0.256
	Vis 7	33.275	31.866	34.683	33.886	32.440	35.331	-0.611	-1.454	0.232
	V7-V1	0.453	0.279	0.626	1.365	1.189	1.540	-0.912	-1.159	-0.665
whr	Vis 1	0.943	0.923	0.963	0.958	0.937	0.978	-0.014	-0.028	-0.001
	Vis 2	0.944	0.924	0.964	0.946	0.926	0.967	-0.003	-0.016	0.011
	Vis 3	0.944	0.924	0.964	0.952	0.931	0.973	-0.008	-0.021	0.006
	Vis 4	0.943	0.923	0.963	0.950	0.929	0.971	-0.007	-0.021	0.007
	Vis 5	0.951	0.931	0.971	0.950	0.929	0.971	0.001	-0.013	0.015
	Vis 6	0.945	0.925	0.966	0.952	0.931	0.973	-0.007	-0.021	0.008
	Vis 7	0.952	0.932	0.972	0.960	0.939	0.980	-0.008	-0.022	0.006
	V7-V1	0.008	0.000	0.017	0.002	-0.006	0.010	0.007	-0.005	0.018
gluc	Vis 1	11.000	10.297	11.703	10.599	9.881	11.317	0.400	-0.177	0.977
	Vis 2	9.013	8.299	9.728	9.481	8.741	10.221	-0.468	-1.081	0.145
	Vis 3	8.578	7.859	9.297	9.417	8.671	10.164	-0.839	-1.466	-0.213
	Vis 4	8.469	7.748	9.191	9.038	8.292	9.784	-0.568	-1.197	0.060
	Vis 5	8.580	7.857	9.303	9.289	8.539	10.038	-0.709	-1.340	-0.078
	Vis 6	8.748	8.020	9.476	8.903	8.143	9.663	-0.155	-0.803	0.493
	Vis 7	8.867	8.154	9.580	8.930	8.195	9.666	-0.063	-0.666	0.540
	V7-V1	-2.132	-2.636	-1.629	-1.669	-2.179	-1.159	-0.463	-1.180	0.253
ins(l)	Vis 1	67.697	51.052	89.771	78.255	58.650	104.413	0.865	0.719	1.041
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	45.192	33.987	60.091	49.284	36.725	66.138	0.917	0.754	1.114
	V7-V1	0.668	0.579	0.770	0.630	0.546	0.727	1.060	0.866	1.297
cpep(l)	Vis 1	721.460	558.457	932.041	783.905	603.206	1018.735	0.920	0.785	1.079
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	527.758	408.006	682.657	542.762	416.649	707.047	0.972	0.826	1.145
	V7-V1	0.732	0.670	0.799	0.692	0.633	0.757	1.057	0.932	1.198
idos(l)	Vis 1	41.975	34.784	50.651	41.401	34.151	50.190	1.014	0.899	1.143
	Vis 2	75.364	62.421	90.991	96.701	79.692	117.340	0.779	0.690	0.881
	Vis 3	83.551	69.199	100.880	112.005	92.267	135.965	0.746	0.660	0.844
	Vis 4	86.813	71.893	104.829	118.297	97.434	143.627	0.734	0.649	0.830
	Vis 5	88.721	73.458	107.156	120.790	99.448	146.713	0.735	0.649	0.832
	Vis 6	90.341	74.777	109.145	121.879	100.305	148.094	0.741	0.654	0.840
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.152	2.019	2.294	2.944	2.755	3.146	0.731	0.667	0.802
ipkg(l)	Vis 1	0.471	0.398	0.558	0.466	0.391	0.554	1.012	0.906	1.129
	Vis 2	0.842	0.710	0.999	1.075	0.902	1.280	0.784	0.701	0.877
	Vis 3	0.931	0.785	1.104	1.229	1.031	1.465	0.757	0.676	0.848
	Vis 4	0.963	0.812	1.142	1.288	1.081	1.536	0.747	0.667	0.837
	Vis 5	0.987	0.832	1.171	1.302	1.092	1.553	0.758	0.676	0.849
	Vis 6	1.002	0.844	1.189	1.313	1.101	1.567	0.763	0.680	0.856
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.127	1.999	2.263	2.820	2.643	3.009	0.754	0.689	0.825
sys	Vis 1	136.062	132.004	140.120	133.787	129.631	137.943	2.275	-0.699	5.250
	Vis 2	130.369	126.287	134.451	132.480	128.271	136.688	-2.111	-5.170	0.948
	Vis 3	132.324	128.233	136.414	129.803	125.580	134.027	2.520	-0.566	5.607
	Vis 4	130.946	126.849	135.044	129.803	125.567	134.040	1.143	-1.977	4.264
	Vis 5	129.659	125.547	133.771	129.316	125.059	133.573	0.343	-2.807	3.493
	Vis 6	129.630	125.505	133.755	128.502	124.219	132.786	1.128	-2.075	4.331
	Vis 7	130.372	126.249	134.495	128.405	124.160	132.649	1.967	-1.195	5.129
	V7-V1	-5.691	-7.965	-3.416	-5.383	-7.705	-3.060	-0.308	-3.558	2.943
dia	Vis 1	85.497	83.168	87.826	85.352	82.966	87.737	0.145	-1.534	1.824
	Vis 2	83.090	80.748	85.431	84.953	82.539	87.366	-1.863	-3.588	-0.138

	Vis 3	83.876	81.530	86.222	83.387	80.966	85.809	0.489	-1.250	2.228
	Vis 4	83.604	81.254	85.954	83.692	81.264	86.121	-0.088	-1.846	1.669
	Vis 5	82.475	80.118	84.832	83.223	80.785	85.662	-0.749	-2.522	1.025
	Vis 6	82.784	80.420	85.148	83.266	80.813	85.719	-0.482	-2.283	1.320
	Vis 7	81.973	79.610	84.336	82.343	79.910	84.776	-0.370	-2.150	1.409
	V7-V1	-3.524	-4.769	-2.279	-3.009	-4.281	-1.737	-0.515	-2.295	1.265
pulse	Vis 1	80.976	77.575	84.378	81.874	78.386	85.362	-0.898	-3.178	1.382
	Vis 2	80.562	77.146	83.977	79.943	76.428	83.458	0.618	-1.711	2.948
	Vis 3	79.863	76.445	83.281	79.318	75.792	82.843	0.545	-1.803	2.894
	Vis 4	80.485	77.064	83.907	79.512	75.983	83.041	0.974	-1.386	3.333
	Vis 5	80.206	76.777	83.635	78.177	74.640	81.713	2.029	-0.347	4.405
	Vis 6	79.714	76.281	83.148	78.246	74.697	81.795	1.468	-0.933	3.870
	Vis 7	80.675	77.236	84.114	78.891	75.359	82.423	1.784	-0.605	4.174
	V7-V1	-0.301	-1.721	1.119	-2.984	-4.433	-1.534	2.682	0.654	4.711
chol	Vis 1	4.820	4.554	5.086	4.769	4.497	5.042	0.051	-0.126	0.228
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.901	4.633	5.169	4.945	4.668	5.222	-0.044	-0.230	0.142
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.852	4.583	5.121	4.977	4.699	5.255	-0.125	-0.312	0.062
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.893	4.625	5.161	4.975	4.700	5.251	-0.082	-0.264	0.100
	V7-V1	0.073	-0.040	0.186	0.206	0.092	0.321	-0.133	-0.294	0.028
ldl	Vis 1	2.530	2.294	2.766	2.553	2.312	2.794	-0.023	-0.177	0.131
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.601	2.363	2.838	2.718	2.473	2.963	-0.117	-0.279	0.044
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.506	2.268	2.744	2.724	2.478	2.970	-0.218	-0.381	-0.055
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.569	2.331	2.807	2.769	2.525	3.013	-0.200	-0.359	-0.041
	V7-V1	0.039	-0.057	0.135	0.216	0.121	0.311	-0.177	-0.312	-0.042
hdl	Vis 1	1.249	1.144	1.355	1.259	1.151	1.368	-0.010	-0.076	0.055
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.291	1.185	1.397	1.302	1.193	1.411	-0.011	-0.079	0.056
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.313	1.207	1.419	1.273	1.164	1.382	0.040	-0.028	0.108
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.260	1.155	1.366	1.255	1.146	1.363	0.006	-0.061	0.072
	V7-V1	0.011	-0.018	0.041	-0.005	-0.035	0.025	0.016	-0.026	0.058
vldl(l)	Vis 1	0.813	0.707	0.936	0.757	0.656	0.873	1.074	0.980	1.178
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.790	0.686	0.911	0.763	0.659	0.883	1.036	0.937	1.145
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.843	0.731	0.973	0.750	0.648	0.869	1.124	1.015	1.245
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.827	0.718	0.953	0.739	0.640	0.854	1.119	1.018	1.230
	V7-V1	1.017	0.960	1.079	0.977	0.921	1.035	1.042	0.959	1.131
trig(l)	Vis 1	1.912	1.641	2.228	1.727	1.476	2.020	1.107	1.003	1.223
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.834	1.572	2.140	1.729	1.474	2.027	1.061	0.956	1.177
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.903	1.630	2.221	1.755	1.496	2.059	1.084	0.977	1.204
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.937	1.661	2.260	1.702	1.452	1.994	1.139	1.028	1.261
	V7-V1	1.013	0.955	1.075	0.986	0.929	1.046	1.028	0.946	1.118
fimtavg	Vis 1	0.718	0.677	0.760	0.730	0.687	0.772	-0.011	-0.037	0.014
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.718	0.676	0.759	0.716	0.673	0.759	0.002	-0.024	0.027
	V7-V1	-0.001	-0.011	0.010	-0.014	-0.024	-0.003	0.013	-0.002	0.027
fimtmax	Vis 1	0.868	0.821	0.916	0.875	0.826	0.924	-0.007	-0.036	0.022
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA

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          Vis 5       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 6       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 7    0.866    0.818    0.913    0.861    0.812    0.910   0.005   -0.025   0.034
          V7-V1   -0.003   -0.015    0.010   -0.014   -0.026   -0.002   0.011   -0.006   0.029
iem       Vis 1 2020.026 1732.683 2307.368 1963.645 1670.320 2256.969  56.381 -128.536 241.298
          Vis 2       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 3       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 4       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 5       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 6       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 7 1975.240 1685.088 2265.392 1793.291 1494.832 2091.749 181.950  -12.840 376.739
          V7-V1  -44.786 -170.824   81.253 -170.354 -296.309  -44.399 125.568  -52.627 303.764
csc2      Vis 1    2.946    2.653    3.239    2.990    2.690    3.289  -0.044   -0.231   0.143
          Vis 2       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 3       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 4       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 5       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 6       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 7    2.956    2.660    3.251    3.069    2.764    3.373  -0.113   -0.309   0.084
          V7-V1    0.010   -0.112    0.132    0.079   -0.043    0.201  -0.069   -0.241   0.104
imtareal  Vis 1   15.267   13.870   16.664   15.826   14.400   17.252  -0.559   -1.412   0.294
          Vis 2       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 3       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 4       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 5       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 6       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 7   15.438   14.036   16.840   15.575   14.140   17.011  -0.137   -1.011   0.736
          V7-V1    0.171   -0.189    0.531   -0.251   -0.610    0.109   0.421   -0.087   0.930
n.pl(l)   Vis 1    1.452    1.088    1.937    1.639    1.219    2.205   0.886    0.750   1.046
          Vis 2       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 3       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 4       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 5       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 6       NA       NA       NA       NA       NA       NA      NA       NA      NA
          Vis 7    1.755    1.315    2.340    1.828    1.358    2.460   0.960    0.812   1.135
          V7-V1    1.209    1.133    1.289    1.115    1.040    1.196   1.084    0.985   1.192
> round( ftable( Eff[,"IT","Conf",,,], col.vars=4:3 ), 3 )
               Met                       Plc                       Dif
               Est       lo       hi     Est       lo       hi     Est       lo      hi
var       par
hba1c     Vis 1    8.901    8.588    9.214    8.790    8.469    9.111   0.111   -0.104   0.325
          Vis 2    8.316    8.001    8.631    9.030    8.707    9.354  -0.715   -0.934  -0.495
          Vis 3    8.015    7.700    8.330    8.538    8.213    8.863  -0.524   -0.745  -0.302
          Vis 4    8.025    7.709    8.340    8.523    8.198    8.849  -0.499   -0.722  -0.275
          Vis 5    8.060    7.744    8.376    8.522    8.195    8.848  -0.462   -0.686  -0.237
          Vis 6    8.043    7.726    8.360    8.420    8.092    8.748  -0.377   -0.605  -0.149
          Vis 7    8.120    7.805    8.436    8.435    8.110    8.759  -0.314   -0.535  -0.094
          V7-V1   -0.781   -0.919   -0.642   -0.355   -0.496   -0.214  -0.425   -0.623  -0.227
weight    Vis 1   89.743   84.978   94.507   89.485   84.598   94.372   0.258   -2.578   3.094
          Vis 2   90.113   85.347   94.879   90.798   85.907   95.688  -0.685   -3.527   2.158
          Vis 3   90.684   85.917   95.450   92.033   87.142   96.925  -1.350   -4.195   1.495
          Vis 4   91.186   86.419   95.953   92.842   87.950   97.734  -1.656   -4.503   1.191
          Vis 5   91.057   86.289   95.824   93.303   88.411   98.196  -2.247   -5.095   0.602
          Vis 6   91.299   86.531   96.067   93.698   88.804   98.592  -2.399   -5.251   0.452
          Vis 7   91.326   86.560   96.093   93.627   88.736   98.518  -2.301   -5.145   0.544
          V7-V1    1.584    1.060    2.108    4.142    3.614    4.671  -2.559   -3.303  -1.814
bmi       Vis 1   32.822   31.414   34.230   32.521   31.077   33.965   0.301   -0.539   1.141
          Vis 2   32.954   31.546   34.362   32.950   31.505   34.395   0.004   -0.838   0.847
          Vis 3   33.141   31.732   34.549   33.355   31.910   34.800  -0.214   -1.058   0.629
          Vis 4   33.300   31.891   34.708   33.628   32.182   35.073  -0.328   -1.172   0.516
          Vis 5   33.258   31.849   34.666   33.781   32.335   35.227  -0.523   -1.368   0.321
          Vis 6   33.328   31.919   34.737   33.918   32.472   35.365  -0.590   -1.436   0.256
          Vis 7   33.275   31.866   34.683   33.886   32.440   35.331  -0.611   -1.454   0.232
          V7-V1    0.453    0.279    0.626    1.365    1.189    1.540  -0.912   -1.159  -0.665
whr       Vis 1    0.943    0.923    0.963    0.958    0.937    0.978  -0.014   -0.028  -0.001
          Vis 2    0.944    0.924    0.964    0.946    0.926    0.967  -0.003   -0.016   0.011
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	Vis 3	0.944	0.924	0.964	0.952	0.931	0.973	-0.008	-0.021	0.006
	Vis 4	0.943	0.923	0.963	0.950	0.929	0.971	-0.007	-0.021	0.007
	Vis 5	0.951	0.931	0.971	0.950	0.929	0.971	0.001	-0.013	0.015
	Vis 6	0.945	0.925	0.966	0.952	0.931	0.973	-0.007	-0.021	0.008
	Vis 7	0.952	0.932	0.972	0.960	0.939	0.980	-0.008	-0.022	0.006
	V7-V1	0.008	0.000	0.017	0.002	-0.006	0.010	0.007	-0.005	0.018
gluc	Vis 1	11.000	10.297	11.703	10.599	9.881	11.317	0.400	-0.177	0.977
	Vis 2	9.013	8.299	9.728	9.481	8.741	10.221	-0.468	-1.081	0.145
	Vis 3	8.578	7.859	9.297	9.417	8.671	10.164	-0.839	-1.466	-0.213
	Vis 4	8.469	7.748	9.191	9.038	8.292	9.784	-0.568	-1.197	0.060
	Vis 5	8.580	7.857	9.303	9.289	8.539	10.038	-0.709	-1.340	-0.078
	Vis 6	8.748	8.020	9.476	8.903	8.143	9.663	-0.155	-0.803	0.493
	Vis 7	8.867	8.154	9.580	8.930	8.195	9.666	-0.063	-0.666	0.540
	V7-V1	-2.132	-2.636	-1.629	-1.669	-2.179	-1.159	-0.463	-1.180	0.253
ins(l)	Vis 1	67.697	51.052	89.771	78.255	58.650	104.413	0.865	0.719	1.041
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	45.192	33.987	60.091	49.284	36.725	66.138	0.917	0.754	1.114
	V7-V1	0.668	0.579	0.770	0.630	0.546	0.727	1.060	0.866	1.297
cpep(l)	Vis 1	721.460	558.457	932.041	783.905	603.206	1018.735	0.920	0.785	1.079
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	527.758	408.006	682.657	542.762	416.649	707.047	0.972	0.826	1.145
	V7-V1	0.732	0.670	0.799	0.692	0.633	0.757	1.057	0.932	1.198
idos(l)	Vis 1	41.975	34.784	50.651	41.401	34.151	50.190	1.014	0.899	1.143
	Vis 2	75.364	62.421	90.991	96.701	79.692	117.340	0.779	0.690	0.881
	Vis 3	83.551	69.199	100.880	112.005	92.267	135.965	0.746	0.660	0.844
	Vis 4	86.813	71.893	104.829	118.297	97.434	143.627	0.734	0.649	0.830
	Vis 5	88.721	73.458	107.156	120.790	99.448	146.713	0.735	0.649	0.832
	Vis 6	90.341	74.777	109.145	121.879	100.305	148.094	0.741	0.654	0.840
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.152	2.019	2.294	2.944	2.755	3.146	0.731	0.667	0.802
ipkg(l)	Vis 1	0.471	0.398	0.558	0.466	0.391	0.554	1.012	0.906	1.129
	Vis 2	0.842	0.710	0.999	1.075	0.902	1.280	0.784	0.701	0.877
	Vis 3	0.931	0.785	1.104	1.229	1.031	1.465	0.757	0.676	0.848
	Vis 4	0.963	0.812	1.142	1.288	1.081	1.536	0.747	0.667	0.837
	Vis 5	0.987	0.832	1.171	1.302	1.092	1.553	0.758	0.676	0.849
	Vis 6	1.002	0.844	1.189	1.313	1.101	1.567	0.763	0.680	0.856
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.127	1.999	2.263	2.820	2.643	3.009	0.754	0.689	0.825
sys	Vis 1	136.062	132.004	140.120	133.787	129.631	137.943	2.275	-0.699	5.250
	Vis 2	130.369	126.287	134.451	132.480	128.271	136.688	-2.111	-5.170	0.948
	Vis 3	132.324	128.233	136.414	129.803	125.580	134.027	2.520	-0.566	5.607
	Vis 4	130.946	126.849	135.044	129.803	125.567	134.040	1.143	-1.977	4.264
	Vis 5	129.659	125.547	133.771	129.316	125.059	133.573	0.343	-2.807	3.493
	Vis 6	129.630	125.505	133.755	128.502	124.219	132.786	1.128	-2.075	4.331
	Vis 7	130.372	126.249	134.495	128.405	124.160	132.649	1.967	-1.195	5.129
	V7-V1	-5.691	-7.965	-3.416	-5.383	-7.705	-3.060	-0.308	-3.558	2.943
dia	Vis 1	85.497	83.168	87.826	85.352	82.966	87.737	0.145	-1.534	1.824
	Vis 2	83.090	80.748	85.431	84.953	82.539	87.366	-1.863	-3.588	-0.138
	Vis 3	83.876	81.530	86.222	83.387	80.966	85.809	0.489	-1.250	2.228
	Vis 4	83.604	81.254	85.954	83.692	81.264	86.121	-0.088	-1.846	1.669
	Vis 5	82.475	80.118	84.832	83.223	80.785	85.662	-0.749	-2.522	1.025
	Vis 6	82.784	80.420	85.148	83.266	80.813	85.719	-0.482	-2.283	1.320
	Vis 7	81.973	79.610	84.336	82.343	79.910	84.776	-0.370	-2.150	1.409
	V7-V1	-3.524	-4.769	-2.279	-3.009	-4.281	-1.737	-0.515	-2.295	1.265
pulse	Vis 1	80.976	77.575	84.378	81.874	78.386	85.362	-0.898	-3.178	1.382
	Vis 2	80.562	77.146	83.977	79.943	76.428	83.458	0.618	-1.711	2.948
	Vis 3	79.863	76.445	83.281	79.318	75.792	82.843	0.545	-1.803	2.894
	Vis 4	80.485	77.064	83.907	79.512	75.983	83.041	0.974	-1.386	3.333

	Vis 5	80.206	76.777	83.635	78.177	74.640	81.713	2.029	-0.347	4.405
	Vis 6	79.714	76.281	83.148	78.246	74.697	81.795	1.468	-0.933	3.870
	Vis 7	80.675	77.236	84.114	78.891	75.359	82.423	1.784	-0.605	4.174
	V7-V1	-0.301	-1.721	1.119	-2.984	-4.433	-1.534	2.682	0.654	4.711
chol	Vis 1	4.820	4.554	5.086	4.769	4.497	5.042	0.051	-0.126	0.228
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.901	4.633	5.169	4.945	4.668	5.222	-0.044	-0.230	0.142
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.852	4.583	5.121	4.977	4.699	5.255	-0.125	-0.312	0.062
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.893	4.625	5.161	4.975	4.700	5.251	-0.082	-0.264	0.100
	V7-V1	0.073	-0.040	0.186	0.206	0.092	0.321	-0.133	-0.294	0.028
ldl	Vis 1	2.530	2.294	2.766	2.553	2.312	2.794	-0.023	-0.177	0.131
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.601	2.363	2.838	2.718	2.473	2.963	-0.117	-0.279	0.044
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.506	2.268	2.744	2.724	2.478	2.970	-0.218	-0.381	-0.055
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.569	2.331	2.807	2.769	2.525	3.013	-0.200	-0.359	-0.041
	V7-V1	0.039	-0.057	0.135	0.216	0.121	0.311	-0.177	-0.312	-0.042
hdl	Vis 1	1.249	1.144	1.355	1.259	1.151	1.368	-0.010	-0.076	0.055
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.291	1.185	1.397	1.302	1.193	1.411	-0.011	-0.079	0.056
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.313	1.207	1.419	1.273	1.164	1.382	0.040	-0.028	0.108
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.260	1.155	1.366	1.255	1.146	1.363	0.006	-0.061	0.072
	V7-V1	0.011	-0.018	0.041	-0.005	-0.035	0.025	0.016	-0.026	0.058
vldl(l)	Vis 1	0.813	0.707	0.936	0.757	0.656	0.873	1.074	0.980	1.178
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.790	0.686	0.911	0.763	0.659	0.883	1.036	0.937	1.145
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.843	0.731	0.973	0.750	0.648	0.869	1.124	1.015	1.245
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.827	0.718	0.953	0.739	0.640	0.854	1.119	1.018	1.230
	V7-V1	1.017	0.960	1.079	0.977	0.921	1.035	1.042	0.959	1.131
trig(l)	Vis 1	1.912	1.641	2.228	1.727	1.476	2.020	1.107	1.003	1.223
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.834	1.572	2.140	1.729	1.474	2.027	1.061	0.956	1.177
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.903	1.630	2.221	1.755	1.496	2.059	1.084	0.977	1.204
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.937	1.661	2.260	1.702	1.452	1.994	1.139	1.028	1.261
	V7-V1	1.013	0.955	1.075	0.986	0.929	1.046	1.028	0.946	1.118
fimtavg	Vis 1	0.718	0.677	0.760	0.730	0.687	0.772	-0.011	-0.037	0.014
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.718	0.676	0.759	0.716	0.673	0.759	0.002	-0.024	0.027
	V7-V1	-0.001	-0.011	0.010	-0.014	-0.024	-0.003	0.013	-0.002	0.027
fimtmax	Vis 1	0.868	0.821	0.916	0.875	0.826	0.924	-0.007	-0.036	0.022
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.866	0.818	0.913	0.861	0.812	0.910	0.005	-0.025	0.034
	V7-V1	-0.003	-0.015	0.010	-0.014	-0.026	-0.002	0.011	-0.006	0.029
iem	Vis 1	2020.026	1732.683	2307.368	1963.645	1670.320	2256.969	56.381	-128.536	241.298
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA

```
          Vis 7   1975.240 1685.088 2265.392 1793.291 1494.832 2091.749  181.950  -12.840  376.739
          V7-V1    -44.786 -170.824   81.253 -170.354 -296.309  -44.399  125.568  -52.627  303.764
csc2      Vis 1      2.946    2.653    3.239    2.990    2.690    3.289   -0.044   -0.231    0.143
          Vis 2         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7      2.956    2.660    3.251    3.069    2.764    3.373   -0.113   -0.309    0.084
          V7-V1      0.010   -0.112    0.132    0.079   -0.043    0.201   -0.069   -0.241    0.104
imtareal  Vis 1     15.267   13.870   16.664   15.826   14.400   17.252   -0.559   -1.412    0.294
          Vis 2         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7     15.438   14.036   16.840   15.575   14.140   17.011   -0.137   -1.011    0.736
          V7-V1      0.171   -0.189    0.531   -0.251   -0.610    0.109    0.421   -0.087    0.930
n.pl(l)   Vis 1      1.452    1.088    1.937    1.639    1.219    2.205    0.886    0.750    1.046
          Vis 2         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7      1.755    1.315    2.340    1.828    1.358    2.460    0.960    0.812    1.135
          V7-V1      1.209    1.133    1.289    1.115    1.040    1.196    1.084    0.985    1.192
```

```
> #for( vv in 1:(dim(Eff)[1]) )
> #   {
> #   cat( "--------------------------------\n",  dimnames(Eff)[[1]][vv], "\n" )
> #   dec <- 3 - ( max(Eff[vv,,,,,1:3])>100  ) -
> #              ( max(Eff[vv,,,,,1:3])>1000 )
> #   print( round( ftable( Eff[vv,,,,,], col.vars=5:4 ), dec ) )
> #   }
```

and then tests in those table:

```
> for( vv in dimnames(Tst)[[1]] )
+    {
+    cat( "--------------------------------\n", vv, "\n" )
+    print( round( ftable( Tst[vv,,,,"Pval"], col.vars=3 ), 4 ) )
+    }
--------------------------------
 hba1c
        test    All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim           0.0000        0.0063        0.0000        0.0000        0.0000
    Rest           0.0000        0.0065        0.0000        0.0000        0.0000
    Conf           0.0000        0.0052        0.0000        0.0000        0.0000
PP  Prim           0.0000        0.0173        0.0000        0.0000        0.0000
    Rest           0.0000        0.0164        0.0000        0.0000        0.0000
    Conf           0.0000        0.0142        0.0000        0.0000        0.0000
--------------------------------
 weight
        test    All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim           0.0000        0.1111        0.0000        0.0000        0.0000
    Rest           0.0000        0.1046        0.0000        0.0000        0.0000
    Conf           0.0000        0.1129        0.0000        0.0000        0.0000
PP  Prim           0.0000        0.1148        0.0000        0.0000        0.0000
    Rest           0.0000        0.0933        0.0000        0.0000        0.0000
    Conf           0.0000        0.1216        0.0000        0.0000        0.0000
--------------------------------
 bmi
        test    All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
```

```
IT  Prim          0.0000       0.1123       0.0000       0.0000       0.0000
    Rest          0.0000       0.1056       0.0000       0.0000       0.0000
    Conf          0.0000       0.1555       0.0000       0.0000       0.0000
PP  Prim          0.0000       0.2444       0.0000       0.0000       0.0000
    Rest          0.0000       0.2046       0.0000       0.0000       0.0000
    Conf          0.0000       0.2942       0.0000       0.0000       0.0000
--------------------------------
 whr
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.2582       0.2752       0.2834       0.0433       0.6177
    Rest          0.2568       0.2664       0.2839       0.0439       0.6205
    Conf          0.2353       0.2601       0.2607       0.0383       0.6340
PP  Prim          0.3915       0.3034       0.3879       0.0526       0.4824
    Rest          0.3876       0.2885       0.3881       0.0527       0.4824
    Conf          0.3690       0.2631       0.3827       0.0514       0.4845
--------------------------------
 gluc
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.0121       0.9281       0.2008       0.0000       0.0000
    Rest          0.0109       0.8981       0.1964       0.0000       0.0000
    Conf          0.0103       0.8376       0.2049       0.0000       0.0000
PP  Prim          0.0145       0.8879       0.1574       0.0000       0.0000
    Rest          0.0131       0.8557       0.1583       0.0000       0.0000
    Conf          0.0120       0.7882       0.1599       0.0000       0.0000
--------------------------------
 ins(l)
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.2561       0.3676       0.5312       0.0000       0.0000
    Rest          0.2422       0.3438       0.5376       0.0000       0.0000
    Conf          0.3003       0.3837       0.5723       0.0000       0.0000
PP  Prim          0.2881       0.3547       0.5678       0.0000       0.0000
    Rest          0.2620       0.3302       0.5602       0.0000       0.0000
    Conf          0.2862       0.3452       0.5771       0.0000       0.0000
--------------------------------
 cpep(l)
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.4014       0.6174       0.3477       0.0000       0.0000
    Rest          0.4134       0.5727       0.3768       0.0000       0.0000
    Conf          0.5158       0.7361       0.3912       0.0000       0.0000
PP  Prim          0.6073       0.9250       0.3800       0.0000       0.0000
    Rest          0.5917       0.8437       0.3913       0.0000       0.0000
    Conf          0.6373       0.9879       0.3881       0.0000       0.0000
--------------------------------
 idos(l)
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim               0            0            0            0            0
    Rest               0            0            0            0            0
    Conf               0            0            0            0            0
PP  Prim               0            0            0            0            0
    Rest               0            0            0            0            0
    Conf               0            0            0            0            0
--------------------------------
 ipkg(l)
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim               0            0            0            0            0
    Rest               0            0            0            0            0
    Conf               0            0            0            0            0
PP  Prim               0            0            0            0            0
    Rest               0            0            0            0            0
    Conf               0            0            0            0            0
```

```
--------------------------------
 sys
        test      All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim             0.0946        0.2301        0.8434        0.0000        0.0000
    Rest             0.0930        0.2170        0.8536        0.0000        0.0000
    Conf             0.0949        0.2227        0.8527        0.0000        0.0000
PP  Prim             0.0768        0.2429        0.8004        0.0000        0.0000
    Rest             0.0725        0.2202        0.7928        0.0000        0.0000
    Conf             0.0734        0.2201        0.7984        0.0000        0.0000
--------------------------------
 dia
        test      All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim             0.2594        0.8207        0.5383        0.0000        0.0000
    Rest             0.2528        0.7257        0.5200        0.0000        0.0000
    Conf             0.2482        0.6835        0.5706        0.0000        0.0000
PP  Prim             0.2160        0.6296        0.6458        0.0000        0.0000
    Rest             0.1935        0.4953        0.6417        0.0000        0.0000
    Conf             0.1984        0.5473        0.6500        0.0000        0.0000
--------------------------------
 pulse
        test      All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim             0.1033        0.0987        0.0100        0.6752        0.0001
    Rest             0.1148        0.1161        0.0107        0.6539        0.0001
    Conf             0.1139        0.1433        0.0096        0.6774        0.0001
PP  Prim             0.0822        0.0887        0.0084        0.7057        0.0001
    Rest             0.0916        0.1110        0.0086        0.6985        0.0001
    Conf             0.0908        0.1163        0.0082        0.7111        0.0000
--------------------------------
 chol
        test      All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim             0.3108        0.6632        0.1089        0.2239        0.0005
    Rest             0.3013        0.6410        0.1085        0.2260        0.0005
    Conf             0.2722        0.3784        0.1047        0.2061        0.0004
PP  Prim             0.1965        0.8877        0.0665        0.2185        0.0002
    Rest             0.1985        0.8493        0.0679        0.2145        0.0002
    Conf             0.2111        0.6081        0.0683        0.2125        0.0002
--------------------------------
 ldl
        test      All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim             0.0190        0.0408        0.0101        0.4538        0.0000
    Rest             0.0174        0.0368        0.0100        0.4558        0.0000
    Conf             0.0095        0.0137        0.0103        0.4217        0.0000
PP  Prim             0.0158        0.0953        0.0054        0.5226        0.0000
    Rest             0.0148        0.0838        0.0055        0.5198        0.0000
    Conf             0.0108        0.0448        0.0055        0.5055        0.0000
--------------------------------
 hdl
        test      All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim             0.1490        0.7419        0.4577        0.4640        0.7486
    Rest             0.1455        0.6951        0.4505        0.4634        0.7367
    Conf             0.1495        0.8654        0.4541        0.4591        0.7483
PP  Prim             0.1416        0.9719        0.4325        0.5373        0.6213
    Rest             0.1444        0.9091        0.4370        0.5442        0.6216
    Conf             0.1372        0.9157        0.4285        0.5347        0.6173
--------------------------------
 vldl(l)
        test      All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim             0.0884        0.0219        0.3042        0.5577        0.3853
    Rest             0.1143        0.0308        0.3152        0.5609        0.4010
```

```
    Conf          0.0792        0.0193        0.3295        0.5637        0.4222
PP  Prim          0.0651        0.0152        0.4463        0.5871        0.5934
    Rest          0.0946        0.0243        0.4459        0.5801        0.5998
    Conf          0.0668        0.0161        0.4467        0.5905        0.5905
--------------------------------
 trig(l)
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.1499        0.0159        0.4735        0.6733        0.5544
    Rest          0.1717        0.0208        0.4837        0.6740        0.5693
    Conf          0.1230        0.0129        0.5156        0.6609        0.6309
PP  Prim          0.0431        0.0040        0.7074        0.6641        0.9209
    Rest          0.0628        0.0065        0.7001        0.6532        0.9218
    Conf          0.0495        0.0047        0.7037        0.6533        0.9271
--------------------------------
 fimtavg
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.2092        0.9559        0.0898        0.8785        0.0115
    Rest          0.2133        0.8697        0.0857        0.8889        0.0109
    Conf          0.2157        0.9058        0.0897        0.8779        0.0114
PP  Prim          0.2067        0.8997        0.0833        0.9919        0.0150
    Rest          0.2264        0.7383        0.0859        0.9731        0.0149
    Conf          0.2125        0.8548        0.0838        0.9883        0.0150
--------------------------------
 fimtmax
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.4223        0.8168        0.1943        0.6755        0.0257
    Rest          0.4170        0.7399        0.1868        0.6842        0.0244
    Conf          0.4265        0.7565        0.1935        0.6754        0.0255
PP  Prim          0.3859        0.6900        0.1676        0.8018        0.0295
    Rest          0.3846        0.5542        0.1717        0.7834        0.0292
    Conf          0.3867        0.6386        0.1685        0.7980        0.0295
--------------------------------
 iem
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.1998        0.0884        0.1749        0.4648        0.0080
    Rest          0.1715        0.0724        0.1776        0.4610        0.0082
    Conf          0.1637        0.0671        0.1672        0.4862        0.0080
PP  Prim          0.1859        0.0674        0.3236        0.5116        0.0406
    Rest          0.1322        0.0443        0.3548        0.4736        0.0433
    Conf          0.1608        0.0567        0.3022        0.5564        0.0411
--------------------------------
 csc2
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.5853        0.3228        0.4534        0.8318        0.2029
    Rest          0.5129        0.2601        0.4539        0.8242        0.1998
    Conf          0.5124        0.2602        0.4334        0.8739        0.2050
PP  Prim          0.4555        0.2099        0.5808        0.9636        0.4629
    Rest          0.3286        0.1376        0.6149        0.9828        0.4642
    Conf          0.4274        0.1923        0.5424        0.8945        0.4667
--------------------------------
 imtareal
        test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim          0.1802        0.6683        0.1160        0.3756        0.1811
    Rest          0.2162        0.7876        0.1177        0.3721        0.1867
    Conf          0.1794        0.7576        0.1044        0.3528        0.1714
PP  Prim          0.2472        0.8815        0.1215        0.3161        0.2352
    Rest          0.3021        0.9219        0.1312        0.3282        0.2474
    Conf          0.2399        0.9642        0.1107        0.2895        0.2314
--------------------------------
 n.pl(l)
```

```
          test     All equal Visit 7 equal  Change equal   Met chg = 0   Plc chg = 0
ana mod
IT  Prim             0.1059        0.4361        0.0979        0.0000        0.0028
    Rest             0.0936        0.3929        0.0955        0.0000        0.0028
    Conf             0.1515        0.6313        0.0982        0.0000        0.0024
PP  Prim             0.1252        0.6174        0.0783        0.0000        0.0031
    Rest             0.1282        0.6122        0.0801        0.0000        0.0029
    Conf             0.1726        0.9049        0.0782        0.0000        0.0027
```

7.3 Graphs of trajectories

Finally we want to plot the estimates, so we put the plotting of a single variable into a function. But first we need a convenience function to place text on the graph:

```
> source( "cnr.R" )
> cnr
  function (xf, yf)
  {
      cn <- par()$usr
      xf <- ifelse(xf > 1, xf/100, xf)
      yf <- ifelse(yf > 1, yf/100, yf)
      xx <- (1 - xf) * cn[1] + xf * cn[2]
      yy <- (1 - yf) * cn[3] + yf * cn[4]
      if (par()$xlog)
          xx <- 10^xx
      if (par()$ylog)
          yy <- 10^yy
      list(x = xx, y = yy)
  }
> pleff <-
+ function( var,
+          ytxt = var,
+            yl = NULL, # yaxis limits
+            yt = NULL, # yaxis major ticks
+            ym = NULL, # yaxis minor ticks
+            hl = ym )
+ #         ltyp = if ltrf[match(var,vnam)] "pch" else "ach",
+ #                # Type of labelling of curves:
+ #                # "pch" - percent change
+ #               # "ach" - absolute change
+ #                # Any other text will be printed
+ #         lval = NULL ) # Values plotted at end of curves )
+ {
+ # Get the estimates, but only for the times where they are, otherwise
+ # the the points will not be connected (a feature)
+ var <- dimnames(Eff)$var[grep(var,vnam <- dimnames(Eff)$var)]
+ eff <- Eff[var,"IT","Prim",,,]
+ pef <- cbind( eff[-8,,"Met"],
+               eff[-8,,"Plc"] )
+ pef <- pef[complete.cases(pef),]
+ tim <- (as.numeric( gsub("Vis ","",rownames(pef) ) )-1)*3
+
+ if( is.null(yl) ) yl <- range(pef)*c(0.9,1.2)
+ matplot( tim, pef, type="n",
+          xlab="Months since trial entry", xaxt="n", xlim=c(0,19.5),
+          ylab=ytxt, ylim=yl, yaxs="i", yaxt="n", bty="n" )
+ if( !is.null(hl) ) abline( h=hl, col=gray(0.8) )
+ axis( side=1, at=0:6*3, col=clr[4] )
+ axis( side=2, if(!is.null(yt)) at=yt, col=clr[4] )
+ axis( side=2, if(!is.null(ym)) at=ym, labels=rep("",length(ym)), col=clr[4] )
+ text( cnr(c(98,98),c(92,98)), gN, col=clr[2:1],
+       font=2, adj=c(1,1), cex=1.2 )
```

```
+ if( FALSE )
+ {
+ text( cnr(98,74)[[1]], cnr(98,74)[[2]],
+       substitute( "Equal over 0-18 mth: P = "*pval,
+                   list( pval = formatC( Tst[var,"IT","Prim","    All equal","Pval"],
+                         format="f", digits=4 )) ),
+       col=clr[4], adj=1 )
+ text( cnr(98,78)[[1]], cnr(98,78)[[2]],
+       substitute( "Equal at end: P = "*pval,
+                   list( pval = formatC( Tst[var,"IT","Prim","Visit 7 equal","Pval"],
+                         format="f", digits=4 )) ),
+       col=clr[4], adj=1 )
+ }
+ text( cnr(98,82)[[1]], cnr(98,82)[[2]],
+       substitute( "Equal change: P = "*pval,
+                   list( pval = formatC( Tst[var,"IT","Prim"," Change equal","Pval"],
+                         format="f", digits=4 )) ),
+       col=clr[4], adj=1 )
+ if( ltrf[match(var,vnam)] ) { text( cnr(98,74)[[1]], cnr(98,74)[[2]],
+                                     "% change\nfrom baseline", col=clr[4], adj=c(1,0.5) )
+ } else {                          text( cnr(98,74)[[1]], cnr(98,74)[[2]],
+                                     "Change\nfrom baseline", col=clr[4], adj=c(1,0.5) ) }
+ ####################################################Experimental
+ #if( ltyp=="pch" ) text( cnr(98,74)[[1]], cnr(98,74)[[2]],
+ #                       "% change\nfrom baseline", col=clr[4], adj=c(1,0.5) )
+ #else
+ #if( ltyp=="ach" ) text( cnr(98,74)[[1]], cnr(98,74)[[2]],
+ #                       "Change\nfrom baseline", col=clr[4], adj=c(1,0.5) )
+ #else text( cnr(98,74)[[1]], cnr(98,74)[[2]],
+ #           ltyp, col=clr[4], adj=c(1,0.5) )
+ EF <- eff[8,"Est",c("Met","Plc")]
+ # It might not be visit 7 that is the last non-missing, so find that
+ ends <- eff[1:7,"Est",c("Met","Plc")]
+ ends <- ends[max(which(!is.na(ends[,1]))),]
+ dv <- ends-mean(ends) ; dv <- dv/abs(dv)
+ if( abs(diff(ends)) < diff(yl)/20 ) ends <- mean(ends)+dv*diff(yl)/30
+ if( ltrf[match(var,vnam)] ) EF <- (EF-1)*100
+ print( c(EF, ends ) )
+ text( c(20,20), ends,
+       paste( formatC( EF, format="f", digits=1 ), sep="" ),
+       col=clr[1:2], adj=1, font=2 )
+ matlines( tim, pef, type="l", lwd=c(5,1,1), lty=1, col=rep(clr[1:2],each=3) )
+ }
```

So we can draw two example graphs, groomed to look nice:

```
> par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, las=1 )
> pleff( "hba1c", expression("Hb"*A[1][c]*" (%)  [Mean (95% CI)]"),
+        yl = c(7,10),
+        yt = 7:10,
+        ym = seq(7,10,0.5) )
        Met        Plc        Met        Plc
 -0.7809503 -0.3561552  7.9689621  8.2745338
```

```
> par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, las=1 )
> pleff("trig","Triglycerides (mmol/l)  [Mean (95% CI)]",
+              yl = c(1,2.5),        # yaxis limits
+              yt = 0:4,             # yaxis major ticks
+              ym = seq(1,3,0.25) ) # yaxis minor ticks
      Met       Plc       Met       Plc
 1.272308 -1.775583  1.759488  1.549417
```

With this function in place it is now simple to produce plots for all the variables, as a first guide to how they should be individually adjusted to look sensible:

```
> tmpl <-
+ function()
+ {
+ par( mfrow=c(2,2),  mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, las=1 )
+ # HbA1c:
+ pleff( "hba1c",
+        expression("Hb"*A[1][c]*" (%)  [Mean (95% CI)]"),
+        yl = c(7,10),
+        yt = 7:10,
+        ym = seq(7,10,0.5) )
+ text( cnr(2,98), "a", adj=c(0,1), font=2, cex=1.5 )
+ # Gluc
+ pleff("gluc","Fasting p-glucose (mmol/L) [Mean (95% CI)]",
+               yl = c(7,12),      # yaxis limits
+               yt = seq(7,13,2),  # yaxis major ticks
+               ym = seq(7,13,1) ) # yaxis minor ticks
+ text( cnr(2,98), "b", adj=c(0,1), font=2, cex=1.5 )
+ # Insulin dose
+ pleff("ipkg","Insulin dose (IU/day/kg)  [Mean (95% CI)]",
+               yl = c(0.0,2.4),        # yaxis limits
+               yt = seq(0.0,2.0,1.0),  # yaxis major ticks
+               ym = seq(0.0,2.4,0.2) ) # yaxis minor ticks
+ text( cnr(2,98), "c", adj=c(0,1), font=2, cex=1.5 )
+ # Weight:
+ pleff("weight","Weight (kg)  [Mean (95% CI)]",
+               yl = c(90,120),      # yaxis limits
+               yt = seq(90,120,10), # yaxis major ticks
+               ym = seq(90,120,5) ) # yaxis minor ticks
+ text( cnr(2,98), "d", adj=c(0,1), font=2, cex=1.5 )
+ }
> tmpl()
```

```
        Met        Plc        Met        Plc
 -0.7809503 -0.3561552  7.9689621  8.2745338
       Met       Plc       Met       Plc
 -2.139541 -1.672106  8.220279  8.553612
        Met        Plc        Met        Plc
 112.689476 181.777199   1.038848   1.360663
        Met        Plc        Met        Plc
   1.584021   4.148280 100.041043 102.456710
```

```
> win.metafile( "./results/first4-met.emf", height=9, width=8 )
> tmpl()
```

```
        Met        Plc        Met        Plc
 -0.7809503 -0.3561552  7.9689621  8.2745338
       Met       Plc       Met       Plc
 -2.139541 -1.672106  8.220279  8.553612
        Met        Plc        Met        Plc
 112.689476 181.777199   1.038848   1.360663
        Met        Plc        Met        Plc
   1.584021   4.148280 100.041043 102.456710
```

```
> dev.off()
```

```
 null device
           1
```

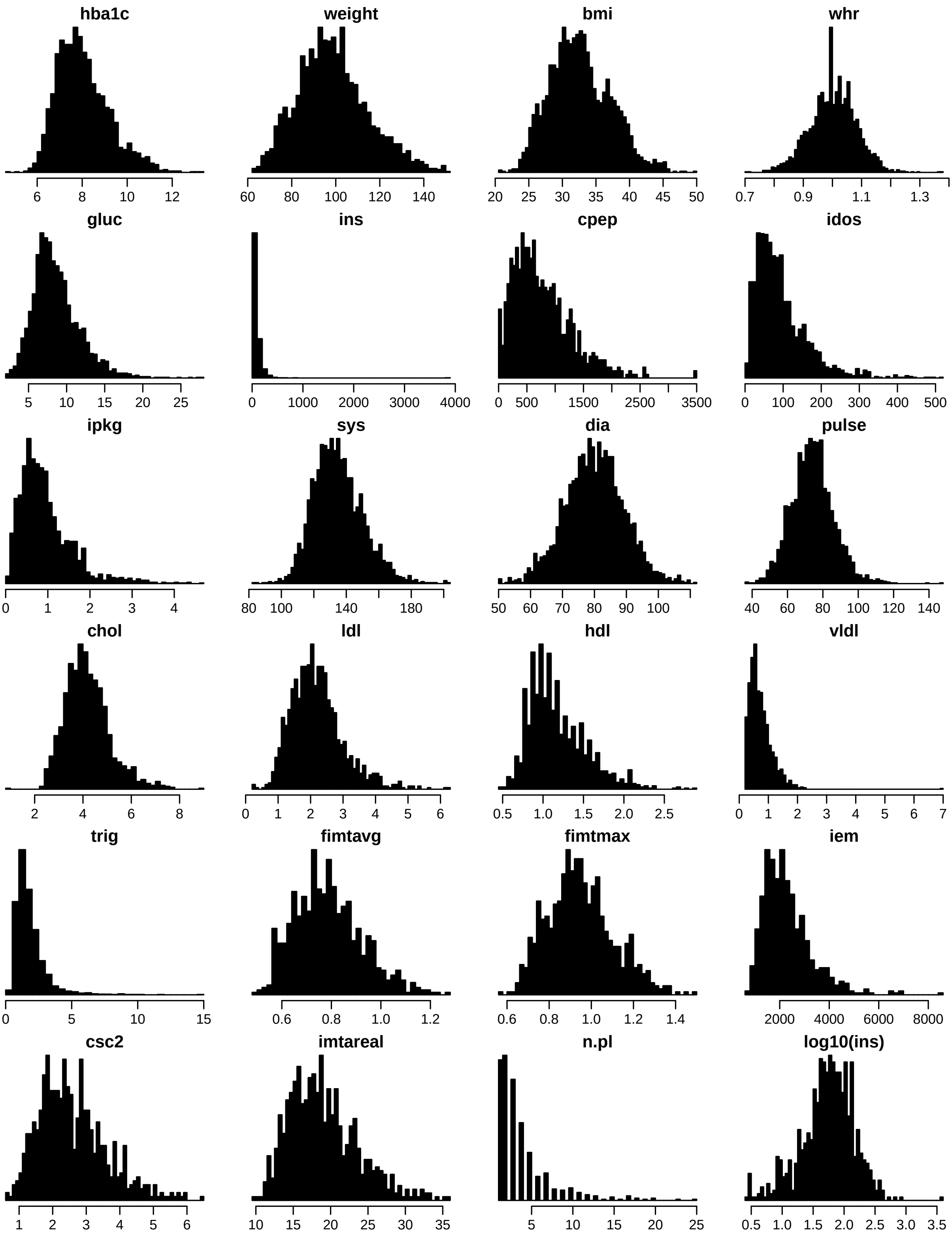

Figure 7.2: *Histograms of the marginal distribution of all chosen variables.*

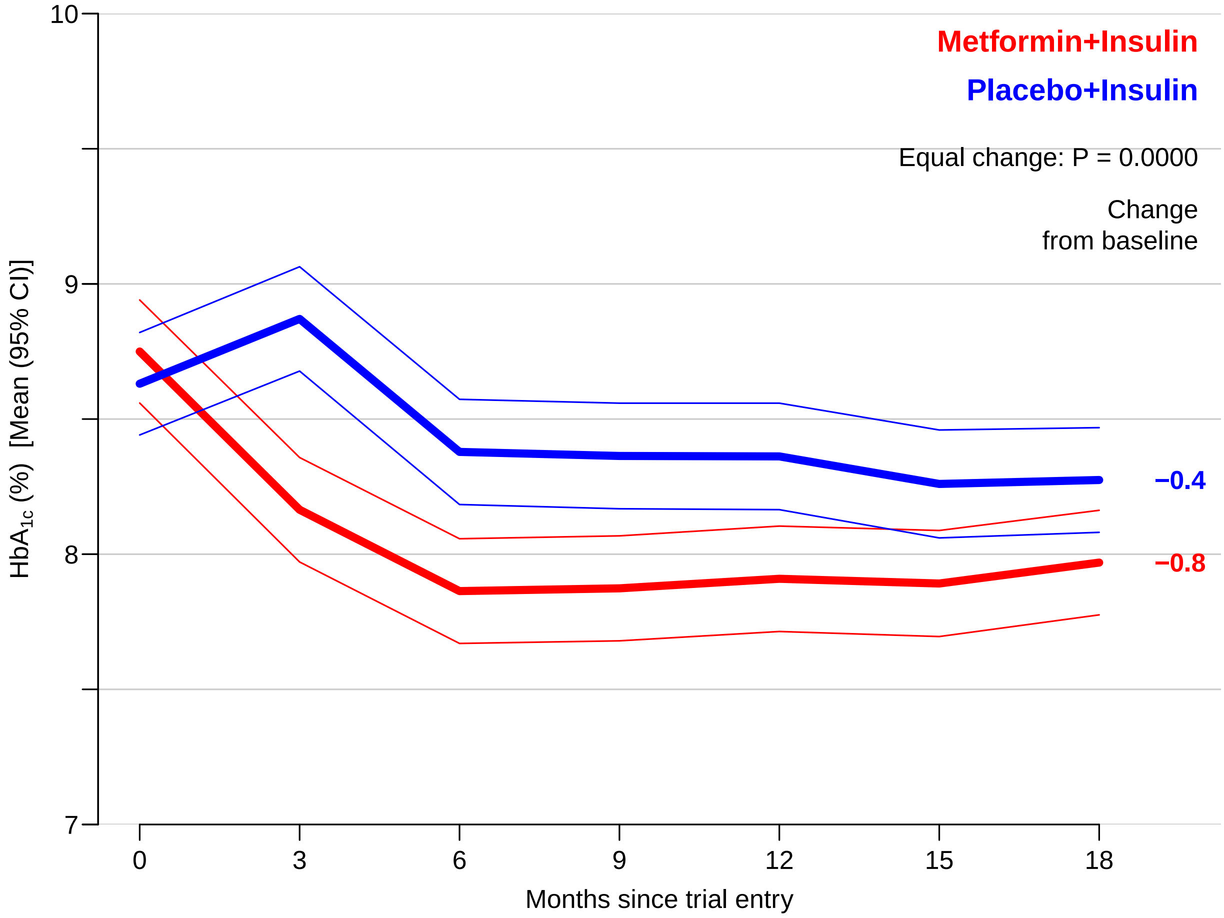

Figure 7.3: *Trajectories for HbA_{1c}, illustrating how parameters translate into the graph.*

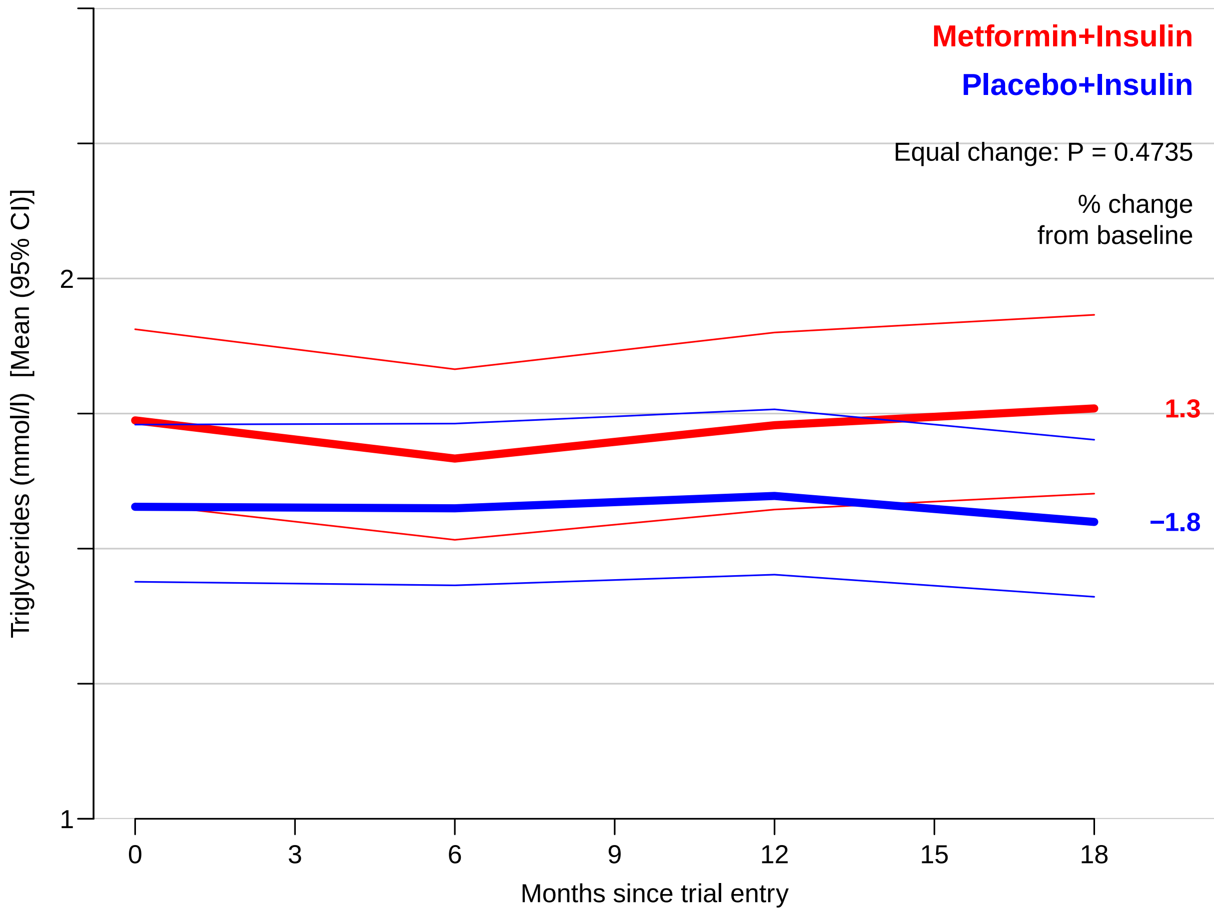

Figure 7.4: *Trajectories for Triglycerides, illustrating how parameters translate into the graph.*

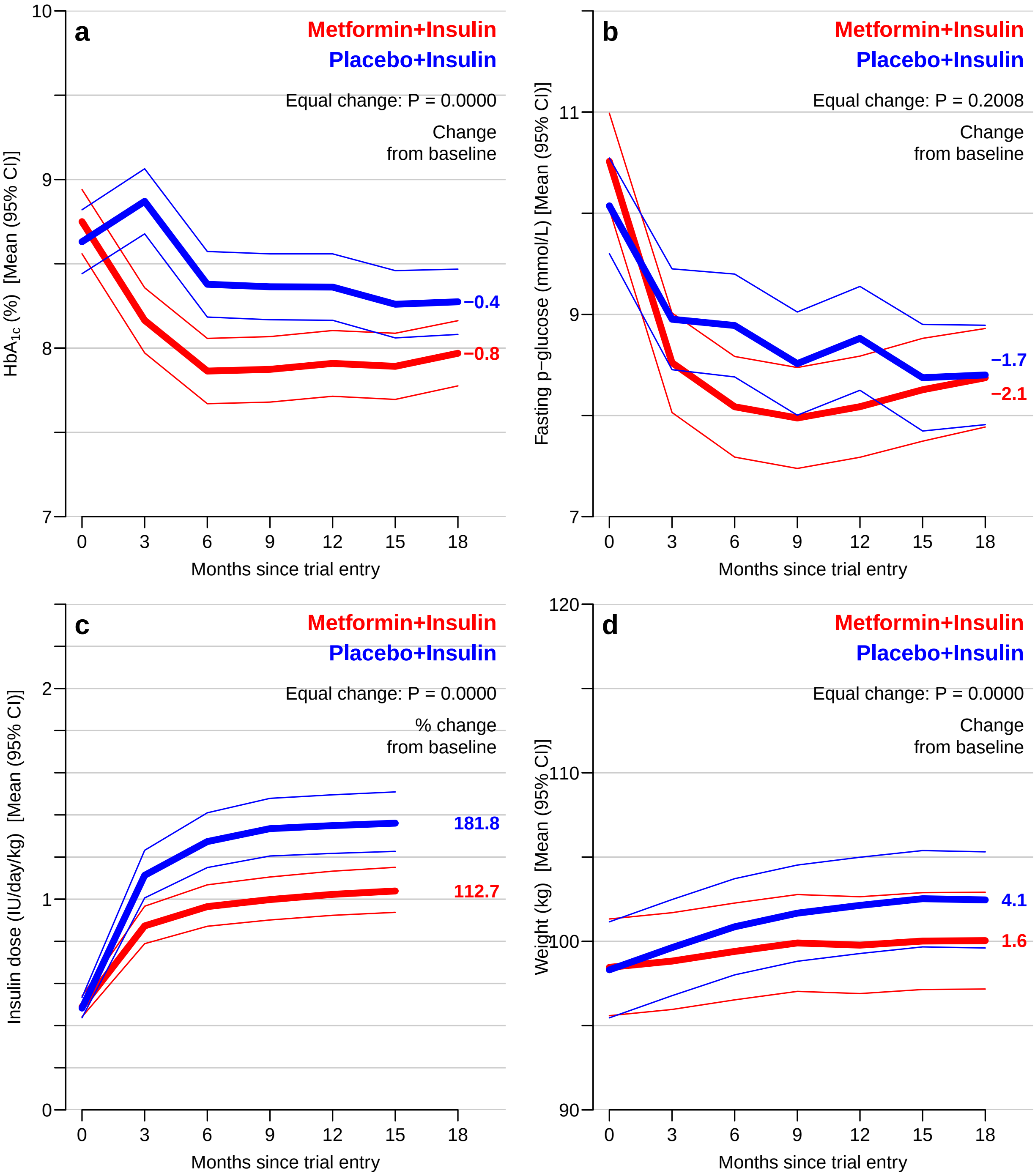

Figure 7.5: *Trajectory plots for the first 4 variables.*

Chapter 8

Secondary outcomes: insulin regimen

Initially we load the collected analysis dataset, and tabulate records and persons by randomization status and per protocol status:

```
> library( Epi )
> library( lme4 )
> library( abind )
> load( file="./data/AD.Rda" )
> with( AD, ftable( addmargins( table(grp,igr,PP=pp),
+                               2:3 ) ) )
          PP FALSE TRUE  Sum
  grp igr
  Plc Biph       7  425  432
      AspD       7  448  455
      Detm      17  355  372
      Sum       31 1228 1259
  Met Biph       4  465  469
      AspD       8  403  411
      Detm      10  438  448
      Sum       22 1306 1328
```

```
> with( AD, ftable( addmargins( tapply( subjid,
+                                       list(grp,igr,PP=pp),
+                                       function(x) length(unique(x) ) ),
+                               2:3 ) ) )
          PP FALSE TRUE Sum

  Plc Biph       5   62  67
      AspD       5   68  73
      Detm      12   54  66
      Sum       22  184 206
  Met Biph       3   67  70
      AspD       5   60  65
      Detm       7   64  71
      Sum       15  191 206
```

8.1 HbA$_{1c}$

8.1.1 HbA$_{1c}$at end of study

Initially we make a simple tabulation of the patients that achieve a HbA$_{1c}$ $\leq 7.0\%$:

```
> load( file="./data/base.Rda" )
> tt <- addmargins( with( base, table( igr, hba1c.b7>7.0 ) ) )
> cbind( tt, round( 100*tt/tt[,3], 1 ) )[,-6]
```

```
      FALSE TRUE Sum FALSE TRUE
Biph     38   88 126  30.2 69.8
AspD     31   96 127  24.4 75.6
Detm     12  108 120  10.0 90.0
Sum      81  292 373  21.7 78.3
```

A more formal analysis is achieved by using a binomial model, in this case with a log-link, so that we directly get the proportions:

```
> m1 <- glm( hba1c.b7<=7.0 ~ igr -1, family=binomial(link="log"), data=base )
> round( 100*ci.exp( m1 ), 1 )
          exp(Est.) 2.5% 97.5%
igrBiph        30.2 23.1  39.3
igrAspD        24.4 18.0  33.1
igrDetm        10.0  5.8  17.1
> anova( m1, update( m1, . ~ 1 ), test="Chisq" )
Analysis of Deviance Table

Model 1: hba1c.b7 <= 7 ~ igr - 1
Model 2: hba1c.b7 <= 7 ~ 1
  Resid. Df Resid. Dev Df Deviance  Pr(>Chi)
1       370     373.46
2       372     390.37 -2  -16.916 0.0002122
```

Thus the p-value for equal fraction of patients achieving a HbA$_{1c}$less than or equal to 7.0 is 0.0002.

We can also compute the RRs and the corresponding p-values for the three differences between

```
> CM = rbind( c(-1,1,0), c(-1,0,1), c(0,-1,1) )
> rownames( CM ) <- paste( levels(base$igr)[c(2,3,3)], "vs.",
+                          levels(base$igr)[c(1,1,2)] )
> CM
             [,1] [,2] [,3]
AspD vs. Biph   -1    1    0
Detm vs. Biph   -1    0    1
Detm vs. AspD    0   -1    1
> round( ci.exp( m1 ), 2 )
          exp(Est.) 2.5% 97.5%
igrBiph        0.30 0.23  0.39
igrAspD        0.24 0.18  0.33
igrDetm        0.10 0.06  0.17
> cbind(
+ round( ci.exp( m1, ctr.mat= CM ), 2 ),
+ round( ci.exp( m1, ctr.mat=-CM ), 2 ),
+ round( ci.lin( m1, ctr.mat= CM )[,4,drop=F], 3 ) )
              exp(Est.) 2.5% 97.5% exp(Est.) 2.5% 97.5%     P
AspD vs. Biph      0.81 0.54  1.21      1.24 0.82  1.85 0.306
Detm vs. Biph      0.33 0.18  0.60      3.02 1.66  5.49 0.000
Detm vs. AspD      0.41 0.22  0.76      2.44 1.32  4.53 0.005
```

8.1.2 HbA$_{1c}$trajectories

We shall use the analysis of HbA$_{1c}$ to set up the model for analyzing the other glucose related outcomes by insulin group.

We set up a random effects model using `lmer`, first fitted to the entire dataset (intention to treat) and then to the restricted (per protocol) — analysis I. We use a model (`ITa`) allowing for baseline imbalance between the groups, but it might be argued that a model with identical baseline among the randomized groups would be better. Unlikely to produce dramatically different results, though.

```
> MM <- model.matrix( ~ igr:factor(visit), data=AD )[,-(1:4)]
> colnames( MM )
 [1] "igrBiph:factor(visit)v2" "igrAspD:factor(visit)v2" "igrDetm:factor(visit)v2"
 [4] "igrBiph:factor(visit)v3" "igrAspD:factor(visit)v3" "igrDetm:factor(visit)v3"
 [7] "igrBiph:factor(visit)v4" "igrAspD:factor(visit)v4" "igrDetm:factor(visit)v4"
[10] "igrBiph:factor(visit)v5" "igrAspD:factor(visit)v5" "igrDetm:factor(visit)v5"
[13] "igrBiph:factor(visit)v6" "igrAspD:factor(visit)v6" "igrDetm:factor(visit)v6"
[16] "igrBiph:factor(visit)v7" "igrAspD:factor(visit)v7" "igrDetm:factor(visit)v7"
```

```
> IT0 <- lmer( hba1c ~ MM +
+                      sdc + over.65 + pre.ins +
+                      (1|subjid),
+                      data = AD )
> round( ci.lin( IT0 ), 3 )
```

```
                           Estimate StdErr       z     P   2.5%  97.5%
(Intercept)                   8.698  0.079 109.427 0.000  8.543  8.854
MMigrBiph:factor(visit)v2    -0.415  0.080  -5.214 0.000 -0.571 -0.259
MMigrAspD:factor(visit)v2    -0.485  0.080  -6.038 0.000 -0.642 -0.327
MMigrDetm:factor(visit)v2     0.397  0.082   4.813 0.000  0.235  0.558
MMigrBiph:factor(visit)v3    -0.913  0.081 -11.290 0.000 -1.072 -0.755
MMigrAspD:factor(visit)v3    -0.727  0.081  -8.973 0.000 -0.885 -0.568
MMigrDetm:factor(visit)v3    -0.057  0.083  -0.677 0.499 -0.220  0.107
MMigrBiph:factor(visit)v4    -0.880  0.081 -10.899 0.000 -1.038 -0.721
MMigrAspD:factor(visit)v4    -0.697  0.082  -8.454 0.000 -0.859 -0.535
MMigrDetm:factor(visit)v4    -0.128  0.084  -1.518 0.129 -0.293  0.037
MMigrBiph:factor(visit)v5    -0.823  0.080 -10.225 0.000 -0.981 -0.665
MMigrAspD:factor(visit)v5    -0.642  0.083  -7.692 0.000 -0.805 -0.478
MMigrDetm:factor(visit)v5    -0.190  0.086  -2.200 0.028 -0.360 -0.021
MMigrBiph:factor(visit)v6    -0.885  0.081 -10.875 0.000 -1.044 -0.725
MMigrAspD:factor(visit)v6    -0.614  0.086  -7.178 0.000 -0.782 -0.447
MMigrDetm:factor(visit)v6    -0.335  0.089  -3.787 0.000 -0.509 -0.162
MMigrBiph:factor(visit)v7    -0.964  0.081 -11.957 0.000 -1.122 -0.806
MMigrAspD:factor(visit)v7    -0.467  0.080  -5.803 0.000 -0.624 -0.309
MMigrDetm:factor(visit)v7    -0.267  0.083  -3.235 0.001 -0.429 -0.105
sdcnotSDC                     0.102  0.090   1.134 0.257 -0.075  0.280
over.65>65                   -0.340  0.098  -3.463 0.001 -0.533 -0.148
pre.insnoIns                 -0.337  0.098  -3.432 0.001 -0.529 -0.144
```

```
> ITa <- lmer( hba1c ~ igr + igr:factor(visit) - 1 +
+                      sdc + over.65 + pre.ins +
+                      (1|subjid),
+                      data = AD )
> round( ci.lin( ITa ), 3 )
```

```
                        Estimate StdErr       z     P   2.5%  97.5%
igrBiph                    8.776  0.110  79.486 0.000  8.559  8.992
igrAspD                    8.644  0.110  78.744 0.000  8.429  8.859
igrDetm                    8.677  0.110  78.820 0.000  8.461  8.893
sdcnotSDC                  0.103  0.090   1.138 0.255 -0.074  0.280
over.65>65                -0.341  0.098  -3.470 0.001 -0.534 -0.148
pre.insnoIns              -0.338  0.098  -3.439 0.001 -0.530 -0.145
igrBiph:factor(visit)v2   -0.446  0.085  -5.226 0.000 -0.613 -0.279
igrAspD:factor(visit)v2   -0.463  0.086  -5.386 0.000 -0.631 -0.294
igrDetm:factor(visit)v2    0.405  0.088   4.609 0.000  0.233  0.578
igrBiph:factor(visit)v3   -0.944  0.087 -10.912 0.000 -1.114 -0.775
igrAspD:factor(visit)v3   -0.705  0.087  -8.138 0.000 -0.874 -0.535
igrDetm:factor(visit)v3   -0.048  0.089  -0.536 0.592 -0.222  0.127
igrBiph:factor(visit)v4   -0.911  0.086 -10.544 0.000 -1.080 -0.741
igrAspD:factor(visit)v4   -0.675  0.088  -7.675 0.000 -0.847 -0.503
igrDetm:factor(visit)v4   -0.119  0.090  -1.327 0.184 -0.295  0.057
igrBiph:factor(visit)v5   -0.854  0.086  -9.911 0.000 -1.023 -0.685
igrAspD:factor(visit)v5   -0.620  0.089  -6.974 0.000 -0.794 -0.446
```

```
  igrDetm:factor(visit)v5   -0.181  0.092  -1.977 0.048 -0.361 -0.002
  igrBiph:factor(visit)v6   -0.916  0.087 -10.529 0.000 -1.086 -0.745
  igrAspD:factor(visit)v6   -0.592  0.091  -6.516 0.000 -0.770 -0.414
  igrDetm:factor(visit)v6   -0.327  0.094  -3.483 0.000 -0.510 -0.143
  igrBiph:factor(visit)v7   -0.995  0.086 -11.531 0.000 -1.164 -0.826
  igrAspD:factor(visit)v7   -0.445  0.086  -5.167 0.000 -0.613 -0.276
  igrDetm:factor(visit)v7   -0.258  0.088  -2.932 0.003 -0.431 -0.086
```

```
> # Per protocol analysis
> PPa <- update( ITa, data = subset( AD, pp ) )
```

We then do the parallel analyses not adjusted for the stratification variables (II)

```
> ITr <- update( ITa, . ~ igr + igr:factor(visit) - 1 + (1|subjid) )
> PPr <- update( ITr, data = subset( AD, pp ) )
```

Finally we expand the first analysis by including further potential confounders (III):

```
> ITc <- update( ITa, . ~ . + sex + statin + gad.pos + cvd )
> PPc <- update( ITc, data = subset( AD, pp ) )
```

So now we have 6 different models for the same outcome, which either will show approximately the same, or in the case they show slightly different results, enables us to pick the results that suits or prejudices best.

8.1.3 Extraction of estimated effects

From this model we want to extract first the average level of HbA$_{1c}$ at each visit, and additionally the estimated change from visit 1 to visit 7, so we set up the corresponding contrast matrix, which will extract these from the models

```
> eM <- rbind( cbind(1,rbind(0,diag(6))), rep(0:1,c(6,1)) )
> rownames( eM ) <- c( paste( "Vis", 1:7, sep="" ), "v7-v1" )
> eM
        [,1] [,2] [,3] [,4] [,5] [,6] [,7]
  Vis1     1    0    0    0    0    0    0
  Vis2     1    1    0    0    0    0    0
  Vis3     1    0    1    0    0    0    0
  Vis4     1    0    0    1    0    0    0
  Vis5     1    0    0    0    1    0    0
  Vis6     1    0    0    0    0    1    0
  Vis7     1    0    0    0    0    0    1
  v7-v1    0    0    0    0    0    0    1
```

With a first look at the entire parameter vector for the model we can see what subset to extract to get the desired estimates:

```
> round( ci.exp( ITa, Exp=F ), 3 )
                          Estimate   2.5%  97.5%
  igrBiph                    8.776  8.559  8.992
  igrAspD                    8.644  8.429  8.859
  igrDetm                    8.677  8.461  8.893
  sdcnotSDC                  0.103 -0.074  0.280
  over.65>65                -0.341 -0.534 -0.148
  pre.insnoIns              -0.338 -0.530 -0.145
  igrBiph:factor(visit)v2   -0.446 -0.613 -0.279
  igrAspD:factor(visit)v2   -0.463 -0.631 -0.294
  igrDetm:factor(visit)v2    0.405  0.233  0.578
  igrBiph:factor(visit)v3   -0.944 -1.114 -0.775
  igrAspD:factor(visit)v3   -0.705 -0.874 -0.535
  igrDetm:factor(visit)v3   -0.048 -0.222  0.127
```

```
  igrBiph:factor(visit)v4   -0.911 -1.080 -0.741
  igrAspD:factor(visit)v4   -0.675 -0.847 -0.503
  igrDetm:factor(visit)v4   -0.119 -0.295  0.057
  igrBiph:factor(visit)v5   -0.854 -1.023 -0.685
  igrAspD:factor(visit)v5   -0.620 -0.794 -0.446
  igrDetm:factor(visit)v5   -0.181 -0.361 -0.002
  igrBiph:factor(visit)v6   -0.916 -1.086 -0.745
  igrAspD:factor(visit)v6   -0.592 -0.770 -0.414
  igrDetm:factor(visit)v6   -0.327 -0.510 -0.143
  igrBiph:factor(visit)v7   -0.995 -1.164 -0.826
  igrAspD:factor(visit)v7   -0.445 -0.613 -0.276
  igrDetm:factor(visit)v7   -0.258 -0.431 -0.086

> round( ci.exp( ITa, subset="Biph", Exp=F ), 3 )

                          Estimate   2.5%  97.5%
  igrBiph                    8.776  8.559  8.992
  igrBiph:factor(visit)v2   -0.446 -0.613 -0.279
  igrBiph:factor(visit)v3   -0.944 -1.114 -0.775
  igrBiph:factor(visit)v4   -0.911 -1.080 -0.741
  igrBiph:factor(visit)v5   -0.854 -1.023 -0.685
  igrBiph:factor(visit)v6   -0.916 -1.086 -0.745
  igrBiph:factor(visit)v7   -0.995 -1.164 -0.826

> round( ci.exp( ITa, subset="AspD", Exp=F ), 3 )

                          Estimate   2.5%  97.5%
  igrAspD                    8.644  8.429  8.859
  igrAspD:factor(visit)v2   -0.463 -0.631 -0.294
  igrAspD:factor(visit)v3   -0.705 -0.874 -0.535
  igrAspD:factor(visit)v4   -0.675 -0.847 -0.503
  igrAspD:factor(visit)v5   -0.620 -0.794 -0.446
  igrAspD:factor(visit)v6   -0.592 -0.770 -0.414
  igrAspD:factor(visit)v7   -0.445 -0.613 -0.276

> round( ci.exp( ITa, subset="Detm", Exp=F ), 3 )

                          Estimate   2.5%  97.5%
  igrDetm                    8.677  8.461  8.893
  igrDetm:factor(visit)v2    0.405  0.233  0.578
  igrDetm:factor(visit)v3   -0.048 -0.222  0.127
  igrDetm:factor(visit)v4   -0.119 -0.295  0.057
  igrDetm:factor(visit)v5   -0.181 -0.361 -0.002
  igrDetm:factor(visit)v6   -0.327 -0.510 -0.143
  igrDetm:factor(visit)v7   -0.258 -0.431 -0.086

> round( ci.exp( ITa, subint=c("Detm","v7"), Exp=F ), 3 )

                          Estimate   2.5%  97.5%
  igrDetm:factor(visit)v7   -0.258 -0.431 -0.086
```

```
> ( ilev <- levels( AD$igr ) )

  [1] "Biph" "AspD" "Detm"

> c.1 <- ci.exp( ITa, ctr.mat=eM, subset=ilev[1], Exp=F )
> c.2 <- ci.exp( ITa, ctr.mat=eM, subset=ilev[2], Exp=F )
> c.3 <- ci.exp( ITa, ctr.mat=eM, subset=ilev[3], Exp=F )
> c.21 <- ci.exp( ITa, ctr.mat=cbind(eM,-eM), subset=ilev[c(2,1)], Exp=F )
> c.31 <- ci.exp( ITa, ctr.mat=cbind(eM,-eM), subset=ilev[c(3,1)], Exp=F )
> c.32 <- ci.exp( ITa, ctr.mat=cbind(eM,-eM), subset=ilev[c(3,2)], Exp=F )
> eff <- cbind( c.1, c.2, c.3 )
> colnames(eff)[1+0:2*3] <- ilev
> dff <- cbind( c.21, c.31, c.32)
> colnames(dff)[1+0:2*3] <- paste( ilev[c(2,3,3)], "-",
+                                  ilev[c(1,1,2)], sep="" )
> round( eff, 3 )
```

```
         Biph   2.5%  97.5%   AspD   2.5%  97.5%   Detm   2.5%  97.5%
Vis1    8.776  8.559  8.992  8.644  8.429  8.859  8.677  8.461  8.893
Vis2    8.330  8.112  8.548  8.181  7.963  8.400  9.082  8.860  9.304
Vis3    7.831  7.611  8.051  7.939  7.720  8.159  8.629  8.406  8.853
Vis4    7.865  7.645  8.085  7.969  7.747  8.191  8.558  8.333  8.783
Vis5    7.922  7.702  8.141  8.024  7.801  8.248  8.495  8.267  8.724
Vis6    7.860  7.639  8.080  8.052  7.825  8.278  8.350  8.119  8.582
Vis7    7.780  7.561  8.000  8.199  7.981  8.418  8.419  8.196  8.641
v7-v1 -0.995 -1.164 -0.826 -0.445 -0.613 -0.276 -0.258 -0.431 -0.086
```

```
> round( dff, 3 )
       AspD-Biph   2.5% 97.5% Detm-Biph   2.5% 97.5% Detm-AspD   2.5% 97.5%
Vis1      -0.132 -0.390 0.127    -0.099 -0.357 0.160     0.033 -0.225 0.291
Vis2      -0.149 -0.412 0.115     0.752  0.487 1.018     0.901  0.634 1.167
Vis3       0.108 -0.157 0.374     0.798  0.529 1.067     0.690  0.421 0.958
Vis4       0.104 -0.163 0.371     0.693  0.423 0.962     0.589  0.318 0.860
Vis5       0.103 -0.165 0.370     0.574  0.302 0.846     0.471  0.196 0.746
Vis6       0.192 -0.079 0.464     0.491  0.215 0.766     0.299  0.018 0.579
Vis7       0.419  0.155 0.684     0.638  0.371 0.906     0.219 -0.048 0.486
v7-v1      0.551  0.312 0.790     0.737  0.495 0.979     0.186 -0.055 0.428
```

We also want to test whether the trajectories of the outcome (HbA_{1c}) is the same in the three randomization groups, whether the values at the last visit is the same, and whether the change from first to last visit is the same. These three tests are accomplished by using the same contrast matrix that we just set up:

```
> test <- rbind( Wald( ITa, subset=ilev[c(2,1)], ctr.mat=cbind(-eM,eM)[-8,] ),
+                Wald( ITa, subset=ilev[c(3,1)], ctr.mat=cbind(-eM,eM)[-8,] ),
+                Wald( ITa, subset=ilev[c(3,2)], ctr.mat=cbind(-eM,eM)[-8,] ),
+                Wald( ITa, subset=ilev[c(2,1)], ctr.mat=cbind(-eM,eM)[7,,drop=F] ),
+                Wald( ITa, subset=ilev[c(3,1)], ctr.mat=cbind(-eM,eM)[7,,drop=F] ),
+                Wald( ITa, subset=ilev[c(3,2)], ctr.mat=cbind(-eM,eM)[7,,drop=F] ),
+                Wald( ITa, subset=ilev[c(2,1)], ctr.mat=cbind(-eM,eM)[8,,drop=F] ),
+                Wald( ITa, subset=ilev[c(3,1)], ctr.mat=cbind(-eM,eM)[8,,drop=F] ),
+                Wald( ITa, subset=ilev[c(3,2)], ctr.mat=cbind(-eM,eM)[8,,drop=F] ),
+                Wald( ITa, subint=c(ilev[1],"v7" ) ),
+                Wald( ITa, subint=c(ilev[2],"v7" ) ),
+                Wald( ITa, subint=c(ilev[3],"v7" ) ) )
> tnames <-
+ rownames( test ) <- c( paste( rep(c("    All equal",
+                                     "Visit 7 equal",
+                                     " Change equal"),each=3),
+                              rep( paste( ilev[c(2,3,3)], "vs.",
+                                          ilev[c(1,1,2)] ), 3 ) ),
+                       paste( "       ", ilev, "change=0" ) )
> round( test, 4 )
                              Chisq d.f.      P
    All equal AspD vs. Biph  30.3248    7 0.0001
    All equal Detm vs. Biph  96.3668    7 0.0000
    All equal Detm vs. AspD  84.1411    7 0.0000
Visit 7 equal AspD vs. Biph   9.6418    1 0.0019
Visit 7 equal Detm vs. Biph  21.9093    1 0.0000
Visit 7 equal Detm vs. AspD   2.5916    1 0.1074
 Change equal AspD vs. Biph  20.4151    1 0.0000
 Change equal Detm vs. Biph  35.6933    1 0.0000
 Change equal Detm vs. AspD   2.2875    1 0.1304
        Biph change=0       132.9665    1 0.0000
        AspD change=0        26.6997    1 0.0000
        Detm change=0         8.5939    1 0.0034
```

```
> round( test[c(1,4,7,2,5,8,3,6,9),], 4 )
                             Chisq d.f.      P
    All equal AspD vs. Biph 30.3248    7 0.0001
Visit 7 equal AspD vs. Biph  9.6418    1 0.0019
```

```
 Change equal AspD vs. Biph 20.4151    1 0.0000
    All equal Detm vs. Biph 96.3668    7 0.0000
Visit 7 equal Detm vs. Biph 21.9093    1 0.0000
 Change equal Detm vs. Biph 35.6933    1 0.0000
    All equal Detm vs. AspD 84.1411    7 0.0000
Visit 7 equal Detm vs. AspD  2.5916    1 0.1074
 Change equal Detm vs. AspD  2.2875    1 0.1304
```

For conveience we pack these extractors and tests in a function, that takes a particular model as argument:

```
> ilev <- levels( AD$igr )
> resfun <-
+ function( ITa )
+ {
+ c.1 <- ci.exp( ITa, ctr.mat=eM, subset=ilev[1], Exp=F )
+ c.2 <- ci.exp( ITa, ctr.mat=eM, subset=ilev[2], Exp=F )
+ c.3 <- ci.exp( ITa, ctr.mat=eM, subset=ilev[3], Exp=F )
+ c.21 <- ci.exp( ITa, ctr.mat=cbind(eM,-eM), subset=ilev[c(2,1)], Exp=F )
+ c.31 <- ci.exp( ITa, ctr.mat=cbind(eM,-eM), subset=ilev[c(3,1)], Exp=F )
+ c.32 <- ci.exp( ITa, ctr.mat=cbind(eM,-eM), subset=ilev[c(3,2)], Exp=F )
+ eff <- cbind( c.1, c.2, c.3 )
+ colnames(eff)[1+0:2*3] <- ilev
+ dff <- cbind( c.21, c.31, c.32)
+ colnames(dff)[1+0:2*3] <- paste( ilev[c(2,3,3)], "-",
+                                  ilev[c(1,1,2)], sep="" )
+ test <- rbind( Wald( ITa, subset=ilev[c(2,1)], ctr.mat=cbind(-eM,eM)[-8,] ),
+                Wald( ITa, subset=ilev[c(3,1)], ctr.mat=cbind(-eM,eM)[-8,] ),
+                Wald( ITa, subset=ilev[c(3,2)], ctr.mat=cbind(-eM,eM)[-8,] ),
+                Wald( ITa, subset=ilev[c(2,1)], ctr.mat=cbind(-eM,eM)[7,,drop=F] ),
+                Wald( ITa, subset=ilev[c(3,1)], ctr.mat=cbind(-eM,eM)[7,,drop=F] ),
+                Wald( ITa, subset=ilev[c(3,2)], ctr.mat=cbind(-eM,eM)[7,,drop=F] ),
+                Wald( ITa, subset=ilev[c(2,1)], ctr.mat=cbind(-eM,eM)[8,,drop=F] ),
+                Wald( ITa, subset=ilev[c(3,1)], ctr.mat=cbind(-eM,eM)[8,,drop=F] ),
+                Wald( ITa, subset=ilev[c(3,2)], ctr.mat=cbind(-eM,eM)[8,,drop=F] ),
+                Wald( ITa, subint=c(ilev[1],"v7" ) ),
+                Wald( ITa, subint=c(ilev[2],"v7" ) ),
+                Wald( ITa, subint=c(ilev[3],"v7" ) ) )
+ rownames( test ) <- tnames
+ print( round( eff, 3 ) )
+ print( round( dff, 3 ) )
+ print( round( test, 4 ) )
+ invisible( list( eff=eff, dff=dff, test=test ) )
+ }
```

This can now be applied to all fitted models, but we only store the results from the primary model:

```
> hbr <- resfun( ITa )
         Biph   2.5%  97.5%   AspD   2.5%  97.5%   Detm   2.5%  97.5%
Vis1    8.776  8.559  8.992  8.644  8.429  8.859  8.677  8.461  8.893
Vis2    8.330  8.112  8.548  8.181  7.963  8.400  9.082  8.860  9.304
Vis3    7.831  7.611  8.051  7.939  7.720  8.159  8.629  8.406  8.853
Vis4    7.865  7.645  8.085  7.969  7.747  8.191  8.558  8.333  8.783
Vis5    7.922  7.702  8.141  8.024  7.801  8.248  8.495  8.267  8.724
Vis6    7.860  7.639  8.080  8.052  7.825  8.278  8.350  8.119  8.582
Vis7    7.780  7.561  8.000  8.199  7.981  8.418  8.419  8.196  8.641
v7-v1 -0.995 -1.164 -0.826 -0.445 -0.613 -0.276 -0.258 -0.431 -0.086
      AspD-Biph   2.5% 97.5% Detm-Biph   2.5% 97.5% Detm-AspD   2.5% 97.5%
Vis1     -0.132 -0.390 0.127    -0.099 -0.357 0.160     0.033 -0.225 0.291
Vis2     -0.149 -0.412 0.115     0.752  0.487 1.018     0.901  0.634 1.167
Vis3      0.108 -0.157 0.374     0.798  0.529 1.067     0.690  0.421 0.958
Vis4      0.104 -0.163 0.371     0.693  0.423 0.962     0.589  0.318 0.860
Vis5      0.103 -0.165 0.370     0.574  0.302 0.846     0.471  0.196 0.746
Vis6      0.192 -0.079 0.464     0.491  0.215 0.766     0.299  0.018 0.579
```

```
Vis7       0.419  0.155 0.684     0.638  0.371 0.906     0.219 -0.048 0.486
v7-v1      0.551  0.312 0.790     0.737  0.495 0.979     0.186 -0.055 0.428
                                    Chisq d.f.     P
    All equal AspD vs. Biph  30.3248    7 0.0001
    All equal Detm vs. Biph  96.3668    7 0.0000
    All equal Detm vs. AspD  84.1411    7 0.0000
Visit 7 equal AspD vs. Biph   9.6418    1 0.0019
Visit 7 equal Detm vs. Biph  21.9093    1 0.0000
Visit 7 equal Detm vs. AspD   2.5916    1 0.1074
 Change equal AspD vs. Biph  20.4151    1 0.0000
 Change equal Detm vs. Biph  35.6933    1 0.0000
 Change equal Detm vs. AspD   2.2875    1 0.1304
        Biph change=0       132.9665    1 0.0000
        AspD change=0        26.6997    1 0.0000
        Detm change=0         8.5939    1 0.0034
```

```
> resfun( ITr )
```

```
        Biph   2.5%  97.5%   AspD   2.5%  97.5%   Detm   2.5%  97.5%
Vis1   8.622  8.436  8.808  8.497  8.312  8.682  8.531  8.345  8.717
Vis2   8.175  7.986  8.363  8.034  7.845  8.224  8.934  8.741  9.127
Vis3   7.677  7.486  7.867  7.792  7.601  7.983  8.483  8.288  8.678
Vis4   7.711  7.520  7.901  7.822  7.629  8.015  8.412  8.215  8.608
Vis5   7.768  7.578  7.958  7.876  7.682  8.071  8.349  8.149  8.549
Vis6   7.706  7.515  7.898  7.905  7.707  8.103  8.203  7.999  8.406
Vis7   7.626  7.436  7.816  8.052  7.862  8.241  8.272  8.079  8.466
v7-v1 -0.996 -1.165 -0.827 -0.445 -0.614 -0.277 -0.259 -0.432 -0.087
      AspD-Biph   2.5% 97.5% Detm-Biph   2.5% 97.5% Detm-AspD   2.5% 97.5%
Vis1     -0.125 -0.387 0.138    -0.091 -0.353 0.172     0.034 -0.228 0.297
Vis2     -0.140 -0.407 0.127     0.760  0.490 1.030     0.900  0.629 1.170
Vis3      0.115 -0.154 0.385     0.806  0.533 1.079     0.691  0.418 0.963
Vis4      0.111 -0.160 0.382     0.701  0.427 0.974     0.590  0.315 0.865
Vis5      0.109 -0.163 0.381     0.581  0.305 0.857     0.472  0.193 0.751
Vis6      0.199 -0.077 0.474     0.497  0.217 0.776     0.298  0.014 0.582
Vis7      0.426  0.157 0.695     0.646  0.375 0.918     0.220 -0.051 0.491
v7-v1     0.551  0.312 0.790     0.737  0.495 0.978     0.186 -0.055 0.427
                                    Chisq d.f.     P
    All equal AspD vs. Biph  30.2862    7 0.0001
    All equal Detm vs. Biph  95.8334    7 0.0000
    All equal Detm vs. AspD  83.1796    7 0.0000
Visit 7 equal AspD vs. Biph   9.6498    1 0.0019
Visit 7 equal Detm vs. Biph  21.7785    1 0.0000
Visit 7 equal Detm vs. AspD   2.5396    1 0.1110
 Change equal AspD vs. Biph  20.4156    1 0.0000
 Change equal Detm vs. Biph  35.6658    1 0.0000
 Change equal Detm vs. AspD   2.2812    1 0.1310
        Biph change=0       133.1757    1 0.0000
        AspD change=0        26.7887    1 0.0000
        Detm change=0         8.6569    1 0.0033
```

```
> resfun( ITc )
```

```
        Biph   2.5%  97.5%   AspD   2.5%  97.5%   Detm   2.5%  97.5%
Vis1   8.917  8.588  9.246  8.785  8.456  9.114  8.823  8.488  9.158
Vis2   8.472  8.141  8.802  8.322  7.991  8.653  9.229  8.889  9.569
Vis3   7.973  7.641  8.305  8.080  7.748  8.412  8.776  8.435  9.116
Vis4   8.007  7.675  8.339  8.110  7.777  8.443  8.705  8.363  9.046
Vis5   8.064  7.732  8.395  8.165  7.830  8.500  8.642  8.298  8.986
Vis6   8.002  7.669  8.334  8.193  7.856  8.529  8.497  8.151  8.843
Vis7   7.922  7.590  8.254  8.340  8.009  8.672  8.565  8.225  8.905
v7-v1 -0.995 -1.164 -0.825 -0.445 -0.613 -0.276 -0.258 -0.431 -0.085
      AspD-Biph   2.5% 97.5% Detm-Biph   2.5% 97.5% Detm-AspD   2.5% 97.5%
Vis1     -0.132 -0.391 0.127    -0.094 -0.353 0.166     0.038 -0.221 0.298
Vis2     -0.150 -0.414 0.114     0.757  0.491 1.024     0.907  0.640 1.174
Vis3      0.107 -0.159 0.374     0.803  0.533 1.072     0.696  0.426 0.965
Vis4      0.103 -0.165 0.371     0.698  0.428 0.968     0.595  0.323 0.867
Vis5      0.101 -0.167 0.370     0.579  0.306 0.851     0.477  0.201 0.753
Vis6      0.191 -0.081 0.464     0.496  0.220 0.772     0.304  0.023 0.585
```

```
  Vis7       0.418  0.153 0.683     0.643  0.375 0.911     0.225 -0.043 0.493
  v7-v1      0.550  0.311 0.789     0.737  0.495 0.978     0.187 -0.055 0.428
                                        Chisq d.f.      P
      All equal AspD vs. Biph  30.2721    7 0.0001
      All equal Detm vs. Biph  96.5161    7 0.0000
      All equal Detm vs. AspD  84.4559    7 0.0000
  Visit 7 equal AspD vs. Biph   9.5300    1 0.0020
  Visit 7 equal Detm vs. Biph  22.1220    1 0.0000
  Visit 7 equal Detm vs. AspD   2.7131    1 0.0995
   Change equal AspD vs. Biph  20.3656    1 0.0000
   Change equal Detm vs. Biph  35.6577    1 0.0000
   Change equal Detm vs. AspD   2.2955    1 0.1297
          Biph change=0       132.7498    1 0.0000
          AspD change=0        26.6907    1 0.0000
          Detm change=0         8.5642    1 0.0034
```

```
> resfun( PPa )
```

```
          Biph   2.5%  97.5%   AspD   2.5%  97.5%   Detm   2.5%  97.5%
  Vis1   8.808  8.586  9.030  8.693  8.470  8.916  8.710  8.480  8.939
  Vis2   8.323  8.101  8.545  8.201  7.978  8.424  9.048  8.818  9.277
  Vis3   7.844  7.622  8.067  7.966  7.742  8.190  8.621  8.391  8.851
  Vis4   7.878  7.656  8.101  7.995  7.770  8.221  8.550  8.319  8.781
  Vis5   7.935  7.713  8.157  8.051  7.823  8.278  8.488  8.253  8.722
  Vis6   7.873  7.649  8.097  8.079  7.848  8.309  8.343  8.105  8.580
  Vis7   7.792  7.569  8.015  8.216  7.992  8.440  8.379  8.149  8.609
  v7-v1 -1.015 -1.185 -0.846 -0.477 -0.648 -0.307 -0.331 -0.508 -0.154
        AspD-Biph   2.5% 97.5% Detm-Biph   2.5% 97.5% Detm-AspD   2.5% 97.5%
  Vis1     -0.115 -0.382 0.153    -0.098 -0.371 0.175     0.017 -0.257 0.290
  Vis2     -0.122 -0.390 0.146     0.725  0.451 0.998     0.847  0.573 1.120
  Vis3      0.121 -0.148 0.391     0.777  0.502 1.051     0.655  0.381 0.930
  Vis4      0.117 -0.153 0.388     0.672  0.397 0.947     0.554  0.277 0.832
  Vis5      0.116 -0.156 0.387     0.553  0.275 0.830     0.437  0.156 0.718
  Vis6      0.206 -0.070 0.481     0.470  0.189 0.751     0.264 -0.022 0.550
  Vis7      0.423  0.154 0.693     0.586  0.312 0.861     0.163 -0.112 0.438
  v7-v1     0.538  0.297 0.779     0.685  0.439 0.930     0.146 -0.099 0.392
                                        Chisq d.f.      P
      All equal AspD vs. Biph  28.7065    7 0.0002
      All equal Detm vs. Biph  88.5191    7 0.0000
      All equal Detm vs. AspD  78.2415    7 0.0000
  Visit 7 equal AspD vs. Biph   9.4877    1 0.0021
  Visit 7 equal Detm vs. Biph  17.5220    1 0.0000
  Visit 7 equal Detm vs. AspD   1.3493    1 0.2454
   Change equal AspD vs. Biph  19.1991    1 0.0000
   Change equal Detm vs. Biph  29.9446    1 0.0000
   Change equal Detm vs. AspD   1.3631    1 0.2430
          Biph change=0       137.2700    1 0.0000
          AspD change=0        30.0547    1 0.0000
          Detm change=0        13.4474    1 0.0002
```

```
> resfun( PPr )
```

```
          Biph   2.5%  97.5%   AspD   2.5%  97.5%   Detm   2.5%  97.5%
  Vis1   8.635  8.443  8.827  8.529  8.336  8.722  8.543  8.342  8.744
  Vis2   8.150  7.958  8.343  8.037  7.844  8.230  8.881  8.680  9.082
  Vis3   7.672  7.478  7.865  7.801  7.607  7.995  8.455  8.254  8.657
  Vis4   7.706  7.513  7.899  7.831  7.635  8.027  8.385  8.182  8.587
  Vis5   7.763  7.570  7.956  7.886  7.688  8.084  8.321  8.115  8.527
  Vis6   7.702  7.507  7.896  7.915  7.713  8.116  8.176  7.966  8.385
  Vis7   7.620  7.426  7.813  8.051  7.857  8.246  8.213  8.011  8.414
  v7-v1 -1.015 -1.185 -0.845 -0.478 -0.648 -0.307 -0.331 -0.507 -0.154
        AspD-Biph   2.5% 97.5% Detm-Biph   2.5% 97.5% Detm-AspD   2.5% 97.5%
  Vis1     -0.106 -0.378 0.166    -0.092 -0.370 0.186     0.014 -0.264 0.293
  Vis2     -0.114 -0.386 0.159     0.731  0.453 1.009     0.845  0.566 1.123
  Vis3      0.129 -0.145 0.403     0.783  0.504 1.063     0.654  0.374 0.933
  Vis4      0.125 -0.150 0.400     0.678  0.399 0.958     0.553  0.271 0.836
  Vis5      0.123 -0.153 0.400     0.559  0.276 0.841     0.436  0.150 0.721
  Vis6      0.213 -0.067 0.493     0.474  0.189 0.760     0.261 -0.029 0.552
```

```
Vis7       0.431  0.157 0.706     0.593  0.313 0.872     0.161 -0.119 0.441
v7-v1      0.537  0.297 0.778     0.684  0.439 0.930     0.147 -0.099 0.393
                                Chisq d.f.      P
    All equal AspD vs. Biph  28.7025    7 0.0002
    All equal Detm vs. Biph  87.9288    7 0.0000
    All equal Detm vs. AspD  77.5136    7 0.0000
Visit 7 equal AspD vs. Biph   9.5056    1 0.0020
Visit 7 equal Detm vs. Biph  17.2775    1 0.0000
Visit 7 equal Detm vs. AspD   1.2743    1 0.2590
 Change equal AspD vs. Biph  19.1436    1 0.0000
 Change equal Detm vs. Biph  29.9325    1 0.0000
 Change equal Detm vs. AspD   1.3750    1 0.2410
        Biph change=0       137.1791    1 0.0000
        AspD change=0        30.1099    1 0.0000
        Detm change=0        13.4316    1 0.0002
> resfun( PPc )
        Biph   2.5%  97.5%   AspD   2.5%  97.5%   Detm   2.5%  97.5%
Vis1   8.922  8.578  9.266  8.802  8.458  9.145  8.826  8.471  9.180
Vis2   8.438  8.094  8.782  8.310  7.966  8.653  9.164  8.810  9.519
Vis3   7.959  7.614  8.303  8.074  7.730  8.418  8.738  8.383  9.092
Vis4   7.993  7.648  8.337  8.104  7.759  8.449  8.666  8.311  9.022
Vis5   8.049  7.705  8.394  8.159  7.813  8.506  8.604  8.246  8.962
Vis6   7.987  7.642  8.332  8.187  7.839  8.536  8.459  8.099  8.819
Vis7   7.907  7.562  8.251  8.324  7.980  8.668  8.495  8.140  8.850
v7-v1 -1.015 -1.185 -0.846 -0.477 -0.648 -0.307 -0.331 -0.508 -0.154
      AspD-Biph   2.5% 97.5% Detm-Biph   2.5% 97.5% Detm-AspD   2.5% 97.5%
Vis1     -0.121 -0.389 0.148    -0.096 -0.370 0.178     0.024 -0.250 0.299
Vis2     -0.128 -0.397 0.141     0.726  0.453 1.000     0.854  0.580 1.129
Vis3      0.115 -0.155 0.386     0.779  0.503 1.054     0.663  0.388 0.939
Vis4      0.111 -0.161 0.383     0.674  0.398 0.949     0.563  0.284 0.841
Vis5      0.110 -0.163 0.382     0.555  0.277 0.833     0.445  0.163 0.727
Vis6      0.200 -0.076 0.476     0.472  0.190 0.753     0.272 -0.015 0.559
Vis7      0.418  0.147 0.688     0.588  0.313 0.864     0.171 -0.105 0.447
v7-v1     0.538  0.297 0.779     0.685  0.439 0.930     0.147 -0.099 0.392
                                Chisq d.f.      P
    All equal AspD vs. Biph  28.6045    7 0.0002
    All equal Detm vs. Biph  88.5015    7 0.0000
    All equal Detm vs. AspD  78.6358    7 0.0000
Visit 7 equal AspD vs. Biph   9.1546    1 0.0025
Visit 7 equal Detm vs. Biph  17.5428    1 0.0000
Visit 7 equal Detm vs. AspD   1.4731    1 0.2249
 Change equal AspD vs. Biph  19.1875    1 0.0000
 Change equal Detm vs. Biph  29.9532    1 0.0000
 Change equal Detm vs. AspD   1.3679    1 0.2422
        Biph change=0       137.2637    1 0.0000
        AspD change=0        30.0723    1 0.0000
        Detm change=0        13.4377    1 0.0002
```

We now have the results from all 6 analyses analysis, but we only plot the estimated trajectories of the HbA$_{1c}$ over the seven visits:

```
> plt <-
+ function()
+ {
+ matplot( 0:6*3, hbr$eff[1:7,],
+          xlab="Months since trial entry", xaxt="n", xlim=c(0,19.5),
+          ylim=c(7,9.5),  yaxs="i", yaxt="n",
+          ylab=expression( "Hb"*A[1][c]*" (%)  [Mean (95% CI)]" ),
+          type="n", lwd=c(4,1,1), lty=1, col=rep(iclr[1:3],each=3) )
+ abline( h=seq(7,9.5,0.2), col=gray(0.8) )
+ matlines( 0:6*3, hbr$eff[1:7,],
+           type="l", lwd=c(5,1,1), lty=1, col=rep(iclr[1:3],each=3) )
+ axis( side=1, at=0:6*3, col=clr[4] )
+ axis( side=2, at=7:9, col=clr[4] )
+ text( c(20,20,20), c(9.3,9.1,8.9), iN, col=iclr[1:3],
```

```
+       font=2, adj=1, cex=1 )
+ #text( 20, 8.9, substitute( "Equal change in Hb"*A[1][c]*" 0-18 mth: P ="*pval,
+ #                         list(pval = formatC( hbr$test[3,3], format="f", digits=4 )) ),
+ #       col=clr[4], adj=1 )
+ #text( 19.9, 8.7, "HbA1c change\n from baseline", col=clr[4], adj=c(1,0.5) )
+ #text( c(20,20), hbr$eff[7,c(1,4)],
+ #       paste( formatC( hbr$eff[8,c(1,4)],
+ #                       format="f", digits=1 ), "%", sep="" ),
+ #       col=clr[1:2], adj=1 )
+ }
> oldpar <- par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, las=1, bty="n" )
> plt()
```

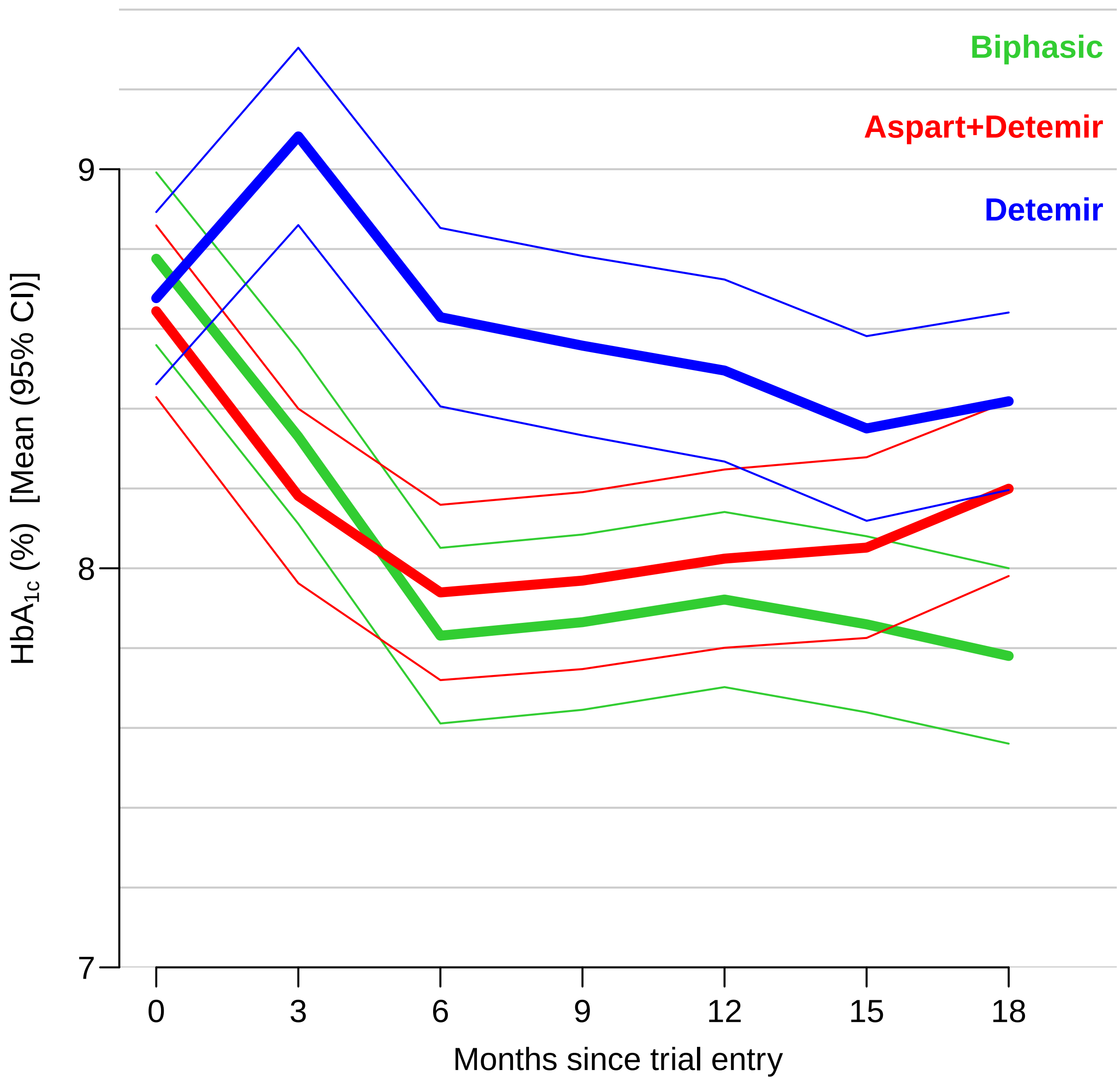

Figure 8.1: *Fitted mean $HbA_{1c}$from a mixed model with 95% c.i.*

8.2 A general lay-out of the analysis

The above analysis of HbA_{1c} can be groomed into a single function that does all analyses, shows the tables and ultimately give a result that can be used as input for a graph.

Some computer programs produce means correponding to population means for a population with the same stratum composition as the study population. If we were to produce estimates (essentially just adding some fixed quantity, namely a suitably weighted sum of the stratum effects) corresponding to some population composition we would have to argue *a priori* exactly which population composition would be of interest. This would of course be totally arbitray, so we have chosen the largest group of patients as reference group, that is we report the estimated means in a population of patients from Steno Diabetes Center, under 65 with previous insulin use — a particular, yet still totally arbitray choice.

First the analysis function, that basically only takes the name of the variable as input. It should return a list of 3 arrays, one with mean estimates, one with standard deviation estimates and one with tests:

```
> var <- "hba1c"
> mod <- ITa
```

Then a function to generate a contrast matrix to *either* get the effects or the test statistics. This is called from `eFUN` and `tFUN`:

```
> CM <-
+ function( mod, eff )
+ {
+ # Contrast matrix to fish out the estimates, resp tests
+ cM <- cbind(1,rbind(0,diag(6)))
+ rownames( cM ) <- paste( "Vis", 1:7 )
+ # Find missing visits for the variable, make two versions of the matrix
+ tp <- sapply( strsplit(rownames(ci.exp(mod,subset=ilev[1])), "" ),
+               function(x) x[length(x)] )
+ tp[1] <- 1
+ tp <- as.numeric( tp )
+ # The contrast row should be between the last existing measurement and
+ # the first:
+ cM <- rbind( cM, cM[tp[length(tp)],]-cM[1,] )
+ # Are there any missing timepoints in this analysis?
+ mv <- setdiff(1:7,tp)
+ if( length(mv) > 0 )
+   {
+   # If used to extract effects keep rows for all timepoints, but
+   # return NAs for timepoints with no measurements:
+   cM[mv,] <- NA
+   cM <- if(eff) cM[,-mv] else cM[-mv,-mv]
+   }
+ cM
+ }
```

Then we need a function to get the mean value estimates from a model

```
> eFUN <-
+ function( mod )
+ {
+ eM <- CM( mod, eff=TRUE )
+ # Insert some NA-rows to get results in right dimension
+ c.1 <- ci.exp( mod, ctr.mat=eM, subset=ilev[1], Exp=F )
+ c.2 <- ci.exp( mod, ctr.mat=eM, subset=ilev[2], Exp=F )
+ c.3 <- ci.exp( mod, ctr.mat=eM, subset=ilev[3], Exp=F )
+ c.21 <- ci.exp( mod, ctr.mat=cbind(eM,-eM), subset=ilev[c(2,1)], Exp=F )
```

```
+ c.31 <- ci.exp( mod, ctr.mat=cbind(eM,-eM), subset=ilev[c(3,1)], Exp=F )
+ c.32 <- ci.exp( mod, ctr.mat=cbind(eM,-eM), subset=ilev[c(3,2)], Exp=F )
+ aa <- abind( list( c.1, c.2, c.3, c.21, c.31, c.32 ), rev.along=0 )
+ dimnames( aa )[[3]] <- c( ilev, paste( ilev[c(2,3,3)], "-",
+                                         ilev[c(1,1,2)], sep="" ) )
+ aa
+ }
```

A function to get the between person and the residual sd from a model:

```
> sFUN <-
+ function( mod )
+ {
+ res <- c( attr( VarCorr( mod )$subjid, "stddev" ),
+           attr( VarCorr( mod ), "sc" ) )
+ names( res ) <- c("Btw","Res")
+ res
+ }
```

A function to compute the relevant tests from a fitted model

```
> tFUN <-
+ function( mod )
+ {
+ eX <- CM( mod, eff=FALSE )
+ np <- nrow( eX )
+ # Find the position of the last parameter
+ last1 <- grep( ilev[1], rownames(ci.exp(mod)) ) ; last1 <- last1[length(last1)]
+ last2 <- grep( ilev[2], rownames(ci.exp(mod)) ) ; last2 <- last2[length(last2)]
+ last3 <- grep( ilev[3], rownames(ci.exp(mod)) ) ; last3 <- last3[length(last3)]
+ test <- rbind( Wald( mod, subset=ilev[c(2,1)], ctr.mat=cbind(-eX,eX)[-np,] ),
+                Wald( mod, subset=ilev[c(3,1)], ctr.mat=cbind(-eX,eX)[-np,] ),
+                Wald( mod, subset=ilev[c(3,2)], ctr.mat=cbind(-eX,eX)[-np,] ),
+                Wald( mod, subset=ilev[c(2,1)], ctr.mat=cbind(-eX,eX)[np-1,,drop=F] ),
+                Wald( mod, subset=ilev[c(3,1)], ctr.mat=cbind(-eX,eX)[np-1,,drop=F] ),
+                Wald( mod, subset=ilev[c(3,2)], ctr.mat=cbind(-eX,eX)[np-1,,drop=F] ),
+                Wald( mod, subset=ilev[c(2,1)], ctr.mat=cbind(-eX,eX)[np,,drop=F] ),
+                Wald( mod, subset=ilev[c(3,1)], ctr.mat=cbind(-eX,eX)[np,,drop=F] ),
+                Wald( mod, subset=ilev[c(3,2)], ctr.mat=cbind(-eX,eX)[np,,drop=F] ),
+                Wald( mod, subset=last1 ),
+                Wald( mod, subset=last2 ),
+                Wald( mod, subset=last3 ) )
+ rownames( test ) <- tnames
+ test
+ }
```

Then we can define the function to use, including a few useful arrays that will be filled out:

```
> # Names of variable to be used in repeated measures analyses
> vnam <- c("hba1c","weight","bmi","whr","gluc","ins","cpep",
+           "idos","ipkg","sys","dia","pulse",
+           "chol","ldl","hdl","vldl","trig",
+           "fimtavg","fimtmax","iem","csc2","imtareal","n.pl")
> match( vnam, names(AD) )
 [1]  11   8   9  10  12  13  16  14  15  22  23  24  17  18  19  20  21 143 145 158 157
[22] 150 187
```

In the previous chapter we saw that the insulin variables and `vldl`, `trig` and the no. of plaques need a log transform:

```
> ltrf <- rep( FALSE, length(vnam) )
> ltrf[c(6:9,16,17,23)] <- TRUE
> vnam[ltrf]
```

```
[1] "ins"  "cpep" "idos" "ipkg" "vldl" "trig" "n.pl"
```

Now we can set up arrays to hold the results from the analyses — for each variable we do 6 analyses in order to 1) make the confusion complete 2) be able to choose the results that fits our prejudices better 3) and make the p-values smaller.

First, we set up a couple of arrays to hold the results from the analyses:

```
> # Arrays to hold results over variables
> # Variance components
> Std <- NArray( list( var = paste( vnam, ifelse(ltrf,"(l)",""), sep="" ),
+                      ana = c("IT","PP"),
+                      mod = c("Prim","Rest","Conf"),
+                      std = c("Btw","Res") ) )
> # Estimates
> Eff <- NArray( c( dimnames(Std)[-4],
+                   list( par = c(paste("Vis",1:7),"V7-V1"),
+                              c("Est","lo","hi"),
+                              c( levels(AD$igr),
+                          paste( levels(AD$igr)[c(2,3,3)], "vs.",
+                                 levels(AD$igr)[c(1,1,2)] ) ) ) ) )
> # Tests
> Tst <- NArray( c( dimnames(Std)[-4],
+                   list( test = tnames,
+                         what = c("Chisq","df","Pval") ) ) )
> # Smaller versions of the arrys to be used inside the function that
> # does the calculations for each response variable
> std <- NArray( dimnames(Std)[-1] )
> eff <- NArray( dimnames(Eff)[-1] )
> tst <- NArray( dimnames(Tst)[-1] )
```

With these structures in place we can se up a function that fits the relevant models and extracts the results. The only argument is the name of the response variable, and an indicator of whether it should be log-transformed before analysis. We first define a log-function that returns `NA` instead of `-Inf`, since the variables we want to log-transform logically cannot have a 0 value.

```
> # Function to do PPplots for residuals
> PPplot <-
+ function( x, xl )
+ {
+ n <- length(x)
+ plot( pnorm( sort(x/sd(x)) ), (1:n-0.5)/n,
+       pch=16, cex=0.4,
+       xlim=0:1, ylim=0:1,
+       xlab="", ylab="",
+       xaxt="n", yaxt="n" )
+ text( 0, 1, xl, adj=c(0,1) )
+ abline( 0, 1 )
+ }
> # A function that returns NA instead of -Inf for 0 argument
> logI <- function(x) ifelse(x>0,log(x),NA)
> # Function that makes all analyses for one response variable
> ana.fun <-
+ function( var, log.tr=FALSE, respl=FALSE )
+ {
+ # We need a single name of the response variable
+ AD$Y <- if(log.tr) logI(AD[,var]) else AD[,var]
+ # Fit models to total and PP part of dataset:
+ # r: Reduced model
+ # a: Primary model
+ # c: Confounder-expanded model
+ ITr <- lmer( Y ~ igr + igr:factor(visit) - 1 + (1|subjid), data = AD )
+ ITa <- lmer( Y ~ igr + igr:factor(visit) - 1 + sdc + over.65 + pre.ins
```

```
+                                              + (1|subjid), data = AD )
+ ITc <- lmer( Y ~ igr + igr:factor(visit) - 1 + sdc + over.65 + pre.ins
+                                              + sex + statin + gad.pos + cvd
+                                              + (1|subjid), data = AD )
+ PPa <- update( ITa, data = subset( AD, pp ) )
+ PPr <- update( ITr, data = subset( AD, pp ) )
+ PPc <- update( ITc, data = subset( AD, pp ) )
+
+ # Plots if specified - but only for ITa analysis - note the S4 way of
+ # extracting slots from the objects, does not work for medMod objects
+ if( respl )
+ {
+ PPplot( ranef(ITa), paste(var,if(log.tr)"(log-tr)","\nptt") )
+ PPplot( resid(ITa), paste(var,if(log.tr)"(log-tr)","\nres") )
+ }
+
+ # Fixed effects
+ eff["IT","Prim",,,] <- eFUN( ITa )
+ eff["IT","Rest",,,] <- eFUN( ITr )
+ eff["IT","Conf",,,] <- eFUN( ITc )
+ eff["PP","Prim",,,] <- eFUN( PPa )
+ eff["PP","Rest",,,] <- eFUN( PPr )
+ eff["PP","Conf",,,] <- eFUN( PPc )
+ if( log.tr ) eff <- exp( eff )
+ # Variance components
+ std["IT","Prim",] <- sFUN( ITa )
+ std["IT","Rest",] <- sFUN( ITr )
+ std["IT","Conf",] <- sFUN( ITc )
+ std["PP","Prim",] <- sFUN( PPa )
+ std["PP","Rest",] <- sFUN( PPr )
+ std["PP","Conf",] <- sFUN( PPc )
+ # Tests
+ tst["IT","Prim",,] <- tFUN( ITa )
+ tst["IT","Rest",,] <- tFUN( ITr )
+ tst["IT","Conf",,] <- tFUN( ITc )
+ tst["PP","Prim",,] <- tFUN( PPa )
+ tst["PP","Rest",,] <- tFUN( PPr )
+ tst["PP","Conf",,] <- tFUN( PPc )
+ # Return all in a list
+ invisible( list( eff=eff, std=std, tst=tst ) )
+ }
```

With this specification of models we can now fill in the arrays:

```
> # par( mfrow=c(8,6), mar=c(0,0,0,0), omi=c(3,3,1,1)/4 )
> for( i in 1:length(vnam) )
+    {
+    res <- ana.fun( vnam[i], ltrf[i], respl=FALSE )
+ cat( vnam[i], " done\n" )
+ flush.console()
+    Eff[i,,,,,] <- res$eff
+    Std[i,,,]   <- res$std
+    Tst[i,,,,]  <- res$tst
+ #   mtext( expression(Phi^-1*"[sort(std. res.)]"),
+ #          side=1, line=2, outer=TRUE )
+ #   mtext( "Uniform[0,1]", side=2, line=2, outer=TRUE )
+    }

  hba1c  done
  weight  done
  bmi  done
  whr  done
  gluc  done
  ins  done
  cpep  done
  idos  done
  ipkg  done
```

```
sys  done
dia  done
pulse  done
chol  done
ldl  done
hdl  done
vldl  done
trig  done
fimtavg  done
fimtmax  done
iem  done
csc2  done
imtareal  done
n.pl  done
```

Once this has been accomplished we can list the estimated parameters, the values for visit 1–7 are estimated means in a certain group:

Prim for the primary amalysis it is the estimated means for the reference group which is patients from Steno, under 65 and with previous insulin use.

Rest restricted analysis, it is the estimated overall mean in each treatment group, assuming no differences between strata.

Conf conforunter controlled, here we have the estimated mean in the reference stratum, among GAD-negative females not on statins and with no heartfailure.

For the differences between the treatment groups, these are for all three models estimated under the assumption that the differences only depend on time (at visit).

The results for the intention to treat analysis is for all variables laid out in this table:

```
> dimnames( Eff )[[6]][4:6] <- c("Asp-Det","Asp-Bip","Det-Bip")
> round( ftable( Eff[,"IT","Prim",,,1:3  ], col.vars=4:3 ), 3 )
                   Biph                        AspD                        Detm
                    Est       lo       hi       Est       lo       hi       Est       lo       hi
var      par
hba1c    Vis 1    8.776    8.559    8.992    8.644    8.429    8.859    8.677    8.461    8.893
         Vis 2    8.330    8.112    8.548    8.181    7.963    8.400    9.082    8.860    9.304
         Vis 3    7.831    7.611    8.051    7.939    7.720    8.159    8.629    8.406    8.853
         Vis 4    7.865    7.645    8.085    7.969    7.747    8.191    8.558    8.333    8.783
         Vis 5    7.922    7.702    8.141    8.024    7.801    8.248    8.495    8.267    8.724
         Vis 6    7.860    7.639    8.080    8.052    7.825    8.278    8.350    8.119    8.582
         Vis 7    7.780    7.561    8.000    8.199    7.981    8.418    8.419    8.196    8.641
         V7-V1   -0.995   -1.164   -0.826   -0.445   -0.613   -0.276   -0.258   -0.431   -0.086
weight   Vis 1   96.863   93.631  100.095   98.668   95.456  101.879   99.629   96.410  102.849
         Vis 2   98.323   95.088  101.557  100.233   97.019  103.448   99.031   95.804  102.259
         Vis 3   99.101   95.866  102.336  101.253   98.037  104.469   99.907   96.677  103.136
         Vis 4   99.506   96.272  102.741  101.933   98.714  105.153  100.814   97.584  104.045
         Vis 5   99.748   96.513  102.983  101.806   98.586  105.026  101.137   97.903  104.371
         Vis 6   99.978   96.742  103.214  101.964   98.741  105.186  101.715   98.479  104.951
         Vis 7  100.207   96.972  103.443  101.900   98.684  105.116  101.552   98.324  104.780
         V7-V1    3.344    2.699    3.990    3.233    2.587    3.878    1.923    1.260    2.586
bmi      Vis 1   32.045   31.125   32.965   32.416   31.502   33.330   32.568   31.651   33.484
         Vis 2   32.527   31.606   33.448   32.937   32.021   33.853   32.371   31.452   33.291
         Vis 3   32.776   31.854   33.697   33.280   32.364   34.196   32.655   31.735   33.576
         Vis 4   32.916   31.994   33.837   33.498   32.581   34.415   32.953   32.032   33.874
         Vis 5   32.990   32.068   33.911   33.466   32.549   34.384   33.058   32.136   33.980
         Vis 6   33.073   32.151   33.995   33.512   32.593   34.431   33.241   32.318   34.163
         Vis 7   33.122   32.201   34.044   33.434   32.518   34.351   33.164   32.244   34.084
         V7-V1    1.077    0.863    1.292    1.019    0.804    1.233    0.596    0.376    0.817
whr      Vis 1    1.001    0.985    1.017    1.006    0.989    1.022    1.009    0.993    1.025
         Vis 2    0.994    0.977    1.010    1.004    0.988    1.021    1.001    0.984    1.017
```

	Vis 3	0.996	0.979	1.012	1.009	0.993	1.026	1.003	0.987	1.020
	Vis 4	0.996	0.979	1.012	1.007	0.991	1.023	1.000	0.983	1.016
	Vis 5	0.999	0.983	1.015	1.011	0.995	1.028	1.005	0.988	1.022
	Vis 6	0.996	0.979	1.012	1.009	0.992	1.026	1.005	0.988	1.022
	Vis 7	0.997	0.981	1.014	1.014	0.998	1.030	1.020	1.003	1.037
	V7-V1	-0.003	-0.013	0.006	0.008	-0.001	0.018	0.011	0.001	0.021
gluc	Vis 1	10.664	10.111	11.217	9.857	9.305	10.408	10.366	9.814	10.918
	Vis 2	9.133	8.560	9.706	8.574	7.996	9.151	8.475	7.886	9.063
	Vis 3	8.720	8.137	9.302	8.557	7.967	9.147	8.123	7.527	8.720
	Vis 4	8.149	7.573	8.726	8.645	8.048	9.242	7.926	7.324	8.528
	Vis 5	8.988	8.414	9.562	8.615	8.016	9.213	7.545	6.933	8.156
	Vis 6	8.758	8.177	9.338	8.323	7.709	8.937	7.791	7.158	8.424
	Vis 7	8.657	8.089	9.226	8.560	7.993	9.127	7.926	7.346	8.506
	V7-V1	-2.007	-2.624	-1.389	-1.297	-1.913	-0.680	-2.440	-3.068	-1.812
ins(l)	Vis 1	58.542	48.321	70.926	72.676	60.091	87.897	64.213	53.042	77.737
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	53.798	44.136	65.575	41.203	33.861	50.138	33.585	27.500	41.016
	V7-V1	0.919	0.775	1.090	0.567	0.480	0.670	0.523	0.440	0.621
cpep(l)	Vis 1	529.985	445.819	630.040	634.449	534.261	753.426	615.653	517.997	731.719
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	450.203	377.847	536.415	443.919	372.776	528.640	370.043	310.301	441.286
	V7-V1	0.849	0.764	0.944	0.700	0.630	0.778	0.601	0.540	0.669
idos(l)	Vis 1	47.090	41.523	53.402	49.362	43.564	55.932	46.198	40.746	52.379
	Vis 2	80.883	71.269	91.794	101.684	89.632	115.358	112.734	99.197	128.119
	Vis 3	89.433	78.788	101.516	110.767	97.568	125.751	136.333	119.878	155.046
	Vis 4	92.321	81.333	104.794	115.123	101.365	130.750	146.673	128.915	166.878
	Vis 5	93.342	82.224	105.963	116.933	102.901	132.878	153.170	134.486	174.449
	Vis 6	95.175	83.795	108.101	115.674	101.694	131.575	157.960	138.625	179.992
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.021	1.874	2.180	2.343	2.166	2.535	3.419	3.153	3.708
ipkg(l)	Vis 1	0.492	0.439	0.551	0.506	0.452	0.566	0.468	0.418	0.524
	Vis 2	0.832	0.743	0.933	1.025	0.915	1.149	1.151	1.025	1.292
	Vis 3	0.912	0.814	1.023	1.108	0.988	1.242	1.382	1.230	1.552
	Vis 4	0.938	0.837	1.052	1.144	1.020	1.284	1.474	1.312	1.657
	Vis 5	0.947	0.845	1.062	1.159	1.032	1.301	1.534	1.363	1.726
	Vis 6	0.964	0.859	1.081	1.148	1.022	1.290	1.577	1.401	1.775
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.959	1.820	2.108	2.269	2.103	2.449	3.368	3.113	3.645
sys	Vis 1	136.086	133.109	139.062	137.256	134.296	140.216	137.366	134.400	140.331
	Vis 2	132.814	129.805	135.823	133.870	130.858	136.883	133.459	130.384	136.534
	Vis 3	133.307	130.284	136.329	132.829	129.801	135.857	133.109	130.008	136.209
	Vis 4	132.122	129.096	135.148	132.376	129.299	135.454	132.619	129.497	135.741
	Vis 5	132.627	129.605	135.649	130.565	127.464	133.666	130.996	127.813	134.178
	Vis 6	132.517	129.473	135.561	130.066	126.916	133.216	130.295	127.061	133.529
	Vis 7	129.420	126.382	132.457	131.287	128.186	134.388	133.822	130.637	137.006
	V7-V1	-6.666	-9.407	-3.926	-5.970	-8.783	-3.156	-3.544	-6.441	-0.647
dia	Vis 1	83.220	81.515	84.926	83.492	81.797	85.188	82.815	81.116	84.514
	Vis 2	82.144	80.421	83.867	82.174	80.450	83.898	80.975	79.217	82.734
	Vis 3	81.413	79.683	83.143	81.377	79.645	83.110	81.491	79.719	83.263
	Vis 4	81.549	79.817	83.281	81.607	79.848	83.365	81.126	79.343	82.909
	Vis 5	80.913	79.183	82.643	80.765	78.994	82.536	80.124	78.308	81.939
	Vis 6	81.884	80.143	83.625	80.558	78.761	82.355	79.747	77.904	81.589
	Vis 7	79.889	78.151	81.627	80.586	78.815	82.357	79.315	77.499	81.131
	V7-V1	-3.331	-4.834	-1.827	-2.907	-4.451	-1.363	-3.500	-5.091	-1.910
pulse	Vis 1	77.025	74.647	79.402	76.234	73.866	78.601	76.811	74.440	79.182
	Vis 2	76.328	73.928	78.727	75.891	73.497	78.285	74.361	71.930	76.792
	Vis 3	75.499	73.092	77.906	75.202	72.791	77.613	73.908	71.465	76.352
	Vis 4	76.140	73.736	78.543	74.912	72.488	77.336	74.815	72.358	77.273

	Vis 5	74.846	72.443	77.250	74.190	71.754	76.625	74.578	72.088	77.067
	Vis 6	74.377	71.966	76.789	73.637	71.171	76.103	75.015	72.508	77.522
	Vis 7	75.680	73.263	78.096	75.700	73.255	78.144	73.784	71.293	76.274
	V7-V1	-1.345	-3.051	0.361	-0.534	-2.296	1.229	-3.027	-4.839	-1.215
chol	Vis 1	4.156	3.968	4.344	4.271	4.084	4.458	4.145	3.957	4.332
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.248	4.056	4.440	4.415	4.221	4.608	4.289	4.094	4.484
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.314	4.123	4.506	4.288	4.093	4.483	4.311	4.113	4.508
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.325	4.133	4.516	4.321	4.131	4.510	4.336	4.143	4.529
	V7-V1	0.169	0.030	0.308	0.049	-0.089	0.187	0.191	0.049	0.333
ldl	Vis 1	2.152	1.989	2.316	2.294	2.131	2.456	2.192	2.029	2.354
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.245	2.079	2.412	2.412	2.245	2.580	2.334	2.165	2.503
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.238	2.070	2.405	2.295	2.127	2.464	2.317	2.145	2.488
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.307	2.140	2.473	2.354	2.189	2.518	2.357	2.189	2.524
	V7-V1	0.154	0.037	0.271	0.060	-0.056	0.177	0.165	0.045	0.285
hdl	Vis 1	1.174	1.103	1.245	1.096	1.025	1.166	1.088	1.017	1.158
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.229	1.157	1.300	1.130	1.058	1.202	1.124	1.051	1.196
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.226	1.154	1.298	1.121	1.049	1.193	1.130	1.057	1.202
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.206	1.135	1.278	1.086	1.015	1.157	1.074	1.002	1.146
	V7-V1	0.032	-0.004	0.068	-0.010	-0.045	0.026	-0.014	-0.051	0.023
vldl(l)	Vis 1	0.716	0.650	0.788	0.725	0.659	0.799	0.735	0.668	0.809
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.663	0.600	0.733	0.740	0.668	0.820	0.757	0.684	0.838
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.679	0.613	0.751	0.770	0.695	0.854	0.767	0.691	0.851
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.688	0.624	0.759	0.737	0.669	0.812	0.744	0.674	0.822
	V7-V1	0.962	0.896	1.032	1.016	0.946	1.091	1.013	0.943	1.089
trig(l)	Vis 1	1.606	1.444	1.785	1.690	1.521	1.878	1.670	1.503	1.856
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.510	1.355	1.682	1.717	1.540	1.914	1.640	1.470	1.830
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.577	1.416	1.756	1.717	1.539	1.915	1.697	1.519	1.895
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.562	1.403	1.739	1.692	1.521	1.883	1.706	1.531	1.901
	V7-V1	0.973	0.905	1.046	1.001	0.932	1.075	1.021	0.949	1.099
fimtavg	Vis 1	0.751	0.724	0.778	0.762	0.735	0.789	0.765	0.737	0.792
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.742	0.715	0.770	0.762	0.735	0.789	0.752	0.724	0.780
	V7-V1	-0.009	-0.022	0.004	0.000	-0.013	0.013	-0.012	-0.025	0.000
fimtmax	Vis 1	0.911	0.880	0.942	0.917	0.886	0.948	0.928	0.897	0.959
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.901	0.869	0.932	0.918	0.887	0.949	0.912	0.881	0.943
	V7-V1	-0.010	-0.025	0.005	0.001	-0.014	0.016	-0.016	-0.031	-0.001
iem	Vis 1	2060.858	1865.596	2256.120	2037.333	1843.510	2231.155	2056.867	1859.459	2254.275
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA

```
          Vis 7  1992.023 1788.994 2195.052 1935.767 1732.873 2138.662 1902.175 1699.921 2104.429
          V7-V1   -68.835 -222.595   84.926 -101.565 -256.927   53.797 -154.692 -310.045    0.662
csc2      Vis 1     2.837    2.637    3.037    2.902    2.703    3.100    2.869    2.667    3.071
          Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7     2.878    2.670    3.085    2.927    2.720    3.134    2.942    2.736    3.149
          V7-V1     0.040   -0.109    0.189    0.025   -0.126    0.175    0.073   -0.077    0.223
imtareal  Vis 1    17.441   16.482   18.400   18.156   17.204   19.108   18.362   17.399   19.325
          Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7    17.582   16.609   18.556   18.147   17.177   19.116   18.094   17.121   19.066
          V7-V1     0.142   -0.297    0.580   -0.010   -0.454    0.435   -0.268   -0.713    0.176
n.pl(l)   Vis 1     2.262    1.893    2.702    2.041    1.691    2.464    2.422    2.010    2.918
          Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7     2.709    2.266    3.238    2.380    1.969    2.876    2.713    2.249    3.273
          V7-V1     1.197    1.106    1.297    1.166    1.071    1.269    1.120    1.029    1.220
> round( ftable( Eff[,"IT","Prim",,,1:3+3], col.vars=4:3 ), 3 )
                Asp-Det                     Asp-Bip                     Det-Bip
                    Est       lo       hi       Est       lo       hi       Est       lo       hi
var       par
hba1c     Vis 1    -0.132   -0.390    0.127   -0.099   -0.357    0.160    0.033   -0.225    0.291
          Vis 2    -0.149   -0.412    0.115    0.752    0.487    1.018    0.901    0.634    1.167
          Vis 3     0.108   -0.157    0.374    0.798    0.529    1.067    0.690    0.421    0.958
          Vis 4     0.104   -0.163    0.371    0.693    0.423    0.962    0.589    0.318    0.860
          Vis 5     0.103   -0.165    0.370    0.574    0.302    0.846    0.471    0.196    0.746
          Vis 6     0.192   -0.079    0.464    0.491    0.215    0.766    0.299    0.018    0.579
          Vis 7     0.419    0.155    0.684    0.638    0.371    0.906    0.219   -0.048    0.486
          V7-V1     0.551    0.312    0.790    0.737    0.495    0.979    0.186   -0.055    0.428
weight    Vis 1     1.805   -1.825    5.434    2.766   -0.870    6.403    0.962   -2.668    4.591
          Vis 2     1.911   -1.725    5.546    0.709   -2.937    4.354   -1.202   -4.841    2.437
          Vis 3     2.152   -1.485    5.789    0.806   -2.842    4.454   -1.346   -4.988    2.296
          Vis 4     2.427   -1.213    6.067    1.308   -2.341    4.957   -1.119   -4.765    2.527
          Vis 5     2.058   -1.583    5.699    1.389   -2.263    5.042   -0.669   -4.319    2.981
          Vis 6     1.985   -1.659    5.629    1.737   -1.918    5.392   -0.249   -3.902    3.405
          Vis 7     1.693   -1.945    5.331    1.345   -2.303    4.993   -0.348   -3.989    3.293
          V7-V1    -0.112   -1.024    0.801   -1.421   -2.347   -0.496   -1.310   -2.235   -0.384
bmi       Vis 1     0.371   -0.664    1.406    0.523   -0.514    1.560    0.152   -0.883    1.187
          Vis 2     0.410   -0.627    1.447   -0.155   -1.196    0.885   -0.566   -1.604    0.473
          Vis 3     0.504   -0.534    1.542   -0.120   -1.162    0.921   -0.625   -1.665    0.415
          Vis 4     0.582   -0.457    1.621    0.037   -1.004    1.079   -0.545   -1.586    0.496
          Vis 5     0.477   -0.563    1.516    0.068   -0.975    1.111   -0.408   -1.451    0.634
          Vis 6     0.439   -0.602    1.479    0.167   -0.877    1.212   -0.271   -1.316    0.773
          Vis 7     0.312   -0.726    1.350    0.042   -0.999    1.083   -0.270   -1.310    0.769
          V7-V1    -0.059   -0.362    0.244   -0.481   -0.788   -0.174   -0.422   -0.729   -0.115
whr       Vis 1     0.005   -0.014    0.023    0.008   -0.011    0.027    0.004   -0.015    0.023
          Vis 2     0.011   -0.008    0.030    0.007   -0.012    0.026   -0.004   -0.023    0.015
          Vis 3     0.014   -0.005    0.033    0.008   -0.012    0.027   -0.006   -0.025    0.013
          Vis 4     0.011   -0.008    0.031    0.004   -0.015    0.023   -0.007   -0.027    0.012
          Vis 5     0.012   -0.007    0.032    0.006   -0.013    0.026   -0.006   -0.026    0.014
          Vis 6     0.013   -0.006    0.033    0.010   -0.010    0.029   -0.004   -0.024    0.016
          Vis 7     0.016   -0.003    0.036    0.023    0.003    0.042    0.006   -0.013    0.025
          V7-V1     0.012   -0.002    0.026    0.014    0.000    0.028    0.002   -0.012    0.016
gluc      Vis 1    -0.807   -1.510   -0.104   -0.298   -1.001    0.406    0.509   -0.194    1.212
          Vis 2    -0.560   -1.301    0.182   -0.658   -1.408    0.091   -0.099   -0.852    0.654
          Vis 3    -0.163   -0.922    0.596   -0.597   -1.360    0.167   -0.434   -1.202    0.335
          Vis 4     0.495   -0.264    1.255   -0.223   -0.987    0.541   -0.718   -1.496    0.059
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	Vis 5	-0.373	-1.132	0.385	-1.444	-2.212	-0.676	-1.070	-1.856	-0.284
	Vis 6	-0.434	-1.209	0.341	-0.967	-1.756	-0.177	-0.532	-1.345	0.280
	Vis 7	-0.097	-0.826	0.631	-0.731	-1.470	0.008	-0.634	-1.371	0.104
	V7-V1	0.710	-0.163	1.582	-0.433	-1.314	0.447	-1.143	-2.023	-0.264
ins(l)	Vis 1	1.241	0.992	1.553	1.097	0.876	1.374	0.884	0.706	1.106
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.766	0.606	0.969	0.624	0.492	0.792	0.815	0.644	1.032
	V7-V1	0.617	0.486	0.784	0.569	0.447	0.725	0.923	0.726	1.173
cpep(l)	Vis 1	1.197	0.982	1.459	1.162	0.953	1.417	0.970	0.796	1.183
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.986	0.805	1.207	0.822	0.670	1.008	0.834	0.680	1.022
	V7-V1	0.824	0.709	0.956	0.708	0.608	0.823	0.859	0.739	0.999
idos(l)	Vis 1	1.048	0.906	1.213	0.981	0.847	1.136	0.936	0.809	1.083
	Vis 2	1.257	1.084	1.458	1.394	1.200	1.618	1.109	0.955	1.287
	Vis 3	1.239	1.067	1.437	1.524	1.312	1.771	1.231	1.059	1.431
	Vis 4	1.247	1.074	1.448	1.589	1.367	1.847	1.274	1.095	1.482
	Vis 5	1.253	1.079	1.455	1.641	1.410	1.909	1.310	1.125	1.525
	Vis 6	1.215	1.045	1.413	1.660	1.425	1.933	1.366	1.171	1.592
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.159	1.039	1.293	1.692	1.514	1.890	1.459	1.303	1.634
ipkg(l)	Vis 1	1.028	0.901	1.174	0.952	0.833	1.087	0.925	0.811	1.056
	Vis 2	1.232	1.077	1.409	1.383	1.207	1.584	1.123	0.980	1.286
	Vis 3	1.214	1.061	1.390	1.515	1.322	1.736	1.247	1.088	1.430
	Vis 4	1.220	1.065	1.397	1.571	1.370	1.801	1.288	1.122	1.478
	Vis 5	1.224	1.068	1.402	1.620	1.411	1.859	1.324	1.152	1.521
	Vis 6	1.191	1.039	1.366	1.636	1.424	1.880	1.374	1.194	1.580
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.159	1.042	1.288	1.720	1.544	1.915	1.484	1.330	1.656
sys	Vis 1	1.171	-2.467	4.809	1.280	-2.361	4.920	0.109	-3.525	3.743
	Vis 2	1.056	-2.654	4.766	0.646	-3.111	4.402	-0.411	-4.176	3.354
	Vis 3	-0.478	-4.214	3.259	-0.198	-3.993	3.597	0.280	-3.520	4.079
	Vis 4	0.255	-3.528	4.037	0.497	-3.320	4.314	0.242	-3.615	4.100
	Vis 5	-2.062	-5.857	1.733	-1.632	-5.492	2.229	0.430	-3.491	4.352
	Vis 6	-2.451	-6.305	1.402	-2.222	-6.141	1.696	0.229	-3.770	4.229
	Vis 7	1.867	-1.946	5.681	4.402	0.522	8.281	2.535	-1.397	6.466
	V7-V1	0.697	-3.231	4.624	3.122	-0.866	7.110	2.426	-1.613	6.464
dia	Vis 1	0.272	-1.797	2.342	-0.405	-2.476	1.666	-0.677	-2.745	1.390
	Vis 2	0.031	-2.078	2.139	-1.168	-3.302	0.966	-1.199	-3.337	0.940
	Vis 3	-0.035	-2.159	2.088	0.079	-2.077	2.234	0.114	-2.043	2.271
	Vis 4	0.057	-2.090	2.205	-0.423	-2.590	1.743	-0.481	-2.669	1.708
	Vis 5	-0.148	-2.302	2.006	-0.790	-2.979	1.400	-0.642	-2.864	1.580
	Vis 6	-1.326	-3.511	0.860	-2.137	-4.358	0.083	-0.812	-3.075	1.452
	Vis 7	0.696	-1.468	2.860	-0.574	-2.774	1.625	-1.271	-3.498	0.957
	V7-V1	0.424	-1.731	2.579	-0.169	-2.358	2.019	-0.593	-2.810	1.623
pulse	Vis 1	-0.791	-3.601	2.019	-0.214	-3.025	2.597	0.577	-2.233	3.387
	Vis 2	-0.437	-3.290	2.417	-1.967	-4.848	0.915	-1.530	-4.412	1.352
	Vis 3	-0.297	-3.172	2.578	-1.591	-4.493	1.311	-1.294	-4.202	1.615
	Vis 4	-1.227	-4.112	1.657	-1.324	-4.236	1.587	-0.097	-3.028	2.835
	Vis 5	-0.657	-3.549	2.236	-0.269	-3.206	2.668	0.388	-2.577	3.352
	Vis 6	-0.740	-3.667	2.186	0.638	-2.320	3.596	1.378	-1.626	4.383
	Vis 7	0.020	-2.896	2.936	-1.896	-4.847	1.056	-1.916	-4.894	1.062
	V7-V1	0.811	-1.641	3.264	-1.682	-4.170	0.806	-2.493	-5.021	0.035
chol	Vis 1	0.115	-0.105	0.336	-0.011	-0.232	0.210	-0.126	-0.347	0.094
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.167	-0.063	0.398	0.041	-0.191	0.274	-0.126	-0.359	0.107
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.027	-0.258	0.204	-0.004	-0.237	0.230	0.023	-0.213	0.259
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA

	Vis 7	-0.004	-0.231	0.223	0.011	-0.218	0.241	0.016	-0.213	0.244
	V7-V1	-0.120	-0.316	0.077	0.022	-0.177	0.221	0.142	-0.056	0.340
ldl	Vis 1	0.141	-0.050	0.333	0.039	-0.153	0.231	-0.102	-0.294	0.090
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.167	-0.032	0.366	0.089	-0.112	0.290	-0.078	-0.280	0.123
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.057	-0.143	0.258	0.079	-0.124	0.281	0.021	-0.182	0.225
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.047	-0.149	0.243	0.050	-0.149	0.248	0.003	-0.195	0.201
	V7-V1	-0.094	-0.259	0.071	0.011	-0.157	0.178	0.105	-0.062	0.272
hdl	Vis 1	-0.079	-0.160	0.003	-0.087	-0.168	-0.005	-0.008	-0.089	0.073
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	-0.099	-0.182	-0.016	-0.105	-0.189	-0.021	-0.006	-0.090	0.078
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.105	-0.188	-0.021	-0.096	-0.180	-0.012	0.008	-0.076	0.093
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.120	-0.203	-0.038	-0.132	-0.216	-0.049	-0.012	-0.095	0.071
	V7-V1	-0.042	-0.093	0.010	-0.046	-0.098	0.006	-0.004	-0.056	0.047
vldl(l)	Vis 1	1.014	0.905	1.135	1.026	0.917	1.150	1.013	0.904	1.134
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.116	0.987	1.262	1.142	1.010	1.291	1.023	0.903	1.159
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.135	1.002	1.286	1.130	0.997	1.280	0.995	0.876	1.130
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.071	0.953	1.203	1.082	0.962	1.216	1.010	0.899	1.135
	V7-V1	1.057	0.956	1.168	1.054	0.952	1.166	0.997	0.901	1.103
trig(l)	Vis 1	1.053	0.930	1.191	1.040	0.919	1.177	0.988	0.873	1.118
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.137	1.000	1.294	1.086	0.954	1.236	0.955	0.839	1.087
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.089	0.957	1.238	1.076	0.945	1.225	0.988	0.867	1.127
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.083	0.955	1.229	1.092	0.961	1.241	1.008	0.888	1.145
	V7-V1	1.029	0.930	1.139	1.050	0.947	1.164	1.020	0.921	1.131
fimtavg	Vis 1	0.011	-0.020	0.042	0.014	-0.017	0.045	0.003	-0.028	0.034
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.020	-0.011	0.051	0.010	-0.021	0.042	-0.010	-0.041	0.022
	V7-V1	0.009	-0.009	0.027	-0.004	-0.022	0.014	-0.012	-0.031	0.006
fimtmax	Vis 1	0.006	-0.029	0.041	0.017	-0.018	0.053	0.011	-0.024	0.047
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.017	-0.019	0.053	0.011	-0.025	0.047	-0.006	-0.042	0.030
	V7-V1	0.011	-0.010	0.032	-0.006	-0.027	0.015	-0.017	-0.039	0.004
iem	Vis 1	-23.526	-249.448	202.397	-3.991	-231.981	223.998	19.534	-208.531	247.600
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-56.256	-296.642	184.131	-89.848	-329.124	149.427	-33.592	-272.968	205.783
	V7-V1	-32.730	-251.312	185.852	-85.857	-304.454	132.740	-53.127	-272.842	166.589
csc2	Vis 1	0.064	-0.166	0.295	0.032	-0.201	0.264	-0.033	-0.265	0.200
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.049	-0.195	0.293	0.065	-0.179	0.308	0.016	-0.228	0.259
	V7-V1	-0.015	-0.227	0.196	0.033	-0.179	0.244	0.048	-0.164	0.261

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imtareal Vis 1    0.716  -0.370   1.801   0.921  -0.170   2.013   0.206  -0.885   1.296
         Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 7    0.564  -0.549   1.678   0.511  -0.602   1.625  -0.053  -1.166   1.060
         V7-V1   -0.151  -0.776   0.473  -0.410  -1.034   0.214  -0.259  -0.887   0.370
n.pl(l)  Vis 1    0.902   0.734   1.109   1.071   0.872   1.315   1.187   0.962   1.463
         Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 7    0.879   0.714   1.081   1.002   0.815   1.232   1.140   0.923   1.409
         V7-V1    0.974   0.867   1.093   0.936   0.833   1.051   0.961   0.852   1.083
> round( ftable( Eff[,"IT","Rest",,,1:3  ], col.vars=4:3 ), 3 )
                   Biph                    AspD                    Detm
                    Est      lo      hi     Est      lo      hi     Est      lo      hi
var      par
hba1c    Vis 1    8.622   8.436   8.808   8.497   8.312   8.682   8.531   8.345   8.717
         Vis 2    8.175   7.986   8.363   8.034   7.845   8.224   8.934   8.741   9.127
         Vis 3    7.677   7.486   7.867   7.792   7.601   7.983   8.483   8.288   8.678
         Vis 4    7.711   7.520   7.901   7.822   7.629   8.015   8.412   8.215   8.608
         Vis 5    7.768   7.578   7.958   7.876   7.682   8.071   8.349   8.149   8.549
         Vis 6    7.706   7.515   7.898   7.905   7.707   8.103   8.203   7.999   8.406
         Vis 7    7.626   7.436   7.816   8.052   7.862   8.241   8.272   8.079   8.466
         V7-V1   -0.996  -1.165  -0.827  -0.445  -0.614  -0.277  -0.259  -0.432  -0.087
weight   Vis 1   95.572  92.926  98.219  97.454  94.817 100.091  98.468  95.821 101.114
         Vis 2   97.030  94.380  99.680  99.019  96.378 101.661  97.871  95.215 100.526
         Vis 3   97.807  95.156 100.458 100.038  97.395 102.681  98.748  96.090 101.406
         Vis 4   98.212  95.561 100.863 100.718  98.071 103.364  99.656  96.996 102.315
         Vis 5   98.454  95.803 101.105 100.591  97.943 103.238  99.979  97.315 102.642
         Vis 6   98.685  96.032 101.338 100.748  98.098 103.398 100.556  97.890 103.222
         Vis 7   98.914  96.262 101.566 100.685  98.042 103.328 100.394  97.738 103.050
         V7-V1    3.342   2.697   3.987   3.231   2.585   3.876   1.926   1.263   2.589
bmi      Vis 1   31.845  31.097  32.593  32.234  31.489  32.979  32.399  31.651  33.147
         Vis 2   32.326  31.577  33.076  32.755  32.008  33.502  32.203  31.451  32.954
         Vis 3   32.575  31.825  33.325  33.097  32.350  33.845  32.487  31.734  33.240
         Vis 4   32.715  31.965  33.464  33.315  32.566  34.064  32.785  32.032  33.538
         Vis 5   32.789  32.039  33.539  33.284  32.534  34.033  32.890  32.135  33.644
         Vis 6   32.872  32.122  33.623  33.329  32.579  34.080  33.072  32.317  33.828
         Vis 7   32.922  32.171  33.672  33.252  32.504  34.000  32.996  32.244  33.748
         V7-V1    1.077   0.862   1.291   1.018   0.804   1.232   0.597   0.377   0.818
whr      Vis 1    0.998   0.985   1.012   1.003   0.990   1.017   1.007   0.994   1.021
         Vis 2    0.991   0.977   1.005   1.002   0.989   1.016   0.998   0.985   1.012
         Vis 3    0.993   0.979   1.006   1.007   0.993   1.021   1.001   0.987   1.015
         Vis 4    0.993   0.980   1.007   1.005   0.991   1.018   0.997   0.984   1.011
         Vis 5    0.996   0.983   1.010   1.009   0.995   1.023   1.003   0.989   1.017
         Vis 6    0.993   0.979   1.007   1.007   0.993   1.021   1.003   0.989   1.017
         Vis 7    0.995   0.981   1.009   1.012   0.998   1.025   1.018   1.004   1.032
         V7-V1   -0.004  -0.013   0.006   0.008  -0.001   0.018   0.011   0.001   0.021
gluc     Vis 1   10.653  10.149  11.157   9.860   9.356  10.364  10.375   9.871  10.879
         Vis 2    9.102   8.574   9.630   8.575   8.041   9.108   8.477   7.932   9.022
         Vis 3    8.689   8.150   9.228   8.544   7.997   9.091   8.128   7.575   8.681
         Vis 4    8.120   7.587   8.654   8.643   8.090   9.196   7.937   7.377   8.496
         Vis 5    8.966   8.436   9.496   8.609   8.053   9.165   7.552   6.984   8.121
         Vis 6    8.732   8.195   9.269   8.317   7.745   8.888   7.794   7.204   8.384
         Vis 7    8.636   8.113   9.159   8.553   8.032   9.074   7.935   7.400   8.470
         V7-V1   -2.018  -2.635  -1.400  -1.307  -1.923  -0.690  -2.440  -3.068  -1.812
ins(l)   Vis 1   59.420  50.610  69.764  73.860  62.974  86.628  65.357  55.659  76.745
         Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
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	Vis 7	54.688	46.186	64.756	41.804	35.405	49.360	34.268	28.888	40.651
	V7-V1	0.920	0.776	1.092	0.566	0.479	0.669	0.524	0.441	0.623
cpep(l)	Vis 1	610.995	527.532	707.663	728.729	629.519	843.575	709.238	612.025	821.892
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	518.490	446.232	602.449	509.869	439.063	592.095	427.012	366.984	496.859
	V7-V1	0.849	0.763	0.944	0.700	0.630	0.778	0.602	0.541	0.671
idos(l)	Vis 1	37.426	33.549	41.752	39.400	35.346	43.919	36.840	33.023	41.098
	Vis 2	64.290	57.571	71.792	81.186	72.724	90.632	89.841	80.320	100.490
	Vis 3	71.108	63.659	79.429	88.480	79.187	98.863	108.687	97.088	121.671
	Vis 4	73.405	65.715	81.994	91.929	82.239	102.761	116.960	104.429	130.995
	Vis 5	74.230	66.446	82.926	93.343	83.456	104.401	122.134	108.924	136.946
	Vis 6	75.696	67.716	84.616	92.351	82.482	103.401	125.947	112.267	141.294
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.023	1.875	2.182	2.344	2.166	2.536	3.419	3.153	3.707
ipkg(l)	Vis 1	0.396	0.359	0.438	0.409	0.370	0.451	0.378	0.342	0.418
	Vis 2	0.671	0.607	0.742	0.829	0.750	0.917	0.928	0.838	1.028
	Vis 3	0.736	0.665	0.814	0.897	0.810	0.992	1.115	1.005	1.236
	Vis 4	0.757	0.684	0.837	0.926	0.836	1.025	1.190	1.072	1.319
	Vis 5	0.764	0.691	0.845	0.937	0.846	1.038	1.238	1.114	1.375
	Vis 6	0.777	0.702	0.861	0.928	0.837	1.029	1.272	1.144	1.414
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.961	1.822	2.110	2.270	2.104	2.451	3.365	3.110	3.642
sys	Vis 1	138.528	135.937	141.120	139.687	137.105	142.269	139.806	137.221	142.392
	Vis 2	135.237	132.606	137.869	136.301	133.657	138.944	135.899	133.190	138.608
	Vis 3	135.713	133.059	138.366	135.261	132.602	137.921	135.543	132.801	138.284
	Vis 4	134.523	131.863	137.182	134.799	132.081	137.517	135.055	132.290	137.820
	Vis 5	135.035	132.382	137.688	132.999	130.258	135.740	133.436	130.605	136.267
	Vis 6	134.920	132.241	137.600	132.500	129.703	135.296	132.744	129.858	135.629
	Vis 7	131.817	129.144	134.490	133.697	130.949	136.445	136.241	133.403	139.080
	V7-V1	-6.711	-9.452	-3.970	-5.990	-8.804	-3.176	-3.565	-6.463	-0.667
dia	Vis 1	82.160	80.612	83.709	82.459	80.916	84.002	81.815	80.269	83.360
	Vis 2	81.046	79.477	82.616	81.116	79.541	82.691	79.975	78.364	81.586
	Vis 3	80.294	78.713	81.875	80.321	78.737	81.905	80.512	78.884	82.140
	Vis 4	80.430	78.846	82.014	80.548	78.934	82.161	80.152	78.512	81.792
	Vis 5	79.799	78.218	81.381	79.701	78.075	81.326	79.149	77.475	80.823
	Vis 6	80.783	79.189	82.378	79.486	77.832	81.140	78.776	77.074	80.478
	Vis 7	78.783	77.192	80.374	79.519	77.890	81.148	78.331	76.653	80.008
	V7-V1	-3.378	-4.883	-1.873	-2.940	-4.486	-1.394	-3.484	-5.078	-1.890
pulse	Vis 1	76.598	74.590	78.606	75.834	73.827	77.840	76.433	74.425	78.441
	Vis 2	75.885	73.848	77.921	75.484	73.446	77.522	73.985	71.907	76.062
	Vis 3	75.047	72.998	77.095	74.791	72.734	76.848	73.546	71.451	75.641
	Vis 4	75.683	73.638	77.728	74.498	72.424	76.571	74.454	72.343	76.565
	Vis 5	74.394	72.349	76.439	73.775	71.690	75.860	74.212	72.066	76.358
	Vis 6	73.930	71.875	75.985	73.224	71.102	75.346	74.651	72.487	76.816
	Vis 7	75.230	73.168	77.291	75.287	73.186	77.387	73.413	71.264	75.563
	V7-V1	-1.368	-3.074	0.337	-0.547	-2.310	1.216	-3.019	-4.831	-1.207
chol	Vis 1	4.126	3.968	4.284	4.246	4.088	4.403	4.121	3.963	4.279
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.216	4.052	4.380	4.388	4.223	4.553	4.266	4.098	4.433
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.284	4.121	4.447	4.261	4.094	4.427	4.287	4.117	4.457
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.294	4.132	4.457	4.294	4.133	4.455	4.314	4.149	4.479
	V7-V1	0.168	0.029	0.308	0.048	-0.090	0.186	0.193	0.051	0.335
ldl	Vis 1	2.104	1.967	2.241	2.246	2.110	2.383	2.148	2.011	2.285
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.196	2.054	2.337	2.365	2.223	2.507	2.291	2.146	2.435
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.189	2.047	2.331	2.247	2.104	2.391	2.273	2.126	2.419
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.258	2.118	2.398	2.306	2.167	2.446	2.314	2.171	2.456
	V7-V1	0.154	0.037	0.271	0.060	-0.056	0.177	0.166	0.046	0.285

hdl	Vis 1	1.221	1.163	1.279	1.142	1.084	1.200	1.133	1.075	1.191
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.276	1.216	1.335	1.176	1.117	1.236	1.169	1.109	1.229
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.273	1.213	1.332	1.167	1.108	1.227	1.175	1.114	1.236
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.253	1.194	1.312	1.132	1.074	1.191	1.119	1.059	1.179
	V7-V1	0.032	-0.004	0.068	-0.009	-0.045	0.027	-0.014	-0.051	0.023
vldl(l)	Vis 1	0.697	0.643	0.756	0.707	0.651	0.766	0.718	0.662	0.778
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.645	0.591	0.703	0.721	0.659	0.788	0.740	0.677	0.809
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.660	0.605	0.720	0.750	0.685	0.821	0.749	0.684	0.821
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.670	0.617	0.728	0.718	0.661	0.780	0.728	0.669	0.792
	V7-V1	0.962	0.896	1.032	1.016	0.946	1.090	1.014	0.944	1.090
trig(l)	Vis 1	1.563	1.430	1.707	1.647	1.508	1.799	1.629	1.491	1.780
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.467	1.339	1.608	1.672	1.525	1.834	1.602	1.459	1.759
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.534	1.400	1.680	1.672	1.523	1.835	1.657	1.508	1.822
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.520	1.388	1.664	1.648	1.506	1.804	1.667	1.520	1.827
	V7-V1	0.973	0.905	1.045	1.001	0.931	1.075	1.023	0.950	1.101
fimtavg	Vis 1	0.786	0.763	0.809	0.796	0.774	0.819	0.798	0.776	0.821
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.777	0.754	0.800	0.796	0.773	0.819	0.786	0.763	0.809
	V7-V1	-0.009	-0.022	0.004	0.000	-0.013	0.013	-0.013	-0.026	0.000
fimtmax	Vis 1	0.949	0.923	0.975	0.954	0.928	0.980	0.965	0.939	0.991
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.939	0.912	0.965	0.955	0.929	0.982	0.949	0.922	0.975
	V7-V1	-0.010	-0.025	0.005	0.001	-0.014	0.016	-0.016	-0.031	-0.001
iem	Vis 1	2368.927	2198.362	2539.493	2324.073	2153.398	2494.748	2351.287	2177.639	2524.934
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2300.793	2120.415	2481.171	2229.243	2048.576	2409.910	2187.918	2008.773	2367.063
	V7-V1	-68.135	-222.397	86.128	-94.830	-250.790	61.129	-163.369	-319.301	-7.437
csc2	Vis 1	2.525	2.350	2.699	2.610	2.436	2.784	2.570	2.393	2.748
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.563	2.380	2.747	2.630	2.446	2.814	2.651	2.469	2.834
	V7-V1	0.039	-0.110	0.188	0.020	-0.130	0.171	0.081	-0.070	0.231
imtareal	Vis 1	18.571	17.770	19.372	19.208	18.408	20.007	19.431	18.622	20.240
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	18.715	17.895	19.535	19.208	18.389	20.027	19.159	18.339	19.978
	V7-V1	0.143	-0.295	0.582	0.000	-0.444	0.445	-0.273	-0.717	0.172
n.pl(l)	Vis 1	2.630	2.277	3.038	2.395	2.060	2.785	2.842	2.449	3.298
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA

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          Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7    3.152    2.728    3.642    2.795    2.402    3.252    3.181    2.736    3.700
          V7-V1    1.198    1.107    1.298    1.167    1.072    1.270    1.120    1.028    1.219
> round( ftable( Eff[,"IT","Rest",,,1:3+3], col.vars=4:3 ), 3 )
                Asp-Det                    Asp-Bip                    Det-Bip
                    Est       lo       hi      Est       lo       hi      Est       lo       hi
 var      par
 hba1c    Vis 1  -0.125   -0.387    0.138   -0.091   -0.353    0.172    0.034   -0.228    0.297
          Vis 2  -0.140   -0.407    0.127    0.760    0.490    1.030    0.900    0.629    1.170
          Vis 3   0.115   -0.154    0.385    0.806    0.533    1.079    0.691    0.418    0.963
          Vis 4   0.111   -0.160    0.382    0.701    0.427    0.974    0.590    0.315    0.865
          Vis 5   0.109   -0.163    0.381    0.581    0.305    0.857    0.472    0.193    0.751
          Vis 6   0.199   -0.077    0.474    0.497    0.217    0.776    0.298    0.014    0.582
          Vis 7   0.426    0.157    0.695    0.646    0.375    0.918    0.220   -0.051    0.491
          V7-V1   0.551    0.312    0.790    0.737    0.495    0.978    0.186   -0.055    0.427
 weight   Vis 1   1.882   -1.854    5.618    2.896   -0.847    6.638    1.014   -2.722    4.750
          Vis 2   1.989   -1.752    5.731    0.841   -2.911    4.592   -1.149   -4.894    2.597
          Vis 3   2.231   -1.512    5.974    0.941   -2.813    4.695   -1.290   -5.038    2.458
          Vis 4   2.506   -1.240    6.251    1.443   -2.312    5.198   -1.062   -4.814    2.690
          Vis 5   2.137   -1.610    5.884    1.524   -2.234    5.283   -0.612   -4.368    3.143
          Vis 6   2.063   -1.687    5.813    1.871   -1.890    5.632   -0.192   -3.951    3.567
          Vis 7   1.771   -1.973    5.515    1.480   -2.274    5.233   -0.291   -4.038    3.456
          V7-V1  -0.111   -1.024    0.801   -1.416   -2.341   -0.491   -1.305   -2.230   -0.379
 bmi      Vis 1   0.389   -0.667    1.445    0.554   -0.504    1.612    0.165   -0.891    1.221
          Vis 2   0.428   -0.630    1.487   -0.124   -1.185    0.938   -0.552   -1.612    0.508
          Vis 3   0.523   -0.536    1.582   -0.088   -1.150    0.975   -0.610   -1.671    0.450
          Vis 4   0.601   -0.459    1.661    0.070   -0.992    1.133   -0.530   -1.593    0.532
          Vis 5   0.495   -0.565    1.555    0.101   -0.963    1.165   -0.394   -1.458    0.670
          Vis 6   0.457   -0.605    1.518    0.200   -0.865    1.265   -0.257   -1.322    0.808
          Vis 7   0.330   -0.729    1.390    0.075   -0.988    1.137   -0.256   -1.316    0.805
          V7-V1  -0.059   -0.362    0.244   -0.479   -0.786   -0.172   -0.420   -0.728   -0.113
 whr      Vis 1   0.005   -0.014    0.024    0.009   -0.010    0.028    0.004   -0.015    0.023
          Vis 2   0.011   -0.008    0.030    0.007   -0.012    0.027   -0.004   -0.023    0.016
          Vis 3   0.014   -0.005    0.033    0.008   -0.011    0.028   -0.006   -0.025    0.014
          Vis 4   0.012   -0.008    0.031    0.004   -0.015    0.024   -0.007   -0.027    0.012
          Vis 5   0.013   -0.007    0.032    0.007   -0.013    0.026   -0.006   -0.026    0.014
          Vis 6   0.014   -0.006    0.033    0.010   -0.010    0.030   -0.004   -0.024    0.016
          Vis 7   0.017   -0.003    0.036    0.023    0.004    0.042    0.006   -0.013    0.026
          V7-V1   0.012   -0.002    0.026    0.014    0.000    0.028    0.002   -0.012    0.016
 gluc     Vis 1  -0.793   -1.506   -0.081   -0.278   -0.991    0.435    0.515   -0.197    1.228
          Vis 2  -0.527   -1.278    0.224   -0.625   -1.383    0.134   -0.098   -0.860    0.665
          Vis 3  -0.145   -0.913    0.623   -0.561   -1.333    0.211   -0.416   -1.194    0.362
          Vis 4   0.523   -0.246    1.291   -0.184   -0.957    0.590   -0.706   -1.493    0.081
          Vis 5  -0.357   -1.125    0.411   -1.414   -2.191   -0.636   -1.057   -1.852   -0.262
          Vis 6  -0.415   -1.199    0.369   -0.938   -1.736   -0.139   -0.523   -1.344    0.299
          Vis 7  -0.082   -0.820    0.656   -0.700   -1.448    0.048   -0.618   -1.365    0.129
          V7-V1   0.711   -0.161    1.584   -0.422   -1.303    0.459   -1.133   -2.013   -0.253
 ins(l)   Vis 1   1.243    0.991    1.559    1.100    0.876    1.380    0.885    0.706    1.110
          Vis 2      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7   0.764    0.603    0.969    0.627    0.493    0.797    0.820    0.646    1.040
          V7-V1   0.615    0.484    0.781    0.570    0.447    0.726    0.926    0.729    1.178
 cpep(l)  Vis 1   1.193    0.969    1.467    1.161    0.943    1.429    0.973    0.791    1.198
          Vis 2      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6      NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7   0.983    0.796    1.215    0.824    0.665    1.019    0.837    0.677    1.036
          V7-V1   0.824    0.710    0.958    0.709    0.610    0.825    0.861    0.740    1.001
```

idos(l)	Vis 1	1.053	0.902	1.228	0.984	0.843	1.149	0.935	0.801	1.091
	Vis 2	1.263	1.081	1.476	1.397	1.194	1.635	1.107	0.946	1.295
	Vis 3	1.244	1.064	1.455	1.528	1.305	1.790	1.228	1.049	1.439
	Vis 4	1.252	1.070	1.465	1.593	1.360	1.867	1.272	1.085	1.491
	Vis 5	1.257	1.074	1.472	1.645	1.403	1.929	1.308	1.115	1.536
	Vis 6	1.220	1.041	1.430	1.664	1.418	1.953	1.364	1.161	1.602
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.159	1.039	1.293	1.690	1.513	1.889	1.459	1.303	1.633
ipkg(l)	Vis 1	1.031	0.897	1.187	0.953	0.828	1.097	0.924	0.803	1.063
	Vis 2	1.236	1.072	1.424	1.383	1.198	1.597	1.119	0.970	1.292
	Vis 3	1.218	1.056	1.405	1.515	1.311	1.750	1.243	1.076	1.437
	Vis 4	1.223	1.060	1.412	1.572	1.360	1.816	1.285	1.111	1.486
	Vis 5	1.226	1.062	1.416	1.620	1.400	1.874	1.321	1.141	1.530
	Vis 6	1.194	1.033	1.380	1.636	1.413	1.894	1.370	1.182	1.588
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.158	1.041	1.287	1.716	1.541	1.912	1.482	1.328	1.654
sys	Vis 1	1.159	-2.500	4.817	1.278	-2.383	4.939	0.119	-3.535	3.774
	Vis 2	1.063	-2.667	4.793	0.661	-3.115	4.438	-0.402	-4.187	3.383
	Vis 3	-0.451	-4.208	3.306	-0.170	-3.985	3.645	0.281	-3.539	4.101
	Vis 4	0.276	-3.526	4.079	0.532	-3.304	4.369	0.256	-3.621	4.133
	Vis 5	-2.036	-5.851	1.779	-1.599	-5.479	2.282	0.437	-3.503	4.378
	Vis 6	-2.421	-6.294	1.453	-2.177	-6.115	1.761	0.244	-3.774	4.262
	Vis 7	1.880	-1.954	5.713	4.424	0.525	8.323	2.544	-1.407	6.495
	V7-V1	0.721	-3.207	4.650	3.146	-0.843	7.135	2.425	-1.615	6.465
dia	Vis 1	0.299	-1.887	2.484	-0.346	-2.534	1.842	-0.644	-2.828	1.539
	Vis 2	0.070	-2.154	2.294	-1.072	-3.321	1.178	-1.141	-3.395	1.112
	Vis 3	0.027	-2.211	2.265	0.218	-2.051	2.488	0.191	-2.081	2.462
	Vis 4	0.117	-2.144	2.379	-0.278	-2.558	2.002	-0.395	-2.696	1.906
	Vis 5	-0.099	-2.367	2.169	-0.651	-2.953	1.652	-0.552	-2.885	1.781
	Vis 6	-1.298	-3.595	1.000	-2.008	-4.340	0.325	-0.710	-3.083	1.663
	Vis 7	0.736	-1.541	3.014	-0.452	-2.765	1.860	-1.189	-3.527	1.150
	V7-V1	0.438	-1.720	2.595	-0.106	-2.298	2.086	-0.544	-2.765	1.676
pulse	Vis 1	-0.764	-3.603	2.074	-0.165	-3.005	2.675	0.599	-2.240	3.438
	Vis 2	-0.401	-3.282	2.480	-1.900	-4.809	1.010	-1.499	-4.409	1.412
	Vis 3	-0.256	-3.159	2.647	-1.500	-4.430	1.430	-1.244	-4.180	1.692
	Vis 4	-1.186	-4.098	1.726	-1.229	-4.169	1.710	-0.044	-3.003	2.915
	Vis 5	-0.619	-3.540	2.302	-0.182	-3.147	2.782	0.437	-2.555	3.429
	Vis 6	-0.706	-3.660	2.248	0.722	-2.263	3.707	1.428	-1.604	4.459
	Vis 7	0.057	-2.886	3.000	-1.816	-4.795	1.163	-1.873	-4.879	1.132
	V7-V1	0.821	-1.632	3.274	-1.651	-4.140	0.838	-2.472	-5.001	0.056
chol	Vis 1	0.119	-0.104	0.342	-0.005	-0.228	0.218	-0.124	-0.347	0.098
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.172	-0.061	0.404	0.050	-0.185	0.284	-0.122	-0.357	0.113
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.023	-0.257	0.210	0.003	-0.232	0.239	0.027	-0.212	0.265
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.001	-0.229	0.228	0.020	-0.212	0.251	0.020	-0.210	0.251
	V7-V1	-0.120	-0.316	0.076	0.025	-0.174	0.224	0.145	-0.054	0.343
ldl	Vis 1	0.142	-0.051	0.336	0.044	-0.149	0.237	-0.099	-0.292	0.095
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.169	-0.031	0.370	0.095	-0.107	0.297	-0.074	-0.277	0.129
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.058	-0.143	0.260	0.084	-0.120	0.288	0.025	-0.180	0.231
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.049	-0.149	0.246	0.056	-0.144	0.256	0.007	-0.192	0.207
	V7-V1	-0.094	-0.259	0.071	0.012	-0.155	0.179	0.106	-0.061	0.273
hdl	Vis 1	-0.079	-0.162	0.003	-0.088	-0.170	-0.006	-0.009	-0.091	0.074
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	-0.099	-0.184	-0.015	-0.107	-0.191	-0.022	-0.007	-0.092	0.077
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.105	-0.189	-0.021	-0.098	-0.183	-0.013	0.007	-0.078	0.093
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.121	-0.204	-0.037	-0.134	-0.218	-0.050	-0.013	-0.097	0.070
	V7-V1	-0.041	-0.092	0.010	-0.046	-0.098	0.006	-0.005	-0.056	0.047
vldl(l)	Vis 1	1.014	0.904	1.137	1.029	0.918	1.154	1.015	0.905	1.139
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA

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          Vis 3    1.118   0.987   1.266   1.148   1.014   1.300   1.027   0.905   1.165
          Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 5    1.137   1.002   1.289   1.135   1.000   1.288   0.999   0.878   1.136
          Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 7    1.071   0.952   1.205   1.086   0.964   1.223   1.014   0.901   1.141
          V7-V1    1.056   0.956   1.168   1.055   0.953   1.167   0.998   0.902   1.105
trig(l)   Vis 1    1.054   0.930   1.195   1.043   0.920   1.182   0.989   0.873   1.121
          Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 3    1.140   1.001   1.298   1.092   0.958   1.245   0.958   0.840   1.093
          Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 5    1.090   0.957   1.242   1.080   0.947   1.232   0.991   0.868   1.132
          Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 7    1.084   0.954   1.232   1.097   0.964   1.248   1.011   0.889   1.150
          V7-V1    1.029   0.929   1.139   1.052   0.949   1.166   1.022   0.923   1.133
fimtavg   Vis 1    0.010  -0.022   0.043   0.012  -0.020   0.045   0.002  -0.030   0.034
          Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 7    0.019  -0.013   0.052   0.009  -0.024   0.042  -0.010  -0.043   0.022
          V7-V1    0.009  -0.009   0.027  -0.004  -0.022   0.015  -0.013  -0.031   0.006
fimtmax   Vis 1    0.005  -0.032   0.042   0.016  -0.021   0.053   0.011  -0.026   0.048
          Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 7    0.017  -0.021   0.054   0.010  -0.027   0.047  -0.007  -0.044   0.031
          V7-V1    0.011  -0.010   0.033  -0.006  -0.027   0.015  -0.018  -0.039   0.004
iem       Vis 1  -44.854 -286.148 196.439 -17.641 -261.046 225.764  27.214 -216.268 270.695
          Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 7  -71.550 -326.848 183.747 -112.875 -367.098 141.348 -41.325 -295.753 213.104
          V7-V1  -26.696 -246.059 192.668 -95.234 -314.578 124.110 -68.538 -289.079 152.002
csc2      Vis 1    0.085  -0.161   0.332   0.046  -0.203   0.294  -0.040  -0.288   0.209
          Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 7    0.067  -0.193   0.326   0.088  -0.171   0.347   0.021  -0.238   0.280
          V7-V1   -0.018  -0.230   0.193   0.042  -0.170   0.254   0.061  -0.152   0.274
imtareal  Vis 1    0.636  -0.496   1.768   0.860  -0.279   1.998   0.224  -0.914   1.361
          Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 7    0.493  -0.666   1.652   0.444  -0.715   1.603  -0.049  -1.208   1.109
          V7-V1   -0.143  -0.767   0.481  -0.416  -1.040   0.208  -0.273  -0.901   0.356
n.pl(l)   Vis 1    0.911   0.739   1.122   1.080   0.878   1.329   1.186   0.960   1.466
          Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
          Vis 7    0.887   0.719   1.093   1.009   0.819   1.244   1.138   0.919   1.410
          V7-V1    0.974   0.867   1.093   0.934   0.832   1.049   0.959   0.851   1.081
> round( ftable( Eff[,"IT","Conf",,,1:3 ], col.vars=4:3 ), 3 )
                    Biph                    AspD                    Detm
                     Est      lo      hi     Est      lo      hi     Est      lo      hi
var       par
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hba1c	Vis 1	8.917	8.588	9.246	8.785	8.456	9.114	8.823	8.488	9.158
	Vis 2	8.472	8.141	8.802	8.322	7.991	8.653	9.229	8.889	9.569
	Vis 3	7.973	7.641	8.305	8.080	7.748	8.412	8.776	8.435	9.116
	Vis 4	8.007	7.675	8.339	8.110	7.777	8.443	8.705	8.363	9.046
	Vis 5	8.064	7.732	8.395	8.165	7.830	8.500	8.642	8.298	8.986
	Vis 6	8.002	7.669	8.334	8.193	7.856	8.529	8.497	8.151	8.843
	Vis 7	7.922	7.590	8.254	8.340	8.009	8.672	8.565	8.225	8.905
	V7-V1	-0.995	-1.164	-0.825	-0.445	-0.613	-0.276	-0.258	-0.431	-0.085
weight	Vis 1	88.238	83.246	93.231	89.607	84.611	94.603	90.594	85.498	95.689
	Vis 2	89.695	84.700	94.690	91.173	86.176	96.171	89.991	84.890	95.092
	Vis 3	90.473	85.477	95.468	92.190	87.192	97.189	90.866	85.764	95.969
	Vis 4	90.878	85.883	95.874	92.872	87.872	97.873	91.773	86.669	96.876
	Vis 5	91.119	86.124	96.115	92.744	87.743	97.746	92.097	86.991	97.202
	Vis 6	91.350	86.353	96.346	92.901	87.898	97.904	92.674	87.567	97.781
	Vis 7	91.579	86.583	96.575	92.839	87.840	97.838	92.512	87.410	97.614
	V7-V1	3.340	2.695	3.986	3.232	2.586	3.877	1.918	1.255	2.581
bmi	Vis 1	32.293	30.821	33.766	32.743	31.269	34.216	32.853	31.350	34.356
	Vis 2	32.776	31.302	34.249	33.264	31.789	34.738	32.656	31.151	34.161
	Vis 3	33.025	31.551	34.499	33.607	32.132	35.082	32.940	31.435	34.446
	Vis 4	33.165	31.691	34.638	33.825	32.350	35.300	33.238	31.732	34.744
	Vis 5	33.239	31.765	34.713	33.793	32.318	35.269	33.342	31.835	34.849
	Vis 6	33.322	31.848	34.796	33.839	32.363	35.315	33.525	32.018	35.032
	Vis 7	33.371	31.897	34.845	33.761	32.286	35.236	33.449	31.943	34.954
	V7-V1	1.078	0.864	1.292	1.019	0.804	1.233	0.596	0.376	0.816
whr	Vis 1	0.948	0.927	0.969	0.950	0.928	0.971	0.953	0.932	0.975
	Vis 2	0.940	0.919	0.962	0.949	0.927	0.970	0.945	0.923	0.967
	Vis 3	0.942	0.921	0.964	0.953	0.932	0.975	0.947	0.926	0.969
	Vis 4	0.942	0.921	0.964	0.951	0.930	0.973	0.944	0.922	0.966
	Vis 5	0.946	0.924	0.967	0.955	0.934	0.977	0.949	0.927	0.972
	Vis 6	0.942	0.921	0.964	0.953	0.931	0.975	0.950	0.927	0.972
	Vis 7	0.944	0.923	0.966	0.958	0.937	0.979	0.964	0.942	0.986
	V7-V1	-0.004	-0.013	0.006	0.008	-0.001	0.018	0.011	0.001	0.021
gluc	Vis 1	11.087	10.330	11.845	10.287	9.529	11.044	10.805	10.036	11.574
	Vis 2	9.560	8.783	10.336	9.004	8.227	9.781	8.918	8.120	9.716
	Vis 3	9.143	8.361	9.926	8.986	8.200	9.772	8.568	7.763	9.373
	Vis 4	8.576	7.796	9.355	9.071	8.281	9.862	8.370	7.561	9.179
	Vis 5	9.416	8.638	10.194	9.041	8.249	9.834	7.986	7.168	8.804
	Vis 6	9.185	8.404	9.967	8.756	7.950	9.562	8.233	7.399	9.066
	Vis 7	9.084	8.310	9.858	8.992	8.221	9.762	8.372	7.579	9.165
	V7-V1	-2.003	-2.621	-1.386	-1.295	-1.912	-0.679	-2.433	-3.061	-1.805
ins(l)	Vis 1	64.286	47.785	86.487	80.062	59.513	107.706	70.705	52.197	95.774
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	59.039	43.634	79.882	45.437	33.644	61.364	36.914	27.071	50.334
	V7-V1	0.918	0.774	1.089	0.568	0.480	0.671	0.522	0.440	0.620
cpep(l)	Vis 1	667.027	510.175	872.105	800.894	612.434	1047.347	780.662	593.168	1027.421
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	568.525	433.829	745.042	560.649	427.932	734.526	469.679	355.892	619.847
	V7-V1	0.852	0.767	0.948	0.700	0.630	0.778	0.602	0.540	0.670
idos(l)	Vis 1	41.179	33.814	50.150	43.018	35.337	52.370	40.074	32.767	49.010
	Vis 2	70.713	58.020	86.183	88.653	72.761	108.017	97.822	79.874	119.803
	Vis 3	78.176	64.133	95.292	96.573	79.233	117.709	118.303	96.551	144.954
	Vis 4	80.700	66.205	98.370	100.367	82.326	122.362	127.272	103.836	155.997
	Vis 5	81.591	66.931	99.462	101.930	83.569	124.326	132.927	108.376	163.039
	Vis 6	83.199	68.224	101.461	100.830	82.615	123.062	137.057	111.705	168.164
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.020	1.873	2.180	2.344	2.166	2.536	3.420	3.154	3.709
ipkg(l)	Vis 1	0.470	0.394	0.562	0.484	0.405	0.578	0.446	0.372	0.535
	Vis 2	0.796	0.666	0.951	0.981	0.821	1.172	1.098	0.914	1.318

	Vis 3	0.872	0.730	1.043	1.060	0.887	1.268	1.318	1.097	1.583
	Vis 4	0.897	0.750	1.072	1.095	0.916	1.310	1.406	1.170	1.689
	Vis 5	0.905	0.757	1.082	1.109	0.927	1.327	1.463	1.216	1.760
	Vis 6	0.921	0.770	1.102	1.099	0.918	1.315	1.504	1.250	1.809
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.959	1.820	2.108	2.270	2.104	2.450	3.370	3.115	3.647
sys	Vis 1	134.274	129.922	138.626	135.331	130.978	139.685	135.463	131.037	139.889
	Vis 2	130.985	126.597	135.373	131.945	127.561	136.329	131.531	127.016	136.045
	Vis 3	131.471	127.070	135.873	130.888	126.486	135.290	131.182	126.652	135.711
	Vis 4	130.287	125.884	134.690	130.443	126.014	134.872	130.690	126.143	135.237
	Vis 5	130.788	126.386	135.190	128.627	124.175	133.078	129.072	124.478	133.666
	Vis 6	130.678	126.261	135.095	128.129	123.644	132.615	128.370	123.742	132.999
	Vis 7	127.583	123.171	131.996	129.355	124.912	133.798	131.882	127.283	136.482
	V7-V1	-6.691	-9.432	-3.949	-5.976	-8.791	-3.162	-3.581	-6.479	-0.682
dia	Vis 1	85.396	82.909	87.883	85.536	83.048	88.025	85.058	82.528	87.588
	Vis 2	84.323	81.816	86.829	84.178	81.673	86.682	83.183	80.605	85.761
	Vis 3	83.583	81.069	86.096	83.380	80.866	85.894	83.699	81.114	86.285
	Vis 4	83.717	81.202	86.231	83.606	81.078	86.135	83.334	80.739	85.929
	Vis 5	83.080	80.566	85.594	82.766	80.226	85.306	82.338	79.718	84.958
	Vis 6	84.047	81.525	86.569	82.564	80.006	85.122	81.957	79.319	84.595
	Vis 7	82.055	79.536	84.575	82.585	80.049	85.120	81.526	78.904	84.149
	V7-V1	-3.341	-4.844	-1.837	-2.952	-4.495	-1.408	-3.532	-5.122	-1.941
pulse	Vis 1	81.748	78.140	85.356	80.905	77.292	84.517	81.704	78.027	85.381
	Vis 2	81.065	77.435	84.696	80.534	76.907	84.162	79.245	75.522	82.969
	Vis 3	80.234	76.597	83.871	79.847	76.207	83.487	78.792	75.061	82.523
	Vis 4	80.876	77.241	84.512	79.555	75.908	83.201	79.702	75.961	83.444
	Vis 5	79.583	75.947	83.218	78.836	75.178	82.493	79.465	75.702	83.229
	Vis 6	79.112	75.472	82.753	78.284	74.607	81.961	79.901	76.126	83.677
	Vis 7	80.414	76.771	84.058	80.340	76.680	83.999	78.679	74.911	82.448
	V7-V1	-1.333	-3.039	0.372	-0.565	-2.328	1.198	-3.025	-4.837	-1.213
chol	Vis 1	4.750	4.469	5.031	4.866	4.584	5.147	4.757	4.470	5.043
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.844	4.559	5.129	5.008	4.723	5.294	4.904	4.612	5.197
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.913	4.628	5.198	4.881	4.594	5.168	4.927	4.633	5.221
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.924	4.639	5.209	4.915	4.632	5.199	4.952	4.661	5.243
	V7-V1	0.174	0.035	0.313	0.050	-0.088	0.187	0.196	0.054	0.337
ldl	Vis 1	2.473	2.223	2.722	2.605	2.355	2.855	2.518	2.264	2.772
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.565	2.313	2.817	2.722	2.470	2.975	2.665	2.405	2.924
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.558	2.305	2.811	2.605	2.352	2.859	2.648	2.387	2.909
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.629	2.376	2.881	2.665	2.414	2.916	2.689	2.429	2.948
	V7-V1	0.156	0.039	0.273	0.060	-0.056	0.176	0.171	0.051	0.290
hdl	Vis 1	1.304	1.194	1.414	1.229	1.120	1.339	1.223	1.111	1.335
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.358	1.248	1.469	1.264	1.153	1.374	1.260	1.146	1.373
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.356	1.245	1.466	1.255	1.144	1.366	1.265	1.152	1.379
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.336	1.226	1.446	1.220	1.110	1.330	1.210	1.097	1.323
	V7-V1	0.032	-0.004	0.068	-0.009	-0.045	0.026	-0.014	-0.051	0.023
vldl(l)	Vis 1	0.778	0.671	0.903	0.791	0.682	0.918	0.800	0.688	0.931
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.722	0.620	0.840	0.806	0.693	0.938	0.826	0.707	0.965
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.739	0.635	0.860	0.839	0.720	0.978	0.837	0.715	0.979
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.750	0.645	0.871	0.804	0.692	0.933	0.812	0.696	0.947
	V7-V1	0.963	0.897	1.034	1.016	0.946	1.090	1.015	0.944	1.091
trig(l)	Vis 1	1.773	1.507	2.085	1.879	1.597	2.210	1.850	1.568	2.183
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.670	1.417	1.968	1.909	1.619	2.251	1.820	1.538	2.153
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA

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           Vis 5     1.746    1.482    2.057    1.911    1.620    2.254    1.884    1.591    2.231
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7     1.730    1.468    2.038    1.882    1.599    2.217    1.893    1.601    2.238
           V7-V1     0.976    0.908    1.049    1.002    0.933    1.076    1.023    0.951    1.102
  fimtavg  Vis 1     0.716    0.672    0.760    0.727    0.683    0.771    0.728    0.683    0.773
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7     0.707    0.663    0.751    0.727    0.683    0.771    0.716    0.671    0.761
           V7-V1    -0.009   -0.022    0.004    0.000   -0.013    0.013   -0.013   -0.026    0.000
  fimtmax  Vis 1     0.865    0.815    0.915    0.871    0.821    0.921    0.880    0.829    0.931
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7     0.855    0.805    0.905    0.872    0.822    0.922    0.864    0.813    0.915
           V7-V1    -0.010   -0.025    0.005    0.001   -0.014    0.016   -0.016   -0.031   -0.001
  iem      Vis 1  2014.330 1710.327 2318.334 1982.322 1680.162 2284.481 2007.021 1695.961 2318.081
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7  1945.748 1635.151 2256.345 1884.895 1577.985 2191.806 1851.932 1536.390 2167.474
           V7-V1   -68.583 -222.237   85.072  -97.426 -252.684   57.831 -155.089 -310.361    0.184
  csc2     Vis 1     2.925    2.615    3.234    2.999    2.691    3.306    2.962    2.645    3.278
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7     2.965    2.649    3.280    3.018    2.706    3.330    3.034    2.714    3.355
           V7-V1     0.040   -0.109    0.188    0.020   -0.131    0.170    0.072   -0.078    0.222
  imtareal Vis 1    15.037   13.572   16.503   15.723   14.268   17.179   15.871   14.376   17.366
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7    15.177   13.699   16.655   15.725   14.260   17.190   15.597   14.093   17.101
           V7-V1     0.140   -0.298    0.578    0.001   -0.443    0.446   -0.274   -0.718    0.170
  n.pl(l)  Vis 1     1.537    1.142    2.069    1.364    0.997    1.864    1.619    1.198    2.189
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7     1.845    1.371    2.483    1.595    1.166    2.181    1.815    1.341    2.455
           V7-V1     1.200    1.109    1.300    1.170    1.075    1.273    1.121    1.030    1.220
> round( ftable( Eff[,"IT","Conf",,,1:3+3], col.vars=4:3 ), 3 )
                   Asp-Det                    Asp-Bip                    Det-Bip
                       Est       lo       hi      Est       lo       hi      Est       lo       hi
  var      par
  hba1c    Vis 1    -0.132   -0.391    0.127   -0.094   -0.353    0.166    0.038   -0.221    0.298
           Vis 2    -0.150   -0.414    0.114    0.757    0.491    1.024    0.907    0.640    1.174
           Vis 3     0.107   -0.159    0.374    0.803    0.533    1.072    0.696    0.426    0.965
           Vis 4     0.103   -0.165    0.371    0.698    0.428    0.968    0.595    0.323    0.867
           Vis 5     0.101   -0.167    0.370    0.579    0.306    0.851    0.477    0.201    0.753
           Vis 6     0.191   -0.081    0.464    0.496    0.220    0.772    0.304    0.023    0.585
           Vis 7     0.418    0.153    0.683    0.643    0.375    0.911    0.225   -0.043    0.493
           V7-V1     0.550    0.311    0.789    0.737    0.495    0.978    0.187   -0.055    0.428
  weight   Vis 1     1.369   -2.089    4.826    2.355   -1.106    5.817    0.987   -2.472    4.446
           Vis 2     1.478   -1.986    4.942    0.296   -3.175    3.767   -1.182   -4.652    2.287
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	Vis 3	1.718	-1.748	5.184	0.394	-3.080	3.867	-1.324	-4.796	2.148
	Vis 4	1.994	-1.475	5.463	0.895	-2.580	4.369	-1.099	-4.576	2.377
	Vis 5	1.625	-1.845	5.094	0.977	-2.501	4.455	-0.647	-4.127	2.833
	Vis 6	1.551	-1.922	5.024	1.324	-2.157	4.805	-0.227	-3.710	3.257
	Vis 7	1.260	-2.207	4.726	0.933	-2.540	4.406	-0.326	-3.797	3.145
	V7-V1	-0.109	-1.021	0.804	-1.422	-2.347	-0.497	-1.313	-2.238	-0.388
bmi	Vis 1	0.449	-0.573	1.472	0.559	-0.464	1.583	0.110	-0.913	1.133
	Vis 2	0.488	-0.537	1.513	-0.120	-1.147	0.908	-0.607	-1.634	0.419
	Vis 3	0.582	-0.443	1.608	-0.085	-1.113	0.943	-0.667	-1.695	0.361
	Vis 4	0.660	-0.366	1.687	0.073	-0.955	1.102	-0.587	-1.616	0.442
	Vis 5	0.555	-0.472	1.582	0.104	-0.926	1.133	-0.451	-1.482	0.580
	Vis 6	0.517	-0.511	1.545	0.203	-0.828	1.234	-0.314	-1.346	0.718
	Vis 7	0.390	-0.636	1.416	0.078	-0.950	1.106	-0.313	-1.340	0.715
	V7-V1	-0.059	-0.362	0.244	-0.482	-0.789	-0.175	-0.423	-0.730	-0.115
whr	Vis 1	0.002	-0.015	0.018	0.005	-0.011	0.022	0.004	-0.013	0.020
	Vis 2	0.008	-0.008	0.025	0.004	-0.012	0.021	-0.004	-0.021	0.013
	Vis 3	0.011	-0.006	0.028	0.005	-0.012	0.022	-0.006	-0.023	0.011
	Vis 4	0.009	-0.008	0.025	0.001	-0.015	0.018	-0.007	-0.024	0.010
	Vis 5	0.010	-0.007	0.026	0.004	-0.013	0.021	-0.006	-0.023	0.011
	Vis 6	0.011	-0.006	0.028	0.007	-0.010	0.024	-0.003	-0.021	0.014
	Vis 7	0.014	-0.003	0.030	0.020	0.003	0.037	0.006	-0.011	0.023
	V7-V1	0.012	-0.002	0.026	0.014	0.000	0.029	0.003	-0.011	0.016
gluc	Vis 1	-0.801	-1.504	-0.098	-0.282	-0.985	0.421	0.518	-0.185	1.221
	Vis 2	-0.556	-1.297	0.186	-0.641	-1.390	0.108	-0.086	-0.839	0.667
	Vis 3	-0.157	-0.916	0.602	-0.575	-1.338	0.188	-0.418	-1.187	0.351
	Vis 4	0.495	-0.264	1.255	-0.206	-0.970	0.557	-0.701	-1.479	0.077
	Vis 5	-0.375	-1.133	0.384	-1.430	-2.197	-0.662	-1.055	-1.841	-0.269
	Vis 6	-0.429	-1.204	0.346	-0.953	-1.742	-0.164	-0.524	-1.336	0.289
	Vis 7	-0.092	-0.821	0.636	-0.712	-1.450	0.026	-0.620	-1.357	0.118
	V7-V1	0.708	-0.164	1.581	-0.429	-1.310	0.451	-1.138	-2.018	-0.258
ins(l)	Vis 1	1.245	0.996	1.558	1.100	0.879	1.377	0.883	0.706	1.105
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.770	0.609	0.973	0.625	0.493	0.793	0.812	0.642	1.029
	V7-V1	0.618	0.487	0.785	0.568	0.446	0.724	0.920	0.724	1.169
cpep(l)	Vis 1	1.201	0.990	1.456	1.170	0.965	1.420	0.975	0.804	1.182
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.986	0.810	1.201	0.826	0.677	1.008	0.838	0.687	1.022
	V7-V1	0.821	0.707	0.954	0.706	0.607	0.821	0.859	0.739	0.999
idos(l)	Vis 1	1.045	0.903	1.208	0.973	0.841	1.126	0.932	0.805	1.078
	Vis 2	1.254	1.082	1.453	1.383	1.192	1.605	1.103	0.951	1.280
	Vis 3	1.235	1.065	1.433	1.513	1.303	1.757	1.225	1.054	1.423
	Vis 4	1.244	1.072	1.443	1.577	1.358	1.832	1.268	1.091	1.474
	Vis 5	1.249	1.076	1.450	1.629	1.401	1.894	1.304	1.120	1.518
	Vis 6	1.212	1.043	1.409	1.647	1.416	1.917	1.359	1.166	1.584
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.160	1.040	1.294	1.693	1.515	1.891	1.459	1.303	1.634
ipkg(l)	Vis 1	1.029	0.901	1.175	0.949	0.831	1.084	0.922	0.808	1.053
	Vis 2	1.233	1.078	1.411	1.380	1.204	1.580	1.119	0.977	1.281
	Vis 3	1.216	1.062	1.392	1.511	1.318	1.732	1.243	1.084	1.425
	Vis 4	1.221	1.066	1.399	1.567	1.367	1.798	1.284	1.118	1.474
	Vis 5	1.225	1.069	1.404	1.616	1.408	1.855	1.319	1.148	1.516
	Vis 6	1.193	1.040	1.368	1.632	1.421	1.876	1.369	1.189	1.575
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.159	1.043	1.288	1.721	1.545	1.916	1.485	1.330	1.657
sys	Vis 1	1.057	-2.583	4.698	1.189	-2.452	4.830	0.132	-3.505	3.769
	Vis 2	0.961	-2.753	4.674	0.546	-3.211	4.303	-0.415	-4.183	3.353
	Vis 3	-0.583	-4.323	3.157	-0.289	-4.085	3.507	0.294	-3.509	4.096
	Vis 4	0.156	-3.630	3.942	0.403	-3.414	4.221	0.247	-3.614	4.108

	Vis 5	-2.161	-5.959	1.637	-1.716	-5.577	2.145	0.445	-3.480	4.370
	Vis 6	-2.548	-6.405	1.308	-2.308	-6.227	1.612	0.241	-3.762	4.243
	Vis 7	1.772	-2.045	5.589	4.299	0.418	8.180	2.527	-1.408	6.462
	V7-V1	0.715	-3.214	4.643	3.110	-0.879	7.099	2.396	-1.644	6.435
dia	Vis 1	0.140	-1.912	2.193	-0.338	-2.391	1.715	-0.478	-2.529	1.572
	Vis 2	-0.145	-2.237	1.947	-1.139	-3.255	0.977	-0.994	-3.116	1.127
	Vis 3	-0.203	-2.309	1.904	0.117	-2.020	2.254	0.319	-1.821	2.460
	Vis 4	-0.110	-2.241	2.021	-0.382	-2.531	1.766	-0.272	-2.444	1.899
	Vis 5	-0.313	-2.451	1.824	-0.741	-2.913	1.430	-0.428	-2.634	1.778
	Vis 6	-1.482	-3.651	0.686	-2.090	-4.293	0.113	-0.608	-2.855	1.640
	Vis 7	0.529	-1.618	2.677	-0.529	-2.711	1.653	-1.058	-3.270	1.153
	V7-V1	0.389	-1.765	2.544	-0.191	-2.379	1.997	-0.580	-2.796	1.636
pulse	Vis 1	-0.843	-3.631	1.944	-0.044	-2.830	2.743	0.799	-1.988	3.587
	Vis 2	-0.531	-3.362	2.300	-1.820	-4.677	1.037	-1.289	-4.149	1.571
	Vis 3	-0.387	-3.239	2.466	-1.442	-4.320	1.436	-1.056	-3.942	1.831
	Vis 4	-1.322	-4.184	1.541	-1.174	-4.061	1.714	0.148	-2.762	3.058
	Vis 5	-0.747	-3.618	2.124	-0.117	-3.030	2.795	0.630	-2.314	3.573
	Vis 6	-0.828	-3.733	2.076	0.789	-2.145	3.723	1.617	-1.366	4.601
	Vis 7	-0.075	-2.969	2.819	-1.735	-4.663	1.193	-1.660	-4.617	1.297
	V7-V1	0.768	-1.684	3.221	-1.691	-4.179	0.797	-2.460	-4.987	0.068
chol	Vis 1	0.116	-0.100	0.331	0.007	-0.209	0.222	-0.109	-0.325	0.106
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.164	-0.062	0.389	0.060	-0.168	0.287	-0.104	-0.332	0.124
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.032	-0.258	0.194	0.014	-0.214	0.242	0.046	-0.185	0.277
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.009	-0.230	0.213	0.028	-0.196	0.252	0.037	-0.186	0.260
	V7-V1	-0.125	-0.320	0.071	0.022	-0.177	0.220	0.146	-0.052	0.344
ldl	Vis 1	0.132	-0.057	0.321	0.045	-0.143	0.234	-0.087	-0.276	0.102
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.157	-0.039	0.354	0.100	-0.098	0.298	-0.058	-0.256	0.141
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.047	-0.150	0.245	0.090	-0.110	0.289	0.042	-0.159	0.243
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.036	-0.157	0.230	0.060	-0.136	0.256	0.024	-0.172	0.219
	V7-V1	-0.096	-0.261	0.069	0.015	-0.153	0.182	0.110	-0.056	0.277
hdl	Vis 1	-0.075	-0.154	0.005	-0.081	-0.160	-0.001	-0.006	-0.085	0.073
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	-0.095	-0.176	-0.014	-0.099	-0.181	-0.017	-0.004	-0.086	0.078
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.101	-0.182	-0.020	-0.091	-0.173	-0.009	0.010	-0.072	0.093
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.116	-0.197	-0.036	-0.126	-0.207	-0.045	-0.010	-0.091	0.071
	V7-V1	-0.041	-0.093	0.010	-0.046	-0.098	0.006	-0.004	-0.056	0.047
vldl(l)	Vis 1	1.017	0.909	1.138	1.028	0.919	1.150	1.011	0.903	1.131
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.117	0.988	1.263	1.144	1.013	1.292	1.024	0.905	1.159
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.136	1.004	1.286	1.132	1.000	1.282	0.997	0.878	1.131
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.072	0.956	1.203	1.083	0.964	1.216	1.010	0.899	1.134
	V7-V1	1.055	0.954	1.166	1.054	0.952	1.166	0.999	0.903	1.105
trig(l)	Vis 1	1.060	0.938	1.197	1.044	0.924	1.179	0.985	0.872	1.112
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.143	1.007	1.298	1.090	0.959	1.238	0.953	0.838	1.084
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.094	0.964	1.243	1.079	0.949	1.226	0.986	0.866	1.122
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.088	0.961	1.233	1.094	0.965	1.241	1.006	0.887	1.140
	V7-V1	1.027	0.928	1.136	1.049	0.946	1.163	1.022	0.922	1.132
fimtavg	Vis 1	0.011	-0.020	0.042	0.012	-0.019	0.043	0.001	-0.030	0.032
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA

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         Vis 7    0.020   -0.012    0.051    0.008   -0.023    0.040   -0.011   -0.043    0.020
         V7-V1    0.009   -0.009    0.027   -0.004   -0.022    0.014   -0.013   -0.031    0.006
fimtmax  Vis 1    0.006   -0.029    0.041    0.015   -0.020    0.051    0.009   -0.026    0.045
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    0.017   -0.018    0.053    0.009   -0.027    0.045   -0.008   -0.044    0.028
         V7-V1    0.011   -0.010    0.032   -0.006   -0.027    0.015   -0.017   -0.039    0.004
iem      Vis 1  -32.009 -256.844  192.827   -7.309 -233.874  219.255   24.699 -202.334  251.733
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7  -60.852 -300.084  178.380  -93.815 -331.691  144.061  -32.963 -271.333  205.407
         V7-V1  -28.844 -247.290  189.603  -86.506 -304.937  131.925  -57.662 -277.271  161.946
csc2     Vis 1    0.074   -0.153    0.301    0.037   -0.192    0.266   -0.037   -0.266    0.192
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    0.054   -0.187    0.295    0.070   -0.170    0.309    0.016   -0.224    0.256
         V7-V1   -0.020   -0.232    0.191    0.032   -0.179    0.244    0.053   -0.160    0.265
imtareal Vis 1    0.686   -0.349    1.721    0.834   -0.206    1.873    0.148   -0.893    1.188
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    0.548   -0.516    1.612    0.420   -0.643    1.482   -0.128   -1.191    0.935
         V7-V1   -0.138   -0.762    0.486   -0.414   -1.038    0.210   -0.275   -0.903    0.353
n.pl(l)  Vis 1    0.887    0.725    1.086    1.053    0.862    1.287    1.187    0.968    1.457
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    0.865    0.706    1.059    0.984    0.804    1.204    1.138    0.925    1.399
         V7-V1    0.974    0.868    1.094    0.934    0.831    1.049    0.958    0.850    1.080
> round( ftable( Eff[,"PP","Prim",,,1:3  ], col.vars=4:3 ), 3 )
                   Biph                       AspD                       Detm                  
                    Est       lo       hi      Est       lo       hi      Est       lo       hi
var      par                                                                                   
hba1c    Vis 1    8.808    8.586    9.030    8.693    8.470    8.916    8.710    8.480    8.939
         Vis 2    8.323    8.101    8.545    8.201    7.978    8.424    9.048    8.818    9.277
         Vis 3    7.844    7.622    8.067    7.966    7.742    8.190    8.621    8.391    8.851
         Vis 4    7.878    7.656    8.101    7.995    7.770    8.221    8.550    8.319    8.781
         Vis 5    7.935    7.713    8.157    8.051    7.823    8.278    8.488    8.253    8.722
         Vis 6    7.873    7.649    8.097    8.079    7.848    8.309    8.343    8.105    8.580
         Vis 7    7.792    7.569    8.015    8.216    7.992    8.440    8.379    8.149    8.609
         V7-V1   -1.015   -1.185   -0.846   -0.477   -0.648   -0.307   -0.331   -0.508   -0.154
weight   Vis 1   97.357   94.015  100.699   98.477   95.122  101.832   99.012   95.566  102.458
         Vis 2   98.868   95.526  102.210  100.093   96.738  103.449   98.491   95.045  101.937
         Vis 3   99.627   96.285  102.968  101.104   97.749  104.460   99.366   95.920  102.813
         Vis 4  100.032   96.690  103.374  101.785   98.427  105.144  100.274   96.826  103.722
         Vis 5  100.274   96.931  103.616  101.658   98.299  105.018  100.597   97.146  104.049
         Vis 6  100.504   97.161  103.847  101.815   98.454  105.177  101.175   97.722  104.628
         Vis 7  100.761   97.418  104.104  101.781   98.425  105.138  101.074   97.627  104.520
         V7-V1    3.404    2.756    4.053    3.304    2.653    3.956    2.061    1.388    2.735
bmi      Vis 1   32.204   31.251   33.158   32.434   31.477   33.391   32.452   31.469   33.435
         Vis 2   32.706   31.752   33.659   32.971   32.014   33.928   32.280   31.297   33.263
         Vis 3   32.948   31.995   33.901   33.312   32.354   34.269   32.565   31.581   33.548
         Vis 4   33.088   32.135   34.041   33.530   32.571   34.488   32.862   31.879   33.846
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	Vis 5	33.162	32.208	34.115	33.498	32.539	34.457	32.967	31.982	33.952
	Vis 6	33.245	32.292	34.199	33.544	32.584	34.503	33.150	32.164	34.136
	Vis 7	33.305	32.351	34.259	33.476	32.518	34.433	33.094	32.110	34.077
	V7-V1	1.101	0.885	1.316	1.041	0.825	1.257	0.642	0.418	0.865
whr	Vis 1	1.001	0.984	1.018	1.004	0.988	1.021	1.013	0.995	1.030
	Vis 2	0.994	0.978	1.011	1.003	0.987	1.020	1.004	0.987	1.022
	Vis 3	0.996	0.979	1.012	1.008	0.992	1.025	1.007	0.989	1.024
	Vis 4	0.996	0.979	1.013	1.006	0.989	1.023	1.003	0.986	1.020
	Vis 5	0.999	0.983	1.016	1.010	0.993	1.027	1.009	0.991	1.026
	Vis 6	0.996	0.979	1.013	1.008	0.991	1.025	1.009	0.991	1.026
	Vis 7	0.998	0.981	1.014	1.013	0.996	1.030	1.024	1.007	1.041
	V7-V1	-0.003	-0.013	0.007	0.009	-0.001	0.019	0.011	0.001	0.022
gluc	Vis 1	10.760	10.199	11.320	9.933	9.369	10.497	10.607	10.025	11.190
	Vis 2	9.193	8.622	9.764	8.565	7.989	9.142	8.300	7.708	8.891
	Vis 3	8.774	8.195	9.352	8.573	7.985	9.160	8.124	7.530	8.718
	Vis 4	8.203	7.630	8.776	8.660	8.066	9.254	7.928	7.328	8.528
	Vis 5	9.042	8.472	9.612	8.631	8.035	9.226	7.547	6.938	8.157
	Vis 6	8.811	8.235	9.388	8.340	7.730	8.950	7.795	7.164	8.425
	Vis 7	8.728	8.162	9.294	8.493	7.924	9.063	7.773	7.187	8.358
	V7-V1	-2.032	-2.649	-1.414	-1.440	-2.061	-0.819	-2.835	-3.478	-2.191
ins(l)	Vis 1	57.923	47.548	70.563	73.917	60.669	90.058	63.247	51.612	77.506
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	53.609	43.839	65.555	40.951	33.483	50.085	32.623	26.538	40.102
	V7-V1	0.926	0.779	1.100	0.554	0.467	0.657	0.516	0.432	0.616
cpep(l)	Vis 1	538.294	452.416	640.474	639.840	537.391	761.820	641.062	535.774	767.040
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	458.522	384.930	546.183	444.524	372.740	530.134	381.163	318.431	456.254
	V7-V1	0.852	0.766	0.948	0.695	0.624	0.773	0.595	0.533	0.664
idos(l)	Vis 1	46.678	41.002	53.139	49.309	43.291	56.163	44.467	38.893	50.840
	Vis 2	80.586	70.787	91.741	101.131	88.788	115.189	109.185	95.474	124.866
	Vis 3	88.834	78.025	101.140	110.318	96.798	125.725	132.084	115.480	151.076
	Vis 4	91.703	80.545	104.406	114.652	100.561	130.717	142.107	124.191	162.607
	Vis 5	92.718	81.429	105.572	116.450	102.084	132.839	148.401	129.562	169.979
	Vis 6	94.538	82.985	107.700	115.202	100.894	131.540	153.044	133.554	175.378
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.025	1.877	2.186	2.336	2.158	2.529	3.442	3.171	3.735
ipkg(l)	Vis 1	0.485	0.432	0.545	0.506	0.450	0.569	0.455	0.403	0.513
	Vis 2	0.826	0.735	0.928	1.020	0.908	1.147	1.122	0.995	1.266
	Vis 3	0.903	0.803	1.014	1.104	0.982	1.242	1.348	1.195	1.521
	Vis 4	0.928	0.826	1.043	1.141	1.013	1.284	1.438	1.274	1.624
	Vis 5	0.937	0.834	1.053	1.155	1.026	1.300	1.497	1.324	1.692
	Vis 6	0.953	0.848	1.072	1.144	1.015	1.289	1.538	1.360	1.740
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.965	1.825	2.115	2.260	2.093	2.440	3.385	3.125	3.666
sys	Vis 1	136.532	133.514	139.551	137.349	134.319	140.380	137.022	133.898	140.146
	Vis 2	133.131	130.115	136.146	133.739	130.708	136.771	132.836	129.718	135.953
	Vis 3	133.635	130.615	136.654	132.905	129.870	135.940	132.890	129.765	136.016
	Vis 4	132.448	129.425	135.471	132.453	129.370	135.537	132.400	129.254	135.546
	Vis 5	132.954	129.936	135.973	130.645	127.537	133.752	130.779	127.572	133.985
	Vis 6	132.844	129.804	135.884	130.145	126.989	133.301	130.079	126.822	133.336
	Vis 7	129.748	126.714	132.782	131.363	128.256	134.470	133.601	130.393	136.809
	V7-V1	-6.784	-9.542	-4.026	-5.986	-8.822	-3.151	-3.422	-6.367	-0.476
dia	Vis 1	83.409	81.658	85.161	83.561	81.803	85.320	83.170	81.358	84.983
	Vis 2	82.133	80.383	83.883	82.103	80.344	83.862	81.223	79.414	83.032
	Vis 3	81.497	79.745	83.249	81.403	79.642	83.164	81.723	79.910	83.536
	Vis 4	81.633	79.879	83.387	81.633	79.846	83.419	81.358	79.534	83.182
	Vis 5	80.997	79.246	82.749	80.791	78.992	82.590	80.356	78.500	82.211
	Vis 6	81.969	80.206	83.732	80.584	78.760	82.408	79.979	78.098	81.861

	Vis 7	79.974	78.214	81.733	80.611	78.812	82.409	79.546	77.690	81.402
	V7-V1	-3.436	-4.952	-1.920	-2.950	-4.509	-1.391	-3.625	-5.244	-2.005
pulse	Vis 1	77.260	74.824	79.696	75.762	73.311	78.213	76.806	74.285	79.327
	Vis 2	76.401	73.961	78.841	75.435	72.986	77.884	74.333	71.816	76.850
	Vis 3	75.616	73.174	78.059	74.828	72.368	77.287	73.890	71.369	76.411
	Vis 4	76.256	73.817	78.696	74.538	72.066	77.010	74.797	72.263	77.331
	Vis 5	74.964	72.524	77.403	73.816	71.332	76.300	74.559	71.994	77.125
	Vis 6	74.494	72.047	76.941	73.263	70.749	75.776	74.997	72.415	77.579
	Vis 7	75.797	73.346	78.249	75.326	72.834	77.819	73.766	71.200	76.333
	V7-V1	-1.463	-3.179	0.253	-0.436	-2.211	1.339	-3.040	-4.875	-1.204
chol	Vis 1	4.138	3.951	4.325	4.251	4.063	4.439	4.133	3.939	4.326
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.241	4.052	4.431	4.405	4.213	4.597	4.285	4.089	4.480
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.308	4.119	4.497	4.277	4.084	4.471	4.306	4.108	4.504
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.323	4.134	4.512	4.311	4.121	4.500	4.332	4.138	4.527
	V7-V1	0.185	0.045	0.326	0.060	-0.080	0.200	0.200	0.055	0.345
ldl	Vis 1	2.140	1.974	2.306	2.309	2.143	2.476	2.198	2.027	2.369
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.240	2.072	2.409	2.424	2.255	2.593	2.339	2.166	2.512
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.233	2.064	2.402	2.307	2.136	2.477	2.322	2.147	2.497
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.307	2.139	2.475	2.368	2.200	2.535	2.363	2.190	2.535
	V7-V1	0.167	0.049	0.285	0.058	-0.060	0.177	0.164	0.042	0.287
hdl	Vis 1	1.169	1.096	1.242	1.094	1.021	1.168	1.083	1.008	1.159
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.223	1.149	1.296	1.127	1.053	1.201	1.119	1.043	1.195
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.220	1.146	1.293	1.119	1.044	1.193	1.125	1.049	1.201
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.199	1.126	1.272	1.082	1.009	1.156	1.068	0.992	1.143
	V7-V1	0.030	-0.007	0.067	-0.012	-0.049	0.024	-0.016	-0.053	0.022
vldl(l)	Vis 1	0.718	0.651	0.792	0.715	0.648	0.790	0.719	0.650	0.796
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.666	0.602	0.737	0.733	0.661	0.813	0.747	0.673	0.828
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.681	0.615	0.755	0.763	0.687	0.847	0.756	0.680	0.841
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.693	0.628	0.766	0.729	0.660	0.804	0.733	0.662	0.812
	V7-V1	0.966	0.899	1.037	1.019	0.948	1.095	1.020	0.947	1.098
trig(l)	Vis 1	1.614	1.451	1.794	1.654	1.487	1.840	1.628	1.459	1.817
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.521	1.366	1.694	1.695	1.520	1.890	1.616	1.447	1.805
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.590	1.428	1.769	1.695	1.519	1.891	1.671	1.495	1.869
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.578	1.418	1.756	1.667	1.498	1.856	1.680	1.505	1.876
	V7-V1	0.978	0.909	1.052	1.008	0.937	1.084	1.032	0.957	1.112
fimtavg	Vis 1	0.751	0.723	0.779	0.757	0.729	0.786	0.755	0.727	0.784
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.742	0.714	0.770	0.758	0.730	0.786	0.744	0.715	0.773
	V7-V1	-0.009	-0.022	0.004	0.000	-0.012	0.013	-0.011	-0.025	0.002
fimtmax	Vis 1	0.912	0.880	0.944	0.912	0.880	0.944	0.918	0.886	0.951
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.901	0.870	0.933	0.913	0.881	0.946	0.904	0.871	0.937
	V7-V1	-0.010	-0.025	0.005	0.001	-0.014	0.017	-0.014	-0.030	0.001

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  iem      Vis 1  2046.014 1845.255 2246.773 1988.263 1787.383 2189.143 2002.397 1791.475 2213.319
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7  1978.637 1772.293 2184.980 1904.071 1696.513 2111.629 1896.961 1686.686 2107.237
           V7-V1   -67.377 -218.365   83.610  -84.192 -237.587   69.202 -105.435 -261.265   50.395
  csc2     Vis 1     2.870    2.666    3.073    2.962    2.759    3.165    2.919    2.705    3.132
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7     2.903    2.695    3.112    2.973    2.763    3.183    2.937    2.724    3.149
           V7-V1     0.034   -0.114    0.181    0.011   -0.139    0.161    0.018   -0.134    0.170
  imtareal Vis 1    17.474   16.506   18.442   18.045   17.077   19.014   17.944   16.935   18.953
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7    17.579   16.601   18.558   18.029   17.047   19.011   17.795   16.787   18.803
           V7-V1     0.105   -0.327    0.538   -0.016   -0.457    0.424   -0.150   -0.596    0.297
  n.pl(l)  Vis 1     2.191    1.835    2.616    1.988    1.641    2.408    2.164    1.785    2.624
           Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7     2.624    2.198    3.133    2.312    1.909    2.800    2.463    2.033    2.985
           V7-V1     1.198    1.105    1.298    1.163    1.067    1.268    1.138    1.043    1.242
> round( ftable( Eff[,"PP","Prim",,,1:3+3], col.vars=4:3 ), 3 )
                 Asp-Det                    Asp-Bip                    Det-Bip
                     Est       lo       hi      Est       lo       hi      Est       lo       hi
  var      par
  hba1c    Vis 1    -0.115   -0.382    0.153   -0.098   -0.371    0.175    0.017   -0.257    0.290
           Vis 2    -0.122   -0.390    0.146    0.725    0.451    0.998    0.847    0.573    1.120
           Vis 3     0.121   -0.148    0.391    0.777    0.502    1.051    0.655    0.381    0.930
           Vis 4     0.117   -0.153    0.388    0.672    0.397    0.947    0.554    0.277    0.832
           Vis 5     0.116   -0.156    0.387    0.553    0.275    0.830    0.437    0.156    0.718
           Vis 6     0.206   -0.070    0.481    0.470    0.189    0.751    0.264   -0.022    0.550
           Vis 7     0.423    0.154    0.693    0.586    0.312    0.861    0.163   -0.112    0.438
           V7-V1     0.538    0.297    0.779    0.685    0.439    0.930    0.146   -0.099    0.392
  weight   Vis 1     1.120   -2.667    4.906    1.655   -2.212    5.523    0.535   -3.339    4.409
           Vis 2     1.226   -2.561    5.013   -0.377   -4.245    3.491   -1.602   -5.477    2.272
           Vis 3     1.478   -2.310    5.265   -0.260   -4.129    3.608   -1.738   -5.613    2.137
           Vis 4     1.753   -2.037    5.543    0.242   -3.627    4.111   -1.511   -5.390    2.368
           Vis 5     1.385   -2.407    5.176    0.324   -3.549    4.196   -1.061   -4.943    2.821
           Vis 6     1.311   -2.483    5.105    0.671   -3.204    4.546   -0.640   -4.526    3.245
           Vis 7     1.020   -2.769    4.809    0.312   -3.557    4.182   -0.708   -4.583    3.168
           V7-V1    -0.100   -1.019    0.819   -1.343   -2.278   -0.408   -1.243   -2.180   -0.306
  bmi      Vis 1     0.230   -0.852    1.312    0.247   -0.858    1.352    0.017   -1.089    1.124
           Vis 2     0.265   -0.817    1.347   -0.426   -1.531    0.679   -0.691   -1.798    0.416
           Vis 3     0.364   -0.719    1.446   -0.383   -1.489    0.722   -0.747   -1.854    0.360
           Vis 4     0.442   -0.641    1.525   -0.225   -1.331    0.880   -0.667   -1.776    0.441
           Vis 5     0.336   -0.747    1.420   -0.195   -1.301    0.912   -0.531   -1.641    0.579
           Vis 6     0.298   -0.786    1.383   -0.095   -1.203    1.012   -0.394   -1.505    0.717
           Vis 7     0.170   -0.912    1.253   -0.211   -1.317    0.894   -0.382   -1.489    0.726
           V7-V1    -0.059   -0.364    0.246   -0.459   -0.769   -0.148   -0.399   -0.710   -0.088
  whr      Vis 1     0.003   -0.016    0.023    0.012   -0.008    0.032    0.008   -0.012    0.028
           Vis 2     0.009   -0.011    0.028    0.010   -0.010    0.030    0.001   -0.019    0.021
           Vis 3     0.013   -0.007    0.032    0.011   -0.009    0.031   -0.002   -0.022    0.018
           Vis 4     0.010   -0.010    0.030    0.007   -0.013    0.027   -0.003   -0.023    0.017
           Vis 5     0.011   -0.009    0.031    0.009   -0.011    0.030   -0.002   -0.022    0.019
           Vis 6     0.012   -0.008    0.032    0.013   -0.008    0.033    0.001   -0.020    0.021
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	Vis 7	0.016	-0.004	0.035	0.026	0.006	0.046	0.011	-0.009	0.031
	V7-V1	0.012	-0.002	0.026	0.015	0.000	0.029	0.003	-0.012	0.017
gluc	Vis 1	-0.826	-1.546	-0.107	-0.152	-0.886	0.581	0.674	-0.062	1.410
	Vis 2	-0.628	-1.366	0.110	-0.893	-1.644	-0.143	-0.265	-1.020	0.489
	Vis 3	-0.201	-0.954	0.551	-0.650	-1.408	0.108	-0.449	-1.213	0.315
	Vis 4	0.457	-0.296	1.210	-0.275	-1.034	0.484	-0.732	-1.505	0.040
	Vis 5	-0.411	-1.163	0.342	-1.494	-2.257	-0.732	-1.084	-1.864	-0.303
	Vis 6	-0.471	-1.240	0.297	-1.017	-1.801	-0.233	-0.546	-1.352	0.261
	Vis 7	-0.235	-0.963	0.493	-0.955	-1.696	-0.214	-0.720	-1.463	0.022
	V7-V1	0.592	-0.285	1.468	-0.803	-1.695	0.089	-1.395	-2.289	-0.500
ins(l)	Vis 1	1.276	1.011	1.611	1.092	0.861	1.385	0.856	0.675	1.085
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.764	0.601	0.970	0.609	0.477	0.777	0.797	0.625	1.016
	V7-V1	0.599	0.470	0.763	0.557	0.435	0.714	0.931	0.728	1.190
cpep(l)	Vis 1	1.189	0.972	1.453	1.191	0.970	1.462	1.002	0.816	1.231
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.969	0.791	1.188	0.831	0.676	1.022	0.857	0.697	1.055
	V7-V1	0.816	0.701	0.949	0.698	0.599	0.814	0.856	0.734	0.998
idos(l)	Vis 1	1.056	0.907	1.230	0.953	0.816	1.113	0.902	0.772	1.053
	Vis 2	1.255	1.078	1.461	1.355	1.160	1.583	1.080	0.924	1.261
	Vis 3	1.242	1.066	1.447	1.487	1.273	1.737	1.197	1.024	1.400
	Vis 4	1.250	1.073	1.457	1.550	1.326	1.811	1.239	1.059	1.450
	Vis 5	1.256	1.077	1.464	1.601	1.368	1.872	1.274	1.088	1.493
	Vis 6	1.219	1.044	1.422	1.619	1.383	1.895	1.328	1.133	1.558
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.154	1.033	1.288	1.699	1.520	1.900	1.473	1.314	1.651
ipkg(l)	Vis 1	1.043	0.909	1.196	0.937	0.814	1.077	0.898	0.780	1.033
	Vis 2	1.235	1.077	1.417	1.359	1.181	1.564	1.100	0.956	1.266
	Vis 3	1.223	1.066	1.404	1.494	1.298	1.719	1.221	1.060	1.406
	Vis 4	1.229	1.070	1.411	1.549	1.346	1.784	1.261	1.094	1.454
	Vis 5	1.233	1.073	1.416	1.597	1.386	1.841	1.296	1.123	1.496
	Vis 6	1.200	1.043	1.380	1.614	1.399	1.861	1.345	1.164	1.554
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.150	1.034	1.280	1.723	1.545	1.920	1.497	1.341	1.673
sys	Vis 1	0.817	-2.918	4.552	0.490	-3.319	4.300	-0.327	-4.143	3.490
	Vis 2	0.609	-3.122	4.339	-0.295	-4.095	3.505	-0.904	-4.715	2.907
	Vis 3	-0.729	-4.466	3.007	-0.744	-4.556	3.067	-0.015	-3.833	3.803
	Vis 4	0.005	-3.777	3.787	-0.048	-3.881	3.785	-0.053	-3.929	3.822
	Vis 5	-2.310	-6.104	1.485	-2.176	-6.052	1.700	0.134	-3.805	4.072
	Vis 6	-2.699	-6.552	1.154	-2.765	-6.699	1.168	-0.066	-4.083	3.950
	Vis 7	1.615	-2.198	5.428	3.853	-0.042	7.748	2.238	-1.711	6.187
	V7-V1	0.798	-3.157	4.754	3.363	-0.672	7.398	2.565	-1.524	6.653
dia	Vis 1	0.152	-1.997	2.300	-0.239	-2.431	1.953	-0.391	-2.586	1.805
	Vis 2	-0.030	-2.176	2.116	-0.910	-3.097	1.277	-0.880	-3.073	1.313
	Vis 3	-0.093	-2.243	2.056	0.226	-1.967	2.419	0.319	-1.877	2.516
	Vis 4	-0.001	-2.174	2.173	-0.275	-2.479	1.929	-0.274	-2.501	1.953
	Vis 5	-0.206	-2.386	1.974	-0.642	-2.868	1.585	-0.436	-2.696	1.825
	Vis 6	-1.385	-3.595	0.826	-1.989	-4.246	0.268	-0.605	-2.906	1.697
	Vis 7	0.637	-1.553	2.827	-0.428	-2.664	1.809	-1.065	-3.331	1.201
	V7-V1	0.485	-1.689	2.660	-0.189	-2.407	2.029	-0.674	-2.922	1.573
pulse	Vis 1	-1.498	-4.409	1.413	-0.454	-3.423	2.515	1.044	-1.935	4.022
	Vis 2	-0.966	-3.877	1.945	-2.068	-5.036	0.901	-1.101	-4.075	1.872
	Vis 3	-0.789	-3.710	2.133	-1.726	-4.701	1.248	-0.938	-3.922	2.047
	Vis 4	-1.718	-4.649	1.212	-1.459	-4.443	1.524	0.259	-2.748	3.266
	Vis 5	-1.148	-4.087	1.791	-0.404	-3.412	2.604	0.744	-2.296	3.783
	Vis 6	-1.232	-4.204	1.741	0.503	-2.526	3.532	1.735	-1.344	4.813
	Vis 7	-0.471	-3.433	2.491	-2.031	-5.053	0.992	-1.560	-4.613	1.493
	V7-V1	1.027	-1.442	3.496	-1.577	-4.089	0.936	-2.604	-5.157	-0.050

chol	Vis 1	0.113	-0.110	0.336	-0.005	-0.233	0.223	-0.118	-0.346	0.110
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.163	-0.065	0.392	0.043	-0.189	0.275	-0.120	-0.353	0.113
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.031	-0.260	0.198	-0.002	-0.235	0.231	0.029	-0.207	0.265
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.013	-0.238	0.213	0.009	-0.220	0.239	0.022	-0.208	0.251
	V7-V1	-0.126	-0.324	0.072	0.014	-0.187	0.216	0.140	-0.061	0.342
ldl	Vis 1	0.169	-0.027	0.365	0.058	-0.142	0.258	-0.111	-0.312	0.090
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.183	-0.017	0.384	0.099	-0.105	0.303	-0.085	-0.289	0.120
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.074	-0.128	0.276	0.089	-0.117	0.294	0.015	-0.192	0.222
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.061	-0.138	0.259	0.056	-0.147	0.258	-0.005	-0.208	0.198
	V7-V1	-0.108	-0.275	0.059	-0.002	-0.172	0.168	0.106	-0.064	0.276
hdl	Vis 1	-0.074	-0.159	0.010	-0.086	-0.172	0.001	-0.011	-0.098	0.075
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	-0.095	-0.181	-0.010	-0.104	-0.191	-0.017	-0.008	-0.096	0.079
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.101	-0.187	-0.016	-0.095	-0.182	-0.008	0.006	-0.082	0.094
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.117	-0.201	-0.032	-0.131	-0.218	-0.045	-0.015	-0.101	0.072
	V7-V1	-0.042	-0.094	0.009	-0.046	-0.098	0.007	-0.003	-0.056	0.049
vldl(l)	Vis 1	0.996	0.887	1.119	1.002	0.890	1.128	1.005	0.893	1.132
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.101	0.972	1.246	1.121	0.990	1.270	1.019	0.898	1.156
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.120	0.988	1.269	1.109	0.977	1.260	0.991	0.871	1.128
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.051	0.935	1.182	1.058	0.939	1.192	1.006	0.893	1.134
	V7-V1	1.055	0.953	1.168	1.056	0.953	1.170	1.001	0.903	1.110
trig(l)	Vis 1	1.025	0.904	1.162	1.009	0.888	1.147	0.985	0.866	1.119
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.114	0.980	1.267	1.062	0.933	1.210	0.953	0.837	1.087
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.066	0.938	1.212	1.051	0.923	1.198	0.986	0.864	1.126
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.057	0.931	1.199	1.065	0.936	1.211	1.008	0.886	1.146
	V7-V1	1.031	0.930	1.142	1.055	0.950	1.172	1.024	0.922	1.136
fimtavg	Vis 1	0.006	-0.026	0.038	0.004	-0.029	0.037	-0.002	-0.035	0.031
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.016	-0.017	0.048	0.002	-0.031	0.035	-0.014	-0.047	0.019
	V7-V1	0.010	-0.009	0.028	-0.002	-0.021	0.016	-0.012	-0.030	0.007
fimtmax	Vis 1	0.000	-0.036	0.037	0.007	-0.031	0.044	0.006	-0.031	0.044
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.012	-0.025	0.049	0.003	-0.035	0.040	-0.009	-0.047	0.028
	V7-V1	0.012	-0.010	0.033	-0.004	-0.026	0.018	-0.016	-0.038	0.006
iem	Vis 1	-57.751	-292.073	176.571	-43.617	-284.768	197.534	14.134	-227.428	255.695
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-74.566	-318.889	169.757	-81.675	-327.383	164.032	-7.109	-253.274	239.055
	V7-V1	-16.815	-232.055	198.424	-38.058	-255.041	178.926	-21.243	-239.907	197.422
csc2	Vis 1	0.092	-0.144	0.329	0.049	-0.194	0.293	-0.043	-0.287	0.201
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA

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         Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 7    0.070  -0.177   0.316   0.033  -0.215   0.281  -0.037  -0.285   0.212
         V7-V1   -0.023  -0.233   0.187  -0.016  -0.228   0.196   0.007  -0.207   0.220
imtareal Vis 1    0.572  -0.535   1.678   0.470  -0.664   1.605  -0.101  -1.236   1.033
         Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 7    0.450  -0.676   1.576   0.216  -0.927   1.359  -0.234  -1.378   0.909
         V7-V1   -0.122  -0.739   0.496  -0.255  -0.876   0.367  -0.133  -0.760   0.494
n.pl(l)  Vis 1    0.907   0.737   1.117   0.988   0.800   1.219   1.088   0.876   1.352
         Vis 2       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 3       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 4       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 5       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 6       NA      NA      NA      NA      NA      NA      NA      NA      NA
         Vis 7    0.881   0.716   1.084   0.939   0.761   1.158   1.065   0.858   1.323
         V7-V1    0.971   0.863   1.092   0.951   0.844   1.070   0.979   0.866   1.107
> round( ftable( Eff[,"PP","Rest",,,1:3  ], col.vars=4:3 ), 3 )
                Biph                    AspD                    Detm
                 Est      lo      hi     Est      lo      hi     Est      lo      hi
var      par
hba1c    Vis 1    8.635   8.443   8.827   8.529   8.336   8.722   8.543   8.342   8.744
         Vis 2    8.150   7.958   8.343   8.037   7.844   8.230   8.881   8.680   9.082
         Vis 3    7.672   7.478   7.865   7.801   7.607   7.995   8.455   8.254   8.657
         Vis 4    7.706   7.513   7.899   7.831   7.635   8.027   8.385   8.182   8.587
         Vis 5    7.763   7.570   7.956   7.886   7.688   8.084   8.321   8.115   8.527
         Vis 6    7.702   7.507   7.896   7.915   7.713   8.116   8.176   7.966   8.385
         Vis 7    7.620   7.426   7.813   8.051   7.857   8.246   8.213   8.011   8.414
         V7-V1   -1.015  -1.185  -0.845  -0.478  -0.648  -0.307  -0.331  -0.507  -0.154
weight   Vis 1   95.884  93.125  98.642  97.153  94.384  99.922  97.867  94.983 100.751
         Vis 2   97.394  94.635 100.153  98.770  96.000 101.539  97.346  94.461 100.230
         Vis 3   98.153  95.394 100.912  99.780  97.010 102.551  98.222  95.337 101.107
         Vis 4   98.558  95.799 101.317 100.460  97.687 103.234  99.130  96.243 102.016
         Vis 5   98.800  96.041 101.559 100.333  97.559 103.108  99.453  96.563 102.343
         Vis 6   99.031  96.270 101.792 100.491  97.713 103.268 100.030  97.138 102.922
         Vis 7   99.288  96.528 102.048 100.458  97.687 103.229  99.928  97.043 102.814
         V7-V1    3.404   2.756   4.053   3.305   2.653   3.956   2.061   1.388   2.735
bmi      Vis 1   31.898  31.118  32.678  32.162  31.378  32.945  32.226  31.410  33.042
         Vis 2   32.399  31.619  33.179  32.698  31.915  33.481  32.054  31.238  32.870
         Vis 3   32.641  31.861  33.422  33.039  32.255  33.822  32.339  31.523  33.155
         Vis 4   32.781  32.001  33.562  33.257  32.472  34.042  32.637  31.820  33.454
         Vis 5   32.855  32.075  33.636  33.225  32.440  34.010  32.742  31.924  33.560
         Vis 6   32.939  32.158  33.720  33.271  32.484  34.057  32.924  32.105  33.743
         Vis 7   32.999  32.218  33.780  33.203  32.419  33.987  32.868  32.052  33.684
         V7-V1    1.101   0.885   1.316   1.041   0.825   1.258   0.642   0.418   0.866
whr      Vis 1    0.999   0.985   1.013   1.003   0.989   1.016   1.011   0.997   1.026
         Vis 2    0.992   0.978   1.006   1.001   0.988   1.015   1.003   0.988   1.017
         Vis 3    0.993   0.980   1.007   1.007   0.993   1.020   1.005   0.990   1.019
         Vis 4    0.994   0.980   1.008   1.004   0.990   1.018   1.001   0.987   1.016
         Vis 5    0.997   0.983   1.011   1.008   0.994   1.023   1.007   0.992   1.022
         Vis 6    0.994   0.980   1.008   1.006   0.992   1.021   1.007   0.992   1.022
         Vis 7    0.995   0.981   1.009   1.011   0.997   1.025   1.022   1.008   1.037
         V7-V1   -0.003  -0.013   0.007   0.009  -0.001   0.019   0.011   0.001   0.022
gluc     Vis 1   10.697  10.182  11.211   9.898   9.380  10.416  10.581  10.043  11.118
         Vis 2    9.122   8.596   9.648   8.530   7.998   9.062   8.275   7.726   8.825
         Vis 3    8.706   8.171   9.241   8.526   7.982   9.069   8.096   7.544   8.647
         Vis 4    8.138   7.608   8.668   8.625   8.075   9.174   7.906   7.348   8.463
         Vis 5    8.983   8.457   9.509   8.591   8.039   9.143   7.522   6.956   8.088
         Vis 6    8.749   8.216   9.283   8.300   7.732   8.867   7.764   7.177   8.352
         Vis 7    8.667   8.146   9.188   8.456   7.932   8.979   7.748   7.206   8.289
         V7-V1   -2.030  -2.648  -1.412  -1.442  -2.063  -0.821  -2.833  -3.476  -2.190
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ins(l)	Vis 1	58.505	49.570	69.050	74.929	63.476	88.449	64.613	54.361	76.798
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	54.330	45.793	64.460	41.516	35.044	49.183	33.340	27.953	39.765
	V7-V1	0.929	0.782	1.103	0.554	0.467	0.657	0.516	0.432	0.616
cpep(l)	Vis 1	601.332	518.567	697.308	714.731	616.002	829.284	727.620	623.252	849.465
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	512.280	441.078	594.977	496.844	427.532	577.392	432.557	370.296	505.285
	V7-V1	0.852	0.766	0.948	0.695	0.624	0.774	0.594	0.532	0.664
idos(l)	Vis 1	37.533	33.548	41.991	39.803	35.561	44.550	35.750	31.791	40.201
	Vis 2	64.798	57.919	72.494	81.634	72.935	91.370	87.759	78.027	98.706
	Vis 3	71.443	63.849	79.940	89.089	79.537	99.787	106.173	94.383	119.436
	Vis 4	73.750	65.911	82.521	92.562	82.603	103.721	114.254	101.520	128.586
	Vis 5	74.579	66.644	83.459	93.985	83.826	105.375	119.307	105.893	134.420
	Vis 6	76.052	67.918	85.160	92.986	82.849	104.363	123.032	109.145	138.685
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.026	1.878	2.187	2.336	2.158	2.529	3.441	3.171	3.735
ipkg(l)	Vis 1	0.396	0.358	0.439	0.414	0.374	0.459	0.370	0.333	0.411
	Vis 2	0.674	0.609	0.747	0.835	0.754	0.925	0.913	0.821	1.016
	Vis 3	0.737	0.666	0.816	0.904	0.816	1.002	1.097	0.985	1.220
	Vis 4	0.758	0.685	0.840	0.934	0.842	1.036	1.170	1.051	1.303
	Vis 5	0.765	0.691	0.848	0.945	0.852	1.049	1.217	1.092	1.357
	Vis 6	0.779	0.703	0.863	0.936	0.843	1.040	1.251	1.122	1.396
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.966	1.826	2.116	2.260	2.093	2.441	3.383	3.124	3.664
sys	Vis 1	138.663	136.016	141.311	139.519	136.860	142.177	139.172	136.410	141.935
	Vis 2	135.268	132.626	137.909	135.911	133.253	138.570	134.987	132.232	137.743
	Vis 3	135.764	133.115	138.413	135.082	132.423	137.742	135.044	132.280	137.807
	Vis 4	134.574	131.919	137.229	134.622	131.905	137.340	134.556	131.769	137.343
	Vis 5	135.086	132.437	137.735	132.824	130.083	135.564	132.938	130.086	135.790
	Vis 6	134.971	132.296	137.646	132.325	129.529	135.121	132.245	129.339	135.151
	Vis 7	131.869	129.201	134.538	133.520	130.773	136.268	135.740	132.881	138.600
	V7-V1	-6.794	-9.552	-4.036	-5.998	-8.834	-3.163	-3.432	-6.378	-0.487
dia	Vis 1	82.183	80.586	83.781	82.390	80.786	83.993	82.159	80.492	83.826
	Vis 2	80.895	79.301	82.489	80.927	79.323	82.530	80.212	78.548	81.875
	Vis 3	80.248	78.650	81.846	80.229	78.625	81.834	80.721	79.053	82.388
	Vis 4	80.384	78.783	81.985	80.455	78.821	82.089	80.360	78.681	82.040
	Vis 5	79.753	78.155	81.351	79.608	77.963	81.254	79.357	77.644	81.069
	Vis 6	80.737	79.126	82.348	79.394	77.720	81.067	78.984	77.244	80.724
	Vis 7	78.736	77.129	80.344	79.427	77.778	81.076	78.539	76.822	80.255
	V7-V1	-3.447	-4.963	-1.931	-2.963	-4.522	-1.403	-3.620	-5.240	-2.001
pulse	Vis 1	76.792	74.721	78.863	75.356	73.270	77.442	76.486	74.320	78.652
	Vis 2	75.929	73.855	78.004	75.025	72.942	77.107	74.014	71.851	76.176
	Vis 3	75.142	73.064	77.220	74.417	72.324	76.511	73.579	71.412	75.746
	Vis 4	75.779	73.704	77.854	74.124	72.015	76.234	74.487	72.304	76.669
	Vis 5	74.490	72.415	76.565	73.402	71.281	75.523	74.245	72.029	76.461
	Vis 6	74.025	71.941	76.110	72.850	70.693	75.008	74.684	72.450	76.919
	Vis 7	75.325	73.234	77.417	74.913	72.777	77.049	73.446	71.226	75.666
	V7-V1	-1.467	-3.183	0.249	-0.443	-2.218	1.333	-3.040	-4.875	-1.204
chol	Vis 1	4.097	3.938	4.256	4.216	4.057	4.376	4.101	3.935	4.267
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.200	4.038	4.362	4.370	4.206	4.533	4.253	4.085	4.421
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.268	4.107	4.429	4.242	4.077	4.407	4.274	4.103	4.445
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.283	4.122	4.444	4.276	4.115	4.436	4.301	4.134	4.467
	V7-V1	0.186	0.046	0.326	0.059	-0.081	0.199	0.200	0.055	0.345
ldl	Vis 1	2.089	1.950	2.229	2.263	2.122	2.403	2.155	2.009	2.301
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA

	Vis 3	2.189	2.047	2.331	2.377	2.234	2.521	2.296	2.148	2.444
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.182	2.040	2.325	2.260	2.115	2.405	2.278	2.128	2.428
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.256	2.115	2.398	2.321	2.180	2.463	2.319	2.172	2.467
	V7-V1	0.167	0.049	0.285	0.059	-0.060	0.177	0.164	0.042	0.287
hdl	Vis 1	1.219	1.158	1.279	1.144	1.083	1.205	1.129	1.066	1.192
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.273	1.211	1.334	1.177	1.115	1.238	1.164	1.101	1.228
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.270	1.209	1.331	1.168	1.106	1.230	1.171	1.106	1.235
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.249	1.188	1.310	1.132	1.071	1.193	1.113	1.050	1.177
	V7-V1	0.030	-0.007	0.066	-0.012	-0.049	0.024	-0.016	-0.053	0.022
vldl(l)	Vis 1	0.698	0.642	0.758	0.695	0.640	0.756	0.703	0.644	0.766
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.646	0.592	0.705	0.713	0.651	0.780	0.730	0.666	0.799
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.661	0.606	0.722	0.742	0.677	0.813	0.738	0.673	0.811
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.674	0.620	0.733	0.709	0.651	0.771	0.716	0.657	0.782
	V7-V1	0.966	0.899	1.038	1.019	0.948	1.095	1.020	0.947	1.098
trig(l)	Vis 1	1.552	1.419	1.697	1.594	1.456	1.744	1.577	1.436	1.732
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.462	1.335	1.602	1.633	1.489	1.791	1.566	1.424	1.722
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.529	1.396	1.674	1.632	1.487	1.791	1.619	1.471	1.782
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.518	1.387	1.662	1.607	1.467	1.759	1.627	1.481	1.788
	V7-V1	0.978	0.910	1.052	1.008	0.937	1.084	1.032	0.957	1.113
fimtavg	Vis 1	0.789	0.765	0.812	0.794	0.770	0.818	0.790	0.766	0.815
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.780	0.756	0.803	0.794	0.770	0.818	0.779	0.754	0.804
	V7-V1	-0.009	-0.022	0.004	0.000	-0.013	0.013	-0.011	-0.025	0.002
fimtmax	Vis 1	0.952	0.925	0.978	0.951	0.924	0.978	0.956	0.928	0.984
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.941	0.914	0.968	0.952	0.925	0.979	0.941	0.913	0.969
	V7-V1	-0.011	-0.026	0.005	0.001	-0.014	0.017	-0.014	-0.030	0.001
iem	Vis 1	2375.608	2198.624	2552.592	2297.540	2119.743	2475.337	2309.967	2122.338	2497.595
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2308.476	2124.780	2492.172	2216.810	2032.078	2401.543	2196.935	2009.804	2384.066
	V7-V1	-67.132	-218.635	84.372	-80.730	-234.720	73.261	-113.032	-269.359	43.295
csc2	Vis 1	2.533	2.353	2.712	2.645	2.464	2.825	2.605	2.415	2.795
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.566	2.380	2.752	2.655	2.468	2.842	2.630	2.440	2.820
	V7-V1	0.033	-0.115	0.181	0.010	-0.140	0.160	0.025	-0.127	0.178
imtareal	Vis 1	18.690	17.876	19.504	19.178	18.362	19.993	19.078	18.223	19.933
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA

```
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    18.796   17.969   19.623   19.169   18.340   19.998   18.923   18.069   19.777
         V7-V1     0.106   -0.327    0.538   -0.009   -0.450    0.432   -0.155   -0.601    0.291
n.pl(l)  Vis 1     2.615    2.264    3.021    2.409    2.065    2.811    2.608    2.228    3.054
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7     3.136    2.716    3.621    2.803    2.404    3.270    2.968    2.536    3.472
         V7-V1     1.199    1.107    1.299    1.164    1.068    1.269    1.138    1.042    1.242
> round( ftable( Eff[,"PP","Rest",,,1:3+3], col.vars=4:3 ), 3 )
                Asp-Det                    Asp-Bip                    Det-Bip
                    Est       lo       hi      Est       lo       hi      Est       lo       hi
var      par
hba1c    Vis 1    -0.106   -0.378    0.166   -0.092   -0.370    0.186    0.014   -0.264    0.293
         Vis 2    -0.114   -0.386    0.159    0.731    0.453    1.009    0.845    0.566    1.123
         Vis 3     0.129   -0.145    0.403    0.783    0.504    1.063    0.654    0.374    0.933
         Vis 4     0.125   -0.150    0.400    0.678    0.399    0.958    0.553    0.271    0.836
         Vis 5     0.123   -0.153    0.400    0.559    0.276    0.841    0.436    0.150    0.721
         Vis 6     0.213   -0.067    0.493    0.474    0.189    0.760    0.261   -0.029    0.552
         Vis 7     0.431    0.157    0.706    0.593    0.313    0.872    0.161   -0.119    0.441
         V7-V1     0.537    0.297    0.778    0.684    0.439    0.930    0.147   -0.099    0.393
weight   Vis 1     1.269   -2.639    5.178    1.983   -2.008    5.974    0.714   -3.285    4.712
         Vis 2     1.375   -2.534    5.285   -0.049   -4.040    3.943   -1.424   -5.423    2.575
         Vis 3     1.627   -2.282    5.537    0.069   -3.923    4.061   -1.559   -5.558    2.441
         Vis 4     1.902   -2.010    5.814    0.571   -3.422    4.564   -1.331   -5.334    2.672
         Vis 5     1.533   -2.380    5.446    0.653   -3.343    4.649   -0.881   -4.887    3.126
         Vis 6     1.460   -2.456    5.376    0.999   -2.999    4.998   -0.460   -4.470    3.549
         Vis 7     1.170   -2.742    5.081    0.640   -3.353    4.633   -0.529   -4.530    3.471
         V7-V1    -0.100   -1.019    0.819   -1.343   -2.278   -0.408   -1.243   -2.180   -0.306
bmi      Vis 1     0.264   -0.842    1.369    0.328   -0.801    1.457    0.064   -1.067    1.195
         Vis 2     0.299   -0.807    1.405   -0.345   -1.474    0.784   -0.644   -1.775    0.487
         Vis 3     0.398   -0.708    1.503   -0.302   -1.432    0.827   -0.700   -1.831    0.432
         Vis 4     0.476   -0.631    1.583   -0.144   -1.274    0.985   -0.620   -1.753    0.513
         Vis 5     0.370   -0.737    1.477   -0.113   -1.244    1.017   -0.483   -1.617    0.651
         Vis 6     0.332   -0.777    1.440   -0.015   -1.146    1.117   -0.346   -1.482    0.789
         Vis 7     0.204   -0.902    1.311   -0.131   -1.260    0.999   -0.335   -1.467    0.797
         V7-V1    -0.059   -0.364    0.246   -0.459   -0.769   -0.148   -0.399   -0.710   -0.088
whr      Vis 1     0.004   -0.016    0.024    0.012   -0.008    0.032    0.008   -0.012    0.029
         Vis 2     0.009   -0.010    0.029    0.011   -0.010    0.031    0.001   -0.019    0.021
         Vis 3     0.013   -0.007    0.033    0.011   -0.009    0.032   -0.002   -0.022    0.019
         Vis 4     0.011   -0.009    0.030    0.008   -0.013    0.028   -0.003   -0.023    0.017
         Vis 5     0.012   -0.008    0.031    0.010   -0.010    0.030   -0.002   -0.022    0.019
         Vis 6     0.013   -0.007    0.033    0.013   -0.007    0.034    0.001   -0.020    0.021
         Vis 7     0.016   -0.004    0.036    0.027    0.007    0.047    0.011   -0.009    0.031
         V7-V1     0.012   -0.002    0.026    0.015    0.000    0.029    0.003   -0.012    0.017
gluc     Vis 1    -0.799   -1.529   -0.069   -0.116   -0.861    0.628    0.683   -0.064    1.430
         Vis 2    -0.592   -1.341    0.156   -0.847   -1.608   -0.086   -0.255   -1.020    0.510
         Vis 3    -0.180   -0.943    0.582   -0.610   -1.379    0.158   -0.430   -1.204    0.344
         Vis 4     0.487   -0.277    1.250   -0.232   -1.001    0.537   -0.719   -1.502    0.064
         Vis 5    -0.392   -1.154    0.371   -1.461   -2.234   -0.688   -1.069   -1.860   -0.278
         Vis 6    -0.450   -1.228    0.329   -0.985   -1.779   -0.191   -0.535   -1.352    0.282
         Vis 7    -0.211   -0.950    0.527   -0.919   -1.671   -0.168   -0.708   -1.461    0.045
         V7-V1     0.588   -0.288    1.464   -0.803   -1.695    0.089   -1.391   -2.285   -0.496
ins(l)   Vis 1     1.281    1.013    1.619    1.104    0.869    1.403    0.862    0.679    1.096
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6        NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7     0.764    0.601    0.972    0.614    0.480    0.784    0.803    0.629    1.026
         V7-V1     0.597    0.468    0.760    0.556    0.434    0.711    0.931    0.728    1.191
cpep(l)  Vis 1     1.189    0.964    1.466    1.210    0.977    1.499    1.018    0.821    1.262
         Vis 2        NA       NA       NA       NA       NA       NA       NA       NA       NA
```

	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.970	0.785	1.199	0.844	0.681	1.048	0.871	0.701	1.081
	V7-V1	0.816	0.701	0.949	0.698	0.598	0.814	0.855	0.733	0.997
idos(l)	Vis 1	1.060	0.905	1.243	0.952	0.810	1.120	0.898	0.763	1.057
	Vis 2	1.260	1.075	1.477	1.354	1.151	1.593	1.075	0.913	1.265
	Vis 3	1.247	1.063	1.463	1.486	1.263	1.749	1.192	1.012	1.403
	Vis 4	1.255	1.070	1.473	1.549	1.316	1.824	1.234	1.048	1.454
	Vis 5	1.260	1.073	1.480	1.600	1.358	1.885	1.269	1.076	1.498
	Vis 6	1.223	1.040	1.437	1.618	1.372	1.907	1.323	1.120	1.563
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.153	1.033	1.287	1.698	1.519	1.899	1.473	1.314	1.651
ipkg(l)	Vis 1	1.046	0.905	1.208	0.933	0.806	1.082	0.893	0.770	1.035
	Vis 2	1.238	1.072	1.431	1.354	1.168	1.569	1.093	0.943	1.267
	Vis 3	1.227	1.061	1.418	1.487	1.283	1.724	1.213	1.045	1.407
	Vis 4	1.231	1.065	1.424	1.543	1.331	1.790	1.253	1.080	1.455
	Vis 5	1.235	1.067	1.428	1.591	1.370	1.846	1.288	1.108	1.498
	Vis 6	1.202	1.038	1.393	1.606	1.383	1.866	1.336	1.148	1.555
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.150	1.034	1.279	1.721	1.544	1.919	1.497	1.340	1.672
sys	Vis 1	0.855	-2.896	4.607	0.509	-3.317	4.335	-0.346	-4.180	3.487
	Vis 2	0.644	-3.103	4.391	-0.280	-4.097	3.537	-0.924	-4.753	2.904
	Vis 3	-0.682	-4.435	3.072	-0.720	-4.548	3.107	-0.039	-3.874	3.797
	Vis 4	0.048	-3.751	3.847	-0.018	-3.867	3.831	-0.066	-3.959	3.826
	Vis 5	-2.262	-6.074	1.549	-2.148	-6.041	1.744	0.114	-3.841	4.069
	Vis 6	-2.646	-6.516	1.224	-2.726	-6.676	1.223	-0.081	-4.113	3.952
	Vis 7	1.651	-2.179	5.481	3.871	-0.040	7.782	2.220	-1.745	6.185
	V7-V1	0.795	-3.160	4.751	3.362	-0.673	7.397	2.566	-1.522	6.655
dia	Vis 1	0.207	-2.057	2.470	-0.024	-2.333	2.284	-0.231	-2.544	2.082
	Vis 2	0.032	-2.229	2.293	-0.683	-2.987	1.621	-0.715	-3.025	1.596
	Vis 3	-0.019	-2.283	2.246	0.473	-1.837	2.782	0.491	-1.823	2.806
	Vis 4	0.072	-2.216	2.359	-0.023	-2.344	2.297	-0.095	-2.438	2.248
	Vis 5	-0.145	-2.439	2.149	-0.396	-2.739	1.946	-0.251	-2.626	2.124
	Vis 6	-1.344	-3.667	0.980	-1.753	-4.124	0.618	-0.410	-2.824	2.005
	Vis 7	0.690	-1.613	2.994	-0.198	-2.550	2.154	-0.888	-3.268	1.492
	V7-V1	0.484	-1.691	2.659	-0.173	-2.392	2.045	-0.657	-2.906	1.591
pulse	Vis 1	-1.436	-4.375	1.503	-0.306	-3.303	2.691	1.130	-1.877	4.137
	Vis 2	-0.905	-3.844	2.034	-1.916	-4.912	1.081	-1.011	-4.013	1.991
	Vis 3	-0.725	-3.675	2.225	-1.563	-4.565	1.439	-0.838	-3.851	2.175
	Vis 4	-1.655	-4.614	1.304	-1.292	-4.303	1.719	0.363	-2.673	3.398
	Vis 5	-1.088	-4.055	1.879	-0.245	-3.281	2.791	0.843	-2.224	3.910
	Vis 6	-1.175	-4.175	1.825	0.659	-2.397	3.715	1.834	-1.272	4.940
	Vis 7	-0.412	-3.401	2.578	-1.879	-4.929	1.171	-1.467	-4.548	1.613
	V7-V1	1.024	-1.445	3.493	-1.573	-4.085	0.939	-2.597	-5.151	-0.044
chol	Vis 1	0.120	-0.105	0.344	0.004	-0.226	0.233	-0.116	-0.345	0.114
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.170	-0.060	0.400	0.053	-0.181	0.287	-0.117	-0.351	0.118
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.026	-0.257	0.204	0.006	-0.229	0.240	0.032	-0.206	0.270
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.007	-0.234	0.220	0.018	-0.213	0.249	0.025	-0.206	0.256
	V7-V1	-0.127	-0.325	0.071	0.014	-0.188	0.216	0.141	-0.061	0.342
ldl	Vis 1	0.174	-0.024	0.372	0.066	-0.136	0.268	-0.108	-0.311	0.094
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.188	-0.014	0.390	0.107	-0.099	0.312	-0.081	-0.288	0.125
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.077	-0.126	0.281	0.096	-0.112	0.303	0.018	-0.191	0.227
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.065	-0.135	0.265	0.063	-0.141	0.267	-0.002	-0.207	0.202
	V7-V1	-0.109	-0.276	0.059	-0.003	-0.173	0.167	0.106	-0.064	0.276
hdl	Vis 1	-0.075	-0.161	0.011	-0.090	-0.177	-0.002	-0.015	-0.103	0.073
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	-0.096	-0.183	-0.009	-0.108	-0.197	-0.020	-0.012	-0.101	0.076
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA

	Vis 5	-0.102	-0.189	-0.015	-0.099	-0.188	-0.011	0.002	-0.087	0.092
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.117	-0.203	-0.031	-0.135	-0.223	-0.047	-0.018	-0.106	0.070
	V7-V1	-0.042	-0.094	0.010	-0.046	-0.098	0.007	-0.003	-0.056	0.049
vldl(l)	Vis 1	0.997	0.886	1.122	1.007	0.893	1.136	1.010	0.896	1.139
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.103	0.973	1.250	1.129	0.996	1.281	1.024	0.901	1.164
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.121	0.988	1.273	1.116	0.982	1.269	0.996	0.874	1.134
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.051	0.934	1.184	1.063	0.942	1.200	1.011	0.896	1.141
	V7-V1	1.055	0.953	1.167	1.056	0.952	1.170	1.001	0.903	1.110
trig(l)	Vis 1	1.027	0.905	1.166	1.016	0.893	1.157	0.990	0.869	1.127
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.116	0.980	1.271	1.071	0.938	1.222	0.959	0.840	1.095
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.068	0.937	1.216	1.059	0.928	1.209	0.992	0.868	1.134
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.058	0.931	1.203	1.072	0.941	1.222	1.013	0.889	1.154
	V7-V1	1.030	0.930	1.142	1.055	0.950	1.171	1.024	0.922	1.136
fimtavg	Vis 1	0.005	-0.028	0.039	0.002	-0.032	0.036	-0.003	-0.038	0.031
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.015	-0.019	0.048	0.000	-0.035	0.034	-0.015	-0.049	0.019
	V7-V1	0.010	-0.009	0.028	-0.002	-0.021	0.017	-0.012	-0.030	0.007
fimtmax	Vis 1	-0.001	-0.039	0.037	0.004	-0.035	0.043	0.005	-0.034	0.044
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.011	-0.027	0.049	0.000	-0.039	0.039	-0.011	-0.050	0.028
	V7-V1	0.012	-0.009	0.033	-0.004	-0.026	0.018	-0.016	-0.038	0.006
iem	Vis 1	-78.068	-328.937	172.801	-65.641	-323.571	192.289	12.427	-246.062	270.915
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-91.666	-352.185	168.853	-111.541	-373.766	150.684	-19.875	-282.828	243.077
	V7-V1	-13.598	-229.622	202.426	-45.900	-263.596	171.796	-32.302	-251.736	187.132
csc2	Vis 1	0.112	-0.143	0.367	0.072	-0.189	0.334	-0.040	-0.302	0.222
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.089	-0.175	0.353	0.064	-0.202	0.330	-0.025	-0.291	0.242
	V7-V1	-0.023	-0.234	0.188	-0.008	-0.220	0.204	0.015	-0.199	0.229
imtareal	Vis 1	0.487	-0.665	1.639	0.387	-0.793	1.568	-0.100	-1.281	1.081
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.373	-0.798	1.544	0.127	-1.062	1.316	-0.246	-1.436	0.944
	V7-V1	-0.114	-0.732	0.503	-0.261	-0.882	0.361	-0.146	-0.773	0.481
n.pl(l)	Vis 1	0.921	0.746	1.138	0.997	0.806	1.235	1.083	0.868	1.350
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA

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          Vis 7      0.894    0.724    1.104    0.946    0.765    1.171    1.059    0.850    1.319
          V7-V1      0.971    0.863    1.092    0.949    0.843    1.068    0.978    0.865    1.105
> round( ftable( Eff[,"PP","Conf",,,1:3  ], col.vars=4:3 ), 3 )
                      Biph                       AspD                       Detm
                       Est       lo       hi      Est       lo       hi      Est       lo       hi
 var      par
 hba1c    Vis 1      8.922    8.578    9.266    8.802    8.458    9.145    8.826    8.471    9.180
          Vis 2      8.438    8.094    8.782    8.310    7.966    8.653    9.164    8.810    9.519
          Vis 3      7.959    7.614    8.303    8.074    7.730    8.418    8.738    8.383    9.092
          Vis 4      7.993    7.648    8.337    8.104    7.759    8.449    8.666    8.311    9.022
          Vis 5      8.049    7.705    8.394    8.159    7.813    8.506    8.604    8.246    8.962
          Vis 6      7.987    7.642    8.332    8.187    7.839    8.536    8.459    8.099    8.819
          Vis 7      7.907    7.562    8.251    8.324    7.980    8.668    8.495    8.140    8.850
          V7-V1     -1.015   -1.185   -0.846   -0.477   -0.648   -0.307   -0.331   -0.508   -0.154
 weight   Vis 1     89.018   83.706   94.330   89.760   84.459   95.062   90.252   84.784   95.721
          Vis 2     90.528   85.216   95.840   91.377   86.076   96.679   89.731   84.262   95.200
          Vis 3     91.287   85.975   96.599   92.388   87.086   97.689   90.607   85.138   96.076
          Vis 4     91.692   86.380   97.005   93.069   87.766   98.373   91.514   86.044   96.984
          Vis 5     91.934   86.621   97.246   92.942   87.638   98.246   91.838   86.366   97.310
          Vis 6     92.164   86.851   97.477   93.098   87.793   98.404   92.415   86.942   97.888
          Vis 7     92.422   87.109   97.735   93.065   87.763   98.367   92.313   86.844   97.782
          V7-V1      3.404    2.756    4.053    3.304    2.653    3.956    2.061    1.387    2.734
 bmi      Vis 1     32.411   30.835   33.987   32.731   31.158   34.304   32.698   31.075   34.321
          Vis 2     32.912   31.336   34.489   33.267   31.694   34.840   32.526   30.903   34.149
          Vis 3     33.155   31.578   34.731   33.608   32.035   35.181   32.811   31.188   34.434
          Vis 4     33.294   31.718   34.871   33.826   32.252   35.400   33.109   31.485   34.732
          Vis 5     33.369   31.792   34.945   33.794   32.220   35.369   33.213   31.589   34.837
          Vis 6     33.452   31.875   35.029   33.840   32.265   35.415   33.396   31.771   35.020
          Vis 7     33.512   31.935   35.088   33.772   32.199   35.345   33.340   31.717   34.963
          V7-V1      1.101    0.885    1.316    1.041    0.825    1.258    0.642    0.419    0.866
 whr      Vis 1      0.947    0.925    0.969    0.948    0.926    0.970    0.956    0.933    0.979
          Vis 2      0.941    0.918    0.963    0.947    0.925    0.969    0.948    0.925    0.971
          Vis 3      0.942    0.920    0.964    0.952    0.930    0.974    0.950    0.927    0.973
          Vis 4      0.942    0.920    0.964    0.950    0.928    0.972    0.946    0.923    0.969
          Vis 5      0.945    0.923    0.968    0.954    0.932    0.976    0.952    0.929    0.975
          Vis 6      0.942    0.920    0.964    0.952    0.929    0.974    0.952    0.929    0.975
          Vis 7      0.944    0.922    0.966    0.957    0.935    0.979    0.967    0.944    0.990
          V7-V1     -0.003   -0.013    0.007    0.009   -0.001    0.019    0.011    0.001    0.022
 gluc     Vis 1     11.160   10.385   11.934   10.337    9.562   11.112   11.026   10.225   11.826
          Vis 2      9.595    8.812   10.378    8.969    8.186    9.752    8.717    7.910    9.524
          Vis 3      9.173    8.386    9.960    8.975    8.185    9.766    8.544    7.733    9.355
          Vis 4      8.605    7.820    9.389    9.059    8.265    9.854    8.346    7.531    9.161
          Vis 5      9.444    8.661   10.227    9.030    8.234    9.827    7.964    7.141    8.787
          Vis 6      9.215    8.429   10.002    8.746    7.936    9.556    8.211    7.373    9.050
          Vis 7      9.129    8.350    9.909    8.896    8.118    9.674    8.193    7.388    8.997
          V7-V1     -2.030   -2.648   -1.413   -1.441   -2.062   -0.819   -2.833   -3.476   -2.190
 ins(l)   Vis 1     63.712   46.690   86.938   81.080   59.465  110.552   69.505   50.469   95.720
          Vis 2         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7     58.664   42.875   80.268   44.932   32.896   61.371   35.702   25.855   49.301
          V7-V1      0.921    0.775    1.094    0.554    0.468    0.657    0.514    0.430    0.613
 cpep(l)  Vis 1    668.105  507.842  878.945  790.612  601.273 1039.573  795.846  599.992 1055.631
          Vis 2         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 3         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 4         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 5         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 6         NA       NA       NA       NA       NA       NA       NA       NA       NA
          Vis 7    569.223  432.294  749.523  549.585  417.648  723.201  473.473  356.674  628.519
          V7-V1      0.852    0.766    0.948    0.695    0.624    0.774    0.595    0.533    0.664
 idos(l)  Vis 1     40.578   33.016   49.871   42.756   34.801   52.530   38.430   31.074   47.528
          Vis 2     70.054   56.999   86.098   87.691   71.375  107.737   94.365   76.293  116.718
          Vis 3     77.212   62.818   94.903   95.673   77.853  117.573  114.160   92.292  141.211
          Vis 4     79.705   64.847   97.968   99.426   80.890  122.211  122.820   99.260  151.972
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	Vis 5	80.586	65.559	99.057	100.971	82.108	124.168	128.282	103.606	158.836
	Vis 6	82.177	66.829	101.050	99.887	81.177	122.908	132.263	106.785	163.820
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	2.025	1.877	2.186	2.336	2.158	2.529	3.442	3.171	3.735
ipkg(l)	Vis 1	0.461	0.383	0.555	0.481	0.400	0.579	0.431	0.356	0.522
	Vis 2	0.785	0.652	0.945	0.970	0.806	1.168	1.065	0.879	1.289
	Vis 3	0.858	0.712	1.032	1.050	0.872	1.264	1.279	1.056	1.549
	Vis 4	0.882	0.733	1.062	1.085	0.901	1.306	1.364	1.126	1.653
	Vis 5	0.890	0.739	1.072	1.098	0.912	1.323	1.420	1.171	1.721
	Vis 6	0.906	0.752	1.091	1.088	0.903	1.311	1.459	1.203	1.770
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.965	1.825	2.115	2.260	2.093	2.440	3.385	3.125	3.666
sys	Vis 1	134.035	129.573	138.498	134.733	130.275	139.191	134.394	129.791	138.996
	Vis 2	130.629	126.167	135.090	131.125	126.665	135.585	130.207	125.607	134.806
	Vis 3	131.131	126.666	135.595	130.285	125.824	134.747	130.265	125.662	134.868
	Vis 4	129.946	125.480	134.412	129.845	125.357	134.332	129.772	125.152	134.393
	Vis 5	130.446	125.981	134.911	128.030	123.520	132.540	128.157	123.490	132.824
	Vis 6	130.336	125.856	134.816	127.533	122.990	132.076	127.457	122.756	132.158
	Vis 7	127.243	122.767	131.718	128.756	124.255	133.257	130.959	126.286	135.632
	V7-V1	-6.793	-9.551	-4.035	-5.976	-8.812	-3.141	-3.435	-6.380	-0.489
dia	Vis 1	85.428	82.828	88.027	85.398	82.801	87.995	85.189	82.508	87.869
	Vis 2	84.151	81.552	86.750	83.940	81.343	86.538	83.241	80.562	85.920
	Vis 3	83.517	80.916	86.118	83.235	80.637	85.834	83.744	81.063	86.425
	Vis 4	83.650	81.049	86.252	83.462	80.850	86.074	83.379	80.689	86.069
	Vis 5	83.014	80.412	85.615	82.622	79.998	85.246	82.384	79.670	85.099
	Vis 6	83.981	81.372	86.590	82.420	79.779	85.061	82.003	79.271	84.735
	Vis 7	81.989	79.383	84.596	82.440	79.821	85.059	81.570	78.853	84.288
	V7-V1	-3.438	-4.954	-1.922	-2.958	-4.517	-1.399	-3.618	-5.238	-1.999
pulse	Vis 1	81.643	77.868	85.418	79.985	76.213	83.757	81.272	77.380	85.165
	Vis 2	80.785	77.007	84.564	79.659	75.886	83.432	78.799	74.909	82.689
	Vis 3	80.000	76.221	83.779	79.045	75.268	82.822	78.356	74.464	82.248
	Vis 4	80.642	76.864	84.419	78.754	74.971	82.537	79.267	75.364	83.169
	Vis 5	79.348	75.570	83.126	78.034	74.241	81.828	79.030	75.106	82.954
	Vis 6	78.877	75.093	82.660	77.484	73.671	81.296	79.466	75.531	83.402
	Vis 7	80.180	76.394	83.966	79.541	75.746	83.335	78.243	74.314	82.172
	V7-V1	-1.463	-3.179	0.252	-0.444	-2.219	1.331	-3.029	-4.864	-1.194
chol	Vis 1	4.618	4.329	4.906	4.724	4.436	5.012	4.626	4.328	4.923
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	4.721	4.431	5.011	4.876	4.586	5.167	4.778	4.479	5.077
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	4.789	4.499	5.079	4.749	4.457	5.041	4.800	4.499	5.101
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	4.804	4.514	5.094	4.783	4.494	5.072	4.826	4.528	5.124
	V7-V1	0.187	0.047	0.327	0.059	-0.081	0.199	0.201	0.056	0.346
ldl	Vis 1	2.412	2.153	2.672	2.570	2.312	2.829	2.479	2.211	2.747
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	2.512	2.251	2.772	2.684	2.424	2.944	2.622	2.352	2.891
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	2.505	2.244	2.766	2.567	2.306	2.828	2.604	2.333	2.876
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	2.580	2.319	2.841	2.628	2.370	2.887	2.646	2.376	2.916
	V7-V1	0.168	0.050	0.286	0.058	-0.060	0.176	0.167	0.045	0.289
hdl	Vis 1	1.299	1.183	1.414	1.228	1.113	1.343	1.219	1.100	1.338
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.352	1.237	1.468	1.261	1.145	1.376	1.255	1.136	1.374
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.350	1.234	1.465	1.252	1.136	1.368	1.260	1.141	1.380
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.328	1.213	1.444	1.216	1.100	1.331	1.204	1.085	1.323
	V7-V1	0.030	-0.007	0.066	-0.012	-0.049	0.024	-0.015	-0.053	0.022
vldl(l)	Vis 1	0.769	0.660	0.897	0.768	0.659	0.895	0.772	0.659	0.905
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.713	0.610	0.833	0.786	0.673	0.917	0.802	0.683	0.941
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.730	0.625	0.853	0.818	0.699	0.956	0.812	0.691	0.955
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA

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         Vis 7    0.743    0.637    0.867    0.782    0.671    0.911    0.787    0.671    0.923
         V7-V1    0.966    0.899    1.038    1.018    0.947    1.094    1.020    0.947    1.098
trig(l)  Vis 1    1.735    1.468    2.050    1.785    1.511    2.108    1.755    1.478    2.084
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3    1.636    1.383    1.934    1.828    1.546    2.161    1.741    1.465    2.069
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5    1.710    1.446    2.021    1.829    1.546    2.164    1.802    1.515    2.144
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    1.698    1.436    2.007    1.800    1.523    2.126    1.811    1.525    2.151
         V7-V1    0.979    0.910    1.053    1.008    0.938    1.084    1.032    0.957    1.112
fimtavg  Vis 1    0.721    0.674    0.767    0.727    0.681    0.773    0.724    0.676    0.771
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    0.712    0.665    0.758    0.727    0.681    0.774    0.712    0.665    0.760
         V7-V1   -0.009   -0.022    0.004    0.000   -0.012    0.013   -0.011   -0.025    0.002
fimtmax  Vis 1    0.870    0.818    0.923    0.871    0.819    0.924    0.876    0.822    0.930
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    0.860    0.808    0.913    0.873    0.820    0.925    0.861    0.807    0.916
         V7-V1   -0.010   -0.025    0.005    0.001   -0.014    0.017   -0.015   -0.030    0.001
iem      Vis 1 2012.277 1690.713 2333.841 1937.271 1618.506 2256.036 1958.331 1625.521 2291.141
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7 1945.203 1619.846 2270.560 1858.681 1537.492 2179.871 1854.539 1521.596 2187.481
         V7-V1  -67.073 -217.920   83.773  -78.589 -231.886   74.707 -103.793 -259.482   51.896
csc2     Vis 1    2.925    2.601    3.248    3.036    2.715    3.357    2.985    2.650    3.319
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    2.958    2.631    3.285    3.041    2.718    3.364    3.000    2.666    3.335
         V7-V1    0.033   -0.114    0.181    0.005   -0.145    0.154    0.016   -0.136    0.168
imtareal Vis 1   15.223   13.697   16.749   15.763   14.252   17.275   15.623   14.050   17.196
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7   15.330   13.796   16.863   15.760   14.244   17.276   15.472   13.898   17.045
         V7-V1    0.107   -0.326    0.540   -0.003   -0.443    0.438   -0.151   -0.598    0.295
n.pl(l)  Vis 1    1.433    1.064    1.930    1.283    0.936    1.760    1.392    1.024    1.893
         Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
         Vis 7    1.718    1.276    2.313    1.495    1.090    2.050    1.586    1.167    2.155
         V7-V1    1.199    1.107    1.299    1.165    1.069    1.270    1.139    1.044    1.243
> round( ftable( Eff[,"PP","Conf",,,1:3+3], col.vars=4:3 ), 3 )
                 Asp-Det                    Asp-Bip                    Det-Bip
                     Est       lo       hi      Est       lo       hi      Est       lo       hi
var      par
hba1c    Vis 1   -0.121   -0.389    0.148   -0.096   -0.370    0.178    0.024   -0.250    0.299
         Vis 2   -0.128   -0.397    0.141    0.726    0.453    1.000    0.854    0.580    1.129
         Vis 3    0.115   -0.155    0.386    0.779    0.503    1.054    0.663    0.388    0.939
         Vis 4    0.111   -0.161    0.383    0.674    0.398    0.949    0.563    0.284    0.841
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	Vis 5	0.110	-0.163	0.382	0.555	0.277	0.833	0.445	0.163	0.727
	Vis 6	0.200	-0.076	0.476	0.472	0.190	0.753	0.272	-0.015	0.559
	Vis 7	0.418	0.147	0.688	0.588	0.313	0.864	0.171	-0.105	0.447
	V7-V1	0.538	0.297	0.779	0.685	0.439	0.930	0.147	-0.099	0.392
weight	Vis 1	0.743	-2.863	4.348	1.234	-2.443	4.911	0.492	-3.194	4.178
	Vis 2	0.849	-2.757	4.455	-0.797	-4.475	2.880	-1.646	-5.333	2.040
	Vis 3	1.101	-2.506	4.707	-0.680	-4.358	2.998	-1.781	-5.468	1.907
	Vis 4	1.377	-2.232	4.986	-0.179	-3.858	3.500	-1.556	-5.247	2.135
	Vis 5	1.008	-2.602	4.618	-0.096	-3.778	3.586	-1.104	-4.798	2.591
	Vis 6	0.934	-2.679	4.547	0.251	-3.434	3.936	-0.683	-4.381	3.015
	Vis 7	0.642	-2.966	4.251	-0.109	-3.788	3.570	-0.752	-4.440	2.936
	V7-V1	-0.100	-1.019	0.819	-1.344	-2.278	-0.409	-1.243	-2.180	-0.307
bmi	Vis 1	0.320	-0.753	1.392	0.287	-0.807	1.381	-0.033	-1.129	1.064
	Vis 2	0.355	-0.718	1.428	-0.386	-1.480	0.708	-0.741	-1.838	0.356
	Vis 3	0.453	-0.620	1.526	-0.344	-1.438	0.751	-0.797	-1.894	0.300
	Vis 4	0.532	-0.543	1.606	-0.186	-1.281	0.909	-0.717	-1.816	0.381
	Vis 5	0.426	-0.649	1.500	-0.155	-1.251	0.940	-0.581	-1.681	0.519
	Vis 6	0.388	-0.688	1.464	-0.056	-1.153	1.041	-0.444	-1.545	0.657
	Vis 7	0.260	-0.813	1.334	-0.172	-1.266	0.923	-0.432	-1.529	0.665
	V7-V1	-0.059	-0.364	0.246	-0.459	-0.769	-0.148	-0.399	-0.710	-0.088
whr	Vis 1	0.001	-0.016	0.018	0.009	-0.008	0.026	0.008	-0.009	0.025
	Vis 2	0.006	-0.010	0.023	0.007	-0.010	0.024	0.001	-0.017	0.018
	Vis 3	0.010	-0.007	0.027	0.008	-0.009	0.025	-0.002	-0.019	0.015
	Vis 4	0.008	-0.009	0.025	0.004	-0.013	0.021	-0.004	-0.021	0.014
	Vis 5	0.009	-0.008	0.026	0.007	-0.011	0.024	-0.002	-0.020	0.016
	Vis 6	0.010	-0.008	0.027	0.010	-0.008	0.027	0.000	-0.018	0.018
	Vis 7	0.013	-0.004	0.030	0.023	0.006	0.041	0.010	-0.007	0.028
	V7-V1	0.012	-0.002	0.026	0.015	0.000	0.029	0.003	-0.012	0.017
gluc	Vis 1	-0.823	-1.543	-0.103	-0.134	-0.868	0.599	0.689	-0.047	1.425
	Vis 2	-0.625	-1.364	0.113	-0.878	-1.628	-0.128	-0.252	-1.007	0.502
	Vis 3	-0.198	-0.950	0.555	-0.629	-1.387	0.129	-0.432	-1.195	0.332
	Vis 4	0.455	-0.299	1.208	-0.259	-1.017	0.500	-0.713	-1.486	0.060
	Vis 5	-0.414	-1.166	0.338	-1.480	-2.242	-0.718	-1.066	-1.847	-0.285
	Vis 6	-0.469	-1.237	0.300	-1.004	-1.787	-0.221	-0.535	-1.342	0.272
	Vis 7	-0.233	-0.961	0.495	-0.937	-1.677	-0.196	-0.704	-1.446	0.039
	V7-V1	0.590	-0.287	1.466	-0.803	-1.695	0.089	-1.392	-2.287	-0.498
ins(l)	Vis 1	1.273	1.009	1.605	1.091	0.861	1.383	0.857	0.676	1.087
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.766	0.603	0.972	0.609	0.477	0.776	0.795	0.624	1.012
	V7-V1	0.602	0.473	0.767	0.558	0.436	0.714	0.927	0.725	1.185
cpep(l)	Vis 1	1.183	0.974	1.438	1.191	0.976	1.453	1.007	0.825	1.229
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.966	0.793	1.176	0.832	0.681	1.017	0.862	0.705	1.053
	V7-V1	0.816	0.701	0.949	0.698	0.599	0.814	0.856	0.734	0.998
idos(l)	Vis 1	1.054	0.906	1.225	0.947	0.812	1.105	0.899	0.770	1.049
	Vis 2	1.252	1.076	1.456	1.347	1.155	1.571	1.076	0.922	1.256
	Vis 3	1.239	1.065	1.442	1.479	1.267	1.725	1.193	1.022	1.393
	Vis 4	1.247	1.072	1.452	1.541	1.320	1.799	1.235	1.057	1.444
	Vis 5	1.253	1.076	1.459	1.592	1.362	1.860	1.270	1.086	1.486
	Vis 6	1.216	1.042	1.417	1.609	1.376	1.882	1.324	1.130	1.551
	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.154	1.033	1.288	1.699	1.520	1.901	1.473	1.315	1.651
ipkg(l)	Vis 1	1.044	0.910	1.198	0.935	0.813	1.076	0.896	0.778	1.031
	Vis 2	1.237	1.078	1.419	1.357	1.179	1.561	1.097	0.953	1.263
	Vis 3	1.225	1.067	1.406	1.491	1.296	1.717	1.218	1.057	1.403
	Vis 4	1.230	1.071	1.413	1.547	1.344	1.781	1.258	1.091	1.450
	Vis 5	1.234	1.074	1.418	1.595	1.384	1.839	1.293	1.120	1.493
	Vis 6	1.201	1.044	1.382	1.611	1.397	1.859	1.341	1.161	1.550

	Vis 7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	V7-V1	1.150	1.034	1.280	1.723	1.545	1.921	1.498	1.341	1.673
sys	Vis 1	0.697	-3.037	4.431	0.358	-3.447	4.164	-0.339	-4.153	3.475
	Vis 2	0.496	-3.233	4.226	-0.422	-4.218	3.374	-0.918	-4.727	2.890
	Vis 3	-0.845	-4.581	2.891	-0.866	-4.673	2.942	-0.020	-3.837	3.796
	Vis 4	-0.101	-3.882	3.680	-0.173	-4.002	3.655	-0.072	-3.946	3.801
	Vis 5	-2.416	-6.210	1.377	-2.289	-6.161	1.583	0.127	-3.810	4.064
	Vis 6	-2.803	-6.654	1.048	-2.879	-6.808	1.051	-0.076	-4.090	3.939
	Vis 7	1.514	-2.298	5.326	3.717	-0.174	7.608	2.203	-1.745	6.150
	V7-V1	0.817	-3.139	4.772	3.358	-0.677	7.394	2.542	-1.547	6.631
dia	Vis 1	-0.029	-2.162	2.103	-0.239	-2.412	1.934	-0.210	-2.388	1.969
	Vis 2	-0.211	-2.341	1.919	-0.910	-3.078	1.258	-0.699	-2.875	1.476
	Vis 3	-0.281	-2.415	1.852	0.227	-1.947	2.402	0.509	-1.671	2.688
	Vis 4	-0.188	-2.346	1.970	-0.271	-2.457	1.915	-0.083	-2.293	2.127
	Vis 5	-0.392	-2.556	1.773	-0.629	-2.838	1.579	-0.238	-2.482	2.006
	Vis 6	-1.561	-3.756	0.634	-1.977	-4.217	0.262	-0.416	-2.701	1.869
	Vis 7	0.451	-1.723	2.624	-0.419	-2.638	1.800	-0.870	-3.119	1.380
	V7-V1	0.480	-1.695	2.655	-0.180	-2.398	2.038	-0.660	-2.908	1.588
pulse	Vis 1	-1.659	-4.547	1.230	-0.371	-3.313	2.571	1.287	-1.666	4.241
	Vis 2	-1.127	-4.015	1.761	-1.986	-4.928	0.956	-0.859	-3.808	2.089
	Vis 3	-0.955	-3.854	1.944	-1.644	-4.592	1.304	-0.689	-3.649	2.270
	Vis 4	-1.887	-4.795	1.021	-1.375	-4.332	1.582	0.513	-2.470	3.495
	Vis 5	-1.314	-4.230	1.602	-0.318	-3.300	2.664	0.996	-2.019	4.011
	Vis 6	-1.393	-4.343	1.557	0.590	-2.413	3.592	1.983	-1.072	5.037
	Vis 7	-0.639	-3.578	2.300	-1.937	-4.933	1.060	-1.297	-4.326	1.731
	V7-V1	1.019	-1.450	3.488	-1.566	-4.078	0.947	-2.585	-5.138	-0.032
chol	Vis 1	0.107	-0.113	0.327	0.008	-0.216	0.232	-0.099	-0.324	0.126
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.156	-0.069	0.381	0.057	-0.171	0.286	-0.099	-0.328	0.131
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.040	-0.266	0.186	0.011	-0.219	0.241	0.051	-0.182	0.284
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.021	-0.244	0.201	0.022	-0.204	0.248	0.043	-0.183	0.270
	V7-V1	-0.128	-0.326	0.070	0.014	-0.188	0.216	0.142	-0.060	0.344
ldl	Vis 1	0.158	-0.037	0.353	0.067	-0.131	0.265	-0.091	-0.290	0.108
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	0.172	-0.027	0.371	0.110	-0.092	0.312	-0.063	-0.266	0.141
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	0.062	-0.138	0.262	0.099	-0.104	0.303	0.037	-0.168	0.243
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	0.048	-0.148	0.245	0.066	-0.135	0.267	0.018	-0.183	0.219
	V7-V1	-0.110	-0.277	0.057	-0.001	-0.171	0.169	0.109	-0.061	0.279
hdl	Vis 1	-0.071	-0.153	0.011	-0.079	-0.163	0.004	-0.009	-0.093	0.075
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	-0.092	-0.175	-0.009	-0.098	-0.182	-0.013	-0.006	-0.091	0.079
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	-0.098	-0.181	-0.014	-0.089	-0.174	-0.005	0.008	-0.077	0.094
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	-0.113	-0.195	-0.030	-0.125	-0.209	-0.041	-0.012	-0.096	0.072
	V7-V1	-0.042	-0.094	0.009	-0.045	-0.098	0.007	-0.003	-0.056	0.049
vldl(l)	Vis 1	0.999	0.890	1.121	1.004	0.892	1.129	1.005	0.893	1.131
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.102	0.974	1.246	1.124	0.994	1.272	1.021	0.900	1.157
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.120	0.989	1.269	1.112	0.981	1.262	0.993	0.874	1.129
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.053	0.937	1.183	1.059	0.941	1.193	1.006	0.894	1.134
	V7-V1	1.054	0.952	1.167	1.056	0.952	1.170	1.002	0.903	1.110
trig(l)	Vis 1	1.029	0.909	1.165	1.012	0.891	1.149	0.983	0.866	1.116
	Vis 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 3	1.117	0.984	1.269	1.065	0.936	1.211	0.953	0.837	1.085
	Vis 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 5	1.070	0.942	1.215	1.054	0.926	1.200	0.985	0.864	1.123
	Vis 6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vis 7	1.060	0.935	1.202	1.067	0.939	1.212	1.006	0.886	1.143
	V7-V1	1.030	0.929	1.142	1.054	0.949	1.170	1.023	0.922	1.136

```
  fimtavg  Vis 1    0.006   -0.026    0.038    0.003   -0.030    0.036   -0.003   -0.036    0.030
           Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7    0.016   -0.016    0.048    0.001   -0.032    0.034   -0.015   -0.048    0.018
           V7-V1    0.010   -0.009    0.028   -0.002   -0.021    0.016   -0.012   -0.030    0.007
  fimtmax  Vis 1    0.001   -0.036    0.037    0.006   -0.032    0.043    0.005   -0.032    0.042
           Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7    0.012   -0.024    0.049    0.001   -0.036    0.039   -0.011   -0.049    0.026
           V7-V1    0.012   -0.010    0.033   -0.004   -0.026    0.018   -0.016   -0.038    0.006
  iem      Vis 1  -75.006 -308.097  158.086  -53.945 -293.455  185.565   21.061 -218.992  261.113
           Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7  -86.522 -329.524  156.481  -90.665 -334.719  153.390   -4.143 -248.927  240.641
           V7-V1  -11.516 -226.583  203.551  -36.719 -253.490  180.051  -25.204 -243.684  193.277
  csc2     Vis 1    0.111   -0.122    0.345    0.060   -0.180    0.300   -0.051   -0.291    0.189
           Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7    0.082   -0.161    0.325    0.042   -0.202    0.286   -0.040   -0.285    0.205
           V7-V1   -0.029   -0.239    0.181   -0.018   -0.229    0.194    0.011   -0.202    0.224
  imtareal Vis 1    0.540   -0.516    1.597    0.400   -0.681    1.482   -0.140   -1.222    0.943
           Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7    0.430   -0.646    1.507    0.142   -0.949    1.233   -0.289   -1.381    0.804
           V7-V1   -0.110   -0.727    0.508   -0.258   -0.880    0.363   -0.149   -0.776    0.478
  n.pl(l)  Vis 1    0.896    0.731    1.098    0.972    0.791    1.193    1.085    0.878    1.341
           Vis 2       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 3       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 4       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 5       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 6       NA       NA       NA       NA       NA       NA       NA       NA       NA
           Vis 7    0.870    0.711    1.066    0.923    0.753    1.133    1.061    0.859    1.310
           V7-V1    0.972    0.864    1.093    0.950    0.844    1.070    0.978    0.865    1.106
```

```
> #for( vv in dimnames(Eff)[[1]] )
> #   {
> #   cat( "-------------------------------------\n", vv, "\n" )
> #   dec <- 3 - ( max(Eff[vv,,,,,1:3])>100  ) -
> #              ( max(Eff[vv,,,,,1:3])>1000 )
> #   print( round( ftable( Eff[vv,,,,,1:3  ], col.vars=5:4 ), dec ) )
> #   print( round( ftable( Eff[vv,,,,,1:3+3], col.vars=5:4 ), dec ) )
> #   }
```

and the tests in those table:

```
> for( vv in dimnames(Tst)[[1]] )
+    {
+    cat( "--------------------------------\n", vv, "\n" )
+    print( round( ftable( Tst[vv,,,,"Pval"], row.vars=3 ), 4 ) )
+    }
  --------------------------------
   hba1c
```

ana mod	IT Prim	Rest	Conf	PP Prim	Rest	Conf
test						
All equal AspD vs. Biph	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
All equal Detm vs. Biph	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
All equal Detm vs. AspD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Visit 7 equal AspD vs. Biph	0.0019	0.0019	0.0020	0.0021	0.0020	0.0025
Visit 7 equal Detm vs. Biph	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Visit 7 equal Detm vs. AspD	0.1074	0.1110	0.0995	0.2454	0.2590	0.2249
Change equal AspD vs. Biph	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Change equal Detm vs. Biph	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Change equal Detm vs. AspD	0.1304	0.1310	0.1297	0.2430	0.2410	0.2422
Biph change=0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AspD change=0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Detm change=0	0.0034	0.0033	0.0034	0.0002	0.0002	0.0002

----

weight

ana mod	IT Prim	Rest	Conf	PP Prim	Rest	Conf
test						
All equal AspD vs. Biph	0.7468	0.7433	0.7905	0.8203	0.8125	0.8414
All equal Detm vs. Biph	0.0005	0.0005	0.0005	0.0011	0.0010	0.0011
All equal Detm vs. AspD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Visit 7 equal AspD vs. Biph	0.3618	0.3539	0.4764	0.5978	0.5578	0.7272
Visit 7 equal Detm vs. Biph	0.4699	0.4398	0.5984	0.8743	0.7533	0.9535
Visit 7 equal Detm vs. AspD	0.8514	0.8789	0.8538	0.7205	0.7953	0.6895
Change equal AspD vs. Biph	0.8102	0.8112	0.8150	0.8316	0.8318	0.8307
Change equal Detm vs. Biph	0.0026	0.0027	0.0026	0.0049	0.0049	0.0048
Change equal Detm vs. AspD	0.0055	0.0057	0.0054	0.0093	0.0093	0.0093
Biph change=0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AspD change=0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Detm change=0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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bmi

ana mod	IT Prim	Rest	Conf	PP Prim	Rest	Conf
test						
All equal AspD vs. Biph	0.7147	0.7104	0.6786	0.7557	0.7499	0.7301
All equal Detm vs. Biph	0.0008	0.0008	0.0007	0.0012	0.0012	0.0012
All equal Detm vs. AspD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Visit 7 equal AspD vs. Biph	0.5557	0.5410	0.4561	0.7577	0.7172	0.6346
Visit 7 equal Detm vs. Biph	0.9372	0.8905	0.8825	0.7078	0.8207	0.7588
Visit 7 equal Detm vs. AspD	0.6103	0.6365	0.5510	0.4991	0.5617	0.4405
Change equal AspD vs. Biph	0.7037	0.7043	0.7014	0.7028	0.7031	0.7036
Change equal Detm vs. Biph	0.0021	0.0022	0.0021	0.0038	0.0038	0.0038
Change equal Detm vs. AspD	0.0071	0.0073	0.0070	0.0118	0.0118	0.0118
Biph change=0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AspD change=0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Detm change=0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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whr

ana mod	IT Prim	Rest	Conf	PP Prim	Rest	Conf
test						
All equal AspD vs. Biph	0.6510	0.6415	0.6754	0.6884	0.6766	0.7159
All equal Detm vs. Biph	0.2192	0.2114	0.2443	0.1406	0.1334	0.1621
All equal Detm vs. AspD	0.5185	0.5196	0.5343	0.4821	0.4846	0.4925
Visit 7 equal AspD vs. Biph	0.0936	0.0894	0.1075	0.1223	0.1129	0.1368
Visit 7 equal Detm vs. Biph	0.0226	0.0206	0.0205	0.0100	0.0087	0.0083
Visit 7 equal Detm vs. AspD	0.5378	0.5286	0.4713	0.2899	0.2856	0.2396
Change equal AspD vs. Biph	0.0926	0.0918	0.0901	0.0902	0.0904	0.0913
Change equal Detm vs. Biph	0.0484	0.0469	0.0431	0.0446	0.0444	0.0453
Change equal Detm vs. AspD	0.7516	0.7447	0.7252	0.7293	0.7269	0.7297
Biph change=0	0.4875	0.4802	0.4766	0.5097	0.5092	0.5151
AspD change=0	0.0914	0.0926	0.0912	0.0821	0.0824	0.0820
Detm change=0	0.0371	0.0365	0.0327	0.0310	0.0308	0.0311

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 gluc
                            ana      IT                      PP
                            mod    Prim    Rest    Conf    Prim    Rest    Conf
test
    All equal AspD vs. Biph      0.1236 0.1332 0.1282 0.1138 0.1321 0.1171
    All equal Detm vs. Biph      0.0125 0.0203 0.0143 0.0021 0.0040 0.0024
    All equal Detm vs. AspD      0.0177 0.0216 0.0199 0.0046 0.0056 0.0052
Visit 7 equal AspD vs. Biph      0.7937 0.8272 0.8041 0.5274 0.5751 0.5301
Visit 7 equal Detm vs. Biph      0.0524 0.0666 0.0588 0.0115 0.0165 0.0132
Visit 7 equal Detm vs. AspD      0.0920 0.1048 0.0995 0.0572 0.0653 0.0633
 Change equal AspD vs. Biph      0.1108 0.1101 0.1116 0.1857 0.1885 0.1873
 Change equal Detm vs. Biph      0.3347 0.3475 0.3392 0.0776 0.0777 0.0778
 Change equal Detm vs. AspD      0.0109 0.0116 0.0113 0.0022 0.0023 0.0023
        Biph change=0            0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        AspD change=0            0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        Detm change=0            0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
--------------------------------
 ins(l)
                            ana      IT                      PP
                            mod    Prim    Rest    Conf    Prim    Rest    Conf
test
    All equal AspD vs. Biph      0.0004 0.0004 0.0004 0.0002 0.0002 0.0002
    All equal Detm vs. Biph      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
    All equal Detm vs. AspD      0.2234 0.2484 0.2135 0.1665 0.1959 0.1609
Visit 7 equal AspD vs. Biph      0.0260 0.0263 0.0286 0.0272 0.0285 0.0284
Visit 7 equal Detm vs. Biph      0.0001 0.0001 0.0001 0.0001 0.0001 0.0001
Visit 7 equal Detm vs. AspD      0.0898 0.1021 0.0845 0.0665 0.0787 0.0629
 Change equal AspD vs. Biph      0.0001 0.0001 0.0001 0.0000 0.0000 0.0000
 Change equal Detm vs. Biph      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
 Change equal Detm vs. AspD      0.5103 0.5326 0.4951 0.5687 0.5704 0.5443
        Biph change=0            0.3319 0.3409 0.3278 0.3788 0.4000 0.3471
        AspD change=0            0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        Detm change=0            0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
--------------------------------
 cpep(l)
                            ana      IT                      PP
                            mod    Prim    Rest    Conf    Prim    Rest    Conf
test
    All equal AspD vs. Biph      0.0248 0.0279 0.0215 0.0226 0.0237 0.0232
    All equal Detm vs. Biph      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
    All equal Detm vs. AspD      0.0822 0.0948 0.0849 0.1050 0.1170 0.1069
Visit 7 equal AspD vs. Biph      0.8917 0.8767 0.8898 0.7649 0.7773 0.7274
Visit 7 equal Detm vs. Biph      0.0593 0.0744 0.0594 0.0798 0.1244 0.0719
Visit 7 equal Detm vs. AspD      0.0794 0.1025 0.0803 0.1456 0.2090 0.1463
 Change equal AspD vs. Biph      0.0110 0.0115 0.0098 0.0083 0.0085 0.0084
 Change equal Detm vs. Biph      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
 Change equal Detm vs. AspD      0.0480 0.0510 0.0487 0.0473 0.0463 0.0472
        Biph change=0            0.0025 0.0024 0.0031 0.0033 0.0033 0.0033
        AspD change=0            0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        Detm change=0            0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
--------------------------------
 idos(l)
                            ana      IT                      PP
                            mod    Prim    Rest    Conf    Prim    Rest    Conf
test
    All equal AspD vs. Biph      0.0005 0.0006 0.0005 0.0008 0.0010 0.0008
    All equal Detm vs. Biph      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
    All equal Detm vs. AspD      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Visit 7 equal AspD vs. Biph      0.0113 0.0140 0.0122 0.0122 0.0148 0.0128
Visit 7 equal Detm vs. Biph      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Visit 7 equal Detm vs. AspD      0.0001 0.0002 0.0001 0.0005 0.0010 0.0005
 Change equal AspD vs. Biph      0.0080 0.0083 0.0078 0.0109 0.0112 0.0109
 Change equal Detm vs. Biph      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
 Change equal Detm vs. AspD      0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        Biph change=0            0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
```

```
        AspD change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        Detm change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
--------------------------------
 ipkg(l)
                            ana     IT                    PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph    0.0004 0.0005 0.0003 0.0006 0.0008 0.0006
    All equal Detm vs. Biph    0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
    All equal Detm vs. AspD    0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Visit 7 equal AspD vs. Biph    0.0123 0.0163 0.0120 0.0106 0.0139 0.0104
Visit 7 equal Detm vs. Biph    0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Visit 7 equal Detm vs. AspD    0.0000 0.0000 0.0000 0.0001 0.0002 0.0001
 Change equal AspD vs. Biph    0.0064 0.0067 0.0063 0.0099 0.0101 0.0099
 Change equal Detm vs. Biph    0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
 Change equal Detm vs. AspD    0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        Biph change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        AspD change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        Detm change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
--------------------------------
 sys
                            ana     IT                    PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph    0.3440 0.3539 0.3447 0.3704 0.3774 0.3675
    All equal Detm vs. Biph    0.0741 0.0765 0.0771 0.0818 0.0838 0.0836
    All equal Detm vs. AspD    0.9303 0.9302 0.9319 0.9189 0.9189 0.9222
Visit 7 equal AspD vs. Biph    0.3373 0.3365 0.3629 0.4064 0.3982 0.4364
Visit 7 equal Detm vs. Biph    0.0262 0.0262 0.0299 0.0525 0.0524 0.0612
Visit 7 equal Detm vs. AspD    0.2064 0.2069 0.2081 0.2667 0.2725 0.2741
 Change equal AspD vs. Biph    0.7282 0.7190 0.7215 0.6925 0.6935 0.6858
 Change equal Detm vs. Biph    0.1249 0.1221 0.1265 0.1024 0.1025 0.1029
 Change equal Detm vs. AspD    0.2391 0.2393 0.2451 0.2189 0.2186 0.2231
        Biph change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        AspD change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        Detm change=0          0.0165 0.0159 0.0155 0.0228 0.0224 0.0223
--------------------------------
 dia
                            ana     IT                    PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph    0.8251 0.8216 0.8188 0.8310 0.8265 0.8223
    All equal Detm vs. Biph    0.6053 0.6443 0.6121 0.6628 0.6999 0.6667
    All equal Detm vs. AspD    0.9043 0.9217 0.9329 0.9491 0.9610 0.9600
Visit 7 equal AspD vs. Biph    0.5282 0.5262 0.6290 0.5685 0.5568 0.6846
Visit 7 equal Detm vs. Biph    0.6088 0.7015 0.6347 0.7077 0.8691 0.7112
Visit 7 equal Detm vs. AspD    0.2635 0.3192 0.3482 0.3569 0.4646 0.4485
 Change equal AspD vs. Biph    0.6996 0.6908 0.7234 0.6617 0.6628 0.6653
 Change equal Detm vs. Biph    0.8795 0.9242 0.8642 0.8675 0.8783 0.8735
 Change equal Detm vs. AspD    0.5998 0.6309 0.6080 0.5565 0.5667 0.5649
        Biph change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        AspD change=0          0.0002 0.0002 0.0002 0.0002 0.0002 0.0002
        Detm change=0          0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
--------------------------------
 pulse
                            ana     IT                    PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph    0.9840 0.9850 0.9820 0.9507 0.9571 0.9323
    All equal Detm vs. Biph    0.3460 0.3585 0.3580 0.3598 0.3810 0.3690
    All equal Detm vs. AspD    0.1496 0.1501 0.1574 0.1542 0.1533 0.1542
Visit 7 equal AspD vs. Biph    0.9893 0.9697 0.9595 0.7553 0.7872 0.6699
Visit 7 equal Detm vs. Biph    0.2080 0.2321 0.2454 0.1878 0.2273 0.2052
Visit 7 equal Detm vs. AspD    0.2074 0.2219 0.2712 0.3166 0.3506 0.4012
 Change equal AspD vs. Biph    0.5168 0.5116 0.5393 0.4149 0.4162 0.4184
 Change equal Detm vs. Biph    0.1852 0.1935 0.1827 0.2187 0.2198 0.2220
```

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 Change equal Detm vs. AspD     0.0532 0.0553 0.0565 0.0457 0.0462 0.0472
        Biph change=0           0.1222 0.1158 0.1255 0.0947 0.0939 0.0946
        AspD change=0           0.5528 0.5431 0.5297 0.6302 0.6251 0.6239
        Detm change=0           0.0011 0.0011 0.0011 0.0012 0.0012 0.0012
--------------------------------
 chol
                            ana     IT                   PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph     0.2625 0.2532 0.2461 0.2542 0.2423 0.2532
    All equal Detm vs. Biph     0.9900 0.9870 0.9846 0.9912 0.9888 0.9873
    All equal Detm vs. AspD     0.3782 0.3756 0.3834 0.4099 0.4137 0.4237
Visit 7 equal AspD vs. Biph     0.9721 0.9962 0.9384 0.9120 0.9504 0.8500
Visit 7 equal Detm vs. Biph     0.9218 0.8682 0.8058 0.9372 0.8793 0.8496
Visit 7 equal Detm vs. AspD     0.8939 0.8640 0.7465 0.8515 0.8314 0.7075
 Change equal AspD vs. Biph     0.2323 0.2309 0.2121 0.2135 0.2101 0.2053
 Change equal Detm vs. Biph     0.8254 0.8079 0.8318 0.8883 0.8920 0.8925
 Change equal Detm vs. AspD     0.1603 0.1527 0.1474 0.1729 0.1715 0.1676
        Biph change=0           0.0175 0.0180 0.0141 0.0095 0.0093 0.0090
        AspD change=0           0.4832 0.4938 0.4803 0.4039 0.4058 0.4108
        Detm change=0           0.0083 0.0078 0.0068 0.0069 0.0069 0.0067
--------------------------------
 ldl
                            ana     IT                   PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph     0.3604 0.3564 0.3801 0.2698 0.2565 0.2962
    All equal Detm vs. Biph     0.9178 0.9029 0.8753 0.8984 0.8769 0.8561
    All equal Detm vs. AspD     0.5429 0.5468 0.5372 0.5397 0.5467 0.5574
Visit 7 equal AspD vs. Biph     0.6380 0.6289 0.7122 0.5492 0.5229 0.6300
Visit 7 equal Detm vs. Biph     0.6228 0.5843 0.5477 0.5895 0.5454 0.5194
Visit 7 equal Detm vs. AspD     0.9782 0.9443 0.8125 0.9624 0.9830 0.8636
 Change equal AspD vs. Biph     0.2634 0.2659 0.2548 0.2038 0.2030 0.1978
 Change equal Detm vs. Biph     0.9012 0.8884 0.8639 0.9789 0.9756 0.9914
 Change equal Detm vs. AspD     0.2187 0.2148 0.1945 0.2222 0.2229 0.2101
        Biph change=0           0.0097 0.0100 0.0090 0.0056 0.0055 0.0053
        AspD change=0           0.3114 0.3124 0.3115 0.3328 0.3324 0.3353
        Detm change=0           0.0069 0.0067 0.0052 0.0084 0.0085 0.0075
--------------------------------
 hdl
                            ana     IT                   PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph     0.0575 0.0604 0.0611 0.0773 0.0834 0.0795
    All equal Detm vs. Biph     0.0346 0.0337 0.0415 0.0475 0.0426 0.0560
    All equal Detm vs. AspD     0.9592 0.9599 0.9627 0.9560 0.9525 0.9615
Visit 7 equal AspD vs. Biph     0.0043 0.0046 0.0047 0.0071 0.0078 0.0073
Visit 7 equal Detm vs. Biph     0.0018 0.0018 0.0022 0.0030 0.0026 0.0036
Visit 7 equal Detm vs. AspD     0.7709 0.7546 0.8047 0.7417 0.6840 0.7823
 Change equal AspD vs. Biph     0.1112 0.1129 0.1117 0.1086 0.1103 0.1095
 Change equal Detm vs. Biph     0.0840 0.0818 0.0845 0.0887 0.0897 0.0913
 Change equal Detm vs. AspD     0.8722 0.8567 0.8725 0.8995 0.8976 0.9072
        Biph change=0           0.0840 0.0847 0.0841 0.1072 0.1094 0.1092
        AspD change=0           0.6036 0.6082 0.6057 0.5109 0.5113 0.5087
        Detm change=0           0.4671 0.4543 0.4693 0.4178 0.4163 0.4237
--------------------------------
 vldl(l)
                            ana     IT                   PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph     0.1419 0.1357 0.1453 0.1699 0.1616 0.1738
    All equal Detm vs. Biph     0.1267 0.1084 0.1145 0.1579 0.1380 0.1451
    All equal Detm vs. AspD     0.9922 0.9903 0.9928 0.9943 0.9926 0.9943
Visit 7 equal AspD vs. Biph     0.2480 0.2535 0.2342 0.4063 0.4080 0.3892
Visit 7 equal Detm vs. Biph     0.1895 0.1739 0.1793 0.3577 0.3211 0.3402
Visit 7 equal Detm vs. AspD     0.8669 0.8194 0.8698 0.9175 0.8581 0.9150
```

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 Change equal AspD vs. Biph      0.2821 0.2834 0.2985 0.3038 0.3043 0.3110
 Change equal Detm vs. Biph      0.3111 0.3014 0.3119 0.3006 0.3032 0.3030
 Change equal Detm vs. AspD      0.9578 0.9765 0.9848 0.9840 0.9876 0.9760
        Biph change=0            0.2789 0.2794 0.2983 0.3386 0.3440 0.3417
        AspD change=0            0.6615 0.6636 0.6674 0.6179 0.6115 0.6288
        Detm change=0            0.7221 0.6996 0.6927 0.6071 0.6053 0.6079
--------------------------------
 trig(l)
                            ana     IT                    PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph      0.3584 0.3544 0.3225 0.4523 0.4478 0.4347
    All equal Detm vs. Biph      0.6407 0.6038 0.6135 0.7484 0.7130 0.7377
    All equal Detm vs. AspD      0.8993 0.9045 0.8983 0.8918 0.9030 0.8939
Visit 7 equal AspD vs. Biph      0.2149 0.2146 0.1840 0.3920 0.3864 0.3628
Visit 7 equal Detm vs. Biph      0.1759 0.1619 0.1604 0.3392 0.2967 0.3224
Visit 7 equal Detm vs. AspD      0.8993 0.8645 0.9296 0.9076 0.8464 0.9238
 Change equal AspD vs. Biph      0.5826 0.5862 0.6116 0.5620 0.5687 0.5720
 Change equal Detm vs. Biph      0.3541 0.3391 0.3653 0.3149 0.3190 0.3231
 Change equal Detm vs. AspD      0.6989 0.6735 0.6843 0.6631 0.6622 0.6647
        Biph change=0            0.4538 0.4522 0.5057 0.5468 0.5569 0.5633
        AspD change=0            0.9801 0.9882 0.9603 0.8280 0.8271 0.8251
        Detm change=0            0.5731 0.5474 0.5384 0.4149 0.4133 0.4147
--------------------------------
 fimtavg
                            ana     IT                    PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph      0.3843 0.4124 0.3849 0.4671 0.4878 0.4643
    All equal Detm vs. Biph      0.6784 0.7385 0.7292 0.9590 0.9773 0.9665
    All equal Detm vs. AspD      0.3979 0.3901 0.3852 0.4194 0.4061 0.3994
Visit 7 equal AspD vs. Biph      0.2136 0.2494 0.2152 0.3418 0.3889 0.3365
Visit 7 equal Detm vs. Biph      0.5332 0.5988 0.5975 0.9063 0.9875 0.9571
Visit 7 equal Detm vs. AspD      0.5382 0.5344 0.4799 0.4164 0.3905 0.3748
 Change equal AspD vs. Biph      0.3369 0.3276 0.3343 0.3030 0.2981 0.3038
 Change equal Detm vs. Biph      0.6934 0.6983 0.6918 0.8267 0.8340 0.8187
 Change equal Detm vs. AspD      0.1793 0.1755 0.1769 0.2192 0.2188 0.2160
        Biph change=0            0.1715 0.1672 0.1708 0.1639 0.1580 0.1650
        AspD change=0            0.9945 0.9954 0.9985 0.9443 0.9483 0.9434
        Detm change=0            0.0590 0.0585 0.0583 0.1001 0.0988 0.0979
--------------------------------
 fimtmax
                            ana     IT                    PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph      0.4679 0.4787 0.4637 0.5279 0.5324 0.5241
    All equal Detm vs. Biph      0.6003 0.6552 0.6540 0.9040 0.9321 0.9135
    All equal Detm vs. AspD      0.2720 0.2683 0.2727 0.3601 0.3572 0.3511
Visit 7 equal AspD vs. Biph      0.3446 0.3824 0.3418 0.5204 0.5663 0.5043
Visit 7 equal Detm vs. Biph      0.5411 0.6021 0.6135 0.8926 0.9972 0.9464
Visit 7 equal Detm vs. AspD      0.7415 0.7275 0.6588 0.6211 0.5770 0.5573
 Change equal AspD vs. Biph      0.2935 0.2847 0.2902 0.2801 0.2757 0.2808
 Change equal Detm vs. Biph      0.5734 0.5776 0.5723 0.7120 0.7200 0.7033
 Change equal Detm vs. AspD      0.1095 0.1066 0.1075 0.1534 0.1538 0.1506
        Biph change=0            0.1860 0.1811 0.1847 0.1785 0.1717 0.1799
        AspD change=0            0.8690 0.8592 0.8640 0.8518 0.8576 0.8506
        Detm change=0            0.0375 0.0370 0.0369 0.0707 0.0698 0.0688
--------------------------------
 iem
                            ana     IT                    PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph      0.8983 0.8594 0.8831 0.8259 0.7700 0.7559
    All equal Detm vs. Biph      0.6861 0.6061 0.6720 0.8078 0.7053 0.7671
    All equal Detm vs. AspD      0.8931 0.8304 0.8759 0.9814 0.9589 0.9715
Visit 7 equal AspD vs. Biph      0.6465 0.5828 0.6181 0.5497 0.4904 0.4853
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Visit 7 equal Detm vs. Biph     0.4617 0.3842 0.4395 0.5147 0.4045 0.4665
Visit 7 equal Detm vs. AspD     0.7833 0.7502 0.7864 0.9549 0.8822 0.9735
 Change equal AspD vs. Biph     0.7692 0.8115 0.7958 0.8783 0.9018 0.9164
 Change equal Detm vs. Biph     0.4414 0.3948 0.4376 0.7310 0.6794 0.7399
 Change equal Detm vs. AspD     0.6356 0.5425 0.6068 0.8490 0.7729 0.8211
        Biph change=0           0.3803 0.3867 0.3817 0.3818 0.3851 0.3835
        AspD change=0           0.2001 0.2334 0.2187 0.2820 0.3042 0.3150
        Detm change=0           0.0510 0.0400 0.0503 0.1848 0.1564 0.1913
--------------------------------
 csc2
                            ana     IT                 PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph     0.8582 0.7925 0.8136 0.7429 0.6853 0.6433
    All equal Detm vs. Biph     0.8718 0.7975 0.8502 0.9243 0.8548 0.8861
    All equal Detm vs. AspD     0.9010 0.8507 0.8813 0.9378 0.9565 0.9137
Visit 7 equal AspD vs. Biph     0.6942 0.6145 0.6619 0.5793 0.5086 0.5069
Visit 7 equal Detm vs. Biph     0.6027 0.5057 0.5693 0.7933 0.6362 0.7354
Visit 7 equal Detm vs. AspD     0.8999 0.8730 0.8971 0.7731 0.8551 0.7478
 Change equal AspD vs. Biph     0.8863 0.8645 0.8507 0.8326 0.8305 0.7885
 Change equal Detm vs. Biph     0.7610 0.6959 0.7634 0.8815 0.9405 0.8690
 Change equal Detm vs. AspD     0.6565 0.5766 0.6266 0.9520 0.8913 0.9200
        Biph change=0           0.5970 0.6116 0.5993 0.6529 0.6594 0.6569
        AspD change=0           0.7475 0.7932 0.7987 0.8839 0.8941 0.9516
        Detm change=0           0.3416 0.2928 0.3456 0.8195 0.7466 0.8409
--------------------------------
 imtareal
                            ana     IT                 PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph     0.4277 0.5343 0.4275 0.5930 0.6986 0.6026
    All equal Detm vs. Biph     0.1694 0.2070 0.1907 0.5951 0.6439 0.6255
    All equal Detm vs. AspD     0.7114 0.6844 0.6903 0.8782 0.8638 0.8300
Visit 7 equal AspD vs. Biph     0.3205 0.4042 0.3132 0.4335 0.5324 0.4333
Visit 7 equal Detm vs. Biph     0.3681 0.4529 0.4387 0.7116 0.8344 0.7988
Visit 7 equal Detm vs. AspD     0.9256 0.9336 0.8138 0.6879 0.6851 0.6045
 Change equal AspD vs. Biph     0.6346 0.6534 0.6636 0.6994 0.7164 0.7274
 Change equal Detm vs. Biph     0.1978 0.1916 0.1936 0.4215 0.4111 0.4149
 Change equal Detm vs. AspD     0.4196 0.3947 0.3902 0.6771 0.6478 0.6422
        Biph change=0           0.5265 0.5217 0.5315 0.6332 0.6321 0.6277
        AspD change=0           0.9660 0.9988 0.9948 0.9422 0.9688 0.9900
        Detm change=0           0.2363 0.2293 0.2267 0.5111 0.4960 0.5058
--------------------------------
 n.pl(l)
                            ana     IT                 PP
                            mod   Prim   Rest   Conf   Prim   Rest   Conf
test
    All equal AspD vs. Biph     0.4705 0.5257 0.3718 0.4828 0.5667 0.4040
    All equal Detm vs. Biph     0.4982 0.4696 0.5032 0.6564 0.6596 0.6039
    All equal Detm vs. AspD     0.2700 0.2765 0.2497 0.7409 0.7683 0.7457
Visit 7 equal AspD vs. Biph     0.2212 0.2602 0.1596 0.2319 0.2971 0.1794
Visit 7 equal Detm vs. Biph     0.9865 0.9311 0.8729 0.5550 0.6120 0.4451
Visit 7 equal Detm vs. AspD     0.2238 0.2353 0.2207 0.5656 0.6119 0.5826
 Change equal AspD vs. Biph     0.6514 0.6517 0.6622 0.6238 0.6184 0.6325
 Change equal Detm vs. Biph     0.2616 0.2512 0.2481 0.4020 0.3854 0.3997
 Change equal Detm vs. AspD     0.5139 0.4983 0.4848 0.7345 0.7183 0.7226
        Biph change=0           0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
        AspD change=0           0.0004 0.0003 0.0003 0.0006 0.0006 0.0005
        Detm change=0           0.0087 0.0091 0.0084 0.0036 0.0038 0.0034
```

8.3 Graphs of trajectories

Finally we want to plot the estimates, so we put the plotting of a single variable into a function. But first we need a convenience function to place text on the graph:

```
> source( "cnr.R" )
> cnr
  function (xf, yf)
  {
      cn <- par()$usr
      xf <- ifelse(xf > 1, xf/100, xf)
      yf <- ifelse(yf > 1, yf/100, yf)
      xx <- (1 - xf) * cn[1] + xf * cn[2]
      yy <- (1 - yf) * cn[3] + yf * cn[4]
      if (par()$xlog)
          xx <- 10^xx
      if (par()$ylog)
          yy <- 10^yy
      list(x = xx, y = yy)
  }
> pleff <-
+ function( var,
+          ytxt = var,
+            yl = NULL, # yaxis limits
+            yt = NULL, # yaxis major ticks
+            ym = NULL, # yaxis minor ticks
+            hl = ym )
+ {
+ # Get the estimates, but only for the times where they are, otherwise
+ # the the points will not be connected (a feature)
+ var <- dimnames(Eff)$var[grep(var,vnam <- dimnames(Eff)$var)]
+ eff <- Eff[var,"IT","Prim",,,]
+ pef <- cbind( eff[-8,,ilev[1]],
+               eff[-8,,ilev[2]],
+               eff[-8,,ilev[3]] )
+ pef <- pef[complete.cases(pef),]
+ tim <- (as.numeric( gsub("Vis ","",rownames(pef) ) )-1)*3
+
+ if( is.null(yl) ) yl <- range(pef)*c(0.9,1.2)
+ matplot( tim, pef, type="n",
+          xlab="Months since trial entry", xaxt="n", xlim=c(0,19.5),
+          ylab=ytxt, ylim=yl, yaxs="i", yaxt="n", bty="n" )
+ if( !is.null(hl) ) abline( h=hl, col=gray(0.8) )
+ axis( side=1, at=0:6*3, col=clr[4] )
+ axis( side=2, if(!is.null(yt)) at=yt, col=clr[4] )
+ axis( side=2, if(!is.null(ym)) at=ym, labels=rep("",length(ym)), col=clr[4] )
+ text( cnr(c(98,98,98),c(98,92,86)), iN, col=iclr[1:3],
+       font=2, adj=c(1,1), cex=1.2 )
+ if( ltrf[match(var,vnam)] ) { text( cnr(98,74)[[1]], cnr(98,74)[[2]],
+                                  "% change\nfrom baseline", col=clr[4], adj=c(1,0.5) )
+ } else {                        text( cnr(98,74)[[1]], cnr(98,74)[[2]],
+                                    "Change\nfrom baseline", col=clr[4], adj=c(1,0.5) ) }
+ EF <- eff[8,"Est",ilev]
+ # It might not be vist 7 that is the last non-missing, so find that
+ ends <- eff[1:7,"Est",ilev]
+ ends <- ends[max(which(!is.na(ends[,1]))),]
+ # dv <- ends-mean(ends) ; dv <- dv/abs(dv)
+ oe <- order( ends )
+ eo <- c(mean(ends),ends[oe])
+ de <- diff(eo)
+ nd <- de[-1]/abs(de[-1])*pmax( abs(de[-1]), diff(yl)/30 )
+ de <- c(de[1]+nd[1]-de[2],nd)
+ eo <- eo[1] + cumsum(de)
+ ends <- eo[order(oe)]
+ if( ltrf[match(var,vnam)] ) EF <- (EF-1)*100
```

```
+ # print( c(EF, ends ) )
+ text( c(20,20,20), ends,
+       paste( formatC( EF, format="f", digits=1 ), sep="" ),
+       col=iclr[1:3], adj=1, font=2 )
+ matlines( tim, pef, type="l", lwd=c(5,1,1), lty=1, col=rep(iclr[1:3],each=3) )
+ }
```

So we can draw two example graphs, groomed to look nice:

```
> par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, las=1 )
> pleff( "hba1c", expression("Hb"*A[1][c]*" (%)  [Mean (95% CI)]"),
+        yl = c(7,10),
+        yt = 7:10,
+        ym = seq(7,10,0.5) )
```

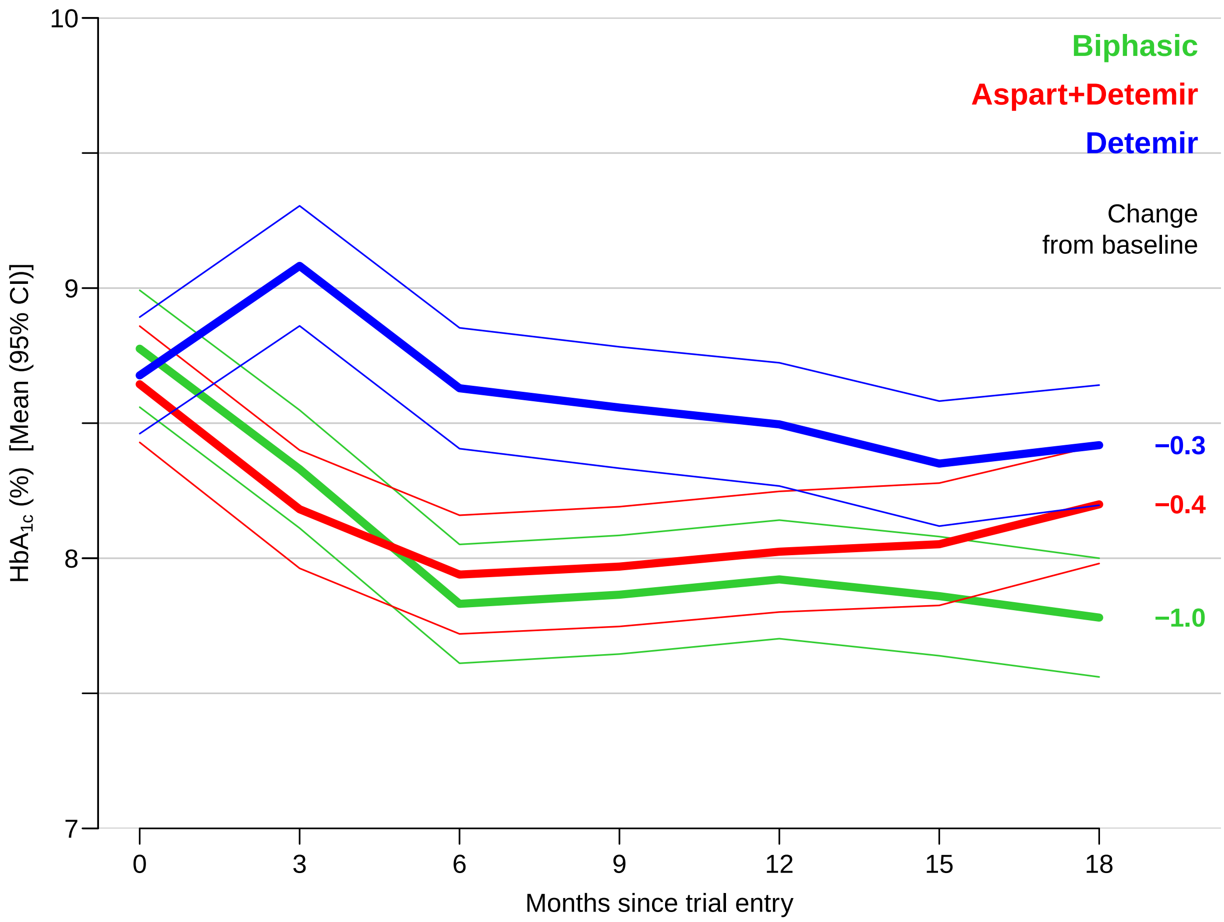

Figure 8.2: *Trajectories for HbA_{1c}, illustrating how parameters translate into the graph.*

```
> par( mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, las=1 )
> pleff("trig","Triglycerides (mmol/l)  [Mean (95% CI)]",
+              yl = c(1,2.5),        # yaxis limits
+              yt = 0:4,             # yaxis major ticks
+              ym = seq(1,3,0.25) ) # yaxis minor ticks
```

With this function in place it is now simple to produce plots for all the variables, as a first guide to how they should be individually adjusted to look sensible:

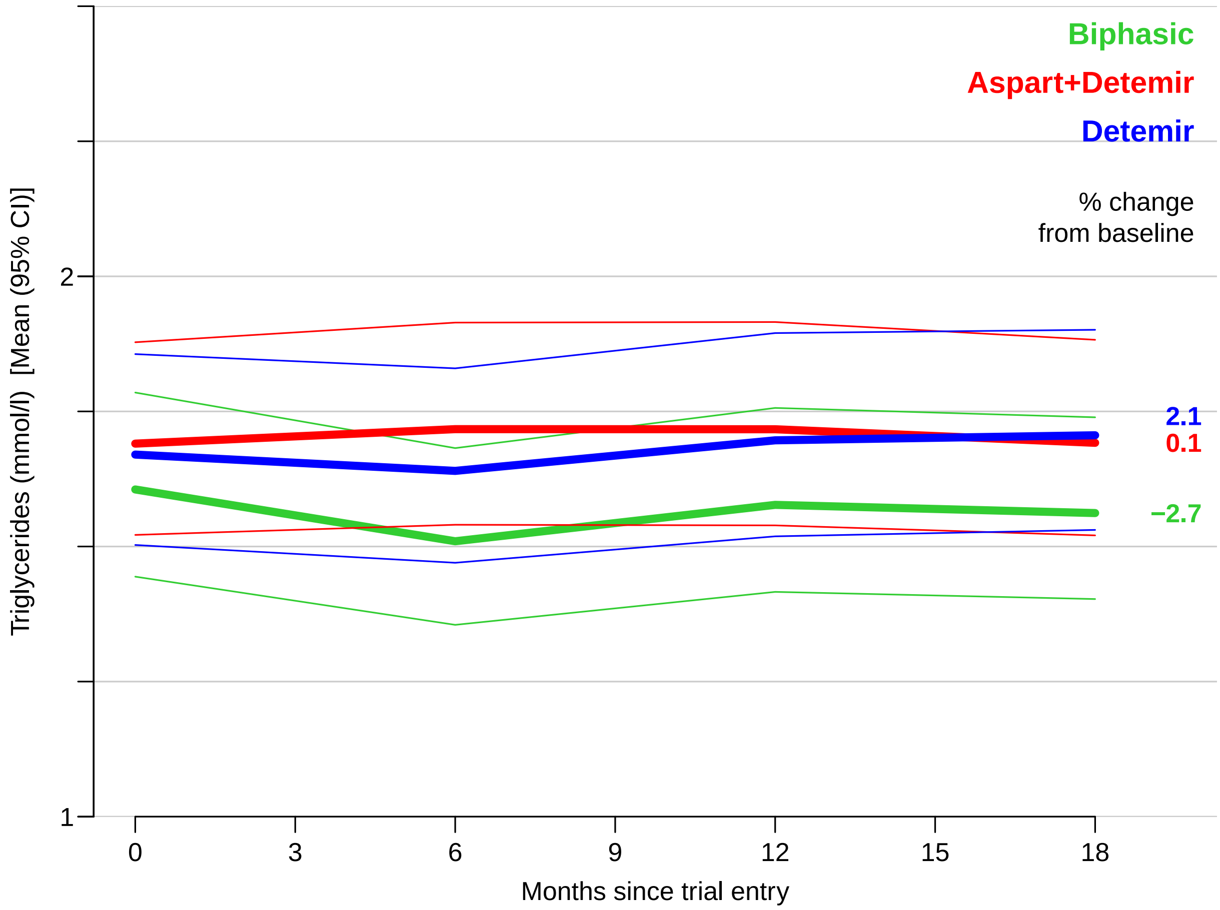

Figure 8.3: *Trajectories for Triglycerides, illustrating how parameters translate into the graph.*

```
> tmpl <-
+ function()
+ {
+ par( mfrow=c(2,2),  mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, las=1 )
+ # HbA1c:
+ pleff( "hba1c",
+        expression("Hb"*A[1][c]*" (%)  [Mean (95% CI)]"),
+        yl = c(7,10),
+        yt = 7:10,
+        ym = seq(7,10,0.5) )
+ text( cnr(2,98), "a", adj=c(0,1), font=2, cex=1.5 )
+ # Gluc
+ pleff("gluc","Fasting p-glucose (mmol/L) [Mean (95% CI)]",
+               yl = c(7,12),       # yaxis limits
+               yt = seq(7,13,2),   # yaxis major ticks
+               ym = seq(7,13,1) ) # yaxis minor ticks
+ text( cnr(2,98), "b", adj=c(0,1), font=2, cex=1.5 )
+ # Insulin dose
+ pleff("ipkg","Insulin dose (IU/day/kg)  [Mean (95% CI)]",
+               yl = c(0.0,2.4),          # yaxis limits
+               yt = seq(0.0,2.0,1.0),    # yaxis major ticks
+               ym = seq(0.0,2.4,0.2) ) # yaxis minor ticks
+ text( cnr(2,98), "c", adj=c(0,1), font=2, cex=1.5 )
+ # Weight:
+ pleff("weight","Weight (kg)  [Mean (95% CI)]",
+               yl = c(90,120),       # yaxis limits
```

```
+                 yt = seq(90,120,10), # yaxis major ticks
+                 ym = seq(90,120,5) ) # yaxis minor ticks
+ text( cnr(2,98), "d", adj=c(0,1), font=2, cex=1.5 )
+ }
> tmpl()
```

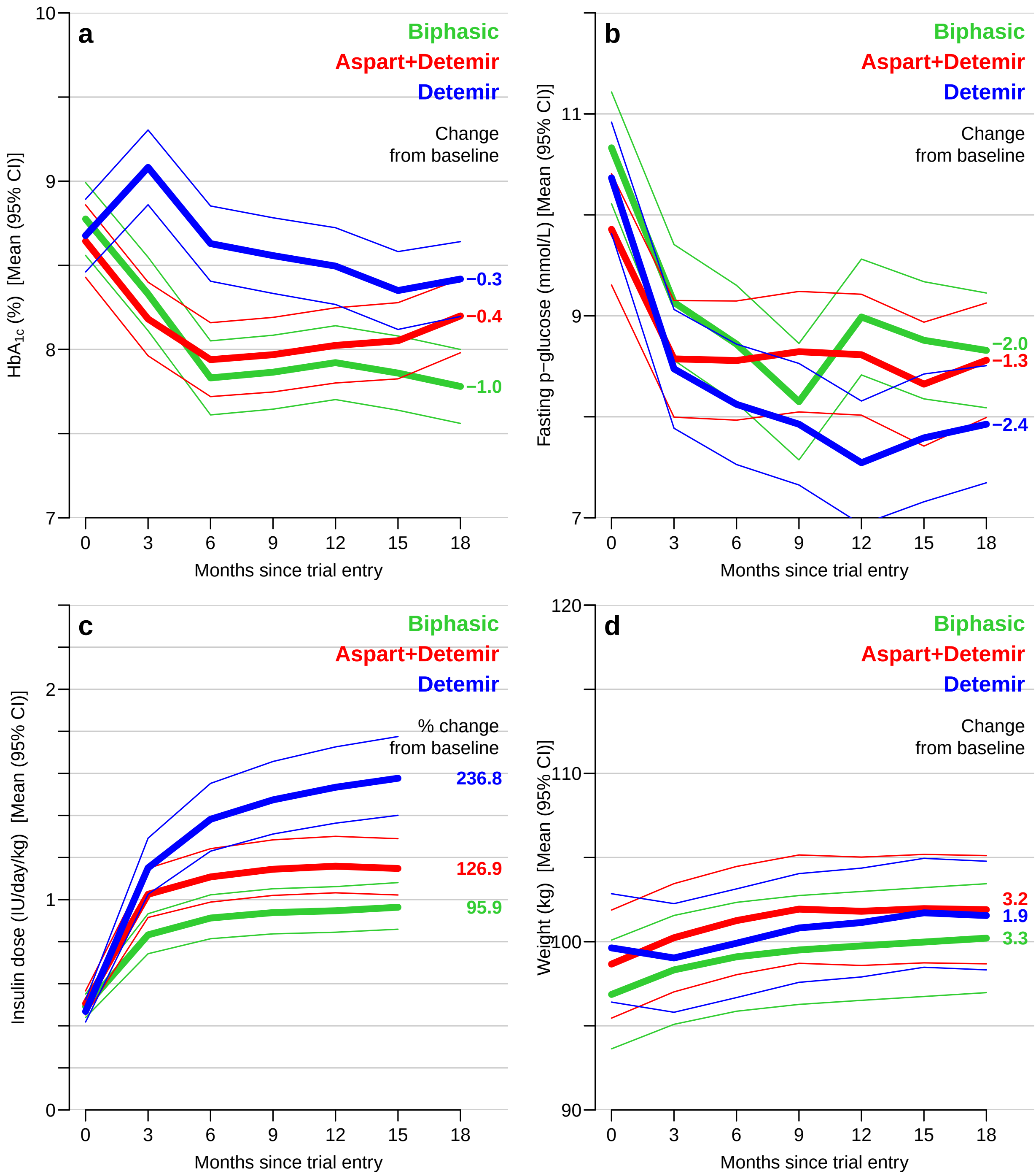

Figure 8.4: *Trajectory plots for the first 4 variables.*

```
> win.metafile( "./results/first4-ins.emf", height=9, width=8 )
> tmpl()
> dev.off()
```

```
null device
          1
```