Trends in prevalence, incidence and mortality of T1 and T2 diabetes in Denmark 1996–2017

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1 Abstract

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Keywords

2 Research in context

What is already known about this subject?

- Incidence of T2D have been increasing, T1D diabetes in childhood too, but less so than T2D
- There are indications that incidence of T2D is decreasing or at least showing a slower increase

What is the key question?

- Is there a real decrease of T2D around the time of the HbA1c criteria?
- How is incidence of T1D in older ages?
- Is there as substantial mortality difference between T1D and T1D patients?
- Is the relative mortality of diabetes patients relative to population mortality still decreasing?

What are the new findings?

- Incidence of T1D is fairly stable over the age-span 30–70
- A decline in incidence of T2D was seen after 2012, but there are indications that rates increase again after 2015.
- The mortality of T1D patients is some XX(20)% higher than that of T2D patients

How might this impact on clinical practice in the foreseeable future?

- The excess mortality of T1D patients may require a closer focus on prevention of complications and there by lowering mortality in T1D patients

3 Introduction

We really are the best...

4 Material and methods

4.1 Register data

4.1.1 Diabetes data

We constructed a Danish diabetes register from existing Danish health care registers. We included persons as diabetes patients on the earliest of the following dates from the registers:

- first diagnosis of diabetes (ICD-8: 249, 250; ICD-10: E10, E11) in the National Patient Register (NPR; 1977–)
- first use of “podiatry for diabetes patients” in the National Health Services Register (NHSR, 1990–)
- first date of purchase of any anti-diabetic medication (ATC A10xxx) in the Medines Products Register (“Prescription register”) (MPR, 1995–)
- earliest mentioned date of diagnosis mentioned in the Danish Adult Diabetes Database (DADD, 2005–) (a clinical quality data base, with annual reports on patients)
- earliest date of eye examination recorded in the diaBase (diaB, 2009–) (a clinical quality data base for eye screening of diabetes patients)

Dates within 30 days prior and 365 days after a recorded diagnosis of gestational diabetes were disregarded. Dates of metformin purchase between a date of PCOS and the woman’s 40th birthday were disregarded. Purchase of metformin in women between 20 and 40 were disregarded because purchase of metformin alone was considered most likely to be part of treatment of infertility in a PCOS patient.

Type of diabetes Persons purchasing OAD before age 15 or insulin before age 30 were considered T1D. Persons in the register were classified as T1D if the majority of the person's records in the DADD classified the person as T1D, or, if the persons was not classified in DADD the majority of the patient's records from NPR calssified the person as T1D. The main source of T1D status was the DADD, which however only comprise persons alive at 2005 or later, so the sensitivity of the T1D classification is declining backwards in time prior to 2005.

Time-range of the register As the MPR is complete from 1995-01-01, we assumed that if the first recorded anti-diabetic drug purchase was after 1996-01-01 (*i.e.* after a year with no purchase), it was a first purchase. Hence, we assumed the constructed register to be reliable as incidence register from 1996-01-01, with the persons in the register alive as of that date to be a reliable roster of prevalent cases. On the other hand, this implies that dates of entry to the register that are before 1996-01-01 are unreliable as dates of diagnosis of diabetes. The latter limits analyses involving durtion of diabetes to persons included after 1996-01-01.

4.1.2 Population data

At Statistics Denmark we had acces to complete register information on the entire Danish population, including dates of birth, emigration, immigration and death. With the above register information we classified all follow-up time (person-years) in the entire Danish population as being without diabetes or with T1 or T2 diabetes.

4.2 Tabulation of data

4.2.1 Prevalence

We tabulated the prevalent cases (persons alive with DM) of T1D and T2D separately, at 1 January 1996–2017 by sex and 1-year age group. The corresponding total population counts was derived from our total register of the Danish population.

4.2.2 Follow-up time

The time at risk was tabulated by diabetes status (no DM, T1D, T2D), sex, and age and date of diagnosis and date of birth in 1-year classes (Lexis triangles, [1]); periods efter emigration and before immigration were not counted. Moreover, the risk time among diabetes patients diagnosed after 1996-01-01 were further classified by duration of diabetes in 6 month intervals.

4.2.3 Incidence

New cases of DM occurring after 1996-01-01 were tabulated by sex, type of diabetes (T1D, T2D), and age and date of diagnosis and date of birth in 1-year classes (Lexis triangles).

4.2.4 Mortality

Deaths occurring after 1996-01-01 were tabulated by sex, diabetes status (no DM, T1D, T2D), duration of diabetes in 6 month classes, and age and date of death and date of birth in 1-year classes (Lexis triangles).

4.3 Statistical methods

All statistical models were fitted separately for men and women and T1D / T2D and total DM.

4.3.1 Prevalence

We modeled prevalence separately for each of the dates (1 Jan 1996–2017) by cubic splines by age, using a binomial model with log-link. The resulting curves were graphed against age. We also fitted models jointly for all dates assuming a constant annual relative change in prevalence.

4.3.2 Incidence rates

Incidence rates were modeled using Poisson models with log person time as offset and natural cubic spline effects of age and date of follow-up and date of birth (age-period-cohort (APC) model **??**), using 2015-01-01 as reference point for calendar time, thus rendering the age-specific rates estimates of the rates as of this date, the period effects estimates of RR relative to 2015-01-01 and the cohort effects as residual effects relative to this. We extracted the overall trend in rates from the APC models; moreover we also show the time-trends at different ages.

4.3.3 Mortality rates

Mortality rates were modeled using Poisson models with log person time as offset and natural cubic spine effects of age, duration of diabetes, age *at* diagnosis and calendar time, using 2015-01-01 as reference point for the calendar time, thus rendering the age-specific mortality rates estimates of the rates as of this date. As model check we also show the residuals by birth-date RRs from this model in the ESM.

Since the effects of current age, age at diagnosis and duration of diabetes cannot be separated (current age = age at diagnosis + duration), we reported the estimated mortality as a function of current age, using separate curves for persons diagnosed at ages 30, 45 etc. (different between T1D and T2d); each curve stretching from the age at diagnosis and 20 years on (20 years being the range of duration for which we have reliable information). The mortality curves are thus showing the *joint* effect of current age, age at diagnosis and duration of disease (see *e.g.* [2].)

Since only persons included after 1996-01-01 have a reliable date of diagnosis, we restricted the mortality analyses using age at diagnosis and duration to persons included after this date. Age-specific mortality rates ignoring age at diagnosis and duration were reported both for the restricted group of patients and for all patients (that is inclusing also the prevalent cases at 1996-01-01).

Analyses were made separately for men and women, and for type of diabetes as well as for all diabetes combined. We computed M/W mortality rate-ratios for each type of diabetes, and T1D/T2D mortality rate-ratios for men and women separately.

4.3.4 SMR

We used the data fro persons without DM to calculate mortality rates and expected number of deaths for T1D and T2D follow-up.

The SMR was modeled exactly as the mortality, by using the log of the expected number of deaths as offset deriving the SMR as the mortality rate-ratio between T1D, resp. T2D and no DM.

The SMR was modeled by current age, duration of diabetes and age at diagnosis exactly as mortality was modeled.

4.4 Hardware, software and documentaion

All registers mentioned were put at our disposal in anonymized, linkable form by the research service at Statistics Denmark. Only graphical and tabular information that holds no possibility for person identification can be taken out from Statsitics Denmark's servers; all tables and graphs in the paper were generated there. Approval for the project was granted by the Danish National Data Protection board.

For register processing we used SAS version 12.4, including the `%Lexis` macro [3]; for statistical analyses and grapics we used **R** version 3.5.0 [4], using the `Epi` package, version 2.30 [5].

Documentation of the construction of the register and the analysis files of prevalence and follow-up can be found in `http://BendixCarstensen.com/DMreg/NewReg.pdf`, and a complete account of all statistical analyses based on these is available in `http://BendixCarstensen.com/DMreg/NewAna.pdf`.

5 Results

5.1 Prevalence

The age-specific numbers respectively prevalences as of 1 January each of the years 1996–2017 are shown in figures 1 and 2 separately for T1D and T2D; table 1 shows the number of prevalent cases in Denmark at 1 January 1996–2017, and table 2 the corresponding crude percentages.

The peak *number* of prevalent cases (figure 1) coincides (not surprisingly) with the age of the 1947 generation — the largest birth cohort en Denmark.

The crude prevalence of T1D (0–99 years of age) hardly increased (from 0.50 to 0.57% for men and 0.38 to 0.45% for women), whereas the crude prevalence of T2D tripled over the study period— from 1.5 to 5.0% for men and from 1.4 to 4.2 for women.

The fraction of T1D diabetes patients among all diabetes patients has consequenltly dropped from over 20% in 1996-01-01 to 10% at 2017-01-01 (table 2).

The average annual relative increase in prevalence was 0.5% per year for T1D and 4.8% per year for T2D, with virtually no difference between men and women.

For T1D the age-specific prevalence increased till about age 40 and showed a moderate increase over the study period for ages up to about 60 (figure 2). The peak prevalence for men were 0.8% and for women 0.6%, bth about age 40. In the period prior to 2010 there was no substantial decrease in prevalence after age 40.

T2D has a peak age-specific prevalence at age 80 at 19% for men and 16% for women, and prevalence at all ages showed a substantial increase over time, overall 4.8% per year over the study period.

5.2 Incidence

The age-specific incidence rates as of 2015-01-01 are shown in figure 3, along with the rate-ratio by time and the birth cohort-residual rate-ratios. The estimated incidence rates (from the APC models) at different ages are shown as functions of date of follow-up in figure 4.

Incidence rates of T1D increased till late adolescence for both men and women, and remained at the peak level of 0.35 per 1000 PY for men, but for women decreased from the peak level of 0.25 per 1000 PY. (figure 3, upper panel). The overall decrease in incidence rates over the study period was 2.7%/year for men and 3.0%/year for women, the period effects showng very little deviation from linearity. There was cohort effect showing a change around birth date 1950; this is what is reflected in the differentila trends in rates at different ages in figure 4, where we saw slightly increasing incidence rates in young ages (some 2%/year), but decreasing incidence rates in older ages (about 5%/year at age 50) — ses ESM figure XX.

Incidence rates of T2D increased by age till about age 60 ahowed a plateau (at 13 resp. 10 cases per 1000 PY for men resp. women) till age 80, and was decreasing after this age (figure 3, lower panel). The overall increase was 2.3%/year for men and 2.2%/year for women, but the period effect was non-linear with a downturn 2012–2015; clearly visible in the lower panels of figure 4. The residual cohort effects are much less pronounced for T2D, but with an indication of change around birth year 1945.

Broadly speakng the incidence rates of T2D are at 2010-01-01 at a level which is 10 times the level of T1D, but it should be borne in mind that the age-shapes of incidence are very different.

5.3 Mortality and SMR

Mortality Figure 5 shows the mortality for T1D ad T2D patients by attained age, duration of diabetes and age at diagnosis of diabetes, as well as mortality RR by calendar time relative to 1 January 2015.

Both for T1D and T2D we saw an initial peak of mortality lasting some 2 years after date of diagnosis, corresponding to a halving of mortality for T1D during the first two years after diagnosis. After this we saw a very modest increase in mortality by age/duration for T1D patients, only for persons diagnosed at later ages (in figure 5 we show it for age 60), the mortality trend increases as in the analysis ignoring duration. Thus it seems that for T1D the mortality is smaller (at a given age) the earlier a person is diagnosed, that is the longer the diabetes duration; however the first 10 years larger than the overall mortality for T1D patients of the same age (dotted line in figure 5).

T2D patients also show an initial peak in mortality but ony with about 25% mortality decrease during the first 2 years. As opposed to T1D mortality the mortality among T2D patients follows the trend of the overall mortality (dotted line in figure 5), but also shows that the younger at diganosis (and hence the longer duration of diabetes) the higher the mortality — the vertical distance between curevs for persons diagnosed 15 years apart (and thus with 15 years difference in diabetes duration) corresponds to a 25% higher mortality.

We found that the M/W mortality RR (black curves in figure 5) was very close to 1.3 borh for T1D and and T2D, except that men with T2D diagnosis in young age seem to have faster increasing mortality than women of similar age and duration.

T1D vs. T2D mortality We also explored the mortality rate-ratio between T1D and T2D patients (figure 6), but owing to the differences in ages at diagnosis only looked at ages at diagnosis 30, 45 and 60; we saw that T1D had a higher mortality; the first few years after diagnosis exceeding 3-fold, but at 10 years of duration the T1D/T2D mortality RR was about 1.5, and decreasing. Ignoring duration altogether showed a T1D/T2D RR varying only modestly by age, at a level of 1.4 for men and 1.3 for women.

SMR Figure 7 shows the SMR, that is the diabetes mortality relative to the mortality among persons without diabetes. We found a pattern reflecting the mortality patterns with high SMRs shortly after diagnosis.

For T1D we found decreasing SMR by age/duration for a given age at diagnosis, with an overall SMR decraseing from 6 for men and 10 for women in childhood to 2 for both sexes in age 80. As expected we also saw an incraesing M/W ratio of SMR from about 0.5 in young age to 1 in older ages.

For T2D SMR we found that for a given age at diagnosis there was a constant SMR by age/duration, but a smaller SMR the older the age at diagnosis. Thus the decline in overall SMR by age is largely attributable to an effect of age at diagnosis.

6 Discussion

Registers are nice and we are at the forefront.

7 Conclusion

Prevalence of T1D has changed vary litte over the period (increasing 0.5% year), whereas T2D increased 4.5%/year. T1D prevalence at 2017-01-01 increased till 40 years of age at 0.8 resp. 0.6% for men and women, and then slowly decreases to about 0.6 resp. 0.5% at age 80.

Incidence
Mortality

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Table 1: *Number of prevalent diabetes patients in Denmark at 1 January each year 1996–2017 by diabetes type and sex.*

	T1D		T2D		% T1 of DM		All DM		
Date	M	W	M	W	M	W	M	W	M+W
1996	13,081	10,231	37,893	37,416	25.7	21.5	50,974	47,647	98,621
1997	13,446	10,430	41,389	40,157	24.5	20.6	54,835	50,587	105,422
1998	13,640	10,654	44,742	42,680	23.4	20.0	58,382	53,334	111,716
1999	13,923	10,808	48,854	45,836	22.2	19.1	62,777	56,644	119,421
2000	14,117	10,935	53,064	49,158	21.0	18.2	67,181	60,093	127,274
2001	14,339	11,048	58,328	53,205	19.7	17.2	72,667	64,253	136,920
2002	14,549	11,140	62,434	56,284	18.9	16.5	76,983	67,424	144,407
2003	14,646	11,223	67,358	60,603	17.9	15.6	82,004	71,826	153,830
2004	14,737	11,250	73,115	65,498	16.8	14.7	87,852	76,748	164,600
2005	14,838	11,372	79,181	70,548	15.8	13.9	94,019	81,920	175,939
2006	14,908	11,461	84,529	74,725	15.0	13.3	99,437	86,186	185,623
2007	15,034	11,545	89,645	78,425	14.4	12.8	104,679	89,970	194,649
2008	15,141	11,676	95,226	82,779	13.7	12.4	110,367	94,455	204,822
2009	15,280	11,816	101,990	88,075	13.0	11.8	117,270	99,891	217,161
2010	15,431	11,891	108,373	92,852	12.5	11.4	123,804	104,743	228,547
2011	15,532	11,981	115,601	98,262	11.8	10.9	131,133	110,243	241,376
2012	15,647	12,094	124,056	105,398	11.2	10.3	139,703	117,492	257,195
2013	15,779	12,197	129,916	110,423	10.8	9.9	145,695	122,620	268,315
2014	15,916	12,386	133,283	113,040	10.7	9.9	149,199	125,426	274,625
2015	16,118	12,578	136,317	115,145	10.6	9.8	152,435	127,723	280,158
2016	16,331	12,792	140,234	117,882	10.4	9.8	156,565	130,674	287,239
2017	16,534	12,923	144,754	121,071	10.3	9.6	161,288	133,994	295,282

Table 2: *Crude prevalence (%) of diabetes in Denmark at 1 January 1996–2017 by diabetes type and sex.*

	T1D		T2D		All DM		
Date	M	W	M	W	M	W	M+W
1996	0.50	0.38	1.46	1.40	1.96	1.79	1.87
1997	0.51	0.39	1.58	1.50	2.10	1.89	1.99
1998	0.52	0.40	1.70	1.59	2.22	1.98	2.10
1999	0.53	0.40	1.85	1.70	2.38	2.10	2.24
2000	0.53	0.40	2.01	1.82	2.54	2.22	2.38
2001	0.54	0.41	2.20	1.96	2.74	2.37	2.55
2002	0.55	0.41	2.34	2.07	2.89	2.48	2.68
2003	0.55	0.41	2.52	2.22	3.07	2.63	2.85
2004	0.55	0.41	2.73	2.39	3.28	2.81	3.04
2005	0.55	0.41	2.94	2.57	3.50	2.99	3.24
2006	0.55	0.42	3.13	2.72	3.69	3.13	3.41
2007	0.56	0.42	3.31	2.84	3.87	3.26	3.56
2008	0.56	0.42	3.50	2.99	4.05	3.41	3.73
2009	0.56	0.42	3.72	3.16	4.28	3.59	3.93
2010	0.56	0.43	3.94	3.32	4.50	3.74	4.12
2011	0.56	0.43	4.18	3.50	4.74	3.92	4.33
2012	0.56	0.43	4.47	3.74	5.03	4.17	4.60
2013	0.57	0.43	4.66	3.90	5.22	4.33	4.77
2014	0.57	0.44	4.75	3.98	5.32	4.41	4.86
2015	0.57	0.44	4.82	4.03	5.39	4.47	4.93
2016	0.57	0.44	4.91	4.09	5.49	4.54	5.01
2017	0.57	0.45	5.02	4.17	5.60	4.62	5.11

Table 3: *Number of incident diabetes cases during each year 1996–2016 by diabetes type and sex.*

	T1D		T2D		All DM		
Period	M	W	M	W	M	W	M+W
1996	725	527	6,269	5,345	6,994	5,872	12,866
1997	649	528	6,192	5,264	6,841	5,792	12,633
1998	714	503	7,019	5,844	7,733	6,347	14,080
1999	654	451	7,415	6,203	8,069	6,654	14,723
2000	692	479	8,450	7,005	9,142	7,484	16,626
2001	655	455	7,391	6,090	8,046	6,545	14,591
2002	621	423	8,410	7,474	9,031	7,897	16,928
2003	588	412	9,468	8,140	10,056	8,552	18,608
2004	583	453	9,782	8,288	10,365	8,741	19,106
2005	585	427	9,163	7,621	9,748	8,048	17,796
2006	584	440	9,050	7,193	9,634	7,633	17,267
2007	585	450	9,636	7,966	10,221	8,416	18,637
2008	603	438	10,831	8,792	11,434	9,230	20,664
2009	596	392	10,962	8,509	11,558	8,901	20,459
2010	587	405	11,876	9,333	12,463	9,738	22,201
2011	537	401	13,363	11,084	13,900	11,485	25,385
2012	517	347	10,981	9,013	11,498	9,360	20,858
2013	495	398	8,650	6,829	9,145	7,227	16,372
2014	495	398	8,637	6,443	9,132	6,841	15,973
2015	520	406	9,569	7,354	10,089	7,760	17,849
2016	518	363	10,404	7,819	10,922	8,182	19,104
Sum	12,503	9,096	193,518	157,609	206,021	166,705	372,726

Table 4: *Number of deaths among diabetes patients during each year 1996–2016 by diabetes type and sex. Only diabetes patients diagnosed from 1996-01-01.*

	T1D		T2D		All DM			non-DM
Period	M	W	M	W	M	W	M+W	M+W
1996	14	12	255	222	269	234	503	53,839
1997	28	16	577	455	605	471	1,076	53,020
1998	50	30	860	715	910	745	1,655	51,549
1999	85	34	1,217	908	1,302	942	2,244	51,971
2000	101	58	1,435	1,180	1,536	1,238	2,774	50,206
2001	97	83	1,737	1,356	1,834	1,439	3,273	50,734
2002	142	70	1,935	1,620	2,077	1,690	3,767	50,636
2003	141	100	2,282	1,834	2,423	1,934	4,357	49,446
2004	157	102	2,361	1,976	2,518	2,078	4,596	47,457
2005	197	113	2,606	2,200	2,803	2,313	5,116	46,474
2006	195	138	2,772	2,381	2,967	2,519	5,486	46,760
2007	239	144	3,032	2,556	3,271	2,700	5,971	46,875
2008	282	177	3,138	2,577	3,420	2,754	6,174	45,509
2009	290	195	3,569	2,851	3,859	3,046	6,905	45,277
2010	313	197	3,751	3,063	4,064	3,260	7,324	44,458
2011	278	183	3,950	3,102	4,228	3,285	7,513	42,738
2012	258	172	4,291	3,248	4,549	3,420	7,969	41,954
2013	253	160	4,510	3,488	4,763	3,648	8,411	41,713
2014	226	175	4,805	3,695	5,031	3,870	8,901	40,383
2015	230	170	4,983	3,967	5,213	4,137	9,350	41,216
2016	264	167	5,175	4,039	5,439	4,206	9,645	40,856

Table 5: *Number of deaths among diabetes patients during each year 1996–2016 by diabetes type and sex. Both diabetes patients diagnosed from 1996-01-01 as well as prevalent cases of diabetes at this date.*

	T1D		T2D		All DM			non-DM
Period	M	W	M	W	M	W	M+W	M+W
1996	363	334	2,798	2,621	3,161	2,955	6,116	53,839
1997	442	311	2,819	2,734	3,261	3,045	6,306	53,020
1998	420	340	2,928	2,709	3,348	3,049	6,397	51,549
1999	453	331	3,193	2,864	3,646	3,195	6,841	51,971
2000	453	361	3,168	2,965	3,621	3,326	6,947	50,206
2001	433	357	3,276	2,988	3,709	3,345	7,054	50,734
2002	513	324	3,464	3,128	3,977	3,452	7,429	50,636
2003	473	384	3,673	3,237	4,146	3,621	7,767	49,446
2004	468	319	3,672	3,181	4,140	3,500	7,640	47,457
2005	488	331	3,733	3,369	4,221	3,700	7,921	46,474
2006	465	348	3,883	3,446	4,348	3,794	8,142	46,760
2007	478	315	3,961	3,578	4,439	3,893	8,332	46,875
2008	458	310	4,048	3,452	4,506	3,762	8,268	45,509
2009	453	323	4,531	3,697	4,984	4,020	9,004	45,277
2010	463	308	4,547	3,876	5,010	4,184	9,194	44,458
2011	423	277	4,744	3,827	5,167	4,104	9,271	42,738
2012	369	237	5,065	3,922	5,434	4,159	9,593	41,954
2013	350	220	5,232	4,149	5,582	4,369	9,951	41,713
2014	293	215	5,528	4,264	5,821	4,479	10,300	40,383
2015	292	208	5,622	4,537	5,914	4,745	10,659	41,216
2016	305	215	5,788	4,532	6,093	4,747	10,840	40,856

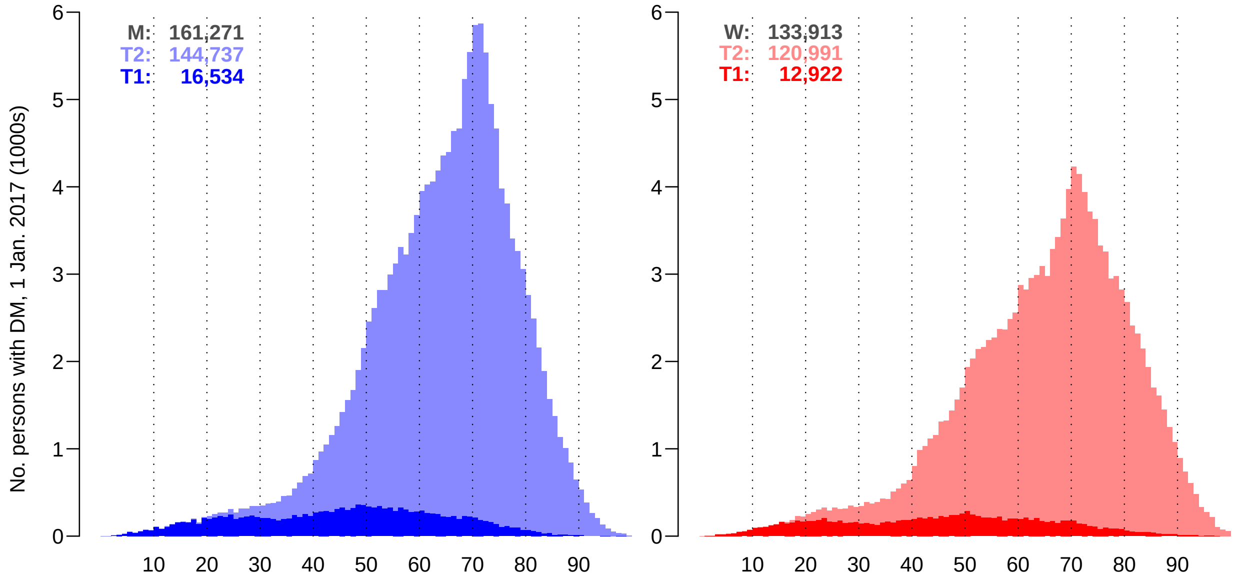

Figure 1: *Number of T1D (dark color), T2D (bright color) Denmark as of 1 January 2017, the blue bars are men, red women. The numbers in the indicate the number of prevalent cases, the black numbers are the total number of prevalent cases.*

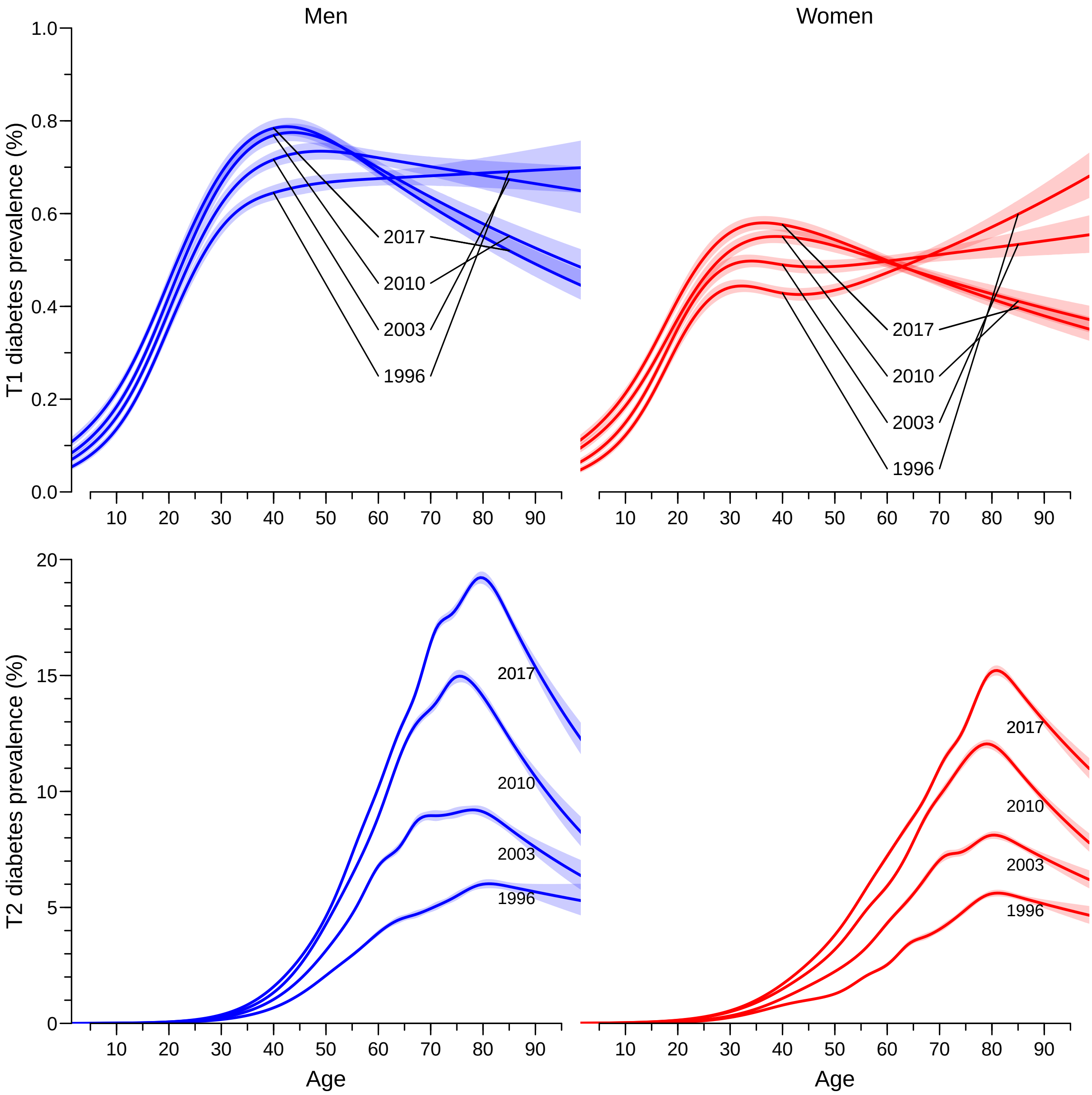

Figure 2: *Age-specific prevalence of (upper panels), T2D (lower panels) in Denmark as of 1 January 1996,2003,. . . ,2017. Not the different y-axes in between upper and lower panels. Blue curves are men, red curves women.*

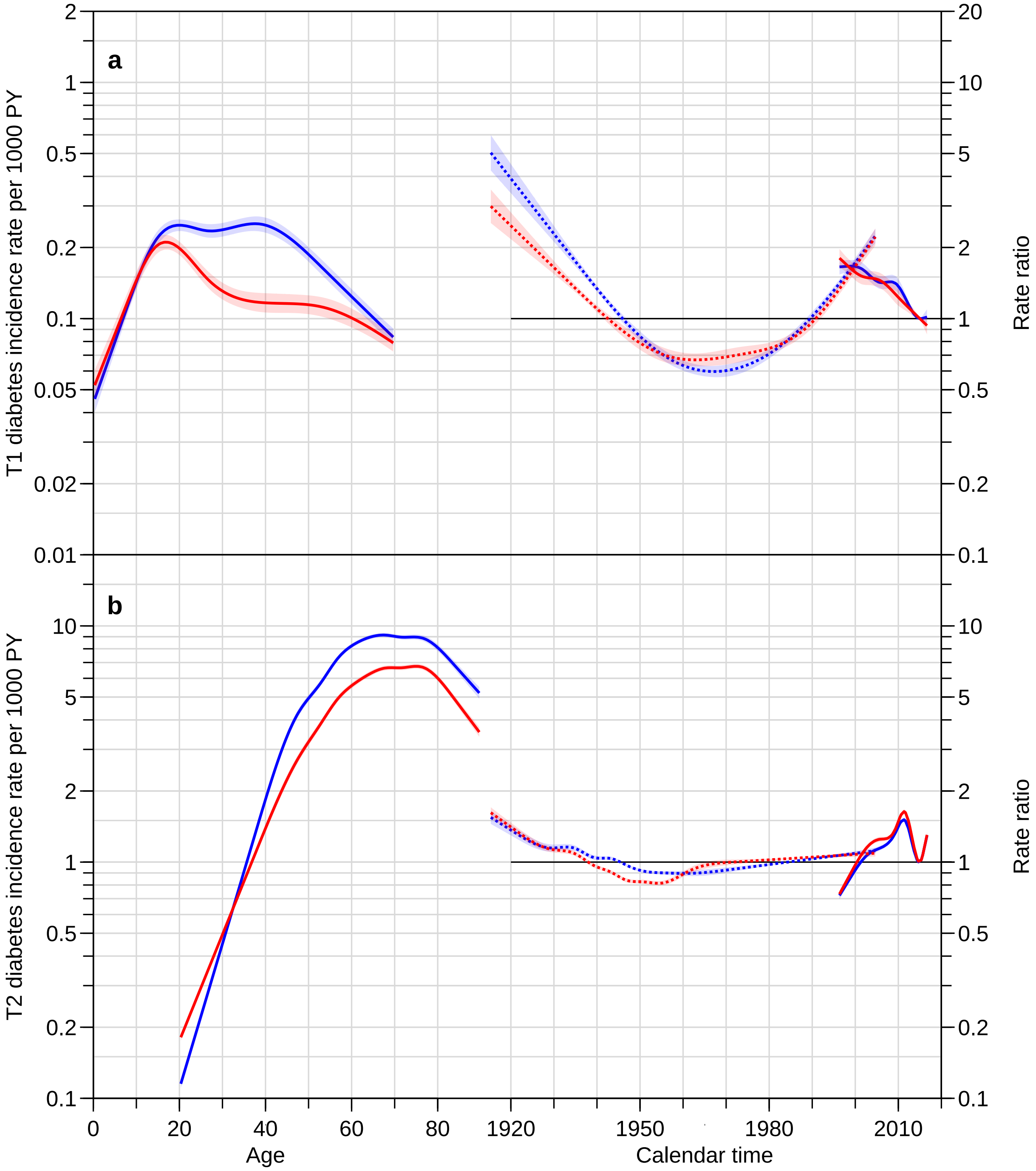

Figure 3: *Age-specific incidence rates (leftmost curves) as of 1 January 2015, period effects relative to this (rightmost curves, full lines) and cohort residual curves (middle set of curves — broke lines). Upper panel: T1D, lower panel: T2D. Blue curves are men, red curves women; shaded areas represent 95% confidence intervals.*

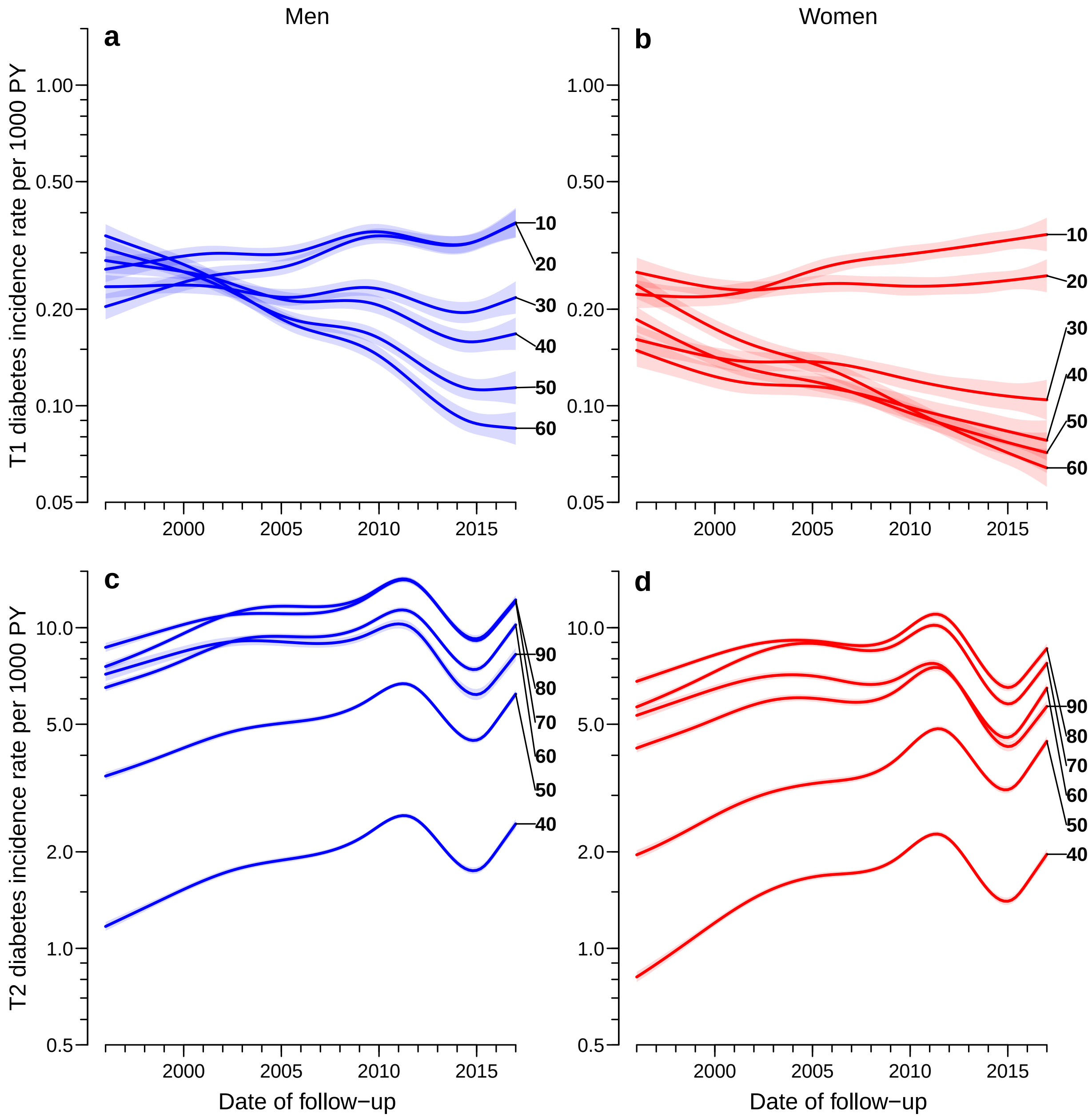

Figure 4: *Age-specific incidence rates in different ages as of 1 January 2015, derived from age-period-cohort models. Blue curves are men, red curves women; shaded areas represent 95% confidence intervals.*

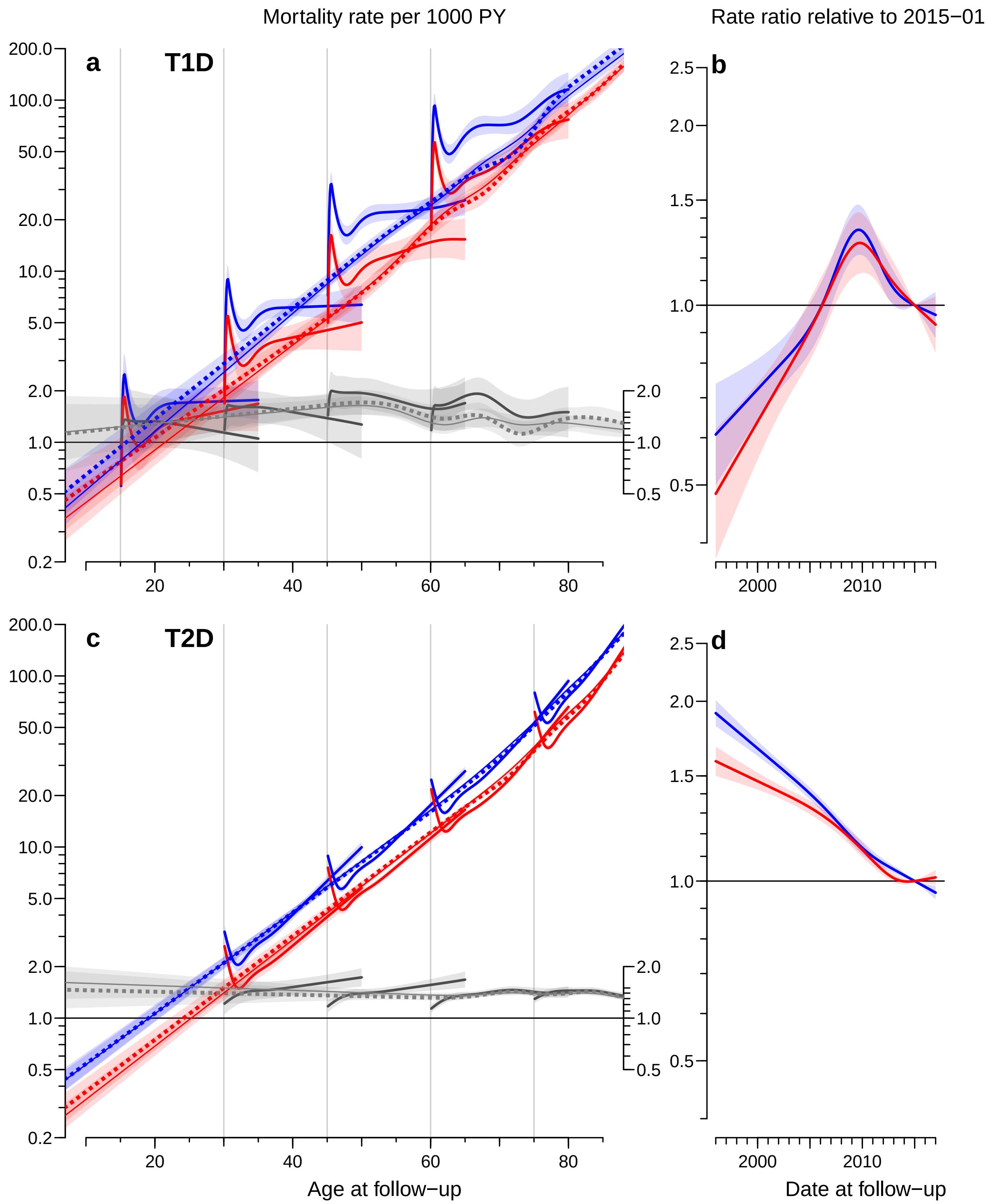

Figure 5: *Age-specific mortality rates as of 2015-01-01 (left panels) and hazard ratios relative to this (right panels) for T1D (upper panels) and T2D (lower panels). Each curve in the left panels represents the mortality among patients diagnosed in ages 15, 30, 45, 60 (T1D) or 30, 45, 60, 75 (T2D); thus the curves represent the* joint *effect of attained age, duration of diabetes and age at diagnosis.*
Thick dotted curves are from a model ignoring duration of diabetes; thin full curves also includes patienst prevalent as of 1996-01-01.
Blue curves are men, red curves women, black curves are M/W rate-ratios and shaded areas represent 95% confidence intervals.

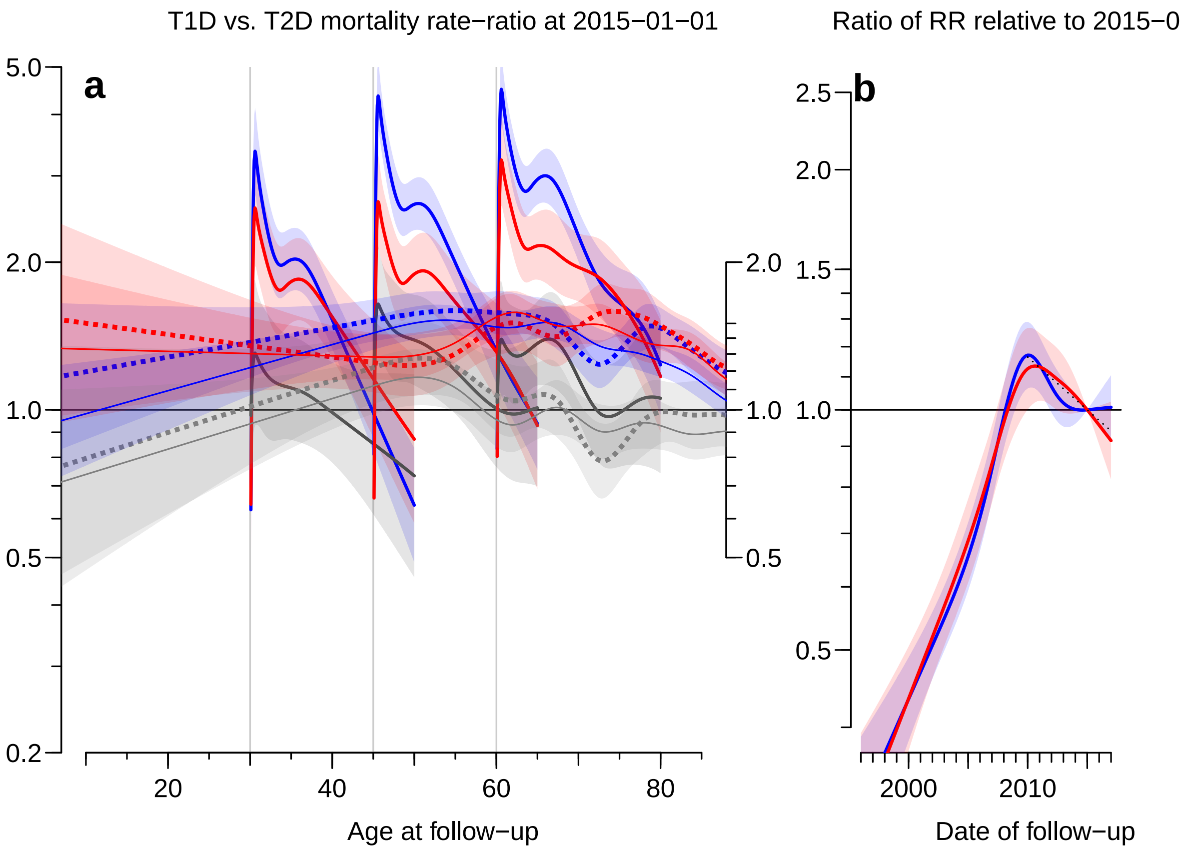

Figure 6: *Age-specific mortality rate-ratio between T1D and T2D as of 2015-01-01 (left panel) and ratios of RR relative to this (right panel). Each curve in the left panel represents the T1D/T2D mortality rate-ratio among patients diagnosed in ages 30, 45, 60; thus the curves represents the* joint *effect of attained age, duration of diabetes and age at diagnosis. Thick dotted curves are from a model ignoring duration of diabetes; thin full curves also includes patients prevalent as of 1996-01-01.*
Blue curves are men, red curves women, black curves are M/W ratios of RRs and shaded areas represent 95% confidence intervals.

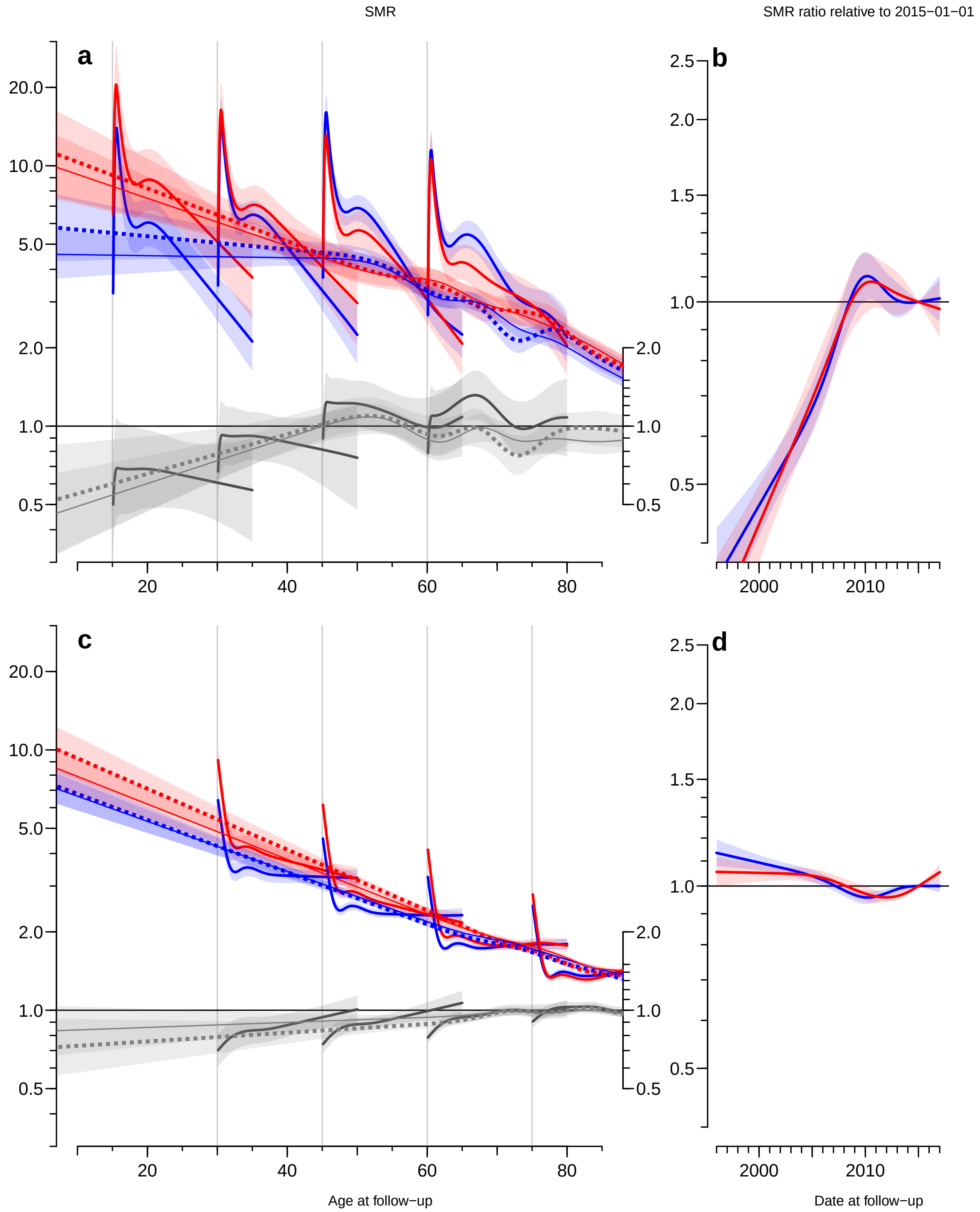

Figure 7: *Age-specific SMR (rate-ratio relative to non-DM population) as of 2015-01-01 (left panels) and SMR ratios relative to this (right panels) for T1D (upper panels) and T2D (lower panels). Each curve in the left panels represents the SMR among patients diagnosed in ages 15, 30, 45, 60 (T1D) or 30, 45, 60, 75 (T2D); thus the curves represents the* joint *effect of attained age, duration of diabetes and age at diagnosis.*
Thick dotted curves are from a model ignoring duration of diabetes; thin full curves also includes patienst prevalent as of 1996-01-01.
Blue curves are men, red curves women, black curves are M/W SMR-ratios and shaded areas represent 95% confidence intervals.