

Danish Diabetes Registers: RUKS & DMreg

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Chapter 1

Dansk oversigt

1.1 Steno-algoritme

Her beskrives den algoritme til konstruktion af et diabetes register som vi (projektgruppen i afdelingen for Klinisk Epidemiologi, BxC & MaEJ) har haft brugt i forbindelse med et projekt (Daffodil) finansieret af Astra-Zeneca.

Det dannede diabetes register ligger som et SAS-datasæt under vores projekt under Danmarks Statistiks forskerordning (projektnummer 705093), og er således ikke tilgængeligt for andre end os. Den SAS-kode der danner registeret er dog naturligvis tilgængelig, således at enhver der har adgang til de samme registre (og SAS) kan danne det samme register.

1.1.1 Register

Algoritmen der danner registeret er baseret på data fra:

- Landspatientregisteret (1977–2016)
- Lægemiddelstatistikregisteret (1995–2016)
- Sygesikringsregisteret (1990–2016)
- Dansk Voksen Diabetes Database (2005–2016)
- Diabasen (øjenscreeningsdatabase for diabetikere) (2009–2016)

I forhold til RUKS anvender Stenos algoritme yderligere oplysninger om fodterapiydelse fra sygesikringsregisteret, oplysninger fra Dansk Voksendiabetesdatabase (DVDD) samt oplysninger fra DiaBasen. Disse tre beskrives derfor nærmere her:

Sygesikringsregistret: ydelse for fodterapi

For at få registreret en dato for ydelse for diabetisk fodterapi kræves følgende:

1. Elektronisk henvisning fra praktiserende læge eller diabetesambulatorium til fodterapeut med ydernummer til diabetesspecifik fodterapi
2. Risikostratificering (inklusive vurdering af diabetisk øjensygdom) hos fodterapeut mhp. at fastlægge antallet af årlige fodbehandlinger:

- Gruppe 1 - Lav risiko for fodsår: Ingen tilskudsberettigede behandlinger udover årlig fodstatus/risikovurdering.
- Gruppe 2 - Mellem risiko for fodsår: Maksimalt fire tilskudsberettigede behandlingsydelser udover årlig fodstatus/risikovurdering.
- Gruppe 3 - Mellem risiko for fodsår med særlige behov: Maksimalt ni tilskudsberettigede behandlingsydelser udover årlig fodstatus/risikovurdering.
- Gruppe 4 - Høj risiko for fodsår: Tilskudsberettigede behandlingsydelser efter behov.

3. Gennemført biotesiometrisk undersøgelse specifik for diabetisk perifer neuropati.

Risikoen for fejlagtig registrering af personer uden diabetes som diabetikere anses at være ikke eksisterende (kræver fejl i henvisning + gennemført diabetesspecifik undersøgelse og risikostratifikation samt betalingsopkrævning hos den undersøgte person som diabetiker).

Datoer Der er omkring 3,9 mio ydelser registreret, fordelt på ca. 263 000 personer. Den tidligste dato for hver person er udtrukket. Af rent administrativ årsager (uenigheder mellem fodterapeuter og regionerne) er disse første datoer *meget* ujævnt fordelt over årene; i årene 1991–2005 voksede det årlige antal fra ca. 5000 til omkring 15 000, fra 2006–2010 var der omkring 1500 årlige første datoer, i 2011 35 000, og derefter falder tallet til omkring 12 000.

Dansk Voksendiabetesdatabase (DVDD)

DVDD er en landsdækkende klinisk kvalitetsdatabase for behandling af diabetes hos personer over 18 år. Database har eksisteret siden 2005 og indgår som en af tre diabetesdatabaser under regionernes kliniske kvalitetsdatabaser (RKKP). For den enkelte patient registreres dato for undersøgelse, diabetestype, debutår og årlig klinisk status.

Almen praksis har siden lukningen af Dansk Almen Medicinsk Database i september 2014 ikke indberettet data, og database er således kun komplet for hospitalsbehandlede diabetespatienter. Al type 1 diabetes i Danmark behandles imidlertid i hospitalsregi og defineres ud fra guidelines ved måling af antistoffer og residual insulinproduktion, og dermed udgør DVDD den mest valide kilde til identifikation af type 1 diabetes i Danmark. Registeret indeholder pr. april 2018 ca. 740 000 records fra ca. 200 000 personer.

Risikoen for fejlagtig registrering af personer uden diabetes som diabetikere i DVDD må anses for minimal.

Datoer Indberetningerne til DVDD ligger fra 2005 og fremefter, men diagnose datoerne registreret for patienterne rækker noget længere tilbage; den ældste til 1890 (som nok er en kodefejl), men der er 62 diagnose datoer i år 1900 (!).

Diagnose-datoerne (*diag_dato*) er upræcise; 1. januar og 15. juni udgør omkring 85% af alle registrerede diagnosedatoer; dette må antages i realiteten blot at være en angivelse årstallet. I konstruktionen af indgangs-dato of -kriterium tages der højde for dette, se diskussionen nedenfor.

DiaBasen

DiaBasen er den landsdækkende kliniske kvalitetsdatabase for screening af diabetisk retinopati og maculopati for såvel praktiserende oftalmologer som øjenafdelinger. DiaBasen

har eksisteret siden 2009 og indgår som en af tre diabetesdatabaser under regionernes kliniske kvalitetsdatabaser (RKKP). For den enkelte patient registreres dato for undersøgelse og detaljeret beskrivelse af diabetiske øjenforandringer.

DiaBasen indeholder pr. april 2018 ca. 425 000 registreringer på ca. 170 000 patienter og er således ikke fuldstændig, men risikoen for fejlregistrering (dvs. inklusion af ikke-diabetikere) må også her anses for minimal.

1.1.2 Datoer i diabetes registeret

For hver person er defineret følgende datoer som anvendes i definition af personens eventuelle inklusion i registeret:

- Datoer for hospitalsindlæggelse/ambulant besøg med aktionsdiagnose diabetes (ICD-10: E10,E11,E12,E13,E14; ICD-8: 24900,24901,24902,24903,24904,24905,24906,24907,24908,24909, 25000,25001,25002,25003,25004,25005,25006,25007,25008,25009)
- Datoer for indløsning af metformin (ATC: A10BAx)
- Datoer for indløsning af andre ikke-insulin antidiabetika (ATC: A10Bxx bortset fra A10BAx)
- Datoer for indløsning af insulinpræparater (ATC: A10Axx)
- Datoer for ydelsen fodterapi for diabetikere (speciale=54xx)
- Registrerede diagnose datoer fra DVDD (subsidiært rapporteringsdatoen)
- Registrerede screeningsdatoer fra DiaBasen

Rationalet er at inkludere personer som diabetikere med en debutdato som den tidligste af ovenstående datoer, dog med to undtagelser:

- Gestationel diabetes (GDM):
Såfremt der foreligger flere LPR registreringer med gestationel diabetes (ICD-10: O24; ICD-8: 63474, Y6449), fjernes GDM registreringer som ligger mindre end 200 dage efter den nærmest foregående; for at identificere den første GDM date i hver graviditet. For de resterende GDM registreringer for en kvinde dannes et vindue fra 30 dage før til 365 dage efter GDM registreringsdatoen. Datoer nævnt ovenfor som falder i disse vinduer tælles ikke med i beregningen af debutdato.
- Polycystisk ovarie syndrom (PCOS):
Kvinder der lider af PCOS behandles ofte med metformin. Hvis der derfor foreligger LPR registreringer med PCOS (ICD-10: E282, ICD-8: 61520, 61521) tages den tidligste af disse datoer som PCOS debut dato.

For personer med PCOS ses bort fra metformin køb som ligger fra 30 dage før PCOS debut dato og indtil personens 40 års dag.

Hvis en kvinde udelukkende har indløst metformin (og ingen andre antidiabetika, herunder insulin) mellem alder 20 og alder 40 regnes personen som havende PCOS, og metformin indløsningerne mellem alder 20 og 40 medregnes ikke. I praksis betyder dette

at metformin indløsninger hos kvinder mellem 20 og 40 år ikke medregnes i konstruktionen af datoen `doOAD`.

Med disse to undtagelser defineres så datoerne:

`doNPR` — dato for første LPR registrering (refererer til “National Patient Register”)

`doOAD` — dato for første indløsning af OAD

`doOAD2` — dato for anden indløsning af OAD

`doIns` — dato for første indløsning af insulin

`doIns2` — dato for anden indløsning af insulin

`doPod` — dato for første fodterapiydelse (“podiatry”)

`doDVDD` — dato for tidligste diagnose dato rapporteret i DVDD

`doDiaB` — dato for tidligste øjenundersøgelse i diabasen

Diabetes debut dato defineres nu som den mindste af datoerne `doNPR`, `doOAD`, `doIns`, `doPod`, `doDVDD` og `doDiaB`; alternativt, hvis man ønsker at bruge 2den indløsning af OAD eller insulin (som i RUKS) den mindste af datoerne `doNPR`, `doPod`, `doDVDD`, `doDiaB` og den næst-mindste af datoerne `doOAD`, `doIns`, `doOAD2` og `doIns2`.

Eftersom diagnose datoer i DVDD i realiteten kun er årstals-angivelser, anvendes diagnose datoen fra DVDD kun hvis ingen af de øvrige datoer ligger i samme kalenderår som DVDD-diagnose datoen.

Endelig suppleres diabetes registeret med personernes fødselsdato og eventuelle dødsdato.

1.1.3 Inklusionskriterium

Afhængig af hvilken dato der er den mindste defineres inklusions kriteriet som det med den tidligste dato — en variabel der kan antage en af 6 mulige værdier (LPR, OAD, Insulin, Fodterapi, DVDD, DiaBase), kodet hhv. `LPR`, `OAD`, `Ins`, `Pod`, `DVD` og `Dia`.

I tilfælde af at man vælger anden indløsningsdato fra receptregisteret (LMS) defineres inklusions-kriteriet baseret på recept data som enten `O-OAD`, `O-Ins`, `I-OAD` eller `I-Ins` afhængigt af hvilke to indløsninger der er tale om som de første to. Således er der i denne sammenhæng 8 mulige inklusionskriterier.

1.1.4 Registerets dækningsperiode

Da en væsentlig del af personerne inkluderes på baggrund af medicinkøb er registeret ikke anvendeligt til incidens- og prævalens opgørelser før efter 1 januar 1996 — et år efter Lægemiddelstatistikregisterets start. Inklusionsdatoer der ligger før denne dato må anses at være behæftet med så stor usikkerhed at de ikke bør anvendes som debutdatoer.

Det dannede register er således anvendeligt fra 1 januar 1996 og fremefter; og dækker p.t. en 21 års periode frem til d. 31. december 2016, både hvad angår prævalens, incidens og mortalitet.

Oplysningerne fra DVDD bruges i alt væsentligt til at forfine personernes diagnose dato bagud i tid og til klassifikation af T1 patienter; således er der ikke et væsentligt databrud

omkring 2005 f.s.a. incidens eller prævalens. DiaBasen bidrager med forholdsvis få inklusionsdatoer, så heller ikke denne giver anledning til væsentligt databrud.

1.1.5 Type af diabetes

Der findes et antal forskellige undertyper af diabetes (T2, T1, LADA, MODY, ...), med T2 og T1 som de dominerende; i dette register defineres T1 patienter så præcist som muligt og alle andre kodes som T2.

Definitionen af T1 patienter baseres primært på registreringen i DVDD: Hver patient optræder flere gange i DVDD, stort set en gang om året, og hver registrering indholder en type-definition af personen. Hvis en person optræder med *over* halvdelen af sine registreringer som T1 (dvs. 4 ud af 8 er ikke nok — 4 ud af 7 eller 5 ud af 9 ville være nok) klassificeres patienten som T1. Tilsvarende for T2. Således efterlades nogen få patienter uklassificerede fra DVDD.

Yderligere har vi klassificeret patienternes enkelte *records* fra LPR som LPR-T1 (ICD-8: 249, ICD-10: E10) hhv. som LPR-T2 (ICD-8: 250, ICD-10: E11) eller ukendt (øvrige diagnoser inkluderet fra LPR). Ligesom for DVDD er *patienterne* blevet klassificeret som LPR-T1 hvis *over* halvdelen af NPR-records er klassificeret som T1, og tilsvarende for T2. Således efterlades nogen patienter uklassificerede fra LPR. Vi er nødt til at bruge LPR-klassifikationen selv om den ikke er imponerende præcis, eftersom DVDD først er startet 2005, så personer som er døde før 2005 indgår ikke i DVDD.

Personer klassificeres som T1 i DMreg hvis mindst et af følgende kriterier er opfyldt:

- personen er klassificeret som T1 i DVDD
- personen er klassificeret som T1 i LPR, men *ikke* som T2 i DVDD
- personen har indløst antidiabetisk medicin før 15 års alderen eller har indløst insulin før 30 års alderen, og er *ikke* klassificeret som T2 i DVDD.

Personer der ikke klassificeres som T1, klassificeres som T2.

Denne definition af type af diabetes har den konsekvens at personer i registeret kan ændre status ved opdateringer af de bagvedliggende registre. Tabelleringer af faktisk forekommende klassifikationer af enkelte patienter tyder dog på at dette vil være et forholdsvis begrænset fænomen

1.1.6 Debutdato og diabetes varighed

Som nævnt ovenfor er debutdatoer registreret før 1 januar 1996 næppe pålidelige, men datoer efter 1996 må anses for at være anvendelige i epidemiologiske opgørelser. Det betyder at epidemiologiske analyser hvor diabetes-varigheden indgår bør begrænses til personer med debutdato efter 1 januar 1996.

1.1.7 Anvendte parametre

Der er i definitionen af registeret anvendt følgende (i realiteten arbitrært fastsatte) konstanter i definitionerne:

- Interval mellem GDM diagnoser for at behandle dem som forskellige: 200 dage

- Interval omkring GDM til eksklusion: $[-30, +365]$ dage
- Interval før PCOS diagnose: -30 dage
- Alders interval for PCOS / metformin $[20, 40]$ år
- T1 aldergrænse for antidiabetisk medicin: 15 år
- T1 aldergrænse for insulin: 30 år

Registerindholdet vil naturligvis ændre sig en smule hvis man regulerer på disse parametre.

Aktuelt betyder disse grænser at der er et hop i antallet af kvindelige diabetikere inkluderet 40 års alderen, og et mindre dyk i antallet af T1 diabetikere ved 15 hhv. 30 års alderen. Begge dele er naturligvis artefakter, men sådanne vil være til stede uanset hvordan konstanterne defineres.

1.2 Antal patienter

Dannelsen af registeret ud fra de enkelte komponenter foretages i programmet `06-define`, som også laver forskellige detaljerede oversigts tabeller hvori nedstående tal er hentet, se s. 49 ff.

Det totale antal personer i registeret er 474 700, hvoraf 98 711 har en debutdato før 1 januar 1996; dette er altså antallet af prævalente diabetikere pr 1 januar 1996.

Såfremt kun DVDD kriteriet anvendes vil der ud af de 474 700 registrerede være 30 337 (6,4%) registreret som T1. Hvis yderligere registreringerne fra LPR anvendes vil yderligere 15 293 (3,2%) blive klassificeret som T1, i alt 45 630 (9,6%) for hele perioden 1996-2016.

Hvis man indskrænker sig til at bruge 2den indløsning af OAD/Insulin som kriterium vil der være 16 572 personer (3,5%) som ikke inkluderes i registeret.

1.3 Forskelle til RUKS

Steno algoritmen adskiller sig fra algoritmen brugt til RUKS ved:

- der inkluderes flere diagnosekoder fra LPR.
- personer kan medtages på baggrund af en LPR registrering.
- personer kan medtages på baggrund af en receptindløsning.
- type klassifikationen er baseret på DVDD og derfor mere pålidelig.
- eksklusion for PCOS er mindre restriktiv (flere ekskluderes) — ud over LPR-registrering som bruges både af RUKS og DMreg, kræver RUKS at personer som udelukkende er behandlet med meformin også har indløst clomifen eller antiandrogen + østrogen, mens DMreg alene baserer sig på metformin. DMreg tillader imidlertid kvinder med PCOS at blive inkluderet som diabetikere på andre kriterier, herunder indløsning af metformin efter 40 års alderen, idet PCOS er en velkendt risikofaktor for diabetes.
- eksklusion for GDM er mere restriktiv (færre ekskluderes) idet DMreg opererer med et vindue på $[-30, 365]$ dage, mens RUKS bruger et interval på $[-280, 280]$ dage ($=[-40, 40]$ uger, svarende til en normal graviditetslængde) på hver side af en GDM dato.

- Herudover opererer RUKS med en “forældelsesfrist” på 10 år; personer fjernes fra registeret hvis de i en periode på 10 år ikke er registreret som opfyldende et af inklusionkriterierne.

Det sidste er enten temmelig betydningsløst eller også giver det kunstigt lave tal i perioden før 2007 (10 år før den aktuelle opgørelse). Det er forståeligt at ville ekskludere eventuelle falsk positive registreringer, men det bør ikke gøres ved en eksklusion fra registeret som gør tid-trends upålidelige. I stedet burde man som supplement til variablene med den *tidligste* dato for et kriterium (doIns, doOAD osv.) definere den *senest* registrerede dato for hvert kriterium, således at man muliggør en mere nuanceret analyse af det eventuelle problem med falsk positive.

1.4 Sammenligning af DMreg og RUKS

Dokumentationen for nedenstående sammenligninger findes i mere detaljeret form i kapitel 4, detaljerede tabelleringer af DMreg findes i kapitel 3 og afsnit 5.2 (p. 49) og sammenligninger med RUKS findes mere detaljeret i afsnit 5.3 (p. 74).

1.4.1 Total antal efter type, køn og dato

For hvert af registrene viser vi antallet af personer efter køn, diabetes type og inklusions-år for de to registre i figur 1.1. Der er lavet separate kurver for DMreg med de to forskellige algoritmer for medicin-inklusion, de tykke linjer svarer til en algoritme der tilnærmer den der bruges i RUKS, dvs datoen for anden indløsning af diabetes medicin.

Det ses at der er færre T1D personer i RUKS i tiden før 2008, men flere i tiden efter ca. 2011, mens der for næsten alle års vedkommende er færre T2D personer i RUKS.

Begge registre udviser det samme generelle mønster for antallet af type 2 patienter med afvigelse for 2000–2005, som i alt væsentligst kan tilskrives uregelmæssigheder i antallet af inkluderede fra fodterapikriteriet baseret på Sygesikringsregisteret.

Der er i DMreg en top i 2000 og et dyk i 2001, som er en kombination af mange bidrag fra DVDD i 2000 og få bidrag fra fodterapi i 2001. Det sidste skyldes formentlig administrative forhold, mens det første formentlig er en dato præference fra de retrospektivt indberettede diagnose datoer fra DVDD efter 2005 — de forekommer med meget stor hyppighed 1 januar og 15 juni, jfr. figur 1.2 og 1.3

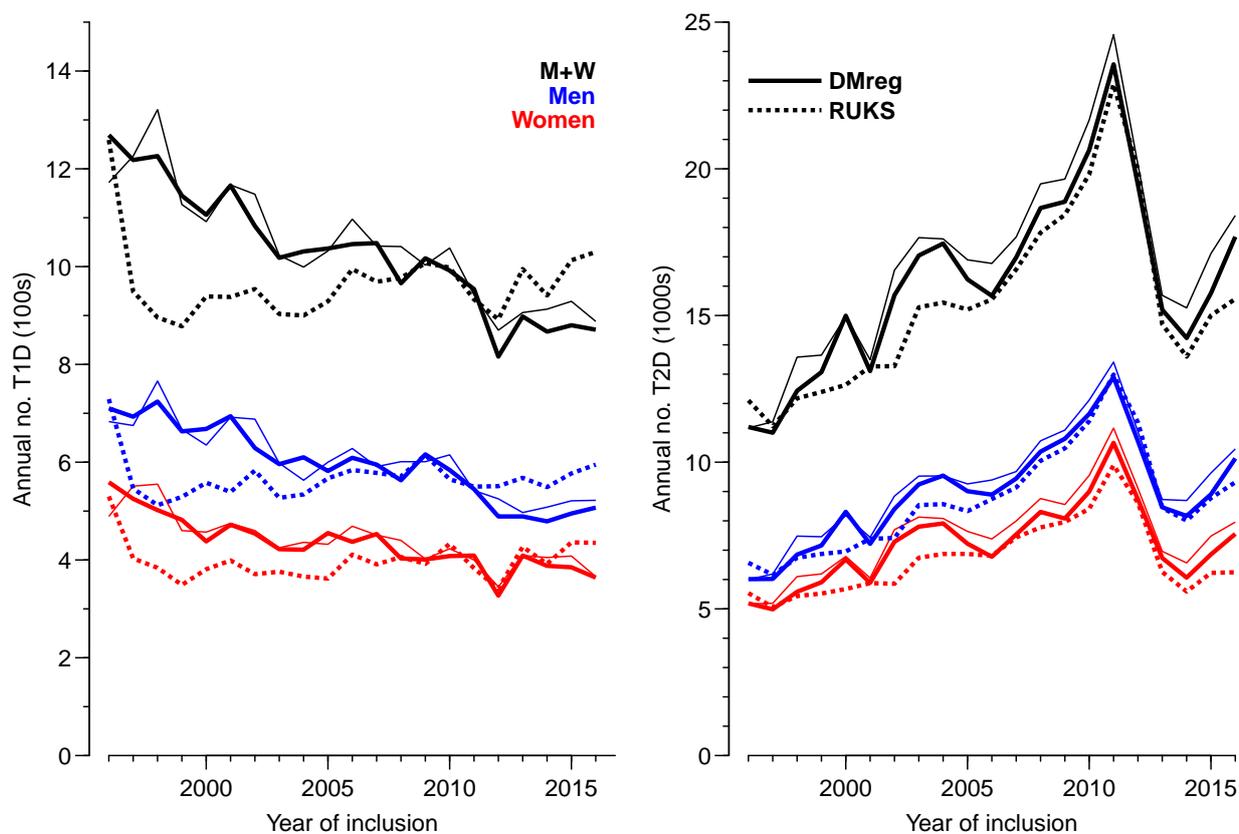


Figure 1.1: Antallet af personer i DMreg resp. RUKS separat for type 1 (venstre) og type 2 (højre) og køn. De tynde linjer er for inklusion ved første medicinkøb, de tykke for inklusion ved andet medicinkøb.

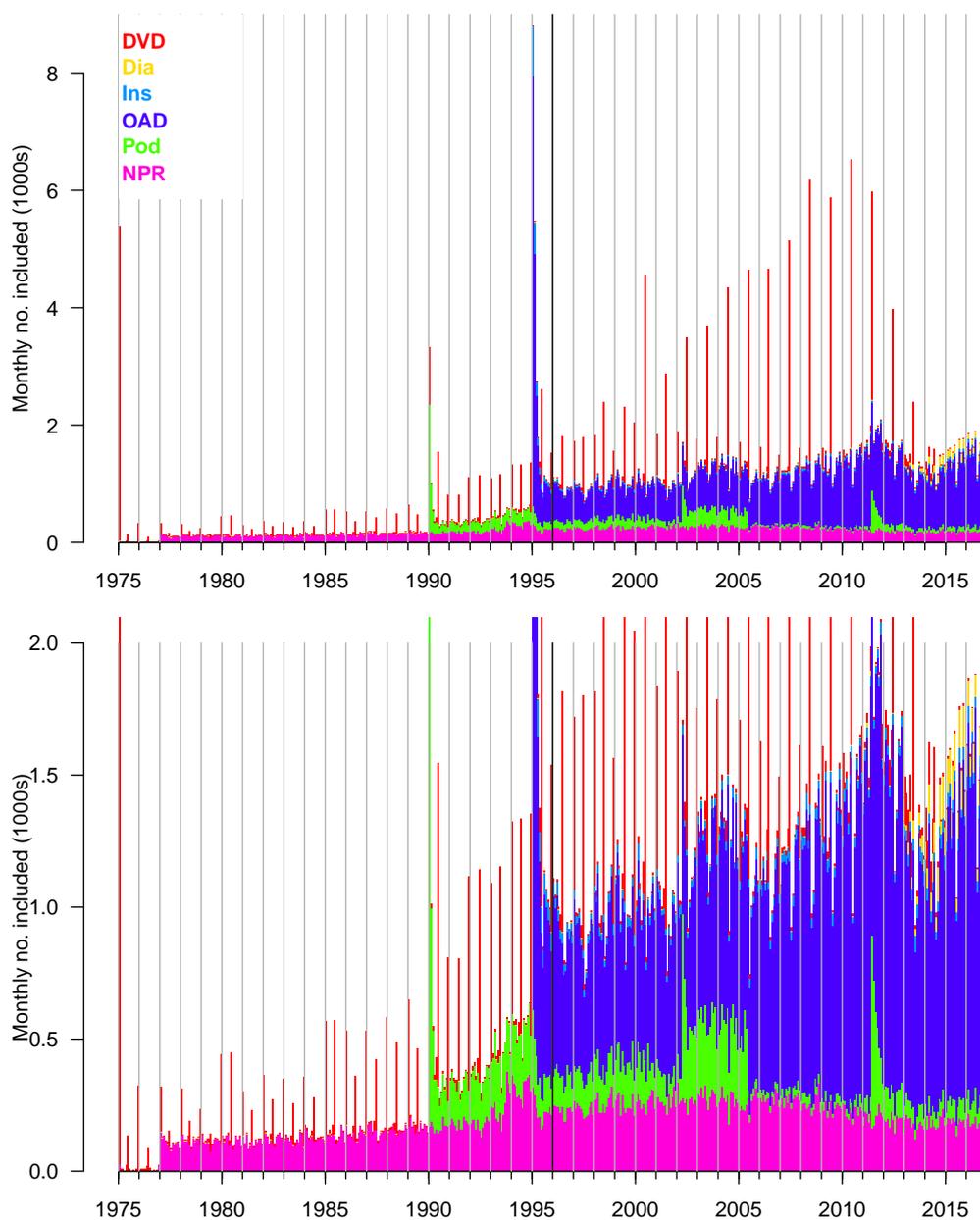


Figure 1.2: Antal inklusioner i DMreg pr. måned efter kriterium. Det nederste panel er blot en forstørrelse af det øverste. Den sorte linje ved 1996 angiver datoen hvorfra registeret anses som pålideligt f.s.a. incidens.

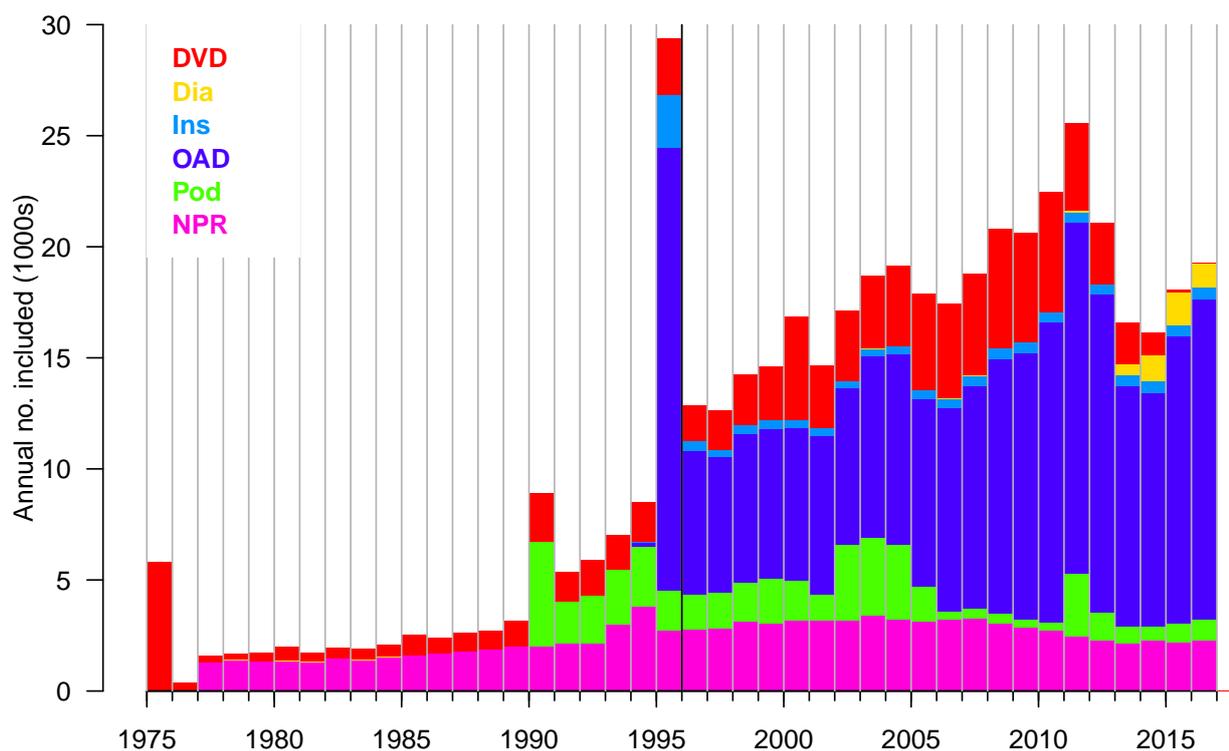


Figure 1.3: Antal inklusioner i DMreg pr. år efter inklusions kriterium. Den sorte linje ved 1996 angiver datoen hvorfra registeret anses som pålideligt f.s.a. incidens.

DMreg er således udsat for unøjagtigheder i inklusionsdatoerne fra DVDD hhv fodterapi, to kriterier hvis validitet f.s.a. personernes faktiske diabetes status må siges at være meget høj.

Sammenligner man inklusionsdatoerne for de patienter der er i begge registre finder man at inklusionsdatoer generelt ligger tidligere i DMreg and i RUKS, jfr. fig 1.4. Figuren viser også med al tydelighed at det er inklusioner hidrørende fra DVDD der giver mange af de tidligere datoer i DMreg — de ligger på 1 januar de enkelte år.

En tabellering af antallet af personer efter de registrerede inklusionsdatoer viser at der blandt personer udelukkende i RUKS er omkring 8000 som har diagnosedato før 1996, og 6300 som har diagnosedato i 2017, i alt 61% af de personer som udelukkende findes i RUKS:

	Dato i RUKS		Dato i DMreg(2)		Dato i DMreg (1)	
	Both	RUKS	Both	DM2rg	Both	DMrg
1994	64,384	7,900	66,248	4,525	65,395	4,524
1995	13,984	558	26,094	1,023	27,973	1,452
1996	13,184	182	10,099	1,057	10,748	1,591
1997	12,025	146	10,990	1,050	11,064	1,539
1998	12,910	163	14,182	1,150	13,265	1,636
1999	13,064	207	13,210	1,220	13,055	1,721
2000	13,334	239	13,035	1,295	14,312	1,751
2001	13,923	279	13,157	1,009	13,246	1,411
2002	13,926	301	16,257	2,203	15,116	2,576
2003	15,856	326	15,681	2,433	15,807	2,869
2004	15,947	394	14,474	2,361	15,712	2,898
2005	15,604	528	15,471	1,772	15,645	2,284

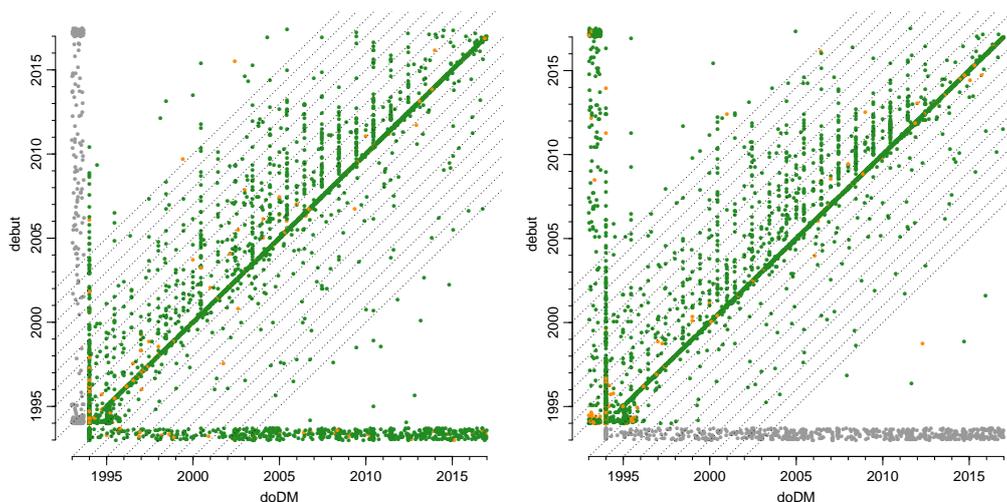


Figure 1.4: Inklusions datoer i de to registre; to forskellige tilfældige udvalg på 5000 personer. Venstre panel er farvelagt med type-klassifikation fra DMreg (venstre) hhv. RUKS (højre). Personer der kun er i det ene register er afsat med dato 1993 i det andet. De stiplede linjer angiver forskelle på $\pm 1, 2, \dots, 10$ år i inklusionsdatoer.

2006	15,996	547	16,892	1,464	15,812	2,060
2007	16,936	604	16,129	1,814	16,283	2,433
2008	18,287	512	16,080	2,184	17,607	2,921
2009	18,877	564	17,703	2,103	17,812	2,841
2010	20,244	566	20,526	2,505	19,413	3,289
2011	23,312	503	20,403	3,895	20,818	4,698
2012	20,345	518	16,942	2,474	17,662	3,357
2013	15,222	473	13,766	2,398	13,527	3,066
2014	14,065	475	13,136	2,509	13,060	3,112
2015	15,491	523	14,016	2,488	14,759	3,283
2016	15,974	620	15,634	2,882	15,361	3,936
2017	562	6,343	167	22	.	.
Sum	413,452	23,471	410,292	47,836	413,452	61,248

1.4.2 Sammenfald mellem registrene efter køn

Det totale antal personer inkluderet enten i RUKS eller DMreg er 498.171, hvoraf 413.452 er i begge, 61.248 kun i DMreg og 23.471 kun i RUKS:

	sex	M	W	Sum
from				
Both		232,982	180,470	413,452
DMrg		26,097	35,151	61,248
RUKS		10,759	12,712	23,471
Sum		269,838	228,333	498,171

Man ser at der er 57% kvinder blandt de der udelukkende finde i DMreg og 52% blandt dem der udelukkende findes i RUKS, mens der kun er 44% kvinder blandt dem der er i begge registre. Det tyder på at det er blandt kvinder at der er de største problemer med at finde en fælles algoritme.

PCOS og GDM

En af forskellene i algotimerne er behandlingen af kvinder med gestational diabetes hhv. PCOS, og vi ser derfor på de personer som ud fra LPR er defineret til at have GDM hhv. PCOS (uanset hvornår), og se hvorledes disse fordeler sig blandt personer der er i det ene eller andet register:

		has.pcos	FALSE	TRUE	TRUE	FALSE	TRUE
		has.gdm	FALSE	TRUE	FALSE	TRUE	TRUE
sex from							
M	Both		232,982	.	.	.	.
	DMrg		26,097	.	.	.	.
	RUKS		10,759	.	.	.	.
W	Both		175,012	3,894	1,450	114	
	DMrg		32,933	574	1,553	91	
	RUKS		12,368	278	54	12	

Vi ser af tabellen at der er meget få kvinder som udelukkende er i RUKS som er klassificeret med en af de to diagnoser — $(278 + 54 + 12)/(278 + 54 + 12 + 12368) = 2.7\%$ mens det blandt personer som udelukkende er i DMreg er $(574 + 1553 + 91)/(574 + 1553 + 91 + 32933) = 6.3\%$ og blandt personer i begge registre $(3894 + 1450 + 114)/(175012 + 3894 + 1450 + 114) = 3.0\%$. Dette tyder på at DM reg inkluderer flere kvinder som på et eller andet tidspunkt har haft GDM eller PCOS. Det er i tråd med at kvinder med PCOS i LPR kan inkluderes efter deres 40. år hvis de opfylder et kriterium for inklusion, samt at GDM vinduet anvendt i DMreg er mindre ($-30 - 365$ dage) mod ± 280 dage i RUKS (kun for T1D?).

1.4.3 Inklusionskriterier i DMreg

En tabellering af personer i registrene efter inklusionskriterier i DMreg viser at det største del kommer fra fodterapikriteriet, som sammen med DVDD og diabasen udgør næsten halvdelen af personer som kun findes i DMreg.

		DMreg Inclusion criterion							
		All	DVD	Dia	Ins	NPR	OAD	Pod	
All	498,171	23,471	88,907	4,328	11,529	96,033	227,334	46,569	
from									
Both	413,452	.	78,788	1,221	8,314	84,519	211,314	29,296	
DMrg	61,248	.	10,119	3,107	3,215	11,514	16,020	17,273	
RUKS	23,471	23,471	.	.	.	.	.	.

		DMreg Inclusion criterion - 2nd dispense									
		All	---	DVD	Dia	I-Ins	I-OAD	NPR	O-Ins	O-OAD	Pod
All	498,171	23,471	16,572	159089	6,136	5,824	926	77,893	837	154959	52,464
from											
Both	413,452	.	3,160	147369	2,839	5,262	809	66,503	716	151642	35,152
DMrg	61,248	.	13,412	11,720	3,297	562	117	11,390	121	3,317	17,312
RUKS	23,471	23,471	.	.	.	.	.	.	.	.	.

Hvis man i stedet bruger den anden indløsning af diabetes medicin er inklusionen på kriterierne DVDD, DiaB og Pod (fodterapi) af personer der ikke findes i RUKS endnu mere udtalt.

1.4.4 Sammenfald mellem registrene efter diabetes type

Begge registre indeholder omkring 46.000 type 1 diabetikere, men kun ca. 32.000 er klassificeret som type 1 i begge — omkring 2/3.

	DMtp	T1	T2	Sum
sygdom				
-	.	2,939	58,309	61,248
TYPE_1	2,889	31,933	11,707	46,529
TYPE_2	20,582	10,758	359,054	390,394
Sum	23,471	45,630	429,070	498,171

Endvidere er omkring 2.900 af type 1 patienterne i hvert af registrene ukendt i det andet register.

1.5 Sammenfatning

Vi har identificeret områder som bærer en del af forskllen mellem registrene:

- Inklusionsdatoer — der er forholdsvis mange personer i RUKS med registreret debut i 1994 som alene findes i RUKS.
- Inklusionsdatoerne i DMreg ligger oftere tidligere i DMreg end i RUKS for personer registreret begge steder.
- Der er en tydelig underrapportering af T1D i de første del af perioden i RUKS.
- Der er tydeligt flere kvinder med (tidligere?) GDM og PCOS diagnoser som udelukkende findes i DMreg.
- Der er en betydelig forskel i T1/T2 klassifikationen af personer som findes begge steder.
- En væsentlig del af de personer som kun findes i DMreg er inkluderet fra de tre diabetes-specifikke kilder: DVDD, DiaBasen og fodterapi i sygesikringsregisteret. Disse kilder er dog ikke imponerende f.s.a. *dateringen* af debut.

Chapter 2

Background and definitions

The maintenance of the National Diabetes Register (NDR) has been discontinued by the Health Data Authority (Sundhedsdatastyrelsen). It is being replaced by the Register of Selected Chronic Diseases (RUKS — Register for Udvalgte Kroniske Sygdomme) which however does not encompass precisely the same persons.

2.1 National Diabetes Register, NDR

The “old” NDR, established 2006, covering the period 1995–2012 (in terms of incidence) was based on the following criteria [1]:

lpr: recording of diabetes as diagnosis in the NPR

fodt: use of the service “foot-therapy for diabetes patients” in the National Health Services Register (NHSR).

b15i1: the date of the 5th blood glucose measurement within a period of one year in the NHSR.

b12i5: two measurements of blood glucose per year in 5 consecutive years. The date is defined as the 2nd blood glucose measurement within the 5th period of one year.

oad: date of 2nd purchase of OAD as recorded in the Register of Medicines Products Statistics (RMPS) – the prescription register.

ins: date of 2nd purchase of insulin as recorded in the RMPS.

The inclusion date was the earliest of the dates where any of these 6 criteria were met, except:

- PCOS — if metformin were the only dispensation of antidiabetic drugs between ages 20 and 35, these were not counted as it was assumed that they were dispensations for treatment of PCOS.
- GDM — if a woman has a record of GDM in the NPR, any criterion met in a 1-year period after the GDM date was disregarded.

It has been pointed out that the two blood-glucose (purely *procedural*) criteria included many persons that were unlikely to be diabetic patients, notably women only being *tested* for gestational diabetes (GDM) [2].

Because of this, the comparison between NDR, RUKS and the reconstructed register is based on a modified version of the NDR, where the two blood glucose criteria are disregarded.

2.2 RUKS

The alleged replacement of the NDR is the Register of Selected Chronic Diseases (Register over Udvalgte Kroniske Sygdomme, RUKS). Among the 8 diseases selected for the register are T1 diabetes and T2 diabetes.

The only available data from RUKS are the tabular counts of incident cases for the years 2000 – 2015 and prevalent cases for 1 January each of the years 2000–2015 (why not 2016 — end of 2015?)

- Type 2 DM:
 - Persons recorded with ICD10 code E11 in NPR, as the latest diagnosis.
Persons are not included on the basis of a single NPR contact with code E11, at least one more contact (E10 or E11?) or purchase of OAD or insulin is required.
 - Persons who have purchased OADs (A10B from the RMPS), and at least two purchases of either A10A (insulins) or A10B (other antidiabetic drugs).
 - Women who have a diagnosis of PCOS or have only purchased metformin (and no other OADs or insulin) and have purchased either clomifen (G03GB02) or estrogen (G03HB) are *excluded*.
 - Persons who have had no diabetes recordings in NPR or RMPS during the last 10 years are *excluded*.
 - The term “latest” for the NPR criterion and the exclusion referring to “last 10 years” seems to indicate that the register is defined relative to a particular creation date for the register, although this is not explicitly stated.
- Type 1 diabetes:
 - Persons recorded with ICD10 code E10 in NPR, as the latest diagnosis.
Persons are not included on the basis of NPR contacts with code E11, at least one purchase of insulins is required
 - Persons who have purchased insulins (A10A from the RMPS), and at least two purchases of A10 (either A10A (insulins) or A10B (OADs)).
 - Persons already classified as T2 above are *excluded*.
 - Women with a diagnosis of GDM (ICD10 024.4) and only have purchased anti diabetic medication in a window from 280 days before the first till 280 days after the last recording of GDM are excluded.

2.3 A new register

The following is an attempt to reconstruct / improve the NDR, using (almost) the same criteria as in the original NDR, with an additional effort to define persons as either T1 or T2.

The basic content of the register is one record per person with sex, type of diabetes and dates of birth, DM and death. Additionally, the register will have the dates for meeting each of the defining criteria (name of the date in the register):

doNPR Date of the first recorded contact date with a diagnosis of diabetes in the NPR.

doPod Earliest date of billing for podiatry in the NHR.

doOAD Date of first recorded purchase of OAD (A10B).

doIns Date of first recorded purchase of insulin (A10A).

doDVD Earliest recorded date of diagnosis in the Danish adult diabetes register (DADD). If none recorded, the date of reporting is used.

doDiab First recorded date of eye-screening in the Danish eye-screening database for diabetes patients.

In order to have a possible comparison with the old NDR, we have also defined variables **doOAD2** and **doIns2** with the dates of the *second* purchase of OAD resp. insulin, as the summary variable **doDM2** with date of inclusion based on using these two instead of dates of first purchases.

2.3.1 Type of diabetes

The classification of patients as T1 or T2 based on register date only is not accurate, and the approach chosen here is to identify persons with T1D with reasonably high specificity, and classify the rest as T2D. Thus T2D will be equivalent to “cannot be classified as T1D with reasonable certainty”, and hence the classification should be used cautiously; the persons recorded as T1D are likely to be T1D, but there is some under-reporting. Consequently, some T1D patients are erroneously classified as T2D, but the precise size of this problem is unknown.

The practical implementation of the type classification is:

- use the DADD recordings of diabetes type (T1,T2,Other,Unkn) and classify persons as T1 resp. T2 if more than half of the recordings are T1 resp. T2. The rest are left unclassified.
- use the NPR to classify persons as T1 resp. T2 if more than half of the recordings are T1 (E10) resp. T2 (E11). The other codes (E12-E13) are ignored, and thus some persons are left unclassified.
- The classification from DADD as T1 is always used. If a person is not classified or does not appear in DADD, the classification as T1 from NPR is used, however not if the person is classified as T2 in DVDD.

- Finally, persons that have purchased OAD before age 15 or insulin before age 30 are classified as T1 (except if classified as T2 in DADD); all other are classified as T2.

The reason that we cannot entirely dispose with the NDR in classification of diabetes is that the DADD was not established till 2005 and onwards, so the classification of patients dead before 2005 is very sparse in the DADD.

2.3.2 Gestational Diabetes (GDM)

GDM diagnoses that are less than 200 days from the previous one are disregarded; so from the earliest GDM for a given person, no GDM diagnosis in the next 200 days is counted, from the next after this, another window of 200 days is used etc.

If a person is recorded with a diagnosis of GDM in the NPR, the person cannot enter the register on any criterion during the next 365 days. To account for registration delays the window starts 30 days prior to the recorded date of GDM.

2.3.3 Polycystic Ovarian Syndrome (PCOS)

If a person is recorded with PCOS in the NPR, this person cannot be included on the basis of metformin purchase in the period from the earliest PCOS diagnosis until the person's 40th birthday.

Moreover, if a person's only drug dispensations are metformin between age 20 and 40, the person is considered a possible PCOS case and these dispensations are not counted. Dispensations after age 40 for women with a PCOS diagnosis are considered as diabetes medication and lead to inclusion in the register at the first date of purchase after the 40th birthday.

2.3.4 Summary

The register we attempt to build is a register where persons are captured by a set of criteria and then kept in the register with this inclusion date.

2.3.5 Differences to RUKS

The proposed approach differs from RUKS in the following points:

- Persons may be included in our register even if only one purchase of OAD/Insulin is recorded.
- Only NPR diagnosis of PCOS is used, and women deemed to suffer from PCOS can actually be included at a time after age 40 based on metformin purchase alone.

It is not entirely clear whether persons who meet the criteria for PCOS before age 40 and meet other criteria after age 40 are included in RUKS with a date of inclusion equal to the first purchase of metformin, or whether these women are not included at all. After all, PCOS is a known risk factor for diabetes, so these women may contract diabetes later.

- RUKS maintains a window of no inclusion of 280 days *before* date of GDM till 280 days after. Our approach only use a window of 30 days before (to account for registration delays) and of 365 days after the date of GDM. Moreover repeat GDM diagnoses closer than 200 days are regarded as being from the same pregnancy in our approach, and only the first one is used in defining the window.
- The RUKS approach to definition T1/T2 is based on recordings in the NPR and classify persons as T1/T2 according to the most recent occurrence of E10 and E11, whereas our approach only classify persons if more than half of the recordings are E10 resp E11, also taking other codes into account. It seems that RUKS do not include the codes E12–E14 as diabetes.
- In principle we might use the health registers to define an exit date as well (for example 10 years). However it would be more viable to define a dates of last meeting each criterion, enabling reserchers to explore the nature of “false” positives in the register according to different criteria.

```
Home folder E:/workdata/705093/BXC/demoDM/r
Time: 2018-12-05 17:33:14
```

```
R version 3.5.0 (2018-04-23)
Platform: x86_64-w64-mingw32/x64 (64-bit)
Running under: Windows Server 2012 R2 x64 (build 9600)
```

```
Matrix products: default
```

```
attached base packages:
```

```
[1] splines      stats      graphics  grDevices  utils      datasets  methods   base
```

```
other attached packages:
```

```
[1] haven_1.1.1  mgcv_1.8-23  nlme_3.1-137  popEpi_0.4.5  Epi_2.30
```

```
loaded via a namespace (and not attached):
```

```
[1] Rcpp_0.12.16  lattice_0.20-35  zoo_1.8-1        MASS_7.3-49
[5] grid_3.5.0    plyr_1.8.4       magrittr_1.5     etm_0.6-2
[9] pillar_1.2.2  rlang_0.2.0     data.table_1.11.0 Matrix_1.2-14
[13] forcats_0.3.0  tools_3.5.0     cmprsk_2.2-7     numDeriv_2016.8-1
[17] survival_2.41-3  parallel_3.5.0  compiler_3.5.0  tibble_1.4.2
```

Chapter 3

Register overview

3.1 The register data

First we read the register file:

```
> system.time( reg <- read_sas("../data/DMreg.sas7bdat") )
  user system elapsed
  3.14   0.07   9.29

> reg <- as.data.frame( reg )
> reg <- transform( reg, sex = factor( sex, labels=c("M","W") ),
+                  inCr = Relevel(factor(inCr),c(2,1,3,5,6,4)),
+                  inCr2 = Relevel(factor(inCr2),c(1,3,2,4,5,7,8,9,6)),
+                  DMtp = factor( DMtp ) )
> levels( reg$inCr )

[1] "DVD" "Dia" "Ins" "OAD" "Pod" "NPR"

> levels( reg$inCr2 )

[1] "----" "DVD" "Dia" "I-Ins" "I-OAD" "O-Ins" "O-OAD" "Pod" "NPR"

> reg <- cal.yr( reg )
> cstr( reg )

data.frame 474700 by 17
pnr      1      character
doNPR    2 cal.yr, numeric
doDVDD   3 cal.yr, numeric
doOAD    4 cal.yr, numeric
doIns    5 cal.yr, numeric
doOAD2   6 cal.yr, numeric
doIns2   7 cal.yr, numeric
doPod    8 cal.yr, numeric
doDiaB   9 cal.yr, numeric
sex      10      factor
doBth   11 cal.yr, numeric
doDth   12 cal.yr, numeric
doDM    13 cal.yr, numeric
doDM2   14 cal.yr, numeric
inCr    15      factor
inCr2   16      factor
DMtp    17      factor
```

3.2 Overview of the register

```
> fCtable( addmargins( tt <- with( reg, table('>1995'=doDM>=1996, DMtp, sex ) ),
+           1:3 ),
+           row.vars=1:2 )
```

	sex	M	W	Sum
>1995 DMtp				
FALSE T1		13,260	10,394	23,654
T2		38,231	37,459	75,690
Sum		51,491	47,853	99,344
TRUE T1		12,718	9,258	21,976
T2		194,870	158,510	353,380
Sum		207,588	167,768	375,356
Sum T1		25,978	19,652	45,630
T2		233,101	195,969	429,070
Sum		259,079	215,621	474,700

```
> str( tt )
' table' int [1:2, 1:2, 1:2] 13260 12718 38231 194870 10394 9258 37459 158510
- attr(*, "dimnames")=List of 3
..$ >1995: chr [1:2] "FALSE" "TRUE"
..$ DMtp : chr [1:2] "T1" "T2"
..$ sex : chr [1:2] "M" "W"
> fCtable( tt, row.vars=1 )
```

	DMtp	T1	W	T2	W
	sex	M	W	M	W
>1995					
FALSE		13,260	10,394	38,231	37,459
TRUE		12,718	9,258	194,870	158,510

We now compute arrays holding the median and IQR for different variables for table 1, classified by diabetes type and sex:

```
> # date of diagnosis
> dd <- with( reg, tapply( doDM,
+                           list( '>1995'=doDM>=1996, DMtp, sex ),
+                           quantile, 1:3/4 ) )
> # age at diagnosis
> ad <- with( reg, tapply( doDM-doBth,
+                           list( '>1995'=doDM>=1996, DMtp, sex ),
+                           quantile, 1:3/4 ) )
> # FU time
> fu <- with( reg, tapply( pmin(doDth,2017,na.rm=TRUE)-pmax(doDM,1996),
+                           list( '>1995'=doDM>=1996, DMtp, sex ),
+                           quantile, 1:3/4 ) )
> # mean date of FU
> df <- with( reg, tapply( (pmin(doDth,2017,na.rm=TRUE)+pmax(doDM,1996))/2,
+                           list( '>1995'=doDM>=1996, DMtp, sex ),
+                           quantile, 1:3/4 ) )
> # mean age at FU
> af <- with( reg, tapply( (pmin(doDth,2017,na.rm=TRUE)+pmax(doDM,1996))/2-doBth,
+                           list( '>1995'=doDM>=1996, DMtp, sex ),
+                           quantile, 1:3/4 ) )
> qq <- ZArray( c( list( c("N","Pdx","Adx","Tfu","Pfu","Afu"),
+                           1:3/4 ),
+                 dimnames(ad) ) )
```

```

> names( dimnames(qq) )[3] <- ""
> dimnames(qq) [[3]] <- c("<1996","1996+")
> str( qq )
num [1:6, 1:3, 1:2, 1:2, 1:2] 0 0 0 0 0 0 0 0 0 0 0 0 ...
- attr(*, "dimnames")=List of 5
..$ : chr [1:6] "N" "Pdx" "Adx" "Tfu" ...
..$ : chr [1:3] "0.25" "0.5" "0.75"
..$ : chr [1:2] "<1996" "1996+"
..$ : chr [1:2] "T1" "T2"
..$ : chr [1:2] "M" "W"
> qq["N",2,,] <- tt
> qq["Pdx",,,] <- unlist( dd ) ; qq["Pdx",,'<1996',,] <- 0
> qq["Adx",,,] <- unlist( ad ) ; qq["Adx",,'<1996',,] <- 0
> qq["Tfu",,,] <- unlist( fu )
> qq["Pfu",,,] <- unlist( df )
> qq["Afu",,,] <- unlist( af )
> fCtable( qq[,c(2,1,3),,], row.vars=c(1,3,5), col.vars=c(4,2), d=1 )

```

		T1			T2		
		0.5	0.25	0.75	0.5	0.25	0.75
N	<1996 M	13,260.0	.	.	38,231.0	.	.
	W	10,394.0	.	.	37,459.0	.	.
1996+	M	12,718.0	.	.	194,870.0	.	.
	W	9,258.0	.	.	158,510.0	.	.
Pdx	<1996 M	.	.	.	.	.	.
	W	.	.	.	.	.	.
1996+	M	2,005.7	2,000.6	2,010.9	2,007.8	2,002.6	2,012.0
	W	2,005.7	2,000.6	2,011.0	2,007.5	2,002.5	2,011.8
Adx	<1996 M	.	.	.	.	.	.
	W	.	.	.	.	.	.
1996+	M	32.9	16.3	51.5	61.4	52.3	70.2
	W	29.5	13.0	54.9	63.8	52.9	73.8
Tfu	<1996 M	21.0	9.4	21.0	11.5	4.4	21.0
	W	21.0	9.2	21.0	11.2	4.3	21.0
1996+	M	8.5	3.9	14.1	6.5	3.1	11.2
	W	8.8	4.0	14.4	6.6	3.2	11.5
Pfu	<1996 M	2,006.5	2,000.7	2,006.5	2,001.7	1,998.2	2,006.5
	W	2,006.5	2,000.6	2,006.5	2,001.6	1,998.2	2,006.5
1996+	M	2,010.9	2,007.9	2,013.8	2,012.0	2,008.6	2,014.4
	W	2,011.0	2,008.0	2,014.0	2,011.9	2,008.5	2,014.3
Afu	<1996 M	53.5	41.1	65.6	69.4	61.2	77.2
	W	55.4	41.0	71.2	74.4	64.1	81.9
1996+	M	38.4	21.2	55.9	65.5	56.5	73.6
	W	35.5	18.0	59.9	67.8	57.2	77.4

3.3 Inclusion criteria

3.3.1 Recorded inclusion dates

While we know that inclusion dates before 1996-01-01 are not usable as proxy for date of diabetes diagnosis, it is illustrative to show how inclusion dates vary by time and criterion.

```

> clr <- rainbow(7)[-4][c(1,2,4,5,3,6)]
> moi <- with( reg, table( inCr, floor(pmax(doDM,1975)*12)/12 ) )
> str( moi )

```

```

'table' int [1:6, 1:504] 5366 0 0 0 0 25 8 0 0 0 ...
- attr(*, "dimnames")=List of 2
..$ inCr: chr [1:6] "DVD" "Dia" "Ins" "OAD" ...
..$      : chr [1:504] "1975" "1975.083333333333" "1975.166666666667" "1975.25" ...
> plx <- function(ym,leg){
+ barplot( moi[6:1,]/1000, beside=FALSE, col=clr[6:1],
+         border="transparent", space=0, xaxt="n",
+         ylim=c(0,ym) )
+ mtext( "Monthly no. included (1000s)", las=0, side=2, line=2 )
+ axis( side=1, at=seq(0,(2015-1975)*12,60), labels=seq(1975,2015,5) )
+ axis( side=1, at=seq(0,(2017-1975)*12,12), labels=NA, tcl=-0.3 )
+ abline( v=0:(2017-1975)*12, col=gray(0.7) )
+ abline( v=(1996-1975)*12 )
+ if( leg ) {
+ rect( 0,ym,6*12,ym*(13/20), col="white", border="transparent" )
+ text( 2, seq(ym*0.95,by=-ym/20,length=6), levels(reg$inCr),
+      col=clr, font=2, adj=0 ) }
+ }
> par( mfrow=c(2,1), mar=c(3,3,1,0), mgp=c(3,1,0), bty="n", las=1 )
> plx(9,TRUE)
> plx(2,FALSE)

> set.seed( 1952 )
> reg$doDMr <- reg$doDM + runif(nrow(reg),-1,1)/120
> yoi <- with( reg, table( inCr, floor(pmax(doDMr,1975)) ) )
> str( yoi )
'table' int [1:6, 1:43] 5755 0 0 0 0 33 353 0 0 0 ...
- attr(*, "dimnames")=List of 2
..$ inCr: chr [1:6] "DVD" "Dia" "Ins" "OAD" ...
..$      : chr [1:43] "1975" "1976" "1977" "1978" ...
> par( mar=c(3,3,1,0), mgp=c(3,1,0), bty="n", las=1 )
> plx <- function(ym,leg){
+ barplot( yoi[6:1,]/1000, beside=FALSE, col=clr[6:1],
+         border="transparent", space=0, xaxt="n",
+         ylim=c(0,ym) )
+ mtext( "Annual no. included (1000s)", las=0, side=2, line=2 )
+ axis( side=1, at=seq(0,(2015-1975),5), labels=seq(1975,2015,5) )
+ axis( side=1, at=seq(0,(2017-1975),1), labels=NA, tcl=-0.3 )
+ abline( v=0:(2017-1975), col=gray(0.7) )
+ abline( v=(1996-1975) )
+ rect( 0,ym,6,ym*(13/20), col="white", border="transparent" )
+ if( leg ) text( 1, seq(ym*0.95,by=-ym/20,length=6), levels(reg$inCr),
+               col=clr, font=2, adj=0 )
+ }
> plx(30,TRUE)

```

From figures 3.1 and 3.2 we see the inception of the health services register at 1990-01-02 and the prescription register 1995-01-01. It is clear from the distribution of first dates of OAD and Ins that a substantial fraction of these dates refer to persons with diabetes prior to 1995-01-01, but also that this wears off during 1995, and hence that inclusion dates after 1996-01-01 are reasonably reliable.

It is also pretty clear that inclusion dates from the DADD are largely confined to January and July, so analysis of seasonal patterns of date of diagnosis will be meaningless with the relatively large measurement error in date of diagnosis obtained from DADD.

Finally we see the administrative problems in relation to podiatrists, giving sudden jumps in number of patients included between mid-2002 and mid 2005, as well as the later half of 2012.

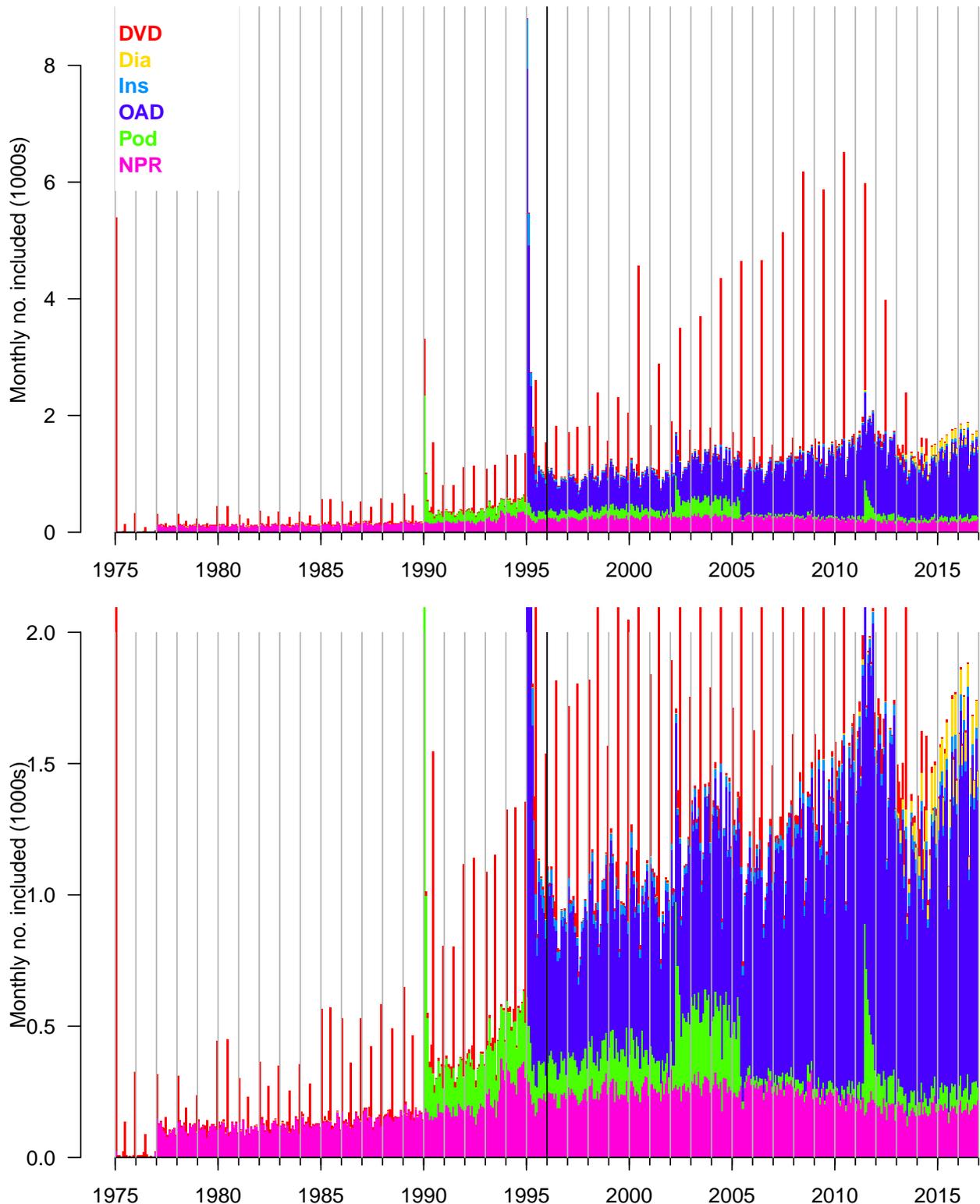


Figure 3.1: *Inclusion in the DMreg by month of inclusion, tick-marks and x-axis labels refer to 1 January each year. The bottom panel is merely a blow-up of the lower quarter of the top one to clarify the patterns. The gray vertical lines indicate 1 January each year, the black vertical line indicates 1996-01-01, wherefrom the register is considered reliable. All dates prior to 1975 are mapped to 1975-01-01 in this plot.*

`./graph/reg-hist`

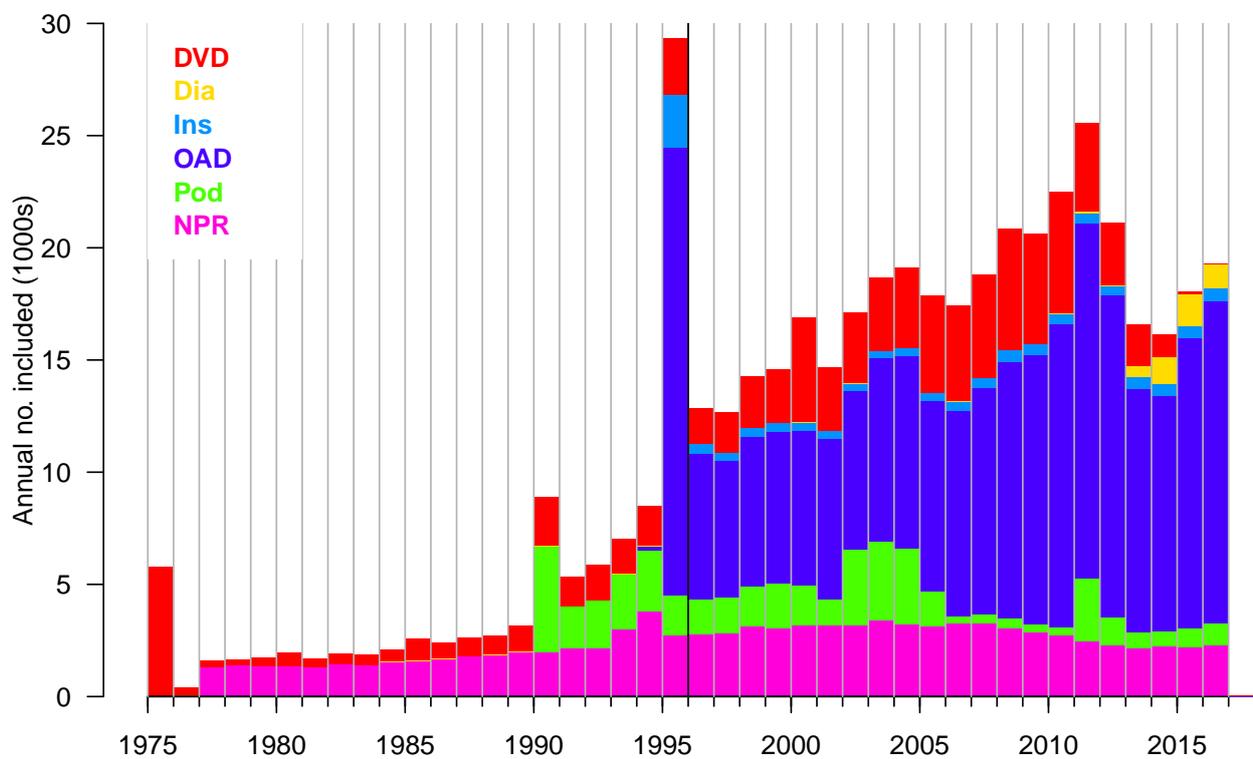


Figure 3.2: Inclusion in the DMreg by year of inclusion, tick-marks and x-axis labels refer to 1 January each year. The black vertical line indicates 1996-01-01, wherefrom the register is considered reliable. All dates prior to 1975 are mapped to 1975 in this plot. `./graph/reg-hist-y`

3.3.2 Inclusion criteria by year

Next, we make a table of inclusion criteria by sex and calendar year:

```
> crtTab <- with( reg, addmargins( table( sex,
+                                     P=pmax(1995,floor(doDM)),
+                                     inCr ),
+                                     margin = c(1,3) ) )#[, ,rev(c(5,3,4,6,1,2))]
> dimnames( crtTab )[[2]][1] <- "<1996"
> dimnames( crtTab )[[2]][-1] <- paste( "", dimnames( crtTab )[[2]][-1] )
> str( crtTab )
'table' num [1:3, 1:22, 1:7] 13972 11096 25068 597 445 ...
- attr(*, "dimnames")=List of 3
 ..$ sex : chr [1:3] "M" "W" "Sum"
 ..$ P   : chr [1:22] "<1996" " 1996" " 1997" " 1998" ...
 ..$ inCr: chr [1:7] "DVD" "Dia" "Ins" "OAD" ...
> fCtable( crtTab, row.vars=1:2, w=7 )
```

		inCr	DVD	Dia	Ins	OAD	Pod	NPR	Sum
sex	P								
M	<1996	13,972	.	.	926	10,928	6,077	19,588	51,491
	1996	597	.	.	217	3,574	638	1,655	6,681
	1997	997	.	.	186	3,364	671	1,644	6,862
	1998	1,681	.	.	195	3,753	762	1,855	8,246
	1999	1,510	.	.	222	3,827	794	1,772	8,125
	2000	2,256	.	.	196	3,789	702	1,877	8,820
	2001	1,658	.	.	164	3,983	468	1,855	8,128
	2002	2,184	.	.	181	3,985	1,280	1,902	9,532
	2003	1,890	.	.	198	4,635	1,406	1,994	10,123
	2004	1,806	.	.	199	4,835	1,373	1,881	10,094
	2005	2,538	.	.	215	4,645	647	1,814	9,859
	2006	2,708	.	.	228	5,083	130	1,872	10,021
	2007	2,537	.	.	251	5,491	165	1,827	10,271
	2008	2,786	.	.	262	6,323	164	1,793	11,328
	2009	2,770	.	5	272	6,791	136	1,721	11,695
	2010	3,073	.	13	245	7,635	144	1,622	12,732
	2011	2,209	.	56	239	8,791	1,200	1,460	13,955
	2012	1,420	.	11	244	7,978	571	1,340	11,564
	2013	1,047	.	226	298	6,066	351	1,236	9,224
	2014	595	.	618	300	6,072	317	1,299	9,201
	2015	57	.	704	297	7,430	396	1,270	10,154
	2016	24	.	516	299	8,293	450	1,391	10,973
W	<1996	11,096	.	.	1,468	9,167	9,616	16,506	47,853
	1996	445	.	.	244	2,933	913	1,123	5,658
	1997	741	.	.	165	2,719	945	1,171	5,741
	1998	1,247	.	.	185	2,949	986	1,288	6,655
	1999	1,066	.	.	167	2,943	1,209	1,266	6,651
	2000	1,599	.	.	187	3,062	1,099	1,296	7,243
	2001	1,164	.	.	193	3,147	699	1,326	6,529
	2002	1,520	.	.	163	3,074	2,099	1,304	8,160
	2003	1,367	.	.	157	3,524	2,070	1,435	8,553
	2004	1,255	.	.	175	3,746	1,978	1,362	8,516
	2005	1,846	.	.	181	3,801	948	1,294	8,070
	2006	2,008	.	.	185	4,069	217	1,372	7,851
	2007	1,998	.	.	201	4,552	276	1,418	8,445
	2008	2,270	.	.	239	5,132	294	1,265	9,200
	2009	2,155	.	9	214	5,196	222	1,162	8,958
	2010	2,549	.	4	221	5,877	217	1,102	9,970

2011	1,693	46	199	7,019	1,594	1,010	11,561
2012	1,255	9	202	6,370	683	936	9,455
2013	829	256	237	4,740	402	905	7,369
2014	433	583	223	4,436	327	969	6,971
2015	36	741	230	5,506	435	940	7,888
2016	20	531	259	6,101	498	915	8,324
Sum <1996	25,068	.	2,394	20,095	15,693	36,094	99,344
1996	1,042	.	461	6,507	1,551	2,778	12,339
1997	1,738	.	351	6,083	1,616	2,815	12,603
1998	2,928	.	380	6,702	1,748	3,143	14,901
1999	2,576	.	389	6,770	2,003	3,038	14,776
2000	3,855	.	383	6,851	1,801	3,173	16,063
2001	2,822	.	357	7,130	1,167	3,181	14,657
2002	3,704	.	344	7,059	3,379	3,206	17,692
2003	3,257	.	355	8,159	3,476	3,429	18,676
2004	3,061	.	374	8,581	3,351	3,243	18,610
2005	4,384	.	396	8,446	1,595	3,108	17,929
2006	4,716	.	413	9,152	347	3,244	17,872
2007	4,535	.	452	10,043	441	3,245	18,716
2008	5,056	.	501	11,455	458	3,058	20,528
2009	4,925	14	486	11,987	358	2,883	20,653
2010	5,622	17	466	13,512	361	2,724	22,702
2011	3,902	102	438	15,810	2,794	2,470	25,516
2012	2,675	20	446	14,348	1,254	2,276	21,019
2013	1,876	482	535	10,806	753	2,141	16,593
2014	1,028	1,201	523	10,508	644	2,268	16,172
2015	93	1,445	527	12,936	831	2,210	18,042
2016	44	1,047	558	14,394	948	2,306	19,297

```
> ( inTp <- dimnames(crtab)[[3]] )
```

```
[1] "DVD" "Dia" "Ins" "OAD" "Pod" "NPR" "Sum"
```

Note that the first date category are the persons that are prevalent diabetes cases as of 1 January 1996.

The relative percentages in each year is also of interest:

```
> pctab <- sweep( crtab, 1:2, crtab[,"Sum"], "/" ) * 100
> fCtable( pctab, row.vars=1:2, w=6, d=1 )
```

		inCr	DVD	Dia	Ins	OAD	Pod	NPR	Sum
sex	P								
M	<1996	27.1	.	1.8	21.2	11.8	38.0	100.0	
	1996	8.9	.	3.2	53.5	9.5	24.8	100.0	
	1997	14.5	.	2.7	49.0	9.8	24.0	100.0	
	1998	20.4	.	2.4	45.5	9.2	22.5	100.0	
	1999	18.6	.	2.7	47.1	9.8	21.8	100.0	
	2000	25.6	.	2.2	43.0	8.0	21.3	100.0	
	2001	20.4	.	2.0	49.0	5.8	22.8	100.0	
	2002	22.9	.	1.9	41.8	13.4	20.0	100.0	
	2003	18.7	.	2.0	45.8	13.9	19.7	100.0	
	2004	17.9	.	2.0	47.9	13.6	18.6	100.0	
	2005	25.7	.	2.2	47.1	6.6	18.4	100.0	
	2006	27.0	.	2.3	50.7	1.3	18.7	100.0	
	2007	24.7	.	2.4	53.5	1.6	17.8	100.0	
	2008	24.6	.	2.3	55.8	1.4	15.8	100.0	
	2009	23.7	.	2.3	58.1	1.2	14.7	100.0	
	2010	24.1	0.1	1.9	60.0	1.1	12.7	100.0	
	2011	15.8	0.4	1.7	63.0	8.6	10.5	100.0	

	2012	12.3	0.1	2.1	69.0	4.9	11.6	100.0
	2013	11.4	2.5	3.2	65.8	3.8	13.4	100.0
	2014	6.5	6.7	3.3	66.0	3.4	14.1	100.0
	2015	0.6	6.9	2.9	73.2	3.9	12.5	100.0
	2016	0.2	4.7	2.7	75.6	4.1	12.7	100.0
W	<1996	23.2	.	3.1	19.2	20.1	34.5	100.0
	1996	7.9	.	4.3	51.8	16.1	19.8	100.0
	1997	12.9	.	2.9	47.4	16.5	20.4	100.0
	1998	18.7	.	2.8	44.3	14.8	19.4	100.0
	1999	16.0	.	2.5	44.2	18.2	19.0	100.0
	2000	22.1	.	2.6	42.3	15.2	17.9	100.0
	2001	17.8	.	3.0	48.2	10.7	20.3	100.0
	2002	18.6	.	2.0	37.7	25.7	16.0	100.0
	2003	16.0	.	1.8	41.2	24.2	16.8	100.0
	2004	14.7	.	2.1	44.0	23.2	16.0	100.0
	2005	22.9	.	2.2	47.1	11.7	16.0	100.0
	2006	25.6	.	2.4	51.8	2.8	17.5	100.0
	2007	23.7	.	2.4	53.9	3.3	16.8	100.0
	2008	24.7	.	2.6	55.8	3.2	13.8	100.0
	2009	24.1	0.1	2.4	58.0	2.5	13.0	100.0
	2010	25.6	.	2.2	58.9	2.2	11.1	100.0
	2011	14.6	0.4	1.7	60.7	13.8	8.7	100.0
	2012	13.3	0.1	2.1	67.4	7.2	9.9	100.0
	2013	11.2	3.5	3.2	64.3	5.5	12.3	100.0
	2014	6.2	8.4	3.2	63.6	4.7	13.9	100.0
	2015	0.5	9.4	2.9	69.8	5.5	11.9	100.0
	2016	0.2	6.4	3.1	73.3	6.0	11.0	100.0
Sum	<1996	25.2	.	2.4	20.2	15.8	36.3	100.0
	1996	8.4	.	3.7	52.7	12.6	22.5	100.0
	1997	13.8	.	2.8	48.3	12.8	22.3	100.0
	1998	19.6	.	2.6	45.0	11.7	21.1	100.0
	1999	17.4	.	2.6	45.8	13.6	20.6	100.0
	2000	24.0	.	2.4	42.7	11.2	19.8	100.0
	2001	19.3	.	2.4	48.6	8.0	21.7	100.0
	2002	20.9	.	1.9	39.9	19.1	18.1	100.0
	2003	17.4	.	1.9	43.7	18.6	18.4	100.0
	2004	16.4	.	2.0	46.1	18.0	17.4	100.0
	2005	24.5	.	2.2	47.1	8.9	17.3	100.0
	2006	26.4	.	2.3	51.2	1.9	18.2	100.0
	2007	24.2	.	2.4	53.7	2.4	17.3	100.0
	2008	24.6	.	2.4	55.8	2.2	14.9	100.0
	2009	23.8	0.1	2.4	58.0	1.7	14.0	100.0
	2010	24.8	0.1	2.1	59.5	1.6	12.0	100.0
	2011	15.3	0.4	1.7	62.0	10.9	9.7	100.0
	2012	12.7	0.1	2.1	68.3	6.0	10.8	100.0
	2013	11.3	2.9	3.2	65.1	4.5	12.9	100.0
	2014	6.4	7.4	3.2	65.0	4.0	14.0	100.0
	2015	0.5	8.0	2.9	71.7	4.6	12.2	100.0
	2016	0.2	5.4	2.9	74.6	4.9	12.0	100.0

We can get a graphical overview of the numbers, but first a groom of the labels to get a nice display:

```
> crt <- crtab
> dimnames( crt )[[2]][c(3,4,5,6,
+                        8,9,10,11,
+                        13,14,15,16,
```

```

+                               18,19,20,21)] <- ""
> crS <- crt["Sum",,-7]
> crM <- crt["M",,-7]
> crF <- crt["W",,-7]
> names( dimnames(crS) ) <-
+ names( dimnames(crM) ) <-
+ names( dimnames(crF) ) <- NULL
> layout( rbind(c(1,1),2:3), heights=2:1 )
> par( mar=c(1,0,0,0) )
> zz <- mosaicplot( crS, off=0, col=clr, main="", las=1, cex.axis=0.9, border=gray(0.0))
> par( mar=c(1,1,0,0) )
> mosaicplot( crM, off=0, col=clr, main="", las=1, cex.axis=0.9, border=gray(0.0))
> text( 0.95, 0.5, "Men", font=2, col="white", adj=c(1,0), cex=1.5 )
> par( mar=c(1,0,0,1) )
> mosaicplot( crF, off=0, col=clr, main="", las=1, cex.axis=0.9, border=gray(0.0))
> text( 0.95, 0.5, "Women", font=2, col="white", adj=c(1,0), cex=1.5 )

```

The fraction of persons included by each of the criteria varies over time, particularly the fraction included on use of OAD has increased from about half to about 3 quarters, presumably reflecting the increasing intensity of early pharmacological intervention.

3.4 Meeting more than one criterion

It is of interest to see how quickly persons meet the second criterion for inclusion in the register; this will give a hint of possible over-inclusion of persons without diabetes. If there is a very long time to second inclusion for certain persons, this will be an indication of inclusion of more persons that are not diabetes patients.

3.4.1 Defining the follow-up

The analysis will be a survival analysis: How long will persons included in the register “survive” without meeting a 2nd criterion? In the first instance we consider meeting any other than the inclusion criterion as the possible event.

We set up a `Lexis` object to handle this, but first we find the date of meeting the first, resp. 2nd criterion. Here we add a small random quantity (± 3 days) to all dates so that no two criteria are met in the same day. By that token we must revise the date of DM slightly, so that we get the first of the revised dates.

```

> set.seed( 1952 )
> dats <- as.matrix( reg[,c("doIns","doOAD","doDVDD","doPod","doDiaB","doNPR")] )
> dats <- dats + runif( dats, -1, 1 )/120
> system.time( idats <- t(apply( dats, 1, sort, na.last=TRUE )) )
  user  system elapsed
 33.11   0.08   33.18
> table( idats[,1] == idats[,2], useNA="ifany" )
 FALSE <NA>
358355 116345
> apply( idats, 2, function(x) sum( is.na(x) ) )
[1]      0 116345 211744 306851 388094 445835

```

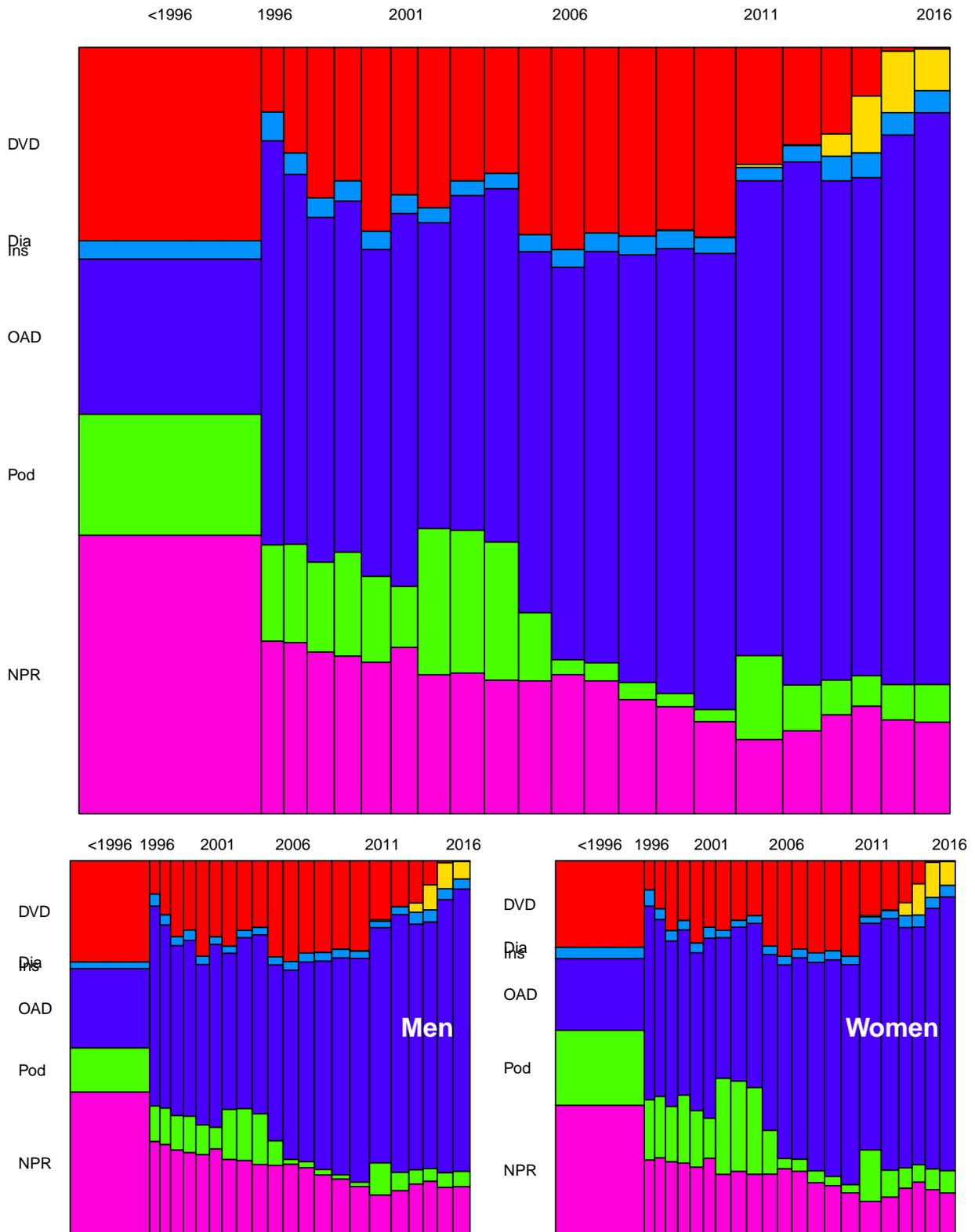


Figure 3.3: Inclusion criteria by year of inclusion. The widths of the bars are proportional to the number of persons included each year, so the area of each rectangle is proportional to the number of persons in it. Colouring of the rectangles is the same as in figure 3.1. `./graph/reg-mosaic`

```

> reg$doDMr <- idats[,1] # revised date of DM
> reg$do2nd <- idats[,2]
> table( reg$do2nd <= 1996 |
+       reg$doDMr <= reg$doBth |
+       reg$doDMr >= 2017 |
+       reg$doDth <= 1996, useNA="ifany" )
FALSE TRUE <NA>
83937 61343 329420

```

Note that this definition only is admissible because we only are interested in the probability of meeting the 2nd criterion and which one it is. In those cases where the second criterion is met close to the first, we will still have the two first dates close to each other.

We have now defined the date of meeting the second criterion, so we can set up a Lexis object to hold the follow-up to either 2nd criterion or death.

```

> rL <- Lexis( entry = list( age = pmax(doDMr,1996)-doBth,
+                          per = pmax(doDMr,1996),
+                          tfi = 0 ),
+            exit = list( per = pmin( do2nd, doDth, 2017, na.rm=TRUE ) ),
+            exit.status = factor( 1*(!is.na(do2nd)) +
+                                2*(!is.na(doDth) &
+                                is.na(do2nd)),
+                                labels=c("One", "2+", "Dead") ),
+            data = reg )

```

NOTE: entry.status has been set to "One" for all.

```
> nrow( reg ) - nrow( rL )
```

```
[1] 61514
```

```
> summary( rL )
```

Transitions:

To

From	One	2+	Dead	Records:	Events:	Risk time:	Persons:
One	64588	297039	51559	413186	348598	1191185	413186

We note that there are some 61,000 persons not in rL, these are the ones that meet the second criterion before 1996

```
> summary( rL, by="inCr" )
```

\$DVD

Transitions:

To

From	One	2+	Dead	Records:	Events:	Risk time:	Persons:
One	4486	67665	904	73055	68569	256566.8	73055

\$Dia

Transitions:

To

From	One	2+	Dead	Records:	Events:	Risk time:	Persons:
One	2957	1264	107	4328	1371	6153.42	4328

\$Ins

Transitions:

```

To
From   One   2+ Dead Records: Events: Risk time: Persons:
   One 2791 5328 3043   11162   8371   52878.49   11162

```

\$OAD

Transitions:

```

To
From   One   2+ Dead Records: Events: Risk time: Persons:
   One 42966 148904 31866   223736   180770   599796.1   223736

```

\$Pod

Transitions:

```

To
From   One   2+ Dead Records: Events: Risk time: Persons:
   One 5863 19814 10549   36226   30363   157520.9   36226

```

\$NPR

Transitions:

```

To
From   One   2+ Dead Records: Events: Risk time: Persons:
   One 5525 54064 5090   64679   59154   118269.4   64679

```

3.4.2 Analysis of rate of meeting 2nd criterion

The relevant analysis is of occurrence rates of 2+, using `tfi` as the primary timescale and age (at inclusion) and date of diagnosis as explanatory variables. The analysis will be conducted separately for each level of `inCr` and sex. However since we want the cumulative probability of meeting a second criterion we need to take mortality into account when doing so.

First we split data in 1, resp. 6 month intervals:

```

> system.time( sL <- splitMulti( rL, tfi=c(0:11/12,seq(1,30,1/2)) ) )
   user  system elapsed
 21.34   10.10   27.49

```

```

> sL <- transform( sL, ain = age-tfi, pin = per-tfi )
> summary( sL )

```

Transitions:

```

To
From   One   2+ Dead Records: Events: Risk time: Persons:
   One 5060796 297039 51559   5409394   348598   1191185   413186

```

```

> range( sL$tfi )

```

```

[1] 0.0 20.5

```

We can then fit models for transition rates to 2+ resp. Dead separately for the two sexes and also for each inclusion criterion as well as overall:

```

> ( inTp <- c( "All", levels(reg$inCr) ) )
[1] "All" "DVD" "Dia" "Ins" "OAD" "Pod" "NPR"

```

```

> lmod <- NULL
> system.time(
+ for( sx in c("M","W") )
+ for( dd in c("2+","Dead") )
+ for( ic in inTp )
+   {
+ cat( ic, dd, sx, "running", format(Sys.time(), "%H:%M:%S"), "\n" )
+ lmod <- c( lmod, list(
+   glm( (lex.Xst==dd) ~ Ns( tfi, knots=c(0,1,2,5,10) ) +
+     Ns( ain, knots=c(4:8*10) ) +
+     Ns( pin, knots=seq(1997,2015,,4) ) +
+     offset( log(lex.dur) ),
+   family = poisson,
+   data = if( ic=="All" ) subset( sL, sex==sx ) else
+     subset( sL, sex==sx & inCr==ic ) ) ) )
+ names( lmod )[length(lmod)] <- paste( ic, dd, sx, sep="-" )
+ gc()
+   } )
All 2+ M running 17:34:34
DVD 2+ M running 17:35:13
Dia 2+ M running 17:35:23
Ins 2+ M running 17:35:24
OAD 2+ M running 17:35:25
Pod 2+ M running 17:35:47
NPR 2+ M running 17:35:50
All Dead M running 17:35:54
DVD Dead M running 17:36:42
Dia Dead M running 17:36:56
Ins Dead M running 17:36:57
OAD Dead M running 17:36:59
Pod Dead M running 17:37:25
NPR Dead M running 17:37:29
All 2+ W running 17:37:34
DVD 2+ W running 17:38:10
Dia 2+ W running 17:38:19
Ins 2+ W running 17:38:20
OAD 2+ W running 17:38:23
Pod 2+ W running 17:38:40
NPR 2+ W running 17:38:45
All Dead W running 17:38:51
DVD Dead W running 17:39:34
Dia Dead W running 17:39:46
Ins Dead W running 17:39:47
OAD Dead W running 17:39:50
Pod Dead W running 17:40:11
NPR Dead W running 17:40:18
  user system elapsed
 251.57   95.95  348.18
> names( lmod )
 [1] "All-2+-M"   "DVD-2+-M"   "Dia-2+-M"   "Ins-2+-M"   "OAD-2+-M"   "Pod-2+-M"
 [7] "NPR-2+-M"   "All-Dead-M" "DVD-Dead-M" "Dia-Dead-M" "Ins-Dead-M" "OAD-Dead-M"
[13] "Pod-Dead-M" "NPR-Dead-M" "All-2+-W"   "DVD-2+-W"   "Dia-2+-W"   "Ins-2+-W"
[19] "OAD-2+-W"   "Pod-2+-W"   "NPR-2+-W"   "All-Dead-W" "DVD-Dead-W" "Dia-Dead-W"
[25] "Ins-Dead-W" "OAD-Dead-W" "Pod-Dead-W" "NPR-Dead-W"
> save( lmod, file="../data/lmod.Rda" )

```

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

What we want next is to show the cumulative probability of meeting a second criterion separately for men and women and for each *first* entry criterion. This will be done for a person entering the register at age 60 at 1.1.2010 (close to the median age at entry), and additionally to this we will show the RR relative to age 60 and date of inclusion both for 2nd inclusion and death.

So we set up arrays for cumulative risk of a second registration and death without this, as well as the corresponding RRs for the two relative to the reference:

```
> lname <- list( inCr = inTp,
+               Xst = c("2+", "Dead"),
+               sex = c("M", "W") )
> t.tfi <- seq(0, 12, 0.1)
> t.ain <- seq(40, 80, 0.2)
> t.pin <- seq(1996, 2017, 0.2)
> Rsk <- NArray( c( lname, list( tfi=t.tfi ) ) )
> CHz <-
+ Haz <- NArray( c( lname, list( tfi=t.tfi, cont=c("Est", "up", "lo") ) ) )
> RRa <- NArray( c( lname, list( age=t.ain, cont=c("Est", "up", "lo") ) ) )
> RRp <- NArray( c( lname, list( per=t.pin, cont=c("Est", "up", "lo") ) ) )
> str( CHz )

logi [1:7, 1:2, 1:2, 1:121, 1:3] NA NA NA NA NA NA ...
- attr(*, "dimnames")=List of 5
..$ inCr: chr [1:7] "All" "DVD" "Dia" "Ins" ...
..$ Xst : chr [1:2] "2+" "Dead"
..$ sex : chr [1:2] "M" "W"
..$ tfi : chr [1:121] "0" "0.1" "0.2" "0.3" ...
..$ cont: chr [1:3] "Est" "up" "lo"
```

We need a little extension of the `ci.cum` function in the `Epi` package, allowing a prediction data frame as input to `ci.cum`, so we call it `ci.Cum`¹ and also tailor it to exploit the `Lexis` structure::

```
> ci.Cum <-
+ function( obj, nd, ... )
+ {
+   ci.cum( obj, Epi:::df2ctr(obj, nd),
+           ci.Exp=TRUE, int=mean(nd$lex.dur), ... )[,1:3]
+ }
```

We can now fill in values in these arrays:

```
> for( ic in inTp )
+ for( dd in c("2+", "Dead") )
+ for( sx in c("M", "W") )
+ {
+   mnam <- paste( ic, dd, sx, sep="-" )
+   # cat( mnam, "\n" )
+   Hzd <- data.frame( tfi = t.tfi,
+                     ain = 60,
+                     pin = 2010,
+                     lex.dur = 0.1 ) # result is cumulative incidence over interval
+   Haz[ic, dd, sx, ] <- ci.pred( lmod[[mnam]], Hzd )
```

¹Ultimately to be incorporated in the `Epi` package.

```

+ CHz[ic,dd,sx,,] <- ci.Cum( lmod[[mnam]], Hzd )
+ Ref <- data.frame( tfi = 1,
+                   ain = 60,
+                   pin = 2010,
+                   lex.dur = 1 )
+ aRR <- data.frame( tfi = 1,
+                   ain = t.ain,
+                   pin = 2010,
+                   lex.dur = 1 )
+ pRR <- data.frame( tfi = 1,
+                   ain = 60,
+                   pin = t.pin,
+                   lex.dur = 1 )
+ RRa[ic,dd,sx,,] <- ci.exp( lmod[[mnam]], list(aRR,Ref) )
+ RRp[ic,dd,sx,,] <- ci.exp( lmod[[mnam]], list(pRR,Ref) )
+ }

```

We have the cumulative hazards over small intervals in `Haz` and the cumulative hazards in `Chz`. From the latter we can construct the so-called “cause-specific risks” of death and 2nd registration with confidence intervals. But we would also like to see the “true risks” taking the competing cause (death) into account:

```

> for( ic in dimnames(Rsk)[[1]] )
+ for( dd in dimnames(Rsk)[[2]] )
+ for( sx in dimnames(Rsk)[[3]] )
+ Rsk[ic,dd,sx,] <- cumsum(Haz[ic,dd,sx,,1]*exp(-CHz[ic,"2+" ,sx,,1]
+                                               -CHz[ic,"Dead",sx,,1]))

```

We have however not bothered to compute the confidence limits of the latter; the main purpose being to see the discrepancy between the cause-specific and the true probabilities.

We now have the quantities we are interested in; three plots for each combination of sex and event type, death being the secondary one. The plots are the cumulative risk of a second registration for a 60 year old in 2010, and then the cause-specific HRs relative to this.

```

> xclr <- c("black",clr)
> par( mfc=c(3,2), mar=c(3,1,0.2,0.1), oma=c(0,2,0,0),
+      mgp=c(3,1,0)/1.6, bty="n", las=1 )
> for( sx in c("M","W") )
+ {
+ Rs <- Ch <- NULL
+ for( ic in inTp[-3] ) Ch <- cbind(Ch,CHz[ic,"2+",sx,,])
+ for( ic in inTp[-3] ) Rs <- cbind(Rs,Rsk[ic,"2+",sx, ])
+ matshade( t.tfi, 1-exp(-Ch), col=xclr[-3], lwd=2, plot=TRUE, yaxt="n",
+           ylim=c(0,1), yaxs="i", xlab="Time since inclusion (years)", ylab="" )
+ matlines( t.tfi, Rs, col=xclr[-3], lwd=2, lty="11", lend="butt" )
+ axis( side=2)
+ if( sx=="M") text( 0, seq(0.97,0.70,,6), inTp[-3], font=2, col=xclr[-3], adj=0 )
+ text( 12, 0.03, paste(sx," included at age 60 on 2010/01/01",sep=""), adj=c(1,0) )
+ abline( h=0.5, v=2, col="gray" )
+ axis( side=1, at=0:12, labels=NA, tcl=-0.3 )
+
+ Rs<- NULL
+ for( ic in inTp[-3] ) Rs <- cbind(Rs,RRa[ic,"2+",sx,,])
+ matshade( t.ain, Rs, col=xclr[-3], lwd=2, plot=TRUE,
+           ylim=c(0.2,5), log="y", xlab="Age at inclusion (years)", ylab="" )
+ abline( h=1, v=60, col="gray" )
+ axis( side=1, at=seq(40,80,5), labels=NA, tcl=-0.3 )

```

```
+  
+ Rs<- NULL  
+ for( ic in inTp[-3] ) Rs <- cbind(Rs,RRp[ic,"2+",sx,,])  
+ matshade( t.pin, Rs, col=xclr[-3], lwd=2, plot=TRUE,  
+           ylim=c(0.2,5), log="y", xlab="Date of inclusion", ylab="" )  
+ abline( h=1, v=2010, col="gray" )  
+ axis( side=1, at=1996:2017, labels=NA, tcl=-0.3 )  
+   }  
> mtext( "Probability of meeting 2nd criterion",  
+       side=2, line=1, las=0, outer=TRUE, at=5/6, cex=0.66 )  
> mtext( "RR of meeting 2nd criterion",  
+       side=2, line=1, las=0, outer=TRUE, at=3/6, cex=0.66 )  
> mtext( "RR of meeting 2nd criterion",  
+       side=2, line=1, las=0, outer=TRUE, at=1/6, cex=0.66 )
```

From figure 3.4 we see that with the exception of podiatry and insulin, persons included on other criteria as the first have at least 50% probability of meeting a second criterion within two years from meeting the first.

We also see that insulin purchase is the criterion where the difference between the wrongly computed probability and the correctly computed one is largest, simply because the mortality is largest among these.

```
-----  
2018-12-05 at 17:53:20  
Time elapsed: 00:20:06  
-----
```

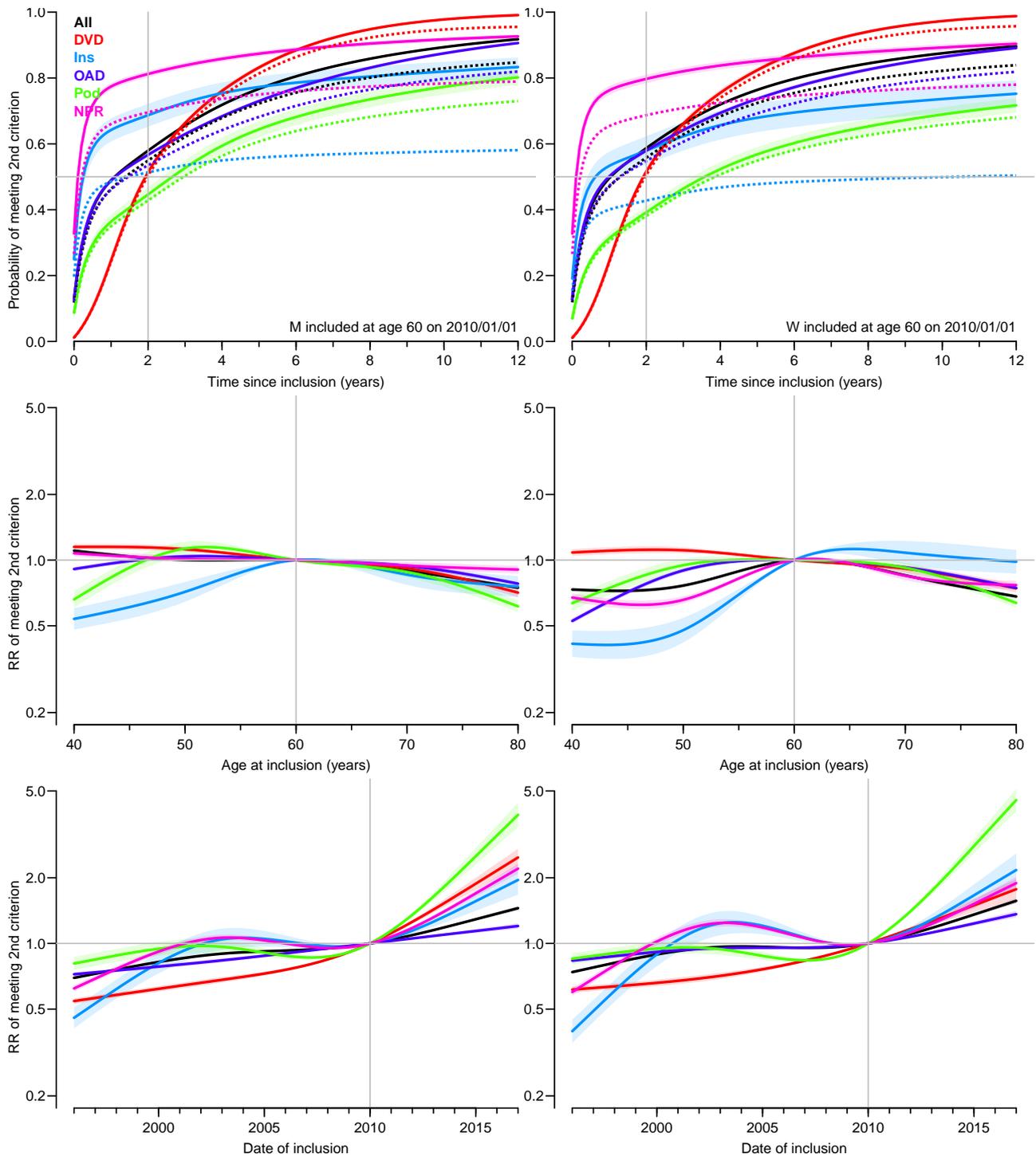


Figure 3.4: Models for meeting a second criterion after inclusion. This was modeled by a proportional hazards model with effects of time since inclusion and age and calendar time at inclusion. The full lines are from the model for the occurrence of a second criterion met; in the top panels these represent an over-estimate of the probabilities because death as a competing risk has not been accounted for. The broken lines in the top panels are the probabilities corrected for death, albeit without confidence intervals. The DiaB criterion was so scarce and with limited time that we omitted this from the plot. ./graph/reg-Cprob

Chapter 4

Comparing the DMreg and RUKS

4.1 DMreg

The DMreg is constructed by computing dates of a number of criteria and taking the earliest of these as the entry (diagnosis) date for the person in the register. Some of these are the same or similar, some are unique for the DMreg. The DMreg includes persons on the first purchase of GLD (glucose-lowering drug), whereas the RUKS uses the second. Hence we have included in the DMreg the dates for the second purchases both for OAD and insulin, as well as the date of inclusion which would be used if second purchase were to be used. Furthermore the inclusion criterion has instead of the levels (“OAD”, “Ins”) the levels (“O-OAD”, “O-Ins”, “I-OAD”, “I-Ins”) according to what the two first purchases were.

In chapter 3 is a detailed exposition of the cases included in the DMreg as well as calculations of waiting time till meeting a second inclusion criterion.

4.2 Comparison of DMreg and RUKS

In this comparison there are three chunks of interest:

1. Who is in DMreg but not in RUKS

2. Who is in RUKS but not in DMreg.

The persons that could be of interest here are those that have been picked up by some of the criteria for DMreg, but who have been deemed non-eligible because of either GDM or PCOS. In principle the “initial” algorithms for the DMreg should pick up at least the same persons as those included in RUKS.

3. How do the persons *both* in RUKS and DMreg differ:

- (a) w.r.t. type of DM

- (b) w.r.t. date of diagnosis

In the section 5.3 there is a set of detailed tables comparing the two registers.

Here we read the joint dataset for slightly more detailed analysis:

```
> library( Epi )  
> library( haven )  
> start()
```

```
Home folder E:/workdata/705093/BXC/demoDM/r
Time: 2018-12-05 18:52:17
```

```
R version 3.5.0 (2018-04-23)
Platform: x86_64-w64-mingw32/x64 (64-bit)
Running under: Windows Server 2012 R2 x64 (build 9600)
```

```
Matrix products: default
```

```
attached base packages:
[1] stats      graphics  grDevices  utils      datasets  methods   base
```

```
other attached packages:
[1] haven_1.1.1 Epi_2.30
```

```
loaded via a namespace (and not attached):
```

```
[1] Rcpp_0.12.16      lattice_0.20-35  zoo_1.8-1        MASS_7.3-49      grid_3.5.0
[6] plyr_1.8.4        magrittr_1.5     etm_0.6-2        pillar_1.2.2     rlang_0.2.0
[11] Matrix_1.2-14     splines_3.5.0    forcats_0.3.0    tools_3.5.0      cmprsk_2.2-7
[16] numDeriv_2016.8-1 survival_2.41-3  parallel_3.5.0   compiler_3.5.0   tibble_1.4.2
```

```
> load( "../data/inits.Rda" )
> sam <- read_sas( "../data/sam.sas7bdat" )
> names( sam )

 [1] "pnr"          "kon"          "fodselsdato"  "sygdom"        "debut"         "alder_debut"
 [7] "doNPR"       "doDVDD"       "doOAD"        "doIns"         "doOAD2"        "doIns2"
[13] "doPod"       "doDiaB"       "sex"          "doBth"         "doDth"         "doDM"
[19] "doDM2"       "inCr"         "inCr2"        "DMtp"          "from"          "dif"
[25] "ageR"        "ageD"         "iNPR"         "iIns"          "iIns2"         "iOAD"
[31] "iOAD2"       "iPod"         "iDVD"         "iDia"

> sam <- cal.yr( as.data.frame( sam, strings.as.factors=TRUE ) )
> sam <- transform( sam ,
+                   sex = factor( sex, labels=c("M","W") ),
+                   kon = factor( kon, levels=c("M","K") ),
+                   DMtp = factor( DMtp ),
+                   sygdom = factor( sygdom ) )
> # cstr( sam )
```

4.2.1 Persons in either DMreg or RUKS

First we can show how many persons that appear in both or only one of the registers by sex:

```
> fCtable(with( sam, addmargins( table( from, sex, exclude=NULL ) ) ))
```

sex	M	W	Sum
from			
Both	232,982	180,470	413,452
DMrg	26,097	35,151	61,248
RUKS	10,759	12,712	23,471
Sum	269,838	228,333	498,171

Although there are more men in total, among those *only* in RUKS there are more women than men (12,712 vs. 10,759)

```
> fCtable(with( sam, addmargins( table( sygdom, DMtp, exclude=NULL ) ) ))
```

	DMtp	T1	T2	Sum
sygdom				
-	.	2,939	58,309	61,248
TYPE_1	2,889	31,933	11,707	46,529
TYPE_2	20,582	10,758	359,054	390,394
Sum	23,471	45,630	429,070	498,171

Se we see that there is a substantial disagreement w.r.t. the type of diabetes between the two registers; the total number is around 45,000 in boteh registers, but only 32,000 are classified as such in both, around 11,000 are classified as T1/T2 each way. The DMreg has 429,000 T2D but RUKS only 390,000, so

Using only 2nd drug purchase will exclude some, but we maintain the same pattern:

```
> fCtable(with( subset( sam, !is.na(doDM2) | from == "RUKS" ),
+             addmargins( table( from, sygdom, DMtp, exclude=NULL ) ) ) )
```

	DMtp	T1	T2	Sum
from sygdom				
Both -	.	.	.	.
TYPE_1	.	31,931	11,628	43,559
TYPE_2	.	10,756	355,977	366,733
Sum	.	42,687	367,605	410,292
DMrg -	.	2,663	45,173	47,836
TYPE_1	.	.	.	.
TYPE_2	.	.	.	.
Sum	.	2,663	45,173	47,836
RUKS -	.	.	.	.
TYPE_1	2,889	.	.	2,889
TYPE_2	20,582	.	.	20,582
Sum	23,471	.	.	23,471
Sum -	.	2,663	45,173	47,836
TYPE_1	2,889	31,931	11,628	46,448
TYPE_2	20,582	10,756	355,977	387,315
Sum	23,471	45,350	412,778	481,599

4.2.2 Annual number of persons included

We can list the number of cases per year, both when we use the RUKS date (first two columns), the 2nd drug date from DMreg (columns 3,4) and the dates based on the first drug purchase (columns 5,6):

```
> tt <-
+ with( sam, addmargins( cbind( table( floor(debut), from ),
+                               table( floor(doDM2), from ),
+                               rbind( table( floor(doDM), from ), 0 ) ),
+                               1 ) )[, -c(2,6,9)]
> colnames( tt )[4] <- 'DM2rg'
> fCtable( tt )
```

	Both	RUKS	Both	DM2rg	Both	DMrg
1994	64,384	7,900	66,248	4,525	65,395	4,524
1995	13,984	558	26,094	1,023	27,973	1,452
1996	13,184	182	10,099	1,057	10,748	1,591
1997	12,025	146	10,990	1,050	11,064	1,539
1998	12,910	163	14,182	1,150	13,265	1,636

1999	13,064	207	13,210	1,220	13,055	1,721
2000	13,334	239	13,035	1,295	14,312	1,751
2001	13,923	279	13,157	1,009	13,246	1,411
2002	13,926	301	16,257	2,203	15,116	2,576
2003	15,856	326	15,681	2,433	15,807	2,869
2004	15,947	394	14,474	2,361	15,712	2,898
2005	15,604	528	15,471	1,772	15,645	2,284
2006	15,996	547	16,892	1,464	15,812	2,060
2007	16,936	604	16,129	1,814	16,283	2,433
2008	18,287	512	16,080	2,184	17,607	2,921
2009	18,877	564	17,703	2,103	17,812	2,841
2010	20,244	566	20,526	2,505	19,413	3,289
2011	23,312	503	20,403	3,895	20,818	4,698
2012	20,345	518	16,942	2,474	17,662	3,357
2013	15,222	473	13,766	2,398	13,527	3,066
2014	14,065	475	13,136	2,509	13,060	3,112
2015	15,491	523	14,016	2,488	14,759	3,283
2016	15,974	620	15,634	2,882	15,361	3,936
2017	562	6,343	167	22	.	.
Sum	413,452	23,471	410,292	47,836	413,452	61,248

We see that of the 23,471 *only* in RUKS, slightly more than a quarter (6,343) are recorded with a date of debut in 2017. Also note that there are 413,452 persons that appear in both registers, (410,292 if restricted to 2nd drug purchase).

We can break down the comparison by type, sex and date, using the two different classifications (sygdom/debut) resp. (DMtp/doDM) and (DMtp/doDM2).

```
> tD <- with( sam,
+           table( P = floor(doDM),
+                 DMtp, from,
+                 sex ) )
> t2 <- with( sam,
+           table( P = floor(doDM2),
+                 DMtp, from,
+                 sex ) )
> tR <- with( sam,
+           table( P = floor(debut),
+                 sygdom, from,
+                 sex ) )
> fCtable( addmargins(tD,c(1,4)), row.vars=2:1, w=6 )
> fCtable( addmargins(t2,c(1,4)), row.vars=2:1, w=6 )
> fCtable( addmargins(tR,c(1,4)), row.vars=2:1, w=6 )
```

For a graphical display of the total numbers we simplify the tables:

```
> tD <- with( subset( sam, from != "RUKS" ),
+           table( P = floor(doDM),
+                 DMtp,
+                 sex ) )
> # Jitter inclusion dates by 3 days in order to avoid funny effects of 1 January
> sam$doDM2r <- sam$doDM2 + runif(nrow(sam),-1,1)/120
> t2 <- with( subset( sam, from != "RUKS" ),
+           table( P = floor(doDM2r),
+                 DMtp,
+                 sex ) )
> tR <- with( subset( sam, from != "DMrg" ),
+           table( P = floor(debut),
```

```

+           sygdom,
+           sex ) )
> tD <- addmargins(tD,3)
> t2 <- addmargins(t2,3)
> tR <- addmargins(tR,3)
> str( tD )
'table' num [1:23, 1:3, 1:3] 0 0 0 0 0 0 0 0 0 0 0 ...
- attr(*, "dimnames")=List of 3
..$ P      : chr [1:23] "1994" "1995" "1996" "1997" ...
..$ DMtp: chr [1:3] "" "T1" "T2"
..$ sex   : chr [1:3] "M" "W" "Sum"
> str( t2 )
'table' num [1:25, 1:3, 1:3] 0 0 0 0 0 0 0 0 0 0 0 ...
- attr(*, "dimnames")=List of 3
..$ P      : chr [1:25] "1993" "1994" "1995" "1996" ...
..$ DMtp: chr [1:3] "" "T1" "T2"
..$ sex   : chr [1:3] "M" "W" "Sum"
> str( tR )
'table' num [1:24, 1:3, 1:3] 0 0 0 0 0 0 0 0 0 0 0 ...
- attr(*, "dimnames")=List of 3
..$ P      : chr [1:24] "1994" "1995" "1996" "1997" ...
..$ sygdom: chr [1:3] "_" "TYPE_1" "TYPE_2"
..$ sex   : chr [1:3] "M" "W" "Sum"
> fCtable( addmargins(tD,1), row.vars=1, w=7 )
      DMtp
      sex      M      W      Sum      T1      T2
      sex      M      W      Sum      M      W      Sum      M      W      Sum
P
1994      .      .      .  11,918  9,328  21,246  23,968  24,705  48,673
1995      .      .      .   1,342  1,066   2,408  14,263  12,754  27,017
1996      .      .      .    683    489   1,172   5,998   5,169  11,167
1997      .      .      .    675    551   1,226   6,187   5,190  11,377
1998      .      .      .    766    555   1,321   7,480   6,100  13,580
1999      .      .      .    667    460   1,127   7,458   6,191  13,649
2000      .      .      .    635    457   1,092   8,185   6,786  14,971
2001      .      .      .    692    475   1,167   7,436   6,054  13,490
2002      .      .      .    688    460   1,148   8,844   7,700  16,544
2003      .      .      .    598    425   1,023   9,525   8,128  17,653
2004      .      .      .    563    436     999   9,531   8,080  17,611
2005      .      .      .    600    432   1,032   9,259   7,638  16,897
2006      .      .      .    628    469   1,097   9,393   7,382  16,775
2007      .      .      .    591    451   1,042   9,680   7,994  17,674
2008      .      .      .    601    440   1,041  10,727   8,760  19,487
2009      .      .      .    601    402   1,003  11,094   8,556  19,650
2010      .      .      .    615    423   1,038  12,117   9,547  21,664
2011      .      .      .    542    400     942  13,413  11,161  24,574
2012      .      .      .    525    345     870  11,039   9,110  20,149
2013      .      .      .    497    409     906   8,727   6,960  15,687
2014      .      .      .    508    405     913   8,693   6,566  15,259
2015      .      .      .    521    408     929   9,633   7,480  17,113
2016      .      .      .    522    366     888  10,451   7,958  18,409
Sum      .      .      .  25,978  19,652  45,630  233,101  195,969  429,070
> fCtable( addmargins(t2,1), row.vars=1, w=7 )
      DMtp
      sex      M      W      Sum      T1      T2
      sex      M      W      Sum      M      W      Sum      M      W      Sum

```

P									
1993	.	.	.	5,747	4,401	10,148	10,403	10,751	21,154
1994	.	.	.	6,257	4,974	11,231	13,524	13,944	27,468
1995	.	.	.	1,290	1,025	2,315	13,210	11,808	25,018
1996	.	.	.	710	559	1,269	6,013	5,186	11,199
1997	.	.	.	693	525	1,218	6,020	4,984	11,004
1998	.	.	.	724	502	1,226	6,850	5,583	12,433
1999	.	.	.	663	482	1,145	7,161	5,907	13,068
2000	.	.	.	668	438	1,106	8,308	6,684	14,992
2001	.	.	.	694	472	1,166	7,216	5,889	13,105
2002	.	.	.	629	454	1,083	8,405	7,287	15,692
2003	.	.	.	596	422	1,018	9,243	7,802	17,045
2004	.	.	.	610	421	1,031	9,541	7,912	17,453
2005	.	.	.	582	455	1,037	9,010	7,221	16,231
2006	.	.	.	609	437	1,046	8,893	6,777	15,670
2007	.	.	.	595	453	1,048	9,443	7,537	16,980
2008	.	.	.	563	403	966	10,359	8,304	18,663
2009	.	.	.	616	401	1,017	10,799	8,080	18,879
2010	.	.	.	584	408	992	11,644	8,995	20,639
2011	.	.	.	545	409	954	12,903	10,659	23,562
2012	.	.	.	489	327	816	10,719	8,737	19,456
2013	.	.	.	489	409	898	8,461	6,733	15,194
2014	.	.	.	479	388	867	8,167	6,065	14,232
2015	.	.	.	495	385	880	8,905	6,856	15,761
2016	.	.	.	507	364	871	10,129	7,555	17,684
2017	.	.	.	.	2	2	105	91	196
Sum	.	.	.	25,834	19,516	45,350	225,431	187,347	412,778

```
> fCtable( addmargins(tR,1), row.vars=1, w=7 )
```

P	sygdom		TYPE_1			TYPE_2			
	sex	M	W	Sum	M	W	Sum	M	W	Sum
1994	.	.	.	13,025	11,097	24,122	24,434	23,728	48,162
1995	.	.	.	913	802	1,715	7,019	5,808	12,827
1996	.	.	.	729	530	1,259	6,571	5,536	12,107
1997	.	.	.	546	403	949	6,161	5,061	11,222
1998	.	.	.	512	384	896	6,742	5,435	12,177
1999	.	.	.	529	349	878	6,871	5,522	12,393
2000	.	.	.	558	381	939	6,957	5,677	12,634
2001	.	.	.	539	399	938	7,387	5,877	13,264
2002	.	.	.	583	371	954	7,416	5,857	13,273
2003	.	.	.	527	376	903	8,537	6,742	15,279
2004	.	.	.	534	366	900	8,569	6,872	15,441
2005	.	.	.	567	362	929	8,331	6,872	15,203
2006	.	.	.	584	411	995	8,742	6,806	15,548
2007	.	.	.	578	391	969	9,136	7,435	16,571
2008	.	.	.	571	406	977	10,046	7,776	17,822
2009	.	.	.	615	392	1,007	10,473	7,961	18,434
2010	.	.	.	565	433	998	11,402	8,410	19,812
2011	.	.	.	550	383	933	12,986	9,896	22,882
2012	.	.	.	551	341	892	11,356	8,615	19,971
2013	.	.	.	568	427	995	8,441	6,259	14,700
2014	.	.	.	549	392	941	8,008	5,591	13,599
2015	.	.	.	577	436	1,013	8,776	6,225	15,001
2016	.	.	.	595	435	1,030	9,316	6,248	15,564
2017	.	.	.	232	165	397	3,967	2,541	6,508
Sum	.	.	.	26,097	20,432	46,529	217,644	172,750	390,394

We can now plot the total numbers included:

```
> clr <- c("blue","red","black")
> par( mfrow=c(1,2), mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, bty="n", las=1 )
> matplot( 1996:2016, cbind( rbind( tD[-(1:2),"T1"    ], NA ),
+                               t2[-(1:3),"T1"    ],
+                               tR[-(1:2),"TYPE_1",] )[-22,]/100,
+         ylim=c(0,15), yaxs="i", ylab="Annual no. T1D (100s)", xlab="Year of inclusion",
+         type="l", lty=rep(c("solid","11"),c(6,3)), lend="butt",
+         col=clr, lwd=rep(c(1,3,3),each=3) )
> axis( side=1, at=1996:2017, labels=NA, tcl=-0.2 )
> axis( side=2, at=0:15, labels=NA, tcl=-0.2 )
> text( 2016, seq(14,13,,3)[c(2,3,1)], c("Men","Women","M+W"), font=2, adj=1, col=clr)
> matplot( 1996:2016, cbind( rbind( tD[-(1:2),"T2"    ], NA ),
+                               t2[-(1:3),"T2"    ],
+                               tR[-(1:2),"TYPE_2",] )[-22,]/1000,
+         ylim=c(0,25), yaxs="i", ylab="Annual no. T2D (1000s)", xlab="Year of inclusion",
+         type="l", lty=rep(c("solid","11"),c(6,3)), lend="butt",
+         col=clr, lwd=rep(c(1,3,3),each=3) )
> axis( side=1, at=1996:2016, labels=NA, tcl=-0.2 )
> axis( side=2, at=0:25, labels=NA, tcl=-0.2 )
> segments( 1996, 23:22,
+          1999, 23:22, lty=c("solid","11"), lwd=3, lend="butt" )
> text( 1999.3, 23:22, c("DMreg","RUKS"), adj=c(0,0.5), font=2 )
```

From figure 4.1 we see that RUKS almost universally includes fewer patients than do DMreg, and in particular has fewer T1D patients in the early years. Moreover we see a marked drop in numbers in 2001, and to a lesser degree in 2005–6, both coincide with a remarkably smaller fraction of persons included on the podiatry criterion.

```
> clt <- c(gray(0.6),"darkorange","forestgreen")
> set.seed(1952)
> par( mfrow=c(1,2), mar=c(3,3,1,1), mgp=c(3,1,0)/1.6, bty="n", las=0 )
> wh <- sample( 1:nrow(sam), N <- 5000 )
> with( sam[wh,], plot( ifelse( is.na(doDM) , 1993+runif(N)*0.7, doDM ),
+                       ifelse( is.na(debut) , 1993+runif(N)*0.7, debut ),
+                       pch=16, cex=0.6, col=clt[DMtp],
+                       xlab="doDM", ylab="debut" ) )
> axis( side=1, at=1993:2017, tcl=-0.2, labels=NA )
> axis( side=2, at=1993:2017, tcl=-0.2, labels=NA )
> for( i in (-10:10)[-11] ) abline( i, 1, lty=3 )
> wh <- sample( 1:nrow(sam), N )
> with( sam[wh,], plot( ifelse( is.na(doDM) , 1993+runif(N)*0.7, doDM ),
+                       ifelse( is.na(debut) , 1993+runif(N)*0.7, debut ),
+                       pch=16, cex=0.6, col=clt[sygd],
+                       xlab="doDM", ylab="debut" ) )
> axis( side=1, at=1993:2017, tcl=-0.2, labels=NA )
> axis( side=2, at=1993:2017, tcl=-0.2, labels=NA )
> for( i in (-10:10)[-11] ) abline( i, 1, lty=3 )
```

From the figure 4.2 it is pretty clear that among those in both registers, the DMreg have many *earlier* inclusion dates (debut dates), and moreover that they come from the DADD, where large fraction of the dates are either 1 January or 1 July (and 15 June). Also not that the RUKS date axis is longer, because RUKS contain some diagnoses from 2017, albeit only from the first 3 quarters of the year:

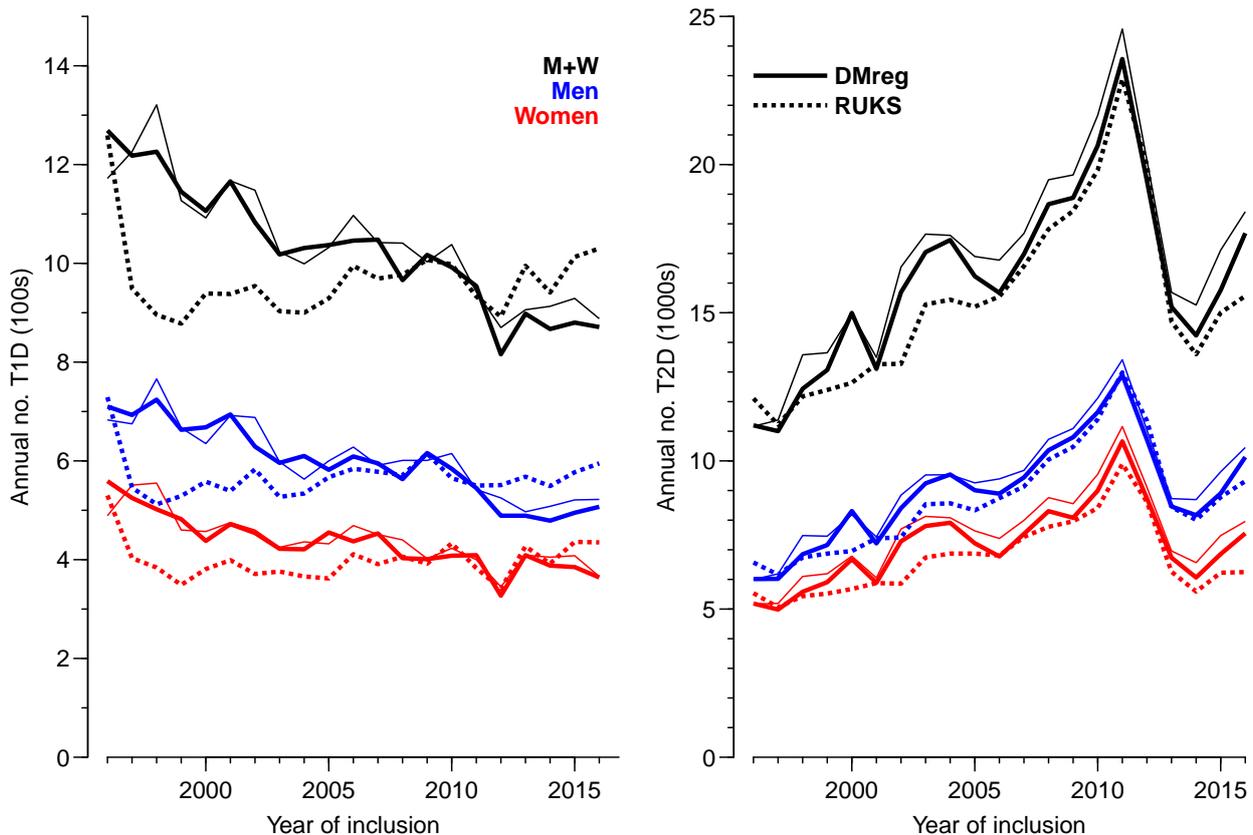


Figure 4.1: Number of persons included in DMreg, resp. RUKS by sex and calendar year. Left panel is T1D and right panel T2D as defined in the respective registers. Thin lines are the “complete” DMreg, thick lines are the DMreg restricted by second drug dispense. `./graph/ruks-incN`

```
> with( sam, table( (debut>2017.00) +
+                   (debut>2017.25) +
+                   (debut>2017.50) +
+                   (debut>2017.75),
+                   exclude=NULL ) )
      0      1      2      3 <NA>
430018  4178  2597  130  61248
```

4.2.3 Persons with PCOS / GDM

In order to explore where the persons in RUKS but not in DMreg has gone we read the datasets of the persons found in NPR who are potential candidates for exclusion, and find the ids of those that are *not* in the DMreg:

```
> pcos <- read_sas( "../data/pcos.sas7bdat" )
> gdm <- read_sas( "../data/gdm.sas7bdat" )
> sam$has.pcos <- sam$pnr %in% pcos$pnr
> sam$has.gdm <- sam$pnr %in% gdm$pnr
> fCtable( with( sam, table( sex, from, has.pcos, has.gdm ) ), row.vars=1:2, w=7 )
      has.pcos  FALSE  TRUE
      has.gdm   FALSE  TRUE  FALSE  TRUE
sex from
```

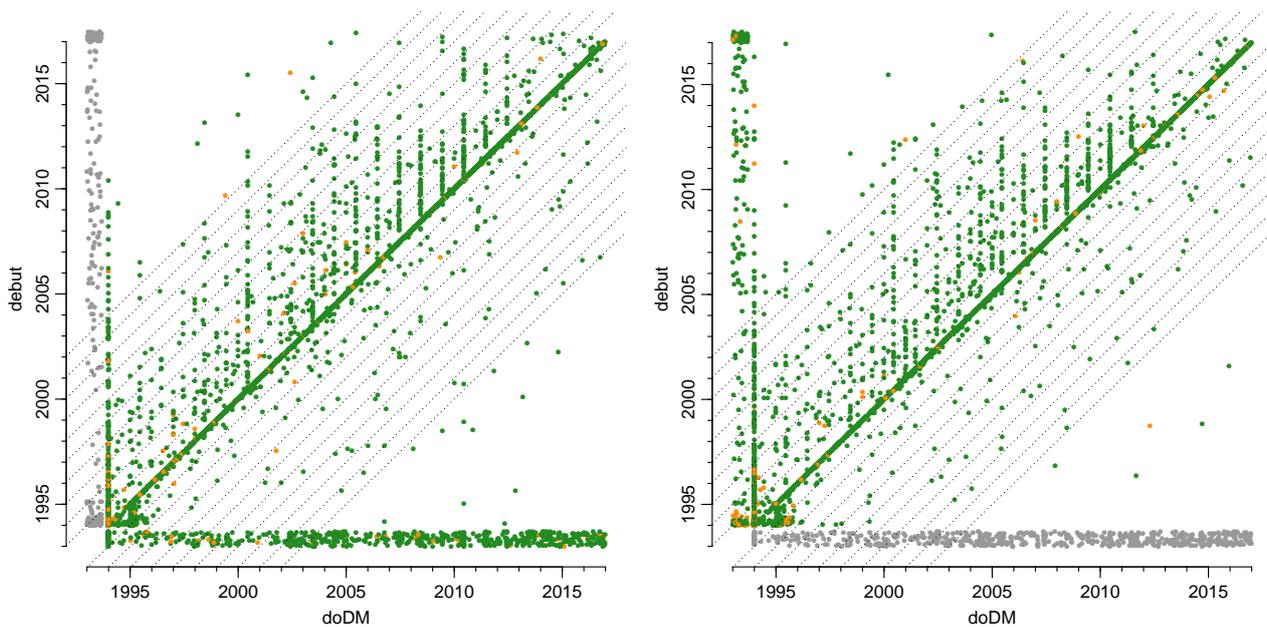


Figure 4.2: Inclusion dates in the two registers. Two different random samples of 5,000 persons. Colored by the DMreg type of DM (left) resp. RUKS (right) type of DM. T1D is orange, T2D green, and not in the register is gray. The dotted lines indicate differences in date of inclusion of $-10, -9, \dots, 10$ years. ./graph/ruks-ddif

M	Both	232,982	.	.	.
	DMrg	26,097	.	.	.
	RUKS	10,759	.	.	.
W	Both	175,012	3,894	1,450	114
	DMrg	32,933	574	1,553	91
	RUKS	12,368	278	54	12

```
> fCtable( with( sam, table( sex, from, has.pcos) ), row.vars=1:2, w=7 )
```

		has.pcos	FALSE	TRUE
sex from				
M	Both		232,982	.
	DMrg		26,097	.
	RUKS		10,759	.
W	Both		178,906	1,564
	DMrg		33,507	1,644
	RUKS		12,646	66

```
> fCtable( with( sam, table( sex, from, has.gdm ) ), row.vars=1:2, w=7 )
```

		has.gdm	FALSE	TRUE
sex from				
M	Both		232,982	.
	DMrg		26,097	.
	RUKS		10,759	.
W	Both		176,462	4,008
	DMrg		34,486	665
	RUKS		12,422	290

So of the 12,712 women only in RUKS only 344(= 278 + 54 + 12) are potentially explainable by exclusion because PCOS or GDM.

There is a tendency that the fraction of persons only in RUKS is increasing by time.

```
> fCtable( with( sam, table( floor(doDM ), sex, from, exclude=NULL ) ), row.vars=1, w=6 )
```

	sex M			W			
	from	Both	DMrg	RUKS	Both	DMrg	RUKS
1994		34,278	1,608	.	31,117	2,916	.
1995		14,982	623	.	12,991	829	.
1996		5,955	726	.	4,793	865	.
1997		6,172	690	.	4,892	849	.
1998		7,496	750	.	5,769	886	.
1999		7,361	764	.	5,694	957	.
2000		8,079	741	.	6,233	1,010	.
2001		7,493	635	.	5,753	776	.
2002		8,531	1,001	.	6,585	1,575	.
2003		8,967	1,156	.	6,840	1,713	.
2004		8,896	1,198	.	6,816	1,700	.
2005		8,957	902	.	6,688	1,382	.
2006		9,158	863	.	6,654	1,197	.
2007		9,292	979	.	6,991	1,454	.
2008		10,038	1,290	.	7,569	1,631	.
2009		10,413	1,282	.	7,399	1,559	.
2010		11,277	1,455	.	8,136	1,834	.
2011		11,885	2,070	.	8,933	2,628	.
2012		10,158	1,406	.	7,504	1,951	.
2013		7,851	1,373	.	5,676	1,693	.
2014		7,774	1,427	.	5,286	1,685	.
2015		8,718	1,436	.	6,041	1,847	.
2016		9,251	1,722	.	6,110	2,214	.
NA		.	.	10,759	.	.	12,712

```
> fCtable( with( sam, table( floor(debut), sex, from, exclude=NULL ) ), row.vars=1, w=6 )
```

	sex M			W			
	from	Both	DMrg	RUKS	Both	DMrg	RUKS
1994		33,448	.	4,011	30,936	.	3,889
1995		7,635	.	297	6,349	.	261
1996		7,195	.	105	5,989	.	77
1997		6,634	.	73	5,391	.	73
1998		7,170	.	84	5,740	.	79
1999		7,299	.	101	5,765	.	106
2000		7,404	.	111	5,930	.	128
2001		7,793	.	133	6,130	.	146
2002		7,856	.	143	6,070	.	158
2003		8,926	.	138	6,930	.	188
2004		8,960	.	143	6,987	.	251
2005		8,741	.	157	6,863	.	371
2006		9,177	.	149	6,819	.	398
2007		9,578	.	136	7,358	.	468
2008		10,492	.	125	7,795	.	387
2009		10,950	.	138	7,927	.	426
2010		11,826	.	141	8,418	.	425
2011		13,424	.	112	9,888	.	391
2012		11,786	.	121	8,559	.	397
2013		8,912	.	97	6,310	.	376
2014		8,470	.	87	5,595	.	388
2015		9,234	.	119	6,257	.	404
2016		9,767	.	144	6,207	.	476
2017		305	.	3,894	257	.	2,449
NA		.	26,097	.	.	35,151	.

2018-12-05 at 18:52:48
Time elapsed: 00:00:30

References

- [1] B. Carstensen, Christensen J.K., Marcussen M.M., and Borch-Johnsen K. The National Diabetes Register. *Scandinavian Journal of Public Health*, 39(7 suppl):58–61, 2011.
- [2] Anders Green, Camilla Sortsø Peter Bjødstrup Jensen, and Martha Emneus. Validation of the Danish National Diabetes Register. *Clinical Epidemiology*, 7:5–15, 2015.

Chapter 5

SAS programs

5.1 Rationale and overview

The following documented programs sequentially construct data sets with dates of diagnosis of DM according to different criteria, then merge these to pick the earliest. All computing is done at the server of Statistics Denmark.

06-define Collects data from the previously created data sets and defines date of diagnosis and type of diabetes (T1/T2), and thus generates a DM-register with sex, date of birth, date of death, date of inclusion, the latter being the smaller of date of OAD, date of insulin, date of DADD recording and date of NPR recording.

However, some 85% of the dates of diagnosis in the DVDD are either 1st January or 15th June; both of which we interpret as “sometime during the year”. The consequence of this that if a person meets another criterion during the same calendar year as the one defined in DVDD, the date from DVDD will be ignored and the person will be included at the date of the other criterion.

For persons with a record from DADD with type of diabetes defined, this is used. If different types are given in different records, the most frequent type is used, but only if present in more than half of the records.

The program also defines a type variable that uses the typing from the NDR, based on the diagnosis code (E10:T1 or E11:T2); if one of these codes occur in more than half of the NPR records. Note that codes E12, E13 and E14 also define diabetes, and such records are counted in this calculation, hence some patients will have an indeterminate type from NPR.

For persons with no classification from DADD, we use a similar algorithm for classification based on diagnoseis codes from NPR.

Finally, a person is classified as T1 if any type of medication has been taken out before age 15 or if insulin has been taken out before age 30 (unless classified as T2 in DADD), otherwise as T2.

07-comp Compares the reconstructed diabetes register with the RUKS.

5.2 06-define

Collects records from the processed registers and defines a diabetes register and the relevant dates in it.

The inclusion date will be the smaller of the earliest dates from NPR, RMPS, DADD, NHSR and DIAB, and the inclusion criterion will be the one that triggered the inclusion. This has been done both using 1st or 2nd dispense of OAD and insulin.

Diabetes type is derived as described above.

Also derives a diabetes register exclusively based on drug information only.

1 "Program: 06-define.sas" 14:34 Tuesday, December 4, 2018

NOTE: Copyright (c) 2002-2012 by SAS Institute Inc., Cary, NC, USA.

NOTE: SAS (r) Proprietary Software 9.4 (TS1M3)

Licensed to FORSKNING 1, Site 50800722.

NOTE: This session is executing on the X64_SRV12 platform.

NOTE: Updated analytical products:

SAS/STAT 14.1

NOTE: Additional host information:

X64_SRV12 WIN 6.2.9200 Server

NOTE: SAS initialization used:

real time 0.07 seconds

cpu time 0.09 seconds

NOTE: AUTOEXEC processing beginning; file is

E:\workdata\705093\BXC\demoDM\sas\optslibs.sas.

NOTE: AUTOEXEC processing completed.

```

1      %put Here we use: tload = &tload. and tlines = &tlines. (ages in years) ;
Here we use: tload = 15 and tlines = 30 (ages in years)
2
3      data DMreg ;
4          merge DMdat.npr    ( in = npr    keep = pnr doNPR  nprtyp )
5                  DMdat.DVDD ( in = dvdd  keep = pnr doDVDD dvdtyp )
6                  DMdat.pRMPS ( in = rmps  keep = pnr doRMPS doOAD doIns doOAD2 doIns2 )
7                  DMdat.FOOT  ( in = foot  keep = pnr doPod )
8                  DMdat.DiaB  ( in = diab  keep = pnr doDiaB )
9                  DMdat.pop    ( in = pop   ) ;
10         by pnr ;
11         format doBth doDM doDth doNPR doDVDD doDiaB doPod doOAD doIns
12                doDM2                                doOAD2 doIns2 ddmmyy10. ;
13         if pop and ( npr or dvdd or rmps or diab or foot ) ;
14
15         * date of diagnosis - GDM and PCOS - taken care of in RMPS / DVDD ;
16         * date in DVDD only used if the person meets no other criterion in the same
17         ! year ;
18         if ( year(doDVDD) eq year(doDiaB) or
19             year(doDVDD) eq year(doPod) or
20             year(doDVDD) eq year(doNPR) or
21             year(doDVDD) eq year(doOAD) or
22             year(doDVDD) eq year(doIns) ) then
23             doDM = min( doNPR, doOAD, doIns, doPod, doDiaB ) ;
24         else doDM = min( doNPR, doOAD, doIns, doPod, doDiaB, doDVDD ) ;
25         if doDM eq doDiaB then inCr = "Dia" ;
26         if doDM eq doPod  then inCr = "Pod" ;
27         if doDM eq doNPR  then inCr = "NPR" ;
28         if doDM eq doOAD  then inCr = "OAD" ;
29         if doDM eq doIns  then inCr = "Ins" ;
30         if doDM eq doDVDD then inCr = "DVD" ;
31
32         * date of using 2nd dispense of OAD/Ins (courtesy of PFR) ;

```

```

32      * and computing the first drug purchased ;
33      if doOAD eq min(doOAD ,doIns ) then do ;
34          doDr2 = min(doOAD2,doIns ) ;
35          fDr = '0' ;
36      end ;
37      if doIns eq min(doOAD ,doIns ) then do ;
38          doDr2 = min(doOAD ,doIns2) ;
39          fDr = 'I' ;
40      end ;
41      * computing the 2nd drug purchased ;
42      if doDr2 eq doIns or doDr2 eq doIns2 then inCr2 = fDr||"-Ins" ;
43      if doDr2 eq doOAD or doDr2 eq doOAD2 then inCr2 = fDr||"-OAD" ;
44
45      * Date of diagnosis using 2nd dispense ;
46      doDM2 = min( doNPR, doDVDD, doDr2, doPod, doDiaB ) ;
47      * Updating the inclusion criterion ;
48      if doDM2 le .z then inCr2 = "---" ;
49      else do ;
50          if doDM2 eq doDiaB then inCr2 = "Dia" ;
51          if doDM2 eq doPod then inCr2 = "Pod" ;
52          if doDM2 eq doDVDD then inCr2 = "DVD" ;
53          if doDM2 eq doNPR then inCr2 = "NPR" ;
54      end ;
55      * only sane results accepted ;
56      if doDM gt doBth and doDM le &end. ;
57
58      * type of diabetes is T1 if known from DVDD or
59      if any dispensation before age &tload. or insulin before &tins. ;
60      if dvdtyp eq 'T1' or
61          .z < (doOAD - doBth) < ( 365.25 * &tload. ) or
62          .z < (doIns - doBth) < ( 365.25 * &tins. ) then DMdtp = 'T1' ;
63      else DMdtp = 'T2' ;
64      * however, never override a DVDD verdict of T2 ;
65      if dvdtyp eq 'T2' then DMdtp = 'T2' ;
66
67      * Extended definintion additionally using the T1 definition from NPR ;
68      if ( nprtyp eq 'T1' and dvdtyp ne 'T2' ) or
69          dvdtyp eq 'T1' or
70          .z < (doOAD - doBth) < ( 365.25 * &tload. ) or
71          .z < (doIns - doBth) < ( 365.25 * &tins. ) then DMtp = 'T1' ;
72      else DMtp = 'T2' ;
73      * however, never override a DVDD verdict of T2 ;
74      if dvdtyp eq 'T2' then DMtp = 'T2' ;
75      run ;

```

NOTE: Missing values were generated as a result of performing an operation on missing values.

Each place is given by: (Number of times) at (Line):(Column).

272322 at 17:8	305339 at 17:24	45399 at 18:8	97314 at 18:24
22833 at 19:8	84866 at 19:24	8390 at 20:8	23401 at 20:24
7491 at 21:8	66640 at 21:24	48858 at 33:15	67544 at 34:15
48858 at 37:15	52343 at 38:15	16575 at 46:11	80267 at 61:18
319417 at 62:18	66663 at 70:18	315901 at 71:18	

NOTE: There were 228681 observations read from the data set DMDAT.NPR.

NOTE: There were 202835 observations read from the data set DMDAT.DVDD.

NOTE: There were 426299 observations read from the data set DMDAT.PRMPS.

NOTE: There were 263476 observations read from the data set DMDAT.FOOT.

NOTE: There were 169856 observations read from the data set DMDAT.DIAB.

NOTE: There were 7411436 observations read from the data set DMDAT.POP.

NOTE: The data set WORK.DMREG has 474700 observations and 25 variables.

NOTE: DATA statement used (Total process time):

real time	6.57 seconds
cpu time	3.65 seconds

```

76
77      title1 'The reconstructed diabetes register' ;
78      data DMdat.DMreg ( label = 'Reconstructed DM register for Denmark'
79                      keep = pnr sex DMtp inCr inCr2 doBth doDth
80                      doDM doNPR doDVDD doOAD doIns doPod doDiaB

```

```

81                                     doDM2                doOAD2 doIns2 ) ;
82         set DMreg ;
83         if doDM lt '01JAN2017'd ;
84         label DMtp = 'Type of DM'
85             inCr = 'Inclusion criterion'
86             inCr2 = 'Inclusion criterion - 2nd dispense' ;
87         run ;

```

NOTE: There were 474700 observations read from the data set WORK.DMREG.
NOTE: The data set DMDAT.DMREG has 474700 observations and 17 variables.
NOTE: DATA statement used (Total process time):

real time	0.29 seconds
cpu time	0.15 seconds

```

88
89         proc contents data = DMdat.DMreg ; run ;

```

NOTE: PROCEDURE CONTENTS used (Total process time):

real time	0.03 seconds
cpu time	0.01 seconds

NOTE: The PROCEDURE CONTENTS printed page 1.

```

90
91         * temporary variables for the tabulation ;
92         data a ;
93         set DMreg ;
94         * age at diagnosis ;
95         ageDM = ( doDM - doBth ) / 365.25 ;
96         a1 = floor( ageDM ) ;
97         * date of diagnosis moved to end 1995 ;
98         doDM = max( doDM , '31DEC1995'd ) ;
99         doDM2 = max( doDM2 , '31DEC1995'd ) + doDM2 - doDM2 ;
100        run ;

```

NOTE: Missing values were generated as a result of performing an operation on missing values.
Each place is given by: (Number of times) at (Line):(Column).
16572 at 99:39

NOTE: There were 474700 observations read from the data set WORK.DMREG.
NOTE: The data set WORK.A has 474700 observations and 27 variables.
NOTE: DATA statement used (Total process time):

real time	0.25 seconds
cpu time	0.25 seconds

```

101
102        proc tabulate data = a missing noseps ;
103            class sex doDth doDM inCr doDM2 inCr2 a1 ageDM dvdtyp nprtyp DMdtp DMtp ;
104            table ( all DMtp ) *
105                ( all nprtyp ),
106                ( all dvdtyp ) * f=comma7.
107            / rts = 19 ;
108            table ( all DMtp ) *
109                ( all inCr2 ),
110                ( all inCr ) * f=comma7.
111            / rts = 19 ;
112            table all doDM,
113                ( all DMtp ) * f = comma8.
114                DMtp * pctn< DMtp all > * f = 4.1
115                DMtp * DMdtp * f = comma8.
116                DMtp * DMdtp=" " * pctn< DMtp * DMdtp all > * f = 4.1
117            / rts = 9 condense ;
118            table all doDM2,
119                ( all DMtp ) * f = comma8.
120                DMtp * pctn< DMtp all > * f = 4.1
121                DMtp * DMdtp * f = comma8.
122                DMtp * DMdtp=" " * pctn< DMtp * DMdtp all > * f = 4.1
123            / rts = 9 condense ;

```

```

124     table all a1="DM Age",
125         ( all DMtp ) * f = comma8.
126         DMtp * pctn< DMtp all > * f = 4.1
127         DMtp * DMdtp * f = comma8.
128         DMtp * DMdtp=" " * pctn< DMtp * DMdtp all > * f = 4.1
129     / rts = 9 condense ;
130     table all doDth,
131         ( all DMtp ) * f = comma8.
132         DMtp * pctn< DMtp all > * f = 4.1
133         DMtp * DMdtp * f = comma8.
134         DMtp * DMdtp=" " * pctn< DMtp * DMdtp all > * f = 4.1
135     / rts = 9 condense ;
136     table all doDM,
137         all * f = comma7.
138         inCr * f = comma6.
139         inCr * pctn< inCr all > * f = 4.1
140     / rts = 9 condense ;
141     table all doDM2,
142         all * f = comma7.
143         inCr2 * f = comma6.
144     / rts = 9 condense ;
145     table all a1="dAge",
146         sex * ( all * f = comma8.
147             inCr * pctn< inCr all > * f = 4.1 )
148     / rts = 6 condense ;
149     table ( sex all="M+F" ) * ( DMtp all="T1+T2" ),
150         ( all ageDM ),
151         all * f = comma7.
152         doDM * f = comma6.
153     / rts = 5 indent = 1 condense ;
154     keylabel n = ' ' ;
155     format doDM doDM2 doDth year4.
156         ageDM agr.
157         sex sex. ;
158     label DMtp = "DM type"
159         DMdtp = "DVDDtyp" ;
160     run ;

```

NOTE: There were 474700 observations read from the data set WORK.A.

NOTE: At least one W.D format was too small for the number to be printed. The decimal may be shifted by the "BEST" format.

NOTE: The PROCEDURE TABULATE printed pages 2-11.

NOTE: PROCEDURE TABULATE used (Total process time):

real time	0.37 seconds
cpu time	1.03 seconds

```

161
162     title2 'Diagnoses 2012 ff. only' ;
163     proc tabulate data = DMdat.DMreg missing noseps ;
164         where doDM > '31DEC2011'd ;
165         class sex doDM inCr DMtp ;
166         table all doDM,
167             ( all DMtp ) * f = comma6.
168             DMtp * pctn< DMtp all > * f = 5.1
169         / rts = 9 condense ;
170         table all doDM,
171             ( all inCr ) * f = comma6.
172             inCr * pctn< inCr all > * f = 4.1
173         / rts = 9 condense ;
174         format doDM yymms7.
175             sex koen_t. ;
176     run ;

```

NOTE: There were 91253 observations read from the data set DMDAT.DMREG.

WHERE doDM>'31DEC2011'D;

NOTE: The PROCEDURE TABULATE printed pages 12-13.

NOTE: PROCEDURE TABULATE used (Total process time):

real time	0.26 seconds
cpu time	0.15 seconds

```

177
178     title1 'The reconstructed diabetes *drug* register' ;
179     data DMdat.DMreg ( label = 'Reconstructed DM register, only persons on drugs'
179     ! ) ;
180     merge DMdat.PRMP5 ( in = rmps keep = pnr doOAD doIns )
181           DMdat.pop   ( in = pop )
182           DMdat.DMreg ( in = dmr   keep = pnr dmtp ) ;
183     by pnr ;
184     keep pnr sex DMtp inCr
185           doBth doDM doDth doOAD doIns ;
186     format doBth doDM doDth doOAD doIns ddmmyy10. ;
187     if pop and rmps and dmr ;
188     * Date of diagnosis - GDM and PCOS - taken care of in RMPS / DVDD ;
189     doDM = min( doOAD, doIns ) ;
190     if doDM < '01JAN2017'd ;
191     if doDM > doBth ;
192     if doDM eq doOAD then inCr = "OAD " ;
193     if doDM eq doIns then inCr = "Ins " ;
194     run ;

```

NOTE: There were 426299 observations read from the data set DMDAT.PRMP5.
NOTE: There were 7411436 observations read from the data set DMDAT.POP.
NOTE: There were 474700 observations read from the data set DMDAT.DMREG.
NOTE: The data set DMDAT.DMDREG has 426150 observations and 9 variables.
NOTE: DATA statement used (Total process time):
real time 1.87 seconds
cpu time 1.78 seconds

```

195
196     proc contents data = DMdat.DMreg ; run ;

```

NOTE: PROCEDURE CONTENTS used (Total process time):
real time 0.00 seconds
cpu time 0.00 seconds

NOTE: The PROCEDURE CONTENTS printed page 14.

```

197     proc tabulate data = DMdat.DMreg missing noseps ;
198     class sex doDM DMtp inCr ;
199     table all doDM,
200           ( all DMtp * ( all inCr ) ) * f = comma7.
201           ( DMtp * ( InCr * pctn< InCr > ) ) * f = 5.1
202           / rts = 6 ;
203     keylabel n = ' ' ;
204     format doDM year4.
205           sex koen_t. ;
206     run ;

```

NOTE: There were 426150 observations read from the data set DMDAT.DMDREG.
NOTE: The PROCEDURE TABULATE printed page 15.
NOTE: PROCEDURE TABULATE used (Total process time):
real time 0.15 seconds
cpu time 0.14 seconds

NOTE: SAS Institute Inc., SAS Campus Drive, Cary, NC USA 27513-2414
NOTE: The SAS System used:
real time 10.00 seconds
cpu time 7.31 seconds

5.2.1 06-define.lst

The following is a tabular documentation of the most important features of the constructed register.

The reconstructed diabetes register 14:34 Tuesday, December 4, 2018 1

The CONTENTS Procedure

Data Set Name	DMDAT.DMREG	Observations	474700
Member Type	DATA	Variables	17
Engine	V9	Indexes	0
Created	04/12/2018 14:34:20	Observation Length	120
Last Modified	04/12/2018 14:34:20	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label	Reconstructed DM register for Denmark		
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information

Data Set Page Size	65536
Number of Data Set Pages	872
First Data Page	*
Max Obs per Page	545
Obs in First Data Page	521
Number of Data Set Repairs	0
ExtendObsCounter	YES
Filename	E:\workdata\705093\BxC\demoDM\DATA\dmreg.sas7bdat
Release Created	9.0401M3
Host Created	X64_SRV12

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
17	DMtp	Char	*			Type of DM
11	doBth	Num	8	DDMMYY10.		
13	doDM	Num	8	DDMMYY10.		
14	doDM2	Num	8	DDMMYY10.		
*	doDVDD	Num	8	DDMMYY10.		
9	doDiaB	Num	8	DDMMYY10.	IS8601DA10.	enscreeningsdato
12	doDth	Num	8	DDMMYY10.		
5	doIns	Num	8	DDMMYY10.		
7	doIns2	Num	4	DDMMYY10.		
*	doNPR	Num	8	DDMMYY10.	DATE9.	
4	doOAD	Num	8	DDMMYY10.		
6	doOAD2	Num	4	DDMMYY10.		
8	doPod	Num	8	DDMMYY10.		
15	inCr	Char	*			Inclusion criterion
16	inCr2	Char	5			Inclusion criterion - 2nd dispense
*	pnr	Char	12	\$12.	\$10.	Personnummer
10	sex	Num	8			

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dvdtyp

		All	NA	T1	T2	
All	All	474,700	272,012	4,288	24,955	173,445
	nprtyp	246,163	169,051	99	19	76,994
	NA	41,877	19,566	1,500	4,348	16,463
	T1	42,554	18,139	1,013	19,235	4,167
	T2	144,106	65,256	1,676	1,353	75,821
DM type	All	45,630	19,470	1,205	24,955	.
T1	nprtyp	621	600	*	19	.
	NA	5,074	573	153	4,348	.
	T1	38,387	18,139	1,013	19,235	.

T2	T2	1,548	158	37	1,353	.
	All	429,070	252,542	3,083	.	173,445
	nprrtyp	245,542	168,451	97	.	76,994
	NA	36,803	18,993	1,347	.	16,463
	T1	4,167	.	.	.	4,167
	T2	142,558	65,098	1,639	.	75,821

The reconstructed diabetes register

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		inCr						
		All	DVD	Dia	Ins	NPR	OAD	Pod
All	All	474,700	88,907	4,328	11,529	96,033	227,334	46,569
	inCr2							
	---	16,572	.	.	2,557	.	14,015	.
	DVD	159,089	88,344	117	1,133	27,222	39,444	2,829
	Dia	6,136	.	4,211	7	.	1,918	.
	I-Ins	5,824	.	.	5,824	.	.	.
	I-OAD	926	.	.	926	.	.	.
	NPR	77,893	563	.	806	68,811	7,713	.
	O-Ins	837	.	.	.	.	837	.
	O-OAD	154,959	.	.	.	154,959	.	.
	Pod	52,464	.	.	276	.	8,448	43,740
DM type	All	45,630	9,376	11	1,625	29,248	3,942	1,428
T1	inCr2							
	---	280	.	.	213	.	67	.
	DVD	23,287	9,158	*	234	12,820	1,012	61
	Dia	14	.	9	.	.	5	.
	I-Ins	881	.	.	881	.	.	.
	I-OAD	39	.	.	39	.	.	.
	NPR	17,254	218	.	226	16,428	382	.
	O-Ins	58	.	.	.	.	58	.
	O-OAD	2,326	.	.	.	.	2,326	.
	Pod	1,491	.	.	32	.	92	1,367
T2	All	429,070	79,531	4,317	9,904	66,785	223,392	45,141
	inCr2							
	---	16,292	.	.	2,344	.	13,948	.
	DVD	135,802	79,186	115	899	14,402	38,432	2,768
	Dia	6,122	.	4,202	7	.	1,913	.
	I-Ins	4,943	.	.	4,943	.	.	.
	I-OAD	887	.	.	887	.	.	.
	NPR	60,639	345	.	580	52,383	7,331	.
	O-Ins	779	.	.	.	.	779	.
	O-OAD	152,633	152,633	.
	Pod	50,973	.	.	244	.	8,356	42,373

The reconstructed diabetes register

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	All	DM type						DM type					
		DM type		DM type		DM type		DM type		DM type		DM type	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
		PctN	PctN	PctN	PctN	PctN	PctN	PctN	PctN	PctN	PctN	PctN	PctN
All	474,700	45,630	429,070	9.6	90.4	30,337	15,293	429,070	6.4	3.2	90.4		
doDM													
1995	98,711	23,545	75,166	23.9	76.1	14,780	8,765	75,166	15.0	8.9	76.1		
1996	12,972	1,281	11,691	9.9	90.1	707	574	11,691	5.5	4.4	90.1		
1997	12,603	1,226	11,377	9.7	90.3	745	481	11,377	5.9	3.8	90.3		
1998	14,276	1,245	13,031	8.7	91.3	723	522	13,031	5.1	3.7	91.3		
1999	14,254	1,108	13,146	7.8	92.2	680	428	13,146	4.8	3.0	92.2		
2000	17,210	1,187	16,023	6.9	93.1	782	405	16,023	4.5	2.4	93.1		

0	238	205	33	86.1	13.9	189	16	33	79.4	6.7	13.9
*	500	472	28	94.4	5.6	456	16	28	91.2	3.2	5.6
*	533	504	29	94.6	5.4	489	15	29	91.7	2.8	5.4
*	601	558	43	92.8	7.2	540	18	43	89.9	3.0	7.2
4	637	609	28	95.6	4.4	592	17	28	92.9	2.7	4.4
5	716	682	34	95.3	4.7	662	20	34	92.5	2.8	4.7
6	782	750	32	95.9	4.1	744	6	32	95.1	0.8	4.1
7	784	746	38	95.2	4.8	740	6	38	94.4	0.8	4.8
8	837	794	43	94.9	5.1	780	14	43	93.2	1.7	5.1
9	1,024	978	46	95.5	4.5	967	11	46	94.4	1.1	4.5
10	1,003	964	39	96.1	3.9	952	12	39	94.9	1.2	3.9
11	1,162	1,088	74	93.6	6.4	1,074	14	74	92.4	1.2	6.4
12	1,253	1,181	72	94.3	5.7	1,160	21	72	92.6	1.7	5.7
13	1,171	1,082	89	92.4	7.6	1,056	26	89	90.2	2.2	7.6
14	1,049	935	114	89.1	10.9	918	17	114	87.5	1.6	10.9
15	1,046	848	198	81.1	18.9	811	37	198	77.5	3.5	18.9
16	981	743	238	75.7	24.3	711	32	238	72.5	3.3	24.3
17	1,077	740	337	68.7	31.3	699	41	337	64.9	3.8	31.3
18	1,086	647	439	59.6	40.4	614	33	439	56.5	3.0	40.4
19	1,195	684	511	57.2	42.8	653	31	511	54.6	2.6	42.8
20	983	658	325	66.9	33.1	622	36	325	63.3	3.7	33.1
21	1,062	679	383	63.9	36.1	638	41	383	60.1	3.9	36.1
22	1,203	738	465	61.3	38.7	687	51	465	57.1	4.2	38.7
23	1,237	735	502	59.4	40.6	671	64	502	54.2	5.2	40.6
24	1,319	711	608	53.9	46.1	654	57	608	49.6	4.3	46.1
25	1,417	714	703	50.4	49.6	650	64	703	45.9	4.5	49.6
26	1,561	768	793	49.2	50.8	684	84	793	43.8	5.4	50.8
27	1,550	704	846	45.4	54.6	631	73	846	40.7	4.7	54.6
28	1,781	741	1,040	41.6	58.4	644	97	1,040	36.2	5.4	58.4
29	1,909	771	1,138	40.4	59.6	678	93	1,138	35.5	4.9	59.6
30	1,935	615	1,320	31.8	68.2	486	129	1,320	25.1	6.7	68.2
31	2,090	605	1,485	28.9	71.1	466	139	1,485	22.3	6.7	71.1
32	2,230	568	1,662	25.5	74.5	452	116	1,662	20.3	5.2	74.5
33	2,387	635	1,752	26.6	73.4	489	146	1,752	20.5	6.1	73.4
34	2,602	570	2,032	21.9	78.1	416	154	2,032	16.0	5.9	78.1
35	2,753	564	2,189	20.5	79.5	413	151	2,189	15.0	5.5	79.5
36	3,006	528	2,478	17.6	82.4	362	166	2,478	12.0	5.5	82.4
37	3,278	556	2,722	17.0	83.0	391	165	2,722	11.9	5.0	83.0
38	3,549	513	3,036	14.5	85.5	342	171	3,036	9.6	4.8	85.5
39	4,022	579	3,443	14.4	85.6	397	182	3,443	9.9	4.5	85.6
40	6,173	551	5,622	8.9	91.1	339	212	5,622	5.5	3.4	91.1
41	5,083	543	4,540	10.7	89.3	328	215	4,540	6.5	4.2	89.3
42	5,414	516	4,898	9.5	90.5	312	204	4,898	5.8	3.8	90.5
43	5,600	519	5,081	9.3	90.7	310	209	5,081	5.5	3.7	90.7
44	6,009	466	5,543	7.8	92.2	252	214	5,543	4.2	3.6	92.2
45	6,416	464	5,952	7.2	92.8	237	227	5,952	3.7	3.5	92.8
46	6,783	499	6,284	7.4	92.6	246	253	6,284	3.6	3.7	92.6
47	7,233	452	6,781	6.2	93.8	201	251	6,781	2.8	3.5	93.8
48	7,648	455	7,193	5.9	94.1	226	229	7,193	3.0	3.0	94.1
49	8,358	468	7,890	5.6	94.4	214	254	7,890	2.6	3.0	94.4
50	8,740	468	8,272	5.4	94.6	199	269	8,272	2.3	3.1	94.6
51	9,136	456	8,680	5.0	95.0	173	283	8,680	1.9	3.1	95.0
52	9,502	456	9,046	4.8	95.2	158	298	9,046	1.7	3.1	95.2
53	9,714	437	9,277	4.5	95.5	148	289	9,277	1.5	3.0	95.5
54	10,107	461	9,646	4.6	95.4	164	297	9,646	1.6	2.9	95.4
55	10,389	452	9,937	4.4	95.6	135	317	9,937	1.3	3.1	95.6
56	10,759	437	10,322	4.1	95.9	127	310	10,322	1.2	2.9	95.9
57	11,105	419	10,686	3.8	96.2	96	323	10,686	0.9	2.9	96.2
58	11,337	409	10,928	3.6	96.4	105	304	10,928	0.9	2.7	96.4
59	11,430	419	11,011	3.7	96.3	94	325	11,011	0.8	2.8	96.3
60	12,080	410	11,670	3.4	96.6	85	325	11,670	0.7	2.7	96.6
61	11,961	397	11,564	3.3	96.7	78	319	11,564	0.7	2.7	96.7
62	12,064	427	11,637	3.5	96.5	66	361	11,637	0.5	3.0	96.5
63	11,916	404	11,512	3.4	96.6	55	349	11,512	0.5	2.9	96.6
64	12,093	398	11,695	3.3	96.7	64	334	11,695	0.5	2.8	96.7
65	11,914	351	11,563	2.9	97.1	49	302	11,563	0.4	2.5	97.1
66	11,679	381	11,298	3.3	96.7	38	343	11,298	0.3	2.9	96.7
67	11,606	381	11,225	3.3	96.7	41	340	11,225	0.4	2.9	96.7
68	11,256	427	10,829	3.8	96.2	33	394	10,829	0.3	3.5	96.2
69	11,037	361	10,676	3.3	96.7	25	336	10,676	0.2	3.0	96.7

2014	10,328	509	9,819	4.9	95.1	319	190	9,819	3.1	1.8	95.1
2015	10,685	497	10,188	4.7	95.3	320	177	10,188	3.0	1.7	95.3
2016	10,977	530	10,447	4.8	95.2	361	169	10,447	3.3	1.5	95.2

The reconstructed diabetes register

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	inCr												
	inCr							DVD	Dia	Ins	NPR	OAD	Pod
	All	DVD	Dia	Ins	NPR	OAD	Pod	PctN	PctN	PctN	PctN	PctN	PctN
All	474,700	88,907	4,328	11,529	96,033	227,334	46,569	18.7	0.9	2.4	20.2	47.9	9.8
doDM													
1995	98,711	24,439	.	2,394	36,090	20,095	15,693	24.8	.	2.4	36.6	20.4	15.9
1996	12,972	1,671	.	461	2,782	6,507	1,551	12.9	.	3.6	21.4	50.2	12.0
1997	12,603	1,738	.	351	2,815	6,083	1,616	13.8	.	2.8	22.3	48.3	12.8
1998	14,276	2,303	.	380	3,143	6,702	1,748	16.1	.	2.7	22.0	46.9	12.2
1999	14,254	2,057	.	389	3,035	6,770	2,003	14.4	.	2.7	21.3	47.5	14.1
2000	17,210	4,999	.	383	3,176	6,851	1,801	29.0	.	2.2	18.5	39.8	10.5
2001	14,657	2,822	.	357	3,181	7,130	1,167	19.3	.	2.4	21.7	48.6	8.0
2002	17,126	3,143	.	344	3,201	7,059	3,379	18.4	.	2.0	18.7	41.2	19.7
2003	18,658	3,239	.	355	3,430	8,158	3,476	17.4	.	1.9	18.4	43.7	18.6
2004	19,194	3,640	.	374	3,247	8,582	3,351	19.0	.	1.9	16.9	44.7	17.5
2005	17,929	4,384	.	396	3,108	8,446	1,595	24.5	.	2.2	17.3	47.1	8.9
2006	17,430	4,278	.	413	3,240	9,152	347	24.5	.	2.4	18.6	52.5	2.0
2007	18,742	4,557	.	452	3,249	10,043	441	24.3	.	2.4	17.3	53.6	2.4
2008	20,944	5,472	.	501	3,058	11,455	458	26.1	.	2.4	14.6	54.7	2.2
2009	20,653	4,925	14	486	2,883	11,987	358	23.8	0.1	2.4	14.0	58.0	1.7
2010	22,528	5,454	17	466	2,718	13,512	361	24.2	0.1	2.1	12.1	60.0	1.6
2011	25,560	3,945	102	438	2,471	15,810	2,794	15.4	0.4	1.7	9.7	61.9	10.9
2012	21,149	2,800	20	446	2,281	14,348	1,254	13.2	0.1	2.1	10.8	67.8	5.9
2013	16,593	1,876	482	535	2,141	10,806	753	11.3	2.9	3.2	12.9	65.1	4.5
2014	16,158	1,015	1,201	523	2,267	10,508	644	6.3	7.4	3.2	14.0	65.0	4.0
2015	18,052	106	1,445	527	2,207	12,936	831	0.6	8.0	2.9	12.2	71.7	4.6
2016	19,301	44	1,047	558	2,310	14,394	948	0.2	5.4	2.9	12.0	74.6	4.9

The reconstructed diabetes register

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	inCr2									
	All	---	DVD	Dia	I-Ins	I-OAD	NPR	O-Ins	O-OAD	Pod
All	474,700	16,572	159089	6,136	5,824	926	77,893	837	154959	52,464
doDM2										
.	16,572	16,572	.	.	.	.	.	.	.	.
1995	96,432	.	33,227	.	1,956	39	28,666	45	16,627	15,872
1996	12,614	.	2,950	.	285	12	2,390	13	5,122	1,842
1997	12,040	.	3,081	.	184	13	2,365	25	4,479	1,893
1998	13,705	.	4,094	.	143	16	2,629	22	4,775	2,026
1999	13,744	.	3,794	.	181	21	2,581	21	4,910	2,236
2000	16,643	.	7,175	.	156	24	2,576	20	4,692	2,000
2001	14,166	.	4,945	.	163	24	2,572	30	5,116	1,316
2002	16,724	.	5,347	.	153	24	2,647	31	4,892	3,630
2003	18,042	.	5,907	.	147	26	2,815	31	5,390	3,726
2004	18,643	.	6,601	.	146	31	2,633	32	5,694	3,506
2005	17,243	.	7,336	.	157	31	2,328	31	5,513	1,847
2006	16,645	.	7,542	.	198	31	2,317	31	6,155	371
2007	17,951	.	8,174	.	175	55	2,331	41	6,720	455
2008	19,967	.	9,462	.	212	59	2,169	52	7,541	472
2009	19,806	.	9,276	13	207	53	2,124	49	7,710	374
2010	21,654	.	10,639	16	178	51	1,929	58	8,396	387
2011	24,605	.	10,458	109	171	43	1,876	47	9,013	2,888
2012	20,486	.	8,387	18	166	64	1,827	32	8,306	1,686
2013	16,164	.	5,882	536	193	59	1,783	48	6,572	1,091
2014	15,203	.	3,449	1,437	206	71	2,109	45	6,797	1,089

2015	16,821	.	999	2,029	202	95	2,350	68	9,344	1,734
2016	18,641	.	364	1,789	245	84	2,876	65	11,195	2,023
2017	189	.	.	189

The reconstructed diabetes register

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	sex													
	M							F						
	inCr													
	DVD	Dia	Ins	NPR	OAD	Pod	DVD	Dia	Ins	NPR	OAD	Pod		
All	PctN	PctN	PctN	PctN	PctN	PctN	All	PctN	PctN	PctN	PctN	PctN	PctN	
All	259,079	19.4	0.8	2.3	21.1	49.1	7.3	215,621	17.9	1.0	2.6	19.2	46.4	12.9
dAge														
0	124	51.6	.	4.8	41.9	1.6	.	114	54.4	.	2.6	38.6	3.5	0.9
*	266	37.2	.	1.1	60.2	1.1	0.4	234	37.2	.	2.6	59.0	1.3	.
*	308	35.4	.	1.9	61.7	1.0	.	225	40.9	.	0.4	57.8	0.9	.
*	301	33.6	.	0.7	64.5	1.0	0.3	300	36.7	.	1.3	60.7	0.7	0.7
4	336	32.4	.	1.5	64.9	0.9	0.3	301	35.5	.	0.7	63.1	0.7	.
5	340	37.4	.	0.6	61.2	0.6	0.3	376	35.4	.	0.5	63.8	.	0.3
6	399	37.1	.	0.5	61.7	0.5	0.3	383	42.0	.	0.5	57.2	0.3	.
7	378	33.3	.	0.8	65.3	.	0.5	406	37.2	.	0.2	62.3	0.2	.
8	410	30.5	.	0.7	68.0	0.5	0.2	427	36.1	.	0.5	62.3	0.9	0.2
9	495	36.4	.	0.6	62.0	0.6	0.4	529	33.8	.	0.6	65.0	0.4	0.2
10	463	29.8	.	1.1	68.7	.	0.4	540	32.0	.	1.1	65.2	1.1	0.6
11	552	32.6	.	1.6	64.1	0.7	0.9	610	29.3	.	1.6	66.9	1.5	0.7
12	666	30.6	.	0.6	67.1	1.2	0.5	587	30.7	.	0.7	66.1	1.5	1.0
13	676	28.6	.	1.5	67.6	1.2	1.2	495	28.3	.	1.8	64.2	3.4	2.2
14	626	29.2	.	0.8	65.7	2.1	2.2	423	29.8	.	0.9	62.2	5.4	1.7
15	574	26.1	.	1.6	68.1	1.4	2.8	472	26.1	.	2.5	55.1	14.6	1.7
16	522	29.1	.	2.1	63.6	2.5	2.7	459	27.9	.	1.7	48.1	21.4	0.9
17	534	34.6	.	2.2	58.8	3.0	1.3	543	22.5	0.2	1.7	44.0	30.0	1.7
18	497	29.6	.	2.0	62.4	4.4	1.6	589	19.9	0.2	1.5	37.5	39.6	1.4
19	539	31.5	.	2.6	59.6	5.0	1.3	656	19.5	.	1.8	36.0	41.9	0.8
20	523	30.4	.	3.4	58.5	6.3	1.3	460	28.7	0.2	4.1	52.4	12.2	2.4
21	531	26.6	.	4.1	61.0	6.8	1.5	531	23.2	0.6	4.1	52.4	17.3	2.4
22	628	29.1	.	3.2	57.0	9.6	1.1	575	29.7	0.2	3.3	49.6	15.8	1.4
23	633	28.0	0.2	2.1	58.8	10.0	1.1	604	25.8	0.3	3.3	51.8	17.2	1.5
24	655	29.3	0.2	2.7	56.6	9.0	2.1	664	24.2	0.3	5.1	47.1	20.0	3.2
25	712	24.0	0.1	2.7	58.1	13.6	1.4	705	24.8	0.4	3.8	45.8	21.6	3.5
26	778	28.5	0.1	3.3	52.4	14.5	1.0	783	24.3	0.1	6.1	47.9	19.0	2.6
27	768	26.4	0.1	2.5	52.0	17.6	1.4	782	27.5	0.4	4.0	40.5	24.2	3.5
28	925	24.3	0.1	4.0	50.5	20.2	0.9	856	27.6	1.1	5.0	40.8	22.8	2.8
29	1,023	29.4	0.1	3.6	44.4	21.0	1.5	886	29.6	0.8	5.4	40.0	20.4	3.8
30	995	26.9	0.1	3.4	44.7	23.3	1.5	940	26.2	0.5	6.1	41.0	21.6	4.7
31	1,092	27.7	0.6	2.6	42.8	24.5	1.8	998	26.4	0.9	7.2	39.6	20.6	5.3
32	1,196	26.9	0.2	3.3	42.6	24.8	2.3	1,034	28.5	1.0	7.6	38.4	20.1	4.4
33	1,384	28.5	0.1	2.6	42.2	25.0	1.7	1,003	25.8	1.0	8.1	37.8	21.8	5.5
34	1,445	27.1	0.4	3.0	40.3	26.7	2.4	1,157	26.0	1.2	8.0	39.4	18.9	6.5
35	1,584	24.7	0.4	2.8	40.5	29.9	1.7	1,169	29.3	0.7	7.8	34.6	21.5	6.1
36	1,792	25.4	0.1	3.1	38.3	31.2	2.0	1,214	32.6	0.8	6.4	33.9	19.6	6.7
37	1,973	27.3	0.3	2.3	35.7	31.8	2.6	1,305	32.0	1.7	7.2	32.9	19.1	7.2
38	2,116	26.7	0.3	2.7	34.0	34.1	2.2	1,433	33.8	1.6	6.8	31.2	17.6	8.9
39	2,434	28.8	0.3	2.5	32.5	33.4	2.4	1,588	36.7	1.3	6.0	32.6	15.3	8.0
40	2,692	26.1	0.2	2.2	29.2	40.1	2.3	3,481	14.0	0.3	3.3	12.3	67.1	3.0
41	2,823	26.0	0.3	3.0	30.5	38.0	2.2	2,260	21.3	0.4	4.6	18.7	50.7	4.3
42	3,106	26.4	0.4	2.3	26.7	41.0	3.3	2,308	21.7	0.4	4.2	19.0	49.7	5.1
43	3,305	25.8	0.2	2.2	26.0	42.5	3.3	2,295	23.6	0.5	2.8	20.8	46.5	5.8
44	3,644	26.3	0.4	2.3	25.2	43.0	2.9	2,365	25.0	0.7	3.2	20.4	45.1	5.5
45	3,889	25.7	0.3	2.1	25.3	43.2	3.4	2,527	25.9	0.5	2.8	19.0	45.5	6.3
46	4,102	24.9	0.4	2.2	23.5	45.6	3.3	2,681	24.3	0.4	3.1	19.4	46.5	6.2
47	4,473	24.9	0.5	2.0	23.2	46.0	3.4	2,760	25.3	0.5	2.9	17.6	46.7	7.0
48	4,641	25.2	0.5	1.8	22.2	46.8	3.4	3,007	24.5	0.6	3.0	17.6	47.1	7.2
49	5,123	25.5	0.3	2.5	21.4	46.2	4.1	3,235	26.4	0.6	2.6	17.1	46.4	6.9

50	5,340	25.7	0.6	1.7	20.0	48.0	3.9	3,400	24.5	0.8	2.3	16.6	48.3	7.5
51	5,499	23.4	0.7	1.7	20.5	49.4	4.4	3,637	24.6	0.7	2.4	17.0	47.2	8.1
52	5,695	23.1	0.6	1.7	19.9	49.8	4.9	3,807	24.3	0.7	1.9	17.8	47.6	7.6
53	5,811	24.3	0.5	1.9	18.3	49.9	5.1	3,903	22.9	0.8	2.0	18.4	48.1	7.8
54	6,102	23.4	0.5	2.0	19.1	50.2	4.8	4,005	22.0	1.0	1.4	17.8	48.3	9.6
55	6,248	23.5	0.6	1.8	18.7	50.3	5.1	4,141	22.2	0.9	1.7	17.0	48.7	9.4
56	6,416	22.3	0.5	1.8	18.1	51.1	6.2	4,343	22.5	0.9	1.7	17.5	46.7	10.7
57	6,729	22.4	0.5	1.9	17.4	52.0	5.7	4,376	22.4	0.9	1.4	17.7	47.2	10.4
58	6,829	21.9	0.8	1.7	17.4	52.3	5.9	4,508	21.7	0.7	1.6	16.9	48.6	10.5
59	6,731	21.8	0.8	1.7	17.0	52.6	6.0	4,699	23.3	0.9	1.6	16.1	46.7	11.4
60	7,095	21.3	0.8	1.7	15.9	53.6	6.8	4,985	22.8	1.0	1.7	16.4	46.8	11.3
61	7,078	20.2	0.7	1.9	15.7	55.3	6.2	4,883	20.8	1.1	1.9	16.2	48.2	11.8
62	7,098	20.3	0.9	1.8	15.0	54.0	8.0	4,966	19.7	1.2	1.9	16.1	48.4	12.7
63	6,854	18.9	0.9	2.1	15.2	54.8	8.0	5,062	18.7	1.1	1.9	15.8	49.4	13.2
64	6,968	17.8	1.0	2.1	15.3	55.3	8.5	5,125	18.5	1.0	2.0	15.2	49.9	13.4
65	6,657	17.6	1.2	2.2	14.3	56.2	8.5	5,257	17.6	1.2	2.1	15.4	49.8	14.0
66	6,500	16.5	1.3	2.0	14.7	55.8	9.7	5,179	16.3	1.2	2.1	15.7	49.7	14.9
67	6,479	16.3	1.2	2.0	14.4	56.0	10.2	5,127	16.0	1.4	2.0	15.2	49.9	15.5
68	6,095	14.4	1.4	2.4	14.7	55.9	11.1	5,161	14.3	1.5	1.9	16.0	50.4	15.9
69	5,970	13.1	1.7	2.5	13.8	58.4	10.5	5,067	14.5	1.7	2.1	15.4	48.8	17.5
70	5,622	13.4	1.8	2.2	14.1	57.6	10.8	5,029	14.8	1.3	2.1	14.3	50.0	17.5
71	5,316	11.7	1.5	2.4	13.6	58.9	11.9	4,876	13.2	1.7	2.2	13.9	51.8	17.3
72	4,978	11.5	1.2	2.6	14.9	57.2	12.6	4,824	11.3	1.9	2.4	14.1	51.9	18.4
73	4,881	11.3	1.4	2.6	13.3	58.6	12.8	4,689	10.0	1.4	2.5	14.0	53.7	18.3
74	4,552	10.9	1.4	2.7	13.4	59.0	12.6	4,576	10.5	1.8	2.3	13.7	52.3	19.3
75	4,159	9.7	1.4	2.7	13.8	58.8	13.5	4,352	10.2	1.2	2.6	13.2	52.3	20.5
76	4,121	9.1	1.2	2.7	13.6	60.2	13.1	4,255	9.1	1.5	2.0	14.2	52.8	20.3
77	3,682	8.2	1.7	2.5	13.9	60.5	13.2	3,943	8.7	1.3	2.0	14.1	52.5	21.4
78	3,409	7.2	1.8	2.7	13.4	60.2	14.7	3,886	9.3	1.5	2.4	12.9	53.1	20.8
79	3,002	7.4	1.3	3.3	13.3	62.0	12.8	3,679	7.2	1.0	2.8	13.7	52.9	22.4
80	2,836	6.0	1.7	3.0	12.5	61.8	15.1	3,340	6.5	1.0	2.7	12.5	55.5	21.8
81	2,383	5.7	1.2	2.9	12.5	63.8	13.9	3,246	6.7	1.2	3.0	12.1	55.2	21.8
82	2,165	6.0	1.3	3.6	11.9	63.5	13.7	2,896	5.5	1.3	2.5	11.8	56.9	22.0
83	1,898	5.6	1.1	3.8	13.0	62.7	13.8	2,652	5.3	1.2	3.5	13.4	55.2	21.4
84	1,628	5.6	1.2	2.7	12.6	61.8	16.1	2,350	5.0	0.7	3.3	13.4	54.8	22.8
85	1,419	3.9	1.1	3.5	13.1	64.1	14.2	2,142	3.5	1.0	2.9	12.7	59.2	20.6
86	1,164	4.0	1.2	3.6	13.5	63.5	14.3	1,800	3.7	0.7	3.1	12.8	57.5	22.3
87	950	3.4	1.6	4.0	11.3	63.7	16.1	1,601	3.4	1.4	3.1	11.7	60.1	20.2
88	750	2.3	0.7	4.5	12.8	62.9	16.8	1,277	2.3	0.9	3.7	12.1	59.4	21.5
89	528	2.7	0.9	3.2	11.0	64.4	17.8	1,052	3.7	0.8	3.8	12.5	56.3	23.0
90	438	3.4	1.6	4.1	10.7	63.5	16.7	850	2.4	0.7	3.2	10.8	62.6	20.4
91	312	1.0	0.3	3.8	16.3	63.5	15.1	682	2.6	0.6	4.3	9.1	58.8	24.6
92	234	2.6	1.3	4.3	15.4	65.0	11.5	497	2.2	0.6	4.6	8.5	60.4	23.7
93	155	3.2	0.6	3.9	14.8	65.8	11.6	379	1.3	0.5	6.3	11.1	61.5	19.3
94	114	1.8	.	5.3	14.0	65.8	13.2	307	2.0	2.0	2.9	8.8	60.6	23.8
95	89	1.1	1.1	4.5	10.1	71.9	11.2	183	1.6	0.5	8.7	9.8	59.6	19.7
96	41	.	.	4.9	4.9	65.9	24.4	145	3.4	0.7	4.8	11.0	57.9	22.1
97	31	.	.	.	6.5	80.6	12.9	78	.	.	3.8	16.7	56.4	23.1
98	19	.	.	5.3	5.3	73.7	15.8	58	1.7	1.7	1.7	19.0	55.2	20.7
99	11	.	.	18.2	18.2	54.5	9.1	31	.	.	6.5	12.9	61.3	19.4
100	*	.	.	.	.	33.3	66.7	21	.	.	.	9.5	52.4	38.1
101	*	.	.	.	.	100	.	10	.	.	.	10.0	70.0	20.0
102	*	.	.	50.0	.	50.0	.	5	80.0	20.0
104	*	50.0	50.0
105	*	100	.
106	*	.	.	100	.	.	.

The reconstructed diabetes register

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sex M
and DM type T1

	doDM											
	All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
All	25,978	13,213	730	675	726	657	685	692	656	603	590	600
0	1,251	676	27	24	26	42	23	22	23	19	23	31
5	1,933	972	32	39	29	45	41	54	42	41	43	45

10	2,791	1,433	37	40	39	54	51	74	54	58	66	68
15	2,179	1,193	49	36	35	31	42	36	48	34	33	56
20	2,088	1,148	47	46	37	45	43	52	43	38	34	36
25	2,256	1,159	51	60	65	50	60	65	52	51	41	46
30	1,888	1,049	51	51	69	47	44	48	48	35	39	42
35	1,817	892	57	55	53	40	68	49	53	52	46	50
40	1,726	818	59	43	73	50	59	48	46	37	40	36
45	1,483	716	50	44	58	39	41	38	33	37	40	29
50	1,390	670	61	53	50	50	54	45	35	31	32	29
55	1,239	608	44	43	33	38	41	27	58	34	42	38
60	1,122	550	51	30	39	28	28	37	25	42	27	26
65	965	506	41	21	37	36	27	35	29	16	28	25
70	788	421	29	41	37	29	20	23	23	25	17	9
75	594	248	29	30	28	21	22	22	24	26	16	14
80	306	117	11	10	14	9	8	11	11	13	15	13
85	120	31	4	8	4	*	12	5	6	12	7	5
90	35	6	.	.	.	*	*	.	*	*	*	*
95+	7	.	.	*	.	.	.	*	*	.	.	.

(Continued)

doDM											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
All	610	585	625	601	606	542	534	497	507	521	523
0	25	22	29	31	24	32	37	34	24	31	26
5	39	39	46	58	53	44	42	65	48	56	60
10	78	62	63	62	89	65	77	67	82	87	85
15	39	38	59	53	44	57	67	56	53	59	61
20	40	41	48	52	47	39	54	39	48	50	61
25	54	44	51	46	55	39	40	48	49	67	63
30	45	40	34	34	36	31	30	26	38	21	30
35	58	32	44	46	52	44	33	21	26	24	22
40	35	61	55	43	47	36	30	31	23	34	22
45	36	40	32	42	38	35	33	33	20	29	20
50	36	34	27	37	29	21	17	22	26	18	13
55	29	43	26	14	20	23	15	18	17	12	16
60	27	30	33	30	19	28	19	11	16	9	17
65	21	22	24	13	16	15	15	7	12	7	12
70	17	14	17	11	10	11	9	5	11	4	5
75	17	14	15	12	13	10	9	7	8	4	5
80	11	6	14	10	7	9	4	*	*	4	*
85	*	*	*	*	4	*	*	*	*	4	.
90	*	.	4	4	*	*	*	*	*	*	*
95+	.	*	*	.	*	.	.	.	.	.	*

sex M
and DM type T2

doDM												
	All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
All	233,101	37,923	6,306	6,187	7,159	7,129	8,835	7,436	8,523	9,528	9,849	9,259
0	84	59	.	*	*	*	.	*	*	*	*	*
5	89	56	*	4	.	.	.	*	4	4	*	5
10	192	105	*	*	5	*	*	*	8	8	17	6
15	487	227	8	6	10	10	15	11	18	15	14	10
20	882	298	21	14	17	16	21	25	23	41	25	24
25	1,950	533	45	39	47	50	68	54	69	67	65	53
30	4,224	1,133	110	116	128	126	161	138	112	152	144	138
35	8,082	1,950	218	209	226	249	343	261	291	317	344	313

40	13,844	2,980	309	338	365	403	566	417	419	490	560	534
45	20,745	4,024	562	488	626	573	801	608	713	789	761	732
50	27,057	4,351	781	833	993	979	1,238	908	985	1,055	1,089	1,026
55	31,714	4,239	745	796	963	999	1,374	1,206	1,382	1,537	1,582	1,492
60	33,971	4,400	818	775	952	889	1,199	1,002	1,235	1,377	1,508	1,593
65	30,736	4,193	784	737	871	840	1,004	877	1,048	1,209	1,277	1,177
70	24,561	3,888	761	670	763	765	816	747	857	990	1,024	875
75	17,779	2,931	584	607	622	609	635	553	633	741	766	631
80	10,604	1,712	365	342	351	364	375	386	478	467	428	418
85	4,691	663	153	176	177	192	171	189	181	193	175	175
90	1,218	159	30	30	36	55	36	46	58	64	57	47
95+	191	22	9	4	4	7	9	4	8	11	8	9

(Continued)

		doDM										
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
All	9,153	9,695	10,952	11,094	12,029	13,431	11,109	8,727	8,686	9,639	10,452	
0	.	.	*	.	*	4	*	.	*	*	*	*
5	*	*	.	*	*	*	*	.	.	.	.	.
10	*	8	6	.	6	*	*	*	.	*	*	*
15	13	8	22	13	12	18	17	*	15	9	14	
20	22	24	23	30	36	29	36	23	41	38	55	
25	57	59	71	75	76	78	103	64	77	88	112	
30	136	155	166	198	156	162	148	150	144	168	183	
35	274	287	327	322	338	307	310	286	269	315	326	
40	544	584	625	606	687	650	574	508	550	504	631	
45	757	769	944	970	1,044	1,077	992	848	806	893	968	
50	1,049	1,069	1,168	1,273	1,312	1,373	1,237	913	986	1,154	1,285	
55	1,377	1,357	1,508	1,518	1,550	1,762	1,454	1,145	1,095	1,248	1,385	
60	1,629	1,751	1,978	1,907	2,067	2,127	1,669	1,214	1,158	1,308	1,415	
65	1,163	1,305	1,493	1,534	1,842	2,267	1,710	1,323	1,321	1,367	1,394	
70	878	975	1,162	1,185	1,296	1,487	1,187	910	973	1,118	1,234	
75	625	693	754	775	857	1,079	856	686	632	749	761	
80	421	401	433	456	470	632	506	405	363	419	412	
85	150	198	199	176	220	279	227	188	204	194	211	
90	42	42	59	50	49	83	68	54	42	56	55	
95+	11	9	12	5	8	12	11	7	9	6	6	

sex M
and T1+T2

		doDM											
		All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
All	259,079	51,136	7,036	6,862	7,885	7,786	9,520	8,128	9,179	10,131	10,439	9,859	
0	1,335	735	27	25	29	44	23	23	24	20	25	32	
5	2,022	1,028	33	43	29	45	41	56	46	45	46	50	
10	2,983	1,538	39	42	44	55	54	75	62	66	83	74	
15	2,666	1,420	57	42	45	41	57	47	66	49	47	66	
20	2,970	1,446	68	60	54	61	64	77	66	79	59	60	
25	4,206	1,692	96	99	112	100	128	119	121	118	106	99	
30	6,112	2,182	161	167	197	173	205	186	160	187	183	180	
35	9,899	2,842	275	264	279	289	411	310	344	369	390	363	
40	15,570	3,798	368	381	438	453	625	465	465	527	600	570	
45	22,228	4,740	612	532	684	612	842	646	746	826	801	761	
50	28,447	5,021	842	886	1,043	1,029	1,292	953	1,020	1,086	1,121	1,055	
55	32,953	4,847	789	839	996	1,037	1,415	1,233	1,440	1,571	1,624	1,530	
60	35,093	4,950	869	805	991	917	1,227	1,039	1,260	1,419	1,535	1,619	
65	31,701	4,699	825	758	908	876	1,031	912	1,077	1,225	1,305	1,202	

70	25,349	4,309	790	711	800	794	836	770	880	1,015	1,041	884
75	18,373	3,179	613	637	650	630	657	575	657	767	782	645
80	10,910	1,829	376	352	365	373	383	397	489	480	443	431
85	4,811	694	157	184	181	193	183	194	187	205	182	180
90	1,253	165	30	30	36	57	37	46	60	66	58	49
95+	198	22	9	5	4	7	9	5	9	11	8	9

(Continued)

													doDM																						
													2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016												
All	9,763	10,280	11,577	11,695	12,635	13,973	11,643	9,224	9,193	10,160	10,975																								
0	25	22	31	31	25	36	38	34	25	33	28																								
5	41	40	46	59	55	46	44	65	48	56	60																								
10	81	70	69	62	95	68	78	68	82	90	88																								
15	52	46	81	66	56	75	84	58	68	68	75																								
20	62	65	71	82	83	68	90	62	89	88	116																								
25	111	103	122	121	131	117	143	112	126	155	175																								
30	181	195	200	232	192	193	178	176	182	189	213																								
35	332	319	371	368	390	351	343	307	295	339	348																								
40	579	645	680	649	734	686	604	539	573	538	653																								
45	793	809	976	1,012	1,082	1,112	1,025	881	826	922	988																								
50	1,085	1,103	1,195	1,310	1,341	1,394	1,254	935	1,012	1,172	1,298																								
55	1,406	1,400	1,534	1,532	1,570	1,785	1,469	1,163	1,112	1,260	1,401																								
60	1,656	1,781	2,011	1,937	2,086	2,155	1,688	1,225	1,174	1,317	1,432																								
65	1,184	1,327	1,517	1,547	1,858	2,282	1,725	1,330	1,333	1,374	1,406																								
70	895	989	1,179	1,196	1,306	1,498	1,196	915	984	1,122	1,239																								
75	642	707	769	787	870	1,089	865	693	640	753	766																								
80	432	407	447	466	477	641	510	408	366	423	415																								
85	152	200	202	179	224	281	229	189	206	198	211																								
90	43	42	63	54	51	84	69	57	43	57	56																								
95+	11	10	13	5	9	12	11	7	9	6	7																								

sex F
and DM type T1

													doDM																							
													All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005												
All	19,652	10,332	551	551	519	451	502	475	432	434	455	432																								
0	1,097	574	27	32	19	20	27	31	21	32	18	24																								
5	2,017	1,020	24	42	36	22	55	45	45	45	51	54																								
10	2,459	1,244	41	43	39	46	39	53	43	45	56	51																								
15	1,483	794	34	34	37	28	29	26	26	32	29	26																								
20	1,433	785	41	34	39	35	21	40	33	27	25	25																								
25	1,442	771	36	46	45	28	44	37	27	27	30	24																								
30	1,105	576	37	33	39	37	38	34	31	24	28	20																								
35	923	489	16	29	20	19	28	30	25	27	19	20																								
40	869	438	24	27	30	19	20	19	15	25	20	20																								
45	855	447	32	28	22	21	21	15	18	14	21	27																								
50	888	425	33	36	25	29	32	26	19	21	27	22																								
55	897	468	29	27	28	31	28	27	22	22	30	21																								
60	914	517	36	29	24	23	21	17	17	17	28	20																								
65	936	568	34	30	27	20	29	27	25	14	13	15																								
70	903	549	41	26	29	28	20	18	14	19	18	20																								
75	699	398	31	24	22	19	23	12	23	19	17	13																								
80	457	204	19	21	22	15	16	8	18	16	10	16																								
85	198	54	14	6	13	8	9	9	6	6	9	8																								
90	65	10	*	4	*	*	*	*	*	*	5	5																								
95+	12	*	*	.	*	*																								

(Continued)

	doDM										
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
All	454	446	460	402	414	401	353	409	405	407	367
0	29	26	31	30	22	24	10	27	21	25	27
5	36	52	44	49	53	68	42	48	61	50	75
10	69	61	72	68	74	69	71	80	68	71	56
15	28	31	44	35	33	31	39	23	39	48	37
20	22	18	27	26	30	28	28	35	31	37	46
25	30	38	29	31	22	25	28	23	33	39	29
30	25	30	23	20	22	17	15	15	17	13	11
35	22	25	19	19	24	13	18	23	13	15	10
40	37	20	32	16	24	16	15	23	11	10	8
45	18	22	29	11	16	17	11	15	18	17	15
50	22	27	20	10	12	17	12	23	24	15	11
55	28	18	8	17	17	17	12	13	10	17	7
60	29	15	25	14	18	12	12	14	13	8	5
65	11	11	15	11	12	14	14	10	13	11	12
70	15	14	9	16	12	11	10	12	11	8	*
75	9	18	12	5	7	5	6	7	9	13	7
80	17	9	13	9	9	8	6	8	6	4	*
85	6	8	6	10	*	7	*	6	4	*	*
90	.	*	*	4	*	*	*	4	*	*	*
95+	*	*	.	*	*	*	.	.	.	*	*

sex F
and DM type T2

	doDM											
	All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
All	195,969	37,243	5,385	5,190	5,872	6,017	7,188	6,054	7,515	8,093	8,300	7,638
0	77	60	*	*	*	*	*	.	*	*	.	*
5	104	71	.	*	*	.	*	4	4	*	*	4
10	196	90	*	*	*	5	5	5	9	12	8	9
15	1,236	199	8	13	4	10	10	14	31	32	37	51
20	1,401	481	21	27	22	42	28	23	40	41	34	41
25	2,570	788	55	59	56	63	72	57	68	75	112	142
30	4,027	1,193	112	83	122	118	147	110	118	157	148	147
35	5,786	1,650	148	139	155	163	252	195	219	252	236	239
40	11,840	2,057	220	187	260	247	383	272	309	360	463	418
45	13,355	2,564	346	322	366	345	469	369	442	495	513	494
50	17,864	2,944	472	474	588	542	775	559	648	688	721	681
55	21,170	3,276	494	472	614	666	837	759	943	1,019	1,050	955
60	24,107	3,845	568	570	624	732	893	699	924	1,037	1,076	1,059
65	24,855	4,500	674	607	729	716	840	729	929	1,024	1,006	890
70	23,091	4,705	698	695	729	692	828	725	876	918	951	835
75	19,416	4,183	639	686	663	710	707	632	805	847	793	717
80	14,027	2,889	537	477	491	543	489	497	620	607	666	538
85	7,674	1,341	302	258	313	296	322	279	360	358	325	302
90	2,650	363	75	98	111	107	103	107	142	140	133	95
95+	523	44	13	18	21	19	25	19	26	27	27	20

(Continued)

	doDM											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
All	7,213	8,016	8,907	8,556	9,479	11,186	9,153	6,960	6,560	7,485	7,959	
0	.	*	.	.	.	*	.	*	*	.	*	
5	*	.	.	.	*	*	*	.	*	*	*	4
10	4	9	7	5	5	5	*	*	*	5	4	
15	62	69	82	69	99	83	90	89	79	52	53	
20	67	54	50	59	58	62	61	49	48	49	44	
25	110	92	121	98	100	90	111	88	82	54	77	
30	151	165	141	131	146	162	154	126	123	111	162	
35	206	195	224	187	179	217	190	183	193	166	198	
40	503	594	561	572	668	704	651	580	569	589	673	
45	506	538	612	645	662	759	660	497	516	568	667	
50	673	716	805	772	857	998	867	657	667	836	924	
55	793	893	992	949	1,095	1,211	943	793	687	839	890	
60	1,004	1,136	1,318	1,198	1,425	1,426	1,171	811	763	886	942	
65	895	966	1,160	1,197	1,261	1,641	1,289	935	858	1,030	979	
70	805	949	1,005	968	1,016	1,325	1,066	722	728	897	958	
75	611	678	825	737	868	1,062	845	597	538	640	633	
80	442	529	560	530	594	815	549	431	372	417	434	
85	253	289	315	325	317	417	349	268	240	244	201	
90	108	116	110	94	93	171	134	106	76	83	85	
95+	18	27	19	20	33	34	21	26	18	18	30	

sex F
and T1+T2

	doDM											
	All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
All	215,621	47,575	5,936	5,741	6,391	6,468	7,690	6,529	7,947	8,527	8,755	8,070
0	1,174	634	29	33	20	21	29	31	23	34	18	25
5	2,121	1,091	24	43	37	22	56	49	49	47	52	58
10	2,655	1,334	42	46	41	51	44	58	52	57	64	60
15	2,719	993	42	47	41	38	39	40	57	64	66	77
20	2,834	1,266	62	61	61	77	49	63	73	68	59	66
25	4,012	1,559	91	105	101	91	116	94	95	102	142	166
30	5,132	1,769	149	116	161	155	185	144	149	181	176	167
35	6,709	2,139	164	168	175	182	280	225	244	279	255	259
40	12,709	2,495	244	214	290	266	403	291	324	385	483	438
45	14,210	3,011	378	350	388	366	490	384	460	509	534	521
50	18,752	3,369	505	510	613	571	807	585	667	709	748	703
55	22,067	3,744	523	499	642	697	865	786	965	1,041	1,080	976
60	25,021	4,362	604	599	648	755	914	716	941	1,054	1,104	1,079
65	25,791	5,068	708	637	756	736	869	756	954	1,038	1,019	905
70	23,994	5,254	739	721	758	720	848	743	890	937	969	855
75	20,115	4,581	670	710	685	729	730	644	828	866	810	730
80	14,484	3,093	556	498	513	558	505	505	638	623	676	554
85	7,872	1,395	316	264	326	304	331	288	366	364	334	310
90	2,715	373	77	102	114	110	105	108	145	142	138	100
95+	535	45	13	18	21	19	25	19	27	27	28	21

(Continued)

	doDM											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
All	7,667	8,462	9,367	8,958	9,893	11,587	9,506	7,369	6,965	7,892	8,326	
0	29	27	31	30	22	25	10	28	22	25	28	

5	38	52	44	49	56	71	43	48	62	51	79
10	73	70	79	73	79	74	72	81	69	76	60
15	90	100	126	104	132	114	129	112	118	100	90
20	89	72	77	85	88	90	89	84	79	86	90
25	140	130	150	129	122	115	139	111	115	93	106
30	176	195	164	151	168	179	169	141	140	124	173
35	228	220	243	206	203	230	208	206	206	181	208
40	540	614	593	588	692	720	666	603	580	599	681
45	524	560	641	656	678	776	671	512	534	585	682
50	695	743	825	782	869	1,015	879	680	691	851	935
55	821	911	1,000	966	1,112	1,228	955	806	697	856	897
60	1,033	1,151	1,343	1,212	1,443	1,438	1,183	825	776	894	947
65	906	977	1,175	1,208	1,273	1,655	1,303	945	871	1,041	991
70	820	963	1,014	984	1,028	1,336	1,076	734	739	905	961
75	620	696	837	742	875	1,067	851	604	547	653	640
80	459	538	573	539	603	823	555	439	378	421	437
85	259	297	321	335	320	424	352	274	244	246	202
90	108	118	112	98	96	172	135	110	79	85	88
95+	19	28	19	21	34	35	21	26	18	20	31

M+F
and DM type T1

		doDM											
		All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
All	45,630	23,545	1,281	1,226	1,245	1,108	1,187	1,167	1,088	1,037	1,045	1,032	
0	2,348	1,250	54	56	45	62	50	53	44	51	41	55	
5	3,950	1,992	56	81	65	67	96	99	87	86	94	99	
10	5,250	2,677	78	83	78	100	90	127	97	103	122	119	
15	3,662	1,987	83	70	72	59	71	62	74	66	62	82	
20	3,521	1,933	88	80	76	80	64	92	76	65	59	61	
25	3,698	1,930	87	106	110	78	104	102	79	78	71	70	
30	2,993	1,625	88	84	108	84	82	82	79	59	67	62	
35	2,740	1,381	73	84	73	59	96	79	78	79	65	70	
40	2,595	1,256	83	70	103	69	79	67	61	62	60	56	
45	2,338	1,163	82	72	80	60	62	53	51	51	61	56	
50	2,278	1,095	94	89	75	79	86	71	54	52	59	51	
55	2,136	1,076	73	70	61	69	69	54	80	56	72	59	
60	2,036	1,067	87	59	63	51	49	54	42	59	55	46	
65	1,901	1,074	75	51	64	56	56	62	54	30	41	40	
70	1,691	970	70	67	66	57	40	41	37	44	35	29	
75	1,293	646	60	54	50	40	45	34	47	45	33	27	
80	763	321	30	31	36	24	24	19	29	29	25	29	
85	318	85	18	14	17	9	21	14	12	18	16	13	
90	100	16	*	4	*	5	*	*	5	4	6	7	
95+	19	*	.	*	.	.	.	*	*	.	*	*	

(Continued)

		doDM										
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
All	1,064	1,031	1,085	1,003	1,020	943	887	906	912	928	890	
0	54	48	60	61	46	56	47	61	45	56	53	
5	75	91	90	107	106	112	84	113	109	106	135	
10	147	123	135	130	163	134	148	147	150	158	141	
15	67	69	103	88	77	88	106	79	92	107	98	
20	62	59	75	78	77	67	82	74	79	87	107	
25	84	82	80	77	77	64	68	71	82	106	92	
30	70	70	57	54	58	48	45	41	55	34	41	

35	80	57	63	65	76	57	51	44	39	39	32
40	72	81	87	59	71	52	45	54	34	44	30
45	54	62	61	53	54	52	44	48	38	46	35
50	58	61	47	47	41	38	29	45	50	33	24
55	57	61	34	31	37	40	27	31	27	29	23
60	56	45	58	44	37	40	31	25	29	17	22
65	32	33	39	24	28	29	29	17	25	18	24
70	32	28	26	27	22	22	19	17	22	12	8
75	26	32	27	17	20	15	15	14	17	17	12
80	28	15	27	19	16	17	10	11	9	8	6
85	8	10	9	13	7	9	5	7	6	6	*
90	*	*	6	8	5	*	*	7	4	*	4
95+	*	*	*	*	*	*	.	.	.	*	*

M+F
and DM type T2

	doDM											
	All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
All	429,070	75,166	11,691	11,377	13,031	13,146	16,023	13,490	16,038	17,621	18,149	16,897
0	161	119	*	*	4	*	*	*	*	*	*	*
5	193	127	*	5	*	.	*	6	8	6	4	9
10	388	195	*	5	7	6	8	6	17	20	25	15
15	1,723	426	16	19	14	20	25	25	49	47	51	61
20	2,283	779	42	41	39	58	49	48	63	82	59	65
25	4,520	1,321	100	98	103	113	140	111	137	142	177	195
30	8,251	2,326	222	199	250	244	308	248	230	309	292	285
35	13,868	3,600	366	348	381	412	595	456	510	569	580	552
40	25,684	5,037	529	525	625	650	949	689	728	850	1,023	952
45	34,100	6,588	908	810	992	918	1,270	977	1,155	1,284	1,274	1,226
50	44,921	7,295	1,253	1,307	1,581	1,521	2,013	1,467	1,633	1,743	1,810	1,707
55	52,884	7,515	1,239	1,268	1,577	1,665	2,211	1,965	2,325	2,556	2,632	2,447
60	58,078	8,245	1,386	1,345	1,576	1,621	2,092	1,701	2,159	2,414	2,584	2,652
65	55,591	8,693	1,458	1,344	1,600	1,556	1,844	1,606	1,977	2,233	2,283	2,067
70	47,652	8,593	1,459	1,365	1,492	1,457	1,644	1,472	1,733	1,908	1,975	1,710
75	37,195	7,114	1,223	1,293	1,285	1,319	1,342	1,185	1,438	1,588	1,559	1,348
80	24,631	4,601	902	819	842	907	864	883	1,098	1,074	1,094	956
85	12,365	2,004	455	434	490	488	493	468	541	551	500	477
90	3,868	522	105	128	147	162	139	153	200	204	190	142
95+	714	66	22	22	25	26	34	23	34	38	35	29

(Continued)

	doDM										
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
All	16,366	17,711	19,859	19,650	21,508	24,617	20,262	15,687	15,246	17,124	18,411
0	.	*	*	.	*	5	*	*	*	*	*
5	4	*	.	*	5	5	*	.	*	*	4
10	7	17	13	5	11	8	*	*	*	8	7
15	75	77	104	82	111	101	107	91	94	61	67
20	89	78	73	89	94	91	97	72	89	87	99
25	167	151	192	173	176	168	214	152	159	142	189
30	287	320	307	329	302	324	302	276	267	279	345
35	480	482	551	509	517	524	500	469	462	481	524
40	1,047	1,178	1,186	1,178	1,355	1,354	1,225	1,088	1,119	1,093	1,304
45	1,263	1,307	1,556	1,615	1,706	1,836	1,652	1,345	1,322	1,461	1,635
50	1,722	1,785	1,973	2,045	2,169	2,371	2,104	1,570	1,653	1,990	2,209
55	2,170	2,250	2,500	2,467	2,645	2,973	2,397	1,938	1,782	2,087	2,275
60	2,633	2,887	3,296	3,105	3,492	3,553	2,840	2,025	1,921	2,194	2,357

65	2,058	2,271	2,653	2,731	3,103	3,908	2,999	2,258	2,179	2,397	2,373
70	1,683	1,924	2,167	2,153	2,312	2,812	2,253	1,632	1,701	2,015	2,192
75	1,236	1,371	1,579	1,512	1,725	2,141	1,701	1,283	1,170	1,389	1,394
80	863	930	993	986	1,064	1,447	1,055	836	735	836	846
85	403	487	514	501	537	696	576	456	444	438	412
90	150	158	169	144	142	254	202	160	118	139	140
95+	29	36	31	25	41	46	32	33	27	24	36

M+F
and T1+T2

	doDM											
	All	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
All	474,700	98,711	12,972	12,603	14,276	14,254	17,210	14,657	17,126	18,658	19,194	17,929
0	2,509	1,369	56	58	49	65	52	54	47	54	43	57
5	4,143	2,119	57	86	66	67	97	105	95	92	98	108
10	5,638	2,872	81	88	85	106	98	133	114	123	147	134
15	5,385	2,413	99	89	86	79	96	87	123	113	113	143
20	5,804	2,712	130	121	115	138	113	140	139	147	118	126
25	8,218	3,251	187	204	213	191	244	213	216	220	248	265
30	11,244	3,951	310	283	358	328	390	330	309	368	359	347
35	16,608	4,981	439	432	454	471	691	535	588	648	645	622
40	28,279	6,293	612	595	728	719	1,028	756	789	912	1,083	1,008
45	36,438	7,751	990	882	1,072	978	1,332	1,030	1,206	1,335	1,335	1,282
50	47,199	8,390	1,347	1,396	1,656	1,600	2,099	1,538	1,687	1,795	1,869	1,758
55	55,020	8,591	1,312	1,338	1,638	1,734	2,280	2,019	2,405	2,612	2,704	2,506
60	60,114	9,312	1,473	1,404	1,639	1,672	2,141	1,755	2,201	2,473	2,639	2,698
65	57,492	9,767	1,533	1,395	1,664	1,612	1,900	1,668	2,031	2,263	2,324	2,107
70	49,343	9,563	1,529	1,432	1,558	1,514	1,684	1,513	1,770	1,952	2,010	1,739
75	38,488	7,760	1,283	1,347	1,335	1,359	1,387	1,219	1,485	1,633	1,592	1,375
80	25,394	4,922	932	850	878	931	888	902	1,127	1,103	1,119	985
85	12,683	2,089	473	448	507	497	514	482	553	569	516	490
90	3,968	538	107	132	150	167	142	154	205	208	196	149
95+	733	67	22	23	25	26	34	24	36	38	36	30

(Continued)

	doDM											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
All	17,430	18,742	20,944	20,653	22,528	25,560	21,149	16,593	16,158	18,052	19,301	
0	54	49	62	61	47	61	48	62	47	58	56	
5	79	92	90	108	111	117	87	113	110	107	139	
10	154	140	148	135	174	142	150	149	151	166	148	
15	142	146	207	170	188	189	213	170	186	168	165	
20	151	137	148	167	171	158	179	146	168	174	206	
25	251	233	272	250	253	232	282	223	241	248	281	
30	357	390	364	383	360	372	347	317	322	313	386	
35	560	539	614	574	593	581	551	513	501	520	556	
40	1,119	1,259	1,273	1,237	1,426	1,406	1,270	1,142	1,153	1,137	1,334	
45	1,317	1,369	1,617	1,668	1,760	1,888	1,696	1,393	1,360	1,507	1,670	
50	1,780	1,846	2,020	2,092	2,210	2,409	2,133	1,615	1,703	2,023	2,233	
55	2,227	2,311	2,534	2,498	2,682	3,013	2,424	1,969	1,809	2,116	2,298	
60	2,689	2,932	3,354	3,149	3,529	3,593	2,871	2,050	1,950	2,211	2,379	
65	2,090	2,304	2,692	2,755	3,131	3,937	3,028	2,275	2,204	2,415	2,397	
70	1,715	1,952	2,193	2,180	2,334	2,834	2,272	1,649	1,723	2,027	2,200	
75	1,262	1,403	1,606	1,529	1,745	2,156	1,716	1,297	1,187	1,406	1,406	
80	891	945	1,020	1,005	1,080	1,464	1,065	847	744	844	852	
85	411	497	523	514	544	705	581	463	450	444	413	
90	151	160	175	152	147	256	204	167	122	142	144	

95+ 30 38 32 26 43 47 32 33 27 26 38

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	Type of DM			Type of DM	
	All	T1	T2	T1	T2
	N	N	N	PctN	PctN
All	91,253	4,523	86,730	5.0	95.0
doDM					
2012/01	1,679	105	1,574	6.3	93.7
2012/02	1,574	58	1,516	3.7	96.3
2012/03	1,862	77	1,785	4.1	95.9
2012/04	1,398	53	1,345	3.8	96.2
2012/05	1,734	89	1,645	5.1	94.9
2012/06	4,021	86	3,935	2.1	97.9
2012/07	1,161	59	1,102	5.1	94.9
2012/08	1,404	75	1,329	5.3	94.7
2012/09	1,561	75	1,486	4.8	95.2
2012/10	1,684	87	1,597	5.2	94.8
2012/11	1,721	73	1,648	4.2	95.8
2012/12	1,350	50	1,300	3.7	96.3
2013/01	1,495	105	1,390	7.0	93.0
2013/02	1,363	95	1,268	7.0	93.0
2013/03	1,387	80	1,307	5.8	94.2
2013/04	1,416	86	1,330	6.1	93.9
2013/05	1,347	64	1,283	4.8	95.2
2013/06	2,306	75	2,231	3.3	96.7
2013/07	1,012	51	961	5.0	95.0
2013/08	1,086	70	1,016	6.4	93.6
2013/09	1,328	52	1,276	3.9	96.1
2013/10	1,295	71	1,224	5.5	94.5
2013/11	1,351	82	1,269	6.1	93.9
2013/12	1,207	75	1,132	6.2	93.8
2014/01	1,377	98	1,279	7.1	92.9
2014/02	1,232	78	1,154	6.3	93.7
2014/03	1,509	86	1,423	5.7	94.3
2014/04	1,205	66	1,139	5.5	94.5
2014/05	1,375	86	1,289	6.3	93.7
2014/06	1,542	57	1,485	3.7	96.3
2014/07	1,071	66	1,005	6.2	93.8
2014/08	1,139	76	1,063	6.7	93.3
2014/09	1,504	73	1,431	4.9	95.1
2014/10	1,373	73	1,300	5.3	94.7
2014/11	1,447	83	1,364	5.7	94.3
2014/12	1,384	70	1,314	5.1	94.9
2015/01	1,388	77	1,311	5.5	94.5
2015/02	1,438	79	1,359	5.5	94.5
2015/03	1,667	79	1,588	4.7	95.3
2015/04	1,425	73	1,352	5.1	94.9
2015/05	1,426	81	1,345	5.7	94.3
2015/06	1,667	73	1,594	4.4	95.6
2015/07	1,170	65	1,105	5.6	94.4
2015/08	1,317	72	1,245	5.5	94.5
2015/09	1,658	92	1,566	5.5	94.5
2015/10	1,677	90	1,587	5.4	94.6
2015/11	1,597	72	1,525	4.5	95.5
2015/12	1,622	75	1,547	4.6	95.4
2016/01	1,620	91	1,529	5.6	94.4
2016/02	1,704	81	1,623	4.8	95.2
2016/03	1,664	89	1,575	5.3	94.7
2016/04	1,764	68	1,696	3.9	96.1
2016/05	1,635	55	1,580	3.4	96.6
2016/06	1,845	79	1,766	4.3	95.7
2016/07	1,193	58	1,135	4.9	95.1

2016/08	1,536	93	1,443	6.1	93.9
2016/09	1,670	67	1,603	4.0	96.0
2016/10	1,455	68	1,387	4.7	95.3
2016/11	1,662	73	1,589	4.4	95.6
2016/12	1,553	68	1,485	4.4	95.6

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	Inclusion criterion							Inclusion criterion						
	All	DVD	Dia	Ins	NPR	OAD	Pod	DVD	Dia	Ins	NPR	OAD	Pod	
	N	N	N	N	N	N	N	PctN	PctN	PctN	PctN	PctN	PctN	
All	91,253	5,841	4,195	2,589	11,206	62,992	4,430	6.4	4.6	2.8	12.3	69.0	4.9	
doDM														
2012/01	1,679	174	*	35	203	1,153	112	10.4	0.1	2.1	12.1	68.7	6.7	
2012/02	1,574	56	*	40	175	1,170	130	3.6	0.2	2.5	11.1	74.3	8.3	
2012/03	1,862	87	*	38	212	1,402	122	4.7	0.1	2.0	11.4	75.3	6.6	
2012/04	1,398	82	*	41	153	1,014	107	5.9	0.1	2.9	10.9	72.5	7.7	
2012/05	1,734	95	*	28	229	1,277	104	5.5	0.1	1.6	13.2	73.6	6.0	
2012/06	4,021	2,275	4	41	199	1,400	102	56.6	0.1	1.0	4.9	34.8	2.5	
2012/07	1,161	*	*	33	149	909	66	0.2	0.2	2.8	12.8	78.3	5.7	
2012/08	1,404	5	.	32	213	1,059	95	0.4	.	2.3	15.2	75.4	6.8	
2012/09	1,561	*	*	46	191	1,207	113	0.1	0.1	2.9	12.2	77.3	7.2	
2012/10	1,684	*	*	38	213	1,320	109	0.2	0.1	2.3	12.6	78.4	6.5	
2012/11	1,721	7	*	40	204	1,336	133	0.4	0.1	2.3	11.9	77.6	7.7	
2012/12	1,350	12	*	34	140	1,101	61	0.9	0.1	2.5	10.4	81.6	4.5	
2013/01	1,495	179	10	33	195	1,023	55	12.0	0.7	2.2	13.0	68.4	3.7	
2013/02	1,363	111	18	39	201	910	84	8.1	1.3	2.9	14.7	66.8	6.2	
2013/03	1,387	126	41	43	202	904	71	9.1	3.0	3.1	14.6	65.2	5.1	
2013/04	1,416	132	40	35	194	951	64	9.3	2.8	2.5	13.7	67.2	4.5	
2013/05	1,347	118	50	46	188	877	68	8.8	3.7	3.4	14.0	65.1	5.0	
2013/06	2,306	1,081	54	42	168	897	64	46.9	2.3	1.8	7.3	38.9	2.8	
2013/07	1,012	14	36	64	129	730	39	1.4	3.6	6.3	12.7	72.1	3.9	
2013/08	1,086	17	34	52	160	773	50	1.6	3.1	4.8	14.7	71.2	4.6	
2013/09	1,328	25	46	32	174	974	77	1.9	3.5	2.4	13.1	73.3	5.8	
2013/10	1,295	28	35	54	190	927	61	2.2	2.7	4.2	14.7	71.6	4.7	
2013/11	1,351	24	71	43	180	953	80	1.8	5.3	3.2	13.3	70.5	5.9	
2013/12	1,207	21	47	52	160	887	40	1.7	3.9	4.3	13.3	73.5	3.3	
2014/01	1,377	129	67	51	203	877	50	9.4	4.9	3.7	14.7	63.7	3.6	
2014/02	1,232	99	76	47	157	804	49	8.0	6.2	3.8	12.7	65.3	4.0	
2014/03	1,509	148	95	36	213	955	62	9.8	6.3	2.4	14.1	63.3	4.1	
2014/04	1,205	120	76	38	170	756	45	10.0	6.3	3.2	14.1	62.7	3.7	
2014/05	1,375	128	107	39	196	850	55	9.3	7.8	2.8	14.3	61.8	4.0	
2014/06	1,542	295	106	31	168	885	57	19.1	6.9	2.0	10.9	57.4	3.7	
2014/07	1,071	22	70	32	159	748	40	2.1	6.5	3.0	14.8	69.8	3.7	
2014/08	1,139	15	122	39	168	737	58	1.3	10.7	3.4	14.7	64.7	5.1	
2014/09	1,504	27	151	45	214	1,004	63	1.8	10.0	3.0	14.2	66.8	4.2	
2014/10	1,373	5	62	58	213	978	57	0.4	4.5	4.2	15.5	71.2	4.2	
2014/11	1,447	8	155	48	228	932	76	0.6	10.7	3.3	15.8	64.4	5.3	
2014/12	1,384	19	114	59	178	982	32	1.4	8.2	4.3	12.9	71.0	2.3	
2015/01	1,388	19	122	37	179	986	45	1.4	8.8	2.7	12.9	71.0	3.2	
2015/02	1,438	8	116	51	186	1,014	63	0.6	8.1	3.5	12.9	70.5	4.4	
2015/03	1,667	*	139	52	210	1,175	88	0.2	8.3	3.1	12.6	70.5	5.3	
2015/04	1,425	4	110	39	181	1,024	67	0.3	7.7	2.7	12.7	71.9	4.7	
2015/05	1,426	5	115	46	192	997	71	0.4	8.1	3.2	13.5	69.9	5.0	
2015/06	1,667	20	143	47	187	1,185	85	1.2	8.6	2.8	11.2	71.1	5.1	
2015/07	1,170	4	65	36	146	877	42	0.3	5.6	3.1	12.5	75.0	3.6	
2015/08	1,317	5	95	41	171	935	70	0.4	7.2	3.1	13.0	71.0	5.3	
2015/09	1,658	7	135	56	186	1,191	83	0.4	8.1	3.4	11.2	71.8	5.0	
2015/10	1,677	11	157	35	207	1,186	81	0.7	9.4	2.1	12.3	70.7	4.8	
2015/11	1,597	10	144	48	180	1,132	83	0.6	9.0	3.0	11.3	70.9	5.2	
2015/12	1,622	10	104	39	182	1,234	53	0.6	6.4	2.4	11.2	76.1	3.3	
2016/01	1,620	4	117	54	204	1,167	74	0.2	7.2	3.3	12.6	72.0	4.6	
2016/02	1,704	6	83	56	198	1,268	93	0.4	4.9	3.3	11.6	74.4	5.5	
2016/03	1,664	5	81	47	190	1,277	64	0.3	4.9	2.8	11.4	76.7	3.8	

2016/04	1,764	8	87	46	174	1,372	77	0.5	4.9	2.6	9.9	77.8	4.4
2016/05	1,635	6	110	41	181	1,214	83	0.4	6.7	2.5	11.1	74.3	5.1
2016/06	1,845	*	85	36	206	1,406	109	0.2	4.6	2.0	11.2	76.2	5.9
2016/07	1,193	*	51	43	159	882	57	0.1	4.3	3.6	13.3	73.9	4.8
2016/08	1,536	4	95	55	194	1,127	61	0.3	6.2	3.6	12.6	73.4	4.0
2016/09	1,670	*	108	40	179	1,238	102	0.2	6.5	2.4	10.7	74.1	6.1
2016/10	1,455	*	66	48	207	1,045	87	0.1	4.5	3.3	14.2	71.8	6.0
2016/11	1,662	*	99	42	190	1,236	93	0.1	6.0	2.5	11.4	74.4	5.6
2016/12	1,553	.	65	50	228	1,162	48	.	4.2	3.2	14.7	74.8	3.1

The reconstructed diabetes *drug* register 14:34 Tuesday, December 4, 2018 14

The CONTENTS Procedure

Data Set Name	DMDAT.DMDREG	Observations	426150
Member Type	DATA	Variables	9
Engine	V9	Indexes	0
Created	04/12/2018 14:34:21	Observation Length	72
Last Modified	04/12/2018 14:34:21	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label	Reconstructed DM register, only persons on drugs		
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information

Data Set Page Size	65536
Number of Data Set Pages	470
First Data Page	*
Max Obs per Page	908
Obs in First Data Page	880
Number of Data Set Repairs	0
ExtendObsCounter	YES
Filename	E:\workdata\705093\BxC\demoDM\DATA\dmdreg.sas7bdat
Release Created	9.0401M3
Host Created	X64_SRV12

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
7	DMtp	Char	*			Type of DM
5	doBth	Num	8	DDMMYY10.		
8	doDM	Num	8	DDMMYY10.		
6	doDth	Num	8	DDMMYY10.		
3	doIns	Num	8	DDMMYY10.		
2	doOAD	Num	8	DDMMYY10.		
9	inCr	Char	4			
1	pnr	Char	12	\$12.	\$10.	Personnummer
4	sex	Num	8			

The reconstructed diabetes *drug* register 14:34 Tuesday, December 4, 2018 15

												Type of DM										
												Type of DM		T1	T2							
												T1	T2	inCr	inCr							
												inCr	inCr	Ins	OAD	Ins	OAD					
												All	All	Ins	OAD	All	Ins	OAD	PctN	PctN	PctN	PctN
All	426,150	43,117	36,113	7,004	383,033	30,415	352,618	83.8	16.2	7.9	92.1											

doDM												
1995	75,148	20,959	18,715	2,244	54,189	10,965	43,224	89.3	10.7	20.2	79.8	
1996	12,870	2,085	1,684	401	10,785	790	9,995	80.8	19.2	7.3	92.7	
1997	11,315	1,283	943	340	10,032	669	9,363	73.5	26.5	6.7	93.3	
1998	12,265	1,209	874	335	11,056	741	10,315	72.3	27.7	6.7	93.3	
1999	12,450	1,085	804	281	11,365	794	10,571	74.1	25.9	7.0	93.0	
2000	12,624	1,072	790	282	11,552	876	10,676	73.7	26.3	7.6	92.4	
2001	13,301	1,075	809	266	12,226	819	11,407	75.3	24.7	6.7	93.3	
2002	13,173	1,084	806	278	12,089	811	11,278	74.4	25.6	6.7	93.3	
2003	15,414	1,022	729	293	14,392	870	13,522	71.3	28.7	6.0	94.0	
2004	15,978	1,009	765	244	14,969	977	13,992	75.8	24.2	6.5	93.5	
2005	15,789	975	746	229	14,814	962	13,852	76.5	23.5	6.5	93.5	
2006	16,419	1,025	798	227	15,394	979	14,415	77.9	22.1	6.4	93.6	
2007	17,784	1,033	809	224	16,751	986	15,765	78.3	21.7	5.9	94.1	
2008	19,492	997	766	231	18,495	1,055	17,440	76.8	23.2	5.7	94.3	
2009	20,339	992	804	188	19,347	1,024	18,323	81.0	19.0	5.3	94.7	
2010	22,435	960	800	160	21,475	1,006	20,469	83.3	16.7	4.7	95.3	
2011	26,063	904	744	160	25,159	932	24,227	82.3	17.7	3.7	96.3	
2012	22,882	858	709	149	22,024	938	21,086	82.6	17.4	4.3	95.7	
2013	17,232	864	738	126	16,368	1,072	15,296	85.4	14.6	6.5	93.5	
2014	16,036	872	750	122	15,164	1,056	14,108	86.0	14.0	7.0	93.0	
2015	17,870	904	771	133	16,966	1,024	15,942	85.3	14.7	6.0	94.0	
2016	19,271	850	759	91	18,421	1,069	17,352	89.3	10.7	5.8	94.2	

5.3 07-comp

Compares the contents as derived from the working copy of RUKS and the newly constructed DMreg. The two registers are merged and differences in dates (for those who appear in both registers) are compared. T1/T2 classification is also compared.

```
1                                "Program: 07-comp.sas"    15:42 Tuesday, December 4, 2018
```

```
NOTE: Copyright (c) 2002-2012 by SAS Institute Inc., Cary, NC, USA.
```

```
NOTE: SAS (r) Proprietary Software 9.4 (TS1M3)
```

```
      Licensed to FORSKNING 1, Site 50800722.
```

```
NOTE: This session is executing on the X64_SRV12 platform.
```

```
NOTE: Updated analytical products:
```

```
      SAS/STAT 14.1
```

```
NOTE: Additional host information:
```

```
      X64_SRV12 WIN 6.2.9200 Server
```

```
NOTE: SAS initialization used:
```

```
      real time          0.06 seconds
```

```
      cpu time           0.10 seconds
```

```
NOTE: AUTOEXEC processing beginning; file is
```

```
      E:\workdata\705093\BXC\demoDM\sas\optslibs.sas.
```

```
NOTE: AUTOEXEC processing completed.
```

```
1          title1 'DMreg contents' ;
2          proc contents data = DMdat.DMreg ; run ;
```

```
NOTE: PROCEDURE CONTENTS used (Total process time):
```

```
      real time          0.07 seconds
```

```
      cpu time           0.01 seconds
```

NOTE: The PROCEDURE CONTENTS printed page 1.

```

3
4     title1 'RUKS overview' ;
5     proc contents data = ekstn.ruks_dekryp_diabetes ; run ;

```

NOTE: PROCEDURE CONTENTS used (Total process time):

```

real time      0.29 seconds
cpu time       0.00 seconds

```

NOTE: The PROCEDURE CONTENTS printed page 2.

```

6
7     proc tabulate data = ekstn.ruks_dekryp_diabetes missing noseps ;
8         class debut kon sygdom opdateringsdato uddato
9             aarsag_tekst status ;
10        table all debut opdateringsdato uddato,
11            ( all kon sygdom ) * f=comma9.
12            / rts = 7 ;
13        table all aarsag_tekst,
14            ( all status ) * f = comma7.
15            / rts=12 ;
16        format debut opdateringsdato uddato year4. ;
17        run ;

```

NOTE: There were 436923 observations read from the data set EKSTN.RUKS_DEKRYPT_DIABETES.

NOTE: The PROCEDURE TABULATE printed pages 3-4.

NOTE: PROCEDURE TABULATE used (Total process time):

```

real time      1.95 seconds
cpu time       0.62 seconds

```

```

18
19     * Merge the two registers an explore the differences ;
20     title1 'RUKS and DMreg merged, doDM truncated at 1.1.1994' ;
21
22     proc sort data = DMdat.DMreg out = DMreg ;
23         by pnr ;
24     run ;

```

NOTE: There were 474700 observations read from the data set DMDAT.DMREG.

NOTE: The data set WORK.DMREG has 474700 observations and 17 variables.

NOTE: PROCEDURE SORT used (Total process time):

```

real time      1.32 seconds
cpu time       0.31 seconds

```

```

25
26     proc format ;
27         value dif
28             low - -60 = '-5+y'
29             -59 - -48 = '-4 y'
30             -47 - -36 = '-3 y'
31             -35 - -24 = '-2 y'
32             -23 - -12 = '-1 y'
33             12 - 23 = '1 y'
34             24 - 35 = '2 y'
35             36 - 47 = '3 y'
36             48 - 59 = '4 y'
37             60 - high = '5+y' ;
NOTE: Format DIF has been output.
38     run ;

```

NOTE: PROCEDURE FORMAT used (Total process time):

```

real time      0.00 seconds
cpu time       0.00 seconds

```

39

```

40      data DMdat.sam ( label = 'Dataset with all persons in DMreg or RUKS' ) ;
41      merge ekstn.ruks_dekryp_diabetes ( keep = pnr kon debut sygdom fodselsdato
41      ! alder_debut
42
43          DMreg
44          ( keep = pnr sex doBth doDM doDM2 doDth
45              DMtp inCr inCr2
46              doNpr doIns doOAD doPod doDVDD
45      ! doDiaB
46
47              doOAD2 doIns2
47          in = d ) ;
48      by pnr ;
49      * Origin of data ;
50      if r and d then from = 'Both' ;
51      if r and ^d then from = 'RUKS' ;
52      if ^r and d then from = 'DMrg' ;
53      * Avoiding 1 and 2 changed to * ;
54      sygdom = translate( trim(sygdom), '_', ' ' ) ;
55      * Dates and differences ;
56      doDM = max( '01JAN1994'd, doDM ) - doDM + doDM ;
57      doDM2 = max( '01JAN1994'd, doDM2 ) - doDM2 + doDM2 ;
58      debut = max( '01JAN1994'd, debut ) - debut + debut ;
59      dif = int( (doDM - debut)/30 ) ; * Difference in months ;
60      label dif = 'DMr-RUKS' ;
61      * Age at diagnosis ;
62      ageR = ( debut - fodselsdato ) / 365.25 ;
63      ageD = ( doDM - doBth ) / 365.25 ;
64      * Sex ;
65      if kon eq 'M' then sex = 1 ;
66      if kon eq 'K' then sex = 2 ;
67      * Presence of criteria in DMreg ;
68      iNPR = ( doNpr gt .z ) ;
69      iIns = ( doIns gt .z ) ;
70      iIns2= ( doIns2 gt .z ) ;
71      iOAD = ( doOAD gt .z ) ;
72      iOAD2= ( doOAD2 gt .z ) ;
73      iPod = ( doPod gt .z ) ;
74      iDVD = ( doDVDD gt .z ) ;
75      iDia = ( doDiaB gt .z ) ;
76      run ;

```

NOTE: Missing values were generated as a result of performing an operation on missing values.

Each place is given by: (Number of times) at (Line):(Column).

23471 at 56:38 40043 at 57:38 61248 at 58:38 84719 at 59:9 84719 at 59:20
84719 at 59:28 61248 at 62:18 23471 at 63:17

NOTE: There were 436923 observations read from the data set EKSTN.RUKS_DEKRYP_DIABETES.

NOTE: There were 474700 observations read from the data set WORK.DMREG.

NOTE: The data set DMDAT.SAM has 498171 observations and 34 variables.

NOTE: DATA statement used (Total process time):

real time 0.96 seconds
cpu time 0.45 seconds

```

77
78      proc contents data = DMdat.sam ;
79      run ;

```

NOTE: PROCEDURE CONTENTS used (Total process time):

real time 0.01 seconds
cpu time 0.00 seconds

NOTE: The PROCEDURE CONTENTS printed page 5.

```

80
81      title1 'Comparison with the total DMreg' ;
82      proc tabulate data = DMdat.sam missing noseps ;
83          class doDM debut dif from inCr inCr2
84              sex kon ageR ageD DMtp sygdom ;
85          var iDVD iDia iIns iIns2 iNPR iOAD iOAD2 iPod ;
86          table sex, kon * f= comma8. ;

```

```

87      table all from dif,
88          ( all DMtp*sygdom ) * f=comma7.
89          / rts = 8 ;
90      table ( all sex doDM debut ageD ageR ),
91          DMtp * sygdom * f=comma8.
92          / rts=15 ;
93      table all from dif,
94          all * f=comma7.
95          inCr * f=comma7.
96          / rts = 6 ;
97      table all from dif,
98          all * f=comma7.
99          inCr2 * f=comma6.
100         / rts = 6 ;
101      table all from dif,
102          all * f=comma7.
103          sum * ( iDVD iDia iIns iIns2 iNPR iOAD iOAD2 iPod ) * f=comma8.
104          / rts = 6 ;
105      table all doDM,
106          ( all debut ) * f=comma7.
107          / rts=8 ;
108      table all * n * f=comma7.
109          ( all doDM ) * pctn<doDM all> * f=7.2,
110          ( all debut )
111          / rts=8 indent=1 ;
112      table all doDM,
113          n * f=comma7.
114          pctn<debut all> * f=7.2 * ( all debut )
115          / rts=8 indent=1 ;
116      format doDM debut year4.
117          dif dif.
118          sex koen_t.
119          ageR ageD 3. ;
120      keylabel pctn = ' ' ;
121      run ;

```

NOTE: There were 498171 observations read from the data set DMDAT.SAM.

NOTE: The PROCEDURE TABULATE printed pages 6-20.

NOTE: PROCEDURE TABULATE used (Total process time):

```

real time      0.60 seconds
cpu time       2.26 seconds

```

```

122
123      title1 'Comparison with the DMreg based on 2nd drug purchase' ;
124      proc tabulate data = DMdat.sam missing noseps ;
125          where ( doDM2 > .z | from eq 'RUKS' ) ;
126          class doDM2 debut dif from inCr inCr2
127              sex kon ageR ageD DMtp sygdom ;
128          var iDVD iDia iIns iIns2 iNPR iOAD iOAD2 iPod ;
129          table sex, kon * f= comma8. ;
130          table all from dif,
131              ( all DMtp*sygdom ) * f=comma7.
132              / rts = 8 ;
133          table ( all sex doDM2 debut ageD ageR ),
134              DMtp * sygdom * f=comma8.
135              / rts=15 ;
136          table all from dif,
137              all * f=comma7.
138              inCr * f=comma7.
139              / rts = 6 ;
140          table all from dif,
141              all * f=comma7.
142              inCr2 * f=comma6.
143              / rts = 6 ;
144          table all from dif,
145              all * f=comma7.
146              sum * ( iDVD iDia iIns iIns2 iNPR iOAD iOAD2 iPod ) * f=comma8.
147              / rts = 6 ;
148          table all doDM2,

```

```

149         ( all debut ) * f=comma7.
150         / rts=8 ;
151     table  all          *      n          * f=comma7.
152         ( all doDM2 ) * pctn<doDM2 all> * f=7.2,
153         ( all debut )
154         / rts=8 indent=1 ;
155     table  all doDM2,
156         n          * f=comma7.
157         pctn<debut all> * f=7.2 * ( all debut )
158         / rts=8 indent=1 ;
159     format doDM2 debut year4.
160         dif dif.
161         sex koen_t.
162         ageR aged 3. ;
163     keylabel pctn = ' ' ;
164     run ;

```

NOTE: There were 481599 observations read from the data set DMDAT.SAM.

WHERE (doDM2>.Z) or (from='RUKS');

NOTE: The PROCEDURE TABULATE printed pages 21-35.

NOTE: PROCEDURE TABULATE used (Total process time):

```

real time      0.37 seconds
cpu time       1.85 seconds

```

NOTE: SAS Institute Inc., SAS Campus Drive, Cary, NC USA 27513-2414

NOTE: The SAS System used:

```

real time      6.07 seconds
cpu time       5.70 seconds

```

5.3.1 07-comp.lst

DMreg contents

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The CONTENTS Procedure

Data Set Name	DMDAT.DMREG	Observations	474700
Member Type	DATA	Variables	17
Engine	V9	Indexes	0
Created	04/12/2018 14:34:20	Observation Length	120
Last Modified	04/12/2018 14:34:20	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label	Reconstructed DM register for Denmark		
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information

```

Data Set Page Size      65536
Number of Data Set Pages 872
First Data Page        *
Max Obs per Page       545
Obs in First Data Page 521
Number of Data Set Repairs 0
ExtendObsCounter       YES
Filename                E:\workdata\705093\BxC\demoDM\DATA\dmreg.sas7bdat
Release Created         9.0401M3
Host Created            X64_SRV12

```

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
17	DMtp	Char	*			Type of DM

11	doBth	Num	8	DDMMYY10.		
13	doDM	Num	8	DDMMYY10.		
14	doDM2	Num	8	DDMMYY10.		
*	doDVDD	Num	8	DDMMYY10.		
9	doDiaB	Num	8	DDMMYY10.	IS8601DA10.	enscreeningsdato
12	doDth	Num	8	DDMMYY10.		
5	doIns	Num	8	DDMMYY10.		
7	doIns2	Num	4	DDMMYY10.		
*	doNPR	Num	8	DDMMYY10.	DATE9.	
4	doOAD	Num	8	DDMMYY10.		
6	doOAD2	Num	4	DDMMYY10.		
8	doPod	Num	8	DDMMYY10.		
15	inCr	Char	*			Inclusion criterion
16	inCr2	Char	5			Inclusion criterion - 2nd dispense
*	pnr	Char	12	\$12.	\$10.	Personnummer
10	sex	Num	8			

RUKS overview

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The CONTENTS Procedure

Data Set Name	EKSTN.RUKS_DEKRYP_DIABETES	Observations	436923
Member Type	DATA	Variables	14
Engine	V9	Indexes	0
Created	13/03/2018 22:10:25	Observation Length	120
Last Modified	13/03/2018 22:10:25	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	YES
Label			
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information

Data Set Page Size	32768
Number of Data Set Pages	1607
First Data Page	*
Max Obs per Page	272
Obs in First Data Page	251
Number of Data Set Repairs	0
Filename	E:\rawdata\705093\Opdatering_2018\Eksterne data\ruks_dekryp_diabetes.sas7bdat
Release Created	9.0401M5
Host Created	X64_SR12R2

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
9	aarsag_tekst	Char	10			Uddato ag
7	alder_debut	Num	8			
6	debut	Num	8	DATE9.		
*	fodselsdato	Num	8	DATE9.	DATE9.	D_FODDATO
*	kon	Char	*	\$1.	\$1.	C_KON
13	max_reg	Num	8	DATE9.		
10	min_lpr	Num	8	DATE9.		
11	min_lsr	Num	8	DATE9.		
12	min_skizo	Num	8	DATE9.		
14	opdateringsdato	Num	8	DATE9.		
*	pnr	Char	12	\$12.		
4	status	Char	*	\$2.	\$2.	Statuskode CPR pr. 30AUG2017_k1.1126
5	sygdom	Char	20			
8	uddato	Num	8	DATE9.	DATE9.	Uddato

Sort Information

Sortedby pnr

Validated YES
 Character Set ANSI

RUKS overview

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	C_KON			sygdom	
	All	K	M	TYPE *	TYPE *
	N	N	N	N	N
All	436,923	193,182	243,741	46,529	390,394
debut					
1993	*	.	*	.	*
1994	72,258	34,815	37,443	24,116	48,142
1995	14,551	6,612	7,939	1,721	12,830
1996	13,380	6,074	7,306	1,259	12,121
1997	12,171	5,464	6,707	949	11,222
1998	13,066	5,816	7,250	895	12,171
1999	13,254	5,865	7,389	879	12,375
2000	13,597	6,067	7,530	939	12,658
2001	14,202	6,276	7,926	938	13,264
2002	14,210	6,222	7,988	953	13,257
2003	16,188	7,122	9,066	902	15,286
2004	16,352	7,240	9,112	902	15,450
2005	16,132	7,234	8,898	929	15,203
2006	16,535	7,213	9,322	994	15,541
2007	17,541	7,828	9,713	969	16,572
2008	18,806	8,184	10,622	978	17,828
2009	19,441	8,353	11,088	1,007	18,434
2010	20,797	8,839	11,958	997	19,800
2011	23,810	10,277	13,533	934	22,876
2012	20,881	8,962	11,919	892	19,989
2013	15,695	6,686	9,009	995	14,700
2014	14,535	5,982	8,553	940	13,595
2015	16,013	6,659	9,354	1,012	15,001
2016	16,600	6,686	9,914	1,032	15,568
2017	6,905	2,706	4,199	397	6,508
opda-					
teri-					
ngsd-					
ato					
2017	436,923	193,182	243,741	46,529	390,394
Udda-					
to					
1994	4,004	2,014	1,990	1,221	2,783
1995	6,134	3,122	3,012	1,770	4,364
1996	6,329	3,245	3,084	1,727	4,602
1997	5,886	2,799	3,087	1,230	4,656
1998	5,951	2,778	3,173	1,068	4,883
1999	6,155	2,866	3,289	949	5,206
2000	6,428	3,011	3,417	914	5,514
2001	6,643	3,108	3,535	878	5,765
2002	7,077	3,213	3,864	906	6,171
2003	7,300	3,320	3,980	873	6,427
2004	7,290	3,277	4,013	784	6,506
2005	7,698	3,585	4,113	783	6,915
2006	8,102	3,784	4,318	766	7,336
2007	7,145	3,346	3,799	691	6,454
2008	6,912	3,029	3,883	716	6,196
2009	7,749	3,348	4,401	717	7,032
2010	8,223	3,624	4,599	741	7,482
2011	8,407	3,631	4,776	688	7,719
2012	8,779	3,696	5,083	617	8,162
2013	9,019	3,804	5,215	584	8,435
2014	9,321	3,904	5,417	585	8,736
2015	9,697	4,159	5,538	596	9,101
2016	10,022	4,274	5,748	576	9,446
2017	6,782	2,847	3,935	385	6,397

2045 259,870 113,398 146,472 25,764 234,106

RUKS overview

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Statuskode CPR pr. 30AUG2017_kl.1126

	All	01	03	70	80	90
	N	N	N	N	N	N
All	436,923	263,222	301	141	3,775	169,484
Uddato						
ag						
Aktiv	259,870	259,571	299	.	.	.
Dd	86,454	.	.	.	.	86,454
Forsvundet	72	.	.	72	.	.
Inaktiv	87,718	3,651	*	69	966	83,030
Udrejst	2,809	.	.	.	2,809	.

RUKS and DMreg merged, doDM truncated at 1.1.1994

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The CONTENTS Procedure

Data Set Name	DMDAT.SAM	Observations	498171
Member Type	DATA	Variables	34
Engine	V9	Indexes	0
Created	04/12/2018 15:42:15	Observation Length	256
Last Modified	04/12/2018 15:42:15	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label	Dataset with all persons in DMreg or RUKS		
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

Engine/Host Dependent Information

Data Set Page Size	65536
Number of Data Set Pages	1954
First Data Page	*
Max Obs per Page	255
Obs in First Data Page	238
Number of Data Set Repairs	0
ExtendObsCounter	YES
Filename	E:\workdata\705093\BxC\demoDM\DATA\sam.sas7bdat
Release Created	9.0401M3
Host Created	X64_SRV12

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
22	DMtp	Char	*			Type of DM
26	ageD	Num	8			
25	ageR	Num	8			
6	alder_debut	Num	8			
5	debut	Num	8	DATE9.		
24	dif	Num	8			DMr-RUKS
16	doBth	Num	8	DDMMYY10.		
18	doDM	Num	8	DDMMYY10.		
19	doDM2	Num	8	DDMMYY10.		
8	doDVDD	Num	8	DDMMYY10.		
14	doDiaB	Num	8	DDMMYY10.	IS8601DA10.	enscreeningsdato
17	doDth	Num	8	DDMMYY10.		
10	doIns	Num	8	DDMMYY10.		

12	doIns2	Num	4	DDMMYY10.					
7	doNPR	Num	8	DDMMYY10.	DATE9.				
9	doOAD	Num	8	DDMMYY10.					
11	doOAD2	Num	4	DDMMYY10.					
13	doPod	Num	8	DDMMYY10.					
*	fodselsdato	Num	8	DATE9.	DATE9.		D_FODDATO		
23	from	Char	4						
33	iDVD	Num	8						
34	iDia	Num	8						
28	iIns	Num	8						
29	iIns2	Num	8						
27	iNPR	Num	8						
30	iOAD	Num	8						
31	iOAD2	Num	8						
32	iPod	Num	8						
20	inCr	Char	*				Inclusion criterion		
21	inCr2	Char	5				Inclusion criterion - 2nd dispense		
*	kon	Char	*	\$1.	\$1.		C_KON		
*	pnr	Char	12	\$12.	\$10.		Personnummer		
15	sex	Num	8						
4	sygdom	Char	20						

Comparison with the total DMreg

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		C_KON		
		K	M	
	N	N	N	
sex				
Mand	26,097	.	243,741	
Kvinde	35,151	193,182	.	

Comparison with the total DMreg

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		Type of DM							
		T1				T2			
		sygdom				sygdom			
	All	TYPE_1	TYPE_2	TYPE_1	TYPE_2	_	TYPE_1	TYPE_2	_
	N	N	N	N	N	N	N	N	N
All	498,171	2,889	20,582	31,933	10,758	2,939	11,707	359,054	58,309
from									
Both	413,452	.	.	31,933	10,758	.	11,707	359,054	.
DMrg	61,248	.	.	.	.	2,939	.	.	58,309
RUKS	23,471	2,889	20,582	.	.	.	.	.	.
DMr-									
RUKS									
.	84,719	2,889	20,582	.	.	2,939	.	.	58,309
-5+y	20,034	.	.	417	436	.	151	19,030	.
-4 y	6,824	.	.	77	133	.	33	6,581	.
-3 y	9,195	.	.	138	242	.	53	8,762	.
-2 y	13,372	.	.	512	382	.	76	12,402	.
-1 y	21,405	.	.	1,154	769	.	185	19,297	.
-11	1,860	.	.	78	35	.	33	1,714	.
-10	1,953	.	.	96	31	.	23	1,803	.
-9	2,144	.	.	103	38	.	37	1,966	.
-8	2,210	.	.	99	24	.	39	2,048	.
-7	2,896	.	.	140	37	.	46	2,673	.
-6	1,832	.	.	176	42	.	77	1,537	.
-5	1,628	.	.	297	51	.	126	1,154	.
-4	1,998	.	.	473	69	.	191	1,265	.

-3	3,385	.	.	1,013	116	.	318	1,938	.
-2	6,791	.	.	2,208	257	.	710	3,616	.
-1	13,126	.	.	4,427	600	.	1,379	6,720	.
0	263,525	.	.	19,852	6,060	.	6,515	231,098	.
*	3,678	.	.	76	103	.	216	3,283	.
*	2,020	.	.	39	60	.	74	1,847	.
*	1,680	.	.	28	56	.	57	1,539	.
4	1,175	.	.	22	45	.	45	1,063	.
5	1,031	.	.	14	44	.	44	929	.
6	985	.	.	16	45	.	26	898	.
7	1,034	.	.	26	42	.	52	914	.
8	1,017	.	.	20	56	.	34	907	.
9	1,371	.	.	18	69	.	79	1,205	.
10	2,208	.	.	36	114	.	129	1,929	.
11	3,716	.	.	54	208	.	249	3,205	.
* y	10,738	.	.	221	460	.	604	9,453	.
* y	2,083	.	.	37	39	.	33	1,974	.
* y	1,563	.	.	19	30	.	19	1,495	.
4 y	1,133	.	.	14	26	.	6	1,087	.
5+y	3,842	.	.	33	39	.	48	3,722	.

Comparison with the total DMreg

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	Type of DM							
	sygdom		sygdom		sygdom			
	TYPE_1	TYPE_2	TYPE_1	TYPE_2	-	TYPE_1	TYPE_2	-
	N	N	N	N	N	N	N	N
All	2,889	20,582	31,933	10,758	2,939	11,707	359,054	58,309
sex								
Mand	1,428	9,331	18,635	5,878	1,465	6,034	202,435	24,632
Kvinde	1,461	11,251	13,298	4,880	1,474	5,673	156,619	33,677
doDM								
.	2,889	20,582	.	.	.	.	.	.
1994	.	.	16,985	3,878	279	4,939	38,755	4,244
1995	.	.	961	1,336	106	1,487	24,396	1,345
1996	.	.	638	497	146	228	10,016	1,447
1997	.	.	706	416	104	183	9,759	1,435
1998	.	.	673	430	142	182	11,357	1,492
1999	.	.	608	384	116	221	11,327	1,598
2000	.	.	693	377	117	258	14,122	1,643
2001	.	.	723	345	99	222	11,956	1,312
2002	.	.	650	327	111	244	13,331	2,463
2003	.	.	621	323	93	257	14,596	2,768
2004	.	.	622	288	135	254	15,122	2,773
2005	.	.	677	238	117	257	14,473	2,167
2006	.	.	670	274	120	267	14,174	1,925
2007	.	.	646	257	128	252	15,159	2,300
2008	.	.	679	256	150	280	16,788	2,791
2009	.	.	681	198	124	277	16,656	2,717
2010	.	.	716	189	115	256	18,093	3,159
2011	.	.	647	168	128	262	19,780	4,575
2012	.	.	621	135	131	229	16,797	3,236
2013	.	.	674	119	113	281	12,453	2,953
2014	.	.	654	119	139	270	12,006	2,970
2015	.	.	703	128	97	265	13,670	3,189
2016	.	.	685	76	129	336	14,268	3,807
debut								
.					2,939	.	.	58,309
1994	2,349	5,549	15,907	3,310	.	5,860	39,286	.
1995	51	509	1,214	931	.	456	11,390	.
1996	8	174	1,025	749	.	226	11,198	.
1997	4	142	742	591	.	203	10,489	.

1998	5	158	699	567	.	191	11,446	.
1999	11	194	650	456	.	218	11,725	.
2000	6	235	678	416	.	255	12,007	.
2001	7	272	702	407	.	229	12,585	.
2002	4	297	702	383	.	247	12,577	.
2003	*	323	634	368	.	265	14,595	.
2004	7	387	646	313	.	249	14,750	.
2005	6	522	662	258	.	261	14,423	.
2006	*	545	710	304	.	282	14,692	.
2007	7	597	700	283	.	262	15,692	.
2008	5	507	683	262	.	290	17,059	.
2009	*	562	726	214	.	279	17,658	.
2010	*	563	735	184	.	261	19,053	.
2011	*	504	679	170	.	254	22,202	.
2012	*	516	642	150	.	248	19,323	.
2013	*	471	706	115	.	287	14,114	.
2014	*	472	669	119	.	269	13,004	.
2015	7	517	729	132	.	276	14,352	.
2016	9	611	693	75	.	330	14,882	.
2017	388	5,955	.	*	.	9	552	.
ageD								
.	2,889	20,582	.	.	.	.	.	.
0	.	.	13	4	14	.	.	4
*	.	.	159	*	20	*	*	8
*	.	.	229	4	24	*	.	10
*	.	.	254	*	16	*	.	13
4	.	.	284	11	32	*	.	8
5	.	.	359	5	18	*	*	11
6	.	.	376	10	16	*	*	14
7	.	.	434	13	9	5	*	11
8	.	.	434	19	23	5	*	12
9	.	.	483	18	12	5	4	12
10	.	.	564	21	16	*	*	19
11	.	.	582	19	24	13	8	16
12	.	.	689	25	20	6	19	15
13	.	.	605	41	30	8	8	36
14	.	.	552	54	36	12	26	26
15	.	.	548	56	38	10	33	66
16	.	.	524	38	25	10	69	100
17	.	.	477	46	27	10	107	128
18	.	.	511	49	23	17	144	159
19	.	.	478	63	24	14	153	212
20	.	.	514	51	21	11	157	173
21	.	.	497	54	22	6	162	94
22	.	.	564	78	30	13	181	107
23	.	.	555	75	34	16	222	132
24	.	.	504	89	28	20	271	127
25	.	.	591	92	26	13	316	168
26	.	.	613	102	46	29	402	187
27	.	.	617	99	49	32	457	191
28	.	.	625	101	43	36	570	205
29	.	.	602	106	67	38	676	194
30	.	.	543	103	37	88	794	225
31	.	.	553	84	26	99	861	248
32	.	.	576	95	23	113	1,066	240
33	.	.	548	83	18	137	1,117	258
34	.	.	563	129	14	118	1,325	302
35	.	.	503	115	20	144	1,419	302
36	.	.	541	112	11	146	1,676	271
37	.	.	572	133	21	159	1,991	296
38	.	.	529	137	20	181	2,159	324
39	.	.	506	153	32	168	2,431	345
40	.	.	547	141	33	191	3,427	1,170
41	.	.	516	163	21	181	3,305	699
42	.	.	488	146	31	182	3,672	676
43	.	.	492	155	26	157	3,899	597
44	.	.	458	155	24	195	4,260	566
45	.	.	464	158	30	173	4,667	564
46	.	.	450	167	32	183	5,222	614
47	.	.	456	196	39	205	5,659	618

48	.	.	473	185	29	201	6,077	605
49	.	.	446	180	28	201	6,615	699
50	.	.	421	183	26	221	7,371	668
51	.	.	391	215	38	218	7,505	708
52	.	.	323	190	49	168	7,911	768
53	.	.	298	177	43	210	8,192	830
54	.	.	321	193	37	194	8,351	795
55	.	.	345	203	36	208	8,759	886
56	.	.	352	207	35	218	9,045	927
57	.	.	304	209	43	230	9,248	959
58	.	.	264	237	46	226	9,694	1,018
59	.	.	258	194	43	232	9,788	1,057
60	.	.	252	187	47	219	10,050	1,126
61	.	.	249	199	45	231	10,354	1,118
62	.	.	211	220	48	256	10,311	1,250
63	.	.	237	205	46	237	10,203	1,250
64	.	.	182	215	45	229	10,166	1,290
65	.	.	196	220	44	279	10,188	1,401
66	.	.	214	202	40	252	9,868	1,465
67	.	.	178	237	41	273	9,766	1,451
68	.	.	199	216	41	222	9,317	1,478
69	.	.	163	218	40	274	9,119	1,488
70	.	.	181	197	45	239	9,095	1,428
71	.	.	171	221	36	238	8,415	1,428
72	.	.	169	198	36	231	8,264	1,450
73	.	.	166	210	43	241	7,988	1,338
74	.	.	181	205	39	251	7,776	1,382
75	.	.	147	158	41	220	7,006	1,377
76	.	.	129	167	53	215	6,894	1,346
77	.	.	137	144	39	201	6,225	1,308
78	.	.	121	145	50	173	5,983	1,299
79	.	.	125	141	40	186	5,477	1,274
80	.	.	91	140	37	198	5,109	1,240
81	.	.	85	93	26	155	4,708	1,149
82	.	.	67	109	43	143	4,202	1,086
83	.	.	70	78	32	142	3,696	1,043
84	.	.	66	82	22	136	3,298	929
85	.	.	56	50	36	114	2,884	855
86	.	.	49	46	28	85	2,485	770
87	.	.	23	29	20	72	2,052	736
88	.	.	23	15	19	68	1,693	624
89	.	.	20	24	20	58	1,257	503
90	.	.	9	10	17	40	993	447
91	.	.	10	11	15	41	812	350
92	.	.	7	11	7	33	620	257
93	.	.	*	4	8	20	405	181
94	.	.	4	*	9	14	314	161
95	.	.	*	*	7	9	212	118
96	.	.	*	*	*	6	132	83
97	.	.	*	.	*	6	91	59
98	.	.	.	*	*	4	50	34
99	.	.	.	.	*	*	35	21
100	.	.	.	.	*	*	22	15
101	.	.	.	.	.	.	9	*
102	.	.	.	.	.	*	6	*
103	.	.	.	.	.	.	*	*
104	.	.	.	.	.	.	*	*
105	.	.	.	.	.	.	*	.
106	.	.	.	.	.	.	.	*
ageR	.	.	.	.	.	.	.	.
.	.	.	.	.	2,939	.	.	58,309
-7	.	*	.	.	.	.	.	.
0	.	.	12	*	.	.	.	.
*	5	.	146	*	.	*	*	.
*	6	.	212	4	.	*	.	.
*	*	.	237	*	.	*	.	.
4	4	.	255	8	.	*	.	.
5	5	*	337	*	.	*	.	.
6	9	.	346	10	.	*	.	.
7	16	.	392	10	.	*	*	.

8	6	.	400	13	.	6	*	.
9	10	.	471	20	.	5	*	.
10	18	*	539	17	.	4	.	.
11	21	*	551	16	.	12	5	.
12	20	4	649	32	.	4	10	.
13	14	*	589	40	.	6	10	.
14	15	.	557	45	.	10	20	.
15	12	*	506	47	.	11	29	.
16	9	*	662	44	.	14	58	.
17	13	6	502	51	.	9	104	.
18	5	5	494	54	.	15	131	.
19	11	5	481	60	.	13	151	.
20	9	69	510	48	.	15	163	.
21	10	142	505	68	.	5	178	.
22	10	202	553	79	.	12	177	.
23	10	220	563	67	.	15	217	.
24	6	214	508	73	.	21	284	.
25	8	288	600	93	.	20	328	.
26	10	354	612	91	.	18	427	.
27	11	332	634	89	.	38	475	.
28	13	324	629	103	.	33	597	.
29	12	316	623	103	.	40	704	.
30	13	294	525	86	.	108	858	.
31	15	301	567	99	.	92	875	.
32	14	242	584	82	.	122	1,064	.
33	9	225	550	82	.	131	1,069	.
34	10	211	550	113	.	127	1,334	.
35	18	188	520	125	.	152	1,426	.
36	19	172	545	120	.	142	1,587	.
37	15	152	574	132	.	168	1,897	.
38	20	139	535	132	.	186	2,033	.
39	18	115	527	127	.	166	2,368	.
40	15	63	530	121	.	202	2,593	.
41	21	76	542	150	.	172	2,907	.
42	25	94	501	151	.	161	3,267	.
43	23	89	470	147	.	160	3,555	.
44	43	92	481	156	.	185	3,821	.
45	36	130	464	149	.	161	4,225	.
46	37	110	455	177	.	189	4,744	.
47	23	137	464	178	.	192	5,168	.
48	28	150	474	196	.	199	5,591	.
49	20	173	440	181	.	183	6,137	.
50	23	198	444	205	.	232	6,764	.
51	35	219	383	191	.	197	7,222	.
52	21	215	330	193	.	176	7,610	.
53	20	260	310	173	.	211	7,900	.
54	30	231	314	210	.	193	8,119	.
55	27	253	352	202	.	202	8,563	.
56	32	281	362	195	.	218	8,868	.
57	30	253	300	226	.	227	9,123	.
58	36	270	279	207	.	231	9,448	.
59	35	302	250	209	.	222	9,466	.
60	33	301	261	198	.	223	9,778	.
61	34	321	243	220	.	221	10,388	.
62	43	315	217	214	.	253	10,390	.
63	41	339	234	202	.	245	10,287	.
64	55	393	184	237	.	234	10,389	.
65	57	371	203	200	.	278	10,577	.
66	49	372	225	213	.	241	10,167	.
67	61	393	178	233	.	285	10,046	.
68	58	400	189	204	.	232	9,668	.
69	71	410	170	225	.	262	9,634	.
70	57	462	171	209	.	249	9,496	.
71	73	455	177	234	.	226	8,811	.
72	83	466	170	216	.	246	8,622	.
73	70	439	169	213	.	230	8,539	.
74	68	506	177	198	.	250	8,247	.
75	69	489	145	173	.	223	7,282	.
76	65	485	145	163	.	225	7,319	.
77	72	445	131	173	.	208	6,610	.

78	75	435	127	142	.	183	6,319	.
79	75	483	113	133	.	190	5,872	.
80	79	442	102	141	.	189	5,363	.
81	80	433	86	121	.	165	4,984	.
82	72	459	69	110	.	136	4,406	.
83	87	391	69	88	.	137	3,928	.
84	61	368	68	78	.	134	3,470	.
85	65	318	58	50	.	117	2,914	.
86	40	310	50	44	.	83	2,688	.
87	46	322	20	30	.	83	2,206	.
88	26	227	25	19	.	66	1,793	.
89	25	232	20	24	.	57	1,306	.
90	26	168	10	10	.	49	1,073	.
91	13	143	10	13	.	35	835	.
92	20	115	7	10	.	36	628	.
93	8	82	5	4	.	24	446	.
94	4	50	*	*	.	12	306	.
95	6	36	*	*	.	12	235	.
96	6	21	*	*	.	4	146	.
97	*	16	*	.	.	8	90	.
98	*	15	.	*	.	*	51	.
99	.	12	.	.	.	6	31	.
100	.	8	22	.
101	*	5	9	.
102	*	5	.
103	.	*	*	.
104	*	*	.
105	*	.

Comparison with the total DMreg

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	Inclusion criterion							
	All	DVD	Dia	Ins	NPR	OAD	Pod	
	N	N	N	N	N	N	N	N
All	498,171	23,471	88,907	4,328	11,529	96,033	227,334	46,569
from								
Both	413,452	.	78,788	1,221	8,314	84,519	211,314	29,296
DMrg	61,248	.	10,119	3,107	3,215	11,514	16,020	17,273
RUKS	23,471	23,471	.	.	.	.	.	.
DMr-								
RUKS								
.	84,719	23,471	10,119	3,107	3,215	11,514	16,020	17,273
-5+y	20,034	.	14,785	*	38	1,568	74	3,568
-4 y	6,824	.	5,124	4	10	442	22	1,222
-3 y	9,195	.	6,898	22	15	623	23	1,614
-2 y	13,372	.	9,960	102	26	1,152	32	2,100
-1 y	21,405	.	16,080	216	46	1,946	67	3,050
-11	1,860	.	1,410	31	*	109	13	294
-10	1,953	.	1,456	27	8	153	10	299
-9	2,144	.	1,605	36	5	188	*	307
-8	2,210	.	1,696	26	10	174	6	298
-7	2,896	.	2,247	27	8	213	14	387
-6	1,832	.	1,095	22	10	305	8	392
-5	1,628	.	583	40	6	495	18	486
-4	1,998	.	636	49	11	706	19	577
-3	3,385	.	1,048	51	11	1,390	35	850
-2	6,791	.	1,976	59	18	3,109	48	1,581
-1	13,126	.	3,590	86	48	6,480	158	2,764
0	263,525	.	6,900	131	5,224	60,927	184,493	5,850
*	3,678	.	112	12	482	827	1,760	485
*	2,020	.	82	15	152	427	999	345
*	1,680	.	116	10	86	307	838	323
4	1,175	.	103	11	64	215	559	223
5	1,031	.	57	5	48	184	528	209
6	985	.	39	*	44	170	563	166

7	1,034	.	40	13	58	169	584	170
8	1,017	.	33	4	50	155	628	147
9	1,371	.	36	6	92	152	951	134
10	2,208	.	24	4	173	140	1,730	137
11	3,716	.	22	*	379	115	3,075	124
* y	10,738	.	241	33	967	586	8,452	459
* y	2,083	.	169	27	59	301	1,311	216
* y	1,563	.	127	28	40	184	1,023	161
4 y	1,133	.	94	21	16	129	777	96
5+y	3,842	.	404	98	107	478	2,493	262

Comparison with the total DMreg

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Inclusion criterion - 2nd dispense

	All	---	DVD	Dia	I-Ins	I-OAD	NPR	O-Ins	O-OAD	Pod	
	N	N	N	N	N	N	N	N	N	N	
All	498,171	23,471	16,572	159089	6,136	5,824	926	77,893	837	154959	52,464
from											
Both	413,452	.	3,160	147369	2,839	5,262	809	66,503	716	151642	35,152
DMrg	61,248	.	13,412	11,720	3,297	562	117	11,390	121	3,317	17,312
RUKS	23,471	23,471	.	.	.	.	.	.	.	.	.
DMr-											
RUKS											
.	84,719	23,471	13,412	11,720	3,297	562	117	11,390	121	3,317	17,312
-5+y	20,034	.	14	15,286	*	34	.	1,367	11	4	3,317
-4 y	6,824	.	7	5,338	*	9	.	371	*	.	1,094
-3 y	9,195	.	*	7,155	21	12	*	519	6	*	1,477
-2 y	13,372	.	10	10,506	94	22	.	836	*	*	1,900
-1 y	21,405	.	19	16,884	205	37	.	1,466	11	.	2,783
-11	1,860	.	*	1,465	31	*	.	86	4	*	267
-10	1,953	.	*	1,523	26	7	*	116	*	.	276
-9	2,144	.	.	1,684	36	*	.	147	*	.	273
-8	2,210	.	*	1,769	25	9	.	136	.	.	268
-7	2,896	.	7	2,329	22	8	.	169	*	.	360
-6	1,832	.	*	1,198	20	7	.	251	*	.	353
-5	1,628	.	4	741	39	5	.	397	*	*	439
-4	1,998	.	6	827	48	7	*	576	4	.	529
-3	3,385	.	8	1,464	48	7	.	1,073	6	.	779
-2	6,791	.	14	2,858	56	7	.	2,377	12	.	1,467
-1	13,126	.	36	5,411	80	26	*	4,945	26	4	2,596
0	263,525	.	2,386	66,186	1,724	2,905	654	47,260	508	129222	12,680
*	3,678	.	79	701	20	262	40	738	14	1,264	560
*	2,020	.	29	364	18	80	13	369	*	779	366
*	1,680	.	25	292	13	53	8	293	4	644	348
4	1,175	.	20	208	11	47	*	188	*	457	239
5	1,031	.	10	147	6	29	4	172	.	442	221
6	985	.	15	107	5	35	*	165	*	474	180
7	1,034	.	11	110	15	49	*	169	6	488	184
8	1,017	.	10	94	5	43	*	148	5	547	164
9	1,371	.	16	88	5	79	4	156	*	862	159
10	2,208	.	13	71	5	163	*	161	5	1,616	173
11	3,716	.	14	65	*	354	7	143	9	2,937	184
* y	10,738	.	131	617	41	850	29	630	40	7,750	650
* y	2,083	.	74	384	29	32	4	293	7	1,017	243
* y	1,563	.	38	284	33	18	6	189	*	802	191
4 y	1,133	.	34	218	26	13	*	146	*	583	109
5+y	3,842	.	117	995	125	47	25	451	15	1,744	323

Comparison with the total DMreg

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All	Sum									
N	iDVD	iDia	iIns	iIns2	iNPR	iOAD	iOAD2	iPod		

All	498,171	202,688	169,407	154,896	143,715	228,537	373,507	350,807	250,296
from									
Both	413,452	190,086	159,992	150,762	142,840	215,217	355,513	346,503	227,432
DMrg	61,248	12,602	9,415	4,134	875	13,320	17,994	4,304	22,864
RUKS	23,471	0	0	0	0	0	0	0	0
DMr-									
RUKS									
.	84,719	12,602	9,415	4,134	875	13,320	17,994	4,304	22,864
-5+y	20,034	16,762	10,444	6,363	6,031	9,841	17,632	17,215	13,857
-4 y	6,824	5,674	3,539	2,409	2,308	3,459	6,250	6,141	4,819
-3 y	9,195	7,629	4,830	3,388	3,244	4,936	8,387	8,255	6,502
-2 y	13,372	11,038	7,176	5,411	5,175	7,565	11,868	11,686	9,249
-1 y	21,405	17,612	11,884	9,393	9,095	13,170	18,482	18,151	14,724
-11	1,860	1,530	968	662	630	939	1,695	1,668	1,245
-10	1,953	1,588	999	697	669	1,025	1,774	1,741	1,311
-9	2,144	1,750	1,122	753	718	1,137	1,922	1,900	1,435
-8	2,210	1,823	1,170	755	721	1,164	1,987	1,953	1,463
-7	2,896	2,396	1,524	874	849	1,455	2,616	2,579	1,886
-6	1,832	1,280	876	773	742	1,141	1,510	1,479	1,298
-5	1,628	851	645	943	920	1,194	1,129	1,081	1,269
-4	1,998	943	753	1,273	1,246	1,540	1,248	1,188	1,598
-3	3,385	1,659	1,245	2,338	2,280	2,815	1,992	1,910	2,714
-2	6,791	3,223	2,482	4,945	4,851	5,822	3,768	3,604	5,533
-1	13,126	6,100	4,686	10,070	9,909	11,742	7,118	6,759	10,705
0	263,525	100,509	98,180	85,575	80,346	128,085	231,922	226,133	127,459
*	3,678	1,103	881	1,457	1,332	1,945	2,977	2,830	2,026
*	2,020	534	456	696	652	1,029	1,688	1,627	1,145
*	1,680	456	360	612	570	872	1,434	1,383	998
4	1,175	300	254	432	388	589	993	960	677
5	1,031	234	195	372	350	527	891	870	620
6	985	188	166	345	316	493	861	840	571
7	1,034	200	178	410	385	510	884	865	616
8	1,017	156	141	375	353	523	893	874	604
9	1,371	161	154	527	486	654	1,216	1,188	771
10	2,208	191	161	944	885	1,065	1,981	1,947	1,237
11	3,716	248	235	1,687	1,613	1,783	3,323	3,289	2,047
* y	10,738	1,249	1,268	4,324	4,022	4,902	9,524	9,296	5,419
* y	2,083	586	633	544	489	877	1,803	1,707	985
* y	1,563	423	508	397	359	593	1,366	1,284	731
4 y	1,133	334	371	244	219	429	1,010	945	451
5+y	3,842	1,356	1,508	774	687	1,396	3,369	3,155	1,467

Comparison with the total DMreg

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	debut									
	All	.	1994	1995	1996	1997	1998	1999	2000	2001
	N	N	N	N	N	N	N	N	N	N
All	498,171	61,248	72,261	14,551	13,380	12,171	13,066	13,254	13,597	14,202
doDM	23,471	.	7,898	560	182	146	163	205	241	279
1994	69,080	4,523	47,060	4,829	3,110	1,945	1,606	1,222	1,002	766
1995	29,631	1,451	16,556	8,430	665	441	364	304	279	205
1996	12,972	1,593	267	212	8,676	623	356	289	184	165
1997	12,603	1,539	137	113	205	8,356	631	377	255	223
1998	14,276	1,634	84	93	105	190	9,272	788	482	343
1999	14,254	1,714	50	49	69	95	197	9,306	729	462
2000	17,210	1,760	42	40	47	66	90	255	9,599	1,118
2001	14,657	1,411	20	36	43	45	68	95	243	9,746
2002	17,126	2,574	20	28	48	40	58	101	123	314
2003	18,658	2,861	16	23	30	43	42	55	104	133
2004	19,194	2,908	18	20	32	33	40	53	58	101
2005	17,929	2,284	13	17	25	25	28	33	59	60
2006	17,430	2,045	8	14	12	11	15	26	50	51
2007	18,742	2,428	8	17	12	19	22	29	33	39

2000	99	56	32	23	12	*
2001	41	23	19	8	7	*
2002	77	42	27	20	18	*
2003	108	67	41	35	21	6
2004	158	60	59	46	39	8
2005	184	88	64	47	23	16
2006	210	102	49	48	32	8
2007	247	114	92	59	45	17
2008	419	188	110	81	71	36
2009	505	211	139	96	79	19
2010	876	338	199	156	119	40
2011	1,697	566	318	229	185	64
2012	15,125	1,100	302	207	142	49
2013	205	11,839	576	220	144	30
2014	92	172	11,725	352	196	57
2015	81	87	168	13,644	300	52
2016	70	68	69	165	14,505	136

Comparison with the total DMreg

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											debut									
											All	.	1994	1995	1996	1997	1998	1999	2000	2001
All											498,171	61,248	72,261	14,551	13,380	12,171	13,066	13,254	13,597	14,202
N											100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
All											4.71	.	10.93	3.85	1.36	1.20	1.25	1.55	1.77	1.96
.											13.87	7.38	65.13	33.19	23.24	15.98	12.29	9.22	7.37	5.39
1994											5.95	2.37	22.91	57.93	4.97	3.62	2.79	2.29	2.05	1.44
1995											2.60	2.60	0.37	1.46	64.84	5.12	2.72	2.18	1.35	1.16
1996											2.53	2.51	0.19	0.78	1.53	68.65	4.83	2.84	1.88	1.57
1997											2.87	2.67	0.12	0.64	0.78	1.56	70.96	5.95	3.54	2.42
1998											2.86	2.80	0.07	0.34	0.52	0.78	1.51	70.21	5.36	3.25
1999											3.45	2.87	0.06	0.27	0.35	0.54	0.69	1.92	70.60	7.87
2000											2.94	2.30	0.03	0.25	0.32	0.37	0.52	0.72	1.79	68.62
2001											3.44	4.20	0.03	0.19	0.36	0.33	0.44	0.76	0.90	2.21
2002											3.75	4.67	0.02	0.16	0.22	0.35	0.32	0.41	0.76	0.94
2003											3.85	4.75	0.02	0.14	0.24	0.27	0.31	0.40	0.43	0.71
2004											3.60	3.73	0.02	0.12	0.19	0.21	0.21	0.25	0.43	0.42
2005											3.50	3.34	0.01	0.10	0.09	0.09	0.11	0.20	0.37	0.36
2006											3.76	3.96	0.01	0.12	0.09	0.16	0.17	0.22	0.24	0.27
2007											4.20	4.80	0.02	0.10	0.13	0.14	0.10	0.13	0.24	0.24
2008											4.15	4.64	0.01	0.06	0.10	0.14	0.11	0.11	0.18	0.20
2009											4.52	5.35	0.01	0.05	0.16	0.10	0.11	0.15	0.15	0.20
2010											5.13	7.68	0.01	0.09	0.12	0.08	0.14	0.11	0.15	0.20
2011											4.25	5.50	0.01	0.05	0.13	0.05	0.17	0.04	0.10	0.15
2012											3.33	5.01	0.00	0.03	0.05	0.04	0.03	0.12	0.14	0.11
2013											3.24	5.08	0.01	0.04	0.07	0.08	0.06	0.09	0.10	0.10
2014											3.62	5.37	0.01	0.03	0.07	0.04	0.05	0.05	0.07	0.11
2015											3.87	6.43	0.00	0.03	0.05	0.09	0.10	0.08	0.04	0.07
2016																				

(Continued)

Comparison with the total DMreg

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											debut									
											2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
All											14,210	16,188	16,352	16,132	16,535	17,541	18,806	19,441	20,797	23,810
N											100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
All											2.12	2.01	2.41	3.27	3.31	3.44	2.72	2.90	2.71	2.12
.											4.25	3.58	2.51	1.95	1.42	0.95	0.85	0.69	0.45	0.39
1994											1.02	0.93	0.79	0.81	0.49	0.36	0.29	0.26	0.24	0.18
1995																				

1996	1.00	0.64	0.51	0.33	0.33	0.22	0.16	0.15	0.13	0.05
1997	1.25	0.93	0.67	0.48	0.35	0.28	0.21	0.15	0.12	0.10
1998	1.84	1.60	1.08	0.83	0.76	0.46	0.40	0.25	0.17	0.11
1999	2.34	1.83	1.30	1.05	0.78	0.57	0.49	0.41	0.32	0.17
2000	5.39	4.38	3.33	2.67	2.32	1.83	1.36	1.01	0.88	0.74
2001	6.02	3.30	2.31	1.62	1.36	1.02	0.72	0.53	0.41	0.39
2002	68.62	7.43	4.49	3.25	2.29	1.86	1.34	0.92	0.72	0.58
2003	2.02	68.06	7.08	4.32	3.01	2.36	1.75	1.21	1.16	0.83
2004	0.99	1.67	68.14	7.77	4.80	3.26	2.44	1.82	1.41	1.19
2005	0.62	0.77	1.57	66.25	7.40	4.42	3.31	2.49	1.84	1.34
2006	0.40	0.64	0.76	1.51	66.76	7.05	3.72	2.70	1.81	1.44
2007	0.42	0.41	0.68	0.74	1.51	67.57	7.06	3.92	2.58	1.99
2008	0.37	0.37	0.57	0.66	0.69	1.31	69.15	7.95	4.57	3.29
2009	0.22	0.33	0.32	0.42	0.54	0.60	1.16	69.19	7.65	4.09
2010	0.16	0.21	0.24	0.50	0.48	0.56	0.79	1.25	70.06	8.72
2011	0.30	0.21	0.37	0.42	0.44	0.62	0.73	0.81	1.26	70.25
2012	0.14	0.20	0.27	0.25	0.22	0.38	0.45	0.43	0.50	1.00
2013	0.15	0.15	0.15	0.32	0.19	0.21	0.29	0.31	0.29	0.31
2014	0.15	0.12	0.17	0.19	0.16	0.27	0.19	0.25	0.30	0.23
2015	0.13	0.10	0.17	0.17	0.21	0.19	0.23	0.23	0.27	0.30
2016	0.08	0.12	0.10	0.21	0.18	0.21	0.17	0.16	0.15	0.19

(Continued)

Comparison with the total DMreg

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							debut					
							2012	2013	2014	2015	2016	2017
All												
N	20,881	15,695	14,535	16,013	16,600	6,905						
All	100.00	100.00	100.00	100.00	100.00	100.00						
.	2.48	3.01	3.26	3.27	3.73	91.86						
1994	0.40	0.31	0.25	0.16	0.13	0.13						
1995	0.09	0.06	0.03	0.04	0.01	0.01						
1996	0.05	0.06	0.03	0.02	0.02	0.01						
1997	0.07	0.03	0.01	0.04	0.01	0.01						
1998	0.11	0.09	0.08	0.04	0.05	0.01						
1999	0.10	0.10	0.09	0.04	0.03	0.04						
2000	0.47	0.36	0.22	0.14	0.07	0.04						
2001	0.20	0.15	0.13	0.05	0.04	0.03						
2002	0.37	0.27	0.19	0.12	0.11	0.04						
2003	0.52	0.43	0.28	0.22	0.13	0.09						
2004	0.76	0.38	0.41	0.29	0.23	0.12						
2005	0.88	0.56	0.44	0.29	0.14	0.23						
2006	1.01	0.65	0.34	0.30	0.19	0.12						
2007	1.18	0.73	0.63	0.37	0.27	0.25						
2008	2.01	1.20	0.76	0.51	0.43	0.52						
2009	2.42	1.34	0.96	0.60	0.48	0.28						
2010	4.20	2.15	1.37	0.97	0.72	0.58						
2011	8.13	3.61	2.19	1.43	1.11	0.93						
2012	72.43	7.01	2.08	1.29	0.86	0.71						
2013	0.98	75.43	3.96	1.37	0.87	0.43						
2014	0.44	1.10	80.67	2.20	1.18	0.83						
2015	0.39	0.55	1.16	85.21	1.81	0.75						
2016	0.34	0.43	0.47	1.03	87.38	1.97						

Comparison with the total DMreg

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											debut									
											N	All	.	1994	1995	1996	1997	1998	1999	2000
All	498,171	100.00	12.29	14.51	2.92	2.69	2.44	2.62	2.66	2.73										
.	23,471	100.00	.	33.65	2.39	0.78	0.62	0.69	0.87	1.03										

1994	69,080	100.00	6.55	68.12	6.99	4.50	2.82	2.32	1.77	1.45
1995	29,631	100.00	4.90	55.87	28.45	2.24	1.49	1.23	1.03	0.94
1996	12,972	100.00	12.28	2.06	1.63	66.88	4.80	2.74	2.23	1.42
1997	12,603	100.00	12.21	1.09	0.90	1.63	66.30	5.01	2.99	2.02
1998	14,276	100.00	11.45	0.59	0.65	0.74	1.33	64.95	5.52	3.38
1999	14,254	100.00	12.02	0.35	0.34	0.48	0.67	1.38	65.29	5.11
2000	17,210	100.00	10.23	0.24	0.23	0.27	0.38	0.52	1.48	55.78
2001	14,657	100.00	9.63	0.14	0.25	0.29	0.31	0.46	0.65	1.66
2002	17,126	100.00	15.03	0.12	0.16	0.28	0.23	0.34	0.59	0.72
2003	18,658	100.00	15.33	0.09	0.12	0.16	0.23	0.23	0.29	0.56
2004	19,194	100.00	15.15	0.09	0.10	0.17	0.17	0.21	0.28	0.30
2005	17,929	100.00	12.74	0.07	0.09	0.14	0.14	0.16	0.18	0.33
2006	17,430	100.00	11.73	0.05	0.08	0.07	0.06	0.09	0.15	0.29
2007	18,742	100.00	12.95	0.04	0.09	0.06	0.10	0.12	0.15	0.18
2008	20,944	100.00	14.04	0.05	0.07	0.09	0.08	0.06	0.08	0.15
2009	20,653	100.00	13.76	0.04	0.04	0.06	0.08	0.07	0.07	0.12
2010	22,528	100.00	14.53	0.04	0.03	0.09	0.05	0.07	0.09	0.09
2011	25,560	100.00	18.40	0.03	0.05	0.06	0.04	0.07	0.05	0.08
2012	21,149	100.00	15.92	0.04	0.04	0.09	0.03	0.10	0.02	0.06
2013	16,593	100.00	18.48	0.02	0.02	0.04	0.03	0.02	0.10	0.11
2014	16,158	100.00	19.24	0.04	0.04	0.06	0.06	0.05	0.07	0.09
2015	18,052	100.00	18.20	0.04	0.03	0.05	0.03	0.03	0.04	0.05
2016	19,301	100.00	20.39	0.02	0.02	0.04	0.06	0.07	0.05	0.03

(Continued)

Comparison with the total DMreg

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debut										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All	2.85	2.85	3.25	3.28	3.24	3.32	3.52	3.78	3.90	4.17
.	1.19	1.28	1.39	1.68	2.25	2.33	2.57	2.18	2.40	2.40
1994	1.11	0.87	0.84	0.59	0.45	0.34	0.24	0.23	0.20	0.14
1995	0.69	0.49	0.51	0.44	0.44	0.27	0.21	0.19	0.17	0.17
1996	1.27	1.09	0.80	0.64	0.42	0.42	0.29	0.23	0.23	0.21
1997	1.77	1.40	1.20	0.87	0.61	0.46	0.39	0.31	0.23	0.19
1998	2.40	1.83	1.81	1.23	0.94	0.88	0.57	0.53	0.34	0.25
1999	3.24	2.34	2.08	1.49	1.19	0.91	0.70	0.65	0.55	0.46
2000	6.50	4.45	4.12	3.16	2.50	2.23	1.87	1.49	1.14	1.06
2001	66.49	5.83	3.65	2.57	1.78	1.54	1.22	0.93	0.70	0.59
2002	1.83	56.94	7.02	4.29	3.07	2.21	1.90	1.47	1.04	0.87
2003	0.71	1.54	59.05	6.21	3.74	2.66	2.22	1.76	1.26	1.29
2004	0.53	0.73	1.41	58.05	6.53	4.14	2.97	2.39	1.84	1.53
2005	0.33	0.49	0.70	1.43	59.61	6.82	4.33	3.47	2.70	2.13
2006	0.29	0.33	0.60	0.72	1.40	63.33	7.10	4.01	3.01	2.16
2007	0.21	0.32	0.35	0.60	0.63	1.33	63.24	7.09	4.07	2.86
2008	0.16	0.25	0.29	0.45	0.51	0.54	1.09	62.09	7.38	4.54
2009	0.14	0.15	0.26	0.26	0.33	0.43	0.51	1.06	65.13	7.70
2010	0.13	0.10	0.15	0.18	0.36	0.36	0.44	0.66	1.08	64.68
2011	0.11	0.17	0.13	0.24	0.27	0.29	0.43	0.54	0.61	1.03
2012	0.10	0.09	0.16	0.21	0.19	0.17	0.32	0.40	0.40	0.49
2013	0.10	0.13	0.15	0.15	0.31	0.19	0.22	0.33	0.36	0.37
2014	0.09	0.13	0.12	0.17	0.19	0.17	0.29	0.22	0.30	0.39
2015	0.08	0.10	0.09	0.15	0.15	0.19	0.19	0.24	0.24	0.31
2016	0.05	0.06	0.10	0.08	0.18	0.16	0.19	0.17	0.17	0.17

(Continued)

Comparison with the total DMreg

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debut						
2011	2012	2013	2014	2015	2016	2017

All	4.78	4.19	3.15	2.92	3.21	3.33	1.39
.	2.15	2.21	2.02	2.02	2.23	2.64	27.02
1994	0.14	0.12	0.07	0.05	0.04	0.03	0.01
1995	0.14	0.06	0.03	0.01	0.02	0.01	0.00
1996	0.10	0.08	0.08	0.03	0.02	0.03	0.01
1997	0.18	0.12	0.03	0.02	0.05	0.02	0.01
1998	0.18	0.15	0.10	0.08	0.04	0.06	0.01
1999	0.29	0.14	0.11	0.09	0.05	0.04	0.02
2000	1.03	0.58	0.33	0.19	0.13	0.07	0.02
2001	0.63	0.28	0.16	0.13	0.05	0.05	0.01
2002	0.81	0.45	0.25	0.16	0.12	0.11	0.02
2003	1.06	0.58	0.36	0.22	0.19	0.11	0.03
2004	1.47	0.82	0.31	0.31	0.24	0.20	0.04
2005	1.78	1.03	0.49	0.36	0.26	0.13	0.09
2006	1.97	1.20	0.59	0.28	0.28	0.18	0.05
2007	2.53	1.32	0.61	0.49	0.31	0.24	0.09
2008	3.74	2.00	0.90	0.53	0.39	0.34	0.17
2009	4.71	2.45	1.02	0.67	0.46	0.38	0.09
2010	9.22	3.89	1.50	0.88	0.69	0.53	0.18
2011	65.44	6.64	2.21	1.24	0.90	0.72	0.25
2012	1.13	71.52	5.20	1.43	0.98	0.67	0.23
2013	0.44	1.24	71.35	3.47	1.33	0.87	0.18
2014	0.33	0.57	1.06	72.56	2.18	1.21	0.35
2015	0.39	0.45	0.48	0.93	75.58	1.66	0.29
2016	0.23	0.36	0.35	0.36	0.85	75.15	0.70

Comparison with the DMreg based on 2nd drug purchase

21
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		C_KON		
		K	M	
		N	N	N
sex				
Mand		19,987	.	242,037
Kvinde		27,849	191,726	.

Comparison with the DMreg based on 2nd drug purchase

22
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		Type of DM								
		T1				T2				
		sygdom		sygdom		sygdom		-		
		All	TYPE_1	TYPE_2	TYPE_1	TYPE_2	-	TYPE_1	TYPE_2	-
		N	N	N	N	N	N	N	N	N
All		481,599	2,889	20,582	31,931	10,756	2,663	11,628	355,977	45,173
from										
Both		410,292	.	.	31,931	10,756	.	11,628	355,977	.
DMrg		47,836	.	.	.	.	2,663	.	.	45,173
RUKS		23,471	2,889	20,582	.	.	.	.	.	.
DMr-										
RUKS										
.		71,307	2,889	20,582	.	.	2,663	.	.	45,173
-5+y		20,020	.	.	417	436	.	151	19,016	.
-4 y		6,817	.	.	77	133	.	33	6,574	.
-3 y		9,193	.	.	138	242	.	52	8,761	.
-2 y		13,362	.	.	512	382	.	75	12,393	.
-1 y		21,386	.	.	1,154	769	.	185	19,278	.
-11		1,857	.	.	78	35	.	33	1,711	.

-10	1,950	.	.	96	31	.	23	1,800	.
-9	2,144	.	.	103	38	.	37	1,966	.
-8	2,207	.	.	99	24	.	39	2,045	.
-7	2,889	.	.	140	37	.	46	2,666	.
-6	1,830	.	.	176	42	.	77	1,535	.
-5	1,624	.	.	297	51	.	126	1,150	.
-4	1,992	.	.	473	69	.	191	1,259	.
-3	3,377	.	.	1,013	116	.	317	1,931	.
-2	6,777	.	.	2,208	257	.	710	3,602	.
-1	13,090	.	.	4,427	600	.	1,379	6,684	.
0	261,139	.	.	19,850	6,059	.	6,501	228,729	.
*	3,599	.	.	76	103	.	216	3,204	.
*	1,991	.	.	39	60	.	72	1,820	.
*	1,655	.	.	28	56	.	56	1,515	.
4	1,155	.	.	22	45	.	44	1,044	.
5	1,021	.	.	14	44	.	42	921	.
6	970	.	.	16	44	.	26	884	.
7	1,023	.	.	26	42	.	50	905	.
8	1,007	.	.	20	56	.	33	898	.
9	1,355	.	.	18	69	.	75	1,193	.
10	2,195	.	.	36	114	.	127	1,918	.
11	3,702	.	.	54	208	.	246	3,194	.
* y	10,607	.	.	221	460	.	572	9,354	.
* y	2,009	.	.	37	39	.	27	1,906	.
* y	1,525	.	.	19	30	.	15	1,461	.
4 y	1,099	.	.	14	26	.	6	1,053	.
5+y	3,725	.	.	33	39	.	46	3,607	.

Comparison with the DMreg based on 2nd drug purchase

23
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	Type of DM							
	sygdom		sygdom		T2			
	TYPE_1	TYPE_2	TYPE_1	TYPE_2	-	TYPE_1	TYPE_2	-
	N	N	N	N	N	N	N	N
All	2,889	20,582	31,931	10,756	2,663	11,628	355,977	45,173
sex								
Mand	1,428	9,331	18,634	5,877	1,323	6,006	200,761	18,664
Kvinde	1,461	11,251	13,297	4,879	1,340	5,622	155,216	26,509
doDM2								
.	2,889	20,582	.	.	.	.	.	.
1994	.	.	16,985	3,878	279	4,939	38,755	4,244
1995	.	.	943	1,277	81	1,383	22,727	941
1996	.	.	646	506	125	242	10,160	935
1997	.	.	707	432	89	189	9,662	961
1998	.	.	674	434	122	173	11,276	1,026
1999	.	.	602	390	101	228	11,312	1,111
2000	.	.	695	373	99	243	14,027	1,206
2001	.	.	724	345	88	231	11,857	921
2002	.	.	653	326	104	239	13,307	2,095
2003	.	.	620	328	87	260	14,409	2,338
2004	.	.	627	292	123	252	15,099	2,250
2005	.	.	671	230	112	260	14,310	1,660
2006	.	.	671	276	110	276	13,990	1,322
2007	.	.	650	263	119	247	14,987	1,685
2008	.	.	679	247	133	278	16,537	2,093
2009	.	.	681	198	105	277	16,547	1,998
2010	.	.	716	197	102	255	18,015	2,369
2011	.	.	644	172	122	259	19,641	3,767
2012	.	.	625	136	112	238	16,973	2,402
2013	.	.	669	122	113	278	12,697	2,285
2014	.	.	657	120	130	266	11,663	2,367

2015	.	.	705	126	85	272	13,224	2,409
2016	.	.	687	88	122	343	14,635	2,766
2017	.	.	.	.	.	.	167	22
debut	.	.	.	.	2,663	.	.	45,173
1994	2,349	5,549	15,907	3,310	.	5,802	39,162	.
1995	51	509	1,214	931	.	456	11,372	.
1996	8	174	1,025	748	.	225	11,176	.
1997	4	142	742	591	.	203	10,457	.
1998	5	158	699	567	.	191	11,425	.
1999	11	194	650	456	.	218	11,700	.
2000	6	235	678	416	.	255	11,969	.
2001	7	272	702	407	.	229	12,545	.
2002	4	297	701	383	.	247	12,539	.
2003	*	323	634	368	.	265	14,540	.
2004	7	387	646	313	.	249	14,690	.
2005	6	522	662	258	.	261	14,358	.
2006	*	545	710	304	.	282	14,638	.
2007	7	597	700	283	.	261	15,638	.
2008	5	507	683	262	.	288	16,995	.
2009	*	562	726	214	.	279	17,610	.
2010	*	563	735	184	.	261	18,991	.
2011	*	504	679	170	.	254	22,136	.
2012	*	516	642	150	.	248	19,242	.
2013	*	471	706	115	.	286	14,044	.
2014	*	472	669	119	.	266	12,928	.
2015	7	517	729	132	.	274	14,238	.
2016	9	611	692	74	.	320	13,041	.
2017	388	5,955	.	*	.	8	543	.
aged	2,889	20,582	.	.	.	.	.	.
0	.	.	13	4	11	.	.	4
*	.	.	159	*	12	*	*	8
*	.	.	229	4	12	*	.	10
*	.	.	254	*	13	*	.	13
4	.	.	284	11	18	*	.	8
5	.	.	359	5	14	*	*	11
6	.	.	376	10	13	*	*	14
7	.	.	434	13	7	5	*	11
8	.	.	434	19	18	5	*	12
9	.	.	483	18	11	5	4	12
10	.	.	564	20	10	*	*	19
11	.	.	582	19	16	13	8	16
12	.	.	689	24	14	6	19	15
13	.	.	605	41	20	8	8	36
14	.	.	552	54	20	12	26	26
15	.	.	548	56	29	10	33	58
16	.	.	524	38	20	10	66	83
17	.	.	477	46	20	10	107	84
18	.	.	511	49	17	17	140	107
19	.	.	478	63	18	14	149	131
20	.	.	514	51	15	11	154	117
21	.	.	497	54	14	6	159	53
22	.	.	564	78	17	12	171	61
23	.	.	555	75	26	16	218	73
24	.	.	503	89	20	20	264	66
25	.	.	591	92	15	13	308	92
26	.	.	613	102	31	29	395	94
27	.	.	617	99	35	32	447	106
28	.	.	625	101	28	36	554	116
29	.	.	601	106	38	38	661	101
30	.	.	543	103	22	87	783	129
31	.	.	553	84	26	99	842	146
32	.	.	576	95	23	112	1,047	146
33	.	.	548	83	18	136	1,097	162
34	.	.	563	129	14	117	1,313	198
35	.	.	503	115	20	140	1,401	201
36	.	.	541	112	11	145	1,665	191
37	.	.	572	133	21	156	1,977	201
38	.	.	529	137	20	178	2,142	240

39	.	.	506	153	32	166	2,413	255
40	.	.	547	141	33	190	3,369	959
41	.	.	516	163	21	177	3,261	504
42	.	.	488	146	31	176	3,641	465
43	.	.	492	155	26	153	3,858	408
44	.	.	458	155	24	190	4,225	402
45	.	.	464	158	30	168	4,631	405
46	.	.	450	167	32	180	5,183	433
47	.	.	456	196	39	203	5,621	454
48	.	.	473	185	29	198	6,046	441
49	.	.	446	180	28	194	6,565	490
50	.	.	421	183	26	220	7,316	480
51	.	.	391	215	38	215	7,453	535
52	.	.	323	190	49	167	7,862	580
53	.	.	298	177	43	207	8,137	640
54	.	.	321	193	37	194	8,284	589
55	.	.	345	203	36	207	8,699	671
56	.	.	352	207	35	218	8,972	728
57	.	.	304	209	43	230	9,178	768
58	.	.	264	237	46	225	9,620	787
59	.	.	258	194	43	232	9,717	849
60	.	.	252	187	47	219	9,980	901
61	.	.	249	199	45	231	10,290	898
62	.	.	211	220	48	256	10,232	1,020
63	.	.	237	205	46	237	10,137	1,003
64	.	.	182	215	45	227	10,094	1,037
65	.	.	196	220	44	277	10,133	1,159
66	.	.	214	202	40	251	9,803	1,188
67	.	.	178	237	41	273	9,678	1,186
68	.	.	199	216	41	221	9,253	1,206
69	.	.	163	218	40	273	9,045	1,239
70	.	.	181	197	45	239	9,006	1,200
71	.	.	171	221	36	238	8,344	1,153
72	.	.	169	198	36	230	8,191	1,169
73	.	.	166	210	43	240	7,916	1,091
74	.	.	181	205	39	251	7,691	1,143
75	.	.	147	158	41	220	6,958	1,112
76	.	.	129	167	53	214	6,828	1,117
77	.	.	137	144	39	201	6,158	1,045
78	.	.	121	145	50	173	5,915	1,037
79	.	.	125	141	40	186	5,422	1,010
80	.	.	91	140	37	198	5,055	981
81	.	.	85	93	26	154	4,659	920
82	.	.	67	109	43	143	4,167	850
83	.	.	70	78	32	142	3,667	830
84	.	.	66	82	22	136	3,270	737
85	.	.	56	50	36	114	2,844	664
86	.	.	49	46	28	85	2,454	598
87	.	.	23	29	20	72	2,020	555
88	.	.	23	15	19	68	1,669	483
89	.	.	20	24	20	58	1,236	367
90	.	.	9	10	17	40	977	343
91	.	.	10	11	15	41	801	260
92	.	.	7	11	7	33	607	188
93	.	.	*	4	8	20	397	132
94	.	.	4	*	9	14	309	113
95	.	.	*	*	7	9	209	76
96	.	.	*	*	*	6	131	53
97	.	.	*	.	*	6	90	38
98	.	.	.	*	*	4	48	24
99	.	.	.	.	*	*	35	14
100	.	.	.	.	*	*	22	13
101	.	.	.	.	.	.	9	*
102	.	.	.	.	.	*	6	*
103	.	.	.	.	.	.	*	*
104	.	.	.	.	.	.	*	*
ageR	.	.	.	.	2,663	.	.	45,173
-7	.	*	.	.	.	.	.	.
0	.	.	12	*	.	.	.	.

*	5	.	146	*	.	*	*	.
*	6	.	212	4	.	*	.	.
*	*	.	237	*	.	*	.	.
4	4	.	255	8	.	*	.	.
5	5	*	337	*	.	*	.	.
6	9	.	346	10	.	*	.	.
7	16	.	392	10	.	*	*	.
8	6	.	400	13	.	6	*	.
9	10	.	471	19	.	5	*	.
10	18	*	539	17	.	4	.	.
11	21	*	551	16	.	12	5	.
12	20	4	649	31	.	4	10	.
13	14	*	589	40	.	6	10	.
14	15	.	557	45	.	10	20	.
15	12	*	506	47	.	11	29	.
16	9	*	662	44	.	14	54	.
17	13	6	502	51	.	9	104	.
18	5	5	494	54	.	15	128	.
19	11	5	481	60	.	13	147	.
20	9	69	510	48	.	15	159	.
21	10	142	505	68	.	5	171	.
22	10	202	553	79	.	12	168	.
23	10	220	563	67	.	15	213	.
24	6	214	507	73	.	20	274	.
25	8	288	600	93	.	20	317	.
26	10	354	612	91	.	18	419	.
27	11	332	634	89	.	38	464	.
28	13	324	629	103	.	33	571	.
29	12	316	622	103	.	40	683	.
30	13	294	525	86	.	107	836	.
31	15	301	567	99	.	91	852	.
32	14	242	584	82	.	119	1,044	.
33	9	225	550	82	.	130	1,045	.
34	10	211	550	113	.	126	1,316	.
35	18	188	520	125	.	150	1,403	.
36	19	172	545	120	.	139	1,574	.
37	15	152	574	132	.	163	1,884	.
38	20	139	535	132	.	184	2,000	.
39	18	115	527	127	.	162	2,334	.
40	15	63	530	121	.	200	2,562	.
41	21	76	542	150	.	166	2,880	.
42	25	94	501	151	.	155	3,245	.
43	23	89	470	147	.	157	3,524	.
44	43	92	481	156	.	183	3,795	.
45	36	130	464	149	.	158	4,192	.
46	37	110	455	177	.	186	4,708	.
47	23	137	464	178	.	189	5,131	.
48	28	150	474	196	.	193	5,561	.
49	20	173	440	181	.	180	6,090	.
50	23	198	444	205	.	232	6,709	.
51	35	219	383	191	.	196	7,168	.
52	21	215	330	193	.	175	7,565	.
53	20	260	310	173	.	207	7,842	.
54	30	231	314	210	.	193	8,056	.
55	27	253	352	202	.	202	8,503	.
56	32	281	362	195	.	217	8,794	.
57	30	253	300	226	.	227	9,052	.
58	36	270	279	207	.	231	9,373	.
59	35	302	250	209	.	222	9,394	.
60	33	301	261	198	.	223	9,705	.
61	34	321	243	220	.	221	10,322	.
62	43	315	217	214	.	253	10,315	.
63	41	339	234	202	.	244	10,223	.
64	55	393	184	237	.	233	10,319	.
65	57	371	203	200	.	277	10,520	.
66	49	372	225	213	.	240	10,097	.
67	61	393	178	233	.	283	9,960	.
68	58	400	189	204	.	231	9,600	.
69	71	410	170	225	.	262	9,562	.
70	57	462	171	209	.	249	9,409	.

71	73	455	177	234	.	226	8,732	.
72	83	466	170	216	.	245	8,548	.
73	70	439	169	213	.	229	8,468	.
74	68	506	177	198	.	250	8,161	.
75	69	489	145	173	.	223	7,234	.
76	65	485	145	163	.	224	7,255	.
77	72	445	131	173	.	208	6,543	.
78	75	435	127	142	.	183	6,258	.
79	75	483	113	133	.	190	5,805	.
80	79	442	102	141	.	189	5,311	.
81	80	433	86	121	.	164	4,939	.
82	72	459	69	110	.	136	4,374	.
83	87	391	69	88	.	137	3,898	.
84	61	368	68	78	.	134	3,444	.
85	65	318	58	50	.	117	2,874	.
86	40	310	50	44	.	83	2,653	.
87	46	322	20	30	.	83	2,177	.
88	26	227	25	19	.	66	1,774	.
89	25	232	20	24	.	57	1,286	.
90	26	168	10	10	.	49	1,061	.
91	13	143	10	13	.	35	822	.
92	20	115	7	10	.	36	620	.
93	8	82	5	4	.	24	437	.
94	4	50	*	*	.	12	302	.
95	6	36	*	*	.	12	233	.
96	6	21	*	*	.	4	144	.
97	*	16	*	.	.	8	89	.
98	*	15	.	*	.	*	51	.
99	.	12	.	.	.	6	31	.
100	.	8	22	.
101	*	5	9	.
102	*	5	.
103	.	*	*	.
104	*	*	.

Comparison with the DMreg based on 2nd drug purchase

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	Inclusion criterion							
	All	DVD		Dia	Ins	NPR	OAD	Pod
	N	N	N	N	N	N	N	N
All	481,599	23,471	88,907	4,328	8,972	96,033	213,319	46,569
from								
Both	410,292	.	78,788	1,221	8,142	84,519	208,326	29,296
DMrg	47,836	.	10,119	3,107	830	11,514	4,993	17,273
RUKS	23,471	23,471	.	.	.	.	.	.
DMr-								
RUKS								
.	71,307	23,471	10,119	3,107	830	11,514	4,993	17,273
-5+y	20,020	.	14,785	*	38	1,568	60	3,568
-4 y	6,817	.	5,124	4	10	442	15	1,222
-3 y	9,193	.	6,898	22	15	623	21	1,614
-2 y	13,362	.	9,960	102	26	1,152	22	2,100
-1 y	21,386	.	16,080	216	46	1,946	48	3,050
-11	1,857	.	1,410	31	*	109	10	294
-10	1,950	.	1,456	27	8	153	7	299
-9	2,144	.	1,605	36	5	188	*	307
-8	2,207	.	1,696	26	10	174	*	298
-7	2,889	.	2,247	27	8	213	7	387
-6	1,830	.	1,095	22	10	305	6	392
-5	1,624	.	583	40	6	495	14	486
-4	1,992	.	636	49	11	706	13	577
-3	3,377	.	1,048	51	11	1,390	27	850
-2	6,777	.	1,976	59	16	3,109	36	1,581
-1	13,090	.	3,590	86	47	6,480	123	2,764

0	261,139	.	6,900	131	5,159	60,927	182,172	5,850
*	3,599	.	112	12	465	827	1,698	485
*	1,991	.	82	15	145	427	977	345
*	1,655	.	116	10	83	307	816	323
4	1,155	.	103	11	60	215	543	223
5	1,021	.	57	5	44	184	522	209
6	970	.	39	*	43	170	549	166
7	1,023	.	40	13	56	169	575	170
8	1,007	.	33	4	49	155	619	147
9	1,355	.	36	6	86	152	941	134
10	2,195	.	24	4	171	140	1,719	137
11	3,702	.	22	*	376	115	3,064	124
* y	10,607	.	241	33	933	586	8,355	459
* y	2,009	.	169	27	50	301	1,246	216
* y	1,525	.	127	28	36	184	989	161
4 y	1,099	.	94	21	16	129	743	96
5+y	3,725	.	404	98	100	478	2,383	262

Comparison with the DMreg based on 2nd drug purchase

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Inclusion criterion - 2nd dispense

	All	DVD	Dia	I-Ins	I-OAD	NPR	O-Ins	O-OAD	Pod	
	N	N	N	N	N	N	N	N	N	
All	481,599	23,471	159089	6,136	5,824	926	77,893	837	154959	52,464
from										
Both	410,292	.	147369	2,839	5,262	809	66,503	716	151642	35,152
DMrg	47,836	.	11,720	3,297	562	117	11,390	121	3,317	17,312
RUKS	23,471	23,471	.	.	.	.	.	.	.	.
DMr-										
RUKS										
.	71,307	23,471	11,720	3,297	562	117	11,390	121	3,317	17,312
-5+y	20,020	.	15,286	*	34	.	1,367	11	4	3,317
-4 y	6,817	.	5,338	*	9	.	371	*	.	1,094
-3 y	9,193	.	7,155	21	12	*	519	6	*	1,477
-2 y	13,362	.	10,506	94	22	.	836	*	*	1,900
-1 y	21,386	.	16,884	205	37	.	1,466	11	.	2,783
-11	1,857	.	1,465	31	*	.	86	4	*	267
-10	1,950	.	1,523	26	7	*	116	*	.	276
-9	2,144	.	1,684	36	*	.	147	*	.	273
-8	2,207	.	1,769	25	9	.	136	.	.	268
-7	2,889	.	2,329	22	8	.	169	*	.	360
-6	1,830	.	1,198	20	7	.	251	*	.	353
-5	1,624	.	741	39	5	.	397	*	*	439
-4	1,992	.	827	48	7	*	576	4	.	529
-3	3,377	.	1,464	48	7	.	1,073	6	.	779
-2	6,777	.	2,858	56	7	.	2,377	12	.	1,467
-1	13,090	.	5,411	80	26	*	4,945	26	4	2,596
0	261,139	.	66,186	1,724	2,905	654	47,260	508	129222	12,680
*	3,599	.	701	20	262	40	738	14	1,264	560
*	1,991	.	364	18	80	13	369	*	779	366
*	1,655	.	292	13	53	8	293	4	644	348
4	1,155	.	208	11	47	*	188	*	457	239
5	1,021	.	147	6	29	4	172	.	442	221
6	970	.	107	5	35	*	165	*	474	180
7	1,023	.	110	15	49	*	169	6	488	184
8	1,007	.	94	5	43	*	148	5	547	164
9	1,355	.	88	5	79	4	156	*	862	159
10	2,195	.	71	5	163	*	161	5	1,616	173
11	3,702	.	65	*	354	7	143	9	2,937	184
* y	10,607	.	617	41	850	29	630	40	7,750	650
* y	2,009	.	384	29	32	4	293	7	1,017	243
* y	1,525	.	284	33	18	6	189	*	802	191
4 y	1,099	.	218	26	13	*	146	*	583	109
5+y	3,725	.	995	125	47	25	451	15	1,744	323

Comparison with the DMreg based on 2nd drug purchase

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	All		Sum						
	N	iDVD	iDia	iIns	iIns2	iNPR	iOAD	iOAD2	iPod
All	481,599	202,688	169,407	152,339	143,715	228,537	359,492	350,807	250,296
from									
Both	410,292	190,086	159,992	150,590	142,840	215,217	352,525	346,503	227,432
DMrg	47,836	12,602	9,415	1,749	875	13,320	6,967	4,304	22,864
RUKS	23,471	0	0	0	0	0	0	0	0
DMr-									
RUKS									
.	71,307	12,602	9,415	1,749	875	13,320	6,967	4,304	22,864
-5+y	20,020	16,762	10,444	6,363	6,031	9,841	17,618	17,215	13,857
-4 y	6,817	5,674	3,539	2,409	2,308	3,459	6,243	6,141	4,819
-3 y	9,193	7,629	4,830	3,388	3,244	4,936	8,385	8,255	6,502
-2 y	13,362	11,038	7,176	5,411	5,175	7,565	11,858	11,686	9,249
-1 y	21,386	17,612	11,884	9,393	9,095	13,170	18,463	18,151	14,724
-11	1,857	1,530	968	662	630	939	1,692	1,668	1,245
-10	1,950	1,588	999	697	669	1,025	1,771	1,741	1,311
-9	2,144	1,750	1,122	753	718	1,137	1,922	1,900	1,435
-8	2,207	1,823	1,170	755	721	1,164	1,984	1,953	1,463
-7	2,889	2,396	1,524	874	849	1,455	2,609	2,579	1,886
-6	1,830	1,280	876	773	742	1,141	1,508	1,479	1,298
-5	1,624	851	645	943	920	1,194	1,125	1,081	1,269
-4	1,992	943	753	1,273	1,246	1,540	1,242	1,188	1,598
-3	3,377	1,659	1,245	2,338	2,280	2,815	1,984	1,910	2,714
-2	6,777	3,223	2,482	4,943	4,851	5,822	3,756	3,604	5,533
-1	13,090	6,100	4,686	10,069	9,909	11,742	7,083	6,759	10,705
0	261,139	100,509	98,180	85,510	80,346	128,085	229,601	226,133	127,459
*	3,599	1,103	881	1,440	1,332	1,945	2,915	2,830	2,026
*	1,991	534	456	689	652	1,029	1,666	1,627	1,145
*	1,655	456	360	609	570	872	1,412	1,383	998
4	1,155	300	254	428	388	589	977	960	677
5	1,021	234	195	368	350	527	885	870	620
6	970	188	166	344	316	493	847	840	571
7	1,023	200	178	408	385	510	875	865	616
8	1,007	156	141	374	353	523	884	874	604
9	1,355	161	154	521	486	654	1,206	1,188	771
10	2,195	191	161	942	885	1,065	1,970	1,947	1,237
11	3,702	248	235	1,684	1,613	1,783	3,312	3,289	2,047
* y	10,607	1,249	1,268	4,290	4,022	4,902	9,427	9,296	5,419
* y	2,009	586	633	535	489	877	1,738	1,707	985
* y	1,525	423	508	393	359	593	1,332	1,284	731
4 y	1,099	334	371	244	219	429	976	945	451
5+y	3,725	1,356	1,508	767	687	1,396	3,259	3,155	1,467

Comparison with the DMreg based on 2nd drug purchase

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	debut									
	All	.	1994	1995	1996	1997	1998	1999	2000	2001
	N	N	N	N	N	N	N	N	N	N
All	481,599	47,836	72,079	14,533	13,356	12,139	13,045	13,229	13,559	14,162
doDM2										
.	23,471	.	7,898	560	182	146	163	205	241	279
1994	69,080	4,523	47,060	4,829	3,110	1,945	1,606	1,222	1,002	766
1995	27,352	1,022	15,890	7,268	658	438	363	302	277	204
1996	12,614	1,060	635	1,108	7,598	620	355	288	183	164
1997	12,040	1,050	175	194	1,018	7,355	630	377	255	222

1998	13,705	1,148	109	132	186	951	8,295	784	479	342
1999	13,744	1,212	71	96	99	161	949	8,395	727	460
2000	16,643	1,305	51	53	71	111	161	945	8,654	1,112
2001	14,166	1,009	24	48	61	68	94	150	956	8,815
2002	16,724	2,199	28	39	56	53	94	127	180	1,032
2003	18,042	2,425	17	25	48	56	55	96	136	190
2004	18,643	2,373	23	23	40	43	53	65	94	138
2005	17,243	1,772	13	25	36	28	40	52	71	77
2006	16,645	1,432	9	18	22	15	18	29	55	63
2007	17,951	1,804	12	19	16	25	27	41	39	55
2008	19,967	2,226	11	19	25	23	19	23	41	39
2009	19,806	2,103	8	12	20	20	21	17	34	38
2010	21,654	2,471	8	10	24	13	16	25	28	40
2011	24,605	3,889	8	17	16	19	20	19	27	35
2012	20,486	2,514	8	10	24	12	27	9	18	23
2013	16,164	2,398	*	6	10	8	5	19	24	22
2014	15,203	2,497	6	11	13	7	10	15	15	17
2015	16,821	2,494	7	6	11	8	7	9	13	17
2016	18,641	2,888	5	5	12	14	16	15	10	12
2017	189	22	*	.	.	.

(Continued)

Comparison with the DMreg based on 2nd drug purchase

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											debut									
											2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
											N	N	N	N	N	N	N	N	N	N
All	14,171	16,133	16,292	16,067	16,481	17,486	18,740	19,393	20,735	23,744										
doDM2	301	326	394	528	547	604	512	564	564	505										
.	604	579	410	314	235	167	160	135	94	94										
1994	143	149	129	129	81	62	55	51	49	42										
1995	142	103	82	54	54	38	30	30	27	12										
1996	177	150	109	77	58	49	39	29	24	23										
1997	258	259	174	134	126	81	75	48	35	26										
1998	332	294	212	170	129	99	92	79	66	40										
1999	765	707	543	427	384	320	255	197	183	175										
2000	850	535	375	262	224	178	136	102	86	93										
2001	8,855	1,196	733	525	378	326	252	178	148	138										
2002	992	9,966	1,157	695	496	413	327	236	239	196										
2003	191	1,089	10,142	1,248	793	570	458	352	295	284										
2004	115	181	1,010	9,607	1,217	774	621	483	382	318										
2005	87	135	168	1,053	9,919	1,230	699	525	375	345										
2006	67	78	153	188	1,110	10,654	1,322	762	537	474										
2007	60	93	113	151	180	1,175	11,595	1,540	947	783										
2008	39	70	77	90	120	178	1,361	11,996	1,588	970										
2009	26	42	53	97	118	135	230	1,441	13,090	2,071										
2010	47	42	79	92	99	140	179	248	1,483	15,094										
2011	31	42	58	49	55	84	115	126	191	1,602										
2012	25	30	37	59	44	50	84	94	96	167										
2013	28	21	31	42	30	63	42	64	94	112										
2014	17	26	32	31	42	44	55	59	82	102										
2015	19	20	21	44	42	52	46	54	60	78										
2016	.	.	.	*										
2017										

(Continued)

Comparison with the DMreg based on 2nd drug purchase

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debut

	2012	2013	2014	2015	2016	2017
	N	N	N	N	N	N
All	20,800	15,624	14,456	15,897	14,747	6,895
doDM2						
.	518	473	474	524	620	6,343
1994	84	49	37	25	21	9
1995	18	9	4	6	*	*
1996	10	10	4	*	4	.
1997	14	4	*	6	*	*
1998	23	14	11	6	8	*
1999	20	15	11	7	5	*
2000	98	56	32	23	12	*
2001	41	23	19	8	7	*
2002	77	42	26	20	18	4
2003	108	67	41	34	21	6
2004	157	60	59	46	39	8
2005	185	88	63	47	22	16
2006	210	102	49	47	32	8
2007	246	114	90	58	43	17
2008	419	187	110	81	71	36
2009	504	211	138	96	76	19
2010	867	336	199	156	118	40
2011	1,690	566	317	229	186	64
2012	13,698	1,094	299	207	141	49
2013	1,387	10,636	567	219	144	30
2014	176	1,186	10,130	342	195	56
2015	145	170	1,623	11,479	290	52
2016	105	111	149	2,226	12,510	127
2017	.	*	*	*	160	.

Comparison with the DMreg based on 2nd drug purchase

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	debut									
	All	.	1994	1995	1996	1997	1998	1999	2000	2001
All										
N	481,599	47,836	72,079	14,533	13,356	12,139	13,045	13,229	13,559	14,162
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
.	4.87	.	10.96	3.85	1.36	1.20	1.25	1.55	1.78	1.97
1994	14.34	9.46	65.29	33.23	23.29	16.02	12.31	9.24	7.39	5.41
1995	5.68	2.14	22.05	50.01	4.93	3.61	2.78	2.28	2.04	1.44
1996	2.62	2.22	0.88	7.62	56.89	5.11	2.72	2.18	1.35	1.16
1997	2.50	2.19	0.24	1.33	7.62	60.59	4.83	2.85	1.88	1.57
1998	2.85	2.40	0.15	0.91	1.39	7.83	63.59	5.93	3.53	2.41
1999	2.85	2.53	0.10	0.66	0.74	1.33	7.27	63.46	5.36	3.25
2000	3.46	2.73	0.07	0.36	0.53	0.91	1.23	7.14	63.82	7.85
2001	2.94	2.11	0.03	0.33	0.46	0.56	0.72	1.13	7.05	62.24
2002	3.47	4.60	0.04	0.27	0.42	0.44	0.72	0.96	1.33	7.29
2003	3.75	5.07	0.02	0.17	0.36	0.46	0.42	0.73	1.00	1.34
2004	3.87	4.96	0.03	0.16	0.30	0.35	0.41	0.49	0.69	0.97
2005	3.58	3.70	0.02	0.17	0.27	0.23	0.31	0.39	0.52	0.54
2006	3.46	2.99	0.01	0.12	0.16	0.12	0.14	0.22	0.41	0.44
2007	3.73	3.77	0.02	0.13	0.12	0.21	0.21	0.31	0.29	0.39
2008	4.15	4.65	0.02	0.13	0.19	0.19	0.15	0.17	0.30	0.28
2009	4.11	4.40	0.01	0.08	0.15	0.16	0.16	0.13	0.25	0.27
2010	4.50	5.17	0.01	0.07	0.18	0.11	0.12	0.19	0.21	0.28
2011	5.11	8.13	0.01	0.12	0.12	0.16	0.15	0.14	0.20	0.25
2012	4.25	5.26	0.01	0.07	0.18	0.10	0.21	0.07	0.13	0.16
2013	3.36	5.01	0.00	0.04	0.07	0.07	0.04	0.14	0.18	0.16
2014	3.16	5.22	0.01	0.08	0.10	0.06	0.08	0.11	0.11	0.12
2015	3.49	5.21	0.01	0.04	0.08	0.07	0.05	0.07	0.10	0.12
2016	3.87	6.04	0.01	0.03	0.09	0.12	0.12	0.11	0.07	0.08
2017	0.04	0.05	0.01	.	.	.

(Continued)

Comparison with the DMreg based on 2nd drug purchase

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	debut									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
All										
N	14,171	16,133	16,292	16,067	16,481	17,486	18,740	19,393	20,735	23,744
All	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
.	2.12	2.02	2.42	3.29	3.32	3.45	2.73	2.91	2.72	2.13
1994	4.26	3.59	2.52	1.95	1.43	0.96	0.85	0.70	0.45	0.40
1995	1.01	0.92	0.79	0.80	0.49	0.35	0.29	0.26	0.24	0.18
1996	1.00	0.64	0.50	0.34	0.33	0.22	0.16	0.15	0.13	0.05
1997	1.25	0.93	0.67	0.48	0.35	0.28	0.21	0.15	0.12	0.10
1998	1.82	1.61	1.07	0.83	0.76	0.46	0.40	0.25	0.17	0.11
1999	2.34	1.82	1.30	1.06	0.78	0.57	0.49	0.41	0.32	0.17
2000	5.40	4.38	3.33	2.66	2.33	1.83	1.36	1.02	0.88	0.74
2001	6.00	3.32	2.30	1.63	1.36	1.02	0.73	0.53	0.41	0.39
2002	62.49	7.41	4.50	3.27	2.29	1.86	1.34	0.92	0.71	0.58
2003	7.00	61.77	7.10	4.33	3.01	2.36	1.74	1.22	1.15	0.83
2004	1.35	6.75	62.25	7.77	4.81	3.26	2.44	1.82	1.42	1.20
2005	0.81	1.12	6.20	59.79	7.38	4.43	3.31	2.49	1.84	1.34
2006	0.61	0.84	1.03	6.55	60.18	7.03	3.73	2.71	1.81	1.45
2007	0.47	0.48	0.94	1.17	6.74	60.93	7.05	3.93	2.59	2.00
2008	0.42	0.58	0.69	0.94	1.09	6.72	61.87	7.94	4.57	3.30
2009	0.28	0.43	0.47	0.56	0.73	1.02	7.26	61.86	7.66	4.09
2010	0.18	0.26	0.33	0.60	0.72	0.77	1.23	7.43	63.13	8.72
2011	0.33	0.26	0.48	0.57	0.60	0.80	0.96	1.28	7.15	63.57
2012	0.22	0.26	0.36	0.30	0.33	0.48	0.61	0.65	0.92	6.75
2013	0.18	0.19	0.23	0.37	0.27	0.29	0.45	0.48	0.46	0.70
2014	0.20	0.13	0.19	0.26	0.18	0.36	0.22	0.33	0.45	0.47
2015	0.12	0.16	0.20	0.19	0.25	0.25	0.29	0.30	0.40	0.43
2016	0.13	0.12	0.13	0.27	0.25	0.30	0.25	0.28	0.29	0.33
2017	.	.	.	0.01

(Continued)

Comparison with the DMreg based on 2nd drug purchase

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	debut					
	2012	2013	2014	2015	2016	2017
All						
N	20,800	15,624	14,456	15,897	14,747	6,895
All	100.00	100.00	100.00	100.00	100.00	100.00
.	2.49	3.03	3.28	3.30	4.20	91.99
1994	0.40	0.31	0.26	0.16	0.14	0.13
1995	0.09	0.06	0.03	0.04	0.01	0.01
1996	0.05	0.06	0.03	0.02	0.03	.
1997	0.07	0.03	0.01	0.04	0.01	0.01
1998	0.11	0.09	0.08	0.04	0.05	0.01
1999	0.10	0.10	0.08	0.04	0.03	0.04
2000	0.47	0.36	0.22	0.14	0.08	0.04
2001	0.20	0.15	0.13	0.05	0.05	0.03
2002	0.37	0.27	0.18	0.13	0.12	0.06
2003	0.52	0.43	0.28	0.21	0.14	0.09
2004	0.75	0.38	0.41	0.29	0.26	0.12
2005	0.89	0.56	0.44	0.30	0.15	0.23
2006	1.01	0.65	0.34	0.30	0.22	0.12
2007	1.18	0.73	0.62	0.36	0.29	0.25

2008	2.01	1.20	0.76	0.51	0.48	0.52
2009	2.42	1.35	0.95	0.60	0.52	0.28
2010	4.17	2.15	1.38	0.98	0.80	0.58
2011	8.13	3.62	2.19	1.44	1.26	0.93
2012	65.86	7.00	2.07	1.30	0.96	0.71
2013	6.67	68.07	3.92	1.38	0.98	0.44
2014	0.85	7.59	70.07	2.15	1.32	0.81
2015	0.70	1.09	11.23	72.21	1.97	0.75
2016	0.50	0.71	1.03	14.00	84.83	1.84
2017	.	0.01	0.01	0.01	1.08	.

Comparison with the DMreg based on 2nd drug purchase

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											debut									
	N	All	.	1994	1995	1996	1997	1998	1999	2000										
All	481,599	100.00	9.93	14.97	3.02	2.77	2.52	2.71	2.75	2.82										
.	23,471	100.00	.	33.65	2.39	0.78	0.62	0.69	0.87	1.03										
1994	69,080	100.00	6.55	68.12	6.99	4.50	2.82	2.32	1.77	1.45										
1995	27,352	100.00	3.74	58.09	26.57	2.41	1.60	1.33	1.10	1.01										
1996	12,614	100.00	8.40	5.03	8.78	60.23	4.92	2.81	2.28	1.45										
1997	12,040	100.00	8.72	1.45	1.61	8.46	61.09	5.23	3.13	2.12										
1998	13,705	100.00	8.38	0.80	0.96	1.36	6.94	60.53	5.72	3.50										
1999	13,744	100.00	8.82	0.52	0.70	0.72	1.17	6.90	61.08	5.29										
2000	16,643	100.00	7.84	0.31	0.32	0.43	0.67	0.97	5.68	52.00										
2001	14,166	100.00	7.12	0.17	0.34	0.43	0.48	0.66	1.06	6.75										
2002	16,724	100.00	13.15	0.17	0.23	0.33	0.32	0.56	0.76	1.08										
2003	18,042	100.00	13.44	0.09	0.14	0.27	0.31	0.30	0.53	0.75										
2004	18,643	100.00	12.73	0.12	0.12	0.21	0.23	0.28	0.35	0.50										
2005	17,243	100.00	10.28	0.08	0.14	0.21	0.16	0.23	0.30	0.41										
2006	16,645	100.00	8.60	0.05	0.11	0.13	0.09	0.11	0.17	0.33										
2007	17,951	100.00	10.05	0.07	0.11	0.09	0.14	0.15	0.23	0.22										
2008	19,967	100.00	11.15	0.06	0.10	0.13	0.12	0.10	0.12	0.21										
2009	19,806	100.00	10.62	0.04	0.06	0.10	0.10	0.11	0.09	0.17										
2010	21,654	100.00	11.41	0.04	0.05	0.11	0.06	0.07	0.12	0.13										
2011	24,605	100.00	15.81	0.03	0.07	0.07	0.08	0.08	0.08	0.11										
2012	20,486	100.00	12.27	0.04	0.05	0.12	0.06	0.13	0.04	0.09										
2013	16,164	100.00	14.84	0.02	0.04	0.06	0.05	0.03	0.12	0.15										
2014	15,203	100.00	16.42	0.04	0.07	0.09	0.05	0.07	0.10	0.10										
2015	16,821	100.00	14.83	0.04	0.04	0.07	0.05	0.04	0.05	0.08										
2016	18,641	100.00	15.49	0.03	0.03	0.06	0.08	0.09	0.08	0.05										
2017	189	100.00	11.64	0.53	.	.										

(Continued)

Comparison with the DMreg based on 2nd drug purchase

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											debut									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010										
All	2.94	2.94	3.35	3.38	3.34	3.42	3.63	3.89	4.03	4.31										
.	1.19	1.28	1.39	1.68	2.25	2.33	2.57	2.18	2.40	2.40										
1994	1.11	0.87	0.84	0.59	0.45	0.34	0.24	0.23	0.20	0.14										
1995	0.75	0.52	0.54	0.47	0.47	0.30	0.23	0.20	0.19	0.18										
1996	1.30	1.13	0.82	0.65	0.43	0.43	0.30	0.24	0.24	0.21										
1997	1.84	1.47	1.25	0.91	0.64	0.48	0.41	0.32	0.24	0.20										
1998	2.50	1.88	1.89	1.27	0.98	0.92	0.59	0.55	0.35	0.26										
1999	3.35	2.42	2.14	1.54	1.24	0.94	0.72	0.67	0.57	0.48										
2000	6.68	4.60	4.25	3.26	2.57	2.31	1.92	1.53	1.18	1.10										
2001	62.23	6.00	3.78	2.65	1.85	1.58	1.26	0.96	0.72	0.61										
2002	6.17	52.95	7.15	4.38	3.14	2.26	1.95	1.51	1.06	0.88										
2003	1.05	5.50	55.24	6.41	3.85	2.75	2.29	1.81	1.31	1.32										

2004	0.74	1.02	5.84	54.40	6.69	4.25	3.06	2.46	1.89	1.58
2005	0.45	0.67	1.05	5.86	55.72	7.06	4.49	3.60	2.80	2.22
2006	0.38	0.52	0.81	1.01	6.33	59.59	7.39	4.20	3.15	2.25
2007	0.31	0.37	0.43	0.85	1.05	6.18	59.35	7.36	4.24	2.99
2008	0.20	0.30	0.47	0.57	0.76	0.90	5.88	58.07	7.71	4.74
2009	0.19	0.20	0.35	0.39	0.45	0.61	0.90	6.87	60.57	8.02
2010	0.18	0.12	0.19	0.24	0.45	0.54	0.62	1.06	6.65	60.45
2011	0.14	0.19	0.17	0.32	0.37	0.40	0.57	0.73	1.01	6.03
2012	0.11	0.15	0.21	0.28	0.24	0.27	0.41	0.56	0.62	0.93
2013	0.14	0.15	0.19	0.23	0.37	0.27	0.31	0.52	0.58	0.59
2014	0.11	0.18	0.14	0.20	0.28	0.20	0.41	0.28	0.42	0.62
2015	0.10	0.10	0.15	0.19	0.18	0.25	0.26	0.33	0.35	0.49
2016	0.06	0.10	0.11	0.11	0.24	0.23	0.28	0.25	0.29	0.32
2017	0.53

(Continued)

Comparison with the DMreg based on 2nd drug purchase

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	debut						
	2011	2012	2013	2014	2015	2016	2017
All	4.93	4.32	3.24	3.00	3.30	3.06	1.43
.	2.15	2.21	2.02	2.02	2.23	2.64	27.02
1994	0.14	0.12	0.07	0.05	0.04	0.03	0.01
1995	0.15	0.07	0.03	0.01	0.02	0.01	0.00
1996	0.10	0.08	0.08	0.03	0.02	0.03	.
1997	0.19	0.12	0.03	0.02	0.05	0.02	0.01
1998	0.19	0.17	0.10	0.08	0.04	0.06	0.01
1999	0.29	0.15	0.11	0.08	0.05	0.04	0.02
2000	1.05	0.59	0.34	0.19	0.14	0.07	0.02
2001	0.66	0.29	0.16	0.13	0.06	0.05	0.01
2002	0.83	0.46	0.25	0.16	0.12	0.11	0.02
2003	1.09	0.60	0.37	0.23	0.19	0.12	0.03
2004	1.52	0.84	0.32	0.32	0.25	0.21	0.04
2005	1.84	1.07	0.51	0.37	0.27	0.13	0.09
2006	2.07	1.26	0.61	0.29	0.28	0.19	0.05
2007	2.64	1.37	0.64	0.50	0.32	0.24	0.09
2008	3.92	2.10	0.94	0.55	0.41	0.36	0.18
2009	4.90	2.54	1.07	0.70	0.48	0.38	0.10
2010	9.56	4.00	1.55	0.92	0.72	0.54	0.18
2011	61.35	6.87	2.30	1.29	0.93	0.76	0.26
2012	7.82	66.87	5.34	1.46	1.01	0.69	0.24
2013	1.03	8.58	65.80	3.51	1.35	0.89	0.19
2014	0.74	1.16	7.80	66.63	2.25	1.28	0.37
2015	0.61	0.86	1.01	9.65	68.24	1.72	0.31
2016	0.42	0.56	0.60	0.80	11.94	67.11	0.68
2017	.	.	0.53	1.06	1.06	84.66	.