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Lifetime risk and years lost to type 1 and type 2 diabetes in Denmark, 1996–2016

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ABSTRACT

Introduction Lifetime risk and lifetime lost to diabetes are measures of current diabetes burden in a population. We aimed at quantifying these measures in the Danish population.

Research design and methods We modeled incidence and mortality of type 1 diabetes (T1D) and type 2 diabetes (T2D) and non-diabetes mortality based on complete follow-up of the entire population of Denmark in 1996–2016. A multistate model with these transition rates was used to assess the lifetime risk of diabetes, as well as the difference in expected lifetime between persons with type 1 and T2D and persons without.

Results In 2016, the lifetime risk of T1D was 1.1% and that for T2D 24%, the latter a 50% increase from 1996. For 50-year-old persons, the lifetime lost was 6.6 years for T1D and 4.8 years for T2D. These figures have been declining over the study period.

At 2016, the total foreseeable lives lost in Denmark among patients with T1D were 182 000 years, and those among patients with T2D were 766 000 years, corresponding to 6.6 and 3.0 years per person, respectively.

Conclusion At the individual level, improvements in the disease burden for both T1D and T2D have occurred. At the population level, the increasing number of patients with T2D has contributed to a large increase in the total loss of lifetime.

Significance of this study

What is already known about this subject?

- Studies from the Western world have shown that the years of life lost to diabetes in mid-life (around 50 years) is between 5 and 10 years, with large difference between countries.
- Studies have focused on either type 1 diabetes (T1D) or type 2 diabetes (T2D) or have not distinguished between types of diabetes.

What are the new findings?

- In similar ages, the years of life lost to T1D are about twice as high as for T1D; for 50-year-old persons the lifetime lost was 6.6 years for T1D and 4.8 years for T2D. This has been decreasing over the last decades.
- The lifetime risk of T1D is currently 1.1%, and that for for T2D is 24%. At 2016, the total foreseeable life lost in Denmark among patients with T1D was 182 000 years, and that among patients with T2D was 766 000 years.

How might these results change the focus of research or clinical practice?

- There is a clear indication that the *individual* outlook for a person with diabetes is improving, whereas the *population* burden is increasing, indicating the prevention is an important focus area.

INTRODUCTION

Relatively few studies have looked at lifetime lost to diabetes,[1–5] and even fewer have provided figures of the lifetime risk of diabetes.[1 2 6 7] The lifetime lost or years of life lost to a disease have been given many interpretations in the literature (for an overview, see Andersen[8]). In this study, we used the standard definition from demography, namely, as the difference in expected lifetime between persons with and without diabetes at a given age. We base our calculations of lifetime risk and of lifetime lost to diabetes on a proper multistate model, taking both type 1 diabetes (T1D) and type 2 diabetes (T2D) into account.

RESEARCH DESIGN AND MATERIAL

Data

We used a newly established Danish Diabetes Register[9 10] linked to the total population of Denmark, including the causes of death register. Detailed information on diabetes incidence, prevalence, mortality, and current and predicted future numbers with diabetes is given in previous publications.[9 10] We constructed tables of person-years, incident cases of T1D, T2D and deaths by cause for the entire Danish population subdivided by current diabetes status (no diabetes, T1D and T2D). The causes of death used were cardiovascular disease (International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10): I00–I999), cancer (ICD-10: C00–D099, so carcinoma in situ are included, benign and unspecified tumors *ex*cluded), respiratory (ICD-10: J00–J999) and other causes. These tables were classified by sex, age and date of follow-up and

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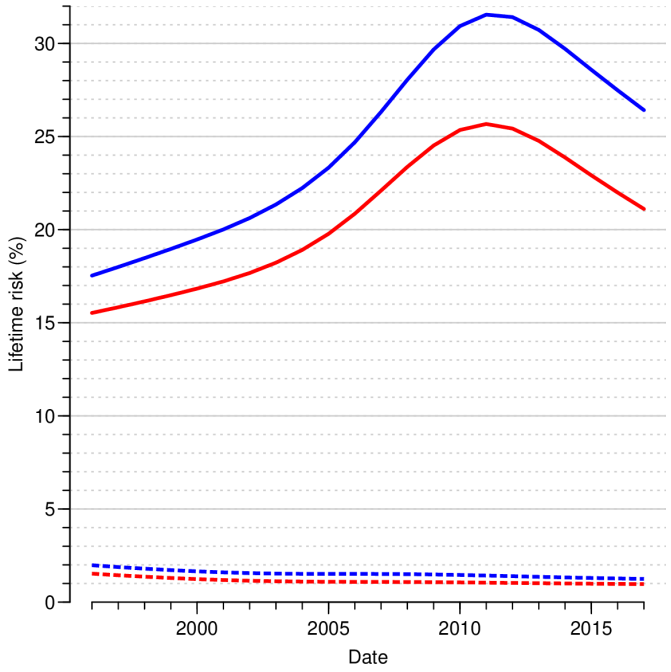

Figure 1 Lifetime risk of T1D and T2D by sex and date of reference. The calculations are based on annual estimated cross-sectional incidence and mortality rates from age–period–cohort models for incidence and mortality. Blue curves are men, red curves women; dotted lines T1D, full lines T2D. T1D, type 1 diabetes; T2D, type 2 diabetes.

date of birth in 1-year intervals, so called Lexis triangles[11]; further details are given in the electronic online supplemental material 1 (ESM), including a detailed overview of causes of death (online supplemental table 2)

Statistical methods

We fitted models for incidence rates of T1D and T2D, and cause-specific mortality rates for persons without diabetes and with T1D and T2D separately. All models were age–period–cohort (APC) models with smooth effects of current age, date of follow-up (period) and date of birth (cohort), providing estimated age-specific rates at each January 1, 1996–2017. Analyses were done separately for men and women—for further details, see the ESM.

Estimated rates were used in a multistate model with states 'no diabetes', 'T1D', 'T2D' and the four causes of death.

Measures

The lifetime risk of diabetes is the probability of getting diabetes before death. The expected lifetime (at birth) is the area under the survival curve, so the lifetime lost to diabetes is the difference in the area *between* the survival curves for a person with and a person without diabetes. If we condition on being alive at a given age, we used the *conditional* survival curves for that age. We subdivided the years of life lost by cause of death.[8]

We used the age-specific rates at each January 1 to compute the lifetime risk of T1D and T2D and the years of life lost to different causes of death. We also computed the *population* burden as the future years of life lost, both among prevalent cases of diabetes at a given date and among persons diagnosed with diabetes during a given year. A detailed account of methods used for computation of these measures is in the ESM.

RESULTS

In the study period 1996–2016 inclusive, there were 19 712 T1D diagnoses and 343 952 T2D diagnoses, while there was 12 762 deaths among patients with T1D, 149 000 among patients with T2D and 988 569 among persons without diabetes (online supplemental table 1). The dominant single cause of death was CVD except for T1D, where the dominant cause of death was other causes.

Lifetime risk of diabetes

The lifetime risk of T1D declined from 2.0% to 1.2% for men and from 1.5% to 1.0% for women over the study period, while lifetime risk for T2D showed a peak around 2011 of more than 30% for men and 25% for women (driven by the very high recorded incidences that year[9]). The lifetime risk of T2D was 26% for men and 21% for women on January 1, 2017, corresponding to increases of 51% and 36% since 1996 (figure 1 and table 1).

EXPECTED LIFETIME

In the study period, the expected lifetime (at birth) without diabetes increased from 70.2 to 74.4 for men and from 75.5 to 78.8 years for women. At the population level, the expected lifetime spent (sojourn time) with T1D was 0.6 years for men and 0.5 years for women, unchanged over the study period, while the expected lifetime with T2D increased from 2.0 to 4.6 years, similar for men and women (table 1). Thus, of the increase in expected lifetime in the period, more than half was expected to be years with T2D (table 1).

Years of life lost to diabetes

At the beginning of 2017, the lifetime lost to T1D was 8.3 years at age 20 years and about 5.6 years at age 60 years (online supplemental table 5). Lifetime lost to T2D at age 60 years was 3.8 years (online supplemental table 6), so T1D carries about 30% higher lifetime loss compared with T2D (figure 2 and online supplemental tables 5 and 6), reflecting the earlier diagnosis and hence longer duration of diabetes at a given age for T1D as compared with T2D. We also found that the years lost to diabetes have been diminishing over the study period, at age 50 years from about 9 to 7 years for T1D and from 8 to 5 years for T2D.

Future years of life lost

The future years of life lost among *patients with prevalent diabetes*—the currently accumulated future population burden in Denmark—was 947 600 years on January 1, 2017 (online supplemental table 3), 19% of which were among persons with T1D, despite only 10% of Danish

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Table 1 Lifetime risk, expected lifetime spent with diabetes and lifetime lost by type of diabetes, sex and date (January 1 each year)

	Lifetime risk (%)		Expected lifetime (years) spent with			Lifetime lost (years) to							
						T1D, at ages				T2D, at ages			
Date	T1D	T2D	No DM	T1D	T2D	25	40	50	60	40	50	60	75
Men													
1996	2.0	17.5	70.2	0.6	2.1	9.6	8.3	6.6	4.7	9.5	7.7	5.7	2.9
1999	1.7	19.0	70.9	0.5	2.4	11.4	10.0	8.2	6.1	8.7	7.1	5.2	2.7
2002	1.6	20.6	71.5	0.5	2.8	12.7	11.1	9.3	6.9	8.1	6.5	4.9	2.4
2005	1.5	23.3	71.8	0.5	3.4	13.2	11.6	9.7	7.3	7.3	5.9	4.4	2.2
2008	1.5	28.1	71.4	0.5	4.4	13.6	12.0	10.1	7.8	6.4	5.1	3.9	2.0
2011	1.4	31.5	71.4	0.6	5.2	12.4	11.0	9.4	7.5	5.7	4.6	3.5	1.9
2014	1.3	29.7	72.7	0.6	5.1	10.2	9.1	7.9	6.4	5.6	4.6	3.6	2.0
2017	1.2	26.4	74.4	0.6	4.6	8.1	7.3	6.3	5.2	5.7	4.7	3.7	2.1
Women													
1996	1.5	15.5	75.5	0.5	2.0	10.9	9.7	8.3	6.4	9.5	8.1	6.3	3.5
1999	1.3	16.5	75.9	0.4	2.3	11.5	10.3	9.1	7.1	8.6	7.3	5.7	3.2
2002	1.1	17.7	76.3	0.4	2.6	11.9	10.8	9.5	7.7	7.8	6.6	5.1	2.9
2005	1.1	19.8	76.5	0.4	3.2	12.4	11.2	9.9	8.1	7.0	5.9	4.6	2.5
2008	1.1	23.4	76.2	0.4	4.0	12.6	11.4	10.2	8.4	6.2	5.2	4.0	2.1
2011	1.0	25.7	76.3	0.5	4.7	11.4	10.4	9.4	7.9	5.7	4.8	3.7	2.0
2014	1.0	23.9	77.4	0.5	4.5	9.8	9.0	8.1	6.9	5.6	4.8	3.7	2.0
2017	1.0	21.1	78.8	0.5	4.1	8.2	7.6	6.9	6.0	5.7	4.9	3.8	2.1

Note the different ages at calculation of life lost for T1D and T2D, accommodating the different age distributions of T1D and T2D.
DM, diabetes mellitus; T1D, type 1 diabetes; T2D, type 2 diabetes.

patients with diabetes are T1D.[9] The average future lifetime lost was 6.6 years for T1D and 3.0 years for T2D, partly attributable to different age distributions.

The *extra* future lifetime lost among *newly diagnosed patients with diabetes* in a single year was around 70 000 years during 2016, some 10% of these from T1D, even if only 5% of newly diagnosed cases are T1D (online supplemental table 3). The average lifetime lost for persons diagnosed in 2016 were 8.2 years for T1D and 3.6 years for T2D (online supplemental figure 2).

For both of these measures, we found an increase at the population level over time, but at the *individual* level, we found that the *average* lifetime lost among patients was decreasing over the study period, over the last 10 years, some 35% for T1D, but less than 10% for T2D (online supplemental tables 3 and 4).

Years of life lost by cause of death

We found that the major contributor to years of life lost in T1D (online supplemental table 5 and online supplemental figures 4–7) was other causes of death (4.1 years at age 50) and only second was CVD (2 years at age 50), whereas respiratory causes contribute slightly less than 1 year throughout the age range. Cancer contributes almost nothing in women with T1D and a negative 1 year among men with T1D. In T2D (online supplemental table 6 and online supplemental figures 4–7), other causes and CVD contribute similar amounts of life lost—about 1.5 years each at age 50, and respiratory causes less than 0.5 years.

DISCUSSION

Our study is the first to simultaneously evaluate the lifetime risk as well as the lifetime lost to T1D and T2D in an entire population using a proper multistate methodology. We evaluated both the individual and the population levels of years of life lost to diabetes.

We found the lifetime risk of T1D to be just over 1% and that of T2D to be about 25%—both of these figures properly account for the competing type of diabetes as well as death, and the lifetime risk of any type of diabetes is therefore 26%.

Whichever way the lifetime lost to diabetes is illustrated, there has been a very clear improvement over the last two decades at the individual patient level, but the overall population burden, particularly for T2D, has been massively increasing.

Life years lost to T1D are some 30% higher than those lost to T2D at any given age. That may be due to longer exposure to risk factors for acute and chronic microvascular and macrovascular complications to diabetes with earlier onset. Furthermore, the aggressive approach to manage cardiometabolic risk factors in T2D is less well

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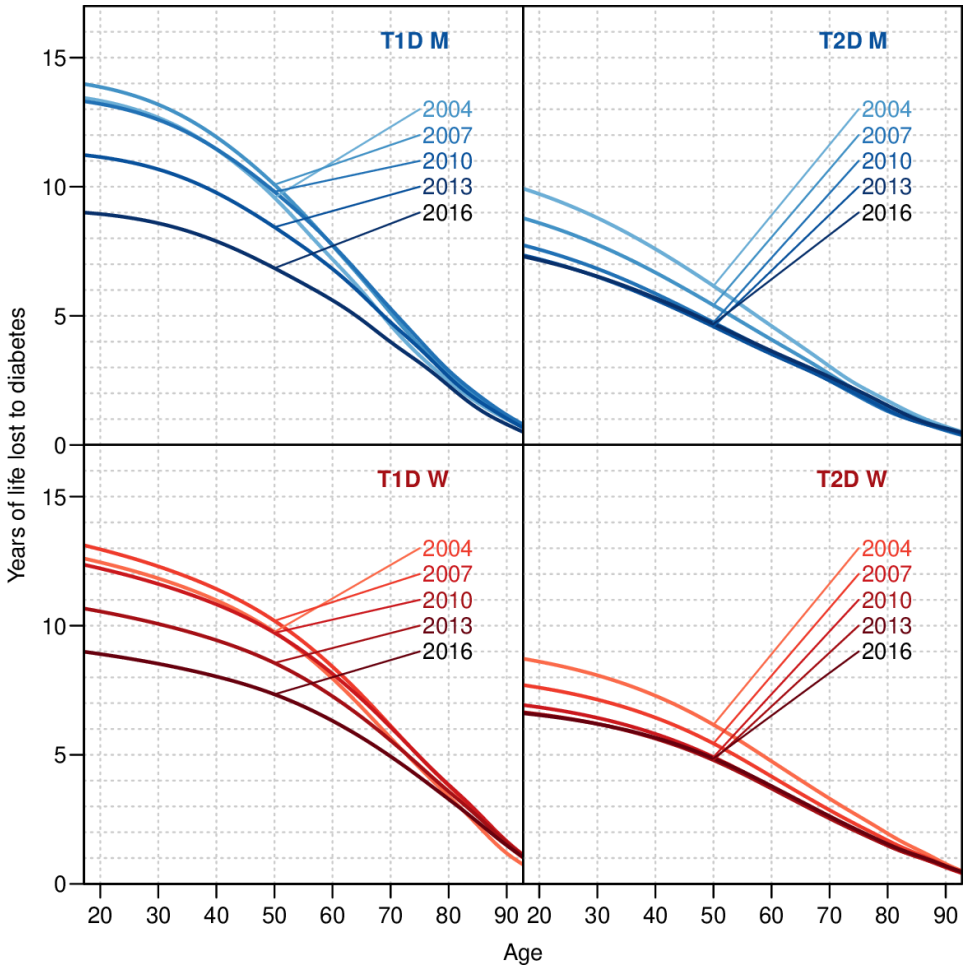

Figure 2 Years of life lost to T1D and T2D in January 1, 2004, 2007, …, 2016, by sex. The calculations are based on annual estimated cross-sectional incidence and mortality rates from age–period–cohort models for incidence and mortality. M, men; T1D, type 1 diabetes; T2D, type 2 diabetes; W, women.

documented in T1D, and quality registers have proven less favorable blood pressure and lipid levels in T1D compared with T2D, as well as some renal-protective and cardioprotective undertreatment.[12]

A number of studies modeling life years lost to diabetes[4 5 13–16] are old or have used suboptimal methods for calculations or very crude model assumptions, and are therefore not directly comparable to ours. The studies by Narayan *et al*[1] and Gregg *et al*[2] use similar methodology as we do, comparing the mortality among persons with and without diabetes at a given survey date (ignoring subsequent diabetes development—not explicitly mentioned in any of the papers), which gives a more valid picture of the lifetime lost to diabetes. The most recent study by Gregg *et al* arrived at years of life lost to diabetes at age 40 years for white men of 5.8 and 6.8 years for white women in the period 2000–2011, where we found 7.3 and 7.0 years in 2005. The validity of this study, however, is limited by the fact that the diagnosis of diabetes is derived from a telephone survey.

Livingstone *et al*[3] provided estimates of lifetime lost to T1D in Scotland for the period 2008–2010 of 9.2 years for men and 10.8 years for women aged 40 years. Huo *et al*[17] estimated the lifetime lost to T1D in Australia for the period 1997–2010 to 10.0 years for men and 11.2 years for women aged 40 years. For 2008, we found 6.4 years for men and 6.2 years for women at age 40 years somewhat smaller than the Scottish and Australian studies.

Strengths and weaknesses

A major strength of our study is the total population coverage, which eliminates sampling biases, and the use of a multistate model to compute realistic survival curves for persons without diabetes, taking the future possibility of both T1D and T2D into account. Moreover, we used 1-month updating intervals in model updating, minimizing the approximation bias, and we took calendar time and cohort trends in rates into account, enabling us to derive these measures for successive years, and thus realistically account for trends.

One study weakness is potential misclassification of insulin treated T2D as T1D in the early years of the diabetes register (before 2005). Thus, years of life lost to T1D may be underestimated before 2005 due to contamination with patients with T2D.

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SUMMARY

Our study shows that there has been a decrease in lifetime risk of T1D to slightly over 1% and an increase in T2D risk to 25%.

Further, we demonstrated a decline in the individual burden of T2D over the last two decades, but also clearly demonstrated that the population burden is increasing, indicating that preventive measures have not had the desired effect yet, and in particular, that the burden of T1D still is quite high, despite decreasing lifetime risk.

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Contributors BC and MEJ conceived the structure of the underlying register. PFR provided support for obtaining data access and contributed to data definition. BC detailed and developed the study and the statistical methods needed, performed all data analysis, and wrote the first draft of the manuscript. MEJ and PFR contributed substantially to the writing of the manuscript. All authors contributed to critical revision and take responsibility for the content. BC is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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Competing interests BC and MEJ own shares in NovoNordisk. BC has received lecture and consultancy fees from NovoNordisk and LeoPharma. MEJ is principal investigator on a trial sponsored by AstraZeneca and received research grants from AMGEN AB, AstraZeneca, Sanofi Aventis and Boehringer Ingelheim. PFR has nothing to disclose.

Patient consent for publication Not required.

Ethics approval This study was approved by the Danish Data Protection Agency (registration number 2015-41-4148). Ethical approval is not required for register-based studies in Denmark.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are not publicly available. The data for this study are population-wide registers, placed at our disposal on the servers of Statistics Denmark. They are barred from release to the public on grounds of confidentiality. A full documentation of the register is given in the electronic supplemental material.

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Electronic Supplementary Material

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1 Calculation of life expectancy and lifetime lost

This is a detailed, albeit quite short description of theory and methods underlying the calculation of the life expectancy and life lost. A complete account of the statistical analysis and all code used is available in
http://bendixcarstensen.com/DMreg/Ana2016.pdf, pp. 235 ff.

1.1 Life expectancy: definition and tradition

The life expectancy as reported by most statistics bureaus is the area under the survival curve constructed from cross-sectional age-specific mortality rates[1]. It represents the expected lifetime of a person at birth under the assumption that the age-specific mortality rates are as the cross-sectional population mortality rates during the person's life. This measure may also be reported for persons that have attained a certain age, a; the expected *residual* life time at age a. This will typically appear as a column in life tables, see *e.g.* https://dst.dk/Site/Dst/Udgivelser/GetPubFile.aspx?id=29442&sid=befudv2017, table 4.7, p. 45. The expected residual life time at age a is derived as the area under the *conditional* survival curve given survival till age a.

1.2 Lifetime lost

Lifetime lost to a disease comes in many guises, see for example [2], but here we shall use the standard definition as the difference between the expected residual lifetimes of a diseased person and a person of the same age without the disease. This is the area between the survival curves for persons with and without the disease ('years of life lost', YLL), formally:

$$\mathrm{YLL}(a) = \int_a^\infty S_{\mathrm{pop}}(u|a) - S_{\mathrm{dis}}(u|a)\,\mathrm{d}u$$

where $S(u|a)$ is the probability of surviving till age u, given attained age a. In simple cases with only one time scale and only transition from alive to dead, $S(u|a) = S(u)/S(a)$, but in more realistic situations this is not the case.

Andersen [1] also introduced the "τ-restricted" life expectancy and the corresponding lifetime lost by considering only a time span of τ after the age we refer to; formally we compare the area between the *conditional* survival curves in the interval $[a, a+\tau]$:

$$\mathrm{YLL}_\tau(a) = \int_a^{a+\tau} S_{\mathrm{pop}}(u|a) - S_{\mathrm{dis}}(u|)\,\mathrm{d}u$$

Thus, the prerequisite for calculation of life lost to a disease is the availability of survival curves for diseased and non-diseased persons. Or more specifically, *conditional* survival curves given survival to a given (set of) age(s), $S_{\mathrm{pop}}(u|a)$. Such survival curves can be derived from the age-specific mortality rates; in some cases disease incidence rates are needed too — see below.

We may compare population survival with either patients alive at a given age (prevalent cases) or patients diagnosed at a given age (incident cases). If we assume that mortality

[1] A short mathematical derivation of this can be found in https://bendixcarstensen.com/AdvCoh/relations.pdf.

rates depend on disease duration these two will be different. In our data we only have observed diabetes duration up to 20 years, and the calculations would need duration effects till at least 50 years, so we do not have the data basis for calculating life lost at a given age at diagnosis.

1.3 Constructing survival curves

The survival curve for persons with diabetes (or newly diagnosed with diabetes) at a given age is a simple transformation of the age-specific mortalities, μ_{DM} (with or without duration included):

$$S_{\text{DM}}(t|a) = \exp\left(-\int_a^t \mu_{\text{DM}}(u)\,\mathrm{d}u\right)$$

On the other hand, a comparison survival curve for persons without disease can be computed in three different ways:

1. use mortality rates among non-diseased persons (μ_{noDM}), transform these to a survival curve by $S_a(t|a) = \exp(-\int_a^t \mu_{\text{noDM}}(u)\,\mathrm{d}u)$, and compute the integral under this curve. This will *over*-estimate the survival among persons without diabetes and hence the expected lifetime among persons without disease, because it ignores the possibility that a non-diseased person later falls ill from diabetes and thus moves to a state with higher mortality.

2. use a multistate model with *both* incidence rates of disease and mortality rates of persons with and without disease to compute a survival function for a person that is non-diseased at a given age. The survival function is computed as the probability of being alive (diseased or non-diseased) at any given age. This is the correct way of computing the expected residual life time among persons without disease at a given time, because it refers to a real-world scenario of persons alive at a given age, with no assumptions about their future life-course.

3. use mortality rates for the *entire* population. This will (slightly) *under*-estimate the survival, because the mortality rates also include persons who already has the disease at age a. If the the disease is not too prevalent or does not carry too high excess mortality this approach may be a reasonable alternative to the correct.

In our calculations we used a more elaborate version of option 2 above, using a multistate model with separate incidence rates of type 1 diabetes and type 2 diabetes, as indicated in figure 1 using different rates for causes of death.

1.4 Models for rates

We tabulated transitions (D, occurrences of type 1 diabetes, type 2 diabetes and death) and person years (Y) by current age, date of follow up (period) and date of birth (cohort) in 1-year classes (Lexis triangles). These were further classified by the current status of persons (noDM, T1D and T2D), as illustrated in figure ESM 1 and table ESM 1.

Thus for each of the left hand boxes in figure ESM 1 we have person-time Y classified by sex, age, period and cohort. Similarly, each instance of the 14 transitions (D) illustrated by the arrows in figure ESM 1 were classified by sex, age, period and cohort and the type of transition (from, to).

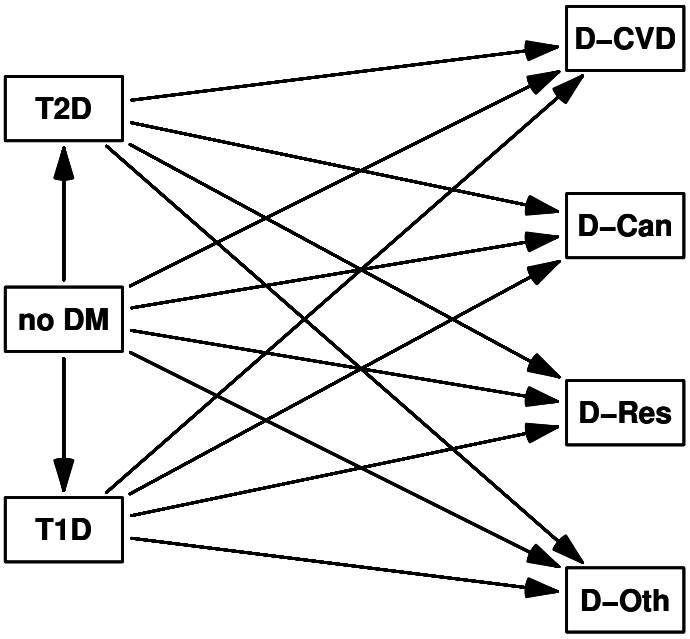

Figure ESM 1: *Multistate model used to compute the survival probabilities of persons in each of the states "no DM", "T1D" and "T2D". The right hand states refer to death from cardiovascular disease ("D-CVD"), cancer ("D-Can"), respiratory causes ("D-Res") and other causes ("D-Oth"). For persons in "T1D" and "T2D" the survival is just the probability of remaining in the state. For persons in state "no DM" at a given age the survival is the probability of being in either of the states "no DM", "T1D" and "T2D".*

For the tabulated data we fitted age-period-cohort models for all transition rates illustrated in figure ESM 1, using a Poisson likelihood for D with log person years ($\log(Y)$) as offset.

All analyses were made separately for men and women. We used natural splines (restricted cubic splines) for the effects of current age, current date (period) and date of birth (cohort).

1.5 Model based survival curves

From the parametric models for each of the 14 transitions (age-period-cohort models with smooth effects) for each sex, and from these derived the estimated cross-sectional age-specific rates at 1996-01-01, 1997-01-01,. . . , 2017-01-01, in ages 0–1200 months. Thus, in line with the normal demographic practice we used cross-sectional rates to compute measures relating to lifetime experience.

The cross-sectional rates were used to construct 1-month transition probabilities between the states, one per transition illustrated in figure 1. We used three different initial state occupancy vectors; one with probability 1 in state "no DM" (and hence 0 in the two other

states), one with probability 1 in state "T1D" and one with probability 1 in state "T2D". These were then successively multiplied by the transition probability matrices for each age, yielding the state probabilities at all ages.

The sum of the probabilities of being in any of the alive states ("noDM", "T1D", "T2D") at a given time were taken as the survival function for persons starting in each of the three transient states ("no DM", "T1D" and "T2D"). This calculation was repeated for persons starting at ages 0, 1, 2 etc. so we have survival functions conditional on being in any of the three states at these ages. The value of these survival functions were computed at 1 month age intervals till age 100 years (1200 months).

The expected lifetimes age were computed as the integral of these survival functions by adding the values of the survival function at different ages multiplied by the interval length (1 month).

The years of life lost to diabetes was computed as the difference in life expectancy between persons with diabetes and persons without.

Following Andersen [1] we used the differences in cumulative risks of each cause of death to decompose the total lifetime lost to each of the causes of death to type 1 diabetes, resp. type 2 diabetes.

1.6 Population related measures

The years of life lost to type 1 diabetes resp. type 2 diabetes are in principle unrelated to the Danish population in the sense that the measures applies to any population with incidence and mortality rates as the Danish, regardless of the age-composition of the population and patients.

But we also want to compute the population burden of diabetes in terms of the total number of years lost to diabetes in the Danish population. This can be done in (at least) two different ways:

1. the total future lifetime lost for persons alive with diabetes at a given time (the beginning of a given calendar year, say). This is the total `accumulated` future burden of diabetes among those currently alive with diabetes.

2. the total future lifetime lost among those diagnosed with diabetes during a given period (a calendar year, say). This is the *added* burden among the persons diagnosed during the last year, say.

1.7 Lifetime risk

The lifetime risk of type 1 resp. type 2 diabetes were computed by evaluating the probability of being in state T1D or T2D at age 100, using only the mortality rates from noDM, and ignoring the mortality rates from states T1D and T2D. This corresponds to ignoring anything that happens to diabetes patients after diagnosis — we are only interested in the probability of entering each of the T1D and T2D states.

2 Methodological issues

Most studies use the overall population mortality as basis for comparison (which is a reasonable approximation), and some use the non-diabetes mortality rates (which result in

an over-estimate of life time lost). Incidentally, the studies based on the NHIS [6, 3] by virtue of the data available use an empirical approximation to the correct survival probabilities for persons alive without diabetes at a given time — only mortality among persons surveyed were available, not the future diabetes occurrence.

Some studies [5, 4] indicate they used Chiang's method for calculation of the life table probabilities. This method dates back to 1968 and is aimed at compensating for irregular distribution of deaths across wide age-intervals, a natural consequence of the absence of computers in 1968. Notably it requires input of the average time lived in the interval before death for those who die in an interval, but none of the studies claiming to use Chiang's method detail how they estimated this quantity. Using a value of half the interval length will in most cases give results indistinguishable from just using the standard mathematical relationship of cumulative risk (= life table probability) as the exponential of minus the cumulative rate, particularly if rates are computed in small (1-year, say) intervals. These studies have used 5-year intervals which induce an extra inaccuracy relative to 1-year intervals. In our study we used 1 month intervals of age for calculation of transition probabilities between states.

The papers by Gregg *et al.* [3] and Narayan *et al.* [6] among others use an approach similar to ours by estimating rates in a multistate model and a Markov-chain approach to estimation of survival probabilities in different scenarios, the latter using a 1-year updating intervals. However, the updating interval should be chosen so small that the probability of transition from no diabetes to diabetes and further to death within a single interval is negligible. Which is not the cases in older ages in a 1-year interval, so these studies are likely to have a small extra bias from this.

Unlike the papers mentioned above, our study exploits the possibility from register data to build results on credible models for incidence and mortality rates (namely as smooth continuous functions of age and calendar time) as well as using modern computing to arrive at results based on continuous time models, through using 1-month updating intervals for the Markov chain. This is a major strength of our study and can be implemented in any study — using 100 1-year age classes or 1200 1-month age classes makes little difference on a modern computer.

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Table ESM 1: *Events (diabetes diagnoses and deaths) and person-years (in 1000s) in the Danish population in the 21 year study period 1996–2016, subdivided by current diabetes status.*
The three parts of the P-years column correspond to the person-years (in 1000s) in the three leftmost boxes (noDM, T1D, T2D) in figure ESM1. The 14 combinations of type of diabetes (2 types) and cause of death (4 causes) on one hand and status (noDM, T1D, T2D) on the other hand correspond to the events (arrows) in figure ESM1. Of course there are no diabetes events among persons with diabetes.

Status	Diabetes cases		Deaths by cause					
Period	T1D	T2D	CVD	Cancer	Respir	Other	All	P-years
No diabetes								
1996-1998	3,478	33,986	58,088	42,494	15,170	43,916	159,668	15,623.6
1999-2001	2,994	36,887	55,457	42,406	14,917	41,430	154,210	15,726.0
2002-2004	2,816	49,185	50,897	40,506	15,295	41,733	148,431	15,808.1
2005-2007	2,780	44,326	42,956	40,444	14,122	42,943	140,465	15,872.1
2008-2010	2,734	56,453	36,812	39,304	15,031	44,762	135,909	16,019.6
2011-2013	2,477	69,728	31,855	39,093	14,811	40,947	126,706	16,105.7
2014-2016	2,433	53,387	29,588	38,229	14,137	41,226	123,180	16,301.0
1996-2016	19,712	343,952	305,653	282,476	103,483	296,957	988,569	111,456.1
T1D								
1996-1998	.	.	868	290	137	671	1,966	68.1
1999-2001	.	.	997	365	130	643	2,135	71.2
2002-2004	.	.	835	333	175	860	2,203	73.1
2005-2007	.	.	610	397	137	950	2,094	74.4
2008-2010	.	.	501	402	183	803	1,889	73.3
2011-2013	.	.	348	284	157	643	1,432	71.0
2014-2016	.	.	243	237	113	450	1,043	70.0
1996-2016	.	.	4,402	2,308	1,032	5,020	12,762	501.1
T2D								
1996-2016	.	.	4,402	2,308	1,032	5,020	12,762	501.1
1996-1998	.	.	8,133	2,788	1,114	3,564	15,599	212.6
1999-2001	.	.	8,559	3,556	1,294	4,005	17,414	269.6
2002-2004	.	.	8,084	4,025	1,860	5,199	19,168	341.0
2005-2007	.	.	7,485	4,760	1,973	6,414	20,632	421.0
2008-2010	.	.	7,080	5,508	2,562	7,416	22,566	502.6
2011-2013	.	.	7,546	6,704	3,013	7,907	25,170	631.1
2014-2016	.	.	7,850	7,965	3,584	9,052	28,451	718.1
1996-2016	.	.	54,737	35,306	15,400	43,557	149,000	3,096.0

Table ESM 2: *Number of deaths in Denmark 1996–2016 by cause of death (10 groups)*

				Other causes						
	CVD	Cancer	Respir	Diab	Digest	Extern	Infect	Other	Renal	Urinal
All	360,278	322,704	118,944	27,196	55,029	54,769	15,277	192,737	6,989	9,831
1996	22,542	15,216	5,691	629	2,428	3,371	530	10,030	195	405
1997	22,001	15,258	5,431	1,093	2,847	3,536	374	8,718	190	444
1998	21,270	15,180	5,284	1,195	2,804	3,409	350	7,894	223	451
1999	21,458	15,445	5,628	1,367	2,886	3,441	463	7,330	242	460
2000	20,535	15,486	5,227	1,434	2,801	3,357	374	7,346	238	429
2001	20,915	15,506	5,363	1,378	2,814	3,082	390	7,695	246	432
2002	20,447	14,967	5,822	1,462	2,830	2,593	732	8,611	373	484
2003	19,834	14,926	5,860	1,360	2,742	2,543	845	8,280	439	514
2004	18,559	15,217	5,420	1,289	2,759	2,434	812	8,177	398	544
2005	17,642	15,286	5,228	1,333	2,867	2,582	725	8,135	359	540
2006	17,001	15,636	5,261	1,306	2,924	2,672	799	8,589	383	627
2007	16,080	15,128	5,661	1,311	2,677	2,525	874	10,130	402	508
2008	15,119	15,231	5,639	1,297	2,758	2,468	720	10,253	314	462
2009	14,852	15,096	6,149	1,349	2,769	2,270	831	10,315	333	493
2010	14,492	15,384	5,850	1,257	2,718	2,067	918	10,627	394	408
2011	13,475	15,529	5,846	1,377	2,478	2,198	812	9,562	334	458
2012	13,419	15,786	5,861	1,338	2,306	2,144	919	9,615	398	373
2013	12,878	15,414	6,126	1,327	2,203	2,098	1,010	10,073	398	463
2014	12,489	15,605	5,674	1,320	2,229	2,105	924	9,775	364	456
2015	12,805	15,658	5,973	1,372	2,112	1,951	969	10,507	355	463
2016	12,464	15,744	5,950	1,401	2,077	1,923	906	11,074	411	417

Table ESM 3: *Future years of life lost (1000s) among* currently prevalent diabetes patients *in Denmark at 1 January each year, and average years of life lost* per person *among these. Note that only every 3rd 1 January is shown.*

		Total YLL (1000s)			Average YLL	
	Date	T1D	T2D	DM	T1D	T2D
Men	1996	85.1	149.4	234.4	6.9	4.9
	1999	110.9	188.2	299.2	8.4	4.6
	2002	129.8	222.8	352.6	9.5	4.3
	2005	138.8	266.8	405.6	9.9	3.9
	2008	148.1	276.8	424.9	10.3	3.4
	2011	141.4	310.5	451.8	9.6	3.1
	2014	121.2	377.9	499.1	8.0	3.0
	2017	99.9	428.5	528.4	6.4	3.1
Women	1996	74.7	150.6	225.3	7.8	4.8
	1999	86.6	173.5	260.2	8.6	4.4
	2002	94.8	192.6	287.3	9.1	4.1
	2005	102.2	223.3	325.5	9.7	3.7
	2008	108.5	225.4	334.0	10.0	3.2
	2011	103.2	248.4	351.7	9.3	3.0
	2014	92.7	303.7	396.3	8.1	2.9
	2017	81.9	337.3	419.2	6.9	3.0
M+W	1996	159.8	300.0	459.7	7.3	4.9
	1999	197.6	361.8	559.3	8.5	4.5
	2002	224.6	415.4	639.9	9.3	4.2
	2005	241.0	490.1	731.1	9.8	3.8
	2008	256.7	502.2	758.8	10.2	3.3
	2011	244.6	558.9	803.5	9.5	3.0
	2014	213.9	681.5	895.4	8.0	3.0
	2017	181.8	765.8	947.6	6.6	3.0

Table ESM 4: *Future years of life lost among* persons diagnosed each year *in Denmark and average future years of life lost* per person *among these. Note that only every 3rd year is shown.*

		Total YLL			Average YLL	
	Year	T1D	T2D	DM	T1D	T2D
Men	1998	5,757	33,376	39,134	8.8	5.1
	2001	6,096	32,815	38,912	10.4	4.8
	2004	5,749	40,636	46,385	11.3	4.4
	2007	6,652	34,104	40,757	11.8	3.9
	2010	6,079	41,343	47,422	11.5	3.5
	2013	4,703	34,857	39,560	10.0	3.4
	2016	3,748	38,619	42,367	8.1	3.6
Women	1998	4,335	26,082	30,418	9.5	4.9
	2001	4,334	24,678	29,012	10.4	4.5
	2004	4,180	32,055	36,236	10.8	4.1
	2007	4,419	25,293	29,712	11.5	3.7
	2010	4,090	29,556	33,647	11.1	3.4
	2013	3,421	26,917	30,339	9.7	3.4
	2016	2,652	28,177	30,830	8.4	3.6
M+W	1998	10,093	59,460	69,553	9.1	5.0
	2001	10,431	57,494	67,925	10.4	4.7
	2004	9,929	72,693	82,622	11.1	4.3
	2007	11,072	59,397	70,470	11.7	3.8
	2010	10,170	70,900	81,070	11.4	3.4
	2013	8,125	61,775	69,900	9.9	3.4
	2016	6,401	66,797	73,198	8.2	3.6

Table ESM 5: *Years of life lost to type 1 diabetes in the Danish population by cause of death at different dates and ages. Dates refer to 1 January every 3rd year.*

		CVD		Cancer		Respir.		Other		All causes	
Date	Age	M	W	M	W	M	W	M	W	M	W
1996	20	3.4	6.2	−2.0	−1.3	0.4	−0.1	7.9	6.4	9.7	11.2
	30	3.5	6.2	−2.0	−1.1	0.4	−0.1	7.3	5.7	9.3	10.6
	40	3.7	6.1	−1.9	−1.0	0.4	−0.1	6.1	4.7	8.3	9.7
	50	4.0	5.7	−1.6	−0.8	0.5	−0.2	3.6	3.6	6.6	8.3
	60	4.2	5.0	−1.3	−0.7	0.4	−0.4	1.4	2.3	4.7	6.4
	70	3.4	3.7	−1.2	−0.4	0.1	−0.5	0.4	1.3	2.7	4.1
	80	1.7	1.8	−0.8	0.0	0.2	−0.4	−0.1	0.6	1.1	2.0
1999	20	4.4	6.2	−2.2	−1.0	0.0	0.0	9.4	6.5	11.6	11.8
	30	4.5	6.3	−2.1	−0.9	0.0	0.0	8.7	5.8	11.1	11.2
	40	4.6	6.2	−2.0	−0.7	0.0	0.0	7.4	4.9	10.0	10.3
	50	4.9	5.8	−1.7	−0.5	0.1	−0.1	4.9	3.8	8.2	9.1
	60	5.1	5.2	−1.4	−0.5	0.0	−0.2	2.3	2.6	6.1	7.1
	70	4.2	4.1	−1.2	−0.5	−0.2	−0.3	1.0	1.6	3.7	4.9
	80	2.3	2.2	−0.8	−0.1	0.0	−0.3	0.3	0.8	1.8	2.6
2002	20	4.3	5.7	−2.1	−0.6	−0.3	0.2	11.0	6.9	12.9	12.2
	30	4.4	5.7	−2.0	−0.4	−0.3	0.2	10.2	6.1	12.3	11.6
	40	4.6	5.7	−1.9	−0.3	−0.3	0.1	8.7	5.2	11.1	10.8
	50	4.8	5.4	−1.6	−0.1	−0.2	0.1	6.3	4.1	9.3	9.5
	60	4.9	4.9	−1.2	−0.2	−0.2	0.0	3.4	3.0	6.9	7.7
	70	4.1	4.0	−1.1	−0.5	−0.4	−0.1	1.8	2.0	4.4	5.4
	80	2.3	2.3	−0.8	−0.1	−0.1	−0.2	0.9	1.1	2.3	3.1
2005	20	2.5	4.2	−1.4	0.1	−0.2	0.3	12.6	8.0	13.5	12.7
	30	2.6	4.3	−1.3	0.2	−0.2	0.3	11.8	7.2	12.9	12.0
	40	2.7	4.2	−1.1	0.4	−0.2	0.3	10.2	6.2	11.6	11.2
	50	2.8	4.1	−0.8	0.6	−0.1	0.3	7.8	5.1	9.7	9.9
	60	3.0	3.7	−0.4	0.4	0.0	0.2	4.8	3.8	7.3	8.1
	70	2.4	3.2	−0.5	−0.2	−0.1	0.1	2.9	2.8	4.8	5.8
	80	1.3	1.9	−0.5	−0.1	0.1	0.0	1.6	1.7	2.6	3.5

Table ESM 5: *(cont.) Years of life lost to type 1 diabetes in the entire Danish population by cause of death at different dates and ages. Dates refer to 1 January every 3rd year.*

		CVD		Cancer		Respir.		Other		All causes	
Date	Age	M	W	M	W	M	W	M	W	M	W
2008	20	1.3	3.0	−0.3	0.5	0.1	0.5	12.8	8.9	13.9	12.9
	30	1.3	3.0	−0.2	0.7	0.1	0.5	12.0	8.1	13.2	12.2
	40	1.4	3.0	0.0	0.9	0.1	0.5	10.4	7.0	12.0	11.4
	50	1.5	2.9	0.3	1.0	0.2	0.4	8.1	5.8	10.1	10.2
	60	1.5	2.7	0.6	0.9	0.2	0.4	5.5	4.5	7.8	8.4
	70	1.2	2.3	0.4	0.1	0.3	0.3	3.4	3.5	5.3	6.2
	80	0.5	1.5	0.0	−0.1	0.4	0.2	2.0	2.3	2.9	3.9
2011	20	1.3	2.4	0.1	0.6	0.4	0.7	10.9	8.0	12.6	11.7
	30	1.3	2.5	0.2	0.7	0.4	0.7	10.2	7.3	12.0	11.1
	40	1.4	2.5	0.3	0.9	0.4	0.7	8.9	6.4	11.0	10.4
	50	1.4	2.4	0.6	1.0	0.4	0.6	7.0	5.3	9.4	9.4
	60	1.3	2.2	0.8	0.9	0.4	0.6	5.1	4.2	7.5	7.9
	70	0.9	1.9	0.5	0.1	0.5	0.5	3.3	3.3	5.2	5.9
	80	0.3	1.3	0.1	−0.2	0.6	0.5	1.9	2.2	2.8	3.8
2014	20	1.8	2.2	−0.4	0.4	0.6	0.9	8.4	6.6	10.4	10.0
	30	1.8	2.2	−0.3	0.4	0.6	0.9	7.9	6.0	10.0	9.5
	40	1.8	2.2	−0.2	0.6	0.6	0.8	7.0	5.3	9.1	9.0
	50	1.8	2.1	0.0	0.7	0.6	0.8	5.6	4.5	7.9	8.1
	60	1.5	2.0	0.0	0.6	0.5	0.7	4.3	3.6	6.4	6.9
	70	1.0	1.7	−0.1	0.1	0.6	0.7	3.0	2.9	4.5	5.4
	80	0.4	1.2	−0.3	−0.3	0.7	0.7	1.8	1.9	2.5	3.5
2017	20	2.1	1.9	−1.0	0.1	0.7	1.0	6.4	5.4	8.2	8.4
	30	2.1	1.9	−1.0	0.1	0.7	1.0	6.1	5.0	7.9	8.0
	40	2.1	1.9	−0.9	0.2	0.7	1.0	5.4	4.4	7.3	7.6
	50	2.0	1.9	−0.8	0.3	0.7	1.0	4.4	3.8	6.3	6.9
	60	1.7	1.7	−0.7	0.3	0.6	0.9	3.5	3.1	5.2	6.0
	70	1.2	1.5	−0.8	−0.1	0.6	0.8	2.7	2.5	3.7	4.7
	80	0.5	1.1	−0.6	−0.4	0.7	0.8	1.6	1.6	2.2	3.2

Table ESM 6: *Years of life lost to type 2 diabetes in the Danish population by cause of death at different dates and ages. Dates refer to 1 January every 3rd year.*

		CVD		Cancer		Respir.		Other		All causes	
Date	Age	M	W	M	W	M	W	M	W	M	W
1996	20	6.8	6.6	−0.6	1.0	−0.7	−0.1	6.4	3.8	11.9	11.3
	30	6.8	6.4	−0.4	1.0	−0.6	−0.1	5.2	3.3	10.9	10.6
	40	6.6	6.1	−0.3	1.0	−0.6	−0.2	3.8	2.6	9.5	9.5
	50	6.3	5.9	−0.2	0.7	−0.6	−0.2	2.2	1.7	7.7	8.1
	60	5.8	5.6	−0.3	0.2	−0.6	−0.3	0.8	0.8	5.7	6.3
	70	4.7	4.9	−0.3	0.0	−0.5	−0.3	−0.1	−0.1	3.8	4.5
	80	2.9	3.0	−0.3	0.0	−0.3	−0.1	−0.3	−0.3	2.0	2.5
1999	20	5.2	5.1	−0.3	1.1	−0.5	0.0	6.6	3.9	11.1	10.2
	30	5.2	4.9	−0.2	1.2	−0.5	0.0	5.5	3.5	10.0	9.6
	40	5.0	4.7	0.0	1.1	−0.4	0.0	4.1	2.8	8.7	8.6
	50	4.8	4.5	0.0	0.8	−0.4	0.0	2.7	2.0	7.1	7.3
	60	4.5	4.3	−0.1	0.4	−0.4	−0.1	1.3	1.2	5.2	5.7
	70	3.6	3.9	−0.2	0.0	−0.4	−0.2	0.4	0.3	3.4	4.0
	80	2.3	2.4	−0.2	0.0	−0.2	−0.1	0.0	0.0	1.9	2.3
2002	20	4.0	3.8	−0.1	1.2	−0.3	0.2	6.8	4.0	10.3	9.3
	30	3.9	3.7	0.0	1.2	−0.3	0.2	5.7	3.6	9.3	8.7
	40	3.8	3.5	0.2	1.2	−0.3	0.2	4.3	3.0	8.1	7.8
	50	3.6	3.4	0.2	0.9	−0.2	0.1	2.9	2.2	6.5	6.6
	60	3.3	3.2	0.1	0.5	−0.2	0.0	1.7	1.4	4.9	5.1
	70	2.6	2.9	−0.1	0.1	−0.2	−0.1	0.8	0.7	3.2	3.6
	80	1.7	1.9	−0.2	0.0	−0.1	0.0	0.4	0.3	1.8	2.1
2005	20	3.0	2.7	0.1	1.3	−0.2	0.3	6.4	3.9	9.4	8.3
	30	3.0	2.6	0.2	1.3	−0.1	0.3	5.4	3.5	8.5	7.8
	40	2.9	2.5	0.4	1.3	−0.1	0.3	4.1	2.9	7.3	7.0
	50	2.8	2.4	0.4	1.0	−0.1	0.3	2.8	2.3	5.9	5.9
	60	2.5	2.3	0.2	0.6	0.0	0.2	1.8	1.5	4.4	4.6
	70	2.0	2.0	0.0	0.2	0.0	0.1	1.0	0.9	3.0	3.2
	80	1.3	1.4	−0.2	0.0	0.0	0.0	0.5	0.5	1.7	1.9

Table ESM 6: *(cont.) Years of life lost to type 2 diabetes in the Danish population by cause of death at different dates and ages. Dates refer to 1 January every 3rd year.*

		CVD		Cancer		Respir.		Other		All causes	
Date	Age	M	W	M	W	M	W	M	W	M	W
2008	20	2.3	1.8	0.3	1.4	0.0	0.5	5.6	3.6	8.2	7.3
	30	2.3	1.8	0.5	1.4	0.0	0.5	4.6	3.2	7.4	6.9
	40	2.2	1.7	0.6	1.4	0.1	0.4	3.5	2.7	6.4	6.2
	50	2.1	1.6	0.6	1.1	0.1	0.4	2.4	2.1	5.1	5.2
	60	1.9	1.6	0.4	0.7	0.1	0.3	1.5	1.5	3.9	4.0
	70	1.5	1.4	0.1	0.2	0.1	0.2	0.9	0.9	2.6	2.7
	80	0.9	1.0	−0.1	0.0	0.1	0.1	0.5	0.6	1.4	1.6
2011	20	1.9	1.4	0.5	1.5	0.1	0.6	4.8	3.2	7.4	6.7
	30	1.9	1.4	0.6	1.5	0.1	0.6	4.0	2.8	6.7	6.3
	40	1.8	1.3	0.7	1.4	0.2	0.6	3.0	2.4	5.7	5.7
	50	1.7	1.3	0.7	1.2	0.2	0.5	2.0	1.9	4.6	4.8
	60	1.6	1.2	0.5	0.8	0.2	0.4	1.3	1.3	3.5	3.7
	70	1.2	1.1	0.2	0.3	0.2	0.3	0.8	0.8	2.5	2.5
	80	0.7	0.7	−0.1	0.0	0.2	0.2	0.5	0.6	1.3	1.5
2014	20	1.9	1.3	0.7	1.8	0.2	0.7	4.4	2.8	7.2	6.6
	30	1.9	1.2	0.8	1.7	0.2	0.7	3.6	2.5	6.5	6.2
	40	1.8	1.2	0.9	1.7	0.2	0.7	2.7	2.1	5.6	5.6
	50	1.7	1.1	0.9	1.4	0.2	0.6	1.8	1.7	4.6	4.8
	60	1.5	1.1	0.6	0.9	0.2	0.6	1.1	1.2	3.6	3.7
	70	1.2	0.9	0.3	0.5	0.2	0.4	0.8	0.7	2.5	2.6
	80	0.7	0.6	0.0	0.0	0.2	0.3	0.5	0.6	1.4	1.5
2017	20	1.9	1.2	1.0	2.1	0.2	0.8	4.1	2.5	7.2	6.5
	30	1.9	1.1	1.1	2.1	0.2	0.8	3.4	2.2	6.5	6.2
	40	1.8	1.1	1.1	2.0	0.2	0.8	2.6	1.9	5.7	5.7
	50	1.7	1.0	1.1	1.7	0.2	0.7	1.7	1.5	4.7	4.9
	60	1.6	1.0	0.8	1.2	0.2	0.7	1.1	1.0	3.7	3.8
	70	1.2	0.8	0.4	0.7	0.2	0.5	0.8	0.6	2.7	2.7
	80	0.8	0.6	0.0	0.2	0.2	0.3	0.6	0.5	1.6	1.6

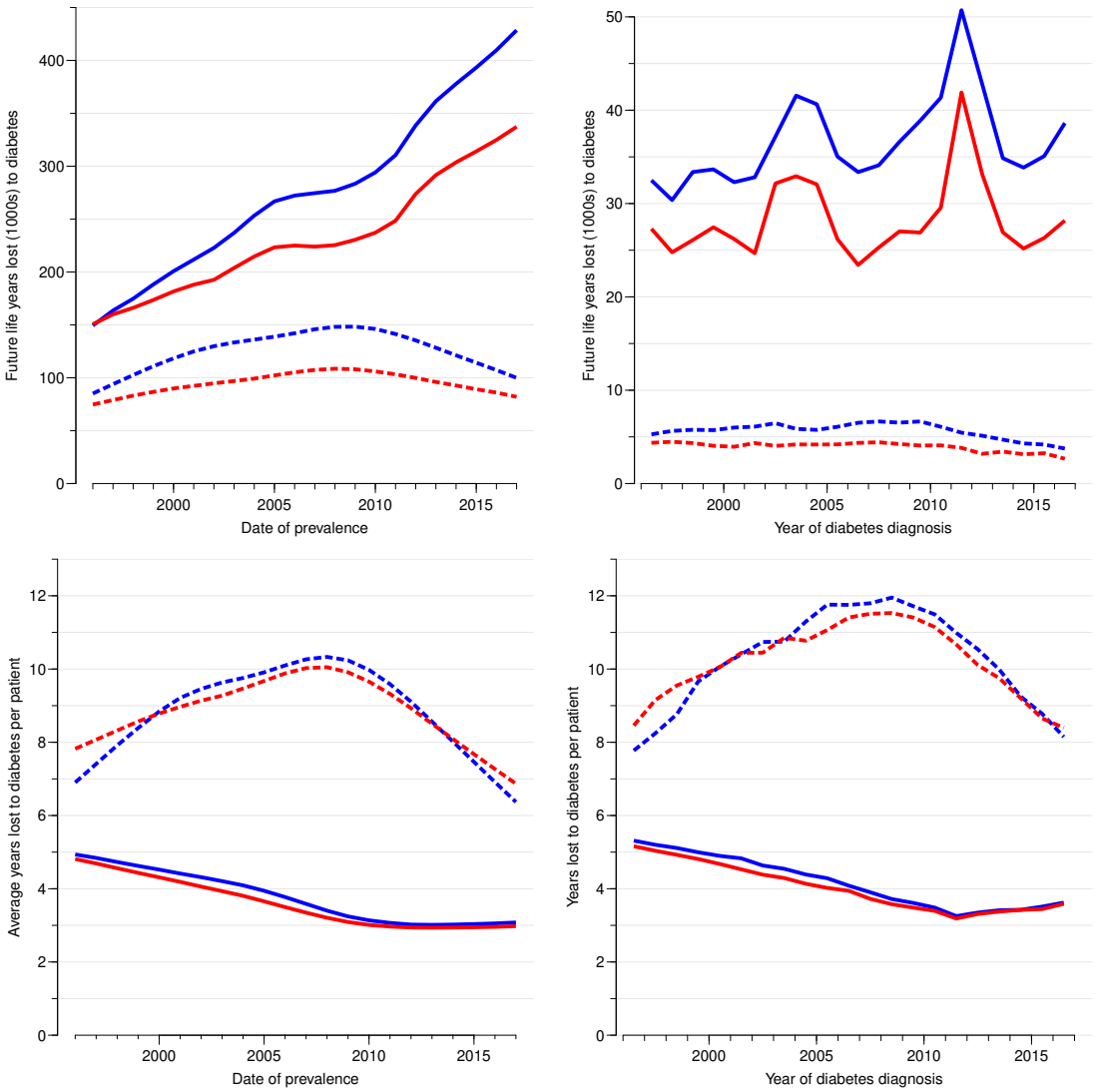

Figure ESM 2: *Upper panels:* Total *future years of life lost among all* currently prevalent *diabetes patients at each 1 January (left) and among* newly diagnosed *patients during each calendar year (right).*
Lower panels: Average *future years of life lost among currently prevalent diabetes patients each 1 January (left) and among patients diagnosed during each calendar year (right).*
Red lines are women, blue lines are men, broken lines are type 1 diabetes and full lines are type 2 diabetes.

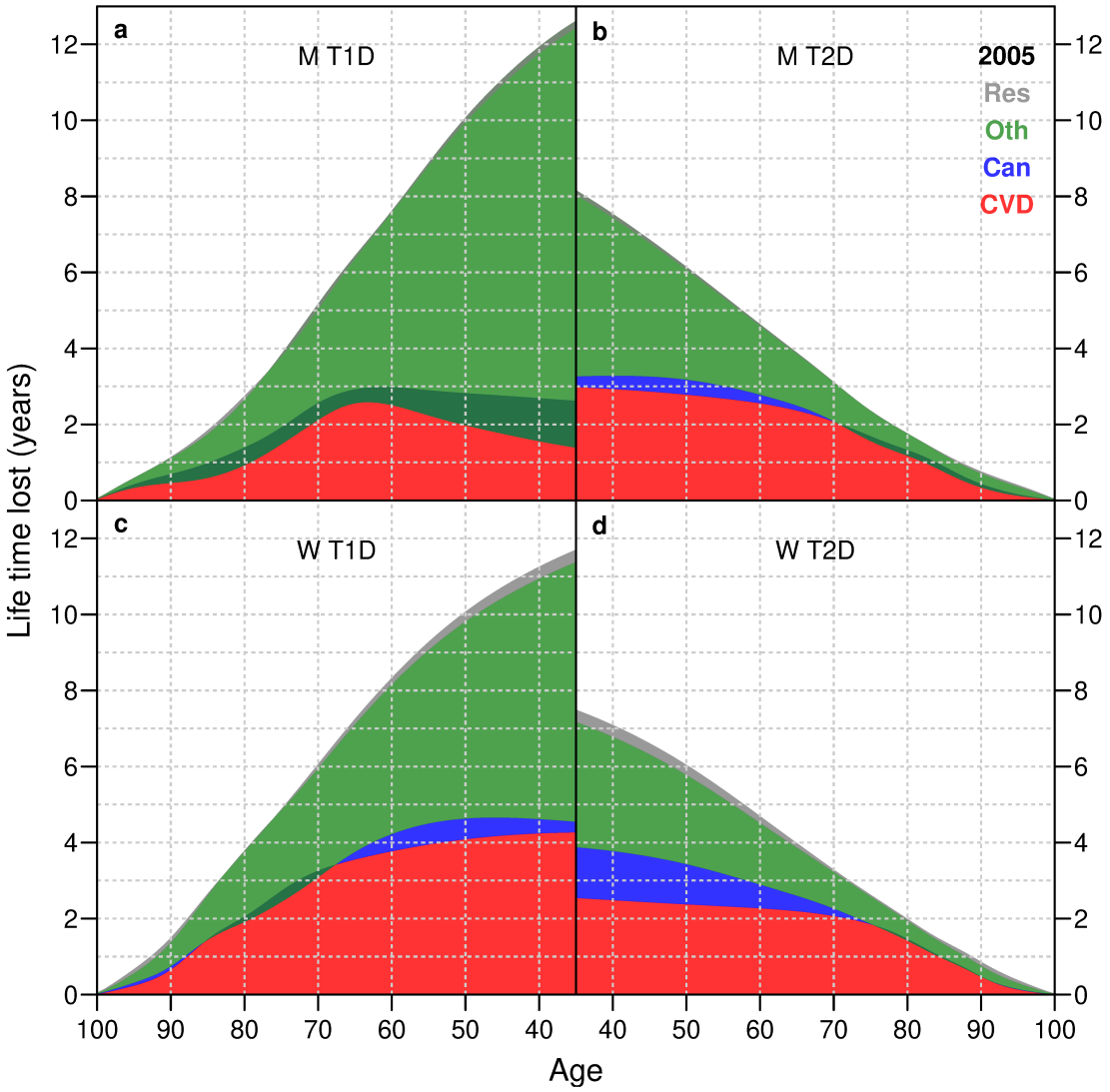

Figure ESM 3: *Years of life lost to different causes of death at 1 January 2005 by sex, type of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to cancer for type 1 diabetes patients (it is the overlap of red, blue and green areas). This area is therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

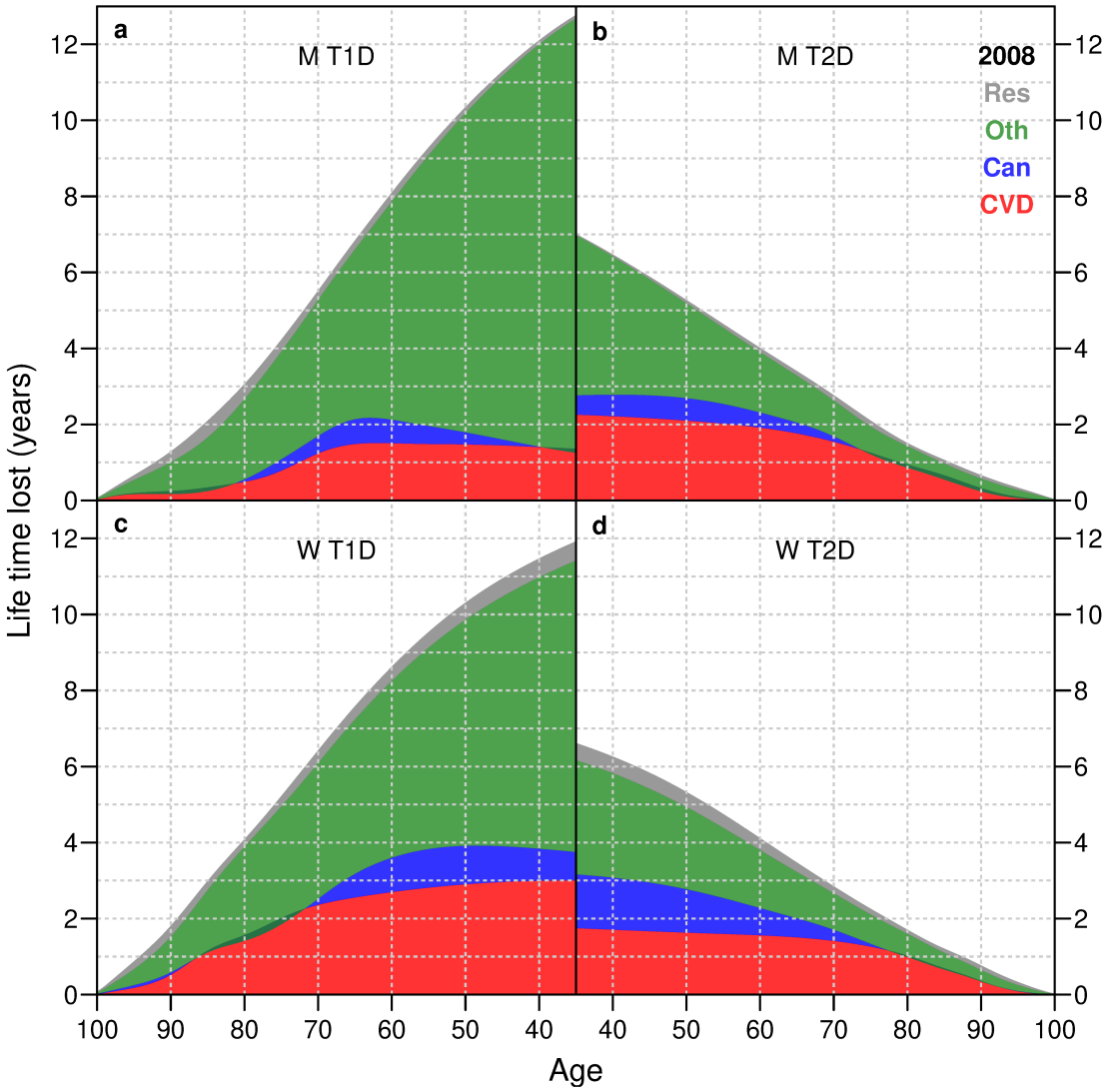

Figure ESM 4: *Years of life lost to different causes of death at 1 January 2008 by sex, type of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to cancer for type 1 diabetes patients (it is the overlap of red, blue and green areas). This area is therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

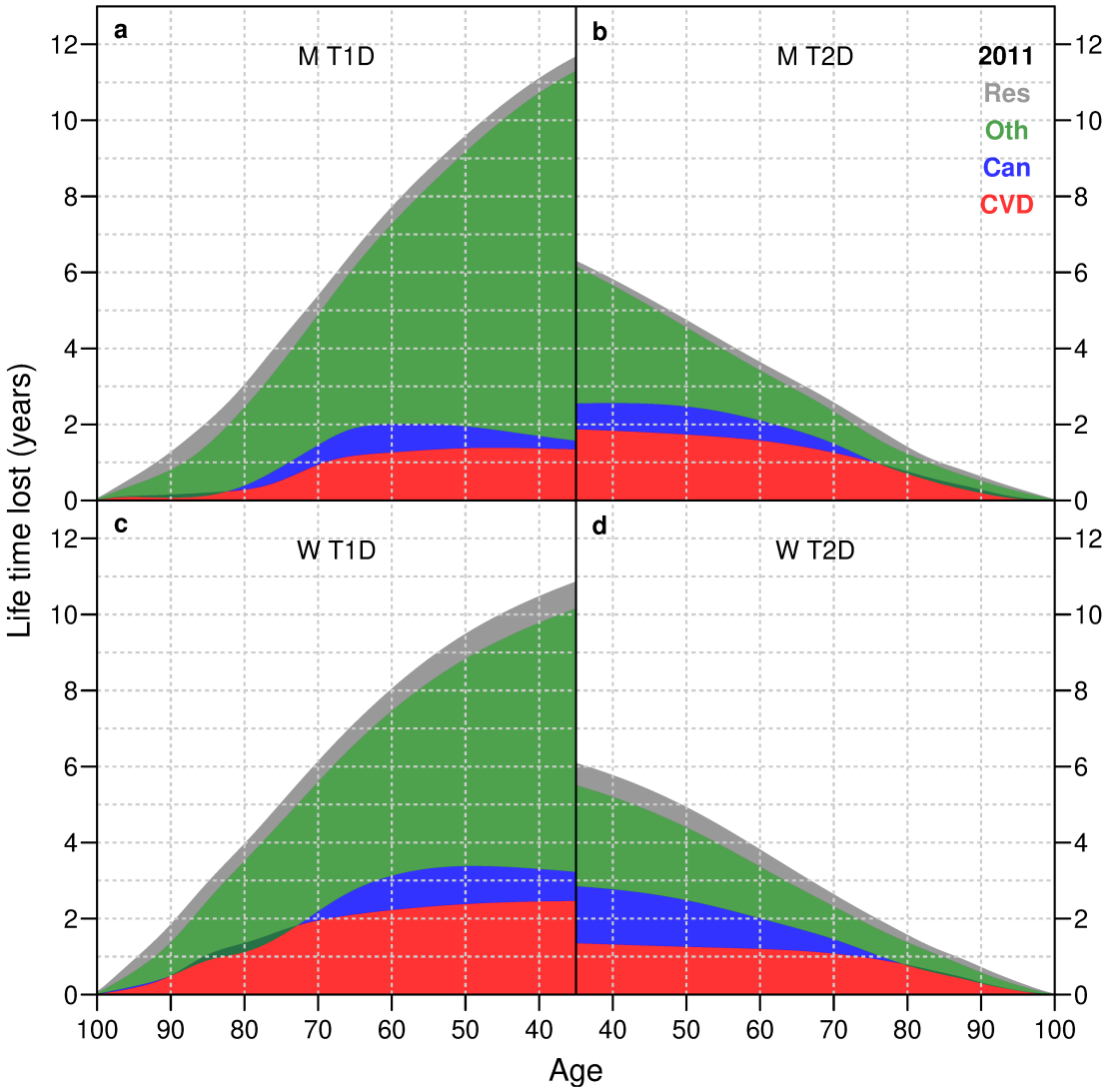

Figure ESM 5: *Years of life lost to different causes of death at 1 January 2011 by sex, type of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to cancer for type 1 diabetes patients (it is the overlap of red, blue and green areas). This area is therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

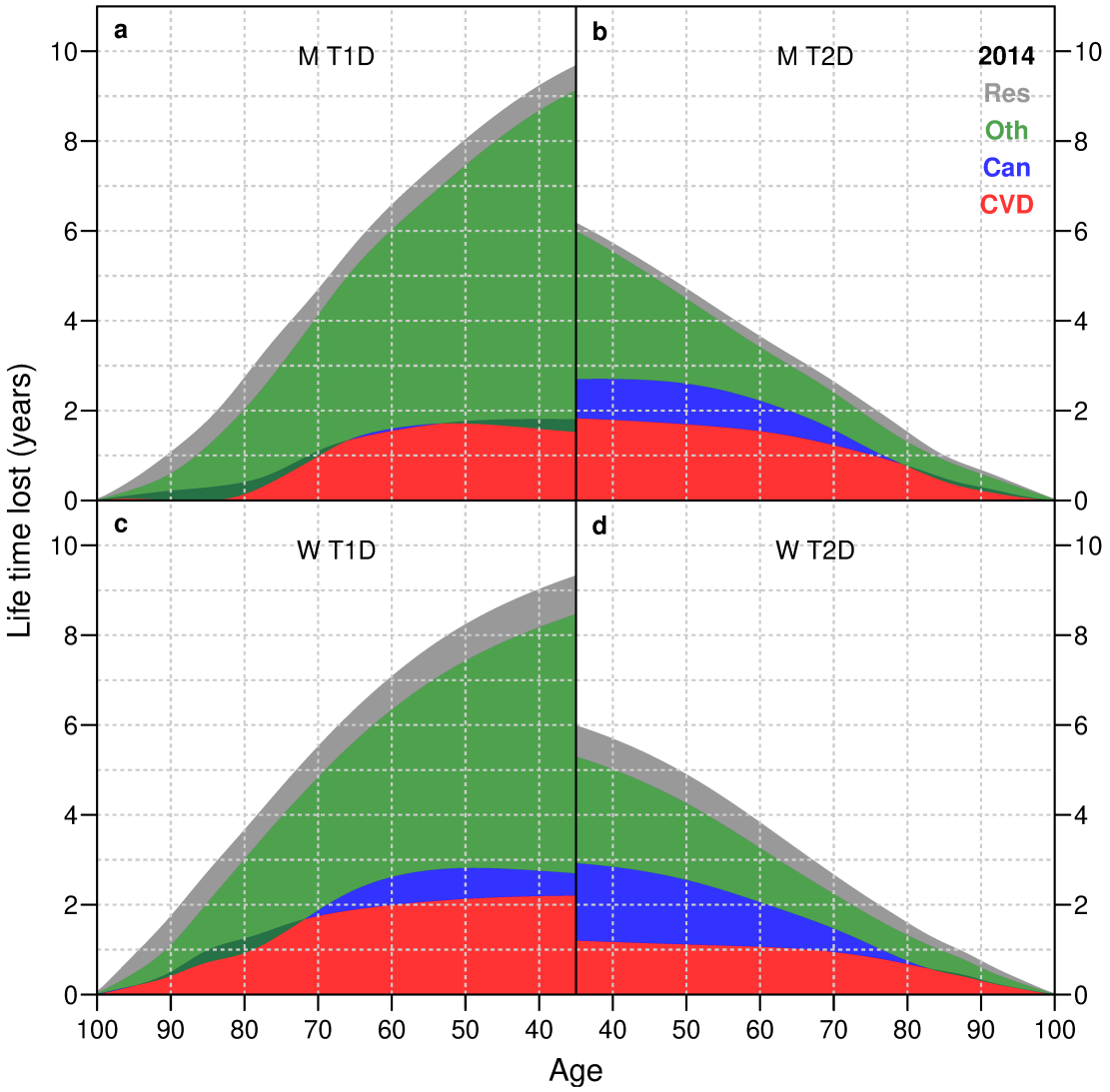

Figure ESM 6: *Years of life lost to different causes of death at 1 January 2014 by sex, type of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to cancer for type 1 diabetes patients (it is the overlap of red, blue and green areas). This area is therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

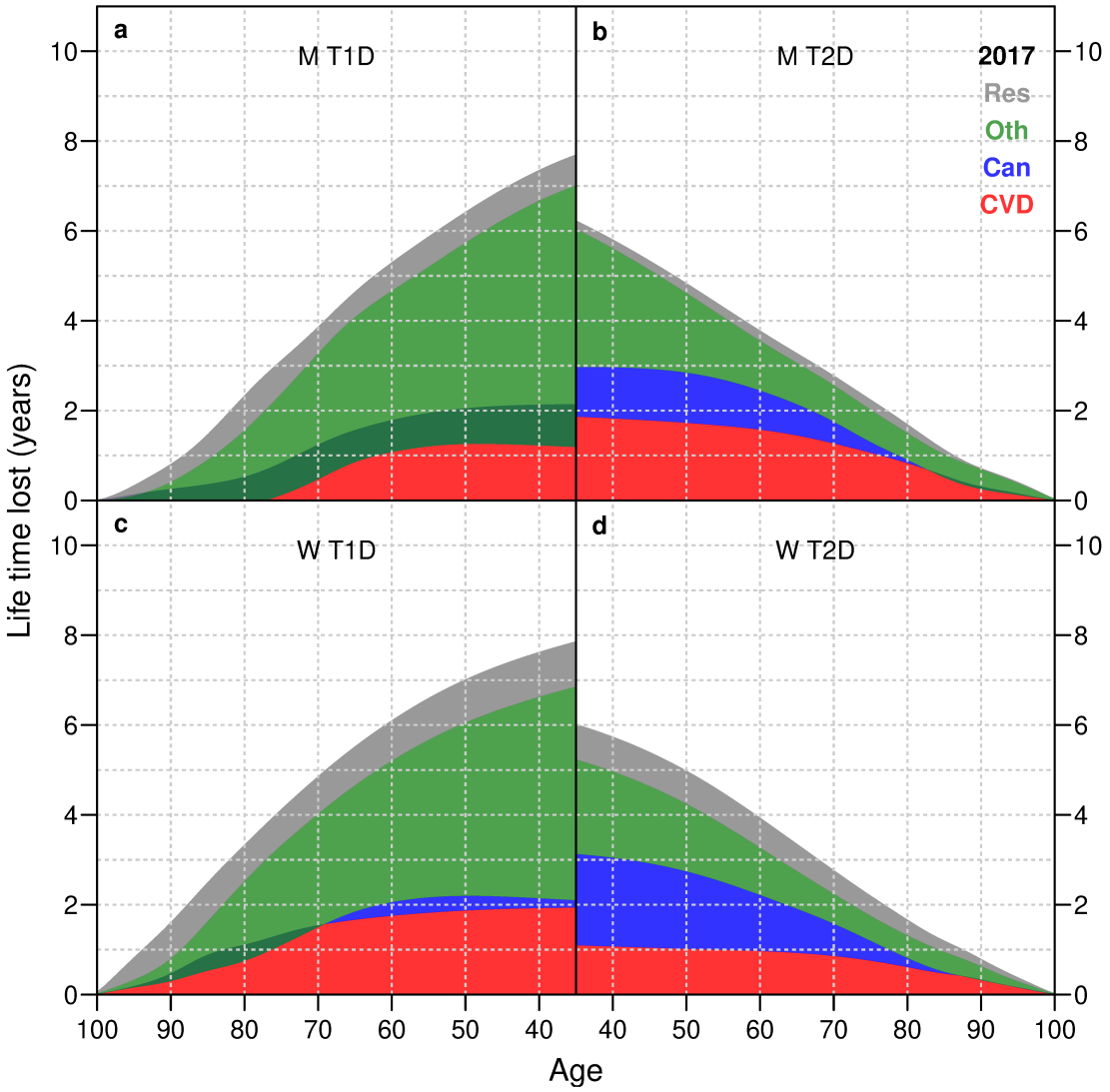

Figure ESM 7: *Years of life lost to different causes of death at 1 January 2017 by sex, type of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to cancer for type 1 diabetes patients (it is the overlap of red, blue and green areas). This area is therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

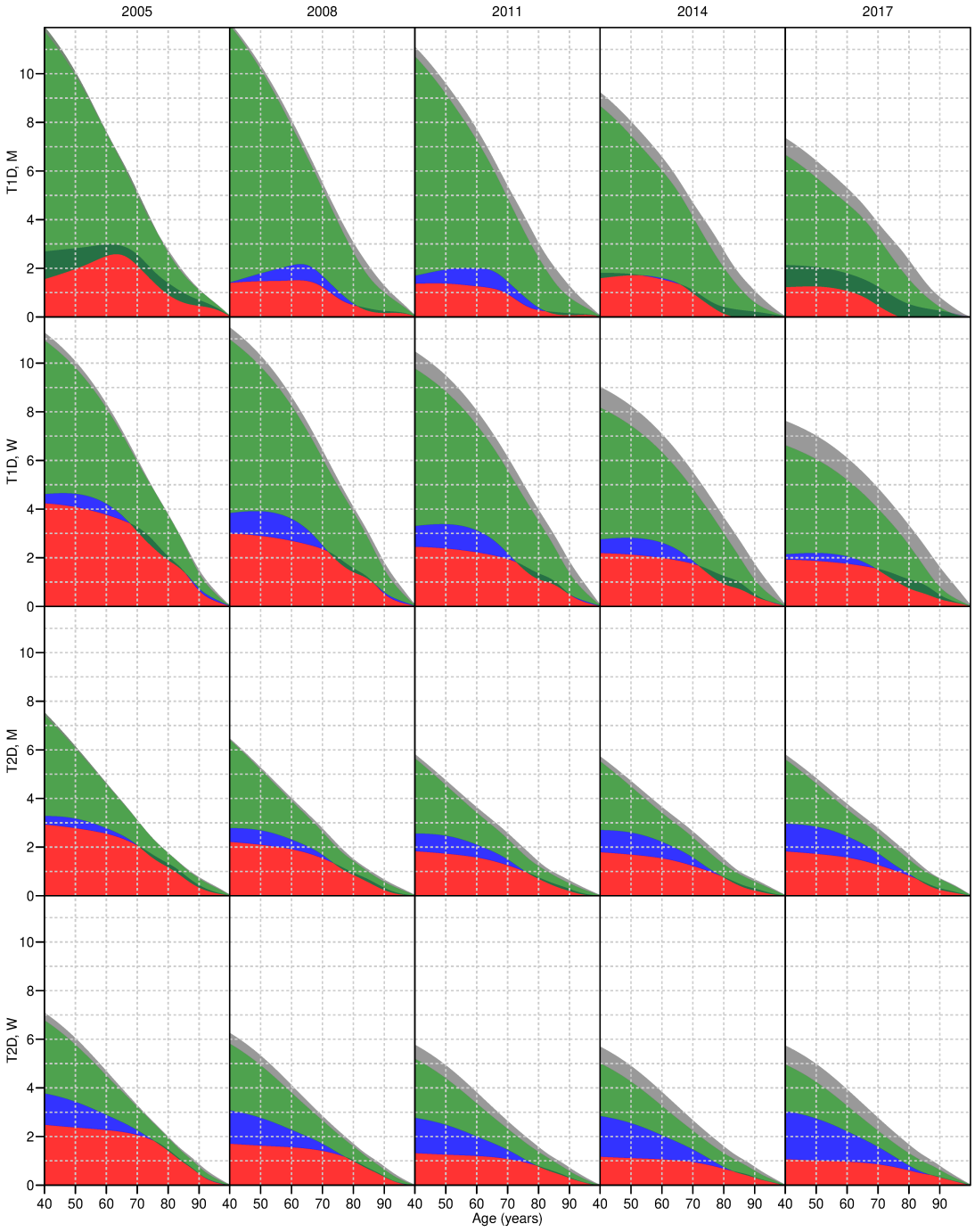

Figure ESM 8: *Years of life lost to different causes of death by date (1 January each year), sex, type of diabetes and age.*
Colours indicate cause of death: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD. The dark green areas is equal to the negative *years of life lost to cancer for type 1 diabetes patients (it is the overlap of red, blue(negative) and green areas). This area is therefore part of both the CVD and the Other component.*

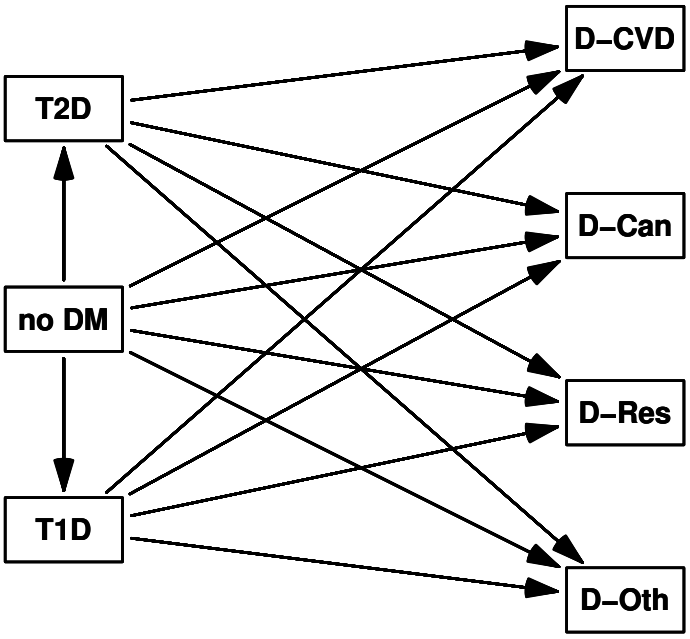

Figure ESM 1: *Multistate model used to compute the survival probabilities of persons in each of the states "no DM", "T1D" and "T2D". The right-hand states refer to death from cardiovascular disease ("D-CVD"), cancer ("D-Can"), respiratory causes ("D-Res") and causes ("D-Oth"). For persons in "T1D" and "T2D" the survival is just the probability of remaining in the state. For persons in state "no DM" at given age the survival is the probability of being in either of the states "no DM", "T1D" and "T2D".*

Thus,

Figures 15

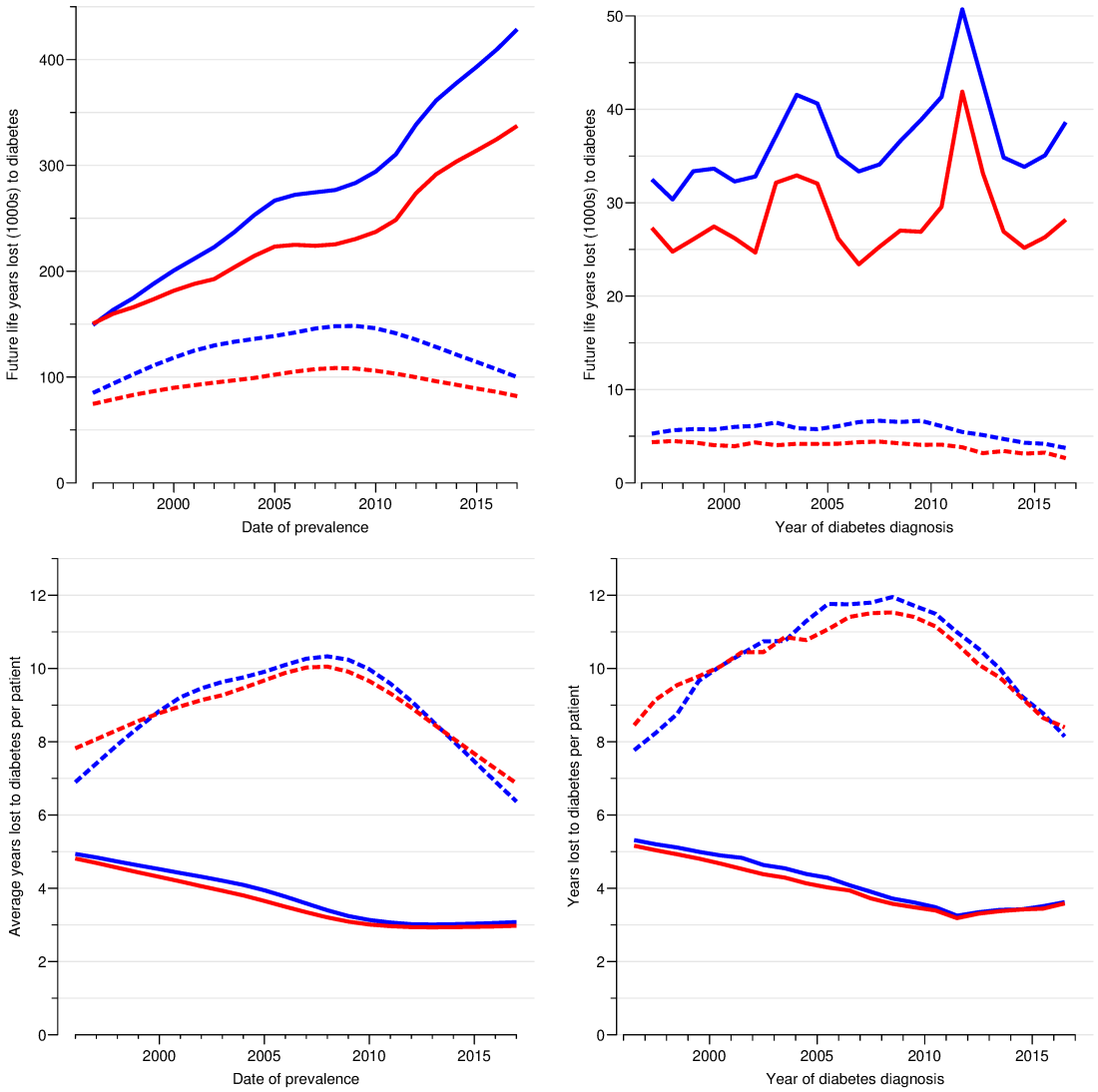

Figure ESM 2: *Upper panels:* Total *future years of life lost among all currently prevalent diabetes patients at each 1 January (left) and among newly diagnosed patients during calendar year (right).*
Lower panels: Average *future years of life lost among currently prevalent diabetes patients each 1 January (left) and among patients diagnosed during each calendar year (right). Red lines are women, blue lines are men, broken lines are type 1 diabetes and full lines are type 2 diabetes.*

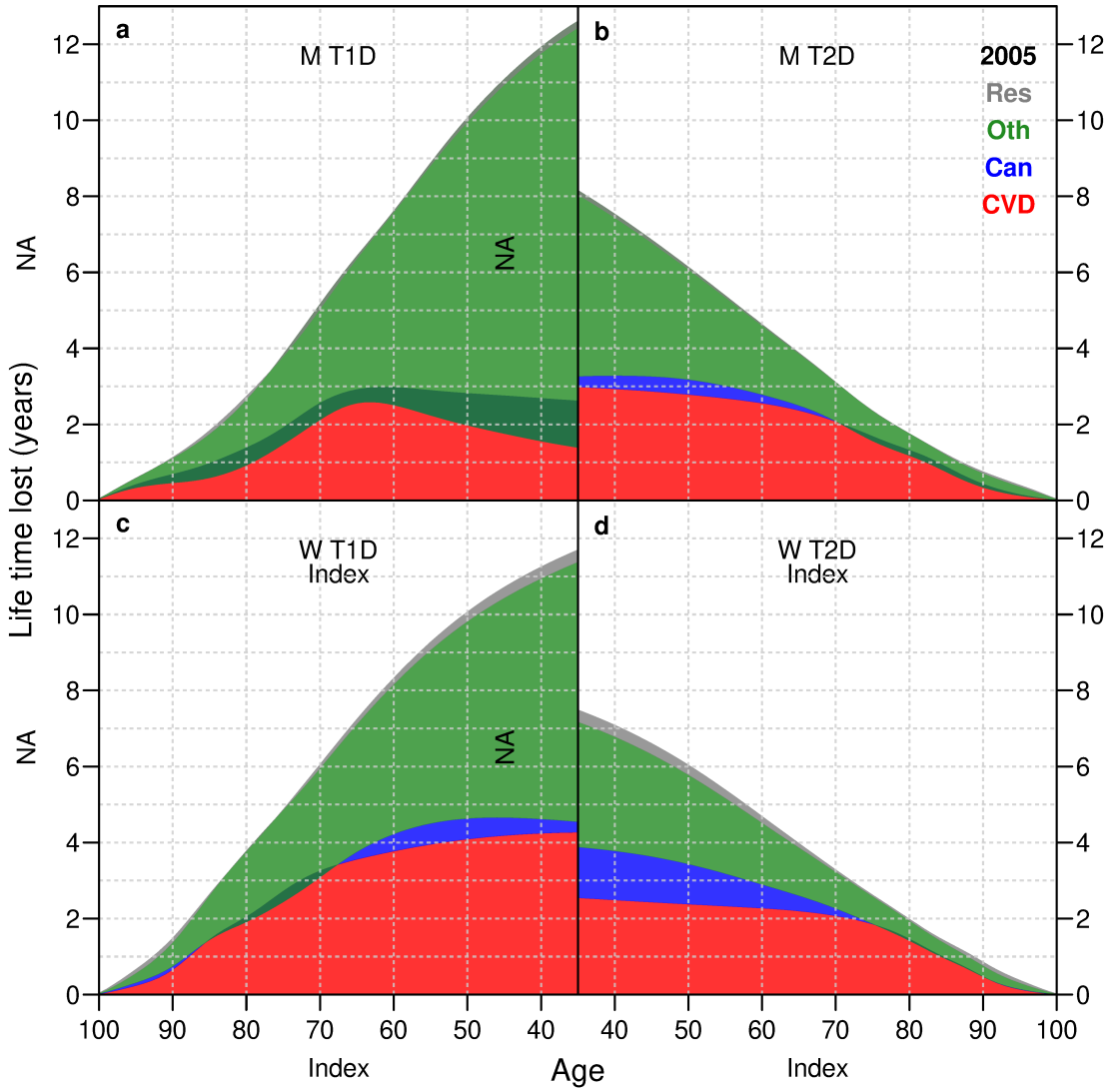

Figure ESM 3: *Years of life lost to different causes of death at 1 January 2005 by sex, ty of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to car type 1 diabetes patients (it is the overlap of red, blue and green areas). This area is therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

Figures 17

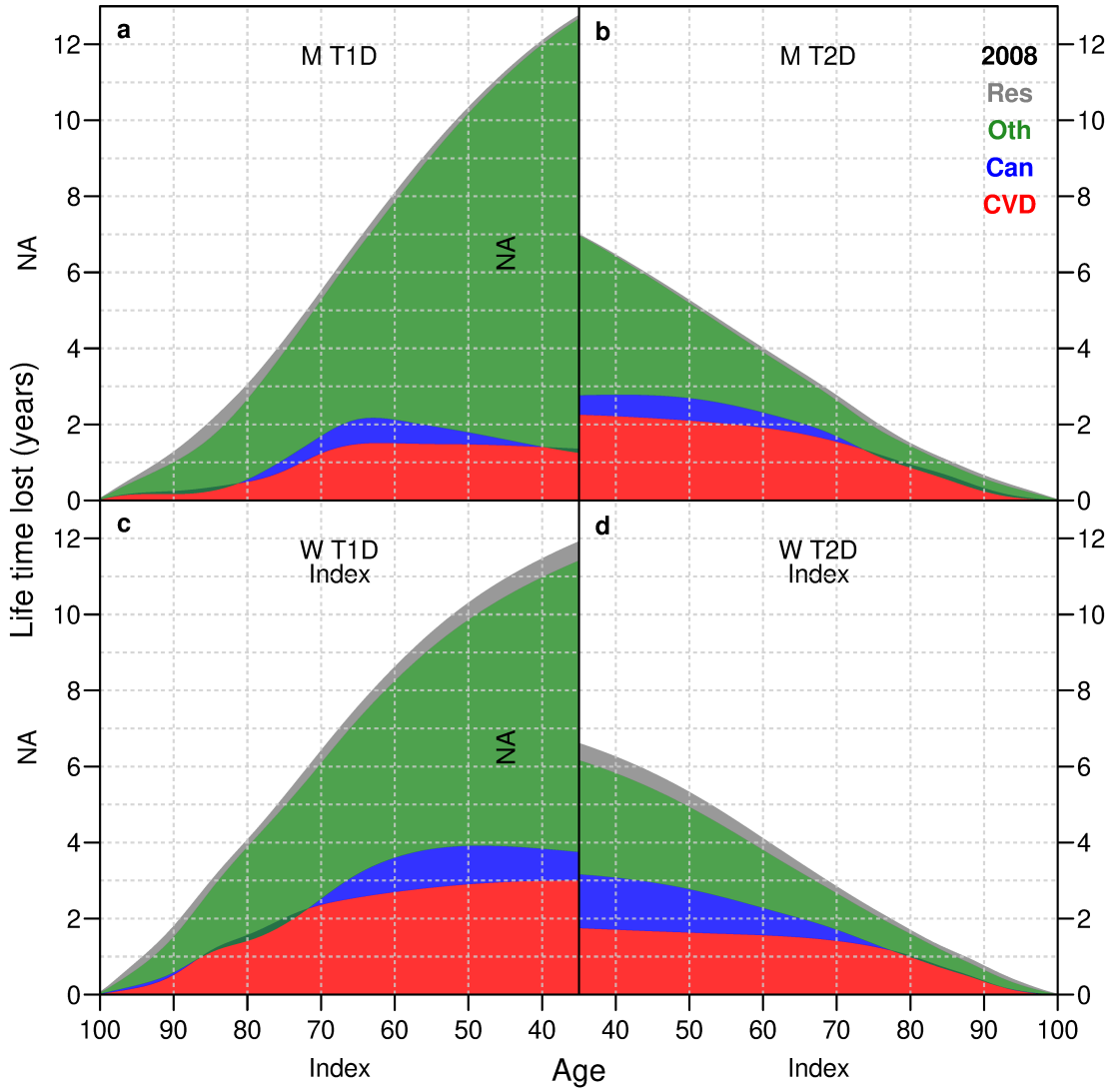

Figure ESM 4: *Years of life lost to different causes of death at 1 January 2008 by sex, ty of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to car type 1 diabetes patients (it is the overlap of red, blue and gr This areas) therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

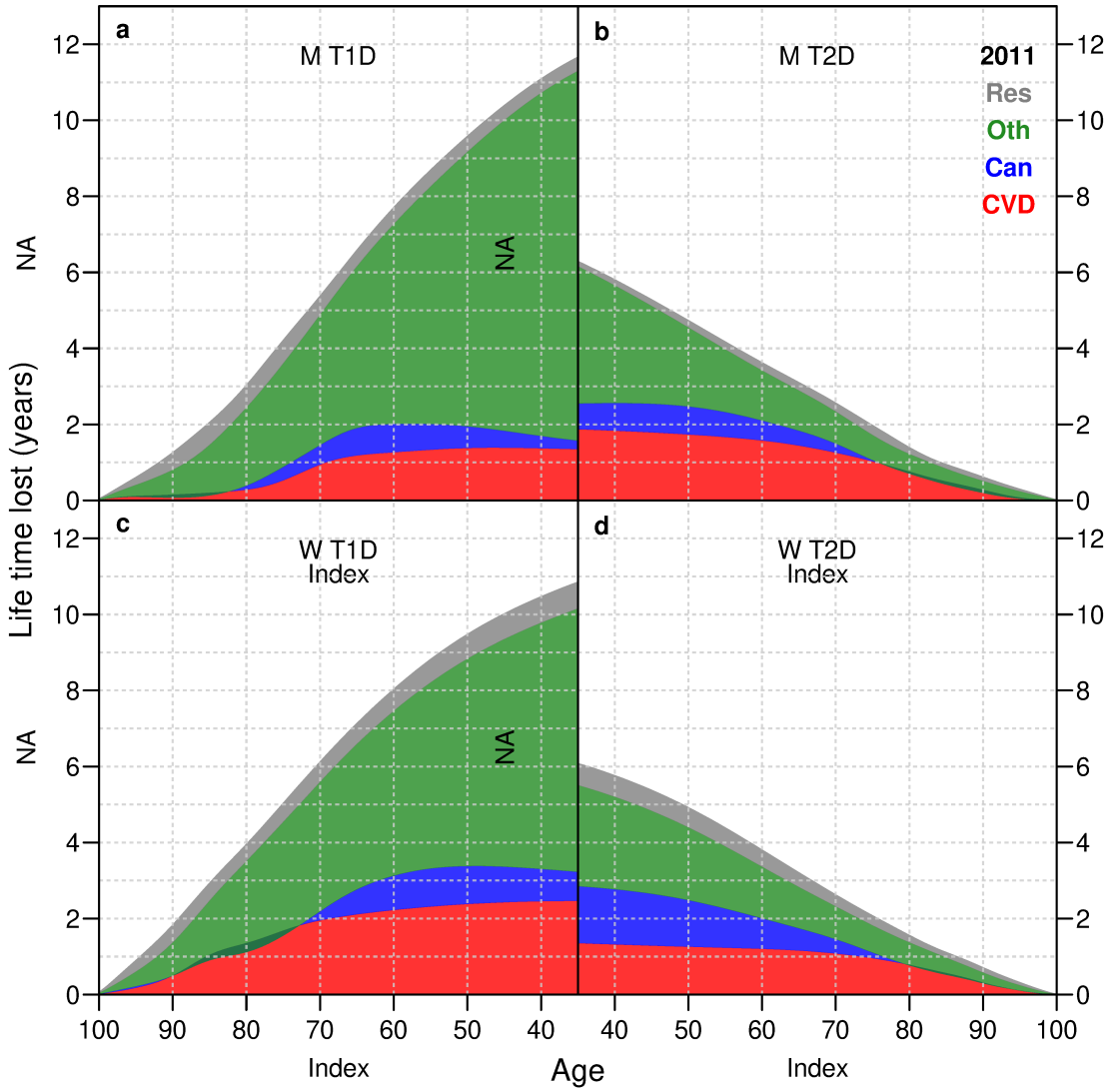

Figure ESM 5: *Years of life lost to different causes of death at 1 January 2011 by sex, ty of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to car type 1 diabetes patients (it is the overlap of red, blue and gr This areas). therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

Figures **19**

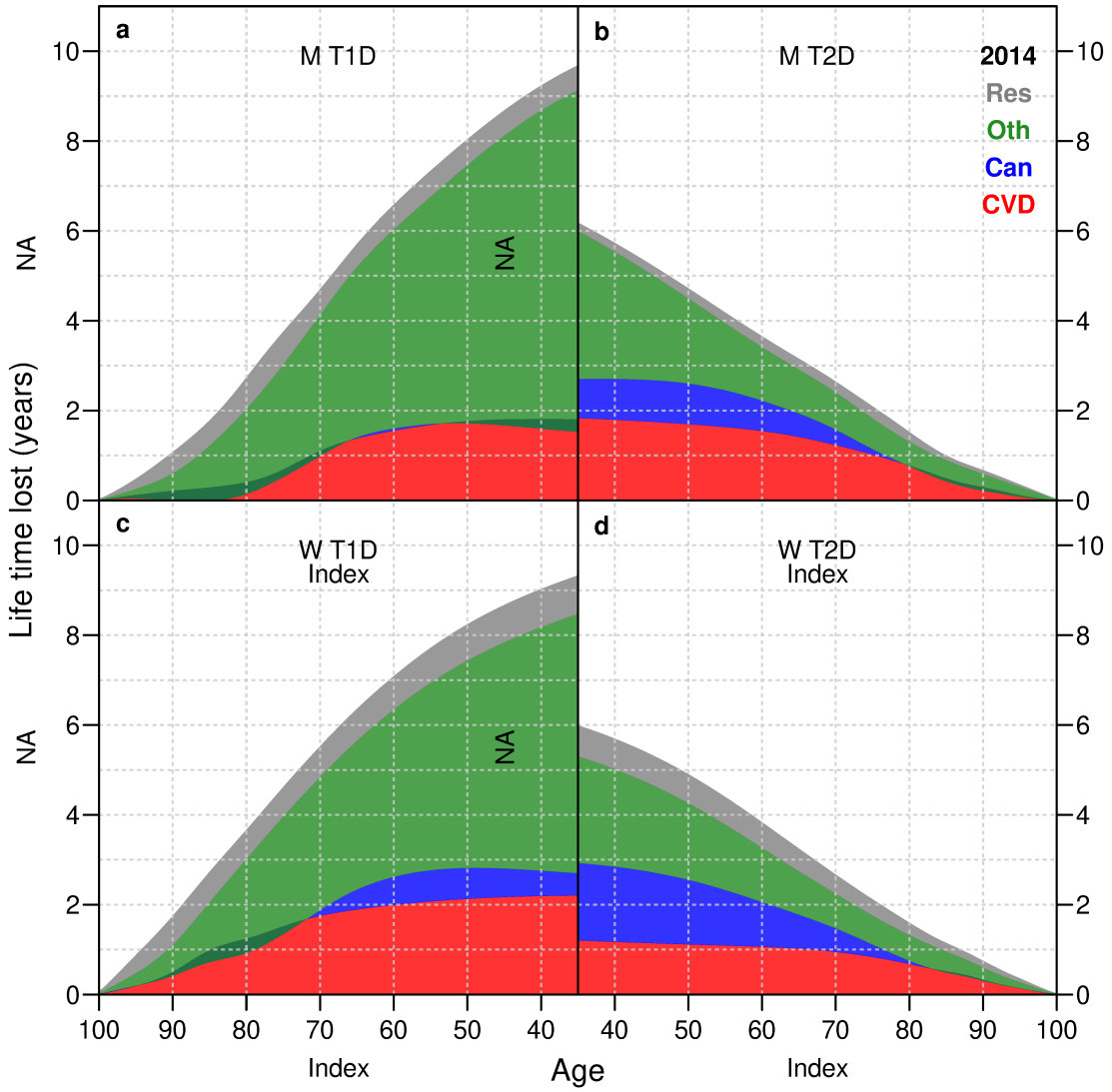

Figure ESM 6: *Years of life lost to different causes of death at 1 January 2014 by sex, ty of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to car type 1 diabetes patients (it is the overlap of red, blue and gre This areas) therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

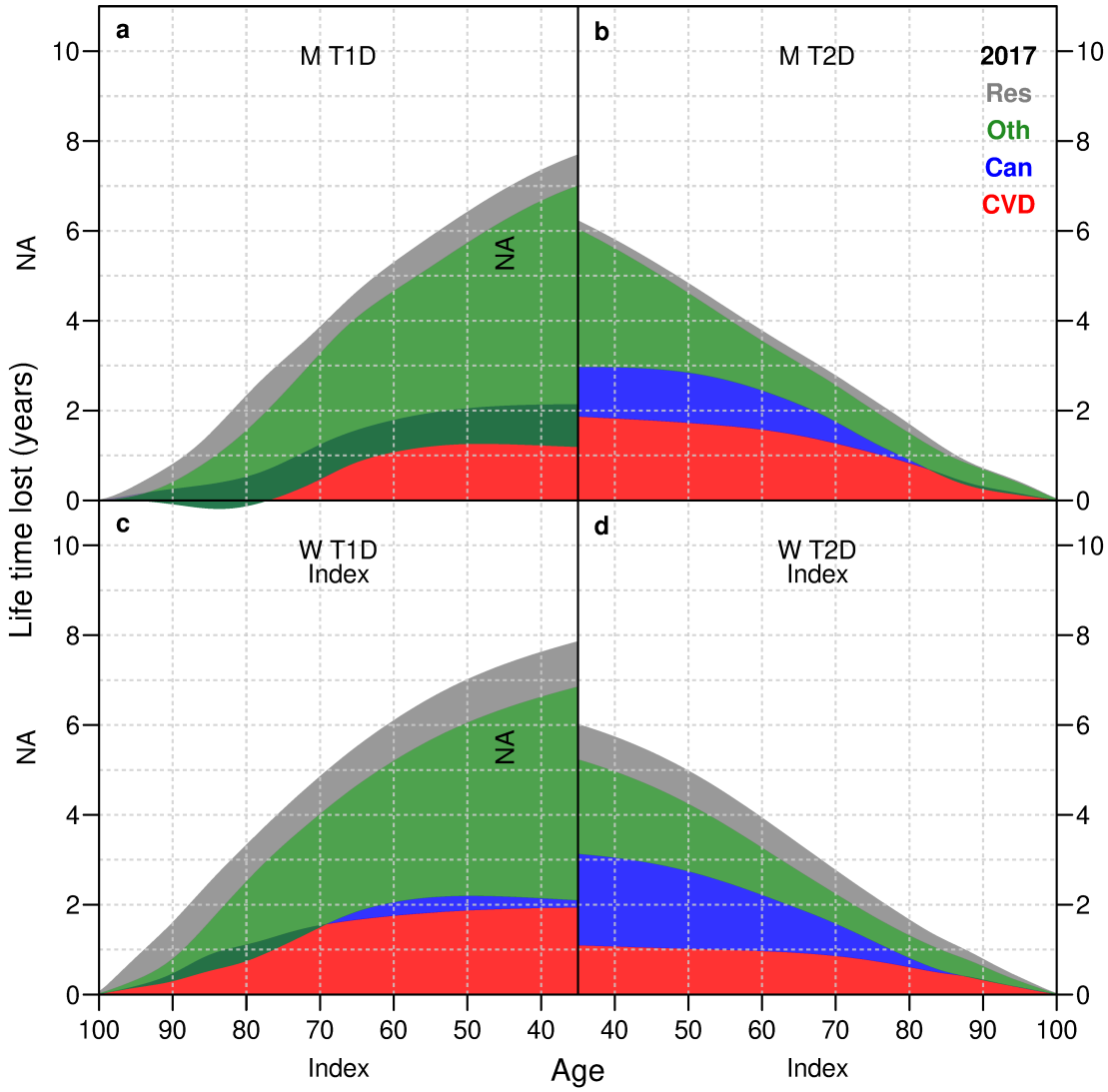

Figure ESM 7: *Years of life lost to different causes of death at 1 January 2017 by sex, ty of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to car type 1 diabetes patients (it is the overlap of red, blue and gre This areas) therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

Figures **21**

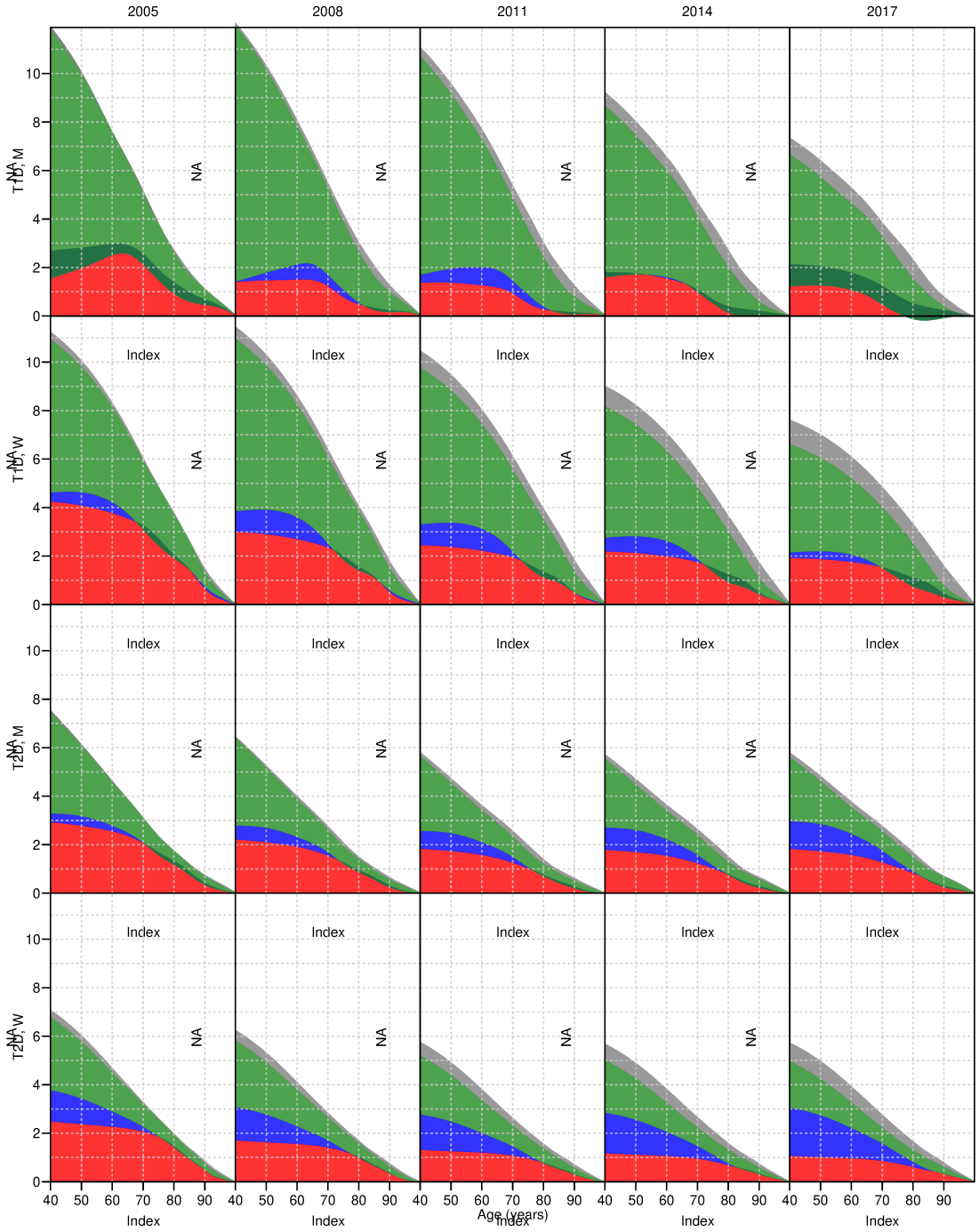

Figure ESM 8: *Years of life lost to different causes of death by date (1 January each year), sex, type of diabetes and age.*
Colours indicate cause of death: grey: Respiratory causes; green: other causes; blue: cancer; red:CVD. The dark green areas is equal to the negative *years of life lost to cancer for type 1 diabetes patients (it is the overlap of red, blue(negative) and green areas). This area is therefore part of both the CVD and the Other component.*

Tables **7**

Table ESM 1: *Events (diabetes diagnoses and deaths) and person-years (in 1000s) in the Danish population in the 21 year study period 1996-2016 subdivided by current diabetes status.*
The three parts of the P-years column correspond to the person-years (in 1000s) in the leftmost boxes (noDM, T1D, T2D) in figure ESM 1.1. The 14 combinations of type of diabetes (2 types) and cause of death (4 causes) on one hand and status (noDM, T1D, T2D) on the other hand correspond to the events (arrows) in figure ESM 1.1. Of course there are no diabetes events among persons with diabetes.

Status	Diabetes cases		Deaths by cause					
Period	T1D	T2D	CVD	Cancer	Respir	Other	All	P-years
No diabetes								
1996-1998	3,478	33,986	58,088	42,494	15,170	43,916	159,668	15,623.6
1999-2001	2,994	36,887	55,457	42,406	14,917	41,430	154,210	15,726.0
2002-2004	2,816	49,185	50,897	40,506	15,295	41,733	148,431	15,808.1
2005-2007	2,780	44,326	42,956	40,444	14,122	42,943	140,465	15,872.1
2008-2010	2,734	56,453	36,812	39,304	15,031	44,762	135,909	16,019.6
2011-2013	2,477	69,728	31,855	39,093	14,811	40,947	126,706	16,105.7
2014-2016	2,433	53,387	29,588	38,229	14,137	41,226	123,180	16,301.0
1996-2016	19,712	343,952	305,653	282,476	103,483	296,957	988,569	111,456.1
T1D								
1996-1998	.	.	868	290	137	671	1,966	68.1
1999-2001	.	.	997	365	130	643	2,135	71.2
2002-2004	.	.	835	333	175	860	2,203	73.1
2005-2007	.	.	610	397	137	950	2,094	74.4
2008-2010	.	.	501	402	183	803	1,889	73.3
2011-2013	.	.	348	284	157	643	1,432	71.0
2014-2016	.	.	243	237	113	450	1,043	70.0
1996-2016	.	.	4,402	2,308	1,032	5,020	12,762	501.1
T2D								
1996-2016	.	.	4,402	2,308	1,032	5,020	12,762	501.1
1996-1998	.	.	8,133	2,788	1,114	3,564	15,599	212.6
1999-2001	.	.	8,559	3,556	1,294	4,005	17,414	269.6
2002-2004	.	.	8,084	4,025	1,860	5,199	19,168	341.0
2005-2007	.	.	7,485	4,760	1,973	6,414	20,632	421.0
2008-2010	.	.	7,080	5,508	2,562	7,416	22,566	502.6
2011-2013	.	.	7,546	6,704	3,013	7,907	25,170	631.1
2014-2016	.	.	7,850	7,965	3,584	9,052	28,451	718.1
1996-2016	.	.	54,737	35,306	15,400	43,557	149,000	3,096.0

Table ESM 2: *Number of deaths in Denmark 1996–2016 by cause of death (10 groups*

				Other causes						
	CVD	Cancer	Respir	Diab	Digest	Extern	Infect	Other	Renal	Urinal
All	360,278	322,704	118,944	27,196	55,029	54,769	15,277	192,737	6,989	9,831
1996	22,542	15,216	5,691	629	2,428	3,371	530	10,030	195	405
1997	22,001	15,258	5,431	1,093	2,847	3,536	374	8,718	190	444
1998	21,270	15,180	5,284	1,195	2,804	3,409	350	7,894	223	451
1999	21,458	15,445	5,628	1,367	2,886	3,441	463	7,330	242	460
2000	20,535	15,486	5,227	1,434	2,801	3,357	374	7,346	238	429
2001	20,915	15,506	5,363	1,378	2,814	3,082	390	7,695	246	432
2002	20,447	14,967	5,822	1,462	2,830	2,593	732	8,611	373	484
2003	19,834	14,926	5,860	1,360	2,742	2,543	845	8,280	439	514
2004	18,559	15,217	5,420	1,289	2,759	2,434	812	8,177	398	544
2005	17,642	15,286	5,228	1,333	2,867	2,582	725	8,135	359	540
2006	17,001	15,636	5,261	1,306	2,924	2,672	799	8,589	383	627
2007	16,080	15,128	5,661	1,311	2,677	2,525	874	10,130	402	508
2008	15,119	15,231	5,639	1,297	2,758	2,468	720	10,253	314	462
2009	14,852	15,096	6,149	1,349	2,769	2,270	831	10,315	333	493
2010	14,492	15,384	5,850	1,257	2,718	2,067	918	10,627	394	408
2011	13,475	15,529	5,846	1,377	2,478	2,198	812	9,562	334	458
2012	13,419	15,786	5,861	1,338	2,306	2,144	919	9,615	398	373
2013	12,878	15,414	6,126	1,327	2,203	2,098	1,010	10,073	398	463
2014	12,489	15,605	5,674	1,320	2,229	2,105	924	9,775	364	456
2015	12,805	15,658	5,973	1,372	2,112	1,951	969	10,507	355	463
2016	12,464	15,744	5,950	1,401	2,077	1,923	906	11,074	411	417

Tables **9**

Table ESM 3: *Future years of life lost (1000s) among* currently prevalent diabetes patien *in Denmark at 1 January each year, and average years of life lost* per person *among these. Note that only every 3rd 1 January is shown.*

		Total YLL (1000s)			Average YLL	
	Date	T1D	T2D	DM	T1D	T2D
Men	1996	85.1	149.4	234.4	6.9	4.9
	1999	110.9	188.2	299.2	8.4	4.6
	2002	129.8	222.8	352.6	9.5	4.3
	2005	138.8	266.8	405.6	9.9	3.9
	2008	148.1	276.8	424.9	10.3	3.4
	2011	141.4	310.5	451.8	9.6	3.1
	2014	121.2	377.9	499.1	8.0	3.0
	2017	99.9	428.5	528.4	6.4	3.1
Women	1996	74.7	150.6	225.3	7.8	4.8
	1999	86.6	173.5	260.2	8.6	4.4
	2002	94.8	192.6	287.3	9.1	4.1
	2005	102.2	223.3	325.5	9.7	3.7
	2008	108.5	225.4	334.0	10.0	3.2
	2011	103.2	248.4	351.7	9.3	3.0
	2014	92.7	303.7	396.3	8.1	2.9
	2017	81.9	337.3	419.2	6.9	3.0
M+W	1996	159.8	300.0	459.7	7.3	4.9
	1999	197.6	361.8	559.3	8.5	4.5
	2002	224.6	415.4	639.9	9.3	4.2
	2005	241.0	490.1	731.1	9.8	3.8
	2008	256.7	502.2	758.8	10.2	3.3
	2011	244.6	558.9	803.5	9.5	3.0
	2014	213.9	681.5	895.4	8.0	3.0
	2017	181.8	765.8	947.6	6.6	3.0

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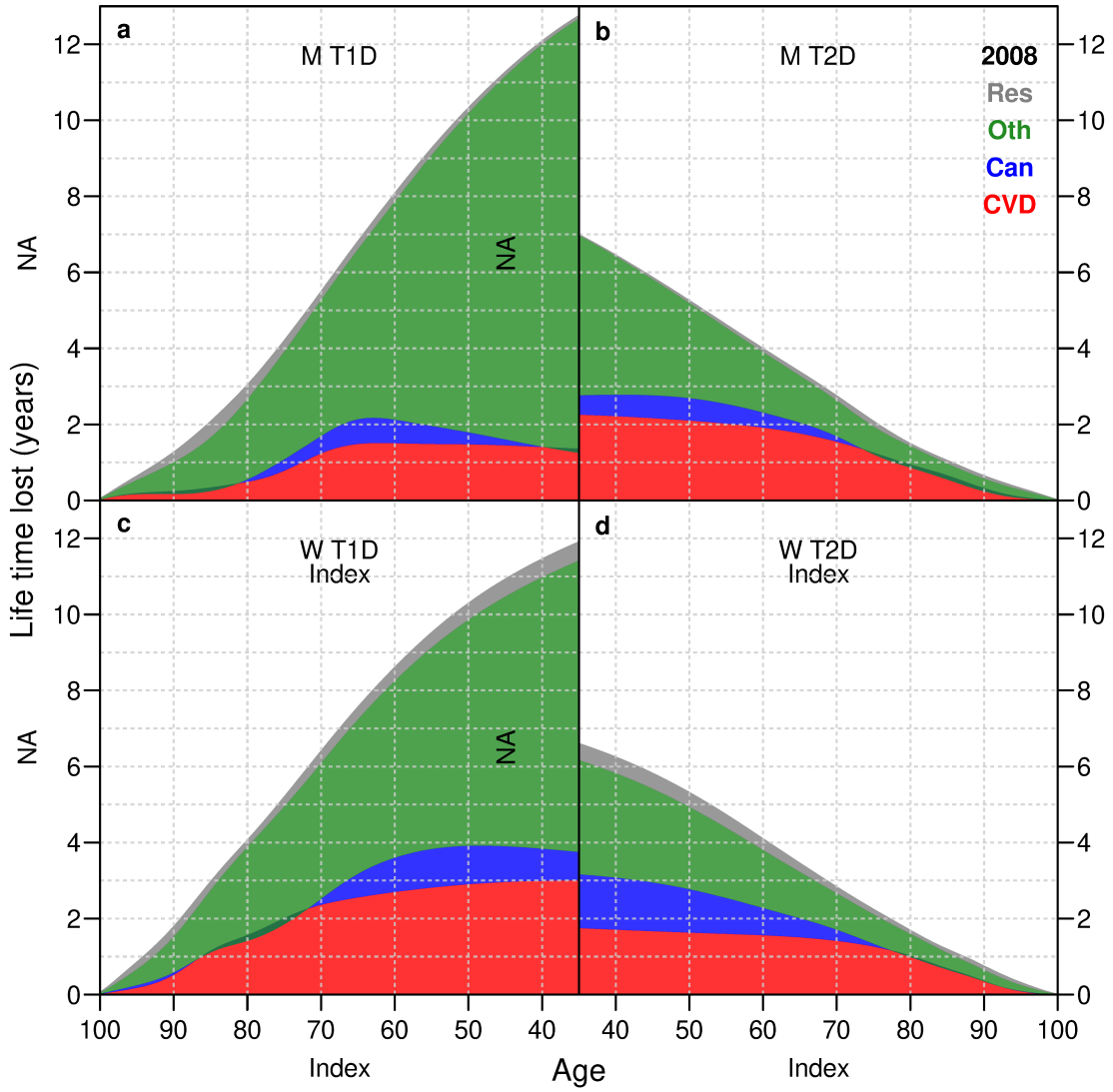

Figure ESM 4: *Years of life lost to different causes of death at 1 January 2008 by sex, ty of diabetes and age.*
The dark green areas in panels a and c is equal to the negative *years of life lost to car type 1 diabetes patients (it is the overlap of red, blue and gr This areas) therefore part of both the CVD and the Other component.*
a: Men, type 1 diabetes; b: Men, type 2 diabetes; c: Women, type 1 diabetes; d: Women, type 2 diabetes.
Colors: gray: Respiratory causes; green: other causes; blue: cancer; red: CVD.

Tables **11**

Table ESM 5 *Years of life lost to type 1 diabetes in the Danish population by cause of de at different dates and ages. Dates refer to 1 January every 3rd year.*

		CVD		Cancer		Respir.		Other		All causes	
Date	Age	M	W	M	W	M	W	M	W	M	W
1996	20	3.4	6.2	−2.0	−1.3	0.4	−0.1	7.9	6.4	9.7	11.2
	30	3.5	6.2	−2.0	−1.1	0.4	−0.1	7.3	5.7	9.3	10.6
	40	3.7	6.1	−1.9	−1.0	0.4	−0.1	6.1	4.7	8.3	9.7
	50	4.0	5.7	−1.6	−0.8	0.5	−0.2	3.6	3.6	6.6	8.3
	60	4.2	5.0	−1.3	−0.7	0.4	−0.4	1.4	2.3	4.7	6.4
	70	3.4	3.7	−1.2	−0.4	0.1	−0.5	0.4	1.3	2.7	4.1
	80	1.7	1.8	−0.8	0.0	0.2	−0.4	−0.1	0.6	1.1	2.0
1999	20	4.4	6.2	−2.2	−1.0	0.0	0.0	9.4	6.5	11.6	11.8
	30	4.5	6.3	−2.1	−0.9	0.0	0.0	8.7	5.8	11.1	11.2
	40	4.6	6.2	−2.0	−0.7	0.0	0.0	7.4	4.9	10.0	10.3
	50	4.9	5.8	−1.7	−0.5	0.1	−0.1	4.9	3.8	8.2	9.1
	60	5.1	5.2	−1.4	−0.5	0.0	−0.2	2.3	2.6	6.1	7.1
	70	4.2	4.1	−1.2	−0.5	−0.2	−0.3	1.0	1.6	3.7	4.9
	80	2.3	2.2	−0.8	−0.1	0.0	−0.3	0.3	0.8	1.8	2.6
2002	20	4.3	5.7	−2.1	−0.6	−0.3	0.2	11.0	6.9	12.9	12.2
	30	4.4	5.7	−2.0	−0.4	−0.3	0.2	10.2	6.1	12.3	11.6
	40	4.6	5.7	−1.9	−0.3	−0.3	0.1	8.7	5.2	11.1	10.8
	50	4.8	5.4	−1.6	−0.1	−0.2	0.1	6.3	4.1	9.3	9.5
	60	4.9	4.9	−1.2	−0.2	−0.2	0.0	3.4	3.0	6.9	7.7
	70	4.1	4.0	−1.1	−0.5	−0.4	−0.1	1.8	2.0	4.4	5.4
	80	2.3	2.3	−0.8	−0.1	−0.1	−0.2	0.9	1.1	2.3	3.1
2005	20	2.5	4.2	−1.4	0.1	−0.2	0.3	12.6	8.0	13.5	12.7
	30	2.6	4.3	−1.3	0.2	−0.2	0.3	11.8	7.2	12.9	12.0
	40	2.7	4.2	−1.1	0.4	−0.2	0.3	10.2	6.2	11.6	11.2
	50	2.8	4.1	−0.8	0.6	−0.1	0.3	7.8	5.1	9.7	9.9
	60	3.0	3.7	−0.4	0.4	0.0	0.2	4.8	3.8	7.3	8.1
	70	2.4	3.2	−0.5	−0.2	−0.1	0.1	2.9	2.8	4.8	5.8
	80	1.3	1.9	−0.5	−0.1	0.1	0.0	1.6	1.7	2.6	3.5

Table ESM 5 *(cont.) Years of life lost to type 1 diabetes in the entire Danish population cause of death at different dates and ages. Dates refer to 1 January every 3rd year.*

		CVD		Cancer		Respir.		Other		All causes	
Date	Age	M	W	M	W	M	W	M	W	M	W
2008	20	1.3	3.0	−0.3	0.5	0.1	0.5	12.8	8.9	13.9	12.9
	30	1.3	3.0	−0.2	0.7	0.1	0.5	12.0	8.1	13.2	12.2
	40	1.4	3.0	0.0	0.9	0.1	0.5	10.4	7.0	12.0	11.4
	50	1.5	2.9	0.3	1.0	0.2	0.4	8.1	5.8	10.1	10.2
	60	1.5	2.7	0.6	0.9	0.2	0.4	5.5	4.5	7.8	8.4
	70	1.2	2.3	0.4	0.1	0.3	0.3	3.4	3.5	5.3	6.2
	80	0.5	1.5	0.0	−0.1	0.4	0.2	2.0	2.3	2.9	3.9
2011	20	1.3	2.4	0.1	0.6	0.4	0.7	10.9	8.0	12.6	11.7
	30	1.3	2.5	0.2	0.7	0.4	0.7	10.2	7.3	12.0	11.1
	40	1.4	2.5	0.3	0.9	0.4	0.7	8.9	6.4	11.0	10.4
	50	1.4	2.4	0.6	1.0	0.4	0.6	7.0	5.3	9.4	9.4
	60	1.3	2.2	0.8	0.9	0.4	0.6	5.1	4.2	7.5	7.9
	70	0.9	1.9	0.5	0.1	0.5	0.5	3.3	3.3	5.2	5.9
	80	0.3	1.3	0.1	−0.2	0.6	0.5	1.9	2.2	2.8	3.8
2014	20	1.8	2.2	−0.4	0.4	0.6	0.9	8.4	6.6	10.4	10.0
	30	1.8	2.2	−0.3	0.4	0.6	0.9	7.9	6.0	10.0	9.5
	40	1.8	2.2	−0.2	0.6	0.6	0.8	7.0	5.3	9.1	9.0
	50	1.8	2.1	0.0	0.7	0.6	0.8	5.6	4.5	7.9	8.1
	60	1.5	2.0	0.0	0.6	0.5	0.7	4.3	3.6	6.4	6.9
	70	1.0	1.7	−0.1	0.1	0.6	0.7	3.0	2.9	4.5	5.4
	80	0.4	1.2	−0.3	−0.3	0.7	0.7	1.8	1.9	2.5	3.5
2017	20	2.1	1.9	−1.0	0.1	0.7	1.0	6.4	5.4	8.2	8.4
	30	2.1	1.9	−1.0	0.1	0.7	1.0	6.1	5.0	7.9	8.0
	40	2.1	1.9	−0.9	0.2	0.7	1.0	5.4	4.4	7.3	7.6
	50	2.0	1.9	−0.8	0.3	0.7	1.0	4.4	3.8	6.3	6.9
	60	1.7	1.7	−0.7	0.3	0.6	0.9	3.5	3.1	5.2	6.0
	70	1.2	1.5	−0.8	−0.1	0.6	0.8	2.7	2.5	3.7	4.7
	80	0.5	1.1	−0.6	−0.4	0.7	0.8	1.6	1.6	2.2	3.2

Tables **13**

Table ESM 6 *Years of life lost to type 2 diabetes in the Danish population by cause of de at different dates and ages. Dates refer to 1 January every 3rd year.*

		CVD		Cancer		Respir.		Other		All causes	
Date	Age	M	W	M	W	M	W	M	W	M	W
1996	20	6.8	6.6	−0.6	1.0	−0.7	−0.1	6.4	3.8	11.9	11.3
	30	6.8	6.4	−0.4	1.0	−0.6	−0.1	5.2	3.3	10.9	10.6
	40	6.6	6.1	−0.3	1.0	−0.6	−0.2	3.8	2.6	9.5	9.5
	50	6.3	5.9	−0.2	0.7	−0.6	−0.2	2.2	1.7	7.7	8.1
	60	5.8	5.6	−0.3	0.2	−0.6	−0.3	0.8	0.8	5.7	6.3
	70	4.7	4.9	−0.3	0.0	−0.5	−0.3	−0.1	−0.1	3.8	4.5
	80	2.9	3.0	−0.3	0.0	−0.3	−0.1	−0.3	−0.3	2.0	2.5
1999	20	5.2	5.1	−0.3	1.1	−0.5	0.0	6.6	3.9	11.1	10.2
	30	5.2	4.9	−0.2	1.2	−0.5	0.0	5.5	3.5	10.0	9.6
	40	5.0	4.7	0.0	1.1	−0.4	0.0	4.1	2.8	8.7	8.6
	50	4.8	4.5	0.0	0.8	−0.4	0.0	2.7	2.0	7.1	7.3
	60	4.5	4.3	−0.1	0.4	−0.4	−0.1	1.3	1.2	5.2	5.7
	70	3.6	3.9	−0.2	0.0	−0.4	−0.2	0.4	0.3	3.4	4.0
	80	2.3	2.4	−0.2	0.0	−0.2	−0.1	0.0	0.0	1.9	2.3
2002	20	4.0	3.8	−0.1	1.2	−0.3	0.2	6.8	4.0	10.3	9.3
	30	3.9	3.7	0.0	1.2	−0.3	0.2	5.7	3.6	9.3	8.7
	40	3.8	3.5	0.2	1.2	−0.3	0.2	4.3	3.0	8.1	7.8
	50	3.6	3.4	0.2	0.9	−0.2	0.1	2.9	2.2	6.5	6.6
	60	3.3	3.2	0.1	0.5	−0.2	0.0	1.7	1.4	4.9	5.1
	70	2.6	2.9	−0.1	0.1	−0.2	−0.1	0.8	0.7	3.2	3.6
	80	1.7	1.9	−0.2	0.0	−0.1	0.0	0.4	0.3	1.8	2.1
2005	20	3.0	2.7	0.1	1.3	−0.2	0.3	6.4	3.9	9.4	8.3
	30	3.0	2.6	0.2	1.3	−0.1	0.3	5.4	3.5	8.5	7.8
	40	2.9	2.5	0.4	1.3	−0.1	0.3	4.1	2.9	7.3	7.0
	50	2.8	2.4	0.4	1.0	−0.1	0.3	2.8	2.3	5.9	5.9
	60	2.5	2.3	0.2	0.6	0.0	0.2	1.8	1.5	4.4	4.6
	70	2.0	2.0	0.0	0.2	0.0	0.1	1.0	0.9	3.0	3.2
	80	1.3	1.4	−0.2	0.0	0.0	0.0	0.5	0.5	1.7	1.9

Table ESM 6 *(cont.) Years of life lost to type 2 diabetes in the Danish population by cau of death at different dates and ages. Dates refer to 1 January every 3rd year.*

		CVD		Cancer		Respir.		Other		All causes	
Date	Age	M	W	M	W	M	W	M	W	M	W
2008	20	2.3	1.8	0.3	1.4	0.0	0.5	5.6	3.6	8.2	7.3
	30	2.3	1.8	0.5	1.4	0.0	0.5	4.6	3.2	7.4	6.9
	40	2.2	1.7	0.6	1.4	0.1	0.4	3.5	2.7	6.4	6.2
	50	2.1	1.6	0.6	1.1	0.1	0.4	2.4	2.1	5.1	5.2
	60	1.9	1.6	0.4	0.7	0.1	0.3	1.5	1.5	3.9	4.0
	70	1.5	1.4	0.1	0.2	0.1	0.2	0.9	0.9	2.6	2.7
	80	0.9	1.0	−0.1	0.0	0.1	0.1	0.5	0.6	1.4	1.6
2011	20	1.9	1.4	0.5	1.5	0.1	0.6	4.8	3.2	7.4	6.7
	30	1.9	1.4	0.6	1.5	0.1	0.6	4.0	2.8	6.7	6.3
	40	1.8	1.3	0.7	1.4	0.2	0.6	3.0	2.4	5.7	5.7
	50	1.7	1.3	0.7	1.2	0.2	0.5	2.0	1.9	4.6	4.8
	60	1.6	1.2	0.5	0.8	0.2	0.4	1.3	1.3	3.5	3.7
	70	1.2	1.1	0.2	0.3	0.2	0.3	0.8	0.8	2.5	2.5
	80	0.7	0.7	−0.1	0.0	0.2	0.2	0.5	0.6	1.3	1.5
2014	20	1.9	1.3	0.7	1.8	0.2	0.7	4.4	2.8	7.2	6.6
	30	1.9	1.2	0.8	1.7	0.2	0.7	3.6	2.5	6.5	6.2
	40	1.8	1.2	0.9	1.7	0.2	0.7	2.7	2.1	5.6	5.6
	50	1.7	1.1	0.9	1.4	0.2	0.6	1.8	1.7	4.6	4.8
	60	1.5	1.1	0.6	0.9	0.2	0.6	1.1	1.2	3.6	3.7
	70	1.2	0.9	0.3	0.5	0.2	0.4	0.8	0.7	2.5	2.6
	80	0.7	0.6	0.0	0.0	0.2	0.3	0.5	0.6	1.4	1.5
2017	20	1.9	1.2	1.0	2.1	0.2	0.8	4.1	2.5	7.2	6.5
	30	1.9	1.1	1.1	2.1	0.2	0.8	3.4	2.2	6.5	6.2
	40	1.8	1.1	1.1	2.0	0.2	0.8	2.6	1.9	5.7	5.7
	50	1.7	1.0	1.1	1.7	0.2	0.7	1.7	1.5	4.7	4.9
	60	1.6	1.0	0.8	1.2	0.2	0.7	1.1	1.0	3.7	3.8
	70	1.2	0.8	0.4	0.7	0.2	0.5	0.8	0.6	2.7	2.7
	80	0.8	0.6	0.0	0.2	0.2	0.3	0.6	0.5	1.6	1.6