Changes in Diabetes prevalence: Decreasing mortality or Increasing incidence?

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DM patients in Denmark, 2010

Prevalence of DM in Denmark.
Where do the changes come from?

The period 1995–2010 for men resp. women:

- Increasing diabetes incidence:
  - 3.8%, 3.9% per year
- Decreasing mortality:
  - non-DM: 2.5%, 1.8% per year
  - DM-ptt: 3.8%, 3.4% per year
- Aim:
  - How much can each factor explain?
- Look at age-specific prevalences, not the numbers of DM-patients.

DM prevalence prediction

If we know
- prevalence of DM in 1995
- the rates in the period 1995-2010
—then we can predict prevalence in 2010

Age-specific prevalences 1995–2010:
Updating age-specific prevalences:

» Use prevalences at 1.1.1995 as starting point
» Use incidence and mortality rates for 1995 to predict age-specific prevalences at 1.1.1996
» Use these prevalences and incidence and mortality rates for 1996 to predict age-specific prevalences at 1.1.1997
» ... etc.

Each step has as input (year $y$):

» Prevalences at 1 Jan
» Mortality rates for the year
» Incidence rates for the year

Outputs age-specific prevalences 1 Jan year $y + 1$

Actual updating interval used: 1/10 year

Incidence and mortality rates

The mortality and incidence rates depend on:

Sex
Age
Date of observation (Period)
Date—Age = Date of birth (Cohort)

Estimated as Age-Period-Cohort models, separately for men and women.

Broken: APC-model
DM prevalence components

- Four scenarios:
  - Rates develop as observed
  - Mortality rates fixed at 1995 level
  - Incidence rates fixed at 1995 level
  - Both mortality and incidence rates fixed at 1995 level

- Differences between these can be transformed to 4 components of prevalence:

  **Mort**: DM-ptt. alive because of declining mortality
  **Inc**: DM-ptt. because of increasing incidence
  **Const**: DM-ptt. attributable to non-equilibrium in 1995
  **Org**: DM-ptt. corresponding to 1995 age-specific prevalences

Attributable parts of prevalence:
Full: Mortality; Broken: Incidence.
Age-specific prevalences, 2010:

How many patients?

Recover the **number** of patients in each group by multiplying by the corresponding population size. This is now done for each year 1996–2010

2010: Mort 9,850 33,365 39,304 58,487 141,007 134,079 53,655 37,189 33,825 9,410
    Inc 7.0 23.7 27.9 41.5 40.0 27.7 25.2 7.0

Thanks for your attention!