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Report of Eurostat's task force

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Executive summary

The use of a standard population is a very useful tool for comparisons of mortality rates, as well as other population-based rates as such disease incidence. Age standardization is one of the key methods to control for different age distributions among populations or over time. Comparing crude rates can in fact be misleading in terms of trends when the age composition in a population changes over time or when comparing groups or regions with different age-structure.

The European standard population in use for the standardization of crude rates dates back to 1976. During the ESSnet project 'Partnership Health — 2009-2011', a Task Force on the revision of the European standard population has been requested and supported by the Working Group on Public Health Statistics with the purpose of updating it to the changes in age-structure of the population occurred in the MS since the mid-seventies.

Three different potential standards were investigated and comparatively tested: the 2010 population estimates; the 2010-based population projections, averaged over the period 2011-30 or 2011-20. The analyses have been performed using both 85+ and 95+ upper bands for comparison.

Based on the work done by the TF, and agreed with the MS, the final revised European Standard Population (ESP) is the unweighted average of the individual populations of all countries in each 5-years age band (with the exception of under 5 and the highest band, as at present). Under the current conditions of data availability and quality, it was agreed that the highest band should be 95+. EU-27 plus EFTA countries have been included, based on the 2010-based population projections, averaged over the period 2011-30.

Acknowledgments

Production

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Introduction

Background

The use of a standard population is a very important tool for comparisons of mortality rates, as well as other population-based rates such as disease incidence or prevalence. Age standardization is one of the key methods to control for different age distributions among populations or over time. When comparing mortality patterns between countries, regions or periods, the differences in age and sex distribution are usually distracting, and standardization is in order.

The European population is ageing, and the demographic perspective of the EU is that the population is expected to increase until the mid-thirties of this century. Eurostat projections from 2008 to 2060 suggest that the age distribution will show a progressive shift to the older ages; the share of the population aged 65 and over is expected to increase in all countries and in particular the population aged 80 and over will increase both in relative and absolute terms ([4]). This age shift will have consequences for both all-cause mortality and the distribution of mortality by cause.

During the ESSnet project 'Partnership Health — 2009-2011', a Task Force on the revision of the European standard population has been requested and supported by the Working Group on Public Health Statistics and then established by the Core Group on Causes of Death Statistics ([5]).

The aim of the Task Force was to update the European Standard Population (ESP) published in 1976 ([6]) in the light of changes in the EU population, so as to provide a more current, methodologically sound and widely acceptable basis for the calculation of age standardized rates.

Discussion and agreement process

At the Working Group Public Health meeting in June 2009 Eurostat agreed to develop a Task Force on the revision of the standard population on the request of the Member States. The TF has been established and has worked during the ESSnet 'Public Health Statistics 2009-2011' project under the coordination of the Core Group on Causes of Death, in close collaboration with Eurostat Units F2 (Population) and F5 (Health Statistics) (The Task Force Terms of Reference are in Annex 1).

A draft report including the methodologies and the preliminary results based on the 2010 projections was presented at the CoD TG meeting on 5-6 May 2011 and at the Working Group on Public Health Statistics meeting on 28-29 June 2011. The draft report was well received by both groups and no comments were sent to the TF thereafter. The Core Group on CoD received also the draft report including the analyses of results at various stage of advancement; the CG discussed and commented the work done during the meetings held on 13-14 January 2011 in Brussels and on 7-8 July 2011 in Vienna.

The draft report was then finalized by September 2011, when the Task Force concluded its mandate. The ESSnet 'Partnership Health' project came to an end in October 2011.

On 20 December 2011 Eurostat launched a written consultation in order to have the final report discussed and agreed with the TG CoD representatives. The table 1 shows the results of the consultation. Some changes were made to the report based on the MS comments.

([4]) Konstantinos Giannakouris. Ageing characterises the demographic perspectives of the European societies. Eurostat, Statistics in focus 72/2008.

([5]) Members of the Core Group on Causes of Death 2009-2011 were: Monica Pace (IT, Leader), Eric Jougla (FR), Jozica Selb-Semerl (SI), Gleb Denissov (EE) , Jan Kardaun (NL), Anne Gro Pedersen (NO), Barbara Leitner (AT), Torsten Schelhase (DE), Peter Ocko (SK). The Core Group members participated as experts; based on the "Partnership Health" rules, procedures and code of conduct, they were not representing their own Country's official position on the issues discussed.

([6]) Waterhouse JAH, Muir CS, Correa P, Powell J, eds. Cancer incidence in five continents. Lyon: IARC, 1976; 3: 456.

Table 1: Summary of the written consultation addressed to the TG COD members on the TF 'Revision of the European standard population'

Agree without comments	Agree with comments for incorporation / change	Disagree	No answer	Total
BE, BG, DE, EE, IE, EL, FR, CY, LT, LU, HU, NL, AT, PL, PT, SI, UK, NO, CH, HR	CZ ('not sure' stated), ES, IT, FI	MT, SK,	DK, LV, RO, SE, IS, TR, MK	
20	4	2	7	33

In May 2012 a written consultation was launched to the Working Group Public Health. The Ms expressed their appreciation for the work done by the TF, especially for the methodology used and the clear structure of the report which covers all the relevant issues necessary to address the problem and find appropriate solutions.

The table 2 shows the results of this first consultation with the WGPH.

Table 2: Comments received by the first written consultation addressed to the WGPH members on the TF 'Revision of the European standard population'

Agree	Disagree	No answer/Neutral /Not sure	Total
BE*, BG, CH, DE, EL(*), FI, FR, HR, HU, IS, IT, LT, LU, LV, NO, PL, PT, RO, SK, UK	AT, CZ, ES, IE, MT	DK, CY, EE, NL, SI, SE, TR, MK	
20	5	8	33

(*) No answer received from WGPH. The reported answer is based on Technical Group on Causes of Death positive opinion.

Despite the good agreement expressed by the WGPH members, Eurostat decided to ask the WGPH a second opinion on the basis the comments received and the availability of some preliminary data on the 2011 population census ([7]). Two options were presented to the MS during the WGPH meeting in September 2012: 1. to postpone the adoption of the new reference population once the census results would have become available; 2. to adopt the new reference population. The final opinions from the MS were made available on November 2012 and are summarized in Table 3.

([7]) The document presented at the WGPH 2012 is available at: https://circabc.europa.eu/w/browse/74d75a8d-896e-4037-a92b-60deb12c663c (Item 8.3 Annex 2).

Table 3: WGPH opinion on options 1 vs 2 on the adoption of the revised standard population — Follow up of the WGPH meeting held in September 2012

In favour of Option 1 – Postpone	In favour of Option 2 – Implement now	No answer/Neutral	Total
CZ, CY, SK, EE, DE, HR, FR, PT, EL, RO	UK, BE, BG, IT, IS, IE, LT, PL, NO, SE, CH, FI, LU, LV, HU, SI	ES, AT, DK, MT, NL, TR, MK	
10	16	7	33

Based on this process that was kept transparent in each phase, Eurostat decided to proceed with the implementation of the revised standard population in 2013.

Beside the close collaboration established between F2 and F5 Units in Eurostat, DG-SANCO and WHO participate to all the TG CoD meetings; DG-SANCO, WHO and OECD participate to all the Working Group 'Public Health' meetings. No specific comments or disagreement were expressed by any of these Institutions during the whole agreement process for establishing a revised standard population for the EU.

Agreement on conceptual issues

Criteria followed

The TF met on 10 September 2010 and on 6 September 2011; during the two meetings the members discussed and analyzed the overall methodological issues, relevant international literature, and the results of tests on different potential ESPs. A number of key decisions were taken, of which the most important were:

— The core geography should be the EU-27 plus EFTA ([8]).

— The base population should be an unweighted average of all the considered populations.

— Age bands should be kept as at present, but with the possibility of an older highest age band of 95+.

— Disaggregation by sex is not necessary.

— There should be the minimum necessary changes to format and presentation.

Details of these recommendations and their rationale are given in the following paragraphs.

Options for the time period

The TF discussed different options for the time period/data source basis of calculation of the standard and decided to investigate three possibilities in depth:

— The 2010 population estimates,

— The 2010-based population projections, averaged over the period 2011-30 or 2011-20.

The 1976 ESP and the three above mentioned populations are shown in Annex C. The arguments on these three options are reported in Chapter 3.

Analysis of overall mortality and selected causes of death

Members of the TF have carried out analysis of overall mortality and selected causes of death (malignant neoplasms, prostate cancer, cervical cancer, diseases of the circulatory system, pneumonia, external causes of death) for EU-27 + EFTA and for each of these countries, based on the populations mentioned in the above paragraph.

The testing results are reported in Annexes D-E. The TF conclusions based on the results of testing are reported in Chapter 3. The TF recommendations are reported in Chapter 6, the proposed standard population is reported in Annex F.

([8]) EFTA countries include: Iceland, Norway and Switzerland.

Characteristics of the proposed standard

Geographical coverage

The TF discussed several options for the geographical coverage (inclusion of countries) of the new ESP:

— The EU-27 states.

— The EU-27 plus EFTA states (with some variations).

— The EU-27 states plus candidate (and possibly potential candidate) members.

— The whole of the WHO Europe region.

The main issues considered were:

— That while the purpose of a standard population is to enable better comparison of mortality (and morbidity) in populations with different age structures, its validity and the plausibility of the rates produced may be reduced if populations with excessively different structures are included, or if there are major between-country differences in the age distribution of (for example) a specific cause of death.

— The mandate of Eurostat and its remit to collect population data, which relate primarily to the existing MS. However, it was noted that Eurostat collects data from 50 countries of Europe. In addition, comparative statistics for the European area are widely used by states and international organizations outside the formal EU institutions.

— The availability and completeness of data, including time series data. Data quality issues were considered of primary importance with the choice of the geographical area of reference.

— The relative similarity of population structures within each group of countries. It was agreed that the inclusion of some countries whose populations differed too widely from the majority of the EU-27 would reduce the validity of comparisons and the credibility of the ESP with users.

— The benefits of statistical coherence with other organizations, mainly the WHO and OECD. It was thought that this was desirable, but could not be an over-riding consideration.

— The group noted that there might be revision in population size and structure following the results of the 2011 census due to March 2014. On the other side, this report reflects the best solution given that the mandate of the TF finished by September 2011.

The TF agreed in the light of the above issues that the geographical coverage of the new ESP should be the EU-27 plus EFTA. This would relate the ESP closely to Eurostat's mandate and avoid the potential problems which might be caused by the inclusion of a range of countries with wider demographic differences. It would also avoid possible issues with the availability of comparable data for a wider group of countries.

Geographical aggregation

The TF considered two approaches to geographical aggregation of the basis population (subject to the discussion above on geographical coverage): the sum of the whole European population, and the average of the populations of the MS + EFTA.

The 'sum' approach was defined as the sum of the populations of all countries in each age band. It was considered that the advantage of the 'sum' approach is that the new ESP would represent the real aggregate population structure of a 'single Europe'. The disadvantage is that the result would predominantly reflect the population structures of the largest countries. The smaller countries might therefore consider the ESP to be less relevant to them. It was noted that a weighted average of the

populations of the countries, according to their total population size, would be effectively the same as the 'sum' approach and did not need to be considered as a separate option.

The 'average' approach was defined as the unweighted average (mean) of the individual populations of all countries in each age band. The advantage of the 'average' approach is that the ESP would represent all countries equally, preventing doubts about its relevance to the smaller MS. The disadvantage is that the ESP would be more arbitrary than in the 'sum' option, as it would not directly represent any real population.

The TF agreed to use the unweighted average age structure of the populations of EU-27 and EFTA countries. The TF considered that the ESP is designed as a population weighting for the calculation of directly standardized rates. As such, the actual values are in a sense arbitrary and should avoid false precision; representation of a specific 'real' population is not essential.

Age bands

The TF discussed the size of the age bands, particularly whether to use single years of age as opposed to the five year bands in the current ESP, and also the size of the upper (unlimited) age band.

It was considered that the advantages of five year age bands are:

— Five year age bands are commonly used in demographic and epidemiological calculations, and many mortality and other data sets are produced in this form.

— Use of a small number of age bands keeps the format of the ESP simple and easy to apply.

— Advanced users who need standard populations for single years, or for age groups that cross the defined age bands, can already use the ESP to construct these.

The disadvantage is that a closer approximation to the real population could be obtained by using single years of age.

The advantage of using single years of age is that users could conceivably benefit from the greater detail of a single year of age standard. The disadvantages are that:

— The ESP would be much more detailed, and thus awkward to apply.

— Many existing systems will be set up to use five year bands and would need to be adapted, or the single years aggregated into bands by the users.

— Single year estimates were thought to provide an inappropriate level of false precision, given the purpose of the ESP as a weighting tool for comparisons.

It was thought that, in principle, the upper age band should be as old as the basis data allow, having in mind that caution should be applied because of the potential quality issues of the data at older ages. Users can aggregate the upper bands as required to match their own data sets. The availability of the population is 100+ and mortality data is currently 95+ (some countries provided data in the past up to 85+). A breakdown of causes of death data extended to 105+ will be collected from 2014 based on the EC Regulation n°328/2011 on Causes of Death. Therefore, the analyses have been performed using both 85+ and 95+ upper bands for comparison.

The TF agreed that the ESP should continue to be in five year age bands (with the exception of under 5 and the highest band, as at present). Under the current conditions of data availability and quality, it was agreed that the highest band should be 95+.

Disaggregation by sex

The TF discussed the option of disaggregating the new ESP by sex, in contrast to the current version. It was considered that the advantage of disaggregation by sex is that there is known to be a sex difference in the population structure, with longer female life expectancy and therefore a higher proportion of the female population in the older age bands. Disaggregation by sex would thus be a more accurate reflection

of the real population. There would be some improvement in accuracy for comparisons of single-sex diseases such as breast and prostate cancer.

The disadvantages are that disaggregation by sex would make the ESP more complex to use, and is not necessary for most foreseeable comparative uses. Only a few significant diseases are single-sex. Importantly, disaggregation by sex would make it more difficult to compare mortality or incidence rates between the sexes.

The TF agreed that disaggregation by sex is not necessary. It is important to be able to compare rates between the sexes. Also, this change would add complexity and increased risk of error by users with little additional analytical value.

Basis time period/data source

It was agreed that data provided by Eurostat should be used. The TF discussed the most appropriate basis time period and data source for the new ESP at length, and identified four options:

— Empirical data, i.e. based on the numbers reported in a past census year.

— Theoretical data, i.e. figures based on a model such as a stationary population associated to a life table.

— Estimated data (cross-sectional or time-point estimates), i.e. figures for a past or current year estimated using demographic methodologies which combine census data, population register data, vital events and migration. It was suggested that the annual estimates provided by the countries to Eurostat, in particular referring to the year 2010, should be used.

— Projected data, i.e. figures incorporating past and current empirical and estimated data, and in addition using demographic methodologies to predict future changes. It was agreed that the Eurostat 2010-based population projections should be used, averaged over a future period 2011-30 or 2011-20.

The argument for the use of empirical data is that it has a clear advantage of being based on the actually observed real population, without any theoretical assumptions and subject to less sources of error. The argument against is that the availability of such data is limited to census years and to those countries collecting census data on a comparable basis. It was agreed that the 2001 census round is too far in the past, while data from the 2011 census round would not be available until 2014. Consequently, this option was excluded.

The argument for the use of theoretical data is that it could use established demographic methods and need not depend on obtaining data for any specific time period. The arguments against are that this approach would be highly dependent on the choice of input data and on theoretical assumptions, which would influence resulting statistical models. It was also thought that this approach would be difficult for users to understand. Consequently, this option was excluded.

The arguments for the use of estimated data are that:

— Data for EU-27 and EFTA regularly available in Eurostat are in principle an acceptable estimate for population size and age structure.

— Estimates are dependent on the estimation methodology and the quality of the contributing data sources, but are relatively free from theoretical assumptions and do not involve the need to predict future trends.

— Estimates for 2010 would be timely for the revision process and provide a good time point on which to base the new ESP.

— As it is expected that key historical time series will have to be revised back 10 or 20 years once the new ESP is implemented, and the new standard is expected to be used for some 20 years in the future, a time point close to the present would be central in the overall time span.

The main argument against is that because of the 'drift' in the accuracy of estimates as they move further from the last census year, the 2010 estimates risk being substantially inaccurate, at least for some countries. It is known that errors, especially concerning migration, accumulate over time.

The arguments for the use of projected data are that:

— Because of the known trend in ageing of the population and its expected continuation, it is desirable to make the new ESP as 'future proof' as possible. This could be done by basing the standard on an average of the annual projections for a twenty year period, 2011-30, or shorter, 2011-20.

— Eurostat population projections are available for a long time horizon and for a few countries outside the EU-27, including EFTA.

The main arguments against the use of projections are that:

— Basing the standard on a time period in the future might reduce its suitability for the revision of historical time series.

— Projections are dependent on the assumptions made, which are uncertain by nature. Their reliability decreases with distance from the present, so use of a 10 to 20 year time span involved some uncertainty. A standard based on projections would thus be less factually based.

The TF discussed also which period of projections is to be used:

Elements in favour of using the 2011-30 projections instead of 2011-20 are:

— The methodology for the projections is well consolidated and tested over many years, therefore the level of uncertainty on a twenty-years time span can be acceptable;

— The 2011-30 projections are more oriented to the envisaged future trends in overall and cause-specific mortality in the considered populations especially for those countries with the older age-structure: in some cases the age-standardized rates using 2011-20 projections are already below crude rates;

— A reference population based on data from a very short-term projection (on average 4 years from now) could be more questionable, due to its temporal proximity to currently available population data. Therefore, the choice of 2011-20 projected population could be not justified compared to the 2010 estimates.

Elements in favour of using the 2011-20 projections instead of 2011-30 are:

— 2011-20 projections are oriented more towards the future than 2010, which is already becoming outdated in relation to some MS populations;

— 2011-20 projections involve a shorter period of projection than 2011-30, and therefore has greater certainty to its estimation;

— 2011-20 projections depart less from the current crude rates of most MS than 2011-30, and therefore will be more descriptive of the real position in the current decade and easier to communicate to users.

Based on the discussion and on the results of testing (see below), the TF agreed to recommend the use of the standard based on the 2011-30 population projections.

Result of testing

Possible standards have been calculated and are shown in Annex C. It should be noted that the application of rounding has been discussed by the TF, however, the reported are analyses based on the unrounded figures.

As expected, all the considered populations are substantially older in structure than the 1976 ESP (Annex C). The greatest differences are at ages 1-19, where the new populations are much smaller, and ages 60+ where those populations are somewhat larger.

The Spearman's correlation test performed on overall mortality rates using the 1976, 2010, 2011-20 and 2011-30 potential standards, shows that the rank order of countries does not change significantly; the correlation matrix is reported on Table 4 below and the graph for EU-27 + EFTA is reported on Figure 1. The same test has been performed on the selected causes of death; these results are reported in Annex D and show a significant positive correlation of the countries ranking when the different standards are compared by cause

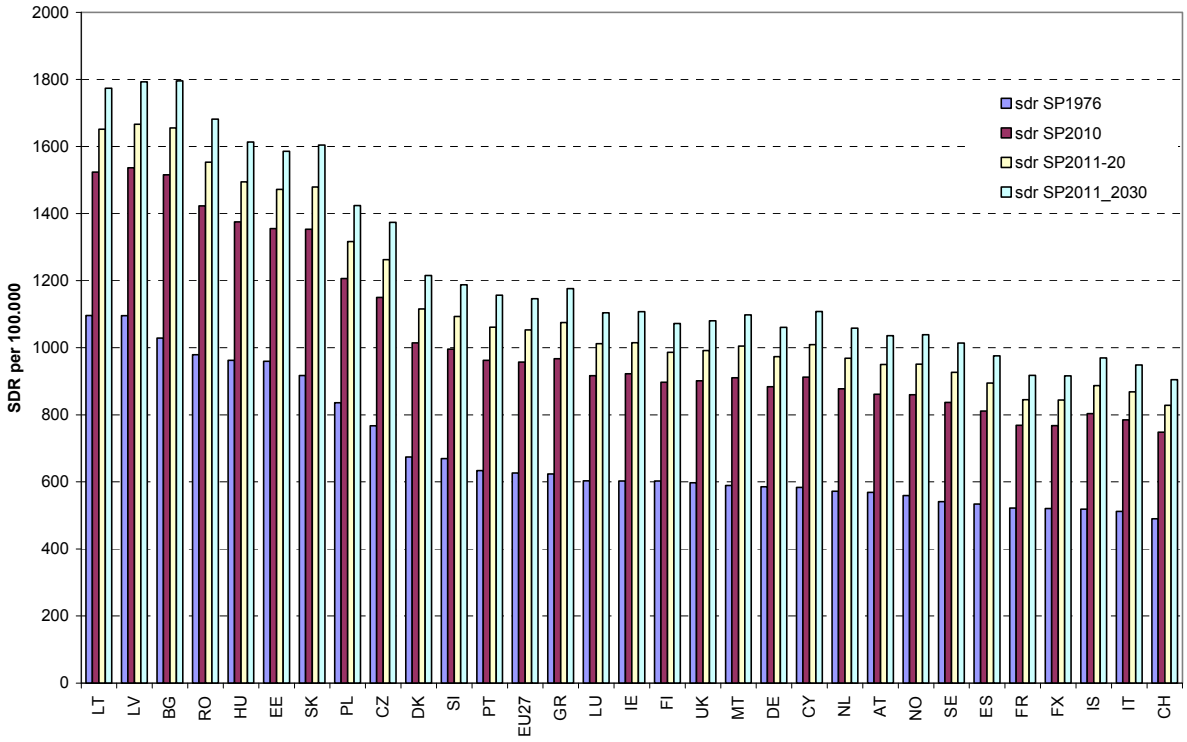
Table 4: Spearman's rank correlation coefficients calculated for standardised death rates ([1]) (sdr) by country based on different standard populations (SP)
(Overall mortality, Year 2007, N = 30)

	sdr_SP1976	sdr_SP2010	sdr_SP2011_20	sdr_SP2011_2030
sdr_SP1976	1.00000	0.98974	0.98790	0.98314
p value [(2)]		*<.0001*	*<.0001*	*<.0001*
sdr_SP2010	0.98974	1.00000	0.99890	0.99707
p value	*<.0001*		*<.0001*	*<.0001*
sdr_SP2011_20	0.98790	0.99890	1.00000	0.99853
p value	*<.0001*	*<.0001*		*<.0001*
sdr_SP2011_2030	0.98314	0.99707	0.99853	1.00000
p value	*<.0001*	*<.0001*	*<.0001*	

([1]) Upper age group for direct standardization: 85 years and over.

([2]) Probability values computed from a t distribution with N-2 degrees of freedom.

Figure 1: All causes EU-27 + EFTA countries (2007) — ranked



Standardized rates using the 2010 standard are (from 2000 to 2009) on average some 49 % higher than equivalents using the 1976 ESP, reflecting the change in age structure. The increase is greatest for circulatory diseases (61 %) and neoplasms (39 %) and less for external causes (21 %). Standardized rates using the 2010 standard are much closer than those using the 1976 ESP to the equivalent crude rates for the 2000s. This reflects the much better approximation of the 2010 standard to actual population structures in the period, and is consistent with the expected age distributions of deaths from the causes selected.

Standardized rates using the 2011-30 standard are on average some 79 % higher than equivalents using the 1976 ESP. The increase is greatest for circulatory diseases (97 %) and neoplasms (61 %) and less for external causes (31 %). This reflects the better approximation of the 2011-30 standard to actual population structures towards the end of the period, and is also consistent with the expected age distributions of deaths from the causes selected.

The above-mentioned results are based on Table 5. As a general result, the rates calculated by using the new potential standards are higher when compared with those calculated with the 1976 standard. This is particularly true for causes with risk of dying strongly increasing with age (malignant neoplasms, circulatory diseases and pneumonia.

Changing the standard population resulted in a variation of the rates' magnitude but not a significant change of the mortality trends (see also Figures 2, 3 — by cause, and Annex E — by country and cause for 85+ and 95+).

Table 5: Age-adjusted death rates ([1]) and percent change based on the different standard populations ([2]) for the European Union (27 countries), selected causes of death

Cause of death	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Percent change 2000-09
All causes (A00-Y89)											
SP 1976	721,9	706,2	723,0	705,1	673,1	666,4	636,2	626,2	620,4	600,6	-16,8
SP 2010	1069,5	1045,7	1072,3	1052,5	1002,9	994,2	947,4	957,3	939,5	895,8	-16,2
SP 2011-20	1172,7	1147,3	1177,3	1157,6	1102,6	1093,4	1040,6	1053,2	1033,7	984,2	-16,1
SP 2011-30	1274,4	1247,0	1280,0	1260,0	1199,6	1189,8	1131,6	1146,1	1124,9	1070,3	-16,0
Malignant neoplasms (C00-C97)											
SP 1976	187,2	186,1	189,7	182,5	179,9	177,6	175,0	173,2	173,0	169,0	-9,7
SP 2010	257,6	256,7	261,2	252,1	248,7	245,5	242,4	244,4	242,7	234,7	-8,9
SP 2011-20	277,5	276,5	281,4	271,8	268,1	264,7	261,3	263,7	261,9	253,1	-8,8
SP 2011-30	297,7	296,8	302,0	291,8	287,9	284,2	280,6	283,4	281,5	271,9	-8,7
Prostate cancer (C61)											
SP 1976	24,5	24,4	24,6	24,1	23,4	22,5	21,8	21,3	21,2	20,4	-16,6
SP 2010	40,6	40,4	40,8	40,1	38,9	37,4	36,2	36,7	35,8	33,7	-17,0
SP 2011-20	45,1	44,9	45,4	44,7	43,2	41,6	40,3	40,9	39,8	37,5	-16,9
SP 2011-30	49,8	49,6	50,1	49,3	47,7	46,0	44,5	45,1	44,0	41,4	-16,9
Cervical cancer (C53)											
SP 1976	4,0	3,8	3,9	3,7	3,6	3,5	3,4	3,4	3,4	3,3	-16,5
SP 2010	4,7	4,6	4,7	4,4	4,3	4,1	4,0	4,1	4,0	3,9	-17,6
SP 2011-20	4,9	4,8	4,9	4,6	4,5	4,3	4,2	4,3	4,2	4,1	-17,3
SP 2011-30	5,1	4,9	5,1	4,7	4,6	4,5	4,3	4,5	4,3	4,2	-17,3
Diseases of the circulatory system (I00-I99)											
SP 1976	295,1	287,8	293,8	281,3	264,3	257,2	240,6	233,2	227,2	217,3	-26,4
SP 2010	469,6	458,2	468,5	451,1	423,9	412,9	386,2	385,8	371,1	349,9	-25,5
SP 2011-20	521,6	509,5	521,3	502,7	472,3	460,3	429,9	430,4	414,1	389,8	-25,3
SP 2011-30	572,9	559,9	573,1	553,0	519,5	506,3	472,7	473,5	455,6	428,7	-25,2
Pneumonia (J12-J18)											
SP 1976	21,6	16,9	17,6	18,0	16,1	16,9	15,2	14,8	14,8	14,1	-34,8
SP 2010	35,7	27,5	28,7	29,6	26,4	27,7	24,8	25,1	24,6	22,9	-35,9
SP 2011-20	40,2	31,1	32,4	33,5	29,8	31,4	28,0	28,3	27,8	25,8	-35,9
SP 2011-30	44,4	34,3	35,8	37,0	33,0	34,7	30,9	31,3	30,7	28,4	-36,0
External causes (V01-Y89)											
SP 1976	45,8	45,4	46,4	44,1	42,6	41,6	39,9	38,8	38,6	37,0	-19,3
SP 2010	54,7	54,3	55,6	53,3	51,4	50,3	48,2	47,6	47,0	44,9	-17,9
SP 2011-20	56,8	56,4	57,9	55,6	53,6	52,5	50,3	49,7	49,2	46,9	-17,5
SP 2011-30	58,9	58,5	60,1	57,8	55,7	54,5	52,3	51,7	51,2	48,7	-17,2

([1]) Upper age group for direct standardization: 85 years and over.

([2]) SP 1976: current European standard population; SP 2010: average age-structure of the estimated populations of the EU-27 and EFTA countries for the year 2010; SP 2011-20: average age-structure of the projected populations of the EU-27 and EFTA countries for the period 2011-20; SP 2011-30; average age-structure of the projected populations of the EU-27 and EFTA countries for the period 2011-30.

For the EU-27 + EFTA (Figure 2) and for most countries as well (Annex E), the 2010 standardized rate is closer to the crude rate than the 2011-30 standard. The 2010 standardized rate crosses the crude rate in the mid to late 2000-10 period. The 2011-30 standardized rates are converging on the crude rate over time, and are likely to reach or cross the crude rates in the next decade if current trends continue.

Figure 2: Trends of overall mortality SDR by different standard populations and crude rates, EU-27 plus EFTA, 2000-2009

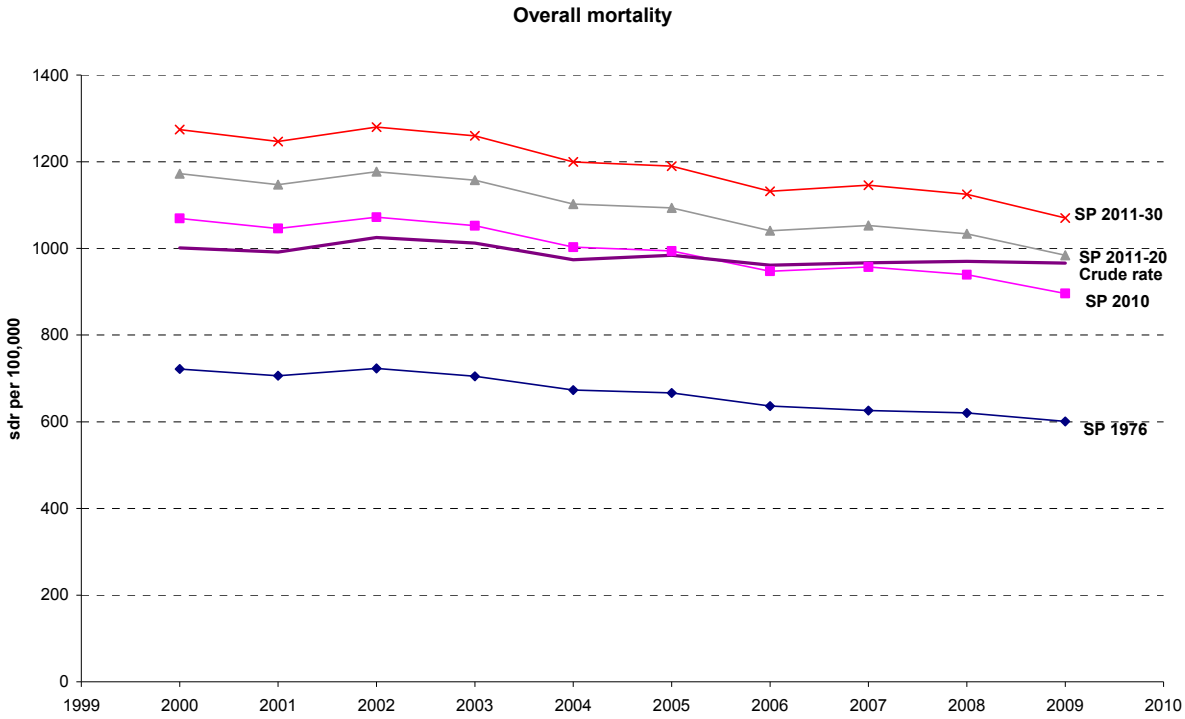
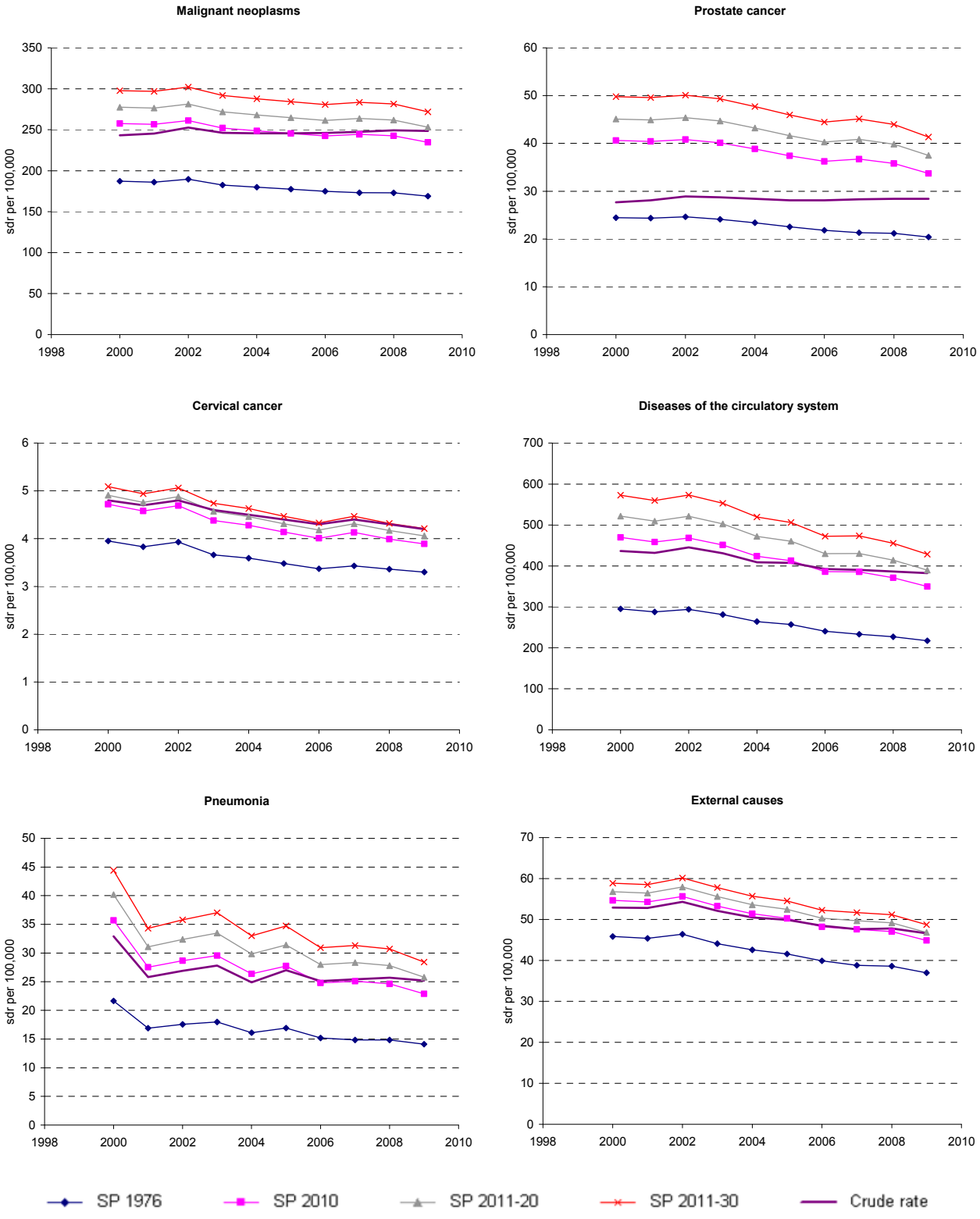


Figure 3: Trends of SDR by different standard populations and crude rates, by selected causes of death, EU-27 plus EFTA, 2000-2009



From Annex E graphs it can be noted that there are some exceptions such as IE, IS, and MT where the 1976 standard is closer to the crude rate, reflecting much younger populations. On the contrary, in the countries where ageing is most advanced such as SE and IT, the 2011-30 standardized rates are already below the crude rates.

In most cases, the level but not the shape of the time trend from 2000-09 differs between the 1976 standardized rates and both the 2010 and 2011-30 standards (see graphs in Annex E). However, there are exceptions to this. For example, the trend for neoplasms in CY, EE, LT and LV decreased over time using the 1976 ESP but increased slightly using the 2010 standard.

For the majority of countries, the 2010 standardized rates for neoplasms were close to the crude rates for most of the time periods. For IE, IS, SK and CY, however, the 1976 standardized rates were closest to the crude rates. As with all-cause mortality, the 2011-30 rates tended to converge with the crude rates over time.

The patterns found in cardiovascular mortality were generally similar to those in all-cause mortality.

Standardized rates using the 2011-20 standard are at intermediate level between those calculated using 2010 or 2011-30 standard. As a consequence, they are a bit closer to crude rates than the rates calculated using the 2011-30 standard population. For overall mortality, rates calculated using the 2011-20 standard are about 64 % higher than those calculated using the 1976 standard. Convergence on the crude rate over time is expected to be earlier than observed for 2011-30 standardized rates; however, standardized rates for IT, DE and SE are already below the crude rates when considering 2009 data.

Format and presentation

The TF considered various issues on the format and presentation of the ESP. It was thought that the format of the new ESP should not differ unnecessarily from the old ESP, as any difference might entail the need for changes to existing systems in which it is used as an element in calculations.

The TF discussed whether there should be any change from the current ESP format, which is expressed as numbers in thousands (except for under 5 years) summing to an arbitrary total population of 100 000. It was noted that recent updates of standard populations followed different strategies: in the US report ([9]) on standardization, a sum of 1 000 000 has been used. These two choices are equally acceptable.

It could be argued that rounding is not necessary, as modern systems can cope easily with the calculations. The WHO world standard ([10]), used a rounding to the second decimal figure; while the US standard population, based on the 2000 census, has been not rounded at all. On the other hand, it was thought that unrounded figures would be less convenient to use and would provide undesirable false precision. To this purpose the possibility of rounding to thousands or five hundreds has been considered. In any case the two upper age bands (90-94 and 95 years and over) resulted to be exceptions.

The TF agreed to recommend that the total standard population should remain at 100 000 or 100 depending on the size of the five-years age bands and be expressed in five hundreds.

There was discussion on the future frequency with which the ESP should be revised, and the need to balance continuity over time with continued relevance to the real population structure. **The TF agreed to recommend that the new ESP should be revised 20 years after its introduction, but that a minor review should be carried out after only 10 years or if availability of new data gives evidence of remarkable changes in the populations' structures. However, the group would caution against unnecessary revisions, as the stability of the standard is one of its primary values.**

([9]) Robert N. Anderson, and Harry M. Rosenberg. Age Standardization of Death Rates: implementation of the Year 2000 Standard. National Vital Statistics Reports Volume 47, Number 3, 1998.

([10]) Omar B. Ahmad, Cynthia Boschi-Pinto, Alan D. Lopez, Christopher JL Murray, Rafael Lozano, Mie Inoue. Age standardization of rates: a new WHO standard. GPE Discussion Paper Series: No.31. EIP/GPE/EBD World Health Organization. http://www.who.int/whosis/indicators/compendium/2008/1mst/en/index.html

Recommendations

Recommendations on methodology and presentation

— Geographical coverage should be the EU-27 plus EFTA.

— Unweighted average of age structure of the populations of EU-27 and EFTA countries should be used.

— The ESP should continue to be in five year age bands (with the exception of under 5 and the highest band, as at present). Under the current conditions of data availability and quality, it was agreed that the highest band should be 95+.

— Disaggregation by sex is not necessary.

— The TF agreed to recommend that the total standard population should remain at 100 000 or 100 depending on the size of the five-years age bands and be expressed in five hundreds.

— The use of the standard based on the 2011-30 population projections is recommended.

The proposed new EU standard population is reported in Annex F.

Recommendation on the revision process

— The new ESP should be revised 20 years after its introduction, but that a minor review should be carried out after only 10 years or if availability of new data gives evidence of remarkable changes in the populations' structures. However, the group would caution against unnecessary revisions, as the stability of the standard is one of its primary values.

References

Ahmad OB., Cynthia Boschi-Pinto C., Lopez AD., Murray CJL, Lozano R., Inoue M. Age standardization of rates: a new WHO standard. GPE Discussion Paper Series: No.31. EIP/GPE/EBD World Health Organization.

Anderson RN., and Rosenberg HM. Age Standardization of Death Rates: implementation of the Year 2000 Standard. National Vital Statistics Reports Volume 47, Number 3, 1998.

Eurostat databases on population, mortality and causes of death. Relevant links:
http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/database

Circulatory diseases — Main causes of death for persons aged 65 and more in Europe, 2009 — Statistics in focus, Issue number 7/2012:
http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-SF-12-007

Who dies of what in Europe before the age of 65 - Statistics in focus, Issue number 67/2009.
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http://epp.eurostat.ec.europa.eu/portal/page/portal/health/public_health/data_public_health/database

Niederlaender, E. Causes of death in the EU. Statistics in focus, Eurostat 10/2006.

Waterhouse JAH, Muir CS, Correa P, Powell J, eds. Cancer incidence in five continents. Lyon: IARC, 1976; 3: 456.

Annexes

Annex A: Terms of Reference — Task Force on the standard population revision

Monica Pace, CoD Core Group Leader

The use of a standard population is a very useful tool for comparisons of mortality rates, as well as other population-based rates as such disease incidence. Age standardization is one of the key methods to control for different age distributions among populations or over time. Comparing crude rates can in fact be misleading in terms of trends when the age composition in a population changes over time or when comparing groups or regions with different age-structure.

The purpose of standardization is to remove the effect of causes that are well known (such the effect of age on mortality) for situations where this effect is not relevant, in order to make other effects more clearly visible. When comparing mortality patterns between countries, regions or periods, the differences in age and sex distribution are usually distracting, and standardization is in order.

The European population is an aging population and the demographic perspectives of the EU are that the population should increase until the mid-thirties of this century. Projections from 2008 to 2060 suggest that the age distribution will show a progressive shift to the older ages; the share of the population aged 65 and over is expected to increase in all countries and in particular the population aged 80 and over will increase both in relative and absolute terms. This age shift will have clear consequences for both all-cause mortality and cause specific mortality.

European standard population (Waterhouse et al., 1976)

Age group (years)	European standard population
0	1 600
1-4	6 400
5-9	7 000
10-14	7 000
15-19	7 000
20-24	7 000
25-29	7 000
30-34	7 000
35-39	7 000
40-44	7 000
45-49	7 000
50-54	7 000
55-59	6 000
60-64	5 000
65-69	4 000
70-74	3 000
75-79	2 000
80-84	1 000
85+	1 000
Total	**100 000**

The standard population is an age distribution of arbitrary population numerousness and derived weights which should not differ too much from the actual populations considered. The European standard population in use for crude rates standardization dates back to the mid-seventies and does not subdivide the older age classes above 85 years of age which have increased.

This standard population is currently used by Eurostat, and is widely applied in official statistics and academic research. Being a tool in use for more than thirty years, it needs to be revised to better reflect the actual age composition of the European population, as identified by the CG on CoD and supported by the Working Group on Health.

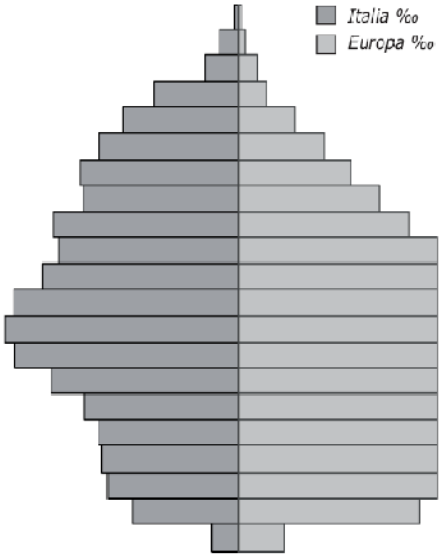
As an example, the comparison between the Italian population (mid-2005) and the standard now in use shows that the actual population differs from the standard population composition in most of the considered age-groups. (ERA Atlante Sanitario Italiano).

Confronto tra la popolazione italiana al 30 giugno 2005 e standard europea

Composizione: popolazione totale =1.000

Classi di età	Italia ‰	Europa ‰
0 anni	9,4	16,0
1-4 anni	37,3	64,0
5-9 anni	46,1	70,0
10-14 anni	48,2	70,0
15-19 anni	49,5	70,0
20-24 anni	54,4	70,0
25-29 anni	66,0	70,0
30-34 anni	78,8	70,0
35-39 anni	82,2	70,0
40-44 anni	79,2	70,0
45-49 anni	69,1	70,0
50-54 anni	63,5	70,0
55-59 anni	65,2	60,0
60-64 anni	54,9	50,0
65-69 anni	55,9	40,0
70-74 anni	48,8	30,0
75-79 anni	40,9	20,0
80-84 anni	29,9	10,0
85-89 anni	12,0	7,0
90-94 anni	6,9	2,0
> 94 anni	1,7	1,0
Totale	**1.000,0**	**1.000,0**

Piramide delle popolazioni tipo utilizzate



Fonte: elaborazioni ERA su dati Istat

280

ERA - Epidemiologia e Ricerca Applicata
Schede di dimissione ospedaliera per genere e USL

Available at: http://www.atlantesanitario.it/

Changing the standard population results in different standardized rates and can lead to more meaningful mortality patterns and trends. This is particularly important for cause specific mortality. For instance, if more weight is given to death rates at older ages where mortality is higher, then an increase of standardized death rates should be expected. This situation can be mirrored for those causes where the risk of dying is higher at younger ages.

Elements that the Task Force on the revision of the standard population should consider and expected outputs

To assist countries in the ESS in dealing with these and related matters, a Task Force on the revision of the Standard European Population has been established. The main objectives and products of this task force will be the following:

— Review the existing recent experiences and methods in the field, as in the 'documents to be considered' reported below (not an exhaustive list).

— Explore the different approaches that can guarantee the best methodology for the standardization of European mortality rates, both all-cause mortality rates and cause-specific ones. The possibility and usefulness should be considered of applying different standardization methods, according to different uses and flexible age grouping. Take into account the existing information and data on the characteristics of the EU population, including differences in age structures between Member States, and possible demographic scenarios for the future years in order to propose (a) standard population(s) which reflects the age distribution in Europe.

— As comparisons can only be made between adjusted rates using the same standard population, an assessment of the impact of the new standard(s) proposed in comparison with the previous standard(s) in use have to be done, showing the differences in the standardized mortality and cause-specific rates and presenting the pros and cons of the new proposed standard(s) compared to

the one(s) in use (for instance World, European).

— Consider any evidence on important differences between Member States in the age-distribution of deaths from specific causes.

— Consider the possibility of differentiating the standard population by sex as well as age.

The report shall include an overview of the issue, the methodology description, the results obtained and a short set of recommendations for using the new standard(s), and annexes where needed.

A draft report and updated standard population(s) from the TF should be available by end 2010, and a final report including the revised product(s) should be available by April 2011. Two face-to-face meetings are foreseen in the framework of the ESSnet project 'Partnership Health 2009-2011 Work package 3 "causes of death"'.

List of main reports and documents to be considered:

Waterhouse JAH, Muir CS, Correa P, Powell J, eds. Cancer incidence in five continents. Lyon: IARC, 1976; 3: 456.

Konstantinos Giannakouris. Ageing characterises the demographic perspectives of the European societies. Eurostat, Statistics in focus 72/2008.

Omar B. Ahmad, Cynthia Boschi-Pinto, Alan D. Lopez, Christopher JL Murray, Rafael Lozano, Mie Inoue. Age standardization of rates: a new WHO standard. GPE Discussion Paper Series: No.31. EIP/GPE/EBD World Health Organization.

Robert N. Anderson, and Harry M. Rosenberg. Age Standardization of Death Rates: implementation of the Year 2000 Standard. National Vital Statistics Reports Volume 47, Number 3, 1998.

Elodie Niederlaender. Causes of death in the EU. Statistics in focus, Eurostat 10/2006.

Health Statistics. Atlas on mortality in the European Union - 2002-2004. Eurostat, 2009 Edition.

Eurostat databases on population, mortality and causes of death. Relevant links:
http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/database
http://epp.eurostat.ec.europa.eu/portal/page/portal/health/public_health/data_public_health/database

Annex B

Members of the Task Force

Mika Gissler (National Institute for Health and Welfare, FI)

Myer Glickman (Office for National Statistics, UK)

Enrico Grande (Italian National Institute of Statistics, IT)

Monica Pace, **Chair** (Italian National Institute of Statistics, IT)

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Eurostat

Giampaolo Lanzieri (Unit F2 Population)

Marta Carvalhido da Silva (until May 2011) (Unit F5 Health)

Elodie Cayotte (Unit F5 Health)

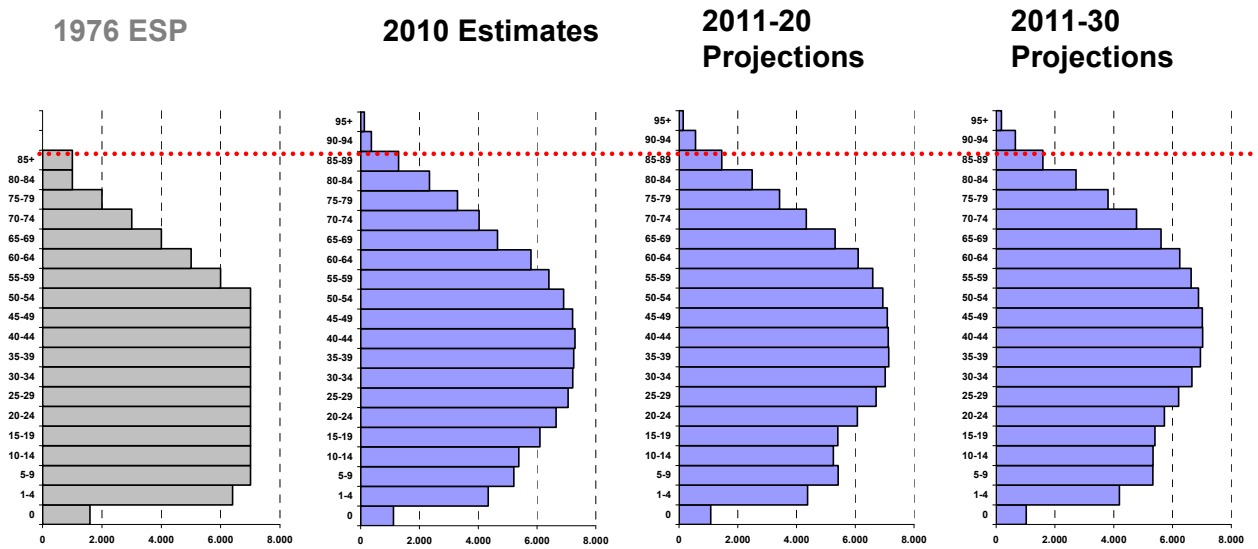
Lucian Agafitei (from June 2011) (Unit F5 Health)

Annex C

The 1976 European Standard Population (ESP), the EU-27+EFTA average populations based on the 2010 estimates, and on the 2011-20 and 2011-30 projections. (Data provided by Eurostat)

Age group (years)	1976 ESP	2010	2011-2020	2011-2030
0	1600	1118,427	1078,641	1028,317
1-4	6400	4338,143	4373,749	4197,445
5-9	7000	5207,188	5410,346	5334,379
10-14	7000	5378,67	5252,859	5342,654
15-19	7000	6095,53	5410,049	5401,298
20-24	7000	6646,578	6066,914	5727,096
25-29	7000	7054,462	6711,973	6209,653
30-34	7000	7211,366	7023,97	6664,236
35-39	7000	7249,137	7135,495	6952,845
40-44	7000	7288,966	7126,248	7029,938
45-49	7000	7207,381	7087,804	7012,201
50-54	7000	6904,728	6938,434	6883,596
55-59	6000	6400,144	6595,514	6635,946
60-64	5000	5798,191	6095,677	6247,087
65-69	4000	4660,589	5307,002	5605,941
70-74	3000	4031,35	4328,78	4772,174
75-79	2000	3292,724	3419,627	3810,569
80-84	1000	2341,146	2492,941	2719,364
85-89		1285,569	1452,548	1592,578
90-94	1000	367,933	555,307	652,077
95+		121,774	136,12	180,606
Total	**100000**	**100000**	**100000**	**100000**

Comparison of age distribution between the 1976 European standard population and the EU-27+EFTA average populations based on the 2010 estimates, and on the 2011-20 and 2011-30 projections



Annex D

Spearman's rank correlation coefficients calculated for standardised death rates[1] (sdr) by country based on different standard populations (SP) - Year 2007

	sdr_SP1976	sdr_SP2010	sdr_SP2011_20	sdr_SP2011_2030
(MALIGNANT NEOPLASMS, N=30)				
sdr_SP1976	1.00000	0.94611	0.92302	0.90616
p value [2]		*<.0001*	*<.0001*	*<.0001*
sdr_SP2010	0.94611	1.00000	0.99450	0.98570
p value	*<.0001*		*<.0001*	*<.0001*
sdr_SP2011_20	0.92302	0.99450	1.00000	0.99560
p value	*<.0001*	*<.0001*		*<.0001*
sdr_SP2011_2030	0.90616	0.98570	0.99560	1.00000
p value	*<.0001*	*<.0001*	*<.0001*	
(PROSTATE CANCER, N=30)				
sdr_SP1976	1.00000	0.99413	0.99313	0.99010
p value		*<.0001*	*<.0001*	*<.0001*
sdr_SP2010	0.99413	1.00000	0.99954	0.99780
p value	*<.0001*		*<.0001*	*<.0001*
sdr_SP2011_20	0.99313	0.99954	1.00000	0.99863
p value	*<.0001*	*<.0001*		*<.0001*
sdr_SP2011_2030	0.99010	0.99780	0.99863	1.00000
p value	*<.0001*	*<.0001*	*<.0001*	
(CERVICAL CANCER, N=30)				
sdr_SP1976	1.00000	0.99313	0.99230	0.98817
p value		*<.0001*	*<.0001*	*<.0001*
sdr_SP2010	0.99313	1.00000	0.99991	0.99835
p value	*<.0001*		*<.0001*	*<.0001*
sdr_SP2011_20	0.99230	0.99991	1.00000	0.99863
p value	*<.0001*	*<.0001*		*<.0001*
sdr_SP2011_2030	0.98817	0.99835	0.99863	1.00000
p value	*<.0001*	*<.0001*	*<.0001*	
(DISEASES OF THE CIRCULATORY SYSTEM, N=30)				
sdr_SP1976	1.00000	0.99853	0.99780	0.99780
p value		*<.0001*	*<.0001*	*<.0001*
sdr_SP2010	0.99853	1.00000	0.99890	0.99890
p value	*<.0001*		*<.0001*	*<.0001*
sdr_SP2011_20	0.99780	0.99890	1.00000	100000
p value	*<.0001*	*<.0001*		*<.0001*
sdr_SP2011_2030	0.99780	0.99890	1.00000	1.00000
p value	*<.0001*	*<.0001*	*<.0001*	
(PNEUMONIA, N=30)				
sdr_SP1976	1.00000	0.96628	0.95748	0.94721
p value		*<.0001*	*<.0001*	*<.0001*
sdr_SP2010	0.96628	1.00000	0.99670	0.99230
p value	*<.0001*		*<.0001*	*<.0001*
sdr_SP2011_20	0.95748	0.99670	1.00000	0.99743
p value	*<.0001*	*<.0001*		*<.0001*
sdr_SP2011_2030	0.94721	0.99230	0.99743	1.00000
p value	*<.0001*	*<.0001*	*<.0001*	
(EXTERNAL CAUSES, N=30)				
sdr_SP1976	1.00000	0.98460	0.97544	0.96188
p value		*<.0001*	*<.0001*	*<.0001*
sdr_SP2010	0.98460	1.00000	0.99633	0.98827
p value	*<.0001*		*<.0001*	*<.0001*
sdr_SP2011_20	0.97544	0.99633	1.00000	0.99487
p value	*<.0001*	*<.0001*		*<.0001*
sdr_SP2011_2030	0.96188	0.98827	0.99487	1.00000
p value	*<.0001*	*<.0001*	*<.0001*	

[1] Upper age group for direct standardization: 85 years and over

[2] Probability values computed from a t distribution with N-2 degrees of freedom

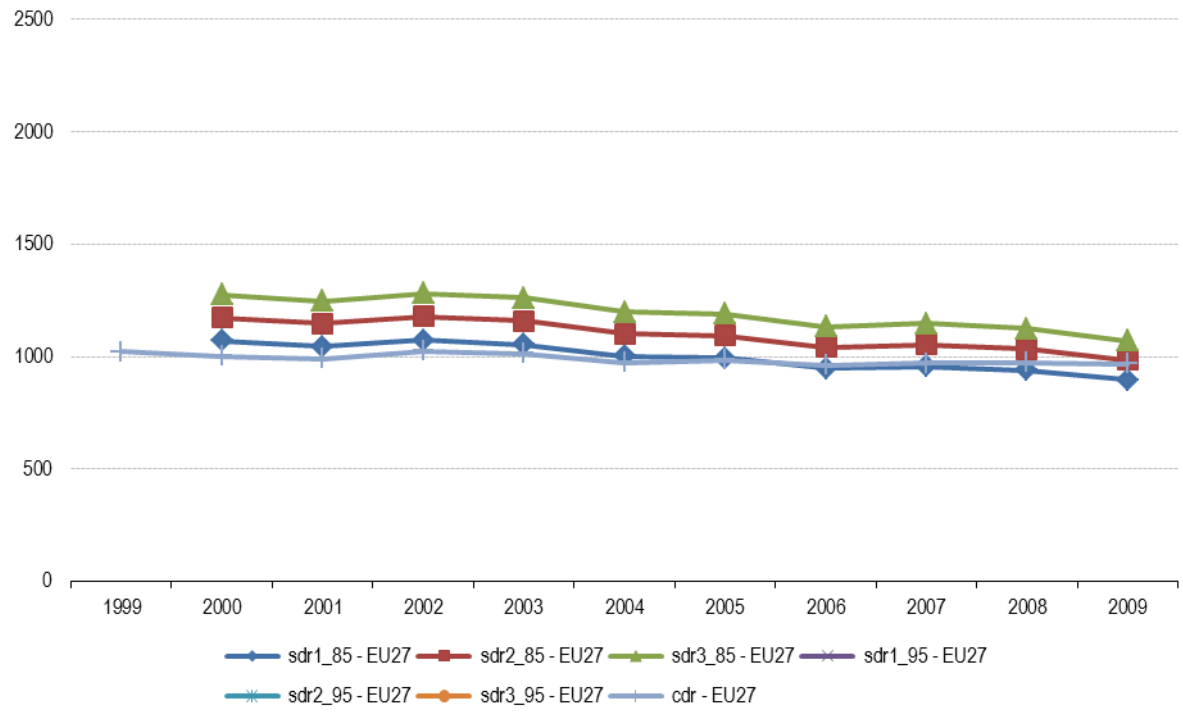
Annex E

Trends of SDR by different standard populations and crude rates by countries and selected causes of death

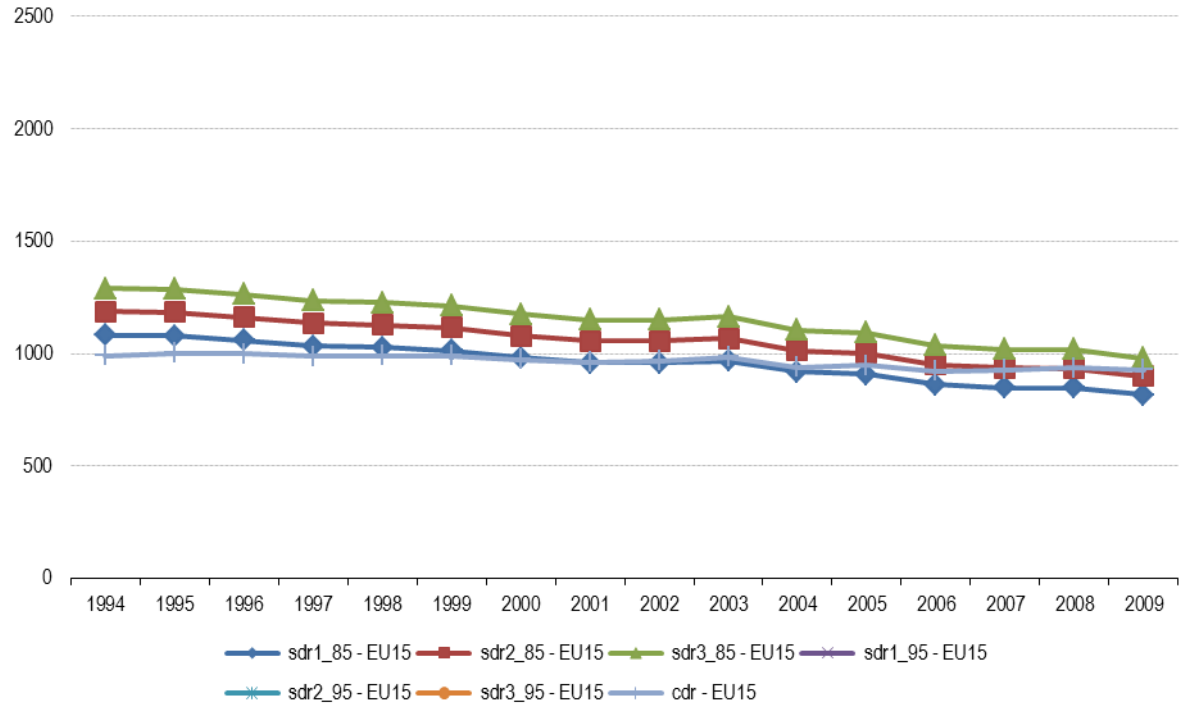
Notes for the readers:

1. Numeric codes identifying each cause of death are taken from the 'European Shortlist'
2. The country abbreviations are reported in the graph's legend and correspond to the current standard in use
3. Mortality figures are expressed per 100 000 inhabitants and reported in the graphs according the following abbreviations:
   - **sdr1_85:** standardized death rate using the 2010 standard population with upper age band 85 years and over
   - **sdr1_95:** standardized death rate using the 2010 standard population with upper age band 95 years and over
   - **sdr2_85:** standardized death rate using the 2011-20 standard population with upper age band 85 years and over
   - **sdr2_95:** standardized death rate using the 2011-20 standard population with upper age band 95 years and over
   - **sdr3_85:** standardized death rate using the 2011-30 standard population with upper age band 85 years and over
   - **sdr3_95:** standardized death rate using the 2011-30 standard population with upper age band 95 years and over
   - **cdr:** crude death rate

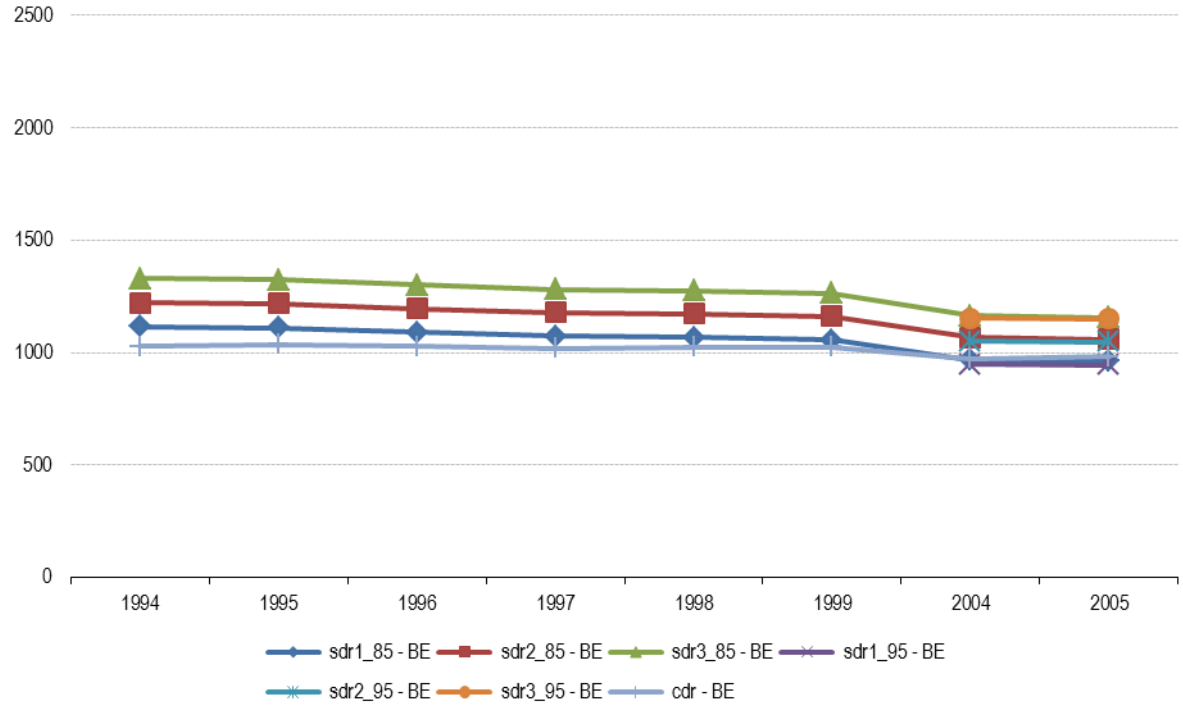
Total deaths – European Union 27 countries



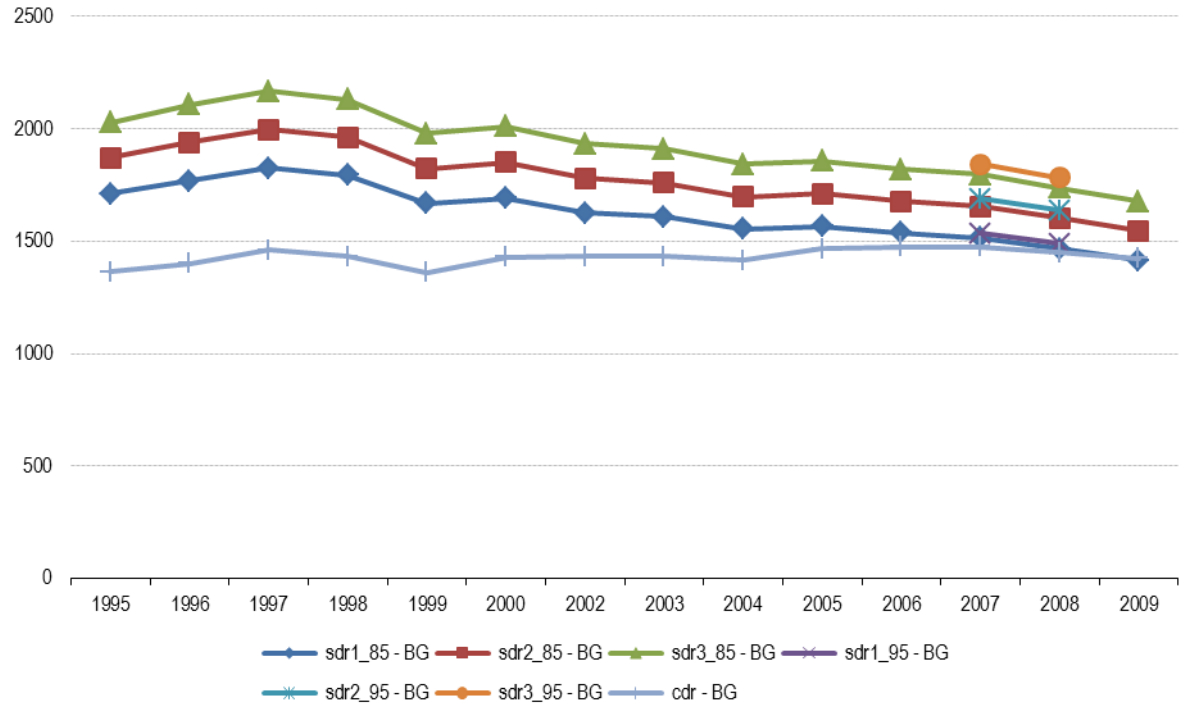
Total deaths – European Union 15 countries



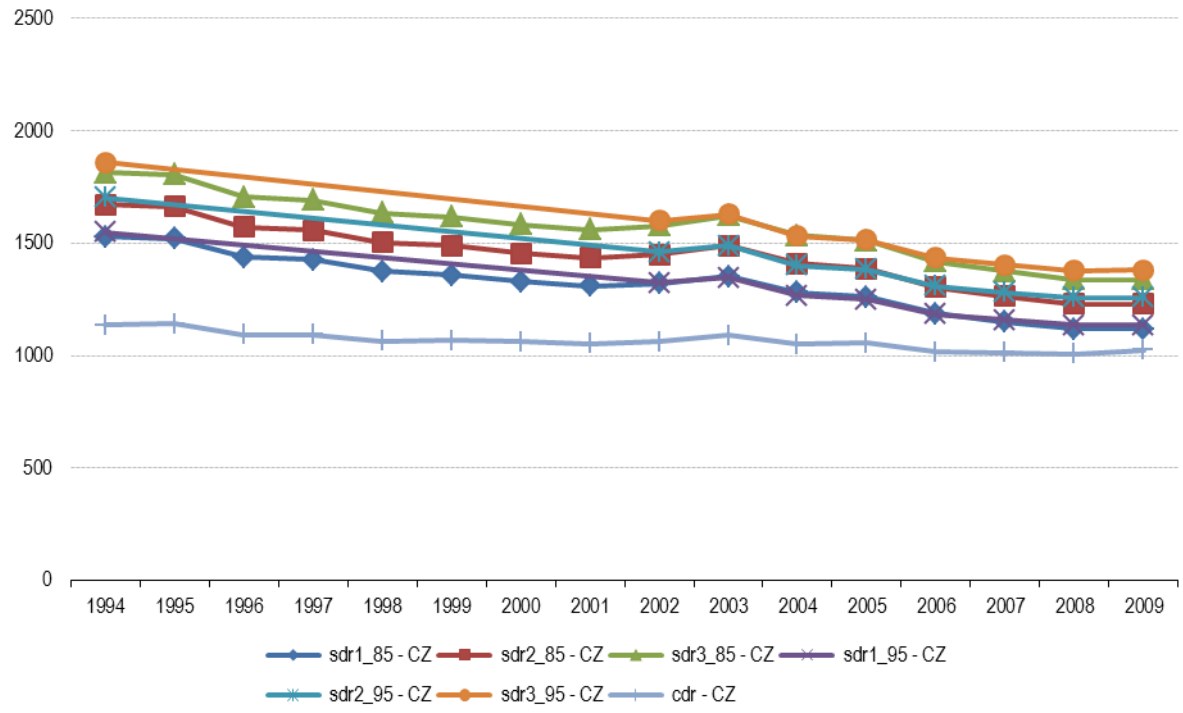
Total deaths – Belgium



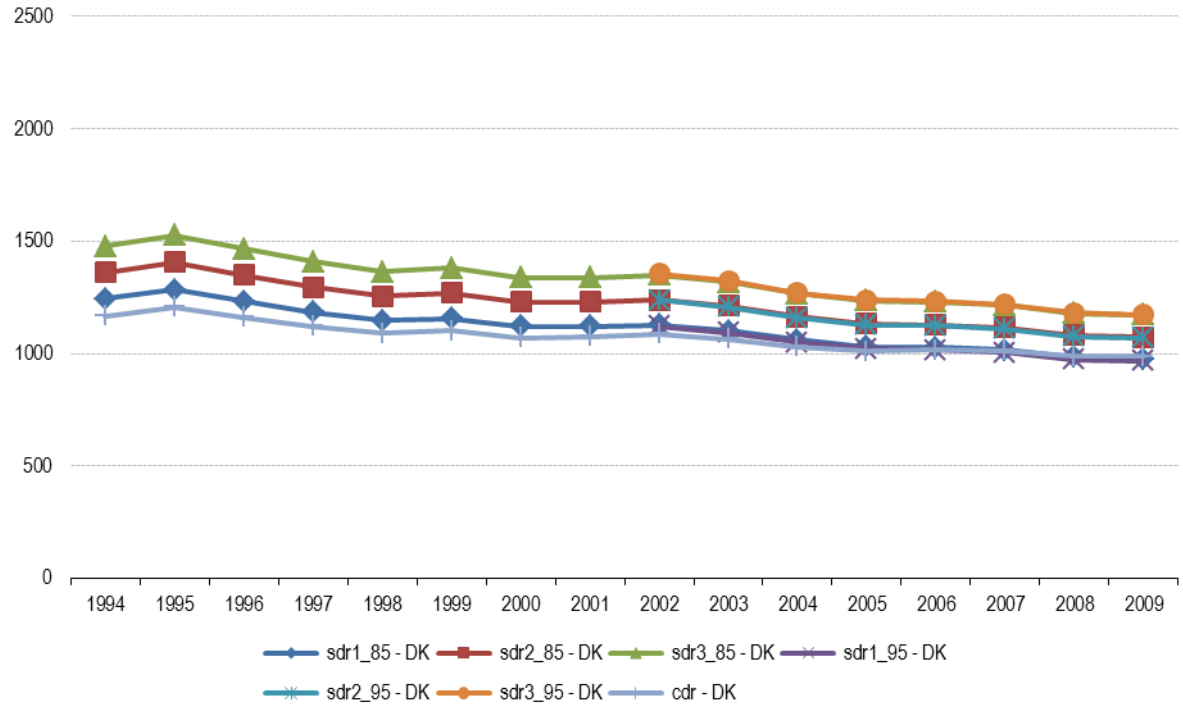
Total deaths – Bulgaria



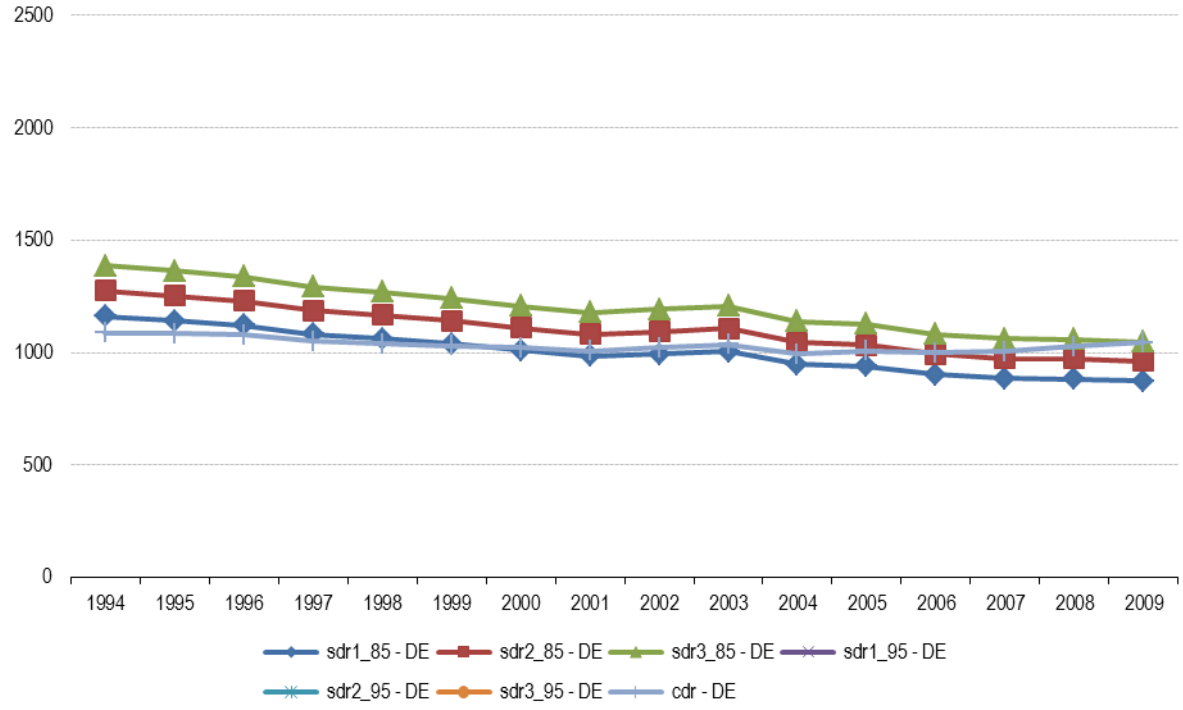
Total deaths – Czech Republic



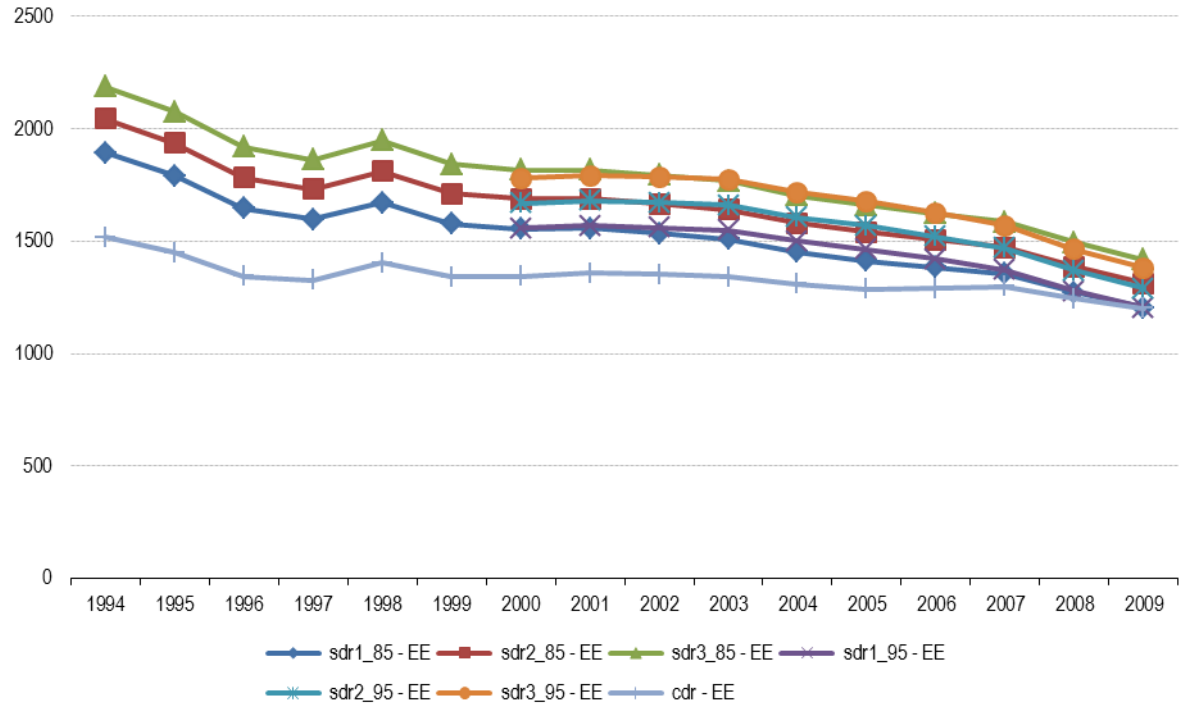
Total deaths – Denmark



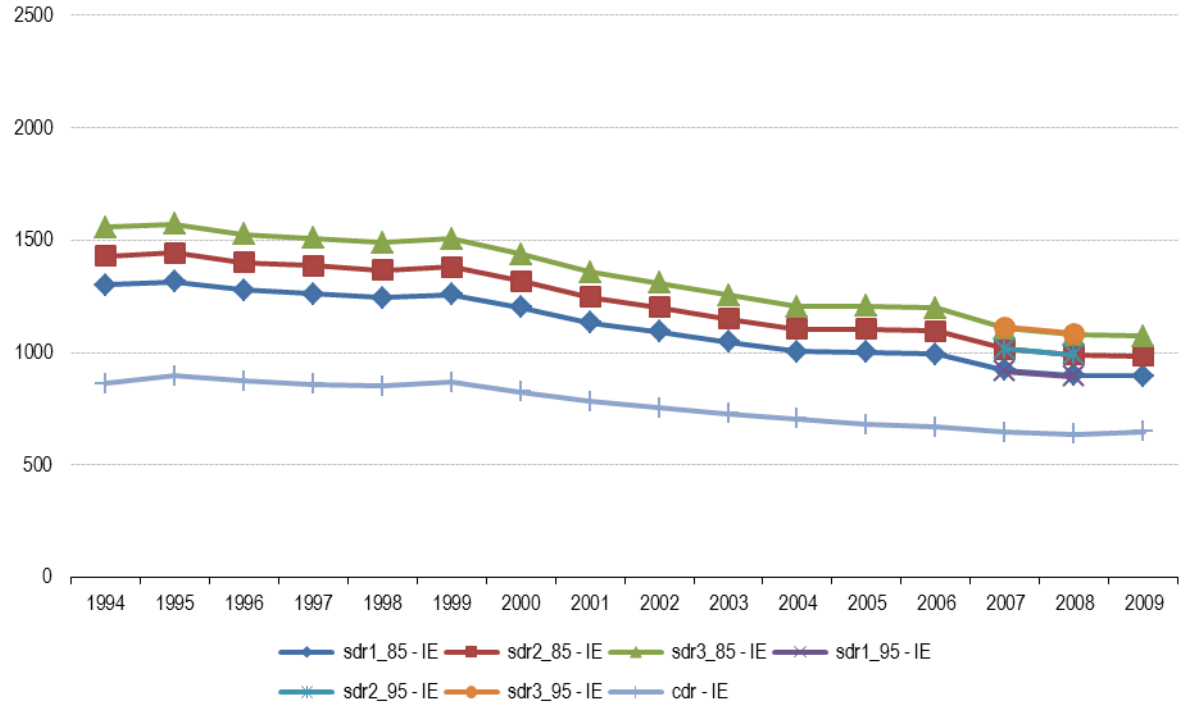
Total deaths – Germany



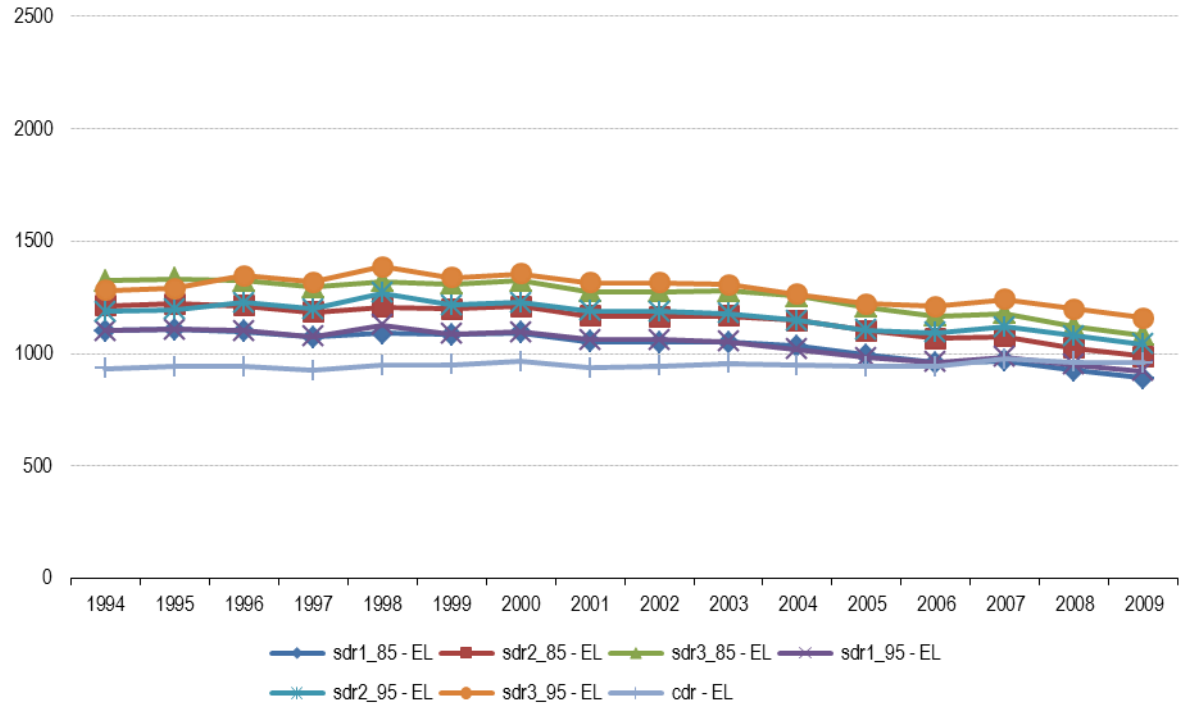
Total deaths – Estonia



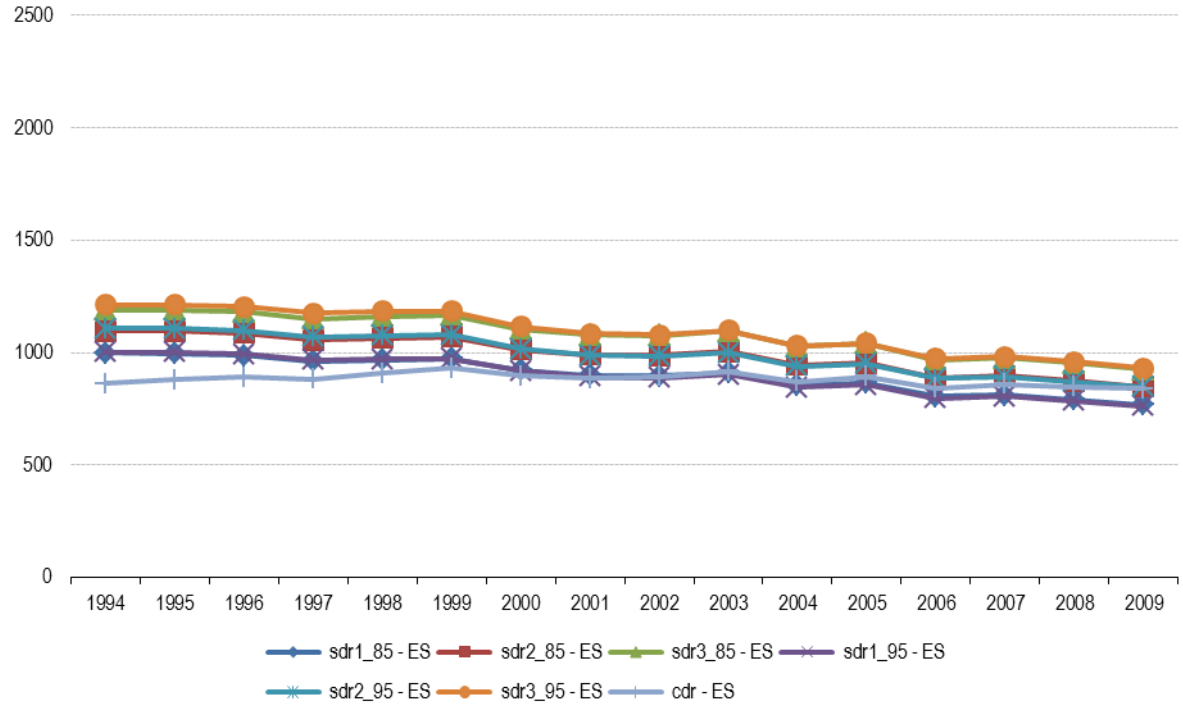
Total deaths – Ireland



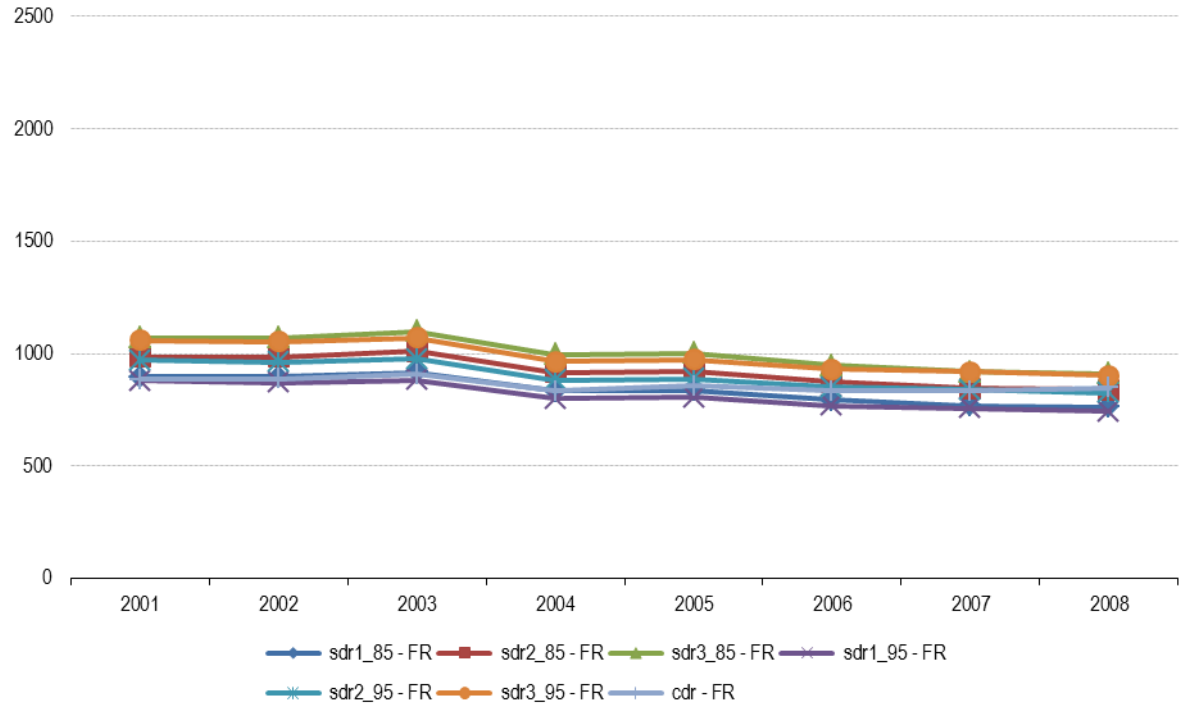
Total deaths – Greece



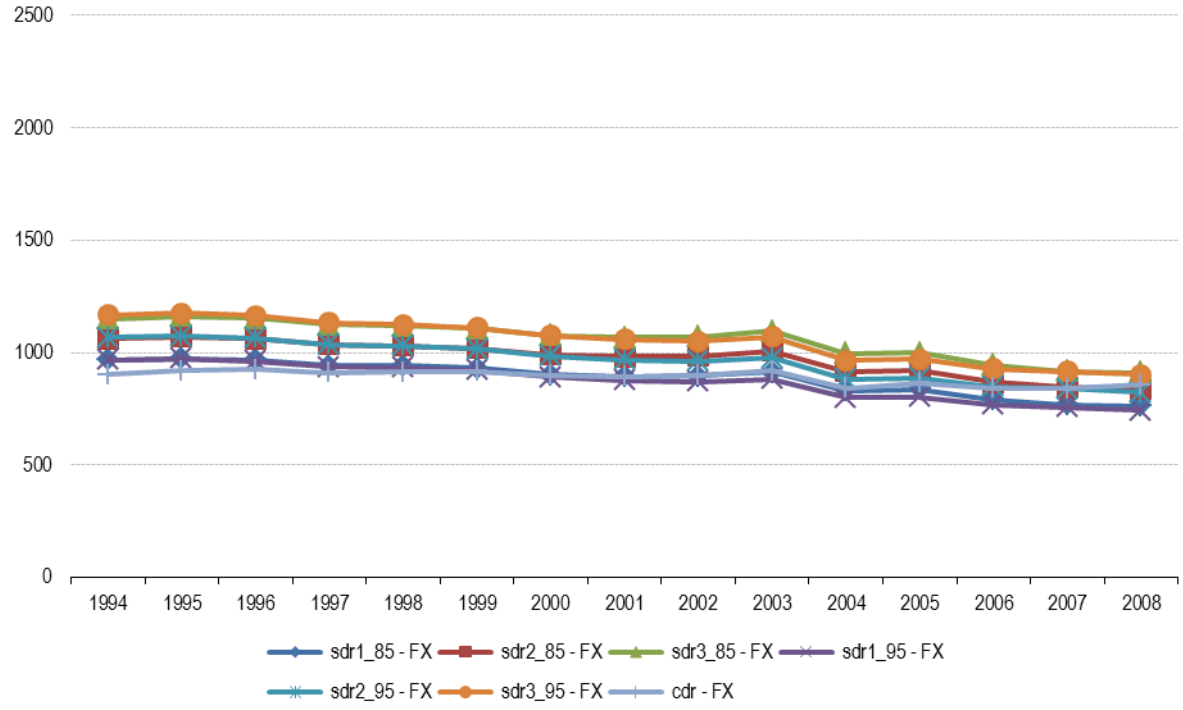
Total deaths – Spain



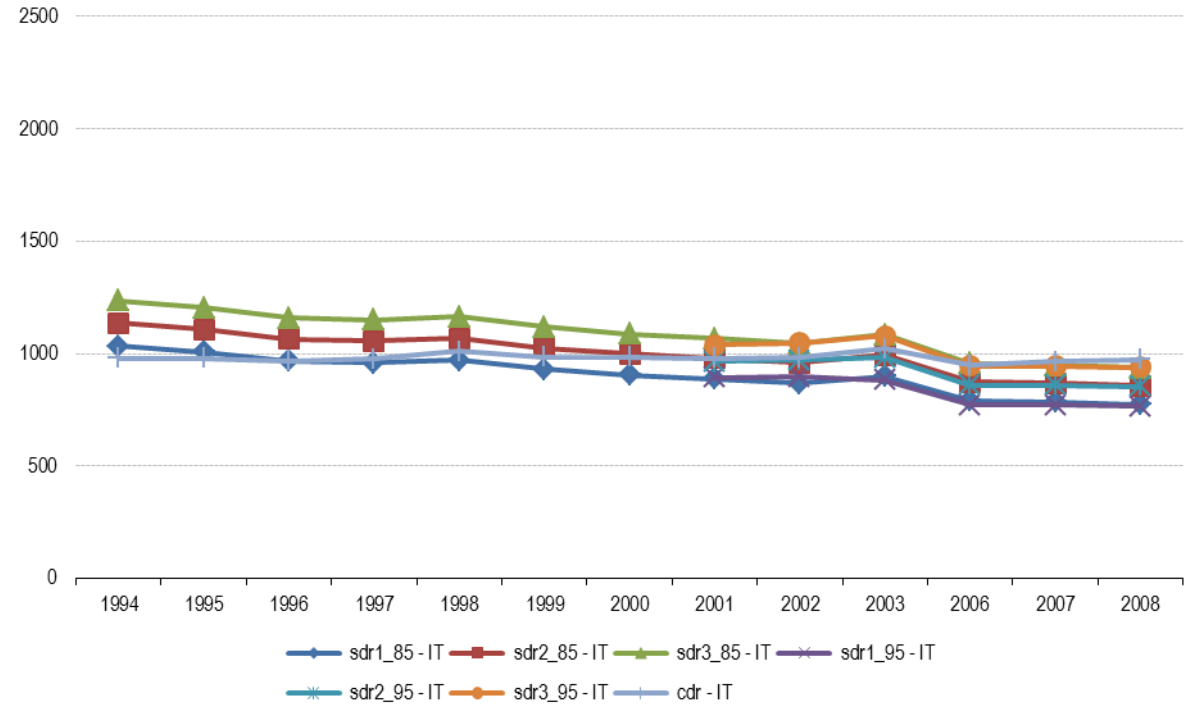
Total deaths – France



Total deaths – France (metropolitan)

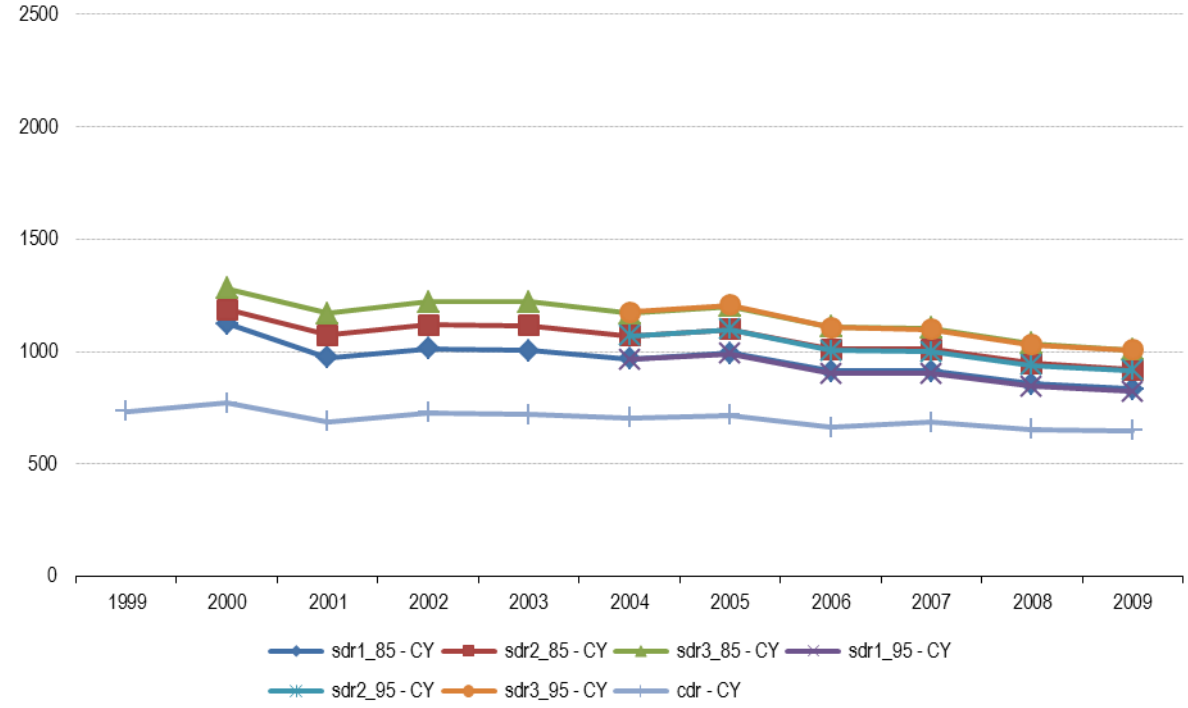


Total deaths – Italy

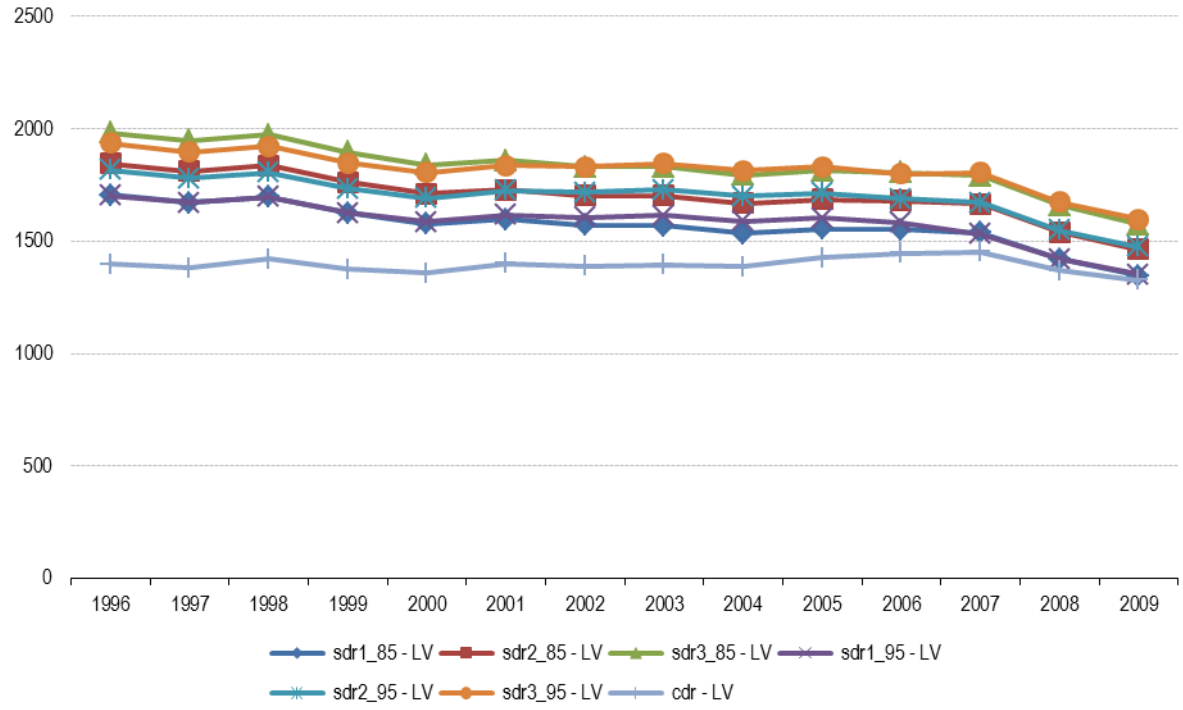


Note: cause-specific mortality data for Italy in the years 2004 and 2005 are not available

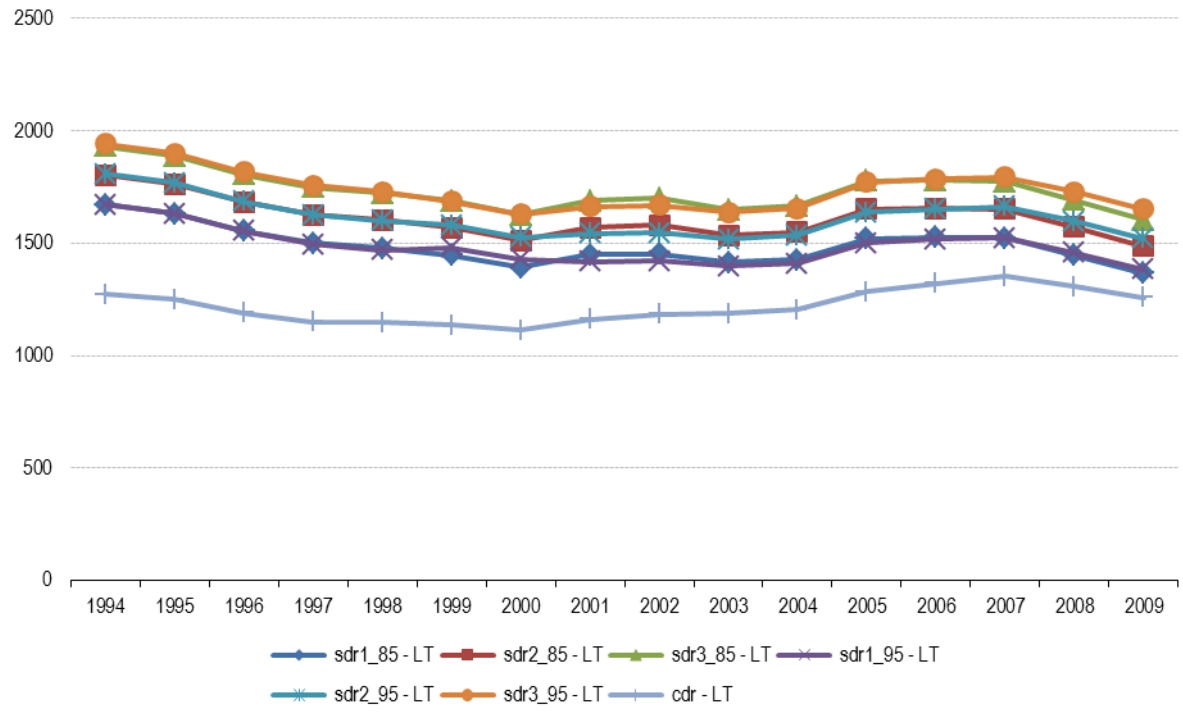
Total deaths – Cyprus



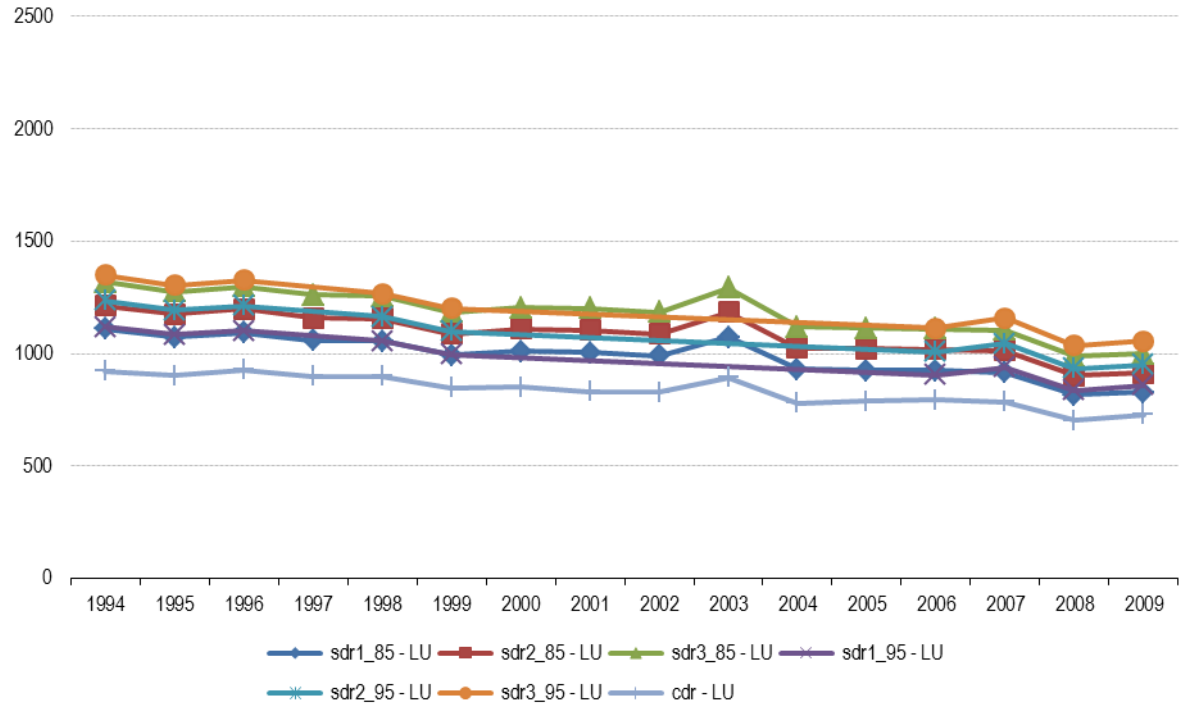
Total deaths – Latvia



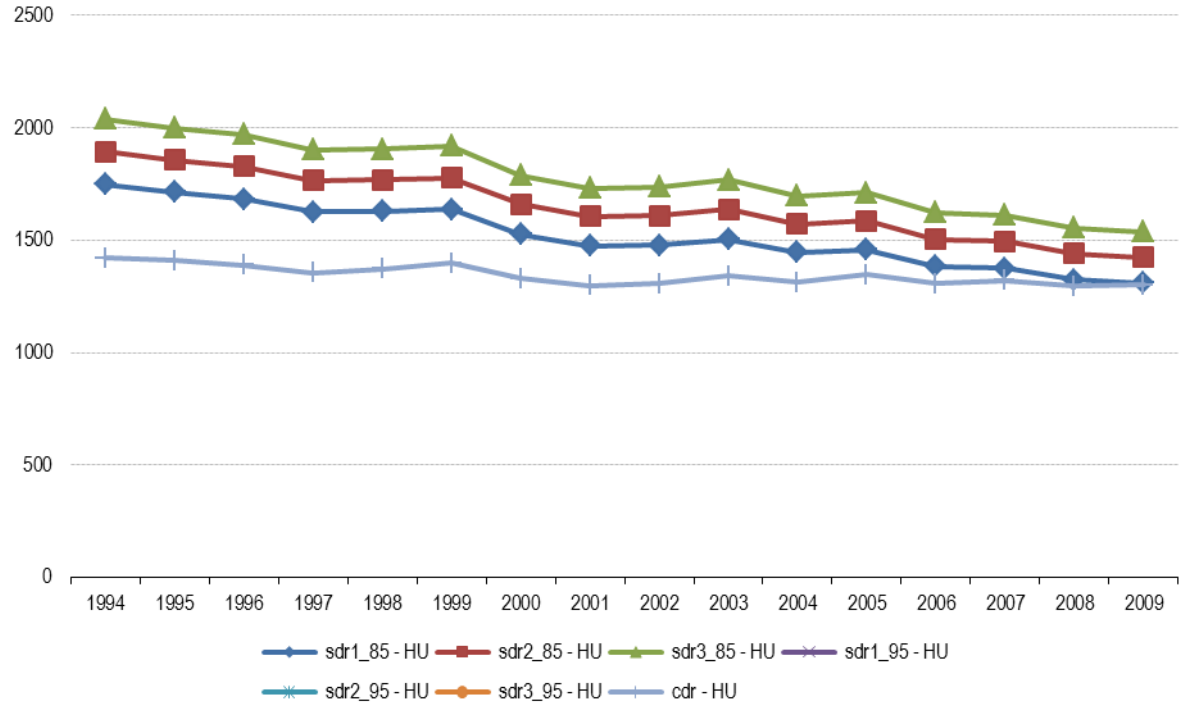
Total deaths – Lithuania



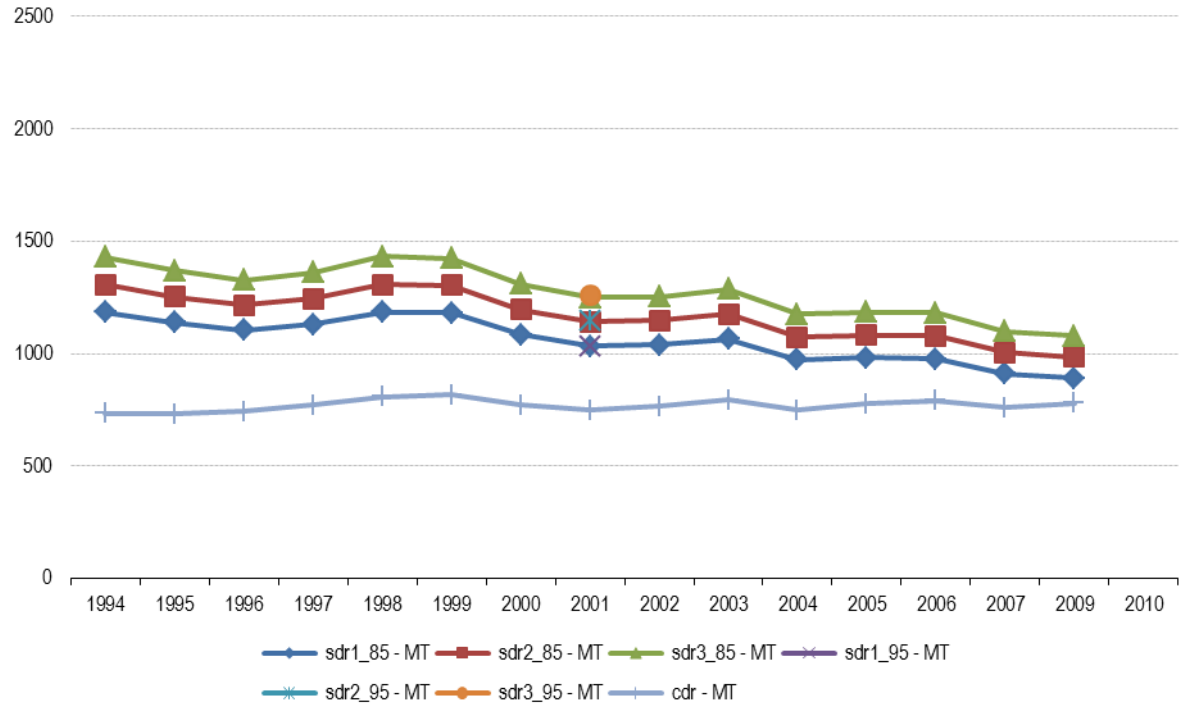
Total deaths – Luxembourg



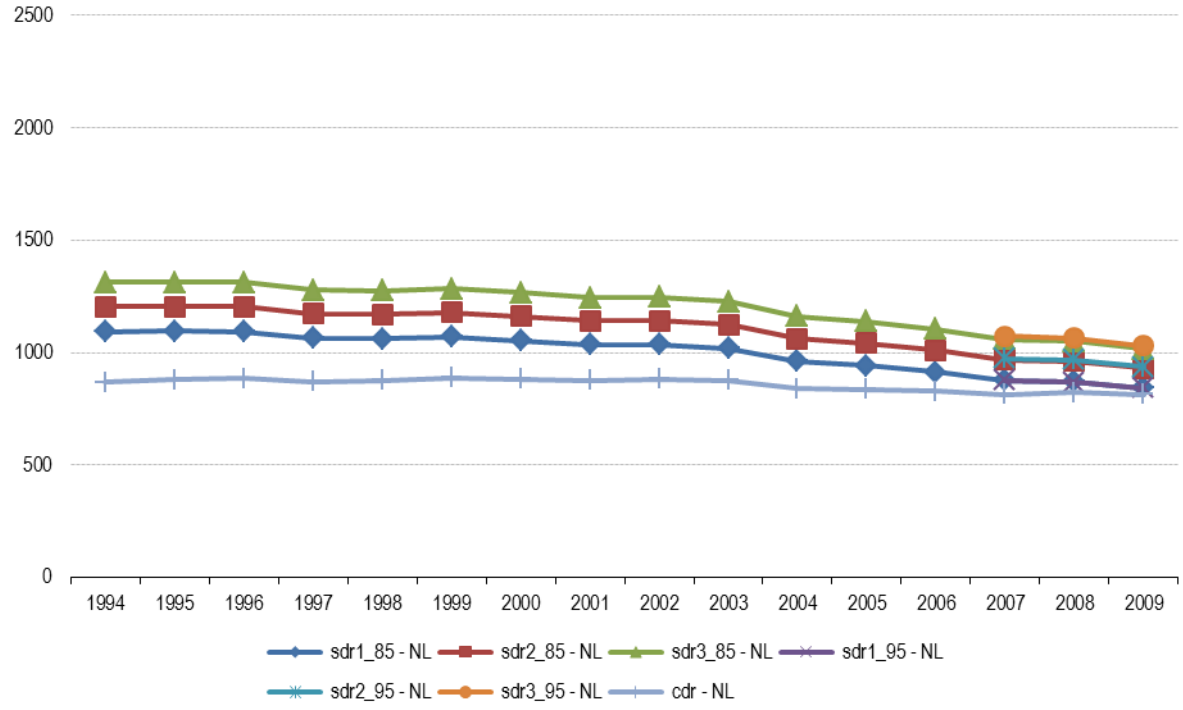
Total deaths – Hungary



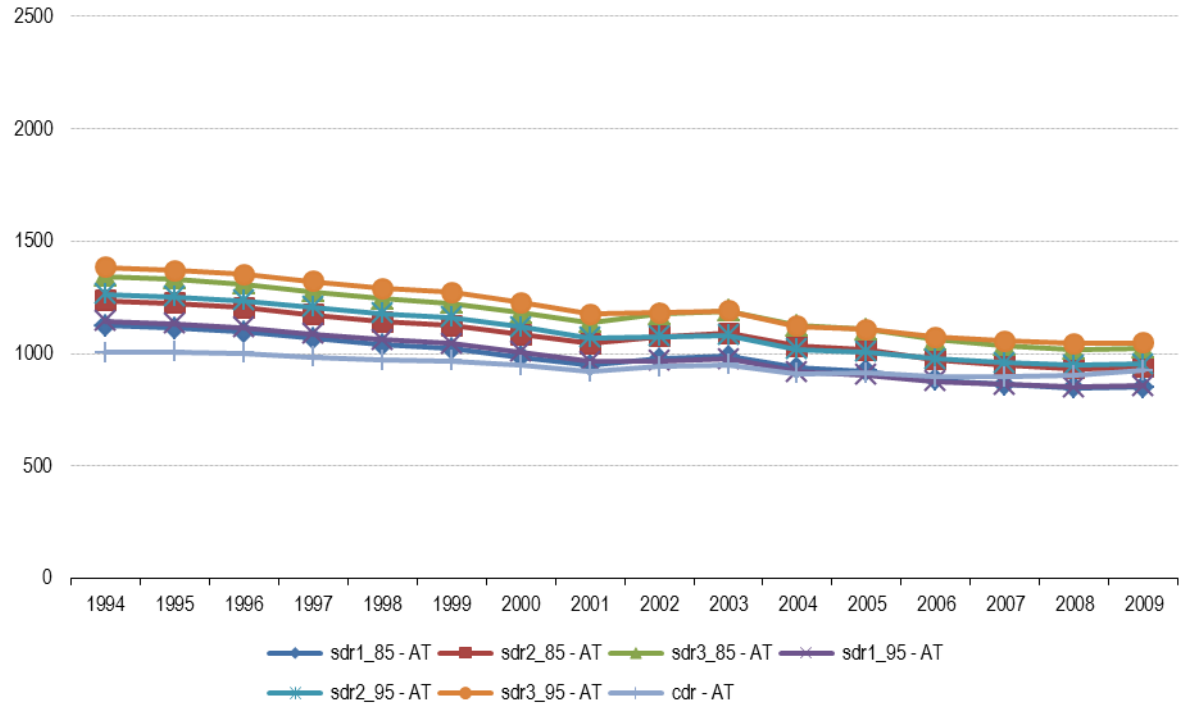
Total deaths – Malta



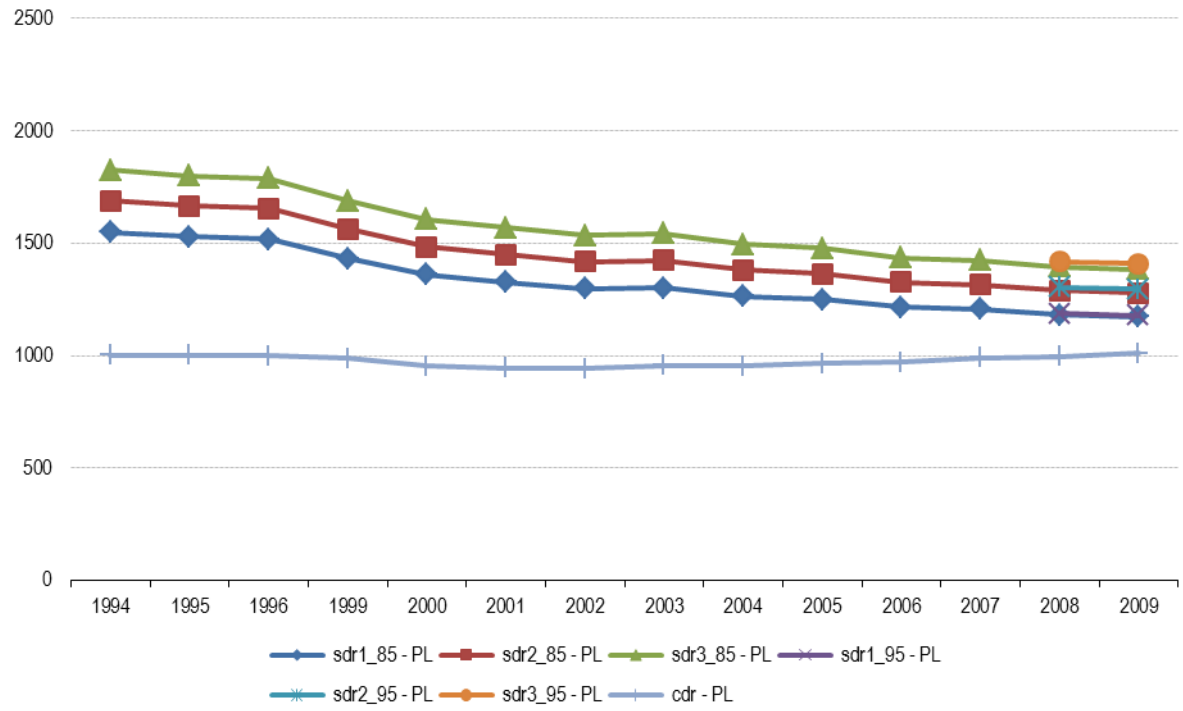
Total deaths – Netherlands



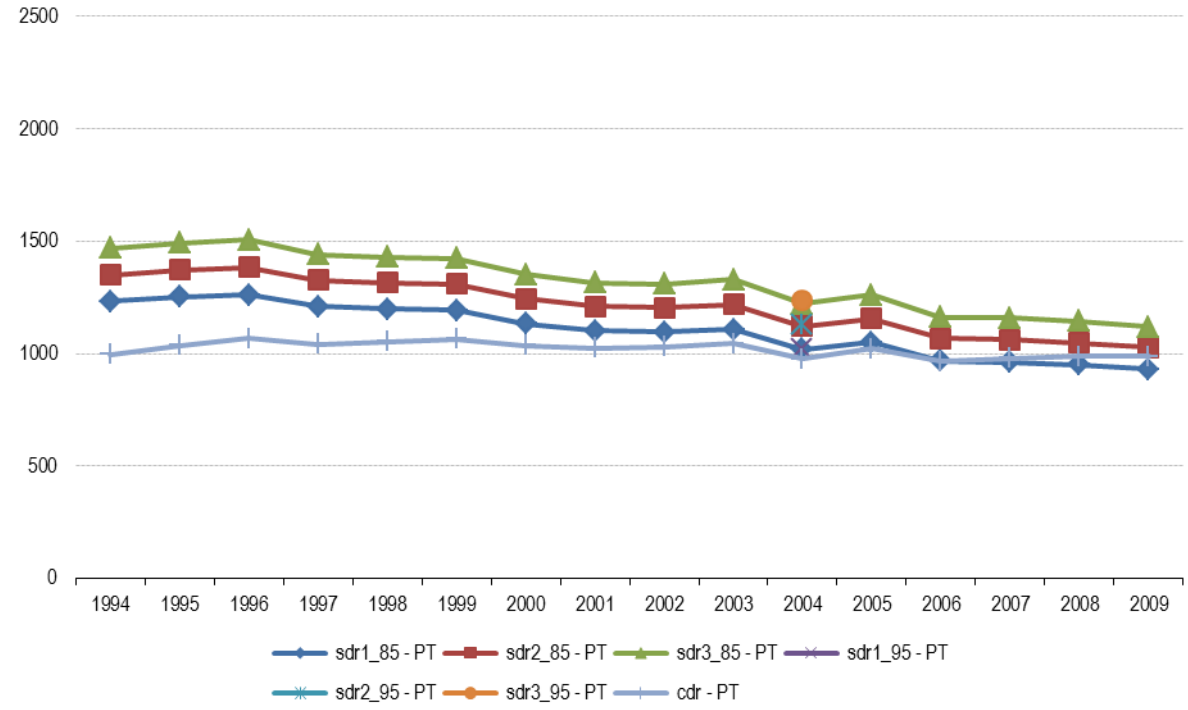
Total deaths – Austria



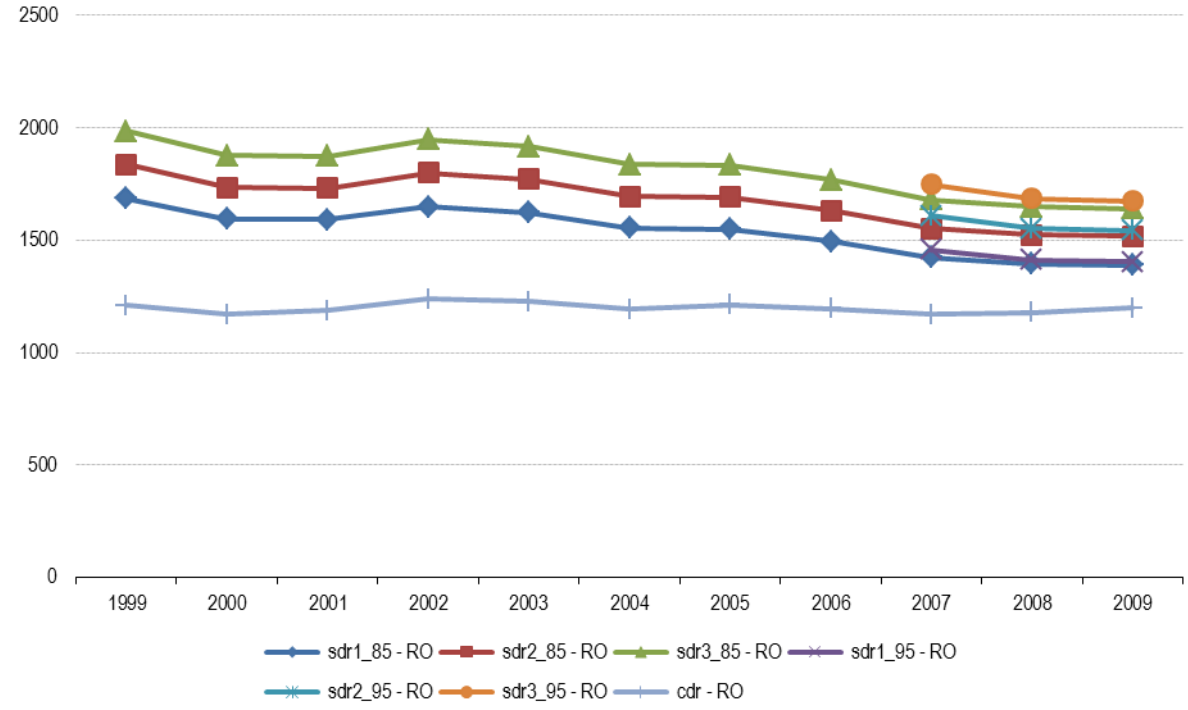
Total deaths – Poland



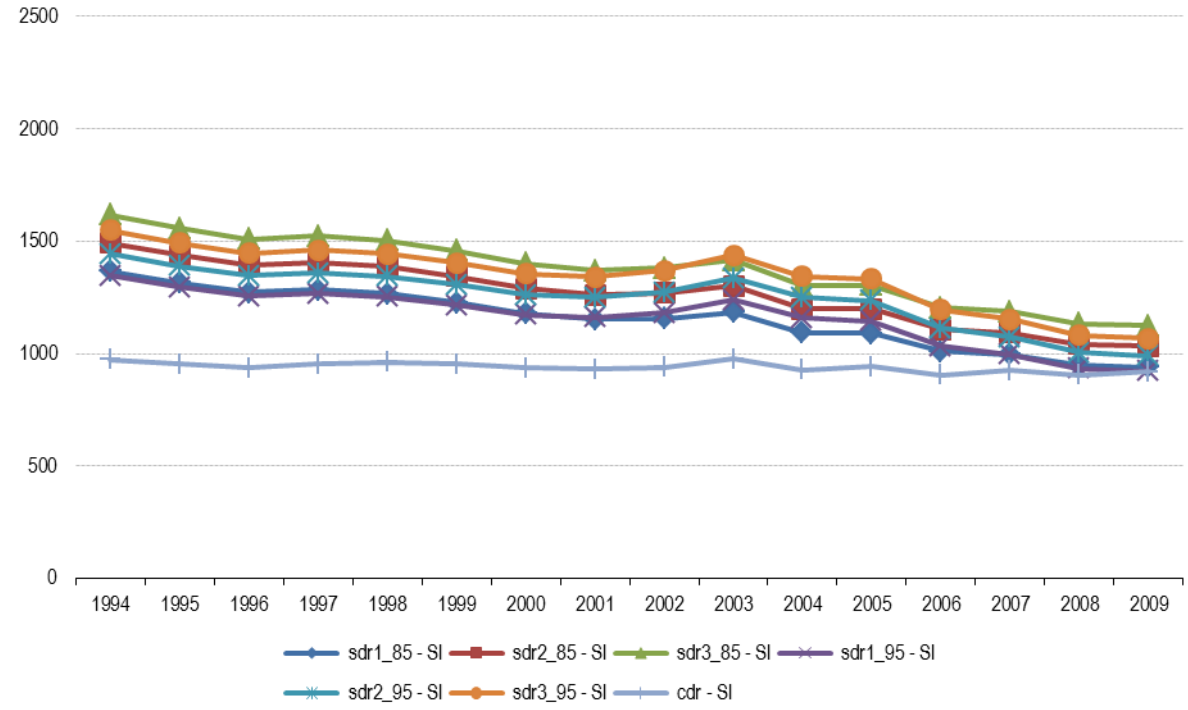
Total deaths – Portugal



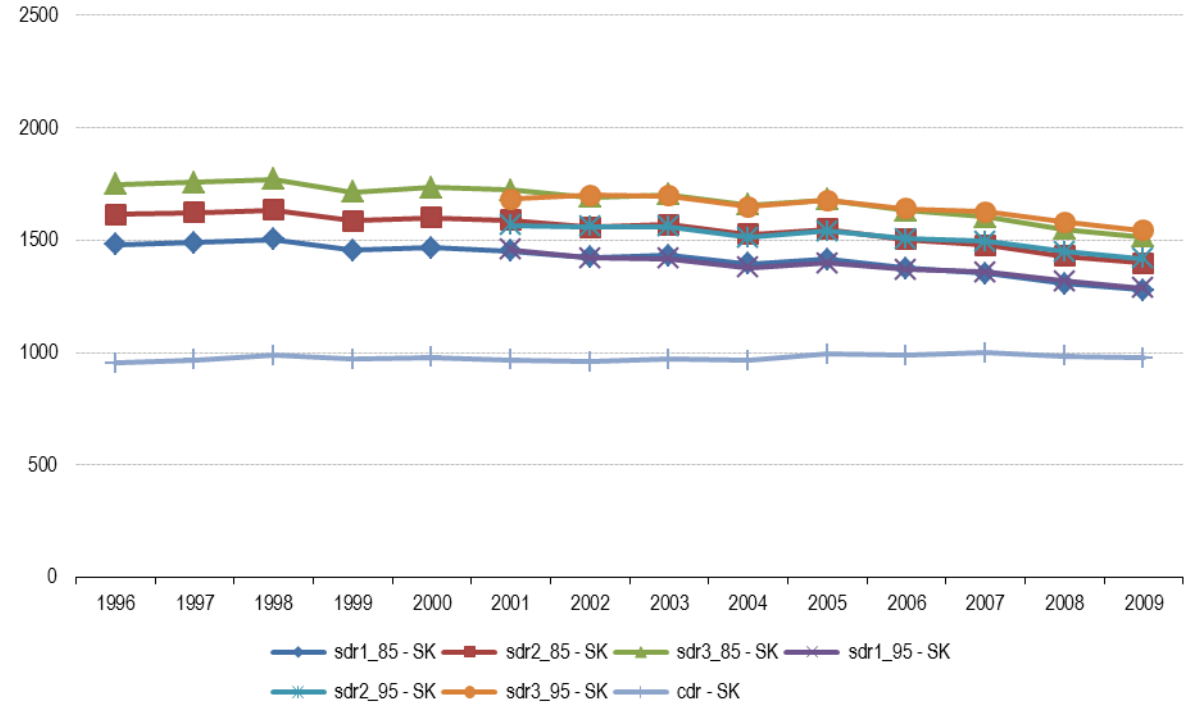
Total deaths – Romania



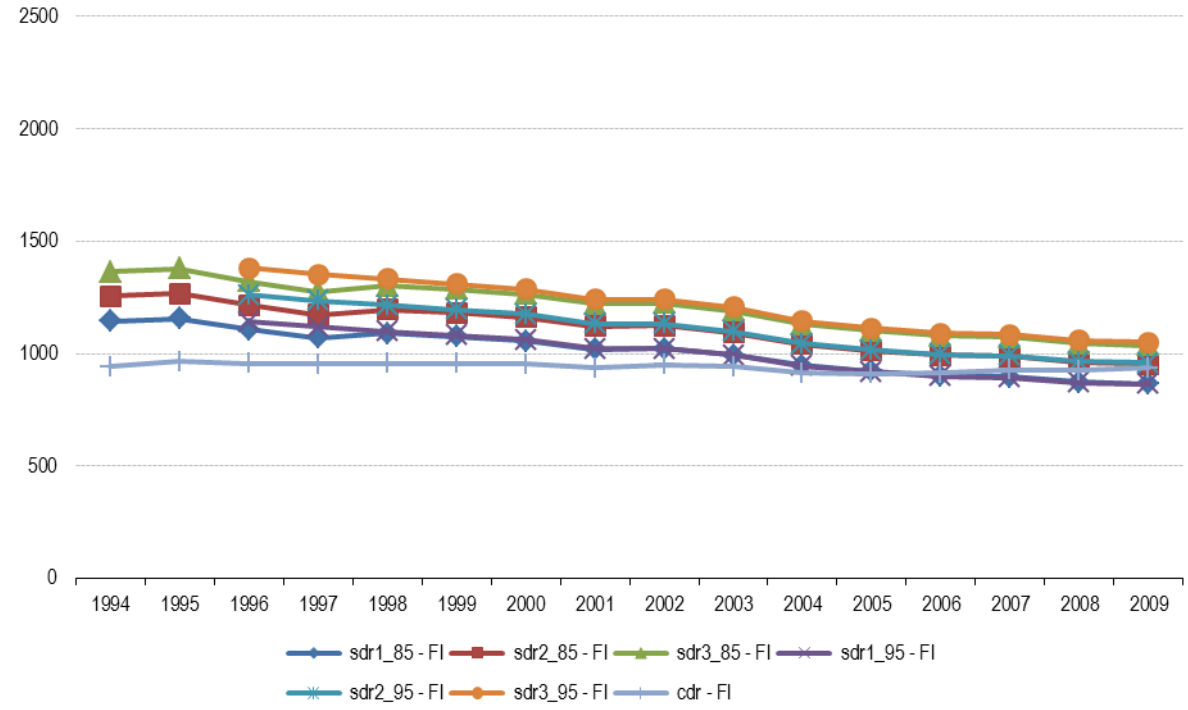
Total deaths – Slovenia



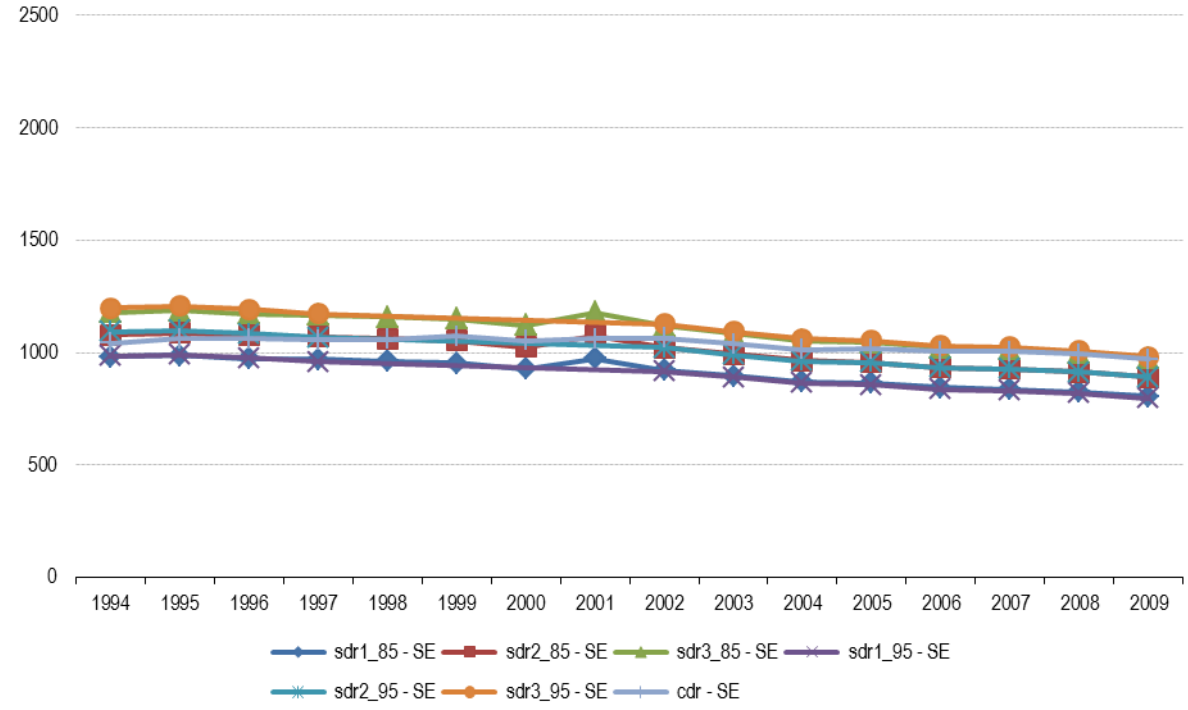
Total deaths – Slovakia



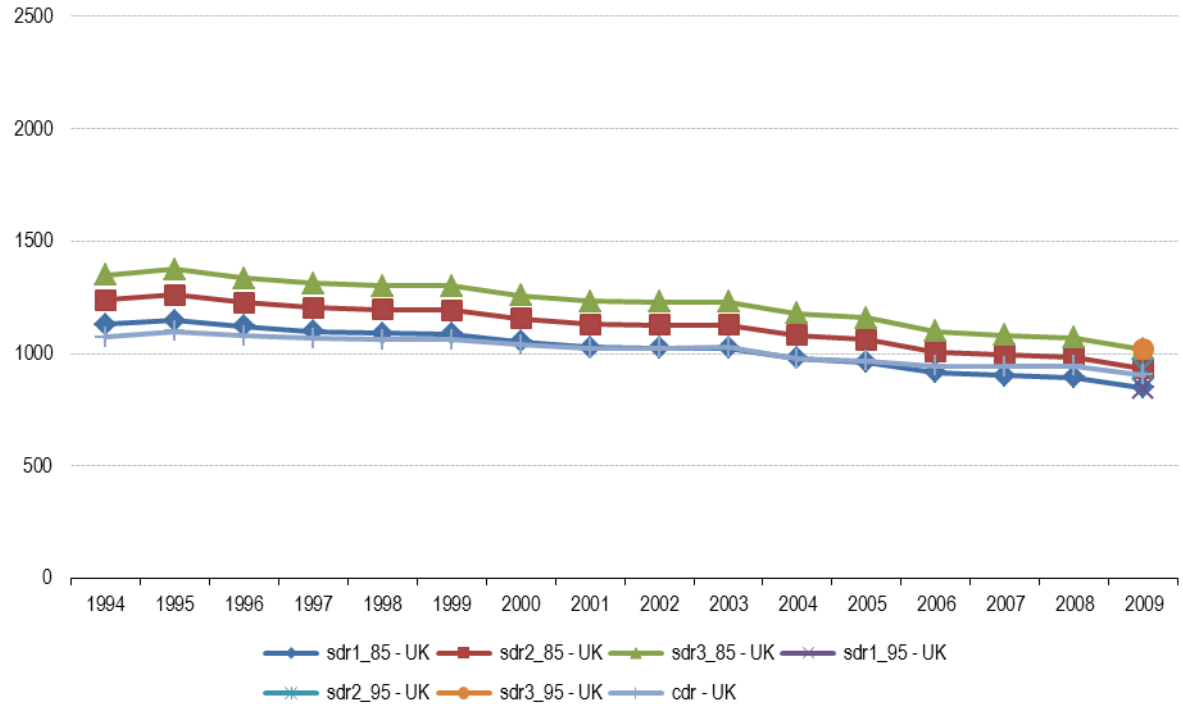
Total deaths – Finland



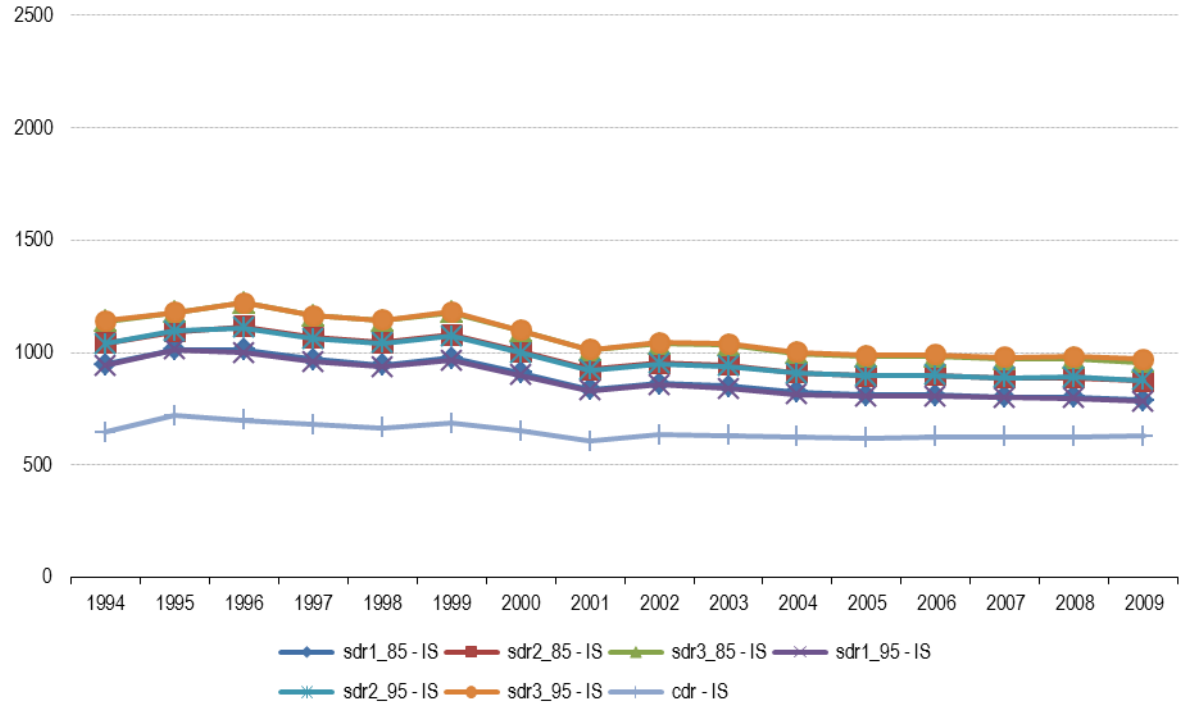
Total deaths – Sweden



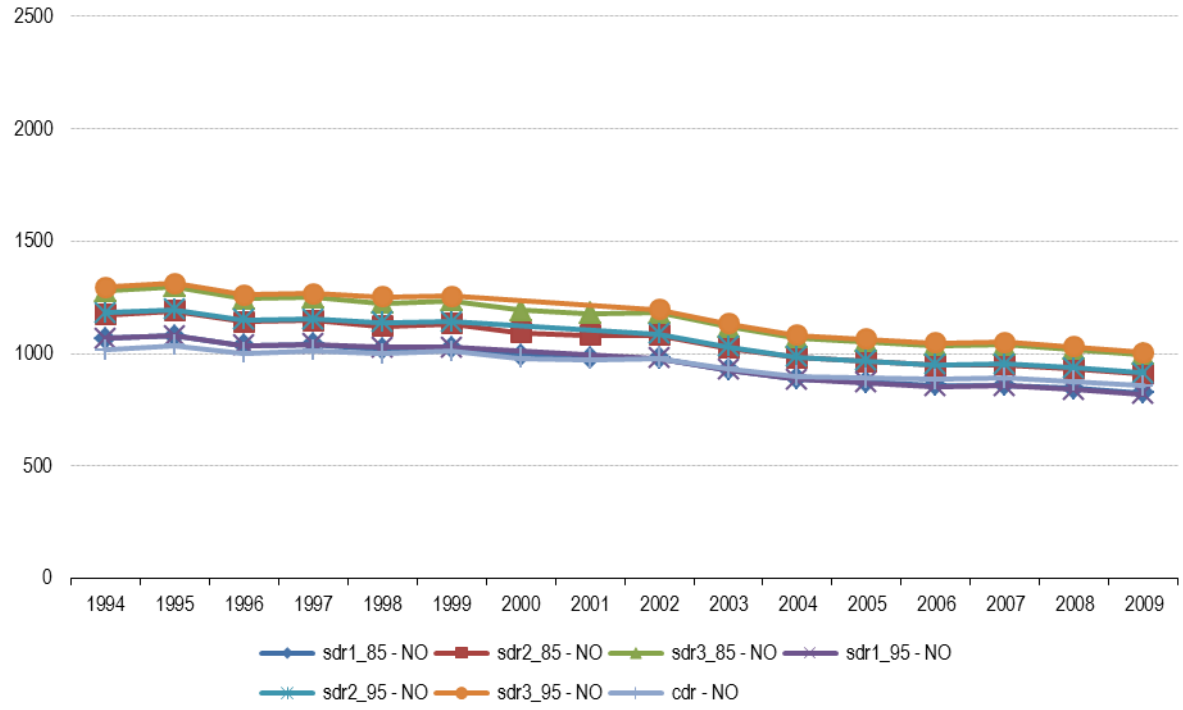
Total deaths – United Kingdom



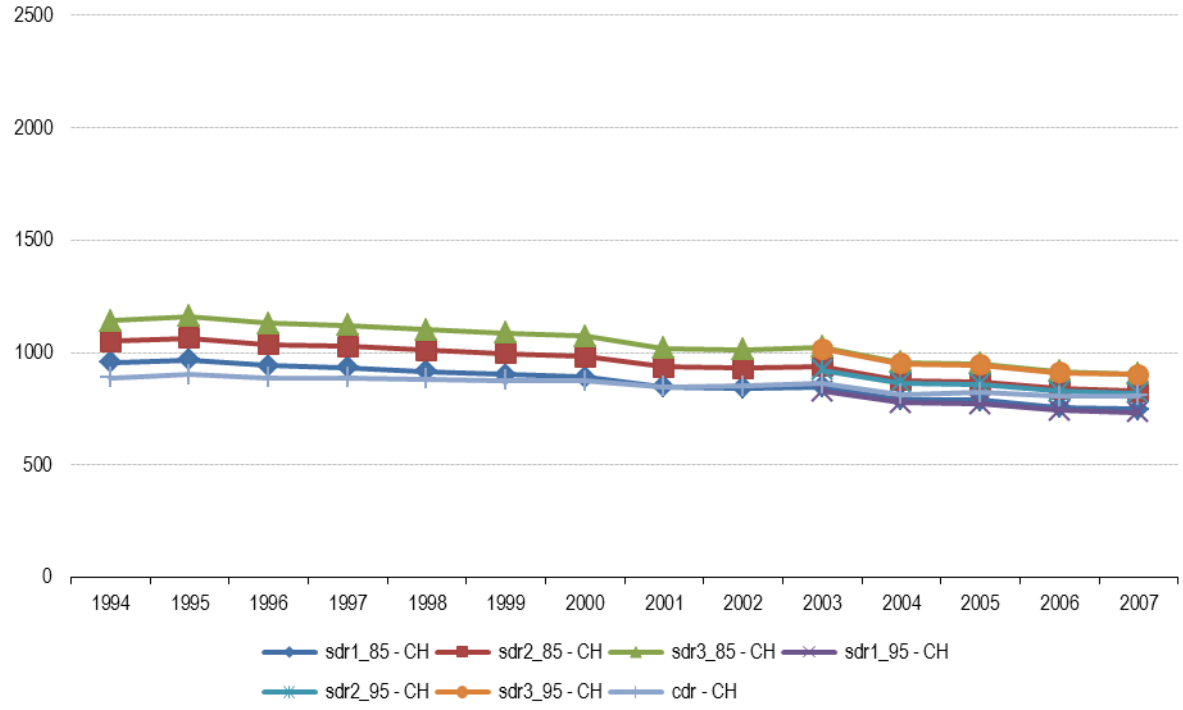
Total deaths – Iceland



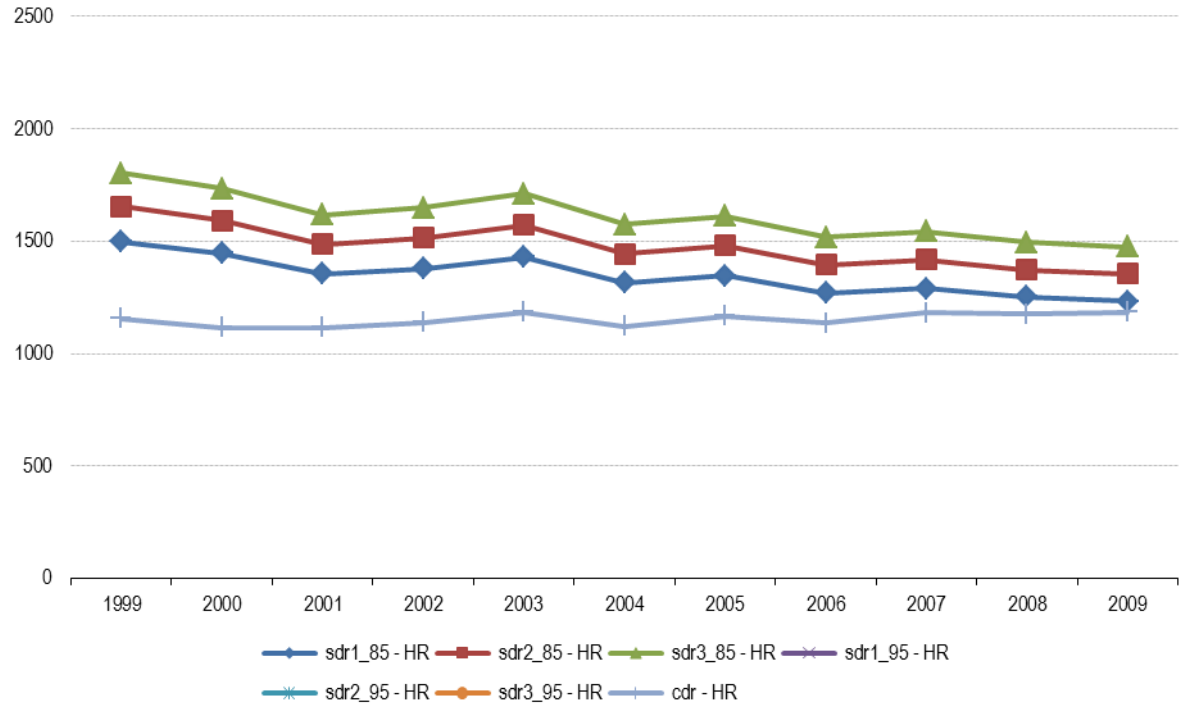
Total deaths – Norway



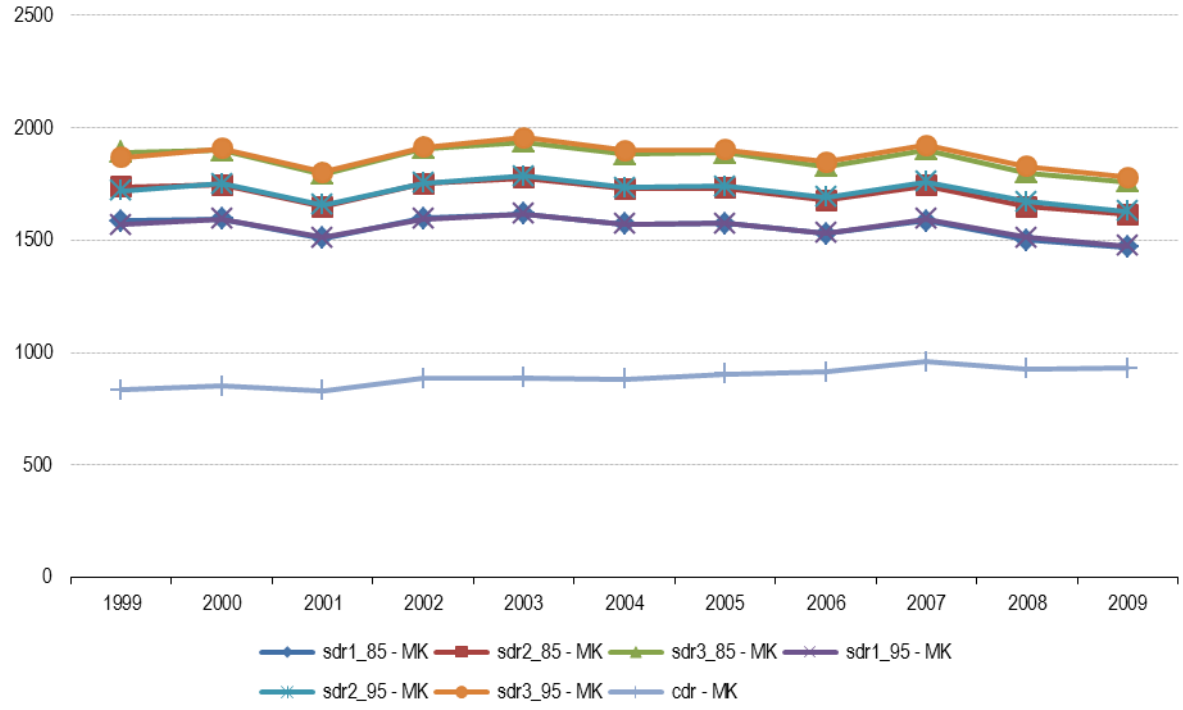
Total deaths – Switzerland



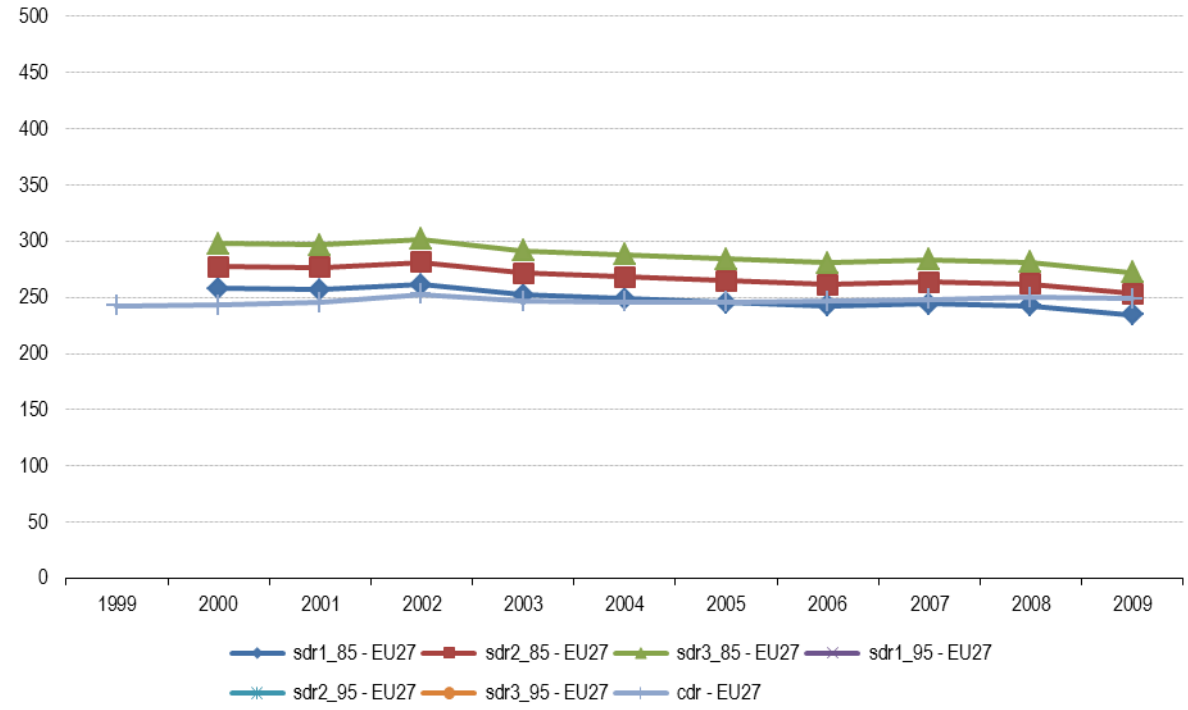
Total deaths – Croatia



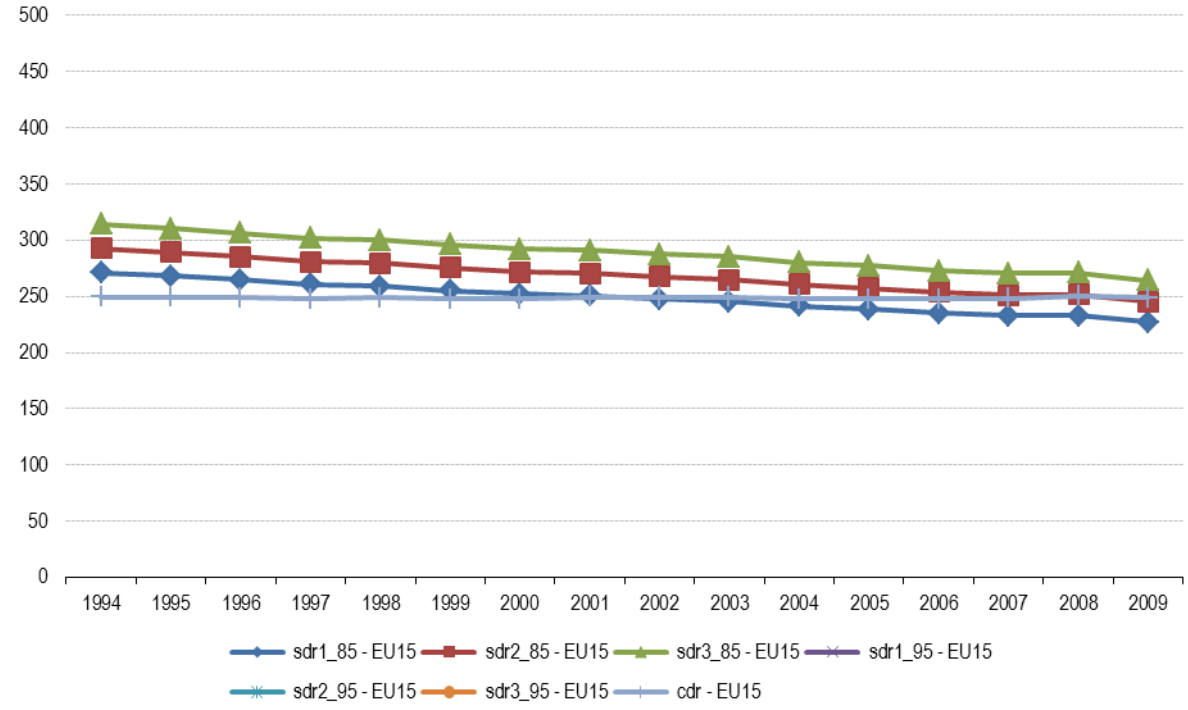
Total deaths – former Yugoslav Republic of Macedonia



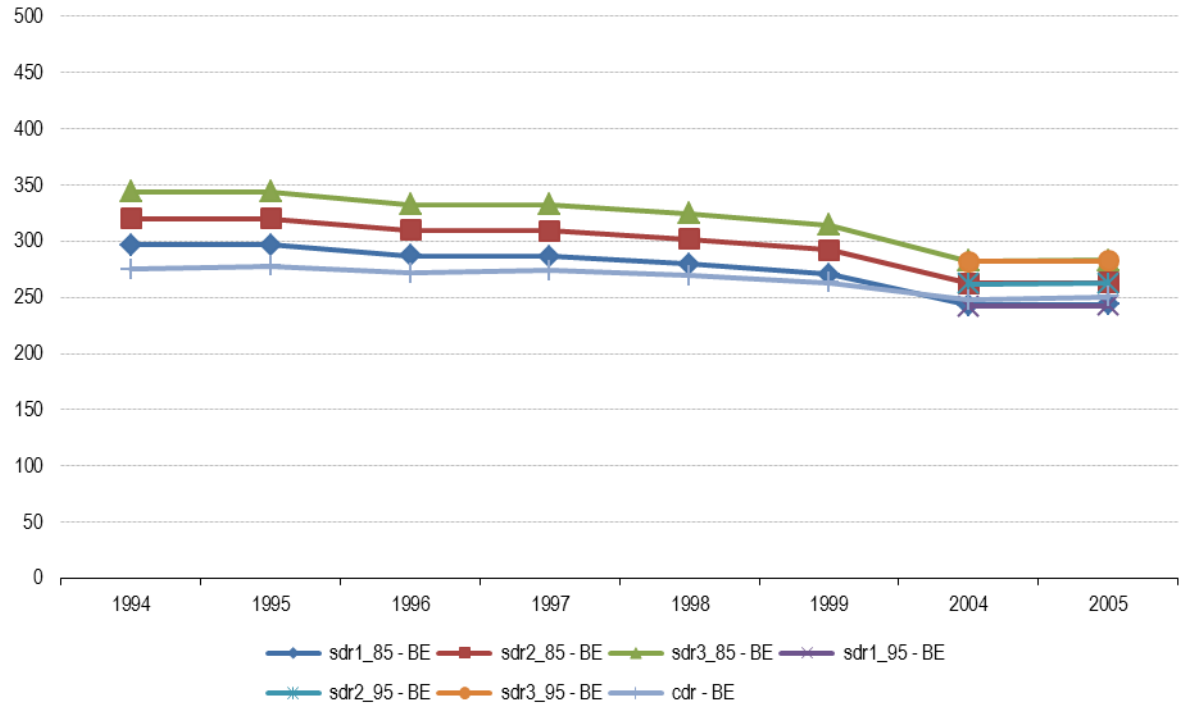
Malignant neoplasms – European Union 27 countries



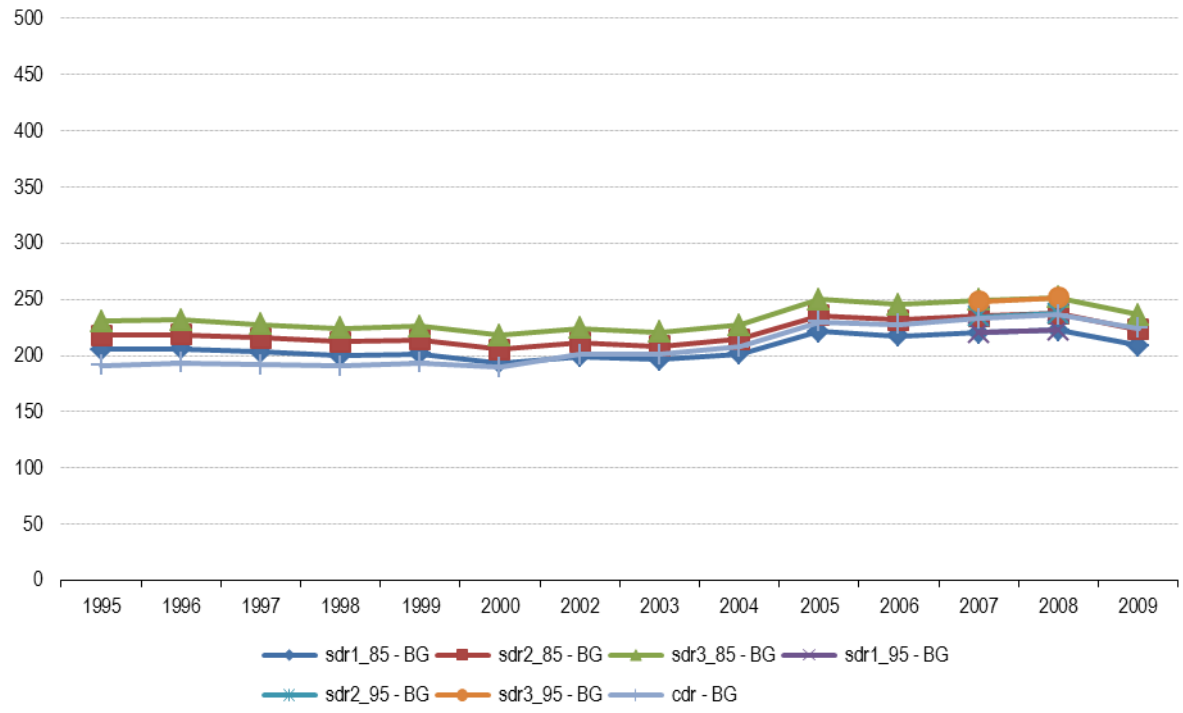
Malignant neoplasms – European Union 15 countries



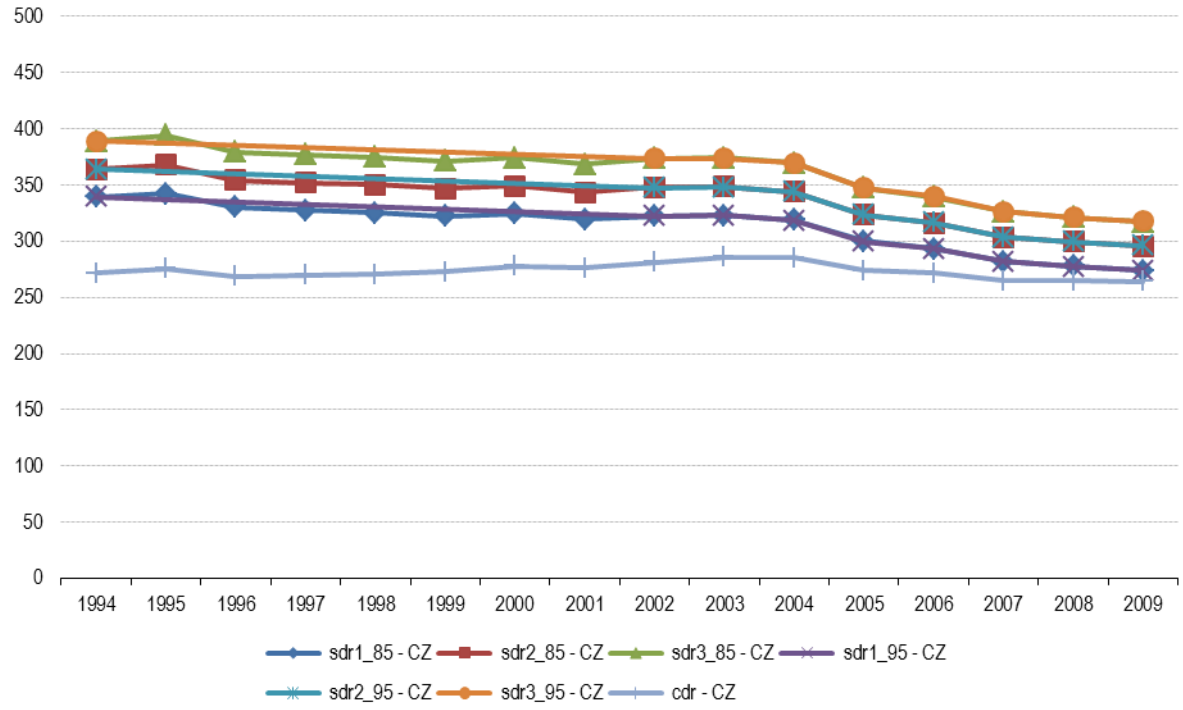
Malignant neoplasms – Belgium



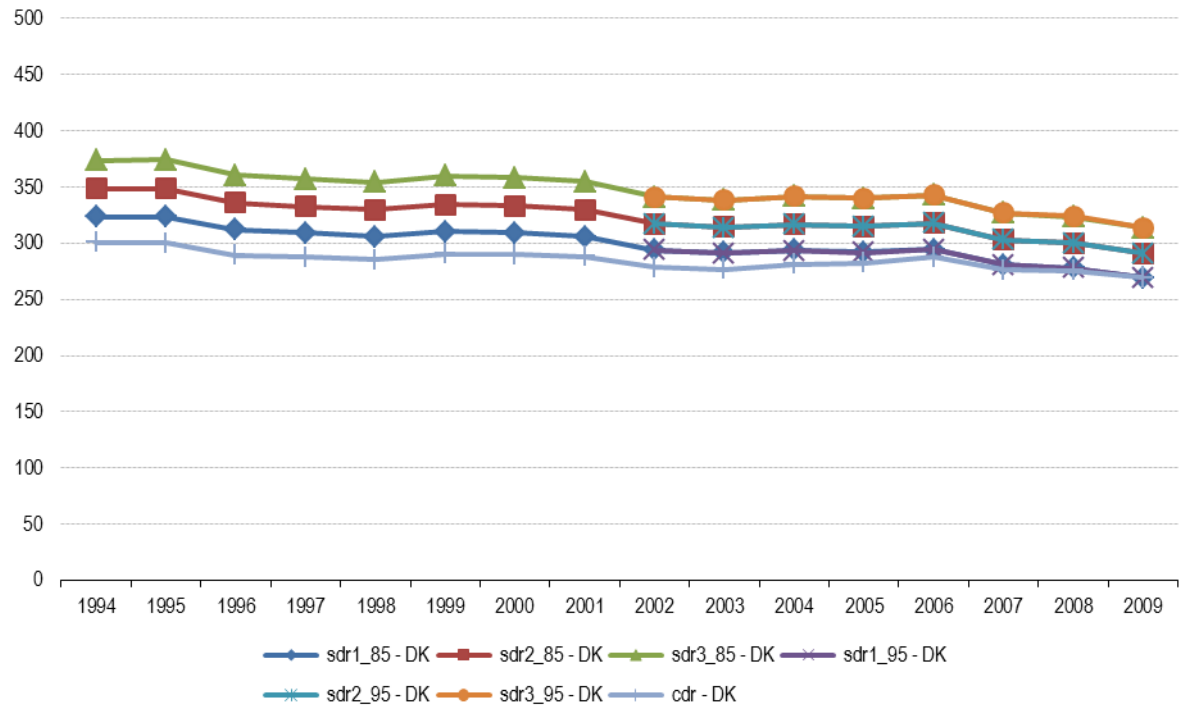
Malignant neoplasms – Bulgaria



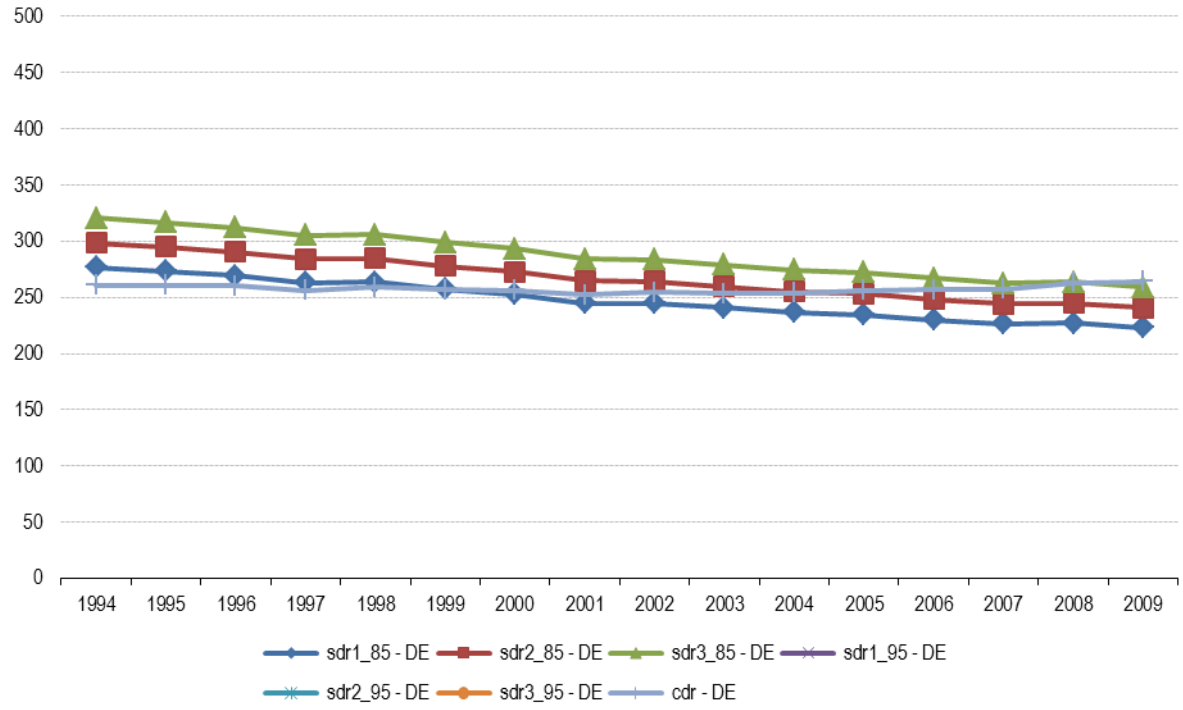
Malignant neoplasms – Czech Republic



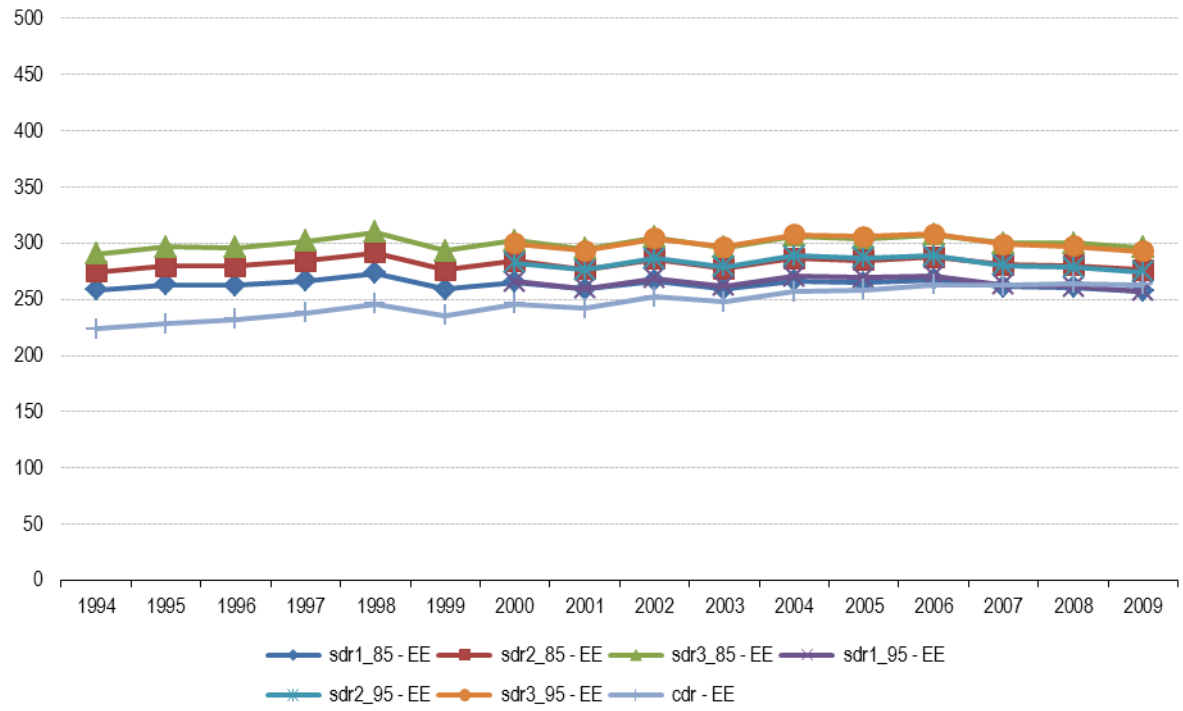
Malignant neoplasms – Denmark



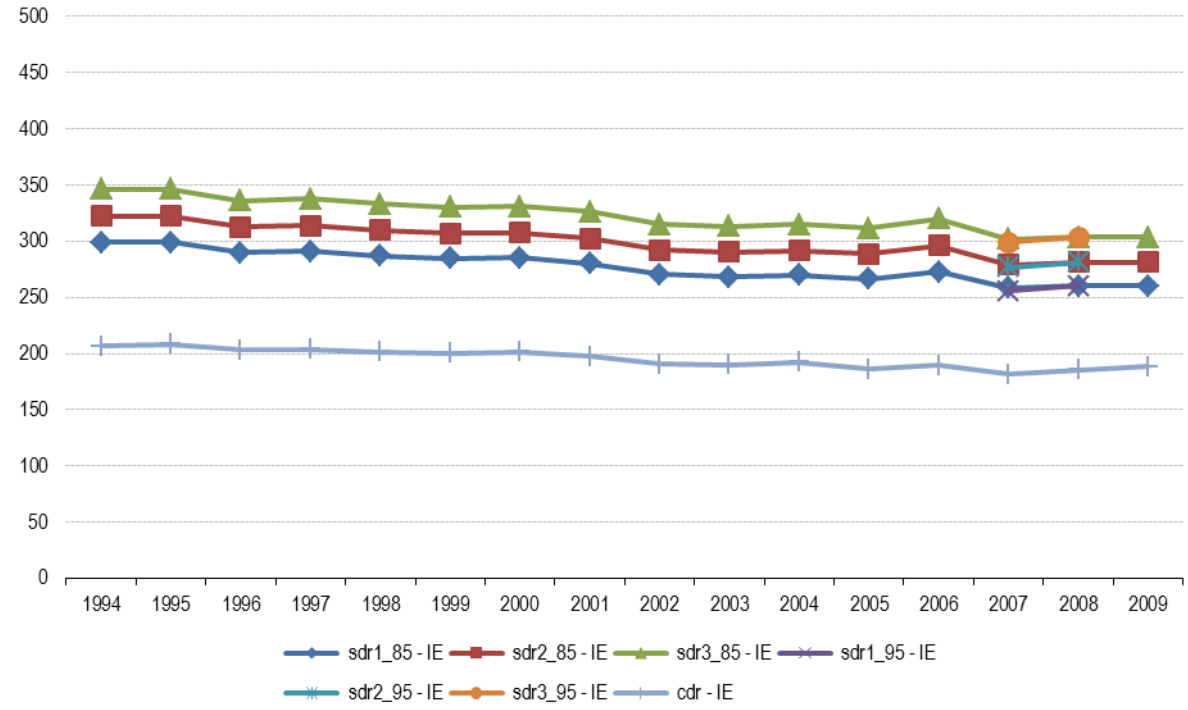
Malignant neoplasms – Germany



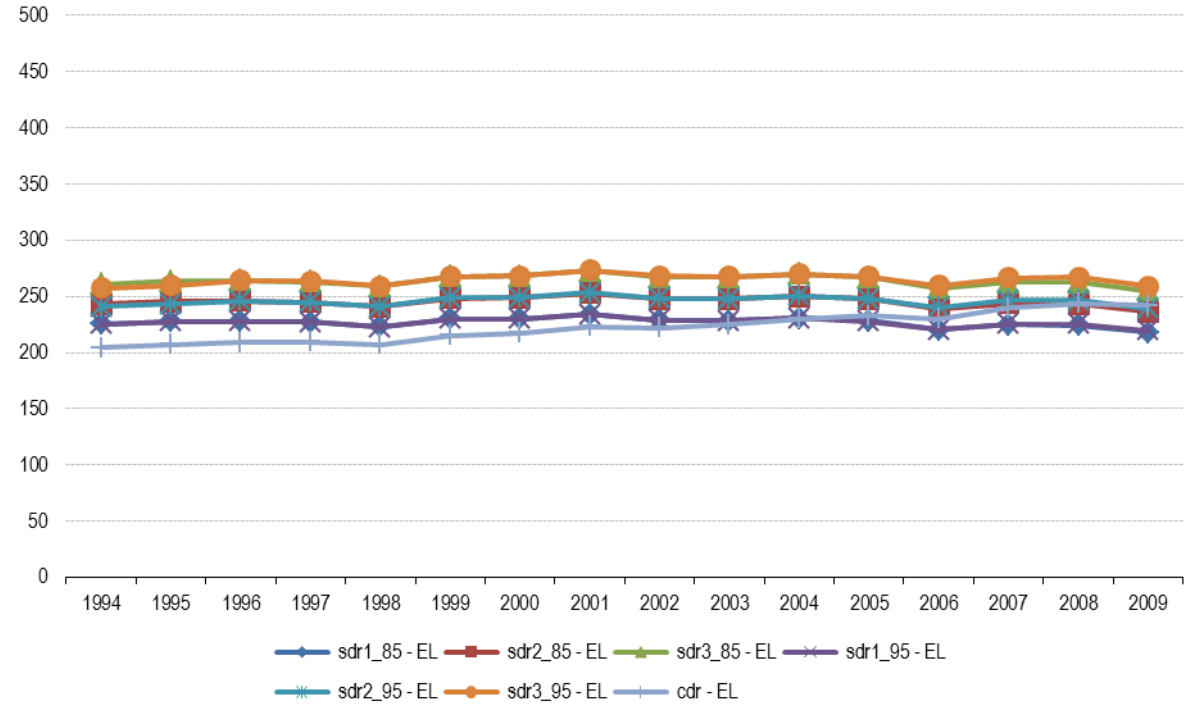
Malignant neoplasms – Estonia



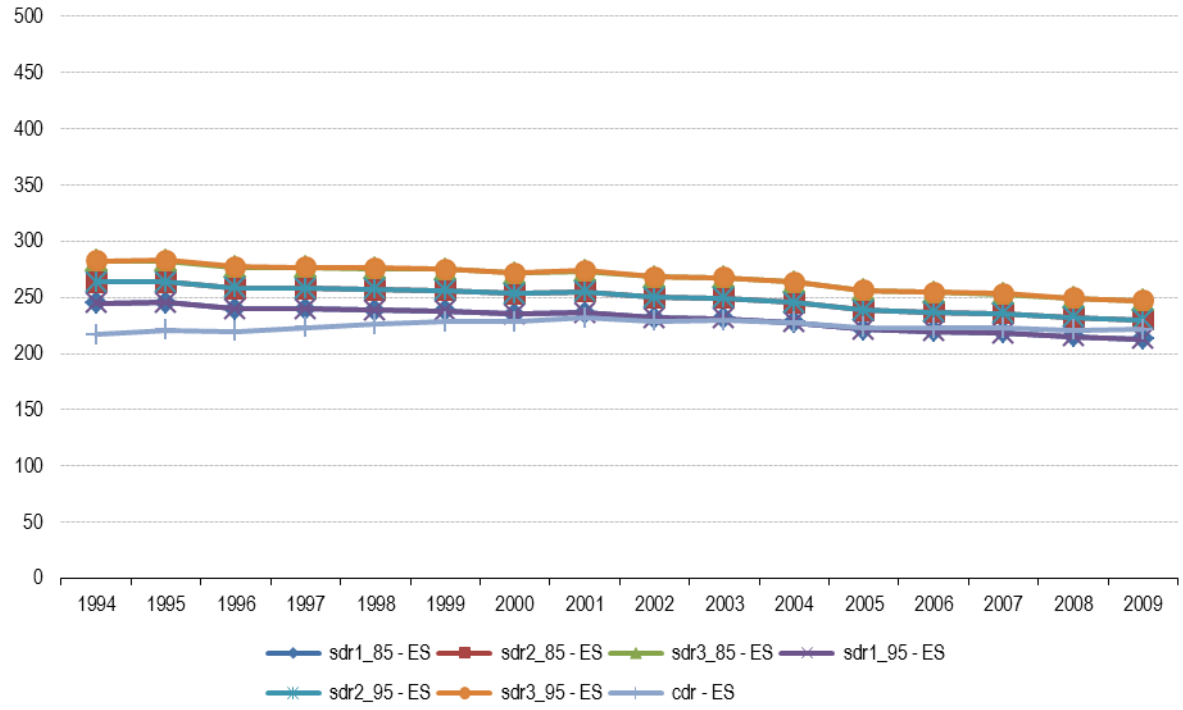
Malignant neoplasms – Ireland



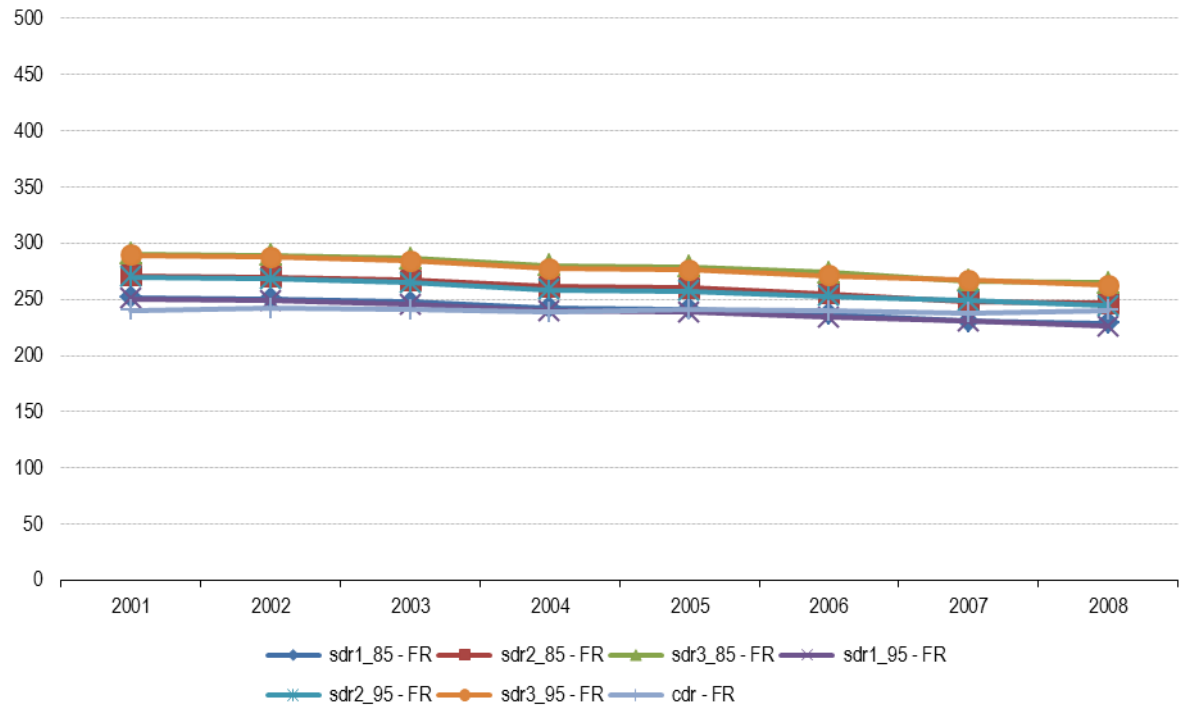
Malignant neoplasms – Greece



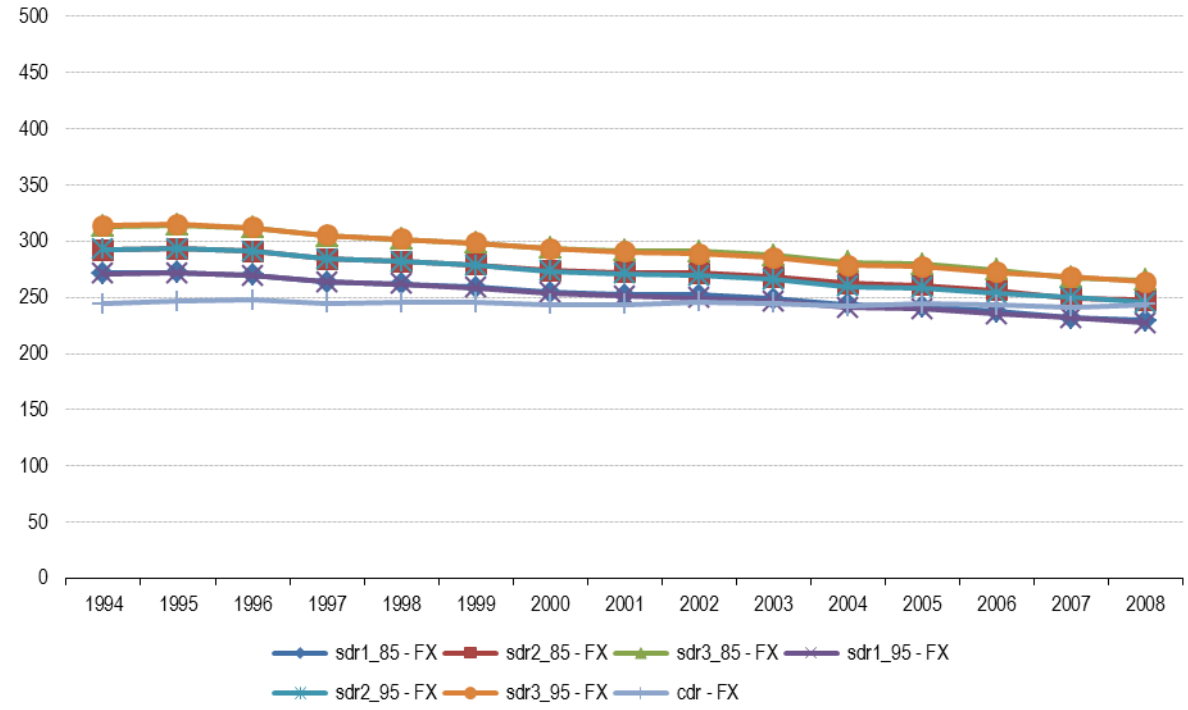
Malignant neoplasms – Spain



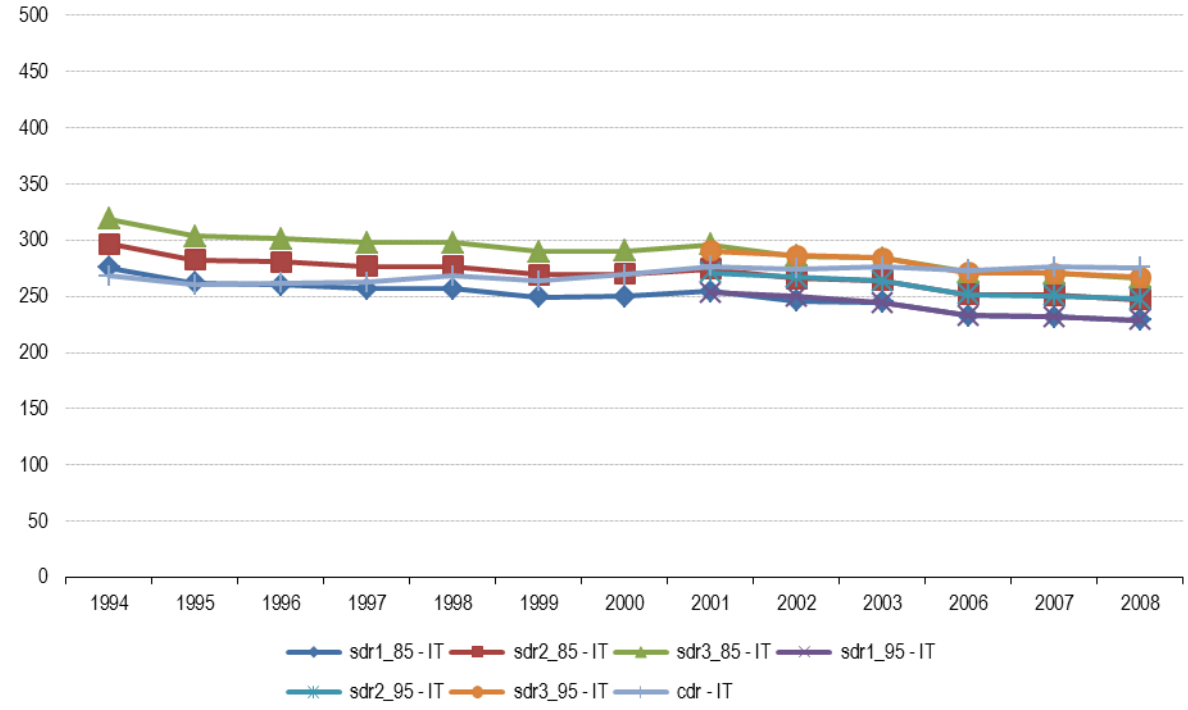
Malignant neoplasms – France



Malignant neoplasms – France (metropolitan)

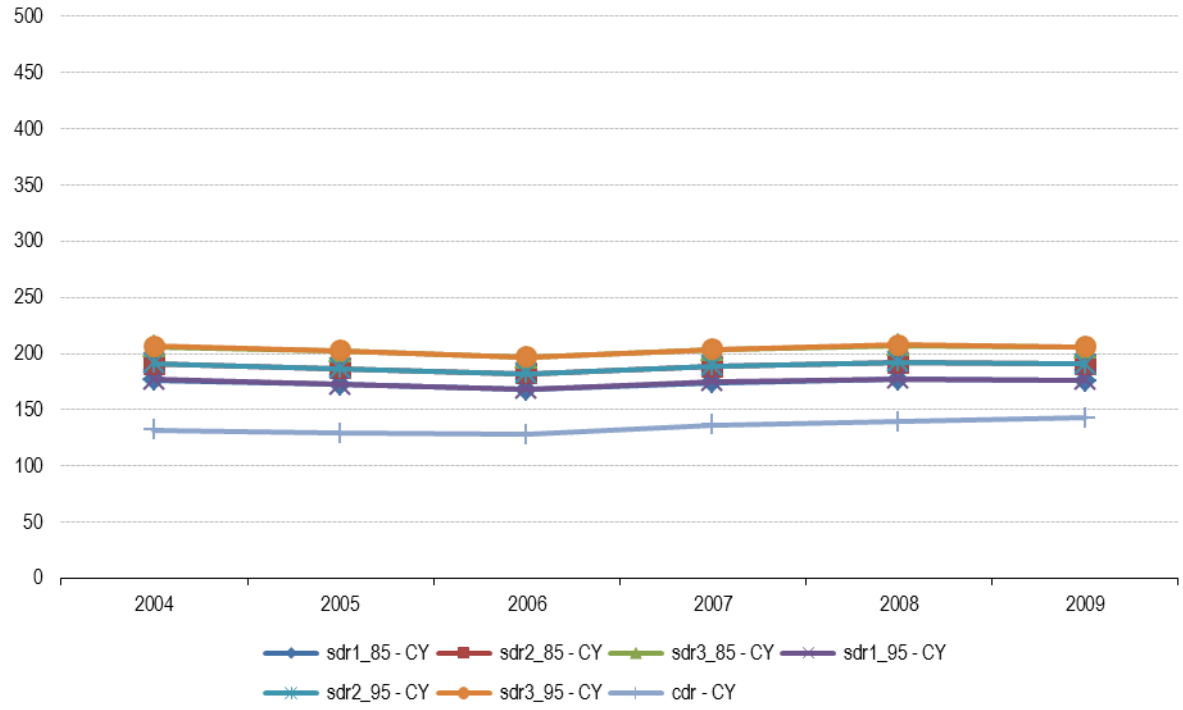


Malignant neoplasms – Italy

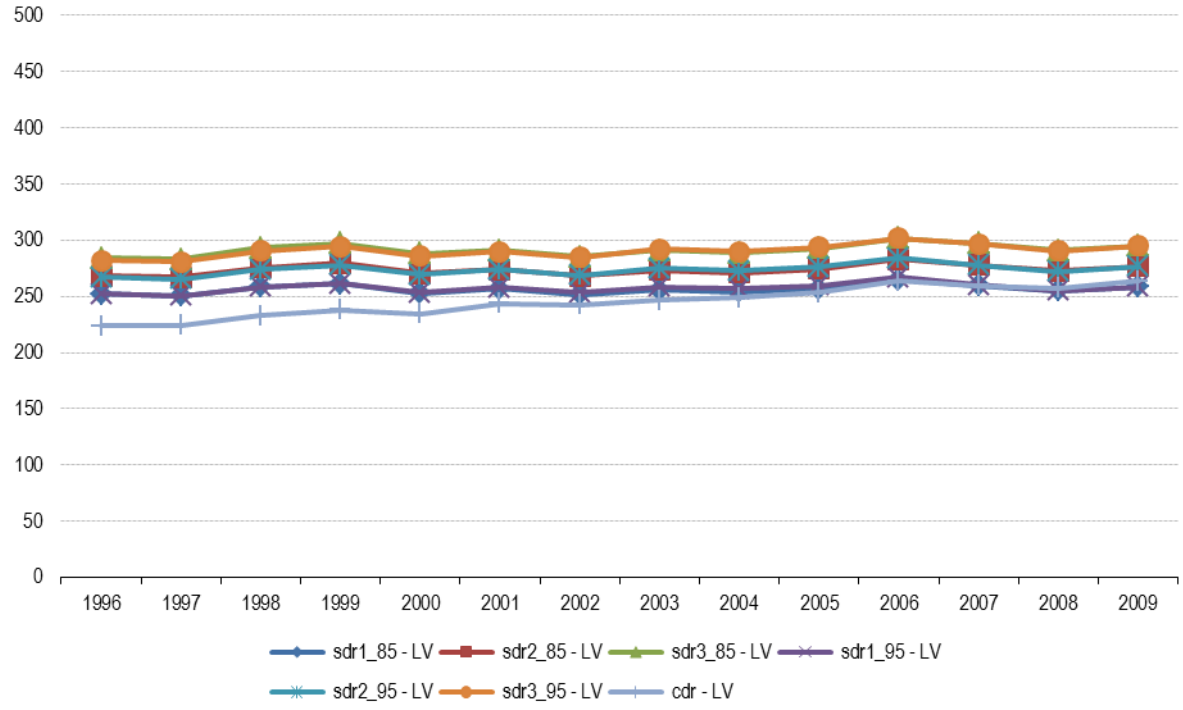


Note: cause-specific mortality data for Italy in the years 2004 and 2005 are not available

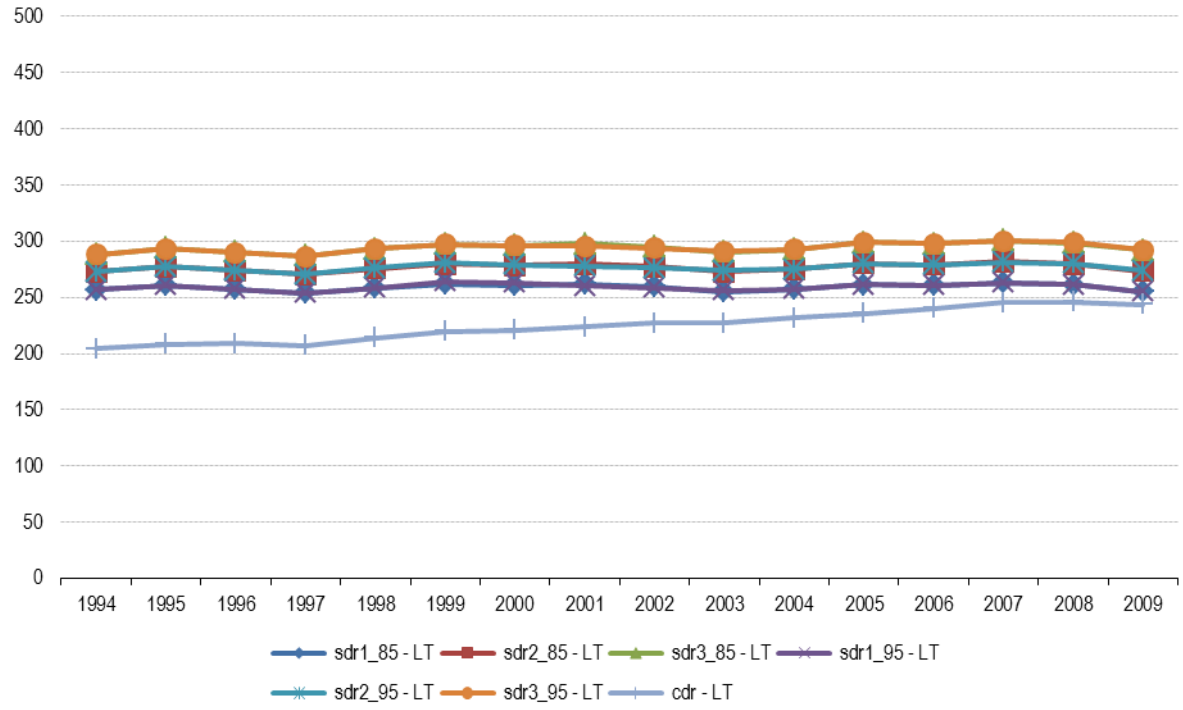
Malignant neoplasms – Cyprus



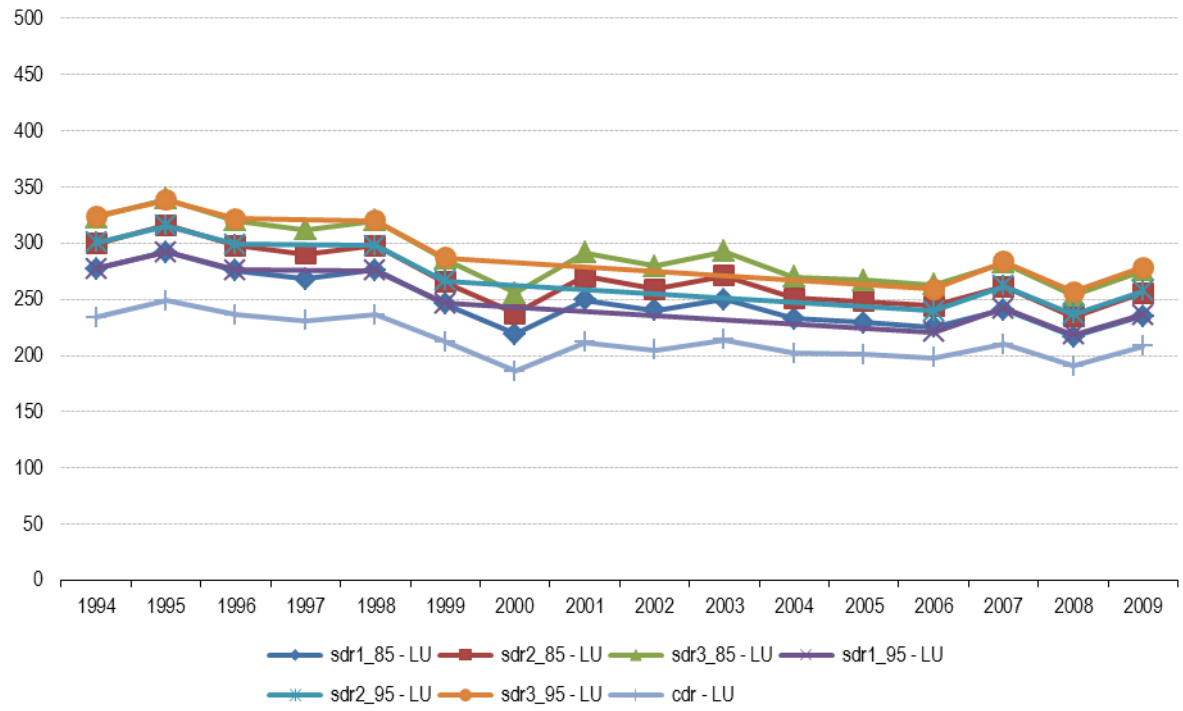
Malignant neoplasms – Latvia



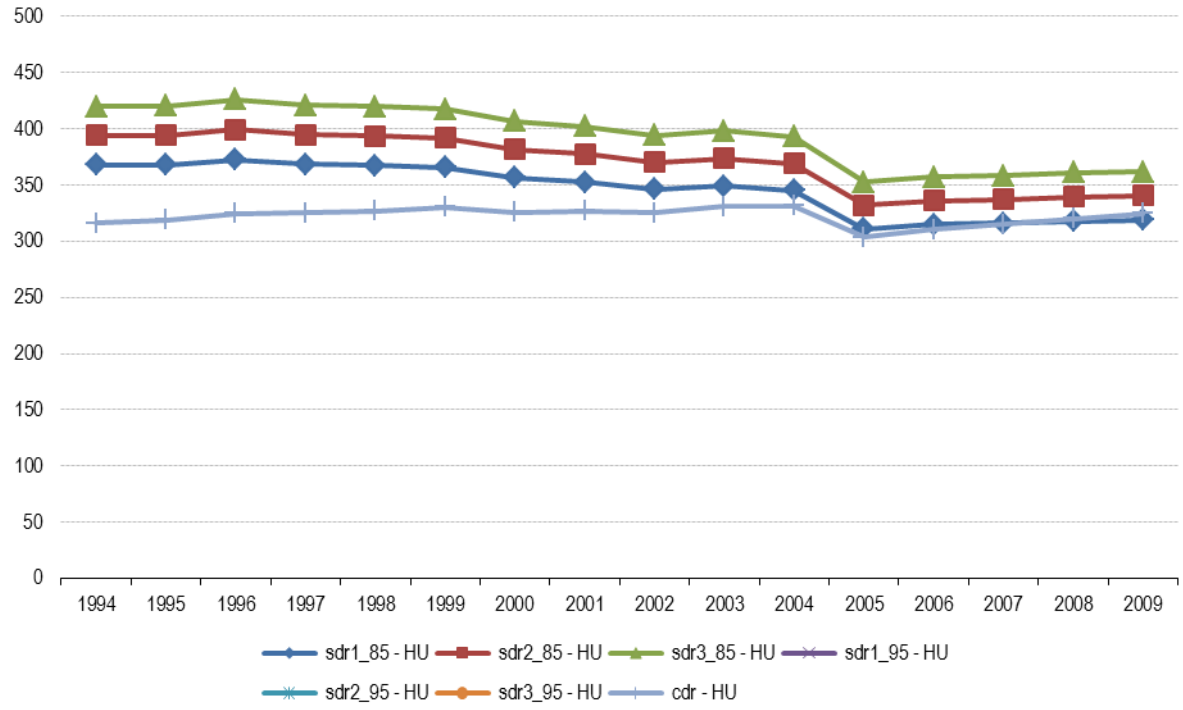
Malignant neoplasms – Lithuania



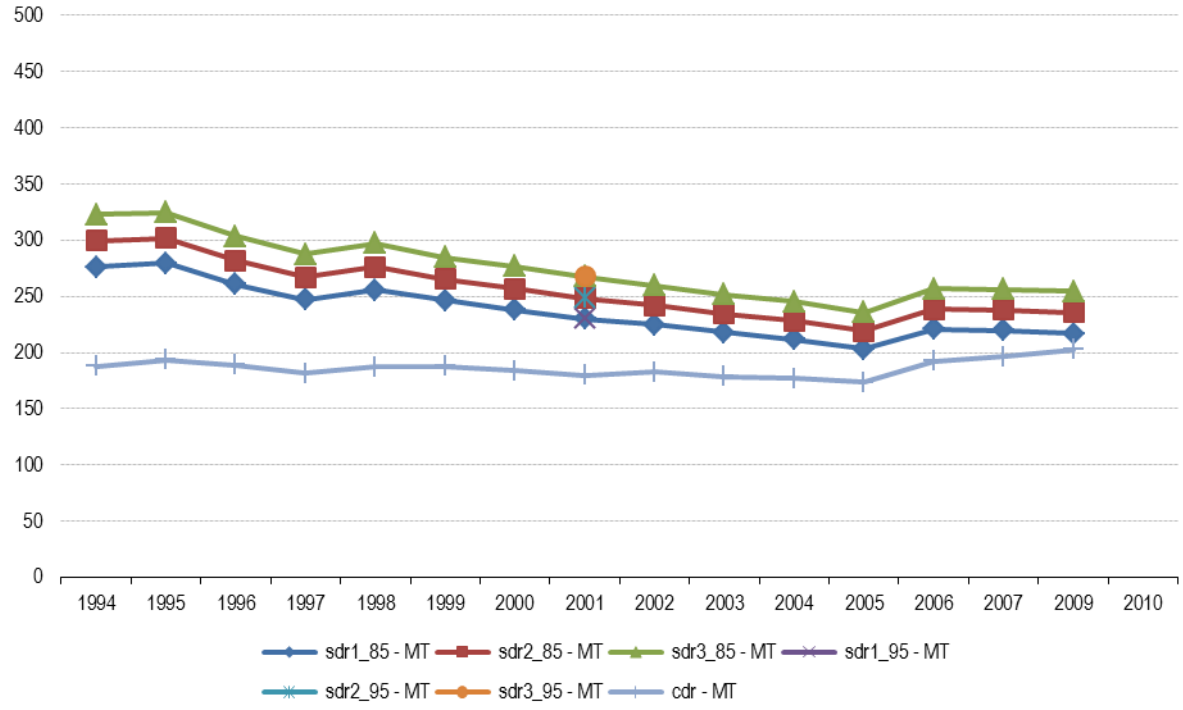
Malignant neoplasms – Luxembourg



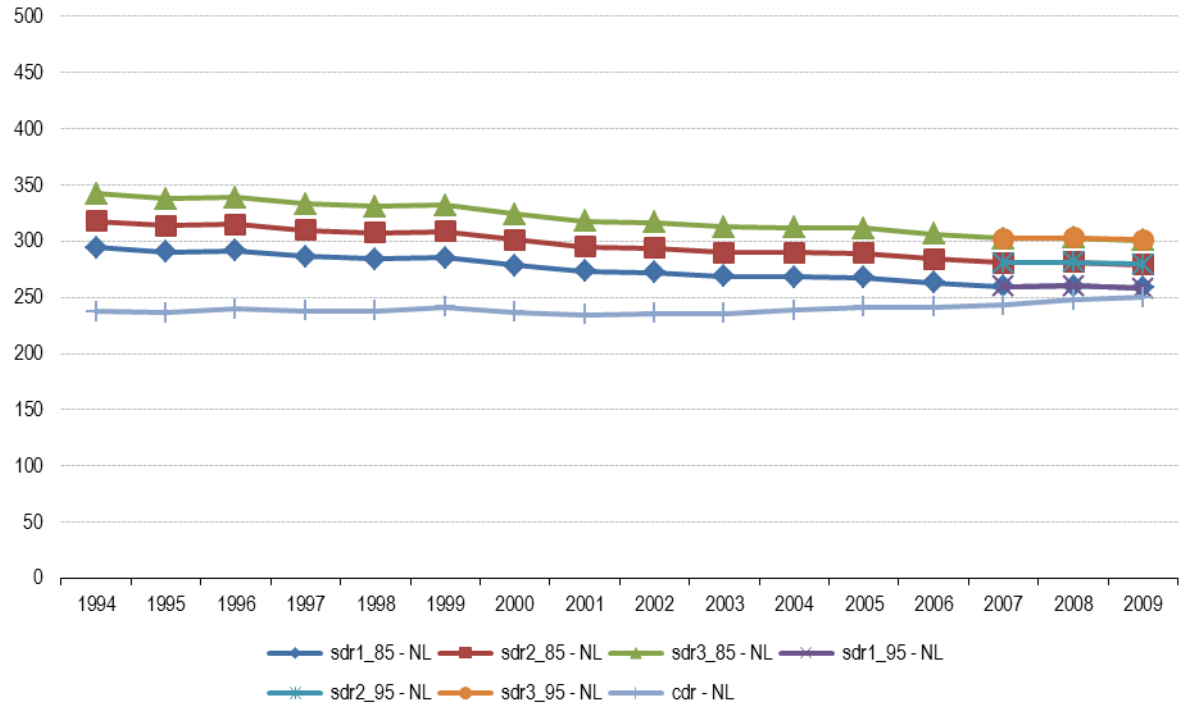
Malignant neoplasms – Hungary



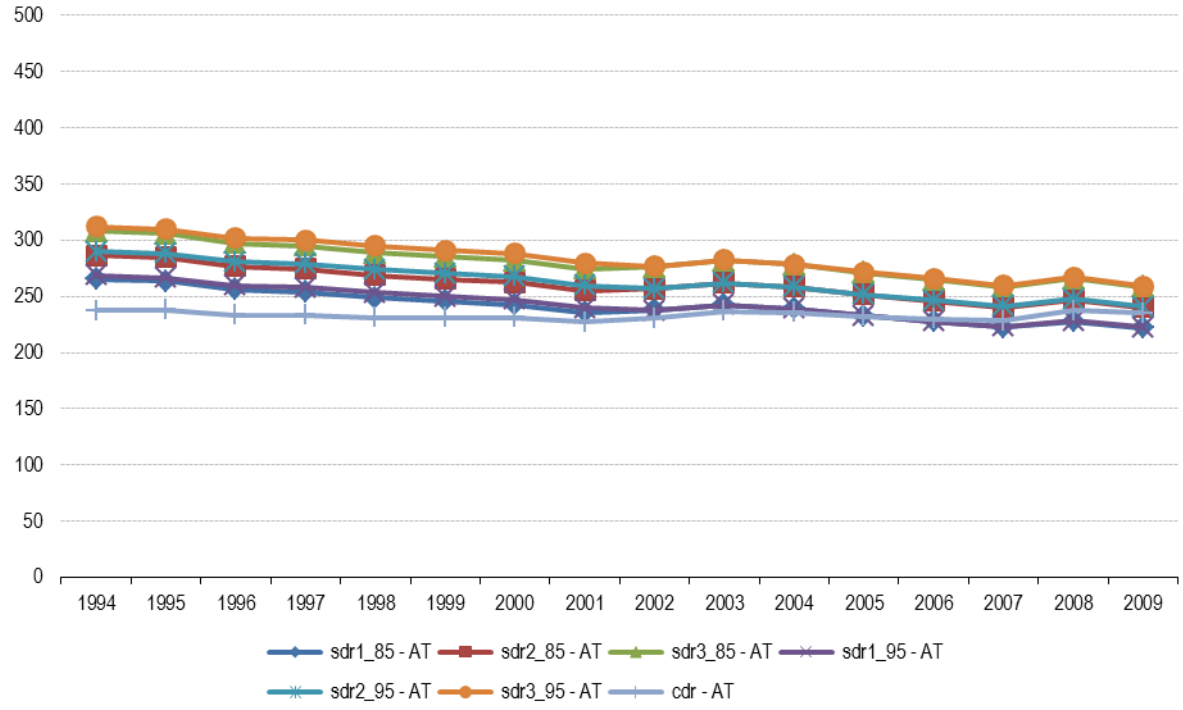
Malignant neoplasms – Malta



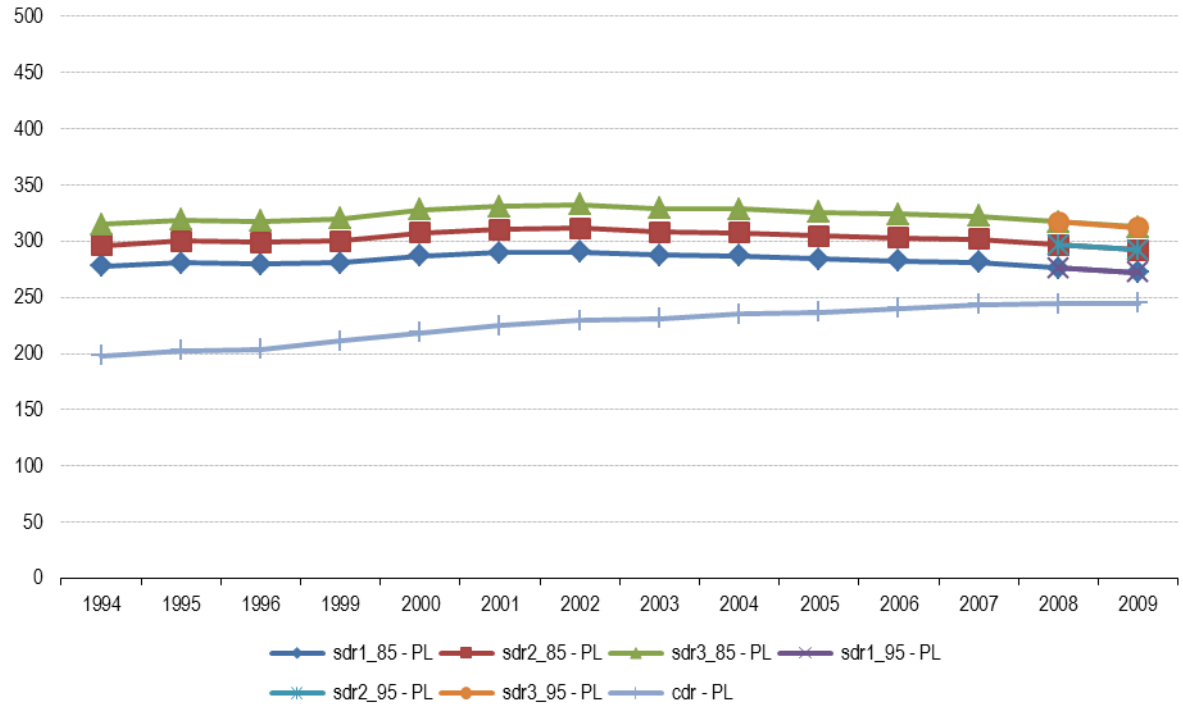
Malignant neoplasms – Netherlands



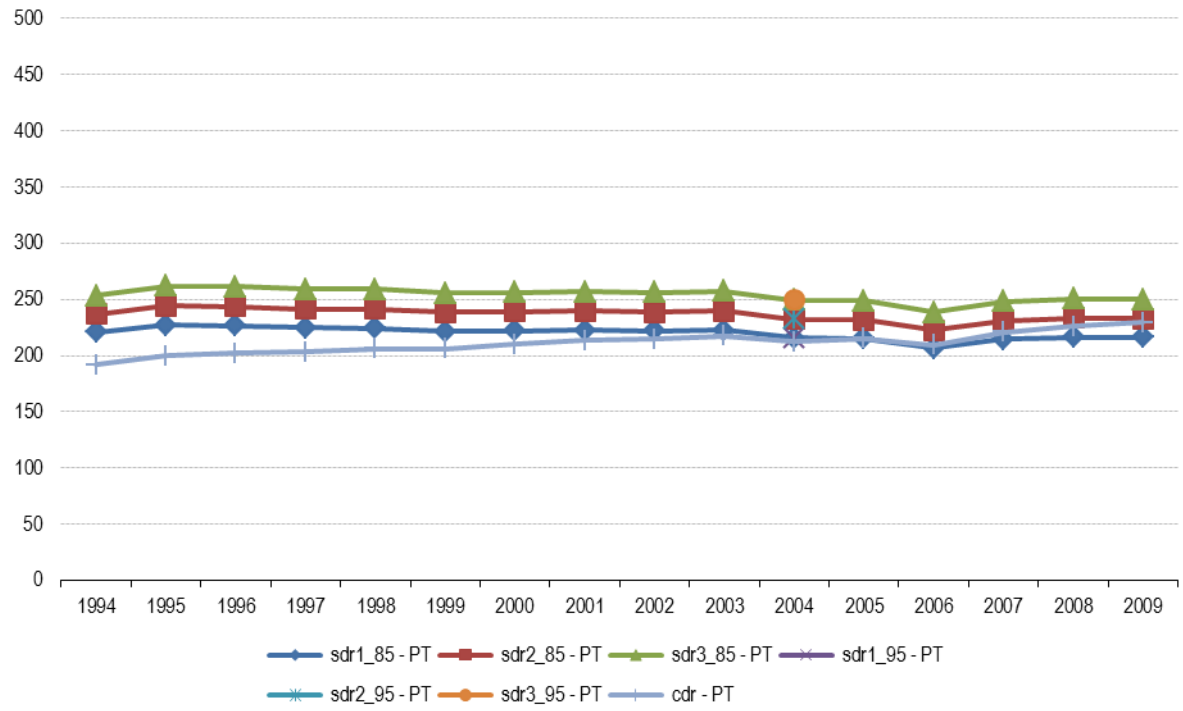
Malignant neoplasms – Austria



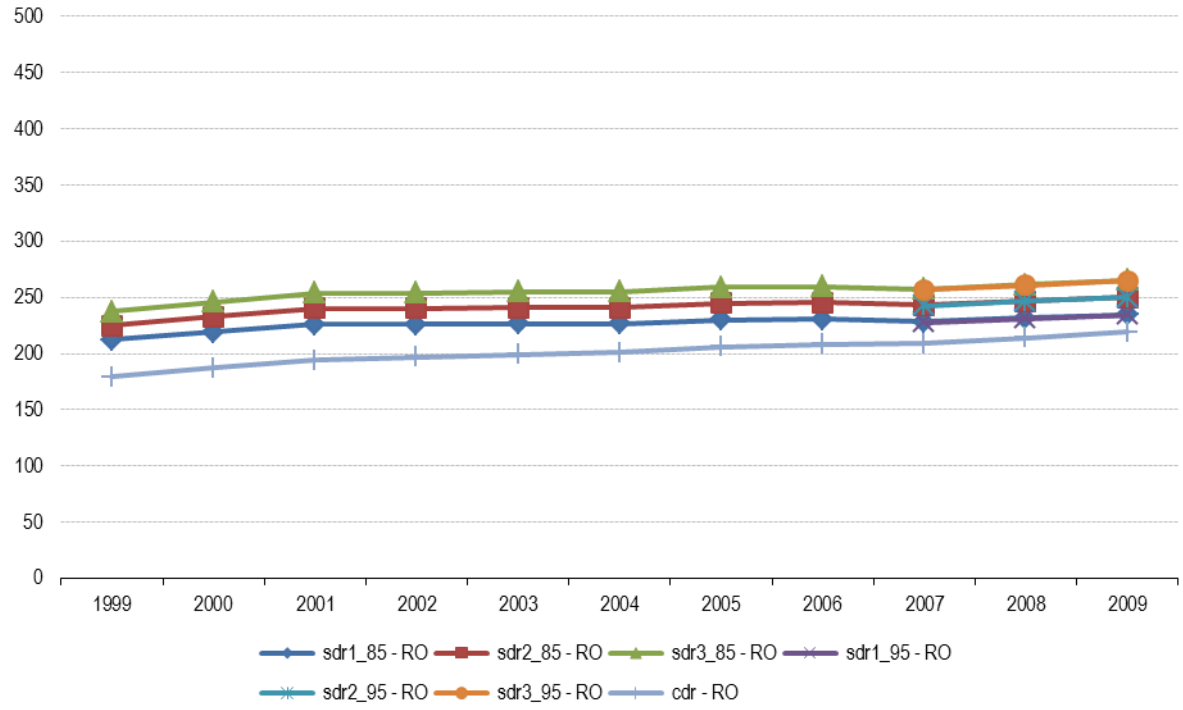
Malignant neoplasms – Poland



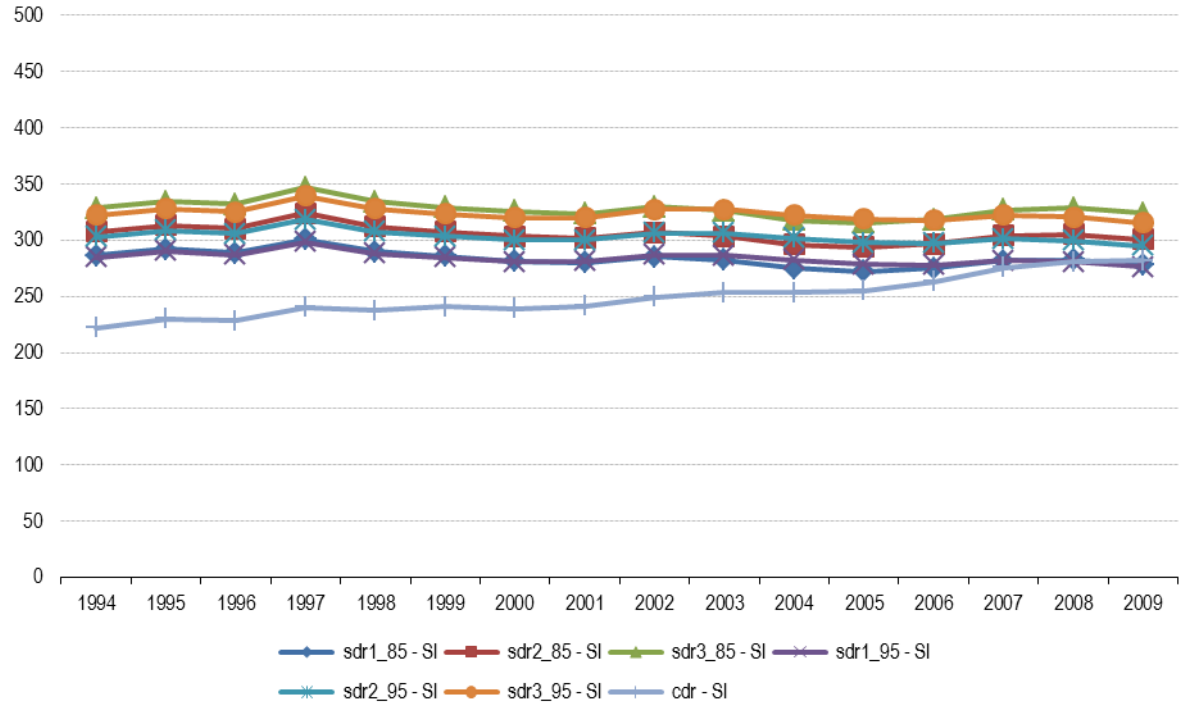
Malignant neoplasms – Portugal



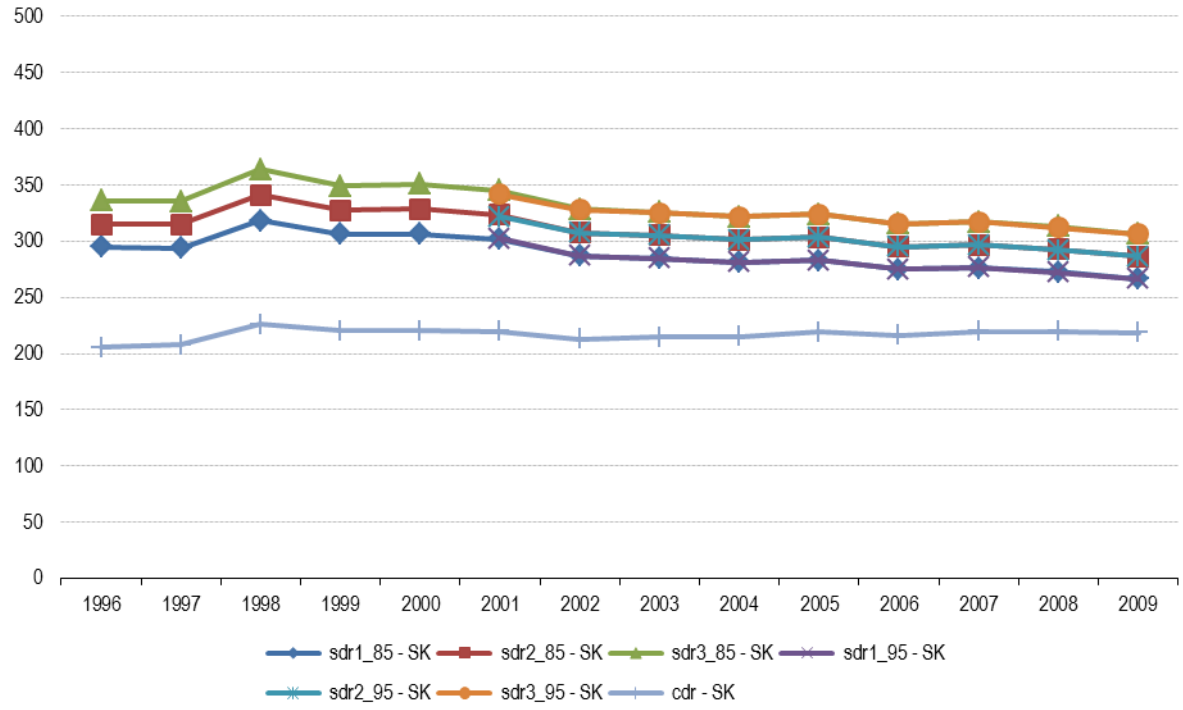
Malignant neoplasms – Romania



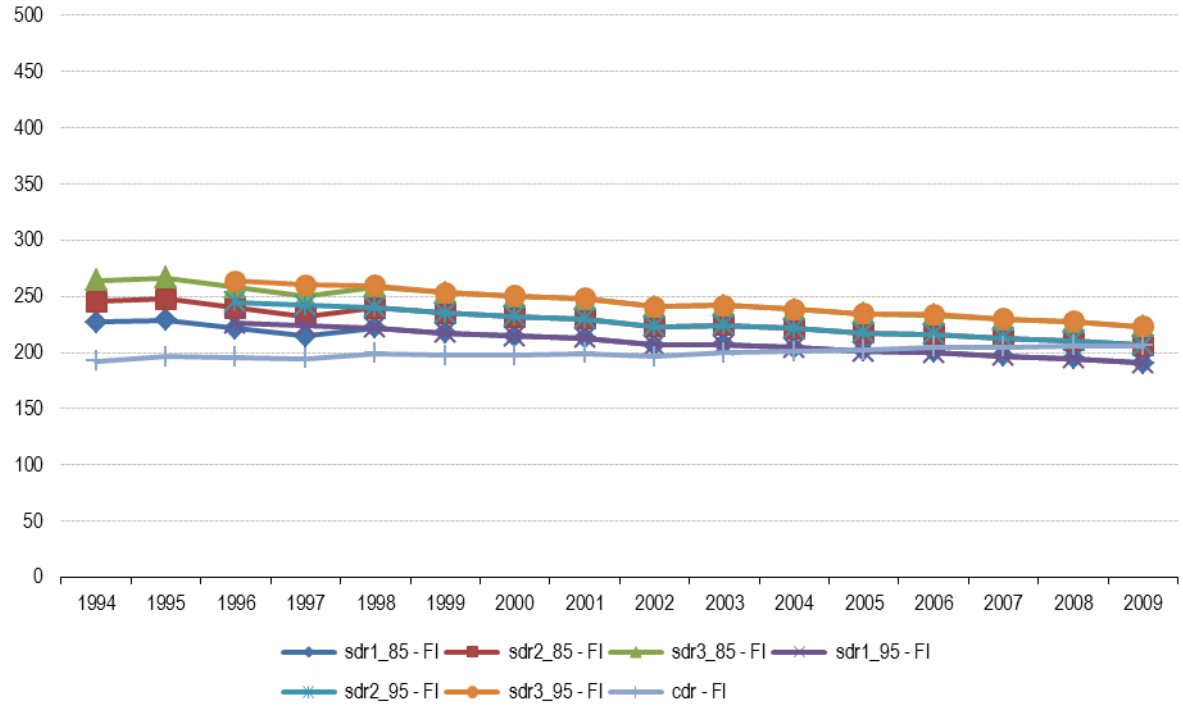
Malignant neoplasms – Slovenia



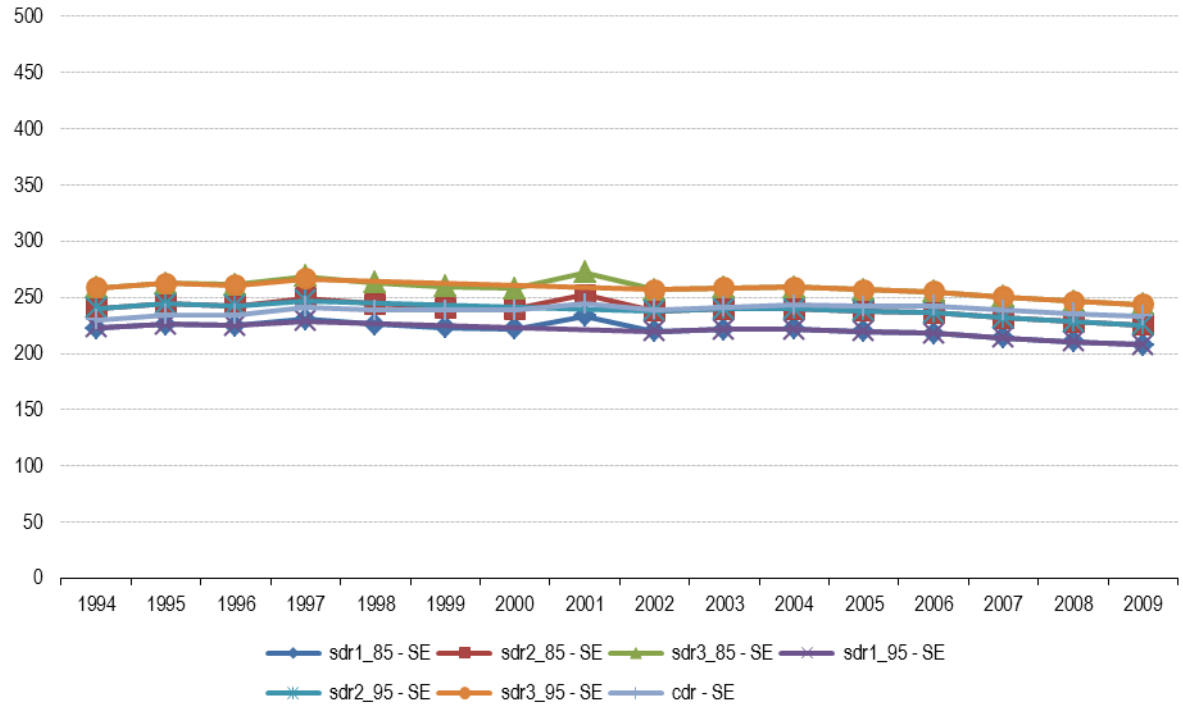
Malignant neoplasms – Slovakia



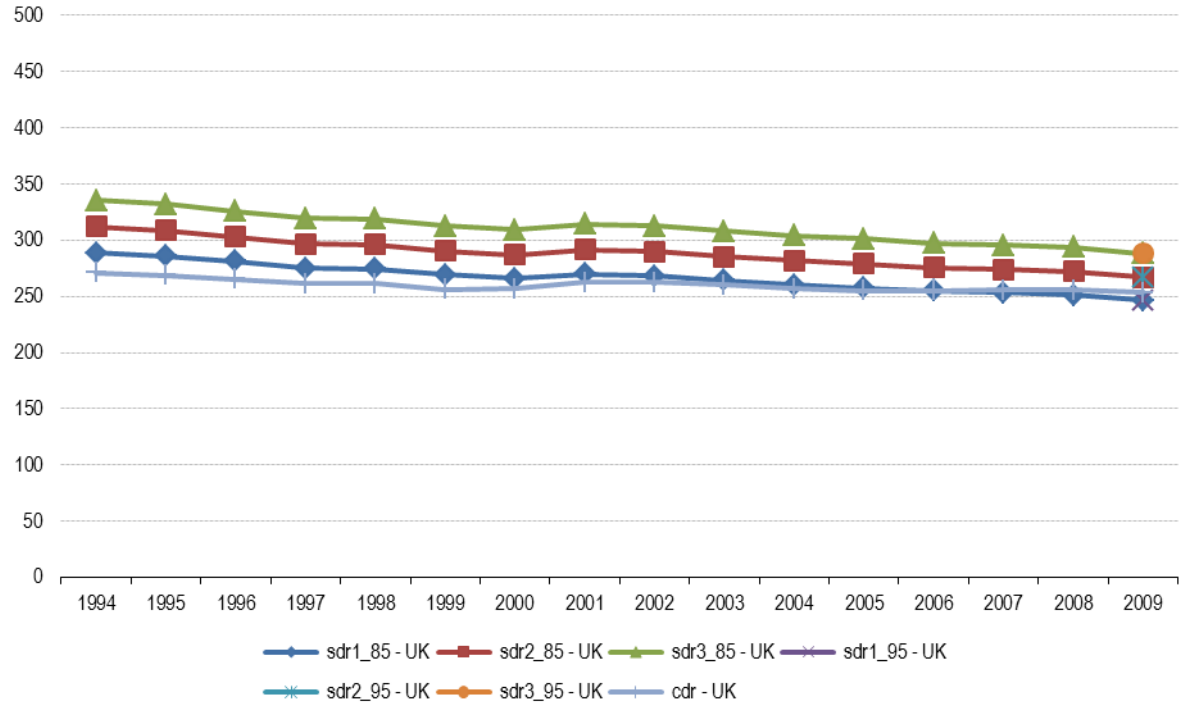
Malignant neoplasms – Finland



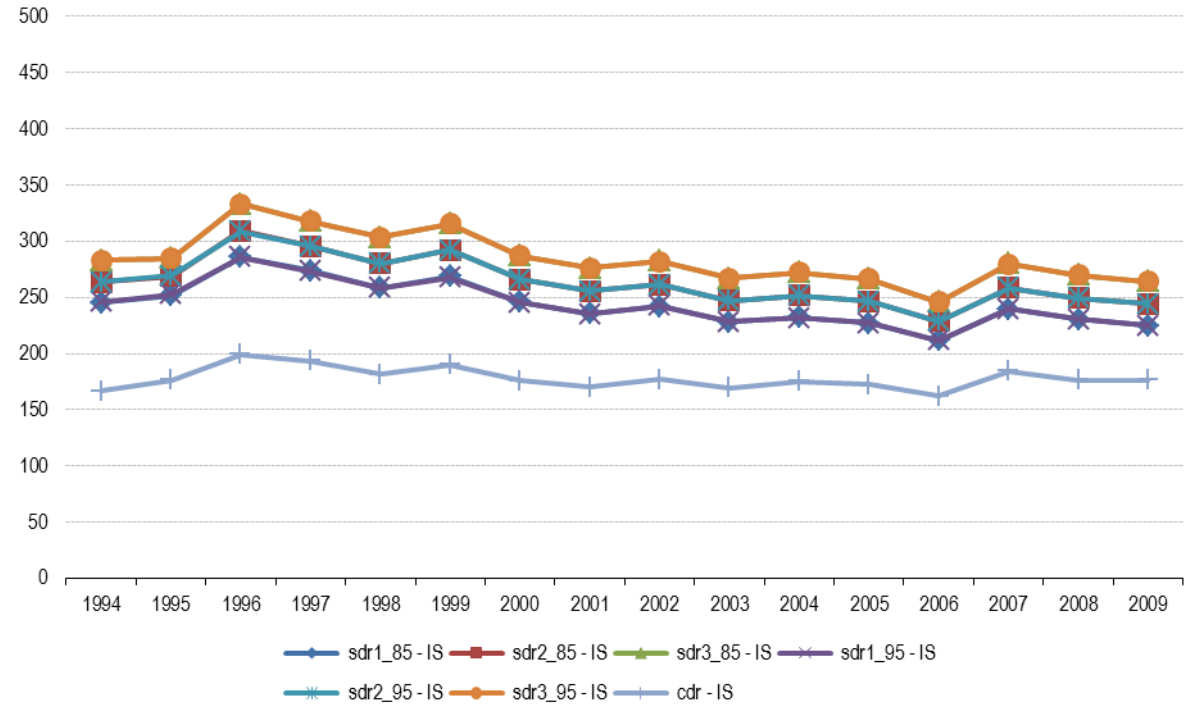
Malignant neoplasms – Sweden



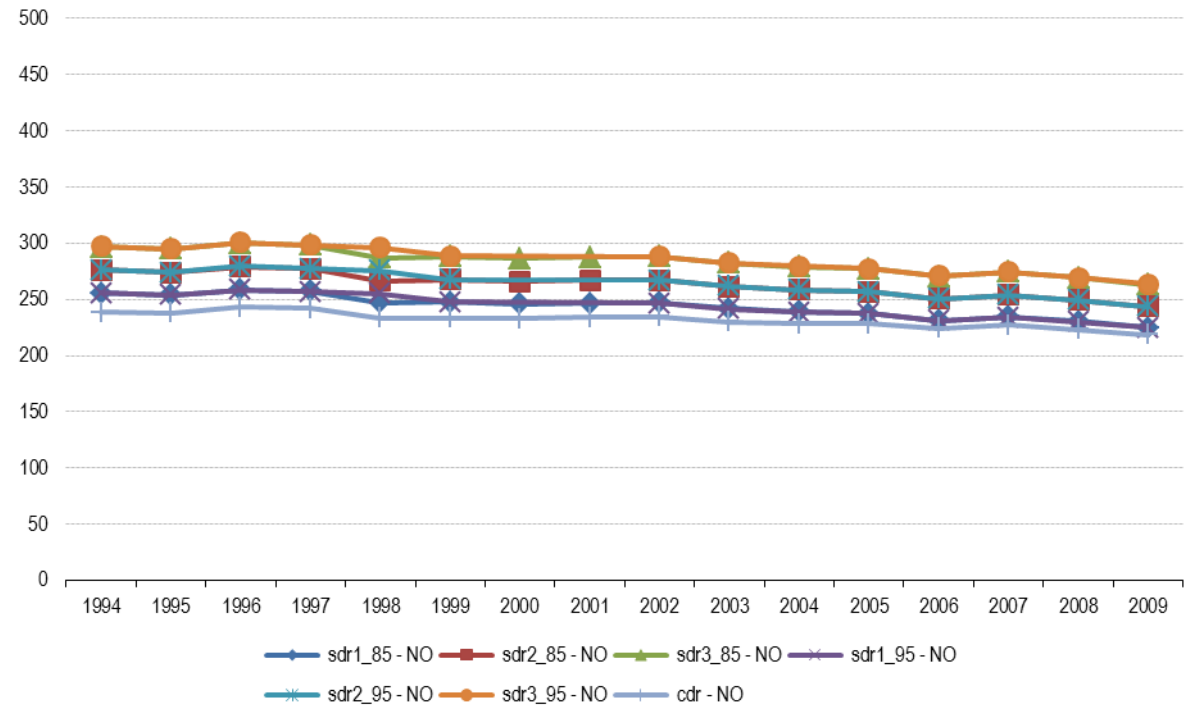
Malignant neoplasms – United Kingdom



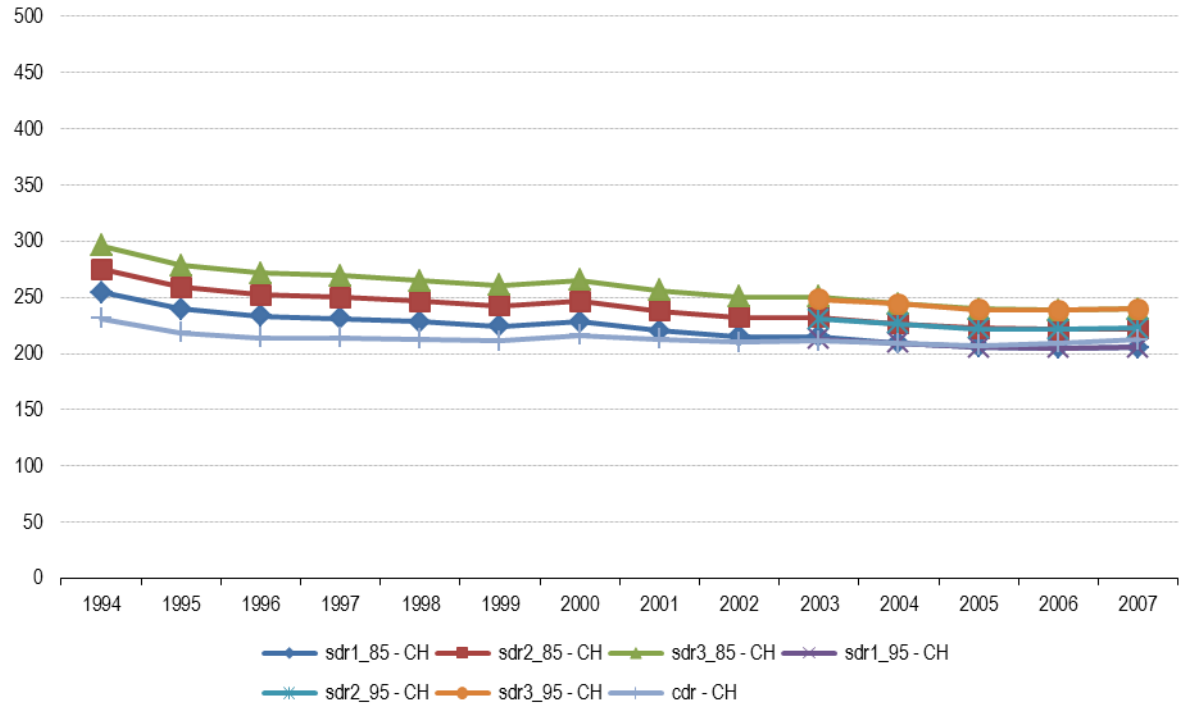
Malignant neoplasms – Iceland



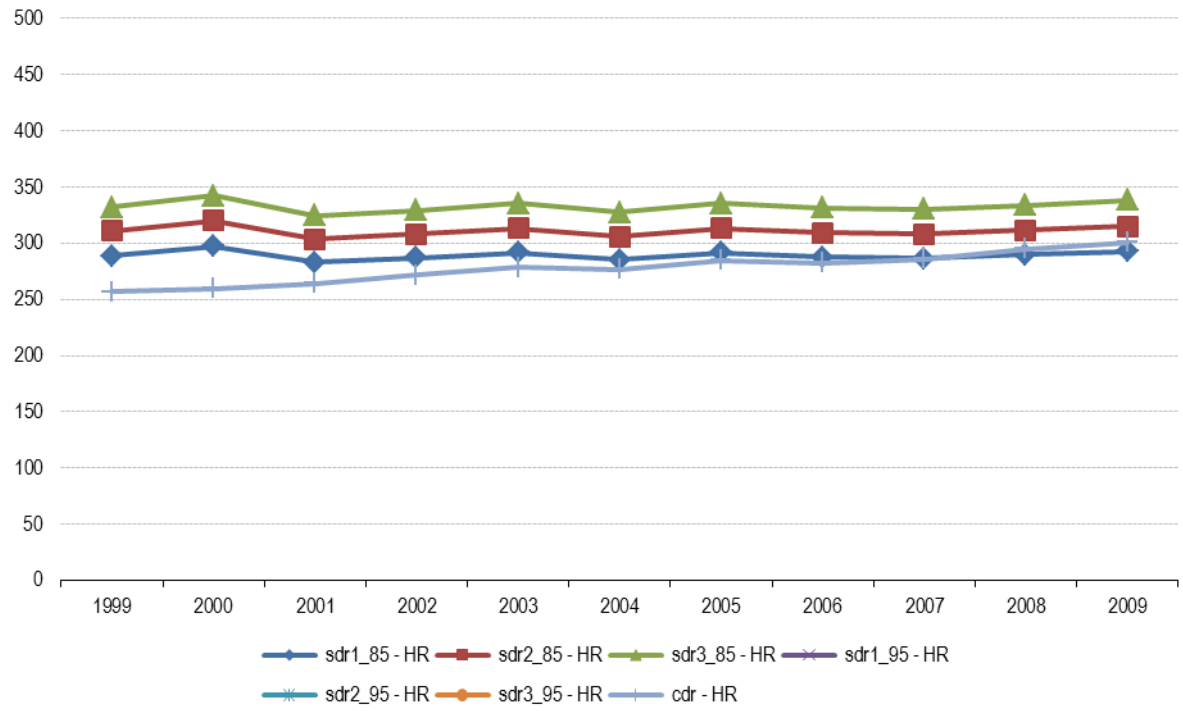
Malignant neoplasms – Norway



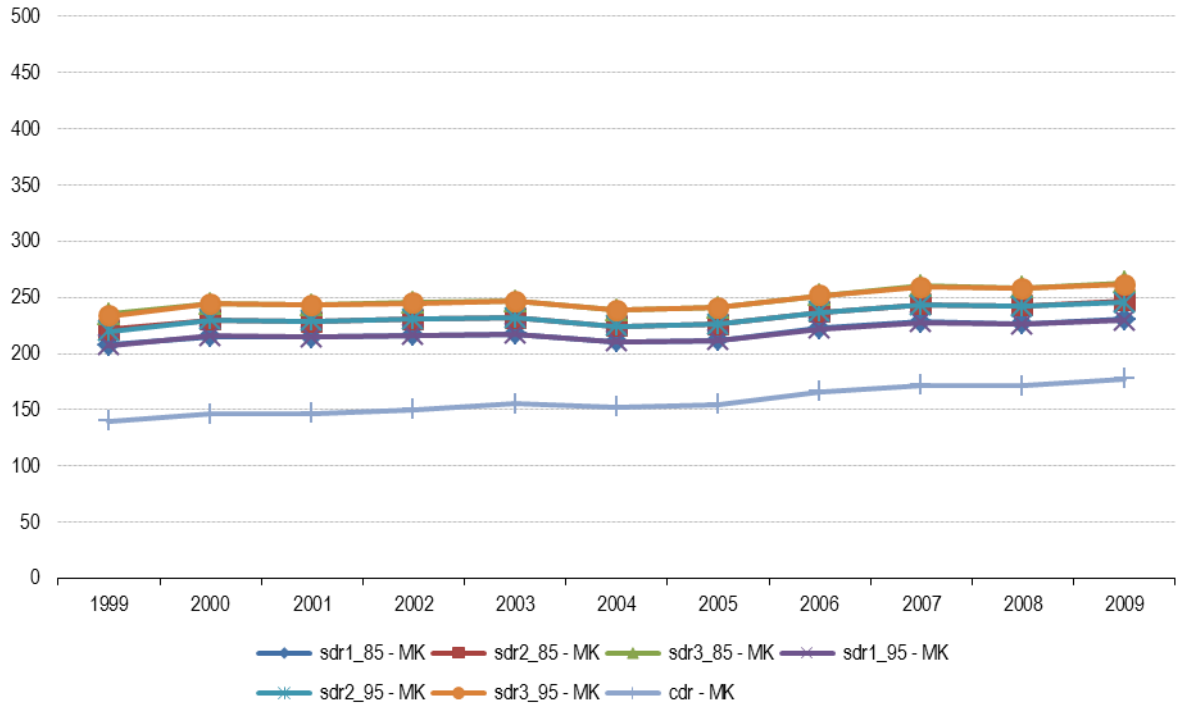
Malignant neoplasms – Switzerland



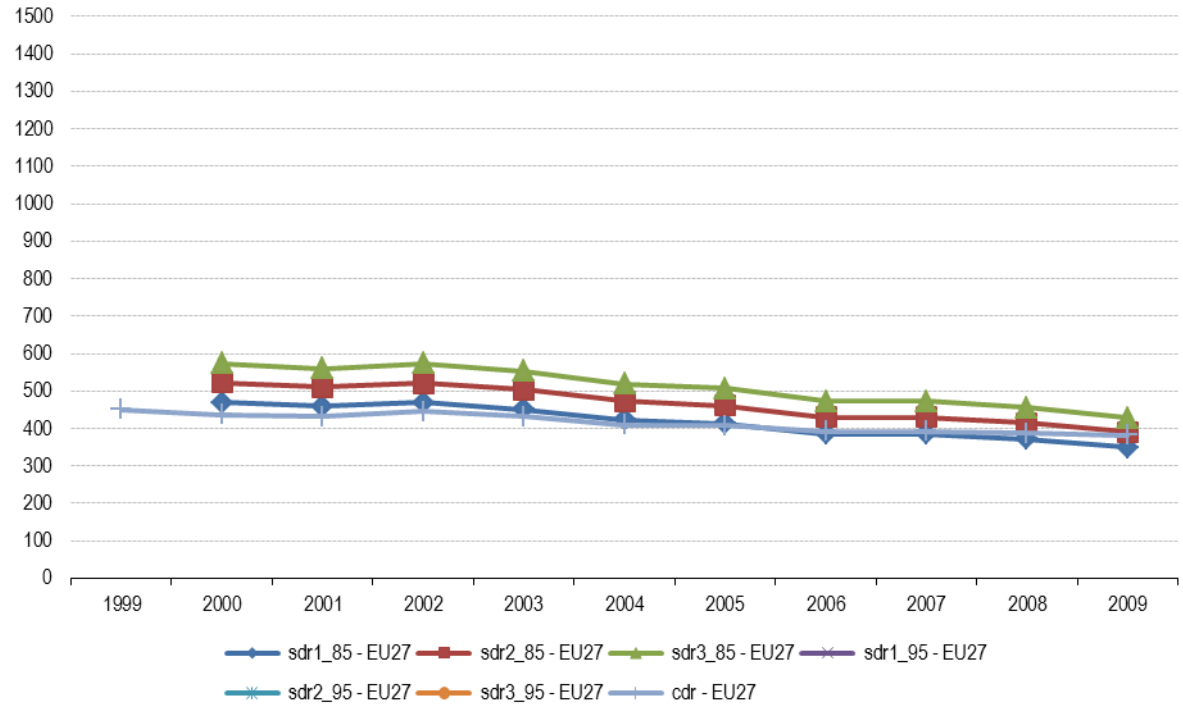
Malignant neoplasms – Croatia



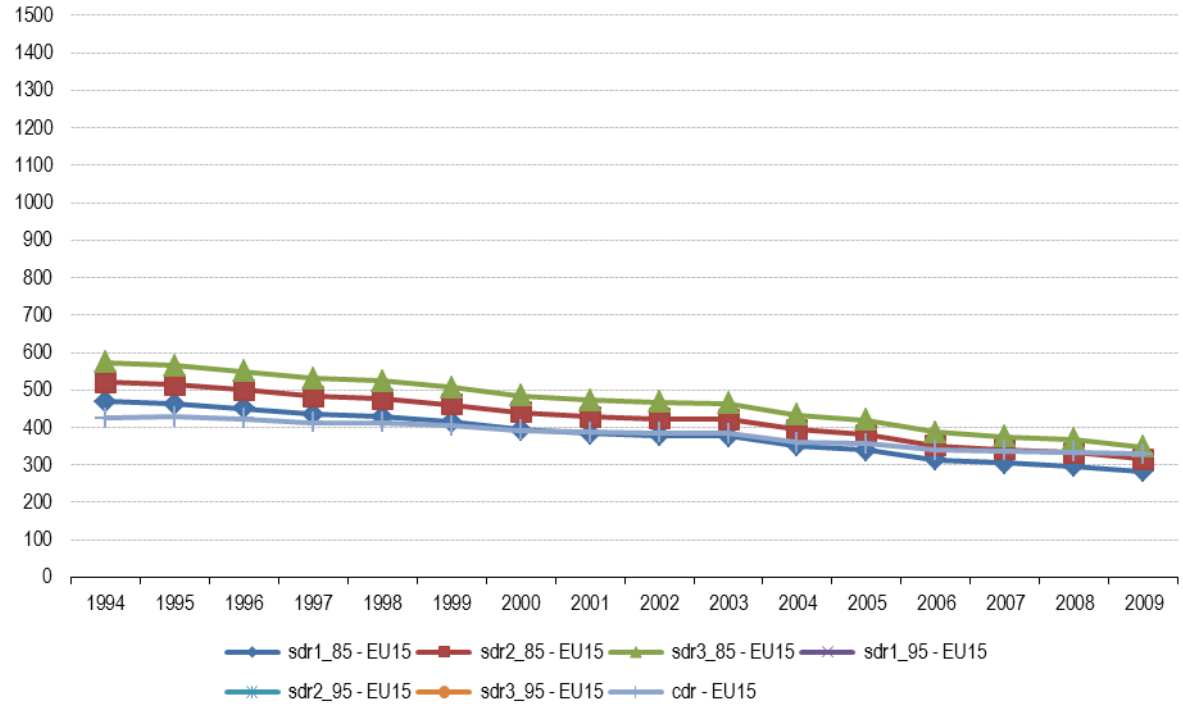
Malignant neoplasms – former Yugoslav Republic of Macedonia



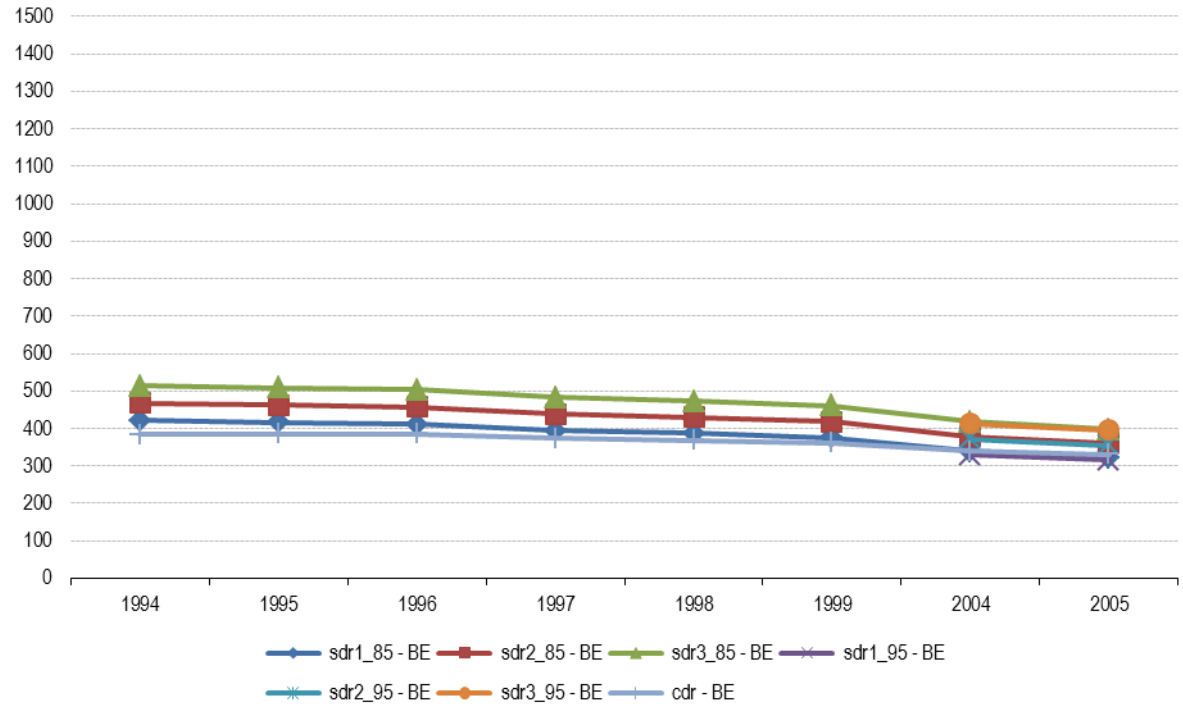
Diseases of the circulatory system – European Union 27 countries



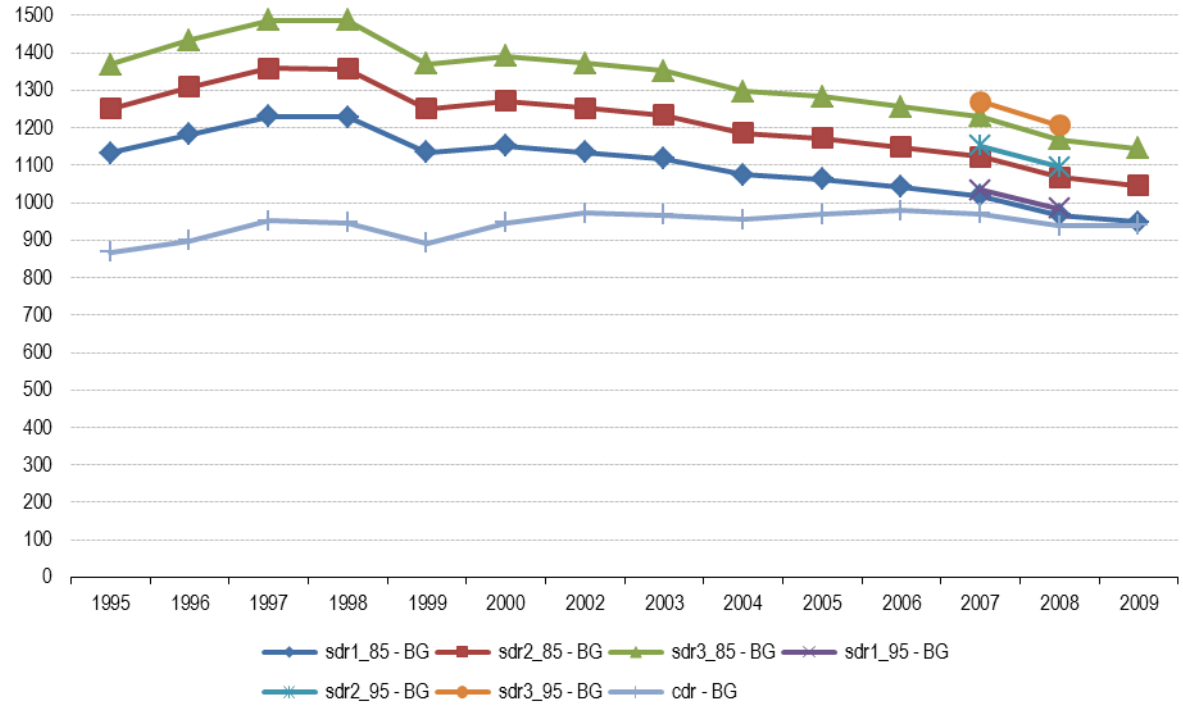
Diseases of the circulatory system – European Union 15 countries



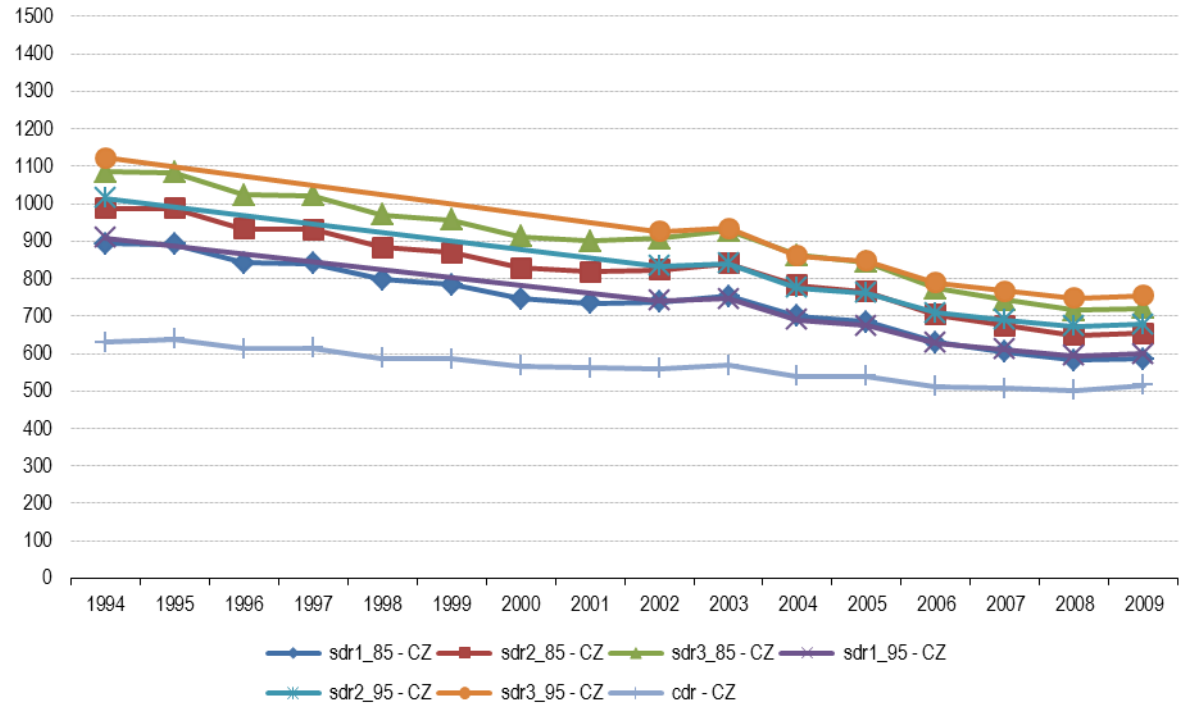
Diseases of the circulatory system – Belgium



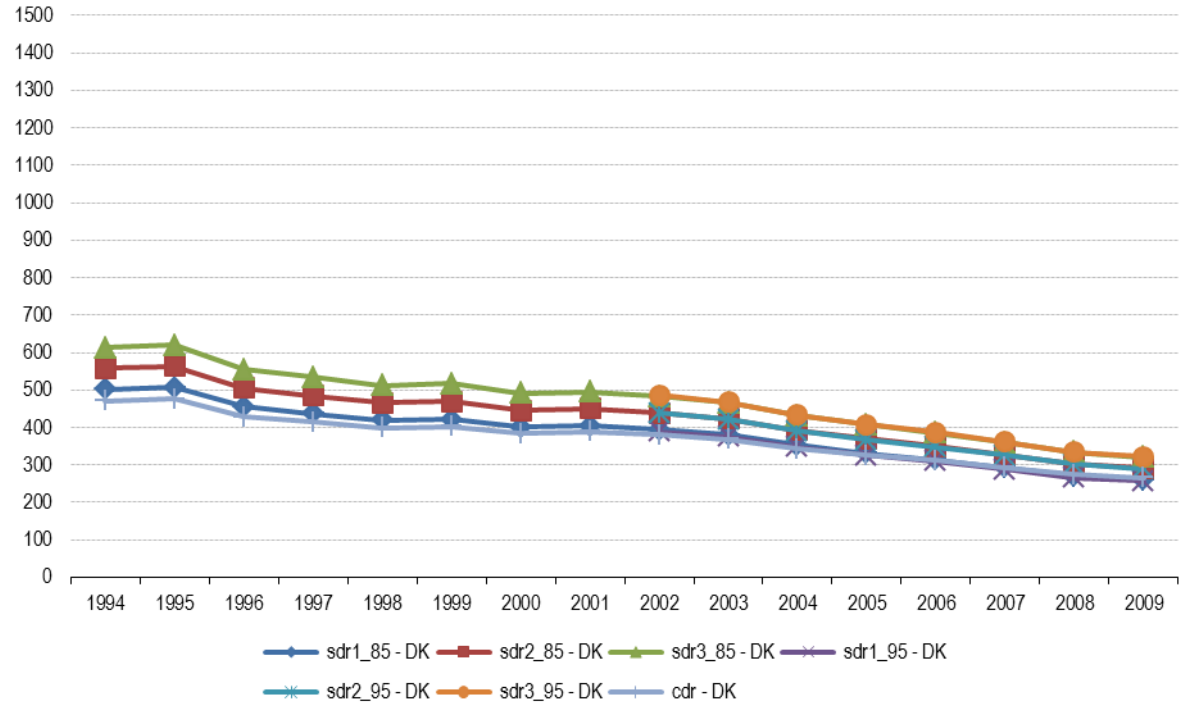
Diseases of the circulatory system – Bulgaria



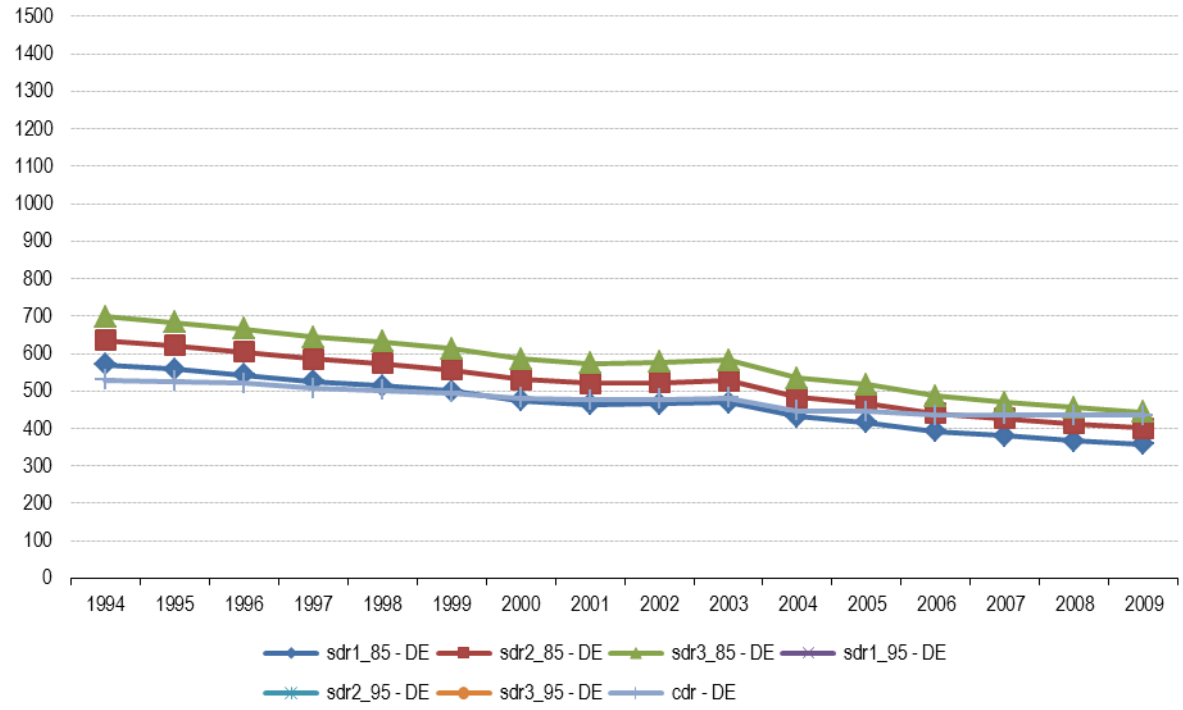
Diseases of the circulatory system – Czech Republic



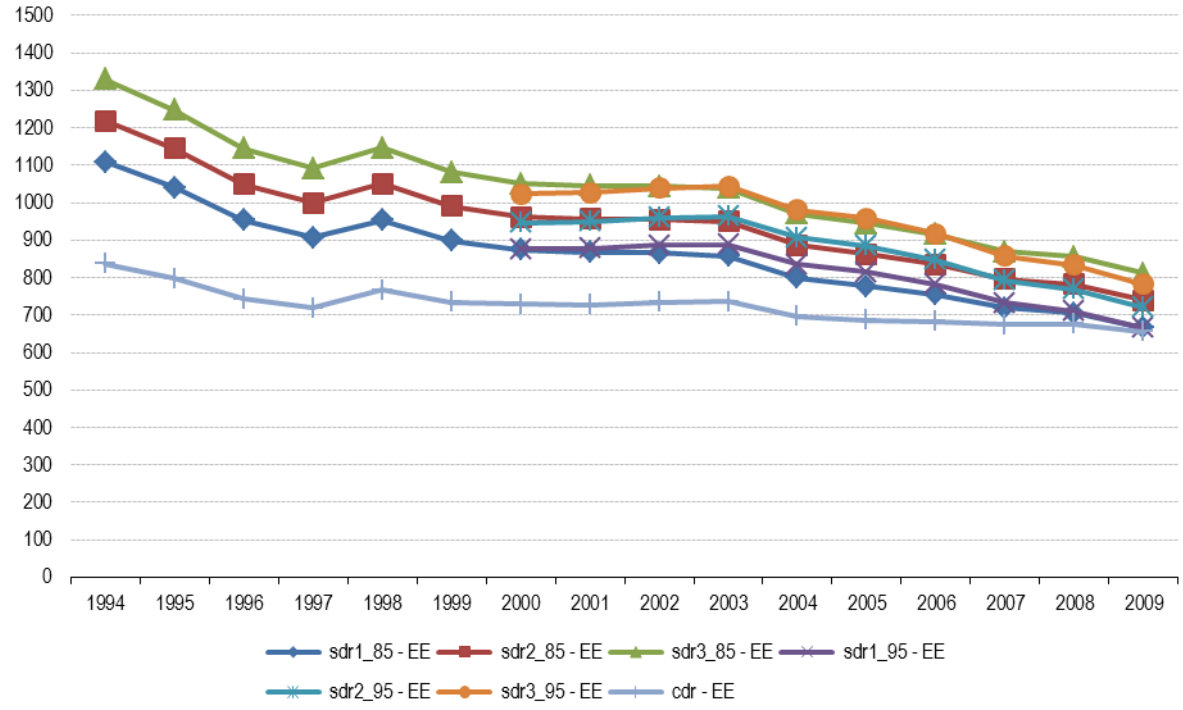
Diseases of the circulatory system – Denmark



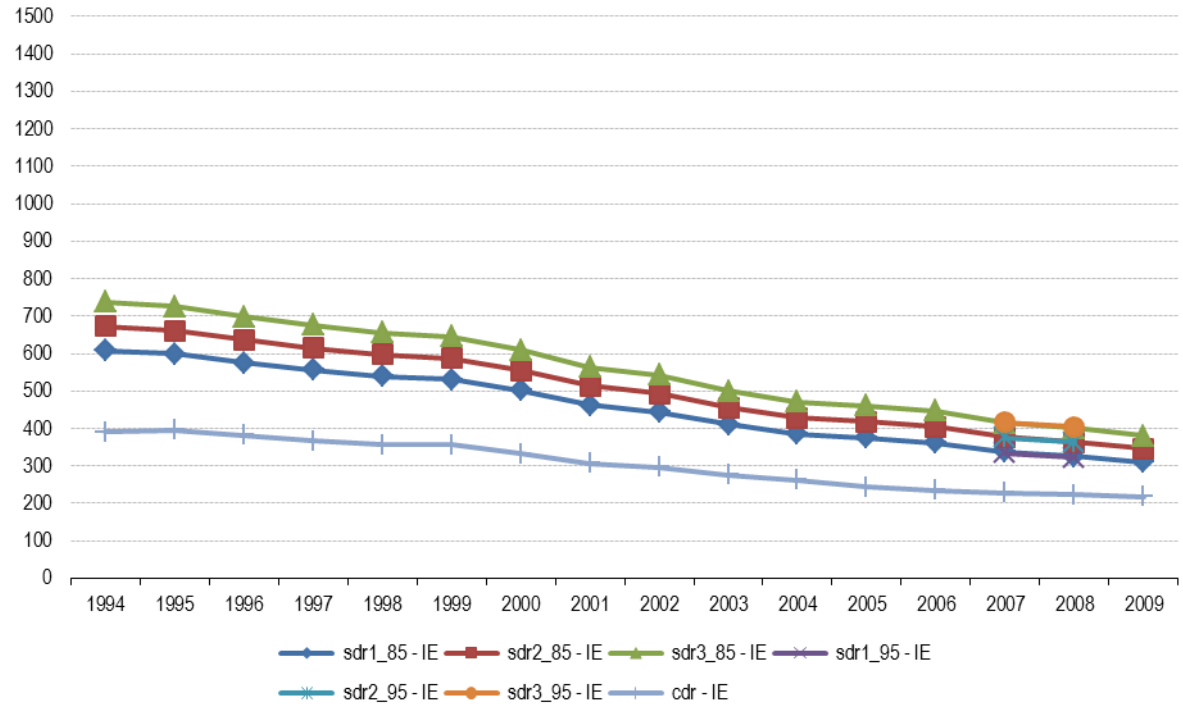
Diseases of the circulatory system – Germany



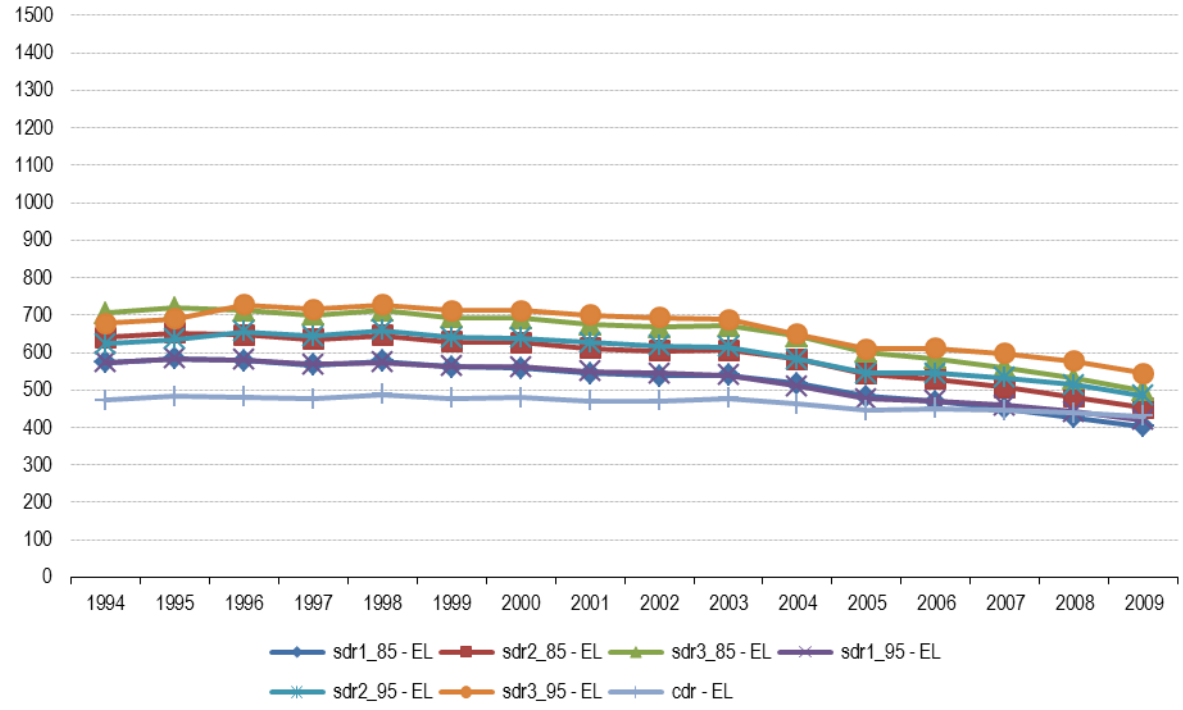
Diseases of the circulatory system – Estonia



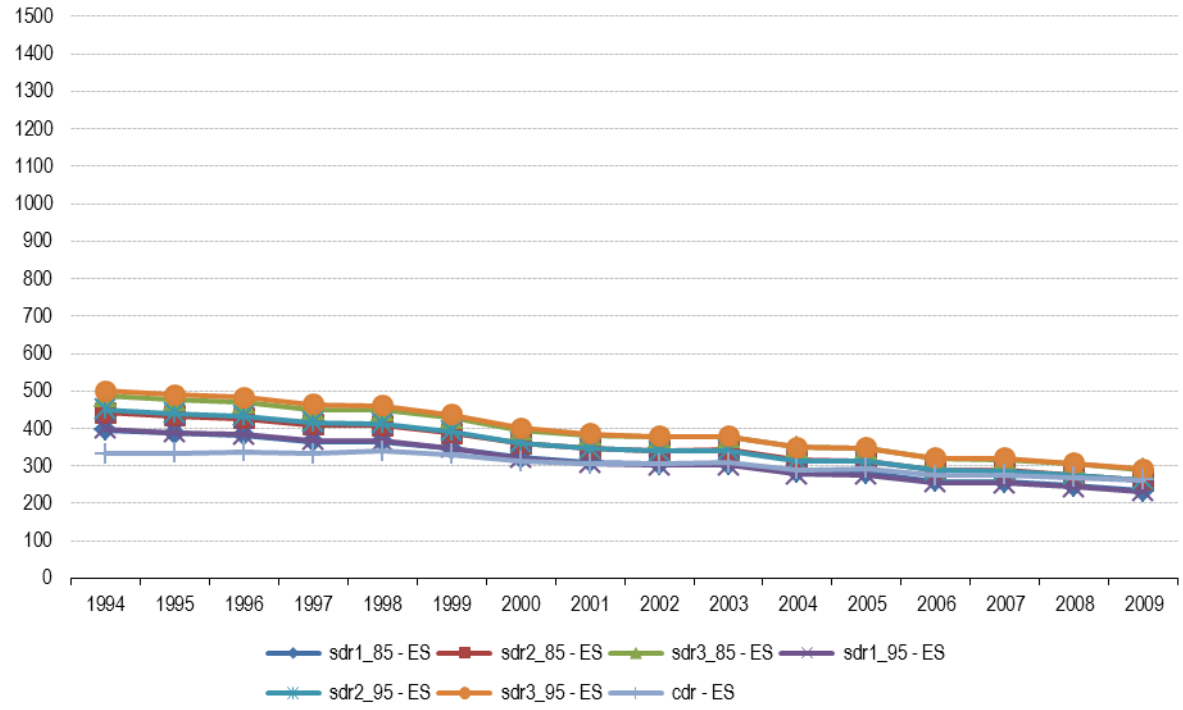
Diseases of the circulatory system – Ireland



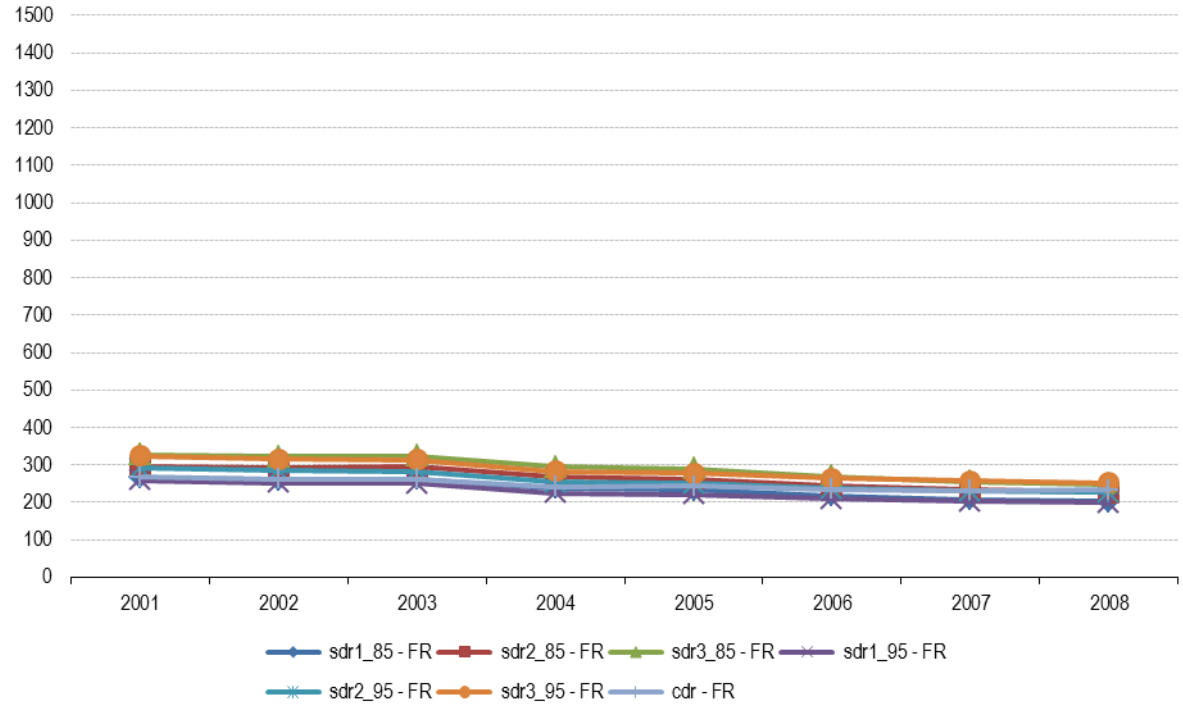
Diseases of the circulatory system – Greece



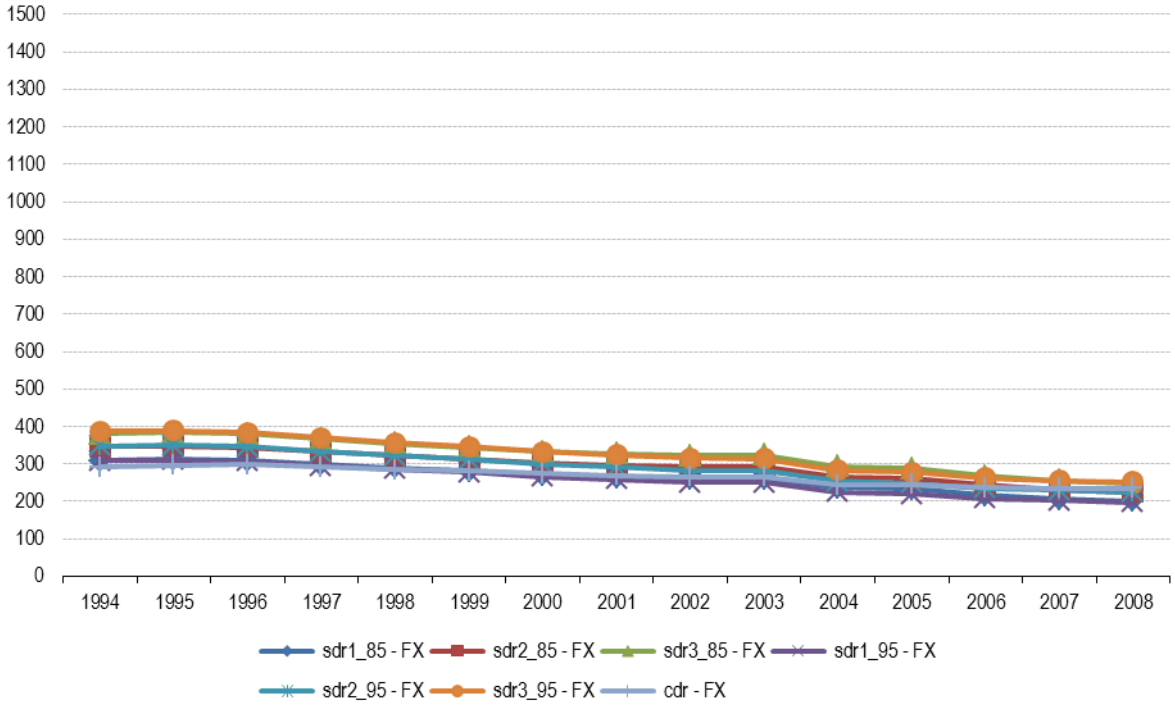
Diseases of the circulatory system – Spain



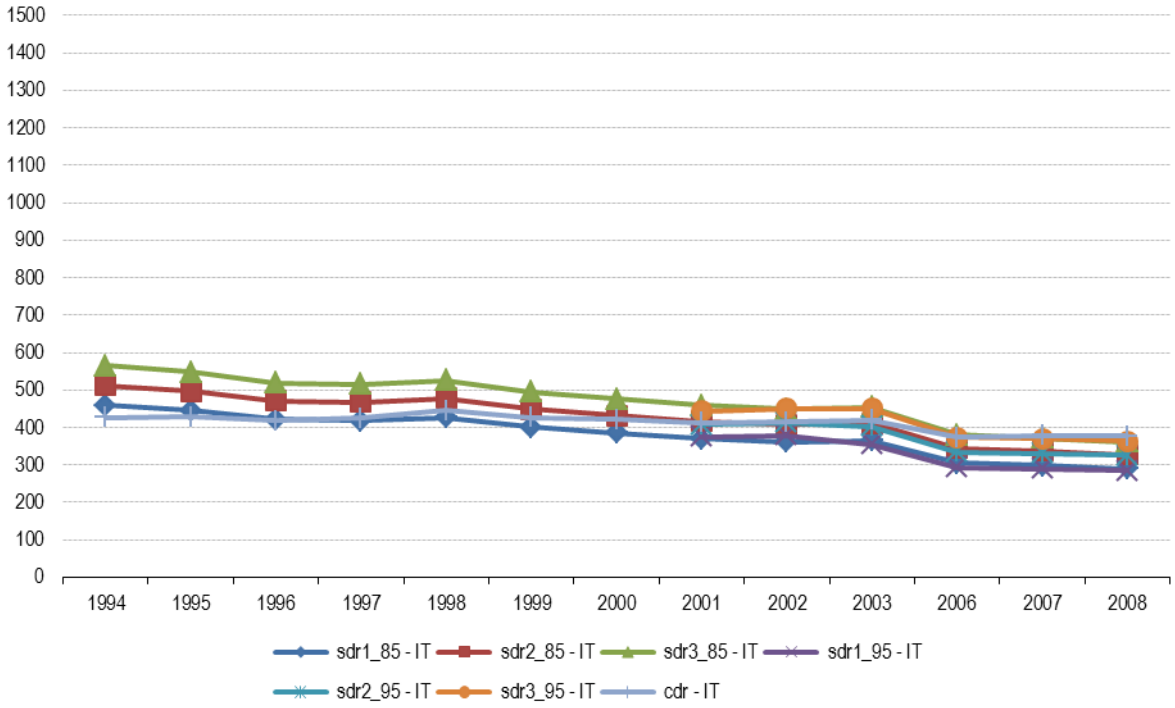
Diseases of the circulatory system – France



Diseases of the circulatory system – France (metropolitan)

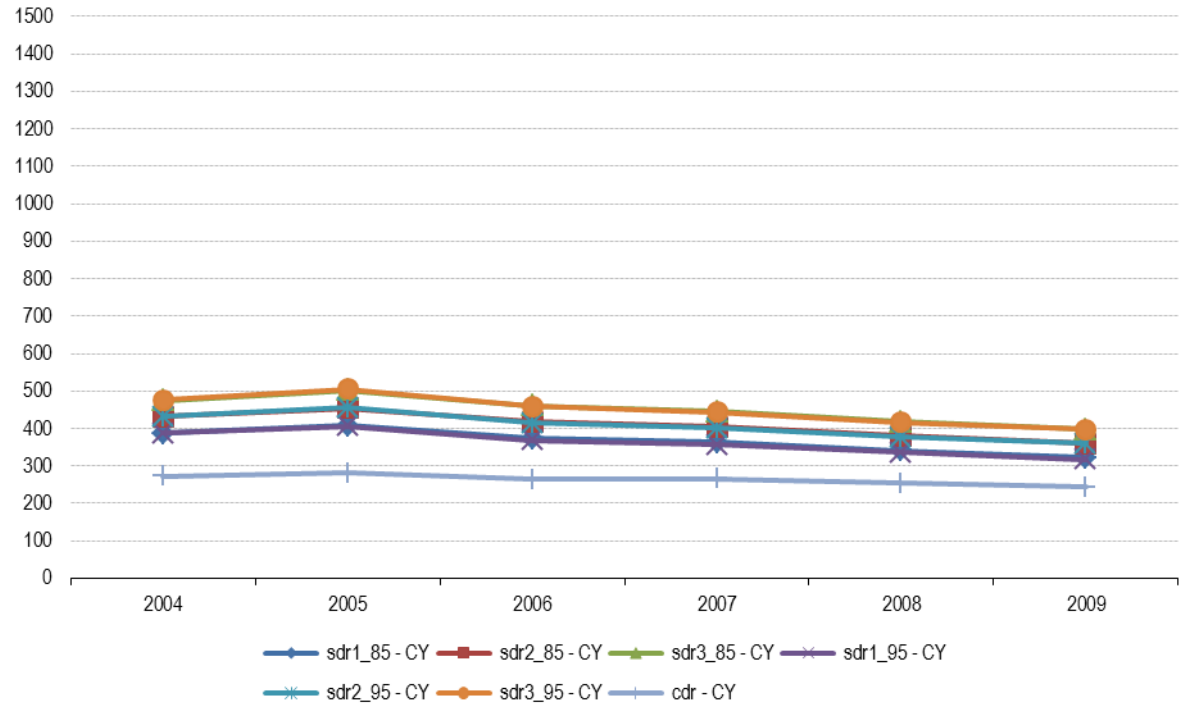


Diseases of the circulatory system – Italy

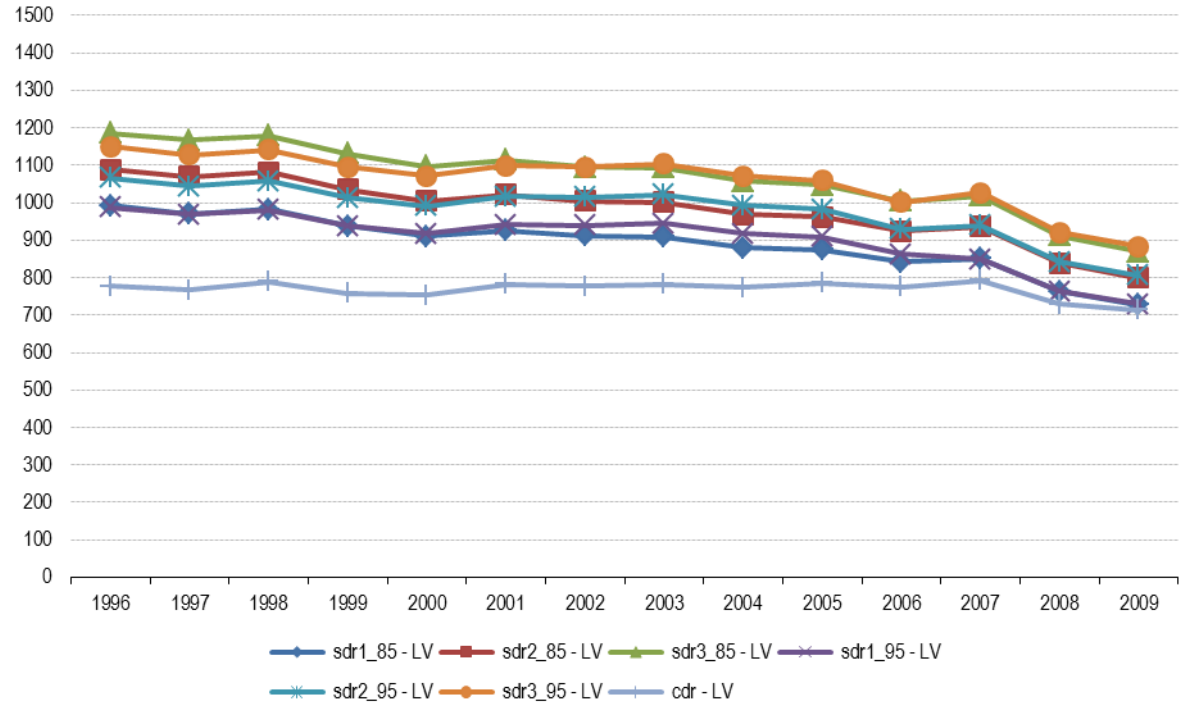


Note: cause-specific mortality data for Italy in the years 2004 and 2005 are not available

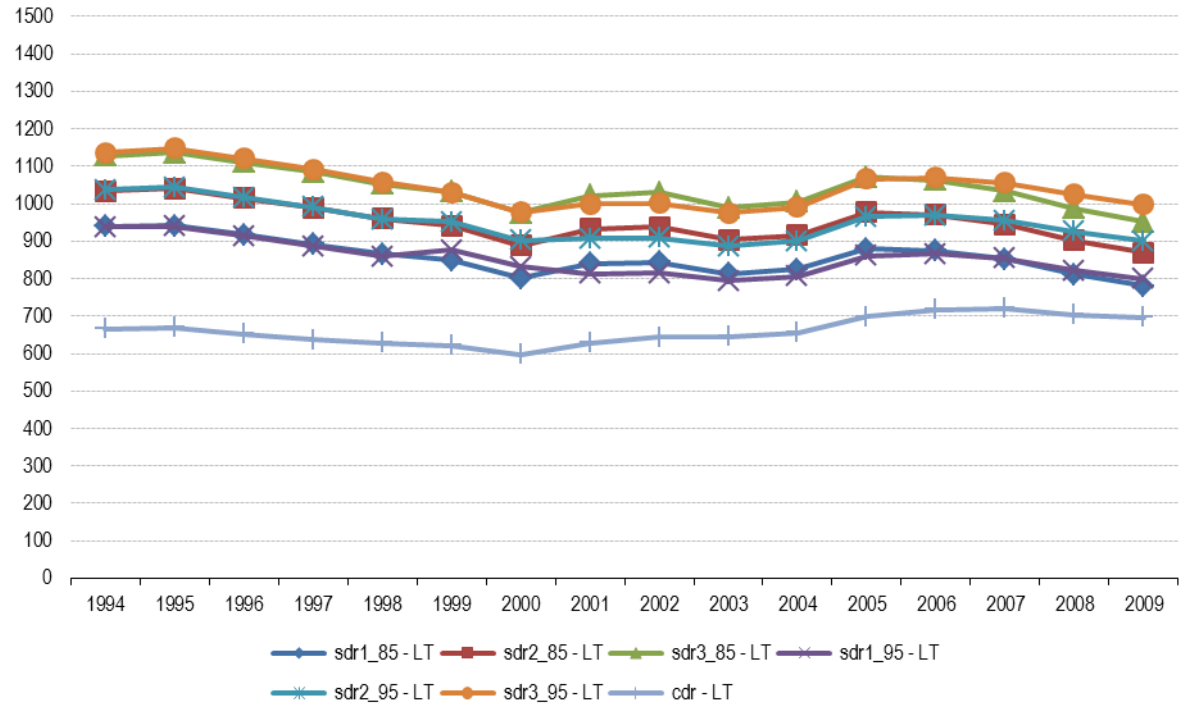
Diseases of the circulatory system – Cyprus



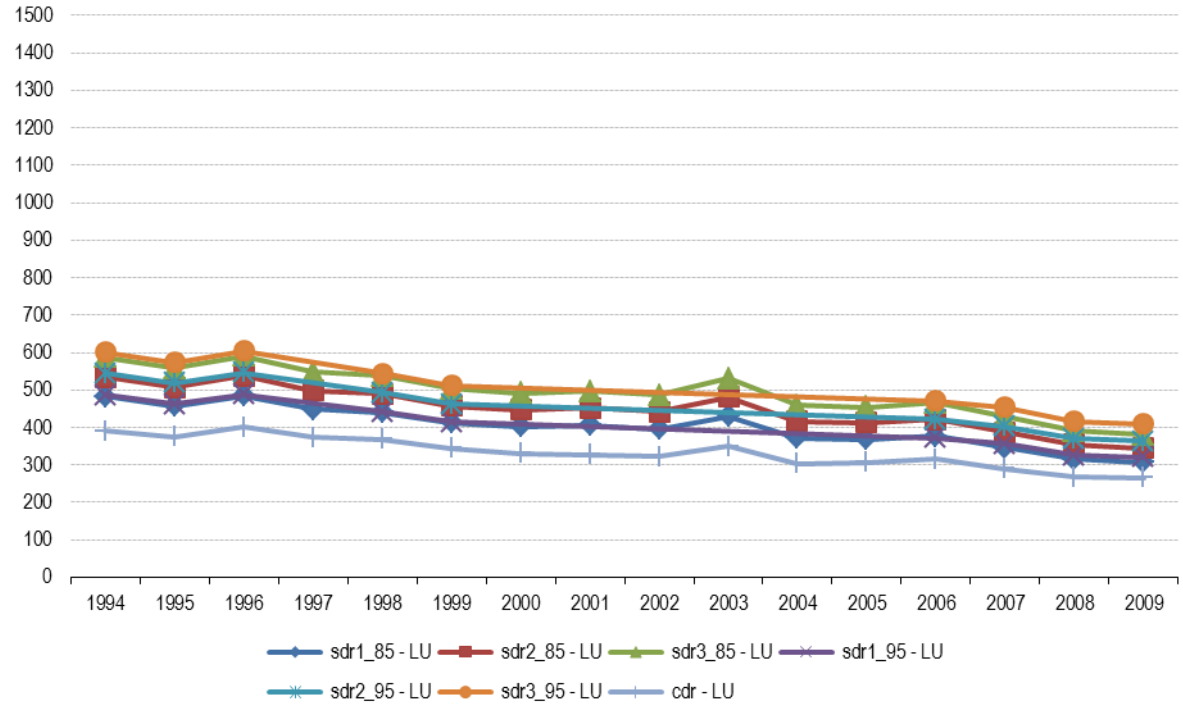
Diseases of the circulatory system – Latvia



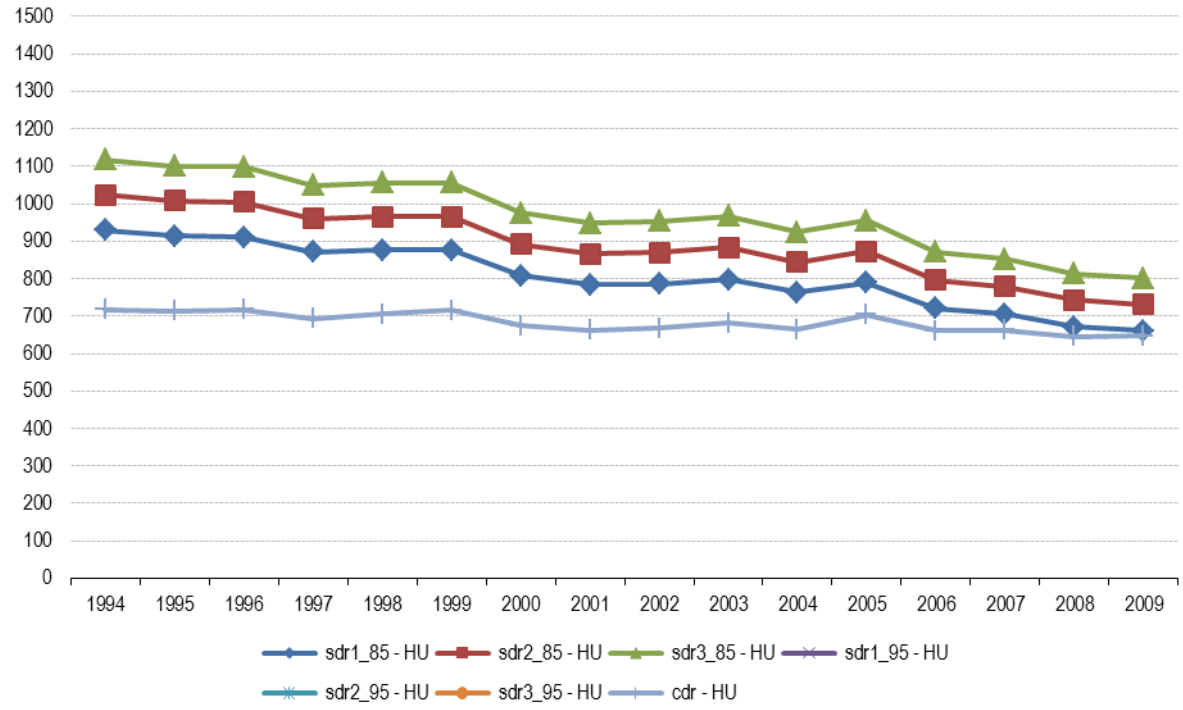
Diseases of the circulatory system – Lithuania



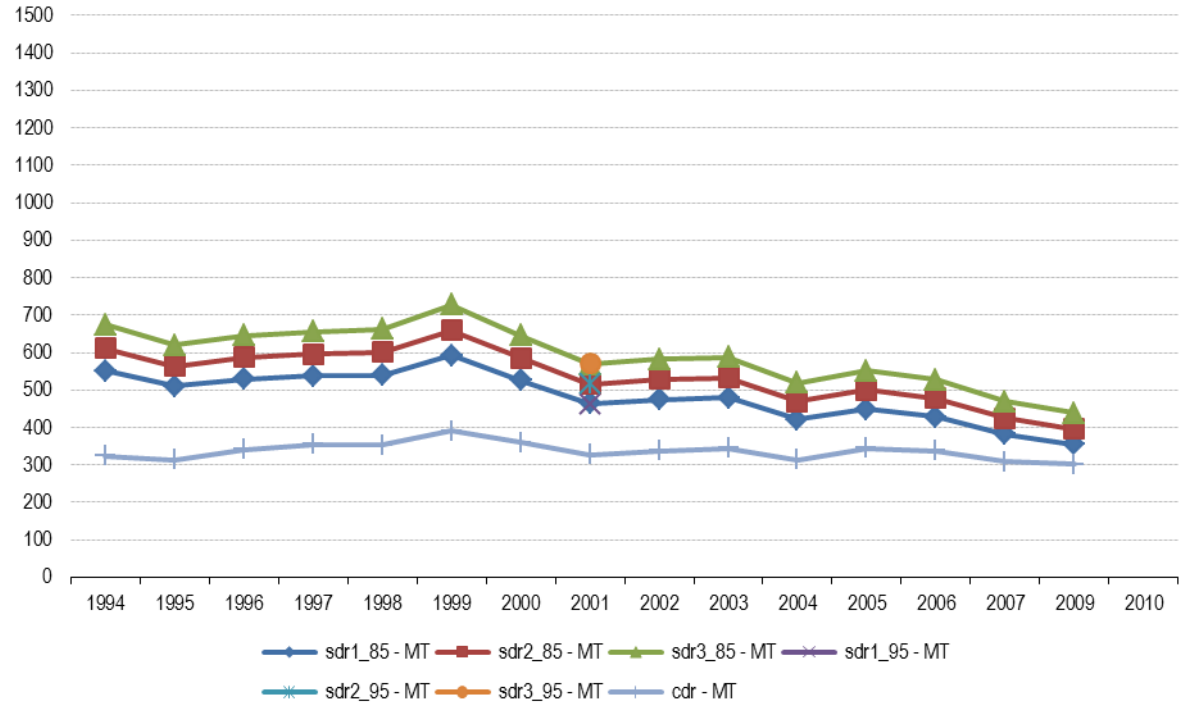
Diseases of the circulatory system – Luxembourg



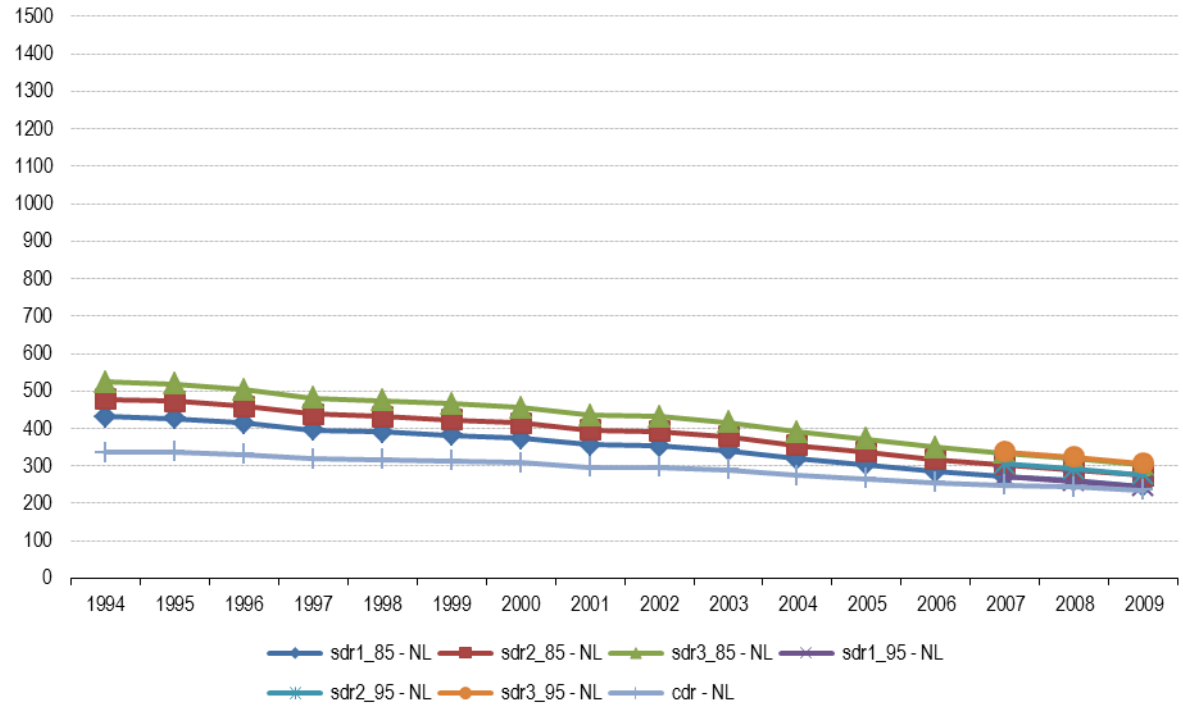
Diseases of the circulatory system – Hungary



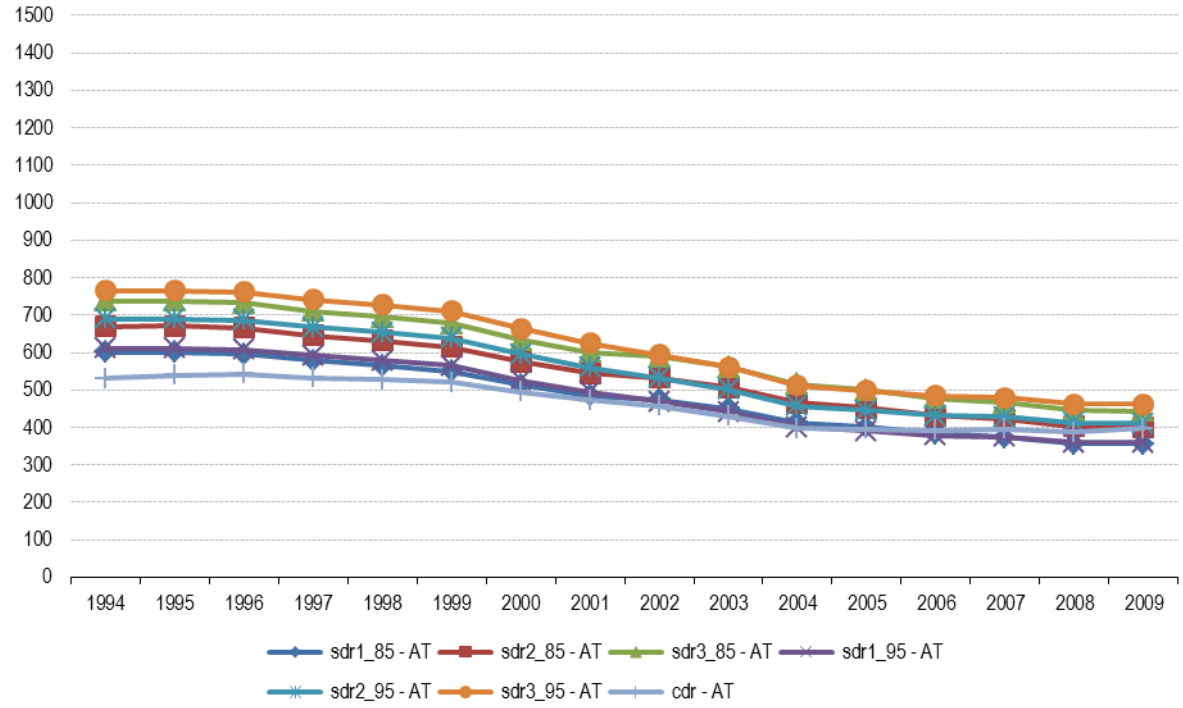
Diseases of the circulatory system – Malta



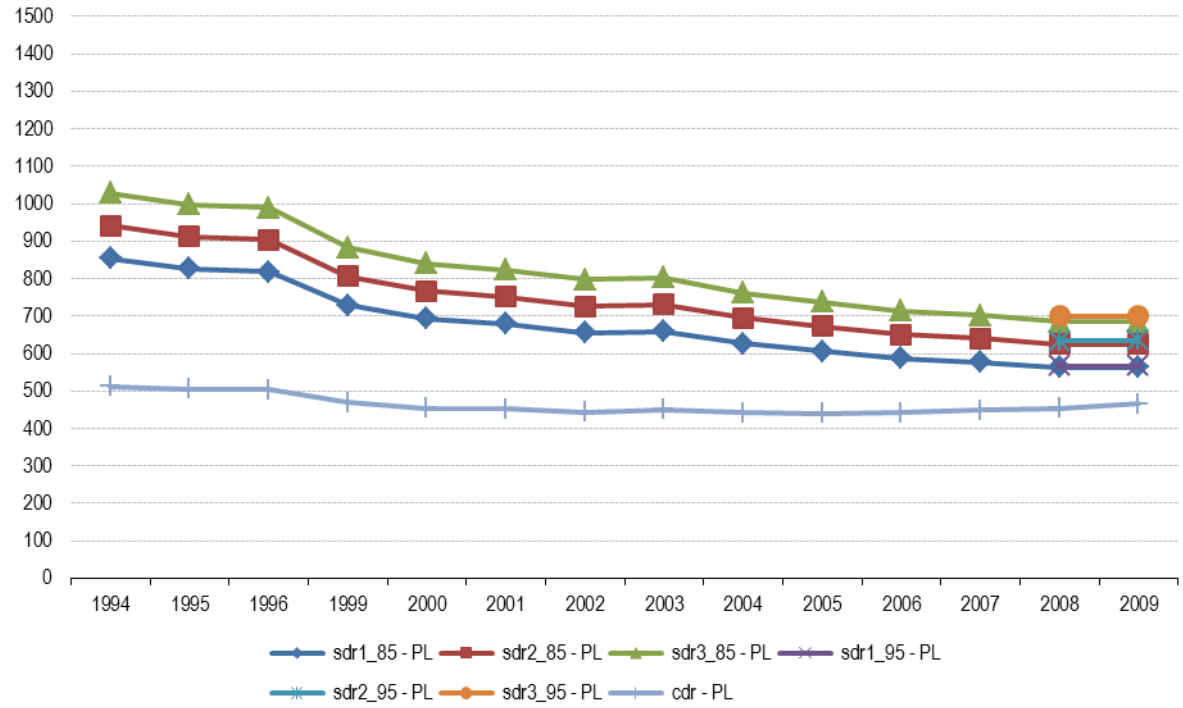
Diseases of the circulatory system – Netherlands



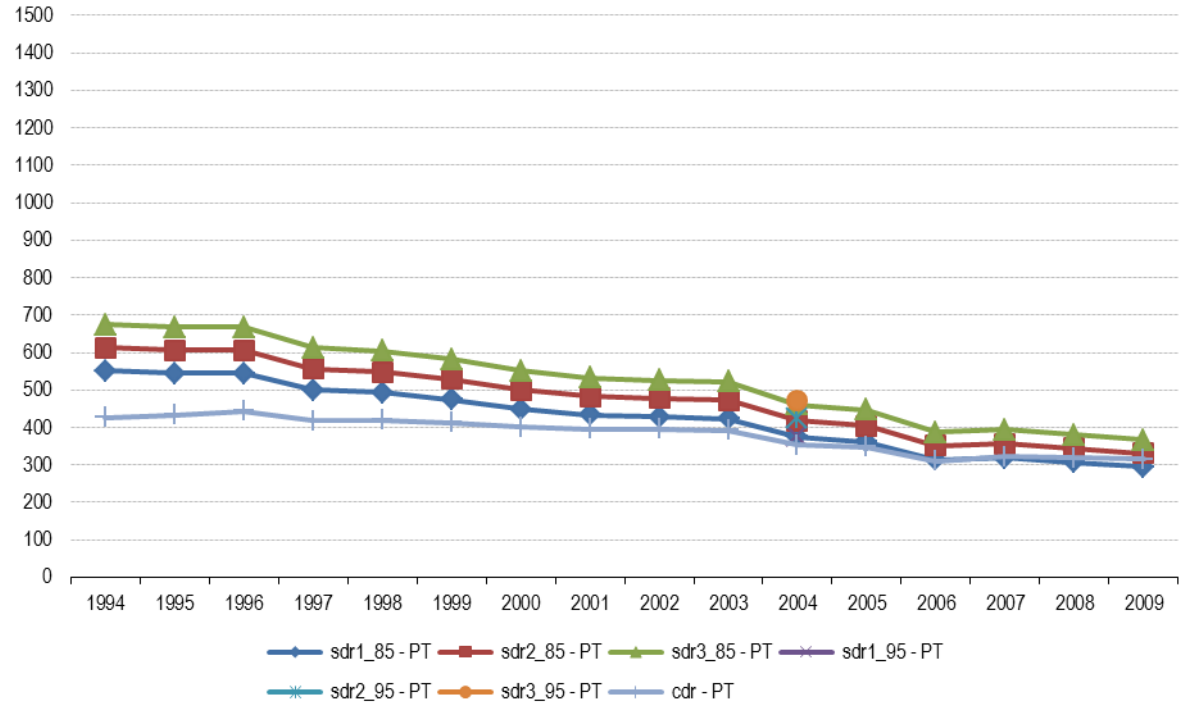
Diseases of the circulatory system – Austria



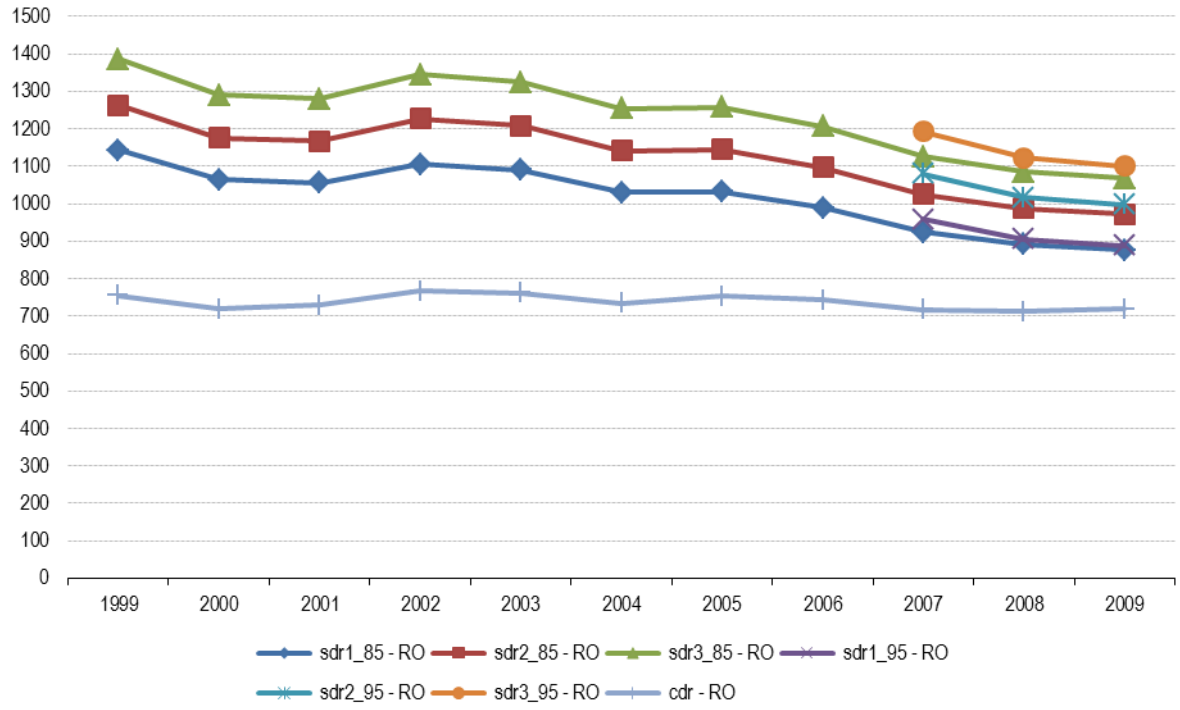
Diseases of the circulatory system – Poland



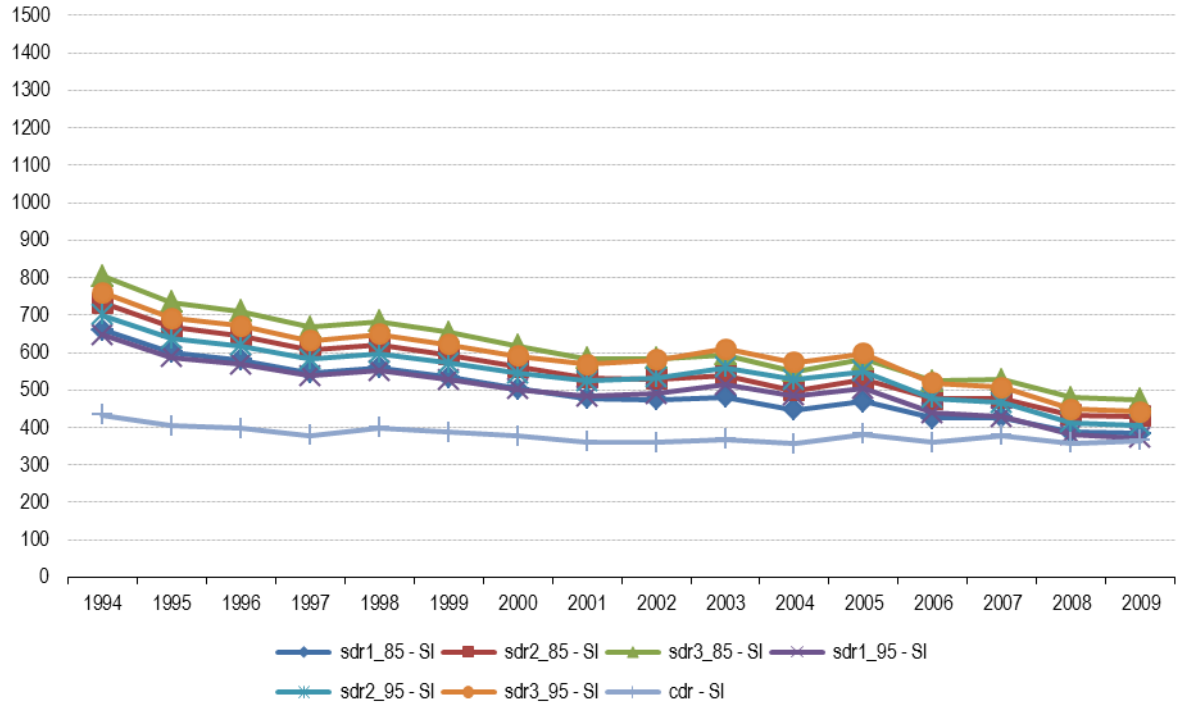
Diseases of the circulatory system – Portugal



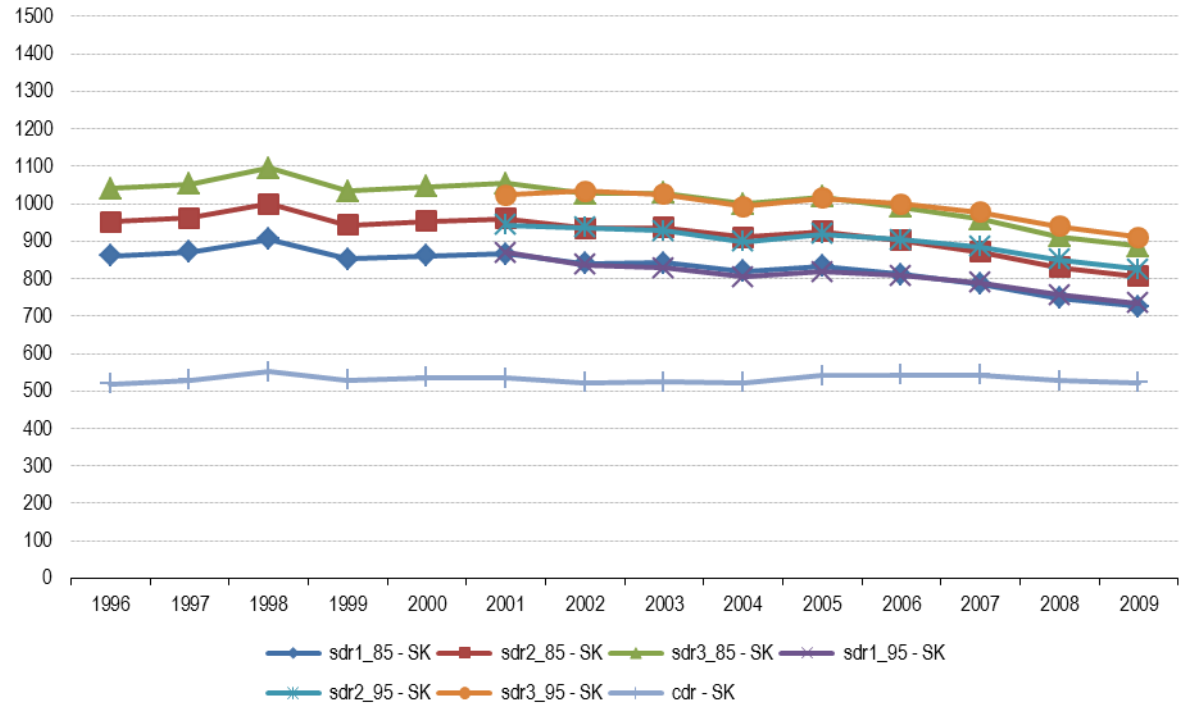
Diseases of the circulatory system – Romania



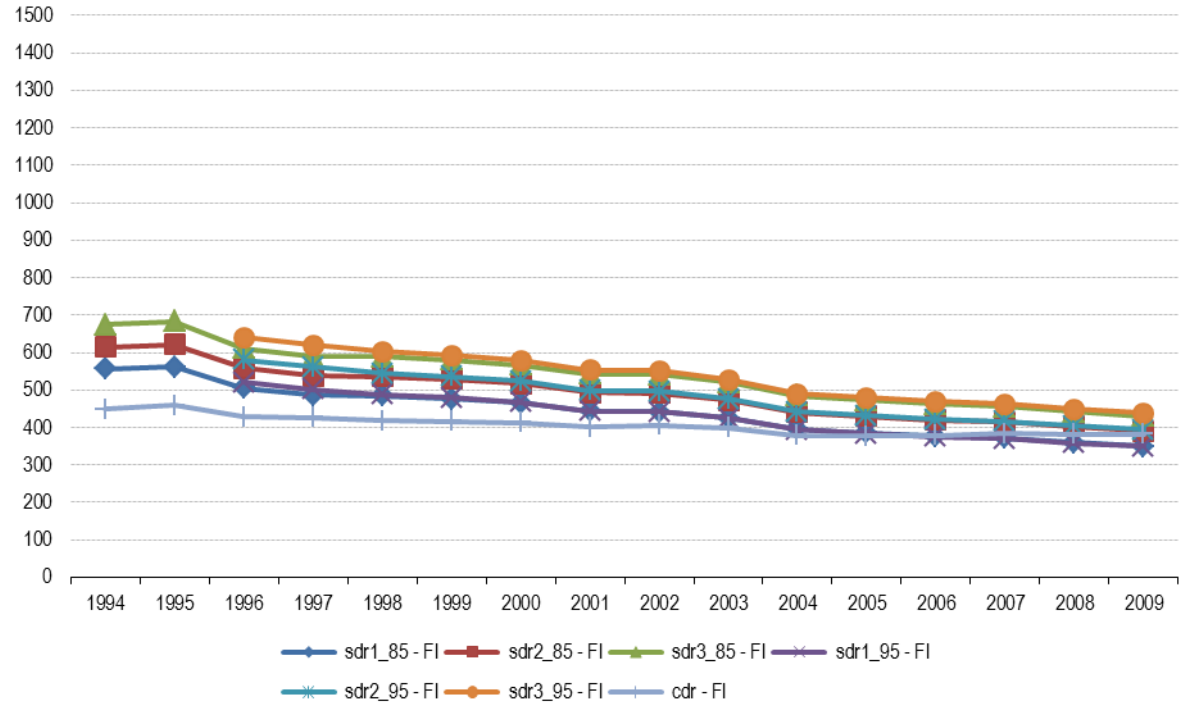
Diseases of the circulatory system – Slovenia



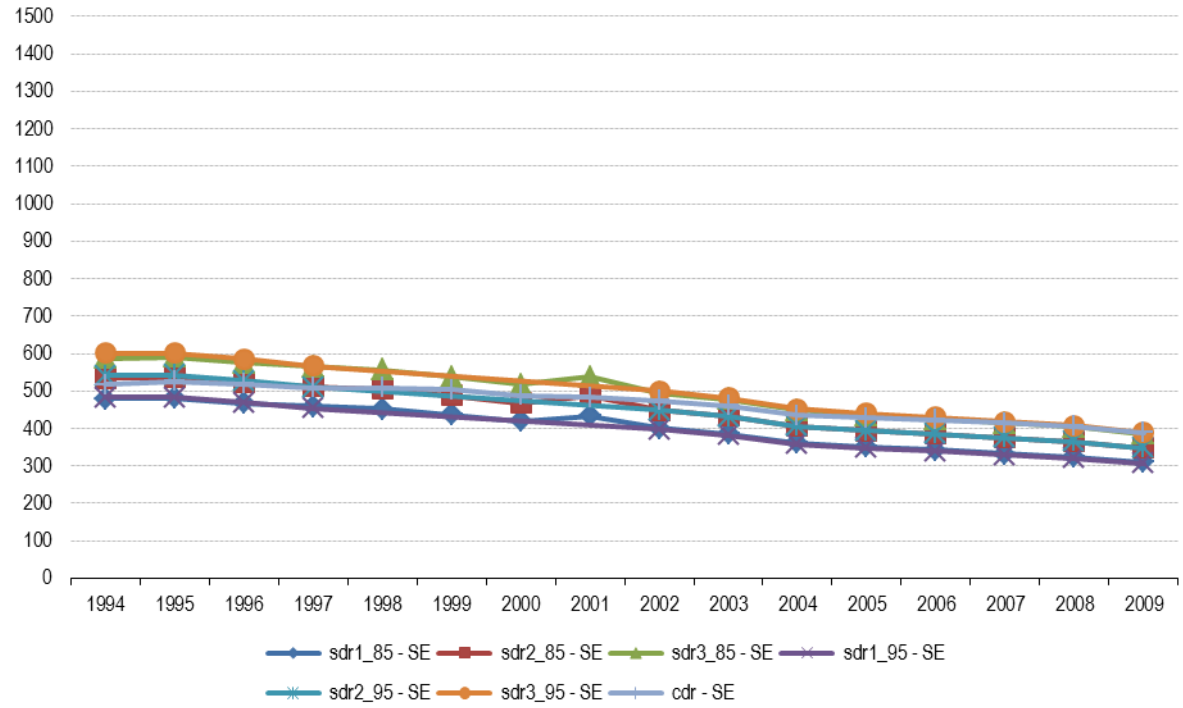
Diseases of the circulatory system – Slovakia



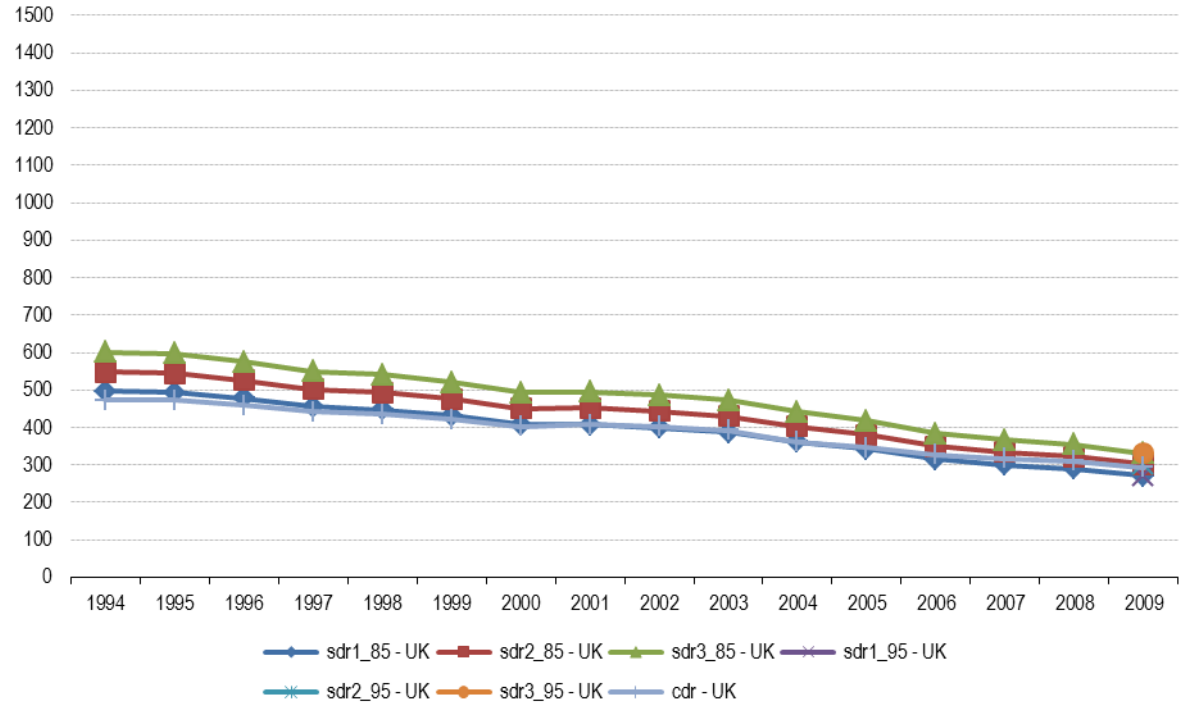
Diseases of the circulatory system – Finland



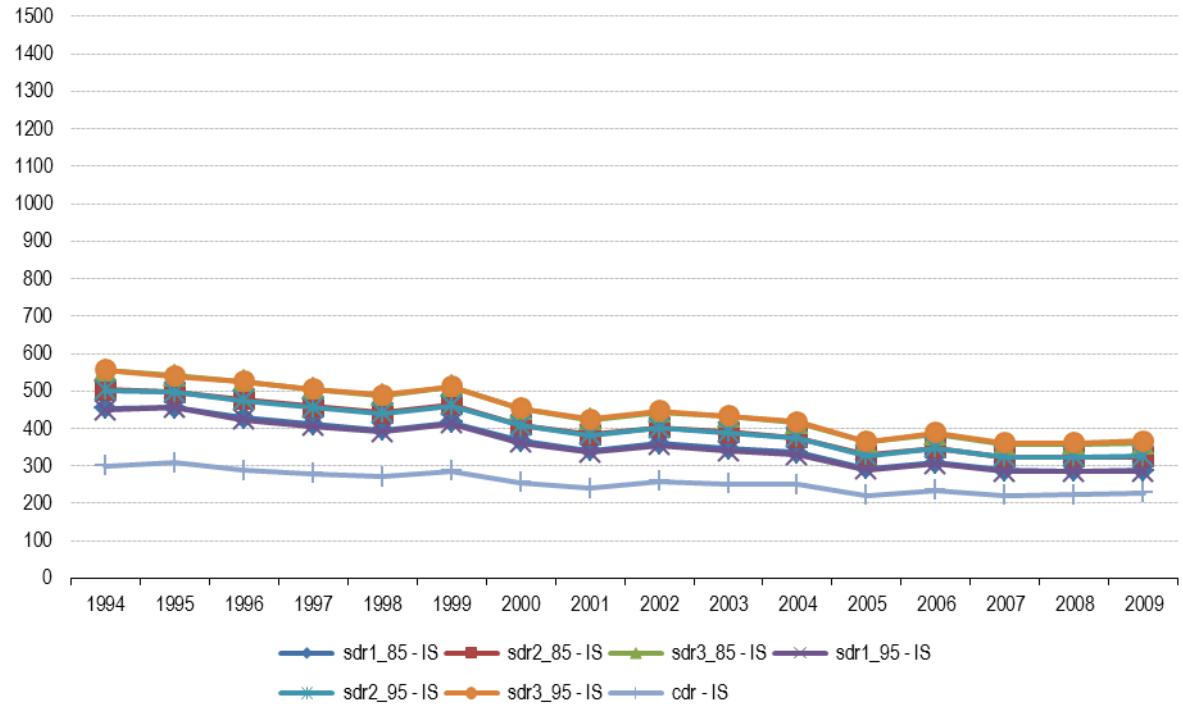
Diseases of the circulatory system – Sweden



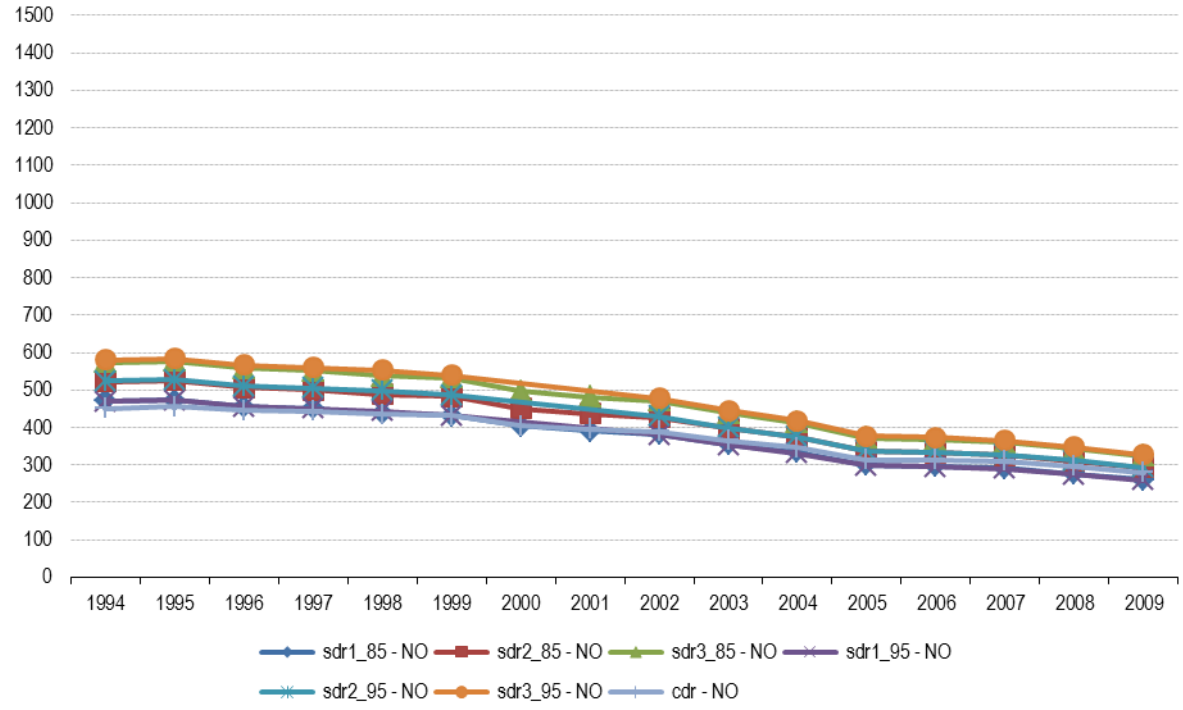
Diseases of the circulatory system – United Kingdom



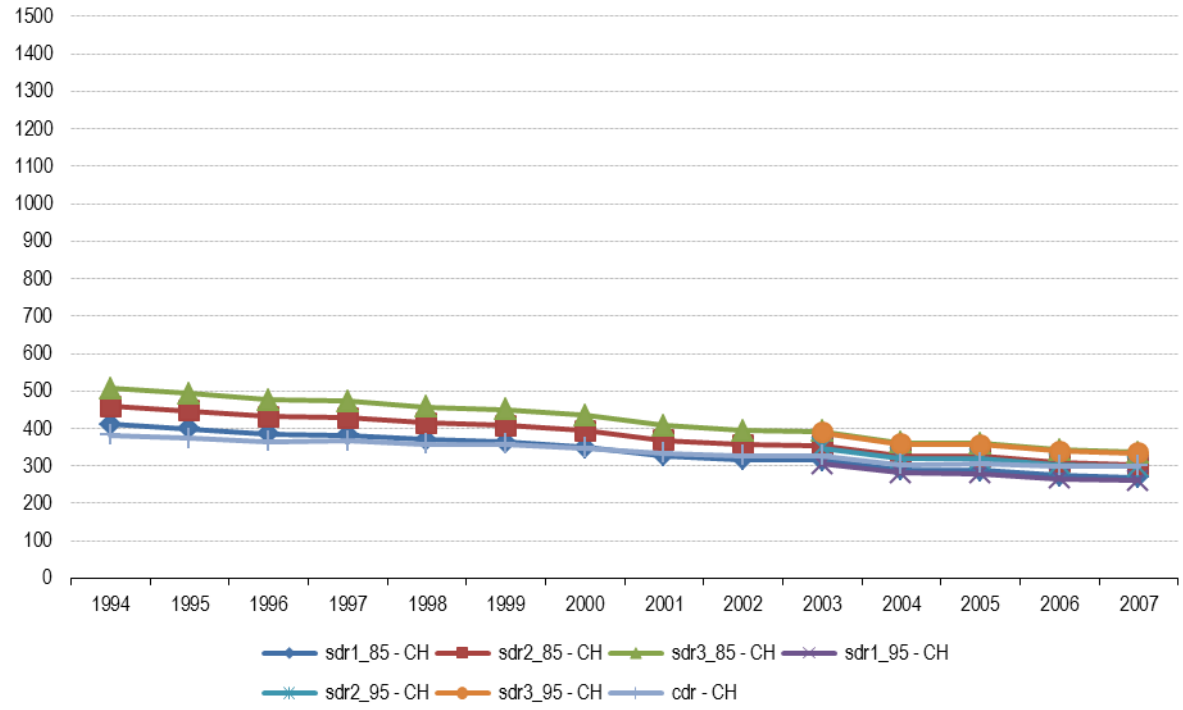
Diseases of the circulatory system – Iceland



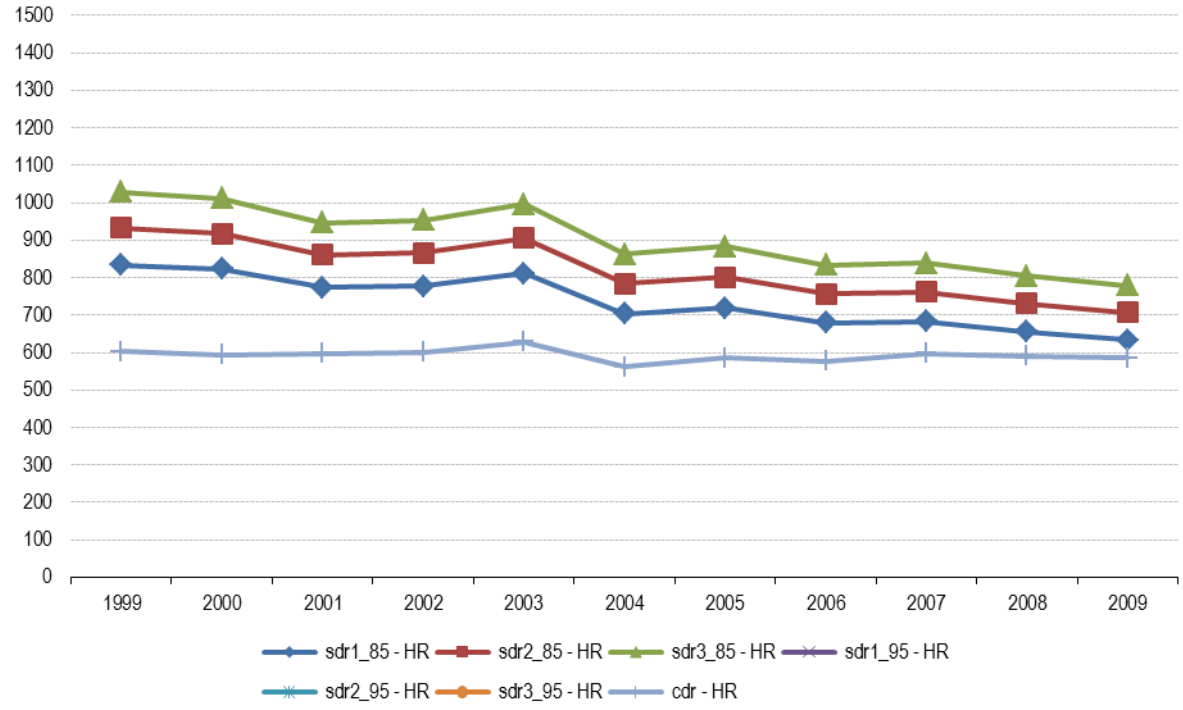
Diseases of the circulatory system – Norway



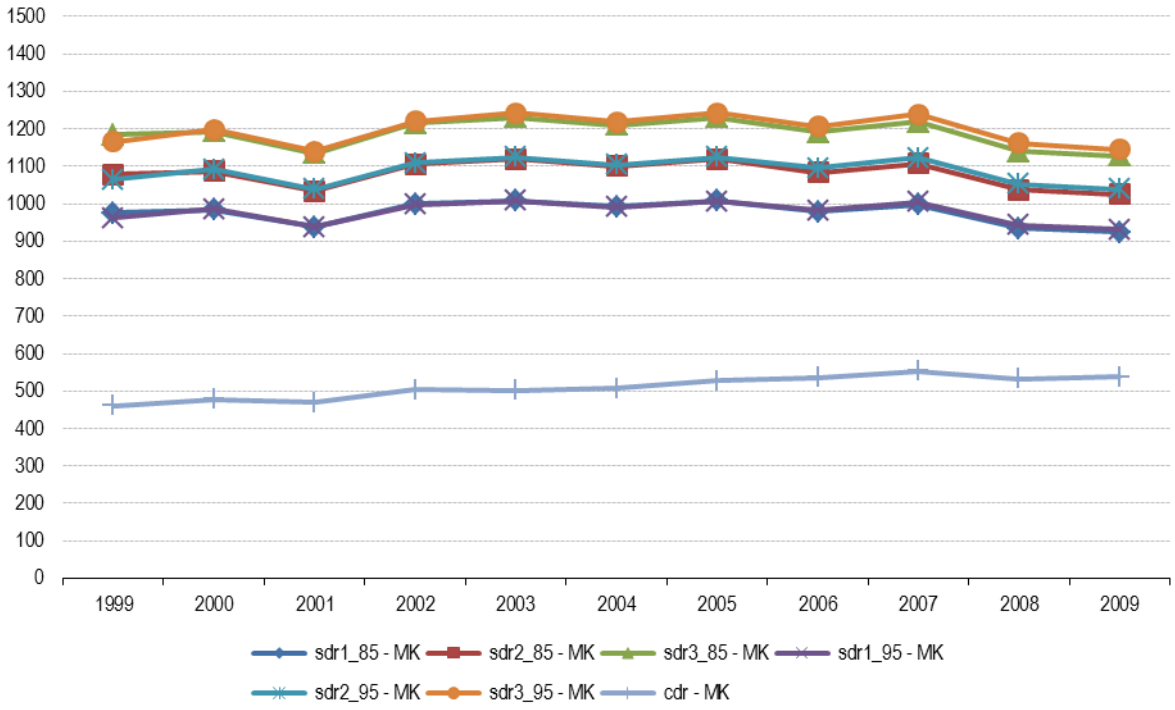
Diseases of the circulatory system – Switzerland



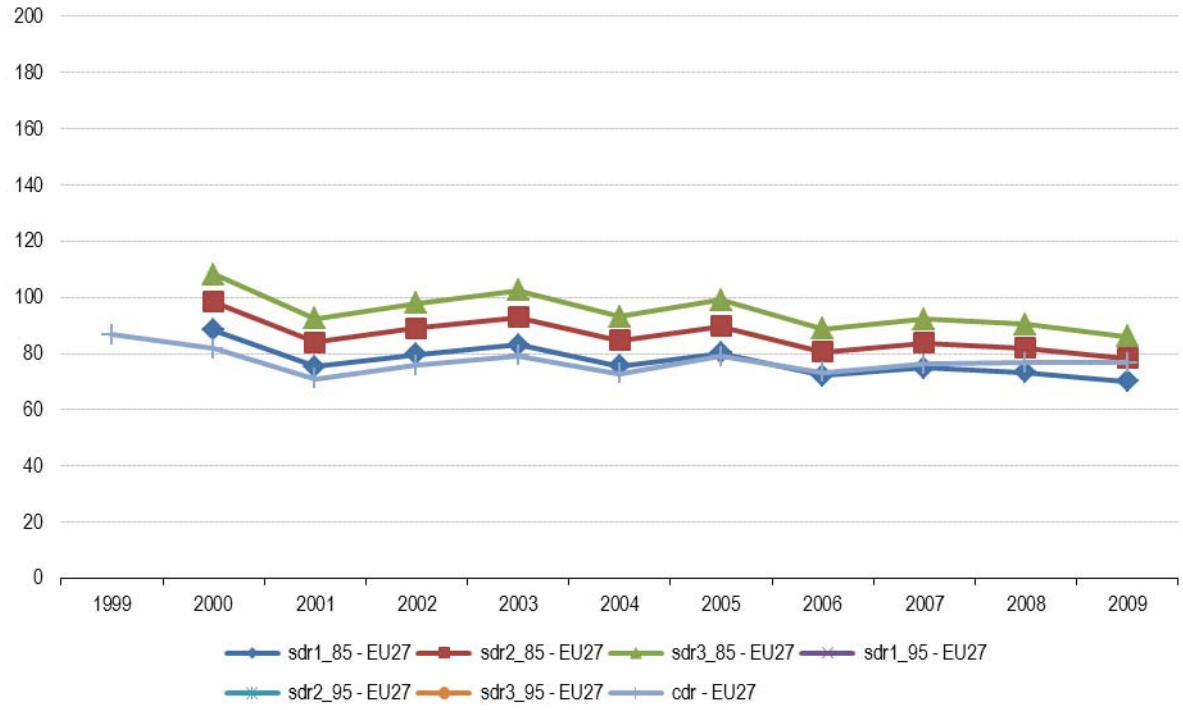
Diseases of the circulatory system – Croatia



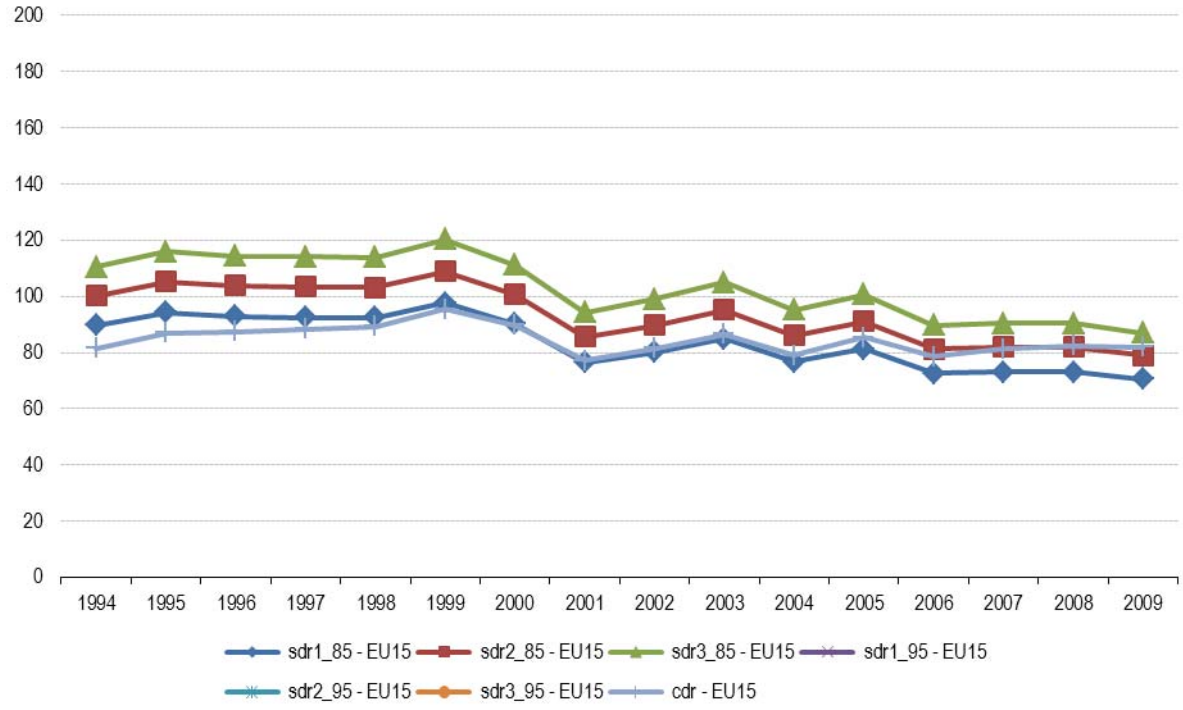
Diseases of the circulatory system – former Yugoslav Republic of Macedonia



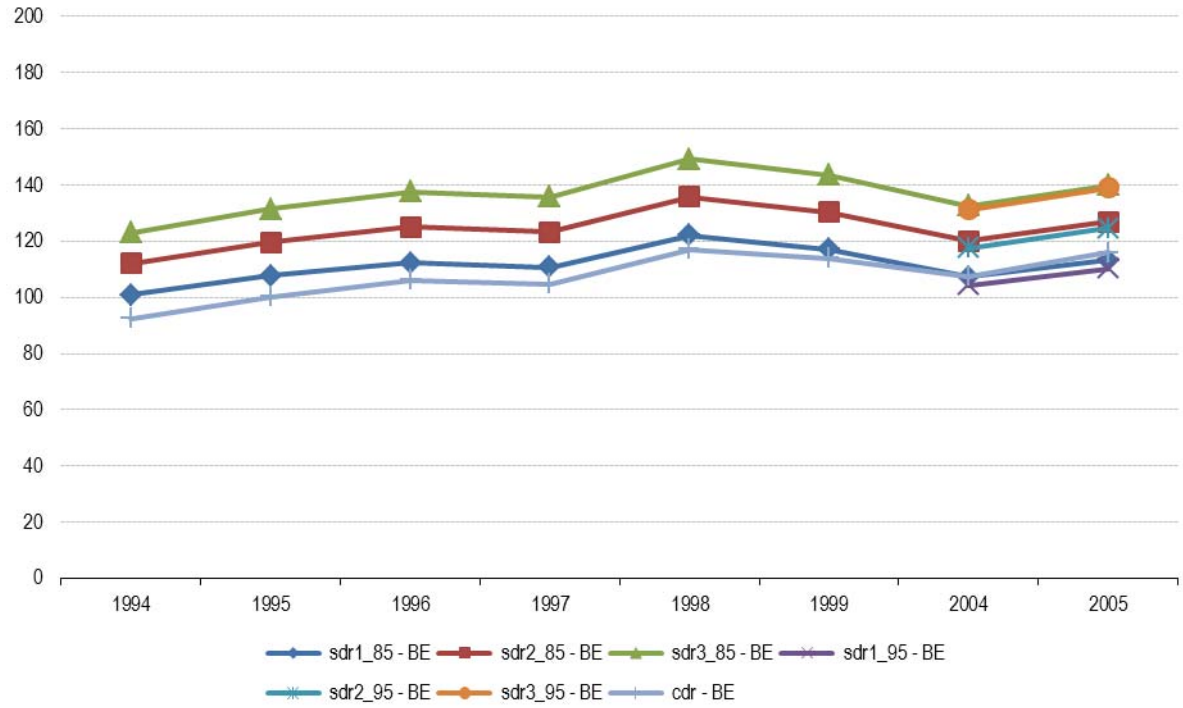
Diseases of the respiratory system – European Union 27 countries



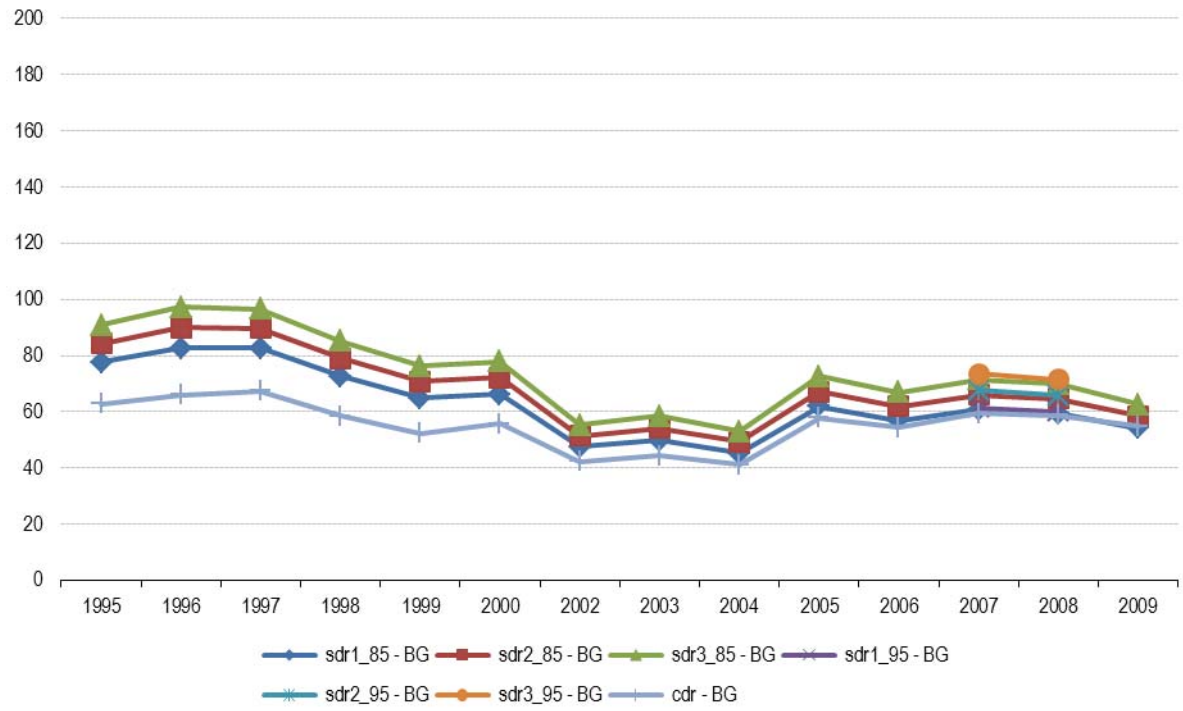
Diseases of the respiratory system – European Union 15 countries



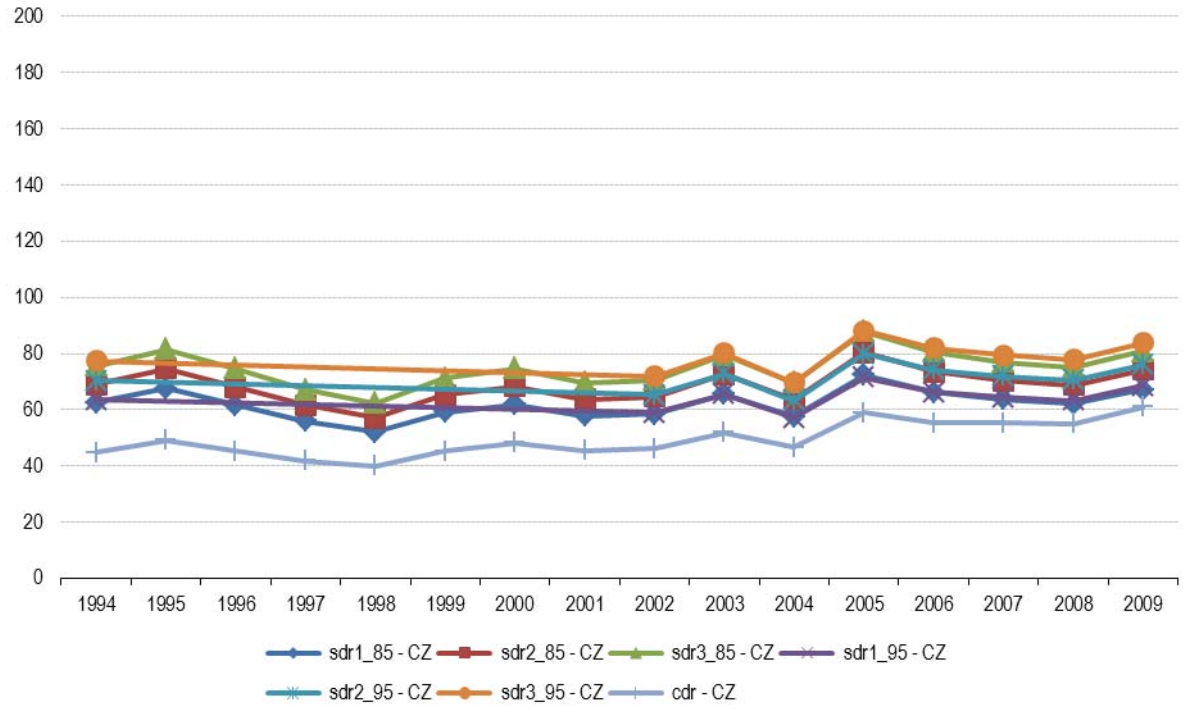
Diseases of the respiratory system – Belgium



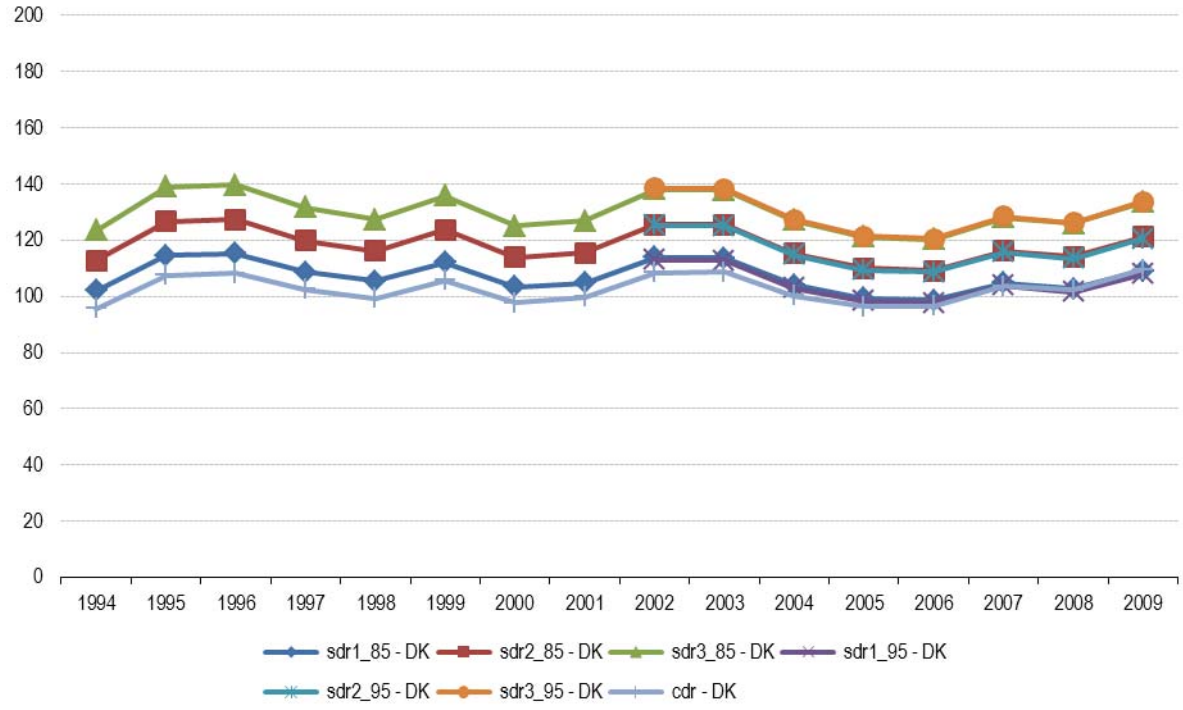
Diseases of the respiratory system – Bulgaria



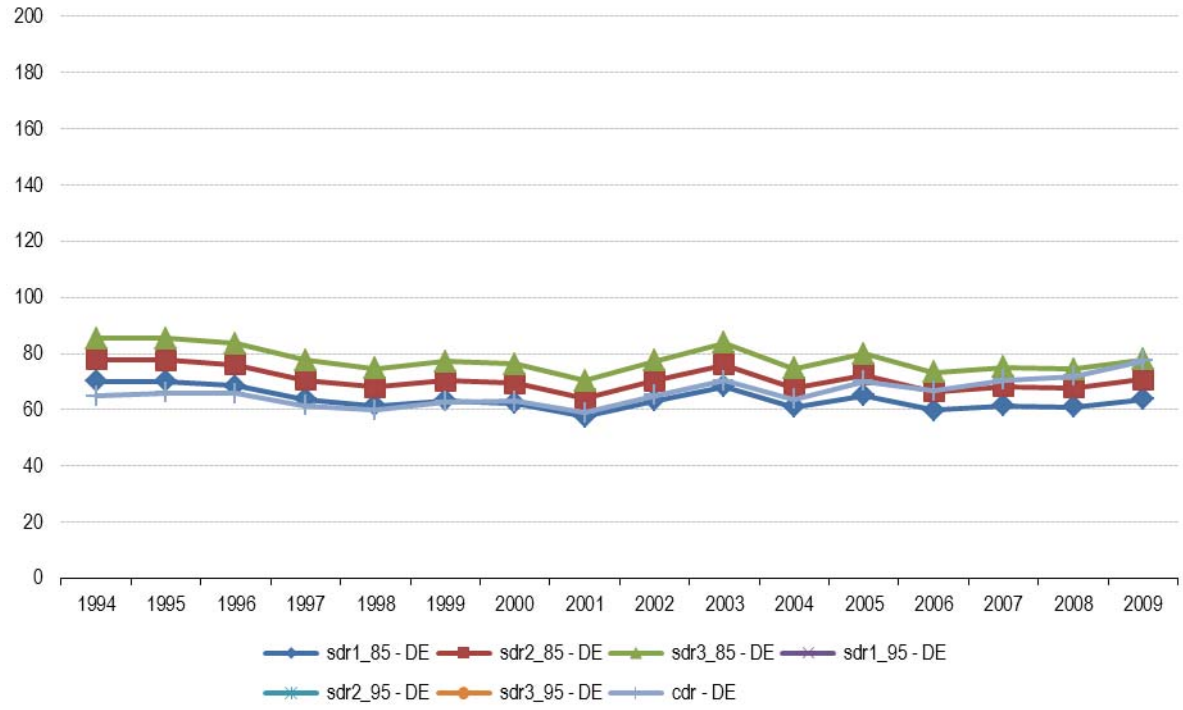
Diseases of the respiratory system – Czech Republic



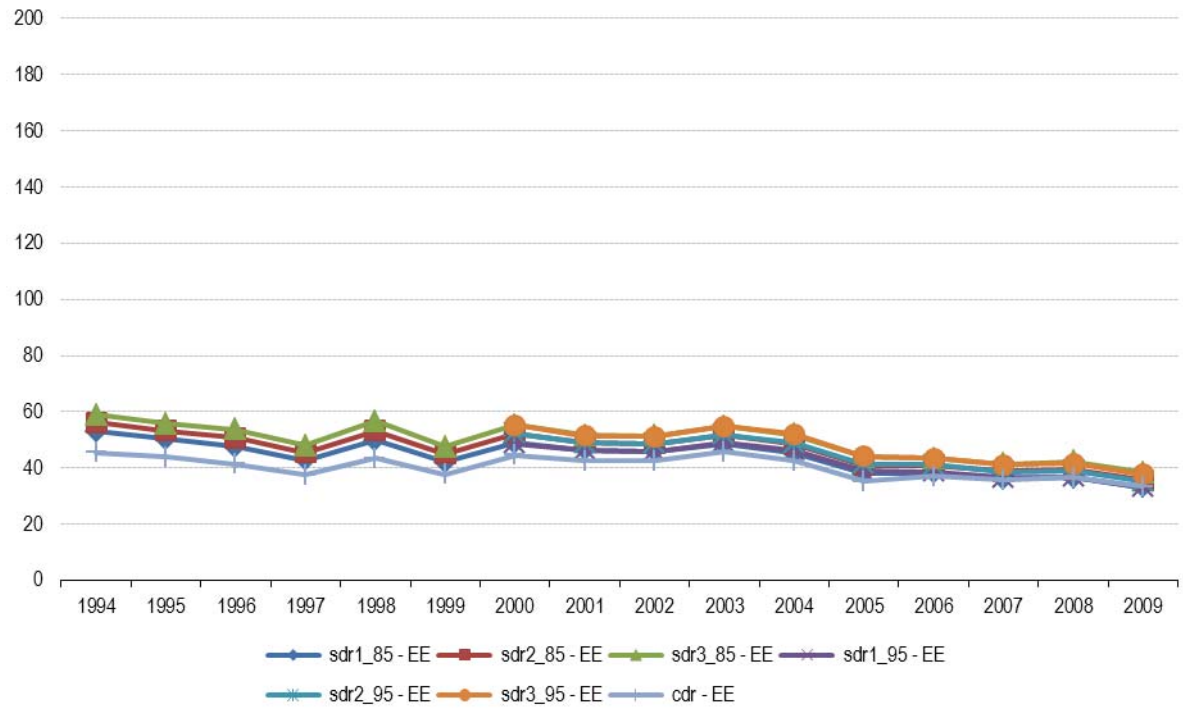
Diseases of the respiratory system – Denmark



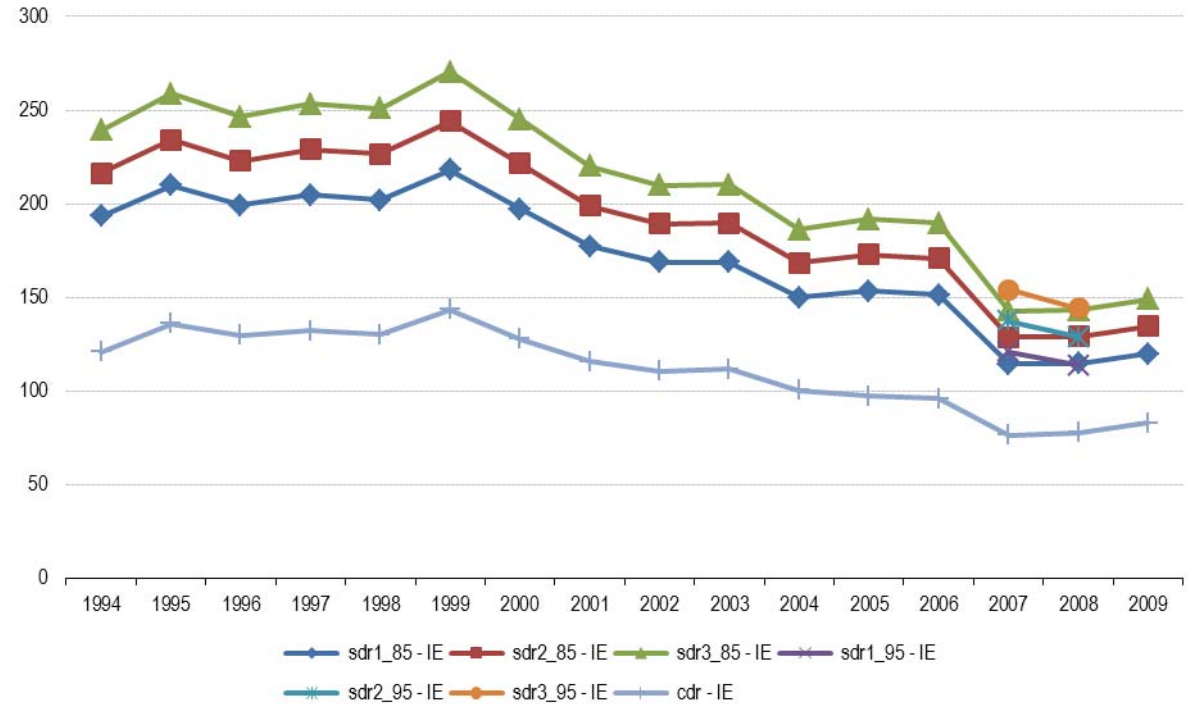
Diseases of the respiratory system – Germany



Diseases of the respiratory system – Estonia

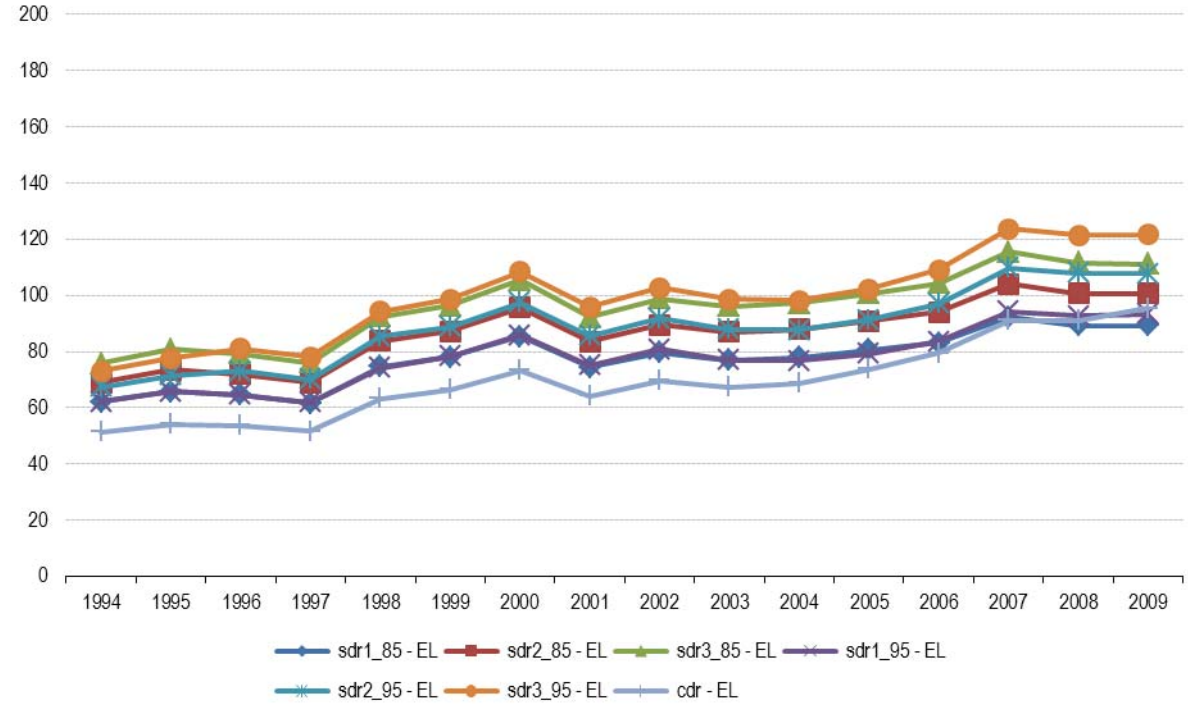


Diseases of the respiratory system – Ireland

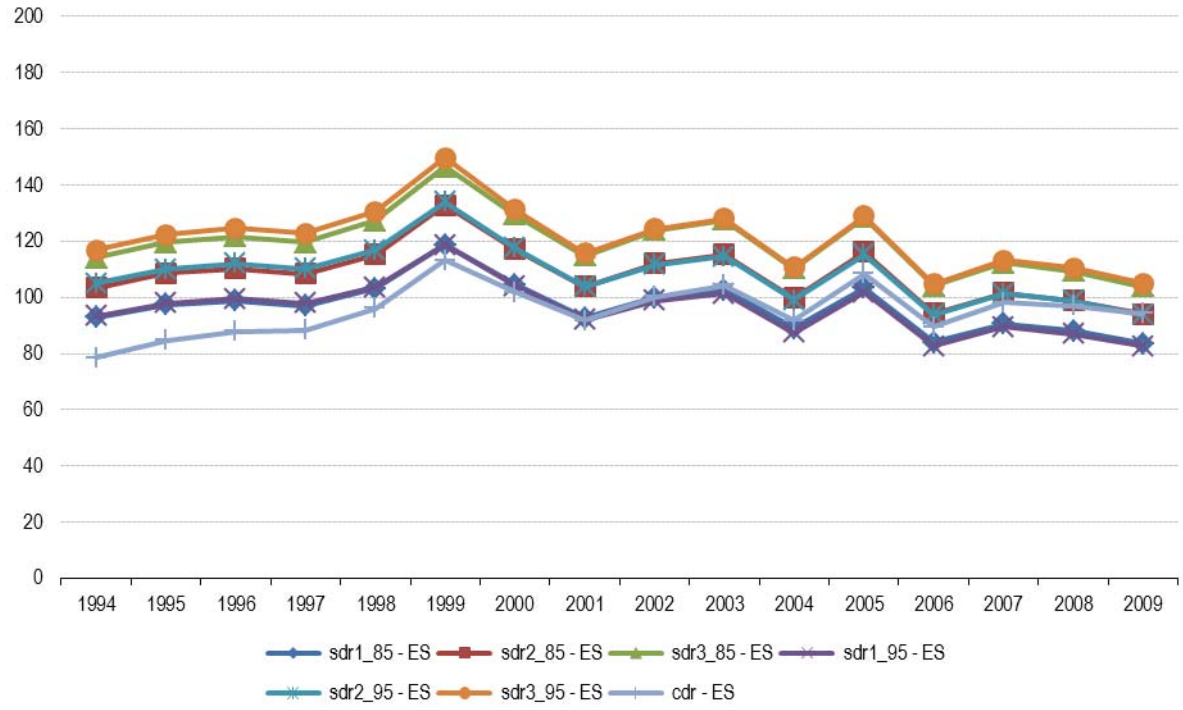


Note: For IE and UK the maximum value of the (Y) axis scale is 300. All the other similar graphs have 200 as maximum value.

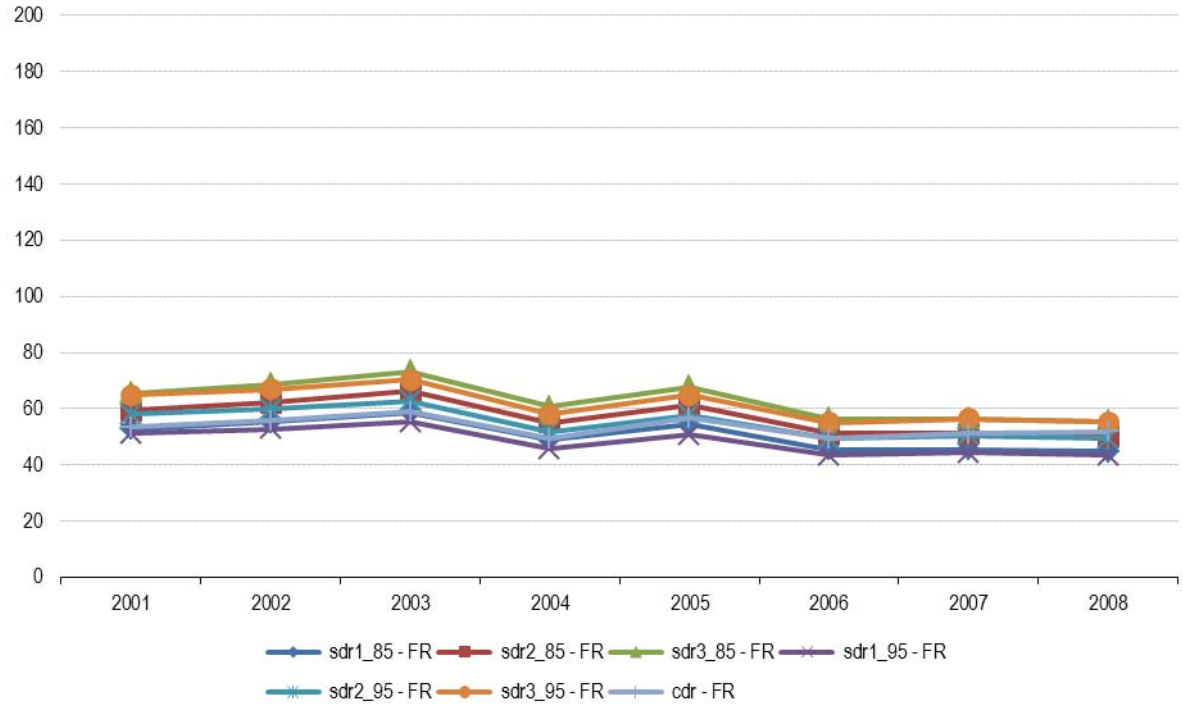
Diseases of the respiratory system – Greece



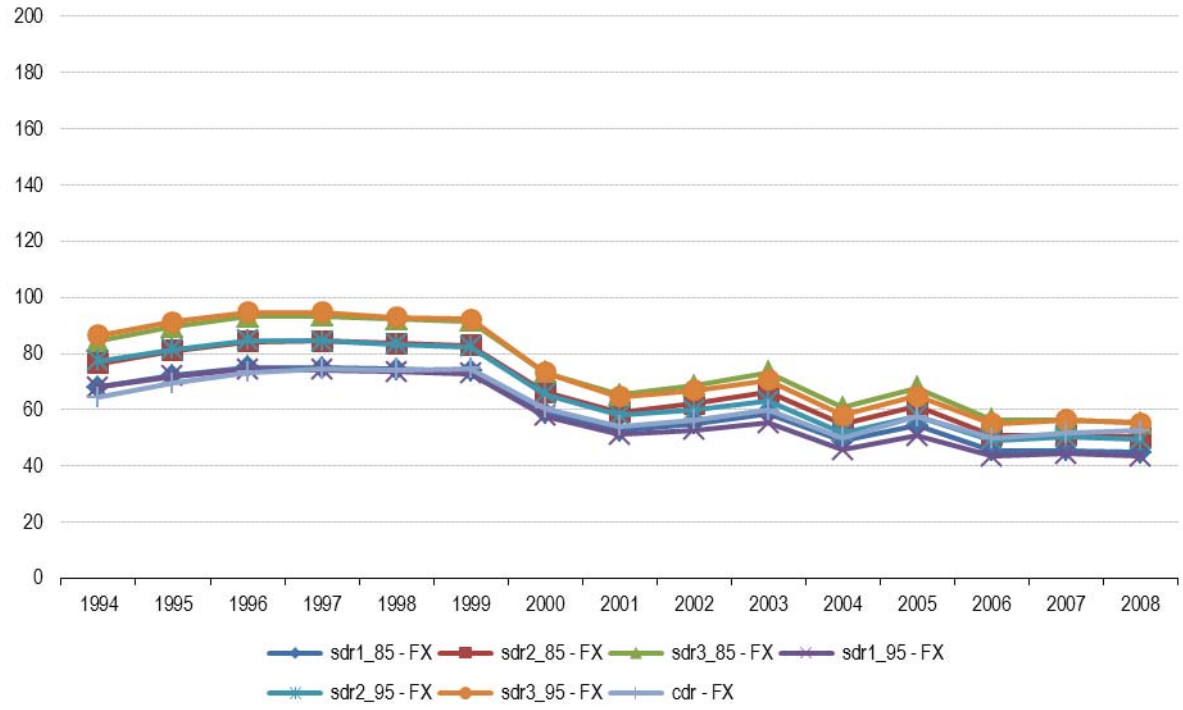
Diseases of the respiratory system – Spain



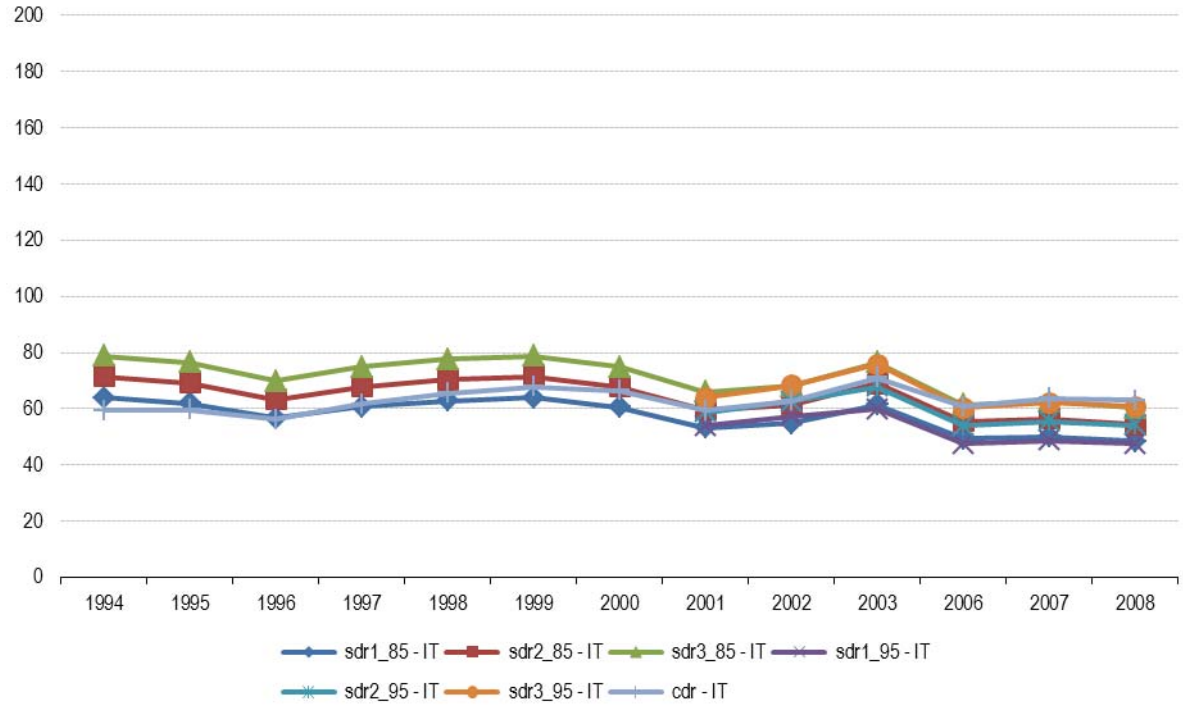
Diseases of the respiratory system – France



Diseases of the respiratory system – France (metropolitan)

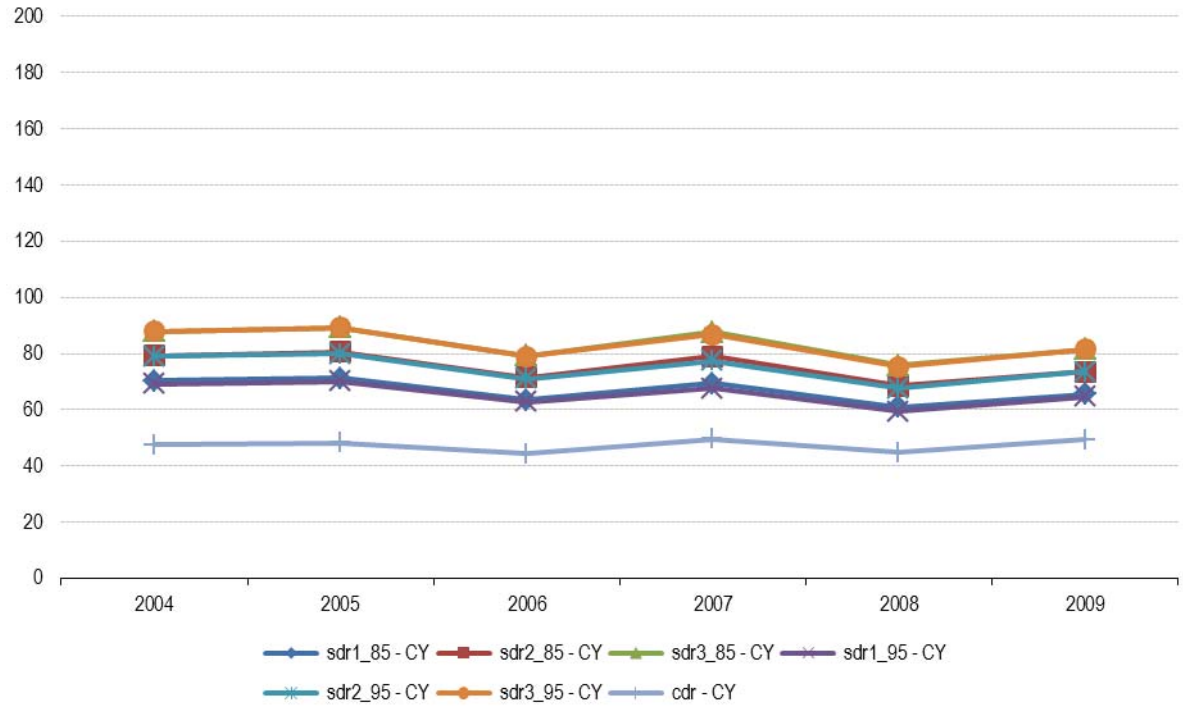


Diseases of the respiratory system – Italy

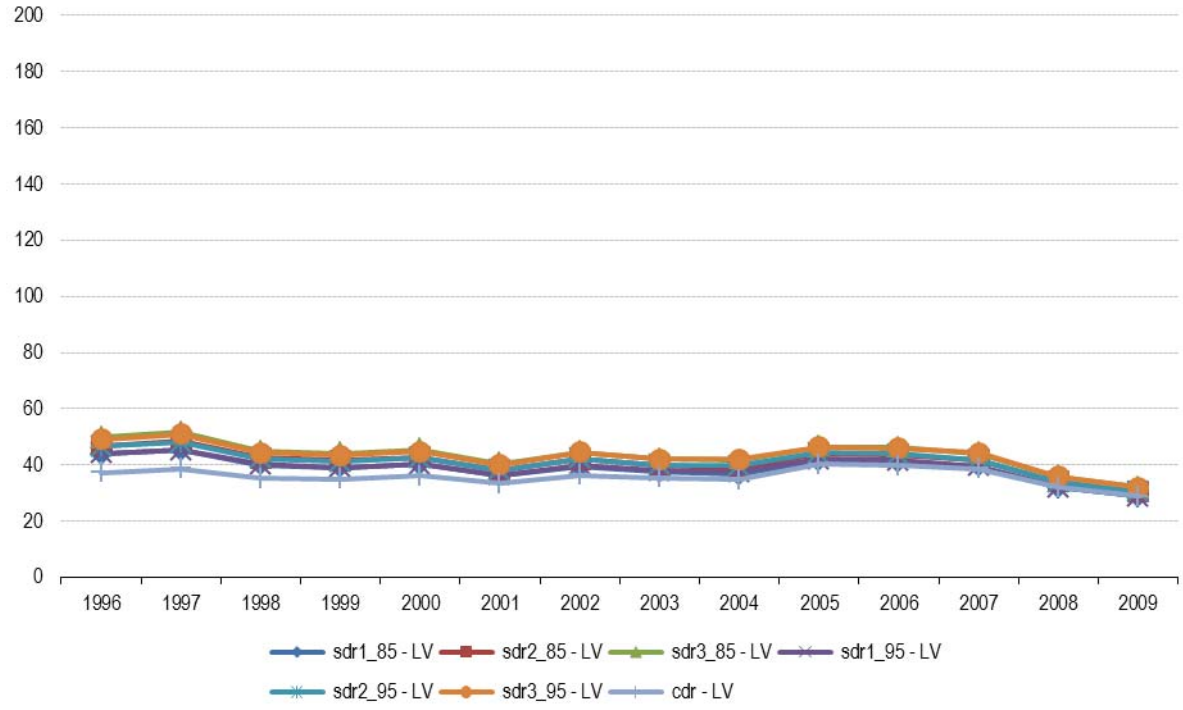


Note: cause-specific mortality data for Italy in the years 2004 and 2005 are not available.

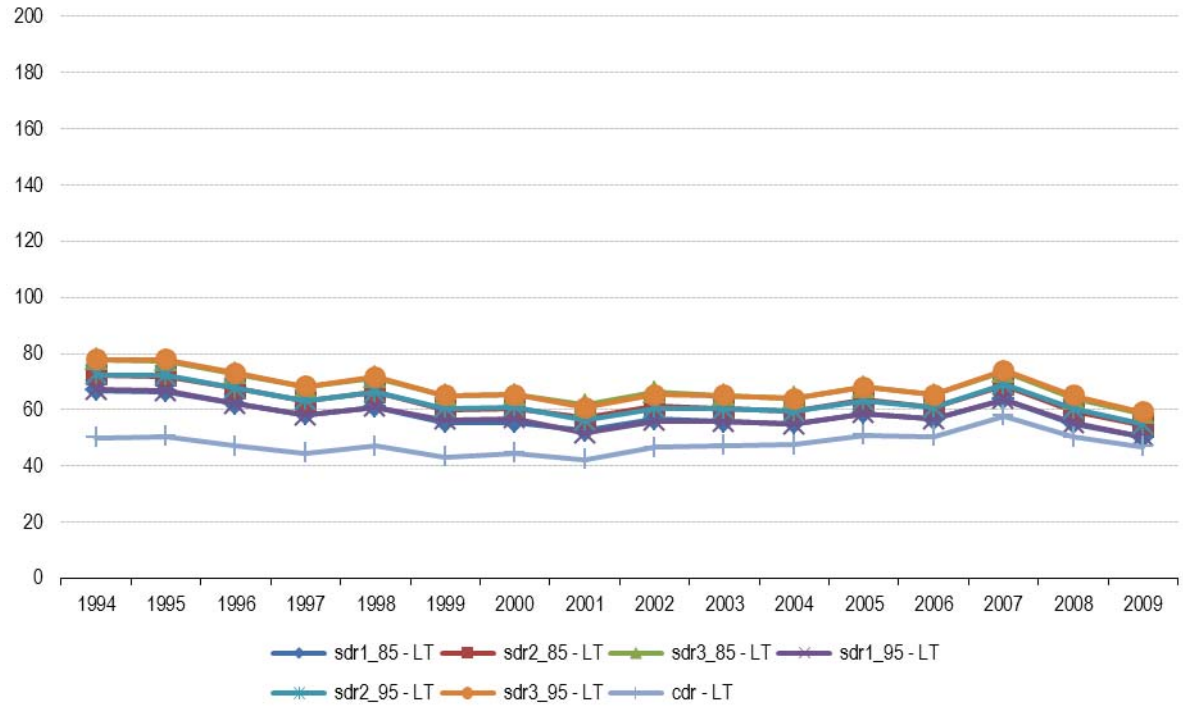
Diseases of the respiratory system – Cyprus



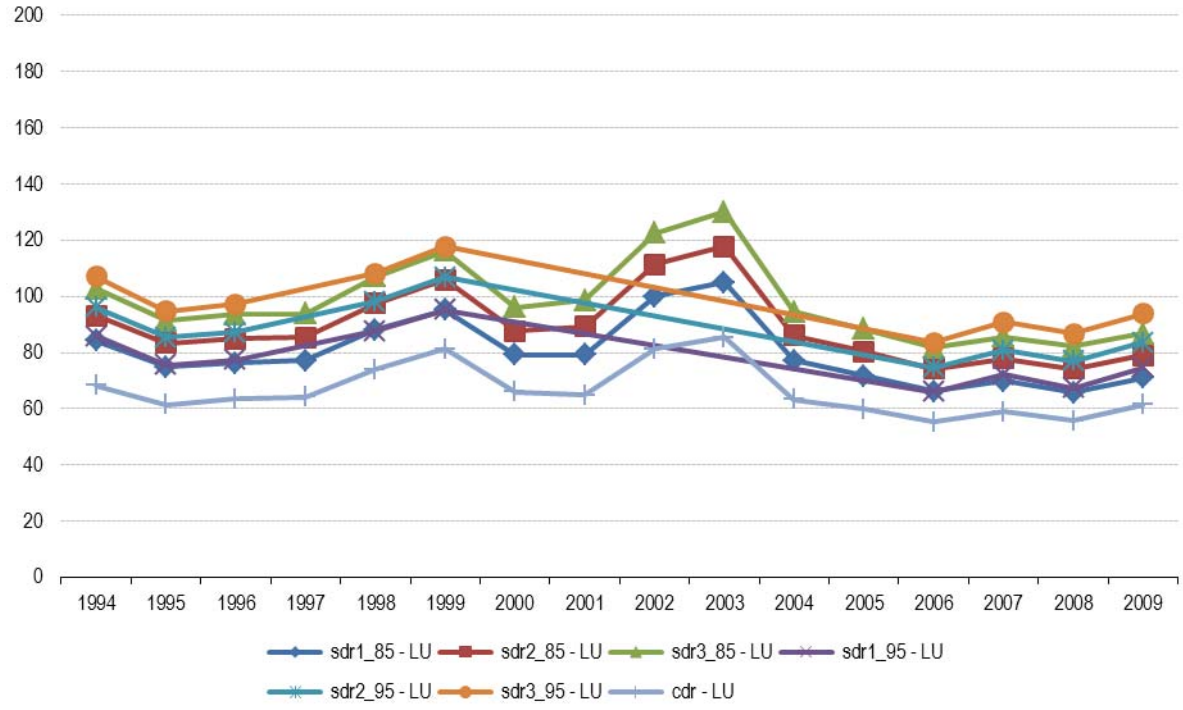
Diseases of the respiratory system – Latvia



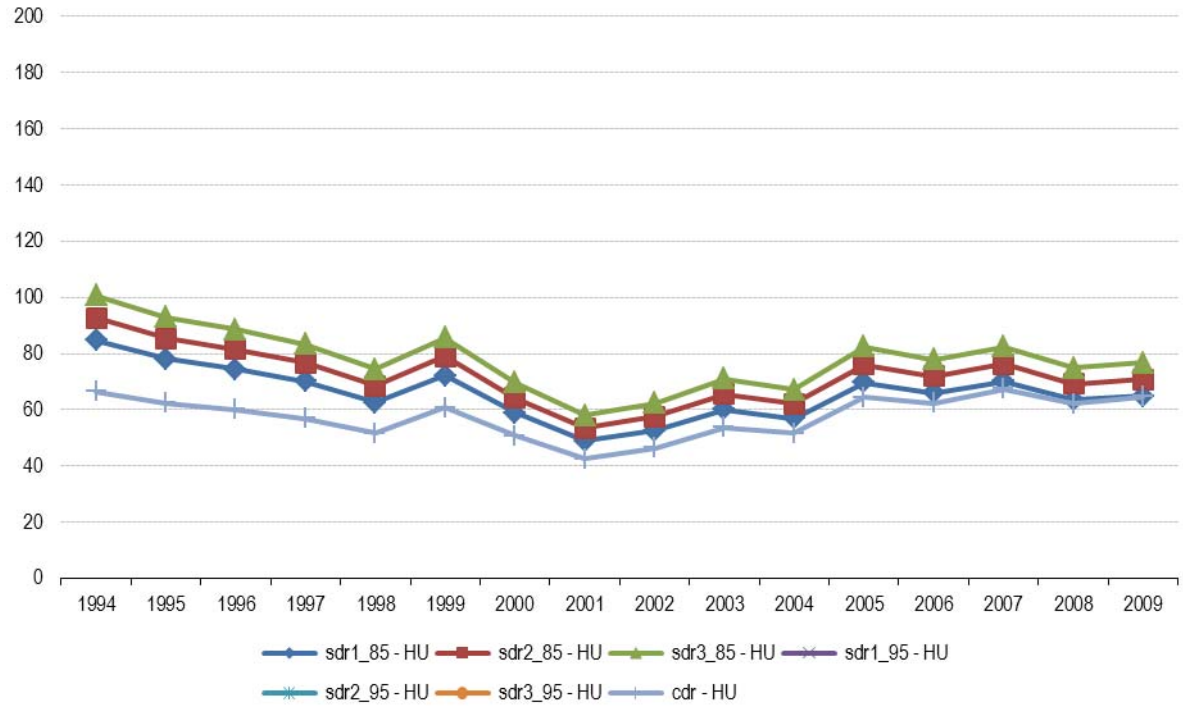
Diseases of the respiratory system – Lithuania



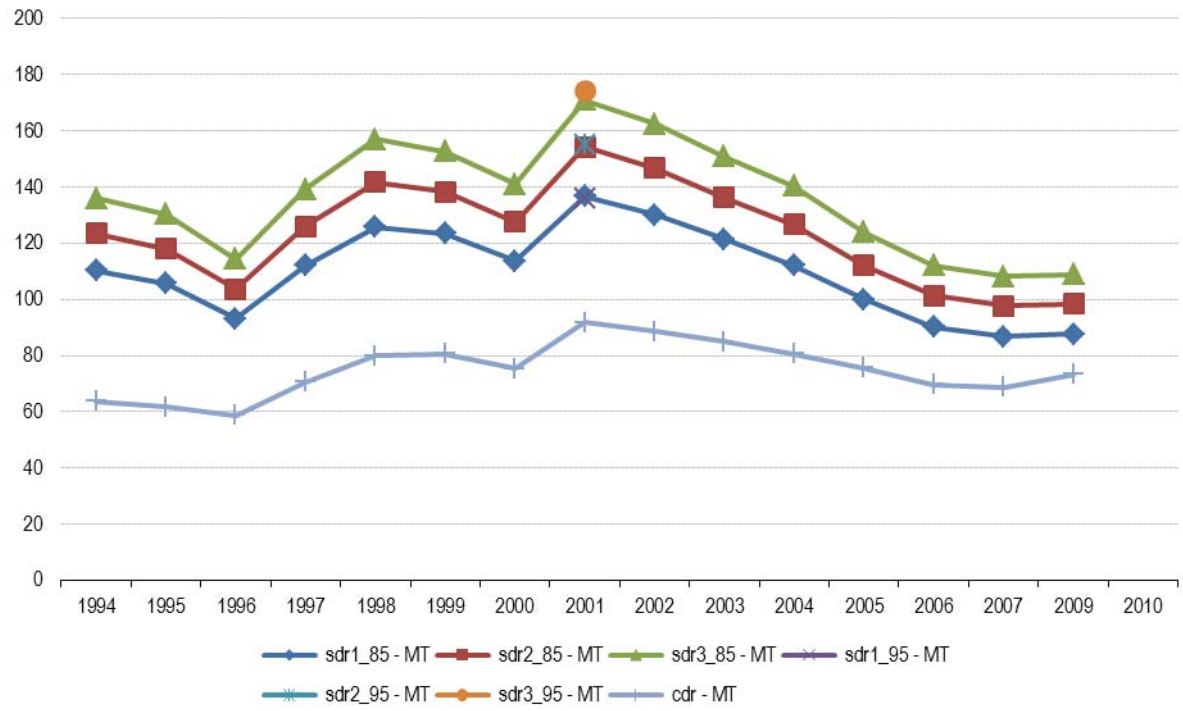
Diseases of the respiratory system – Luxembourg



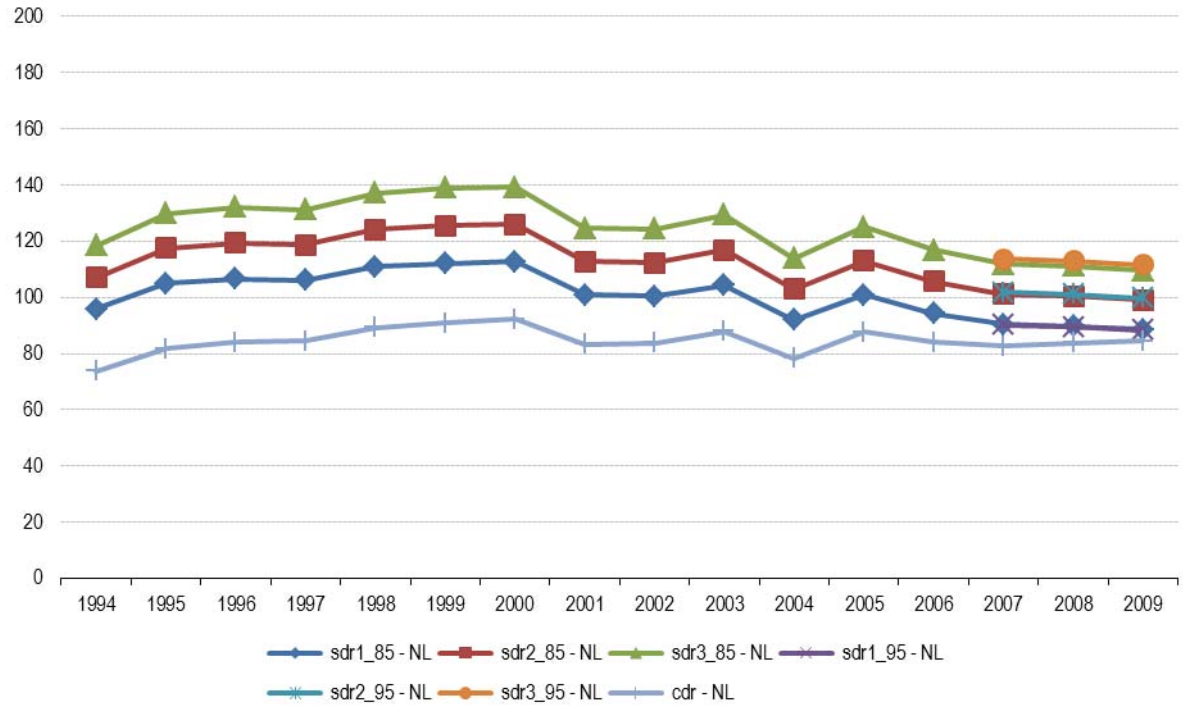
Diseases of the respiratory system – Hungary



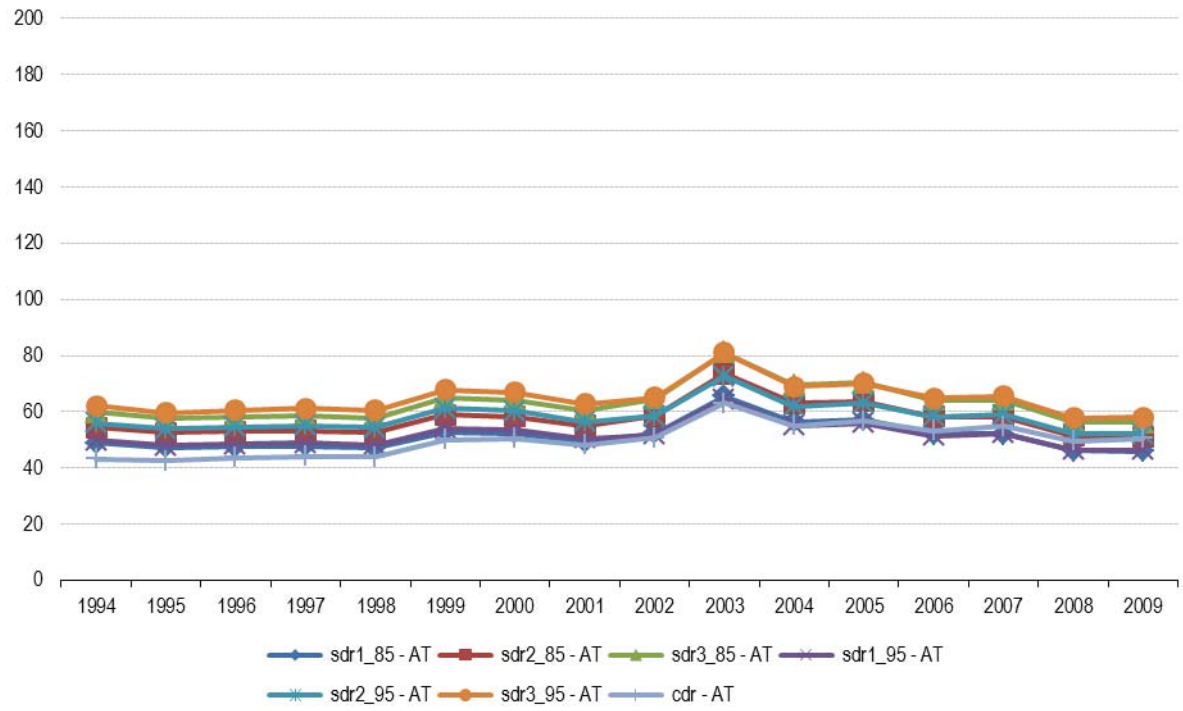
Diseases of the respiratory system – Malta



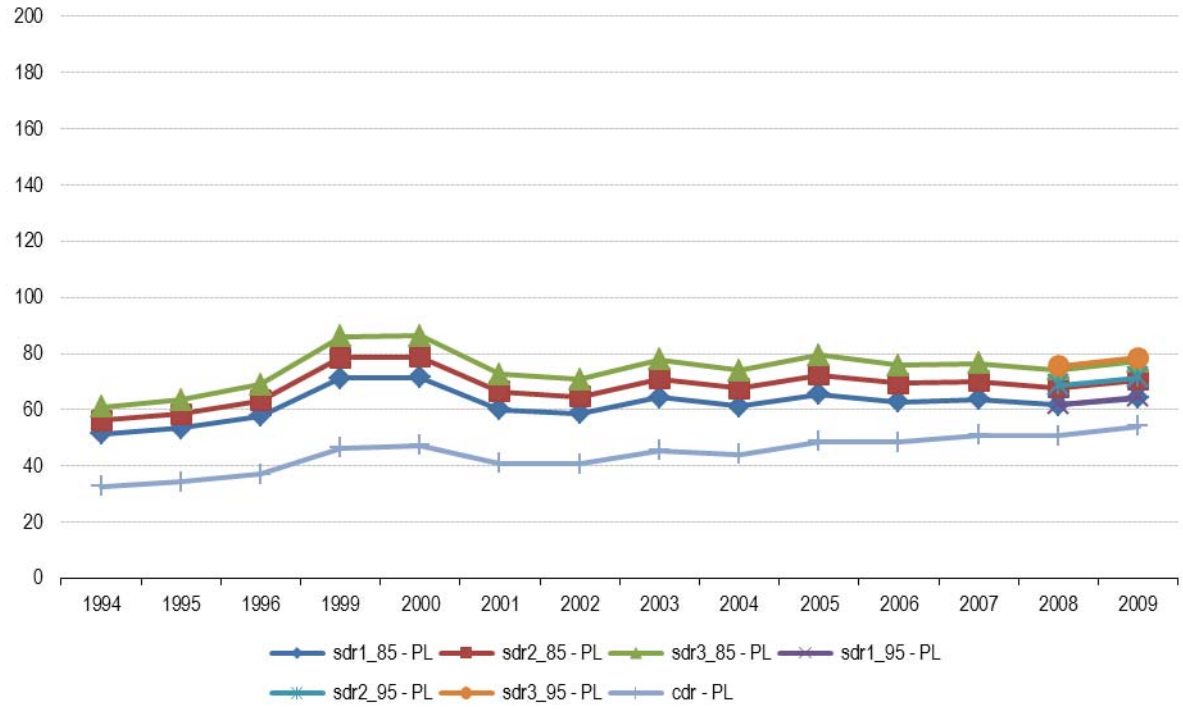
Diseases of the respiratory system – Netherlands



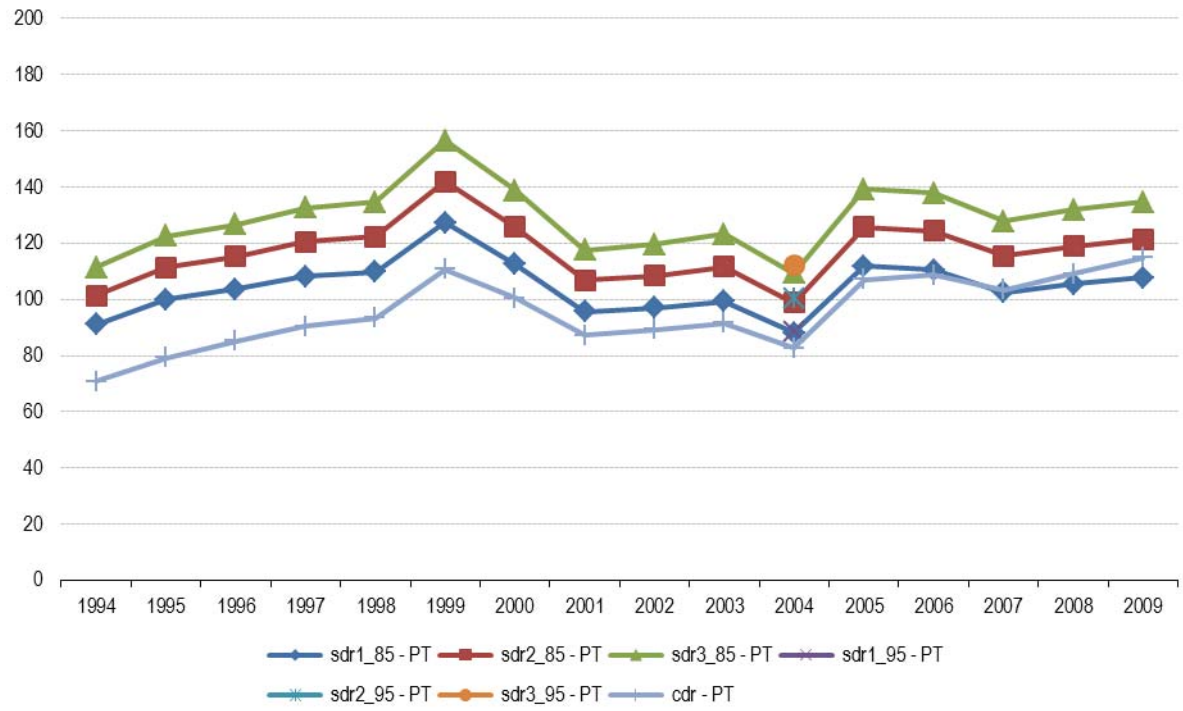
Diseases of the respiratory system – Austria



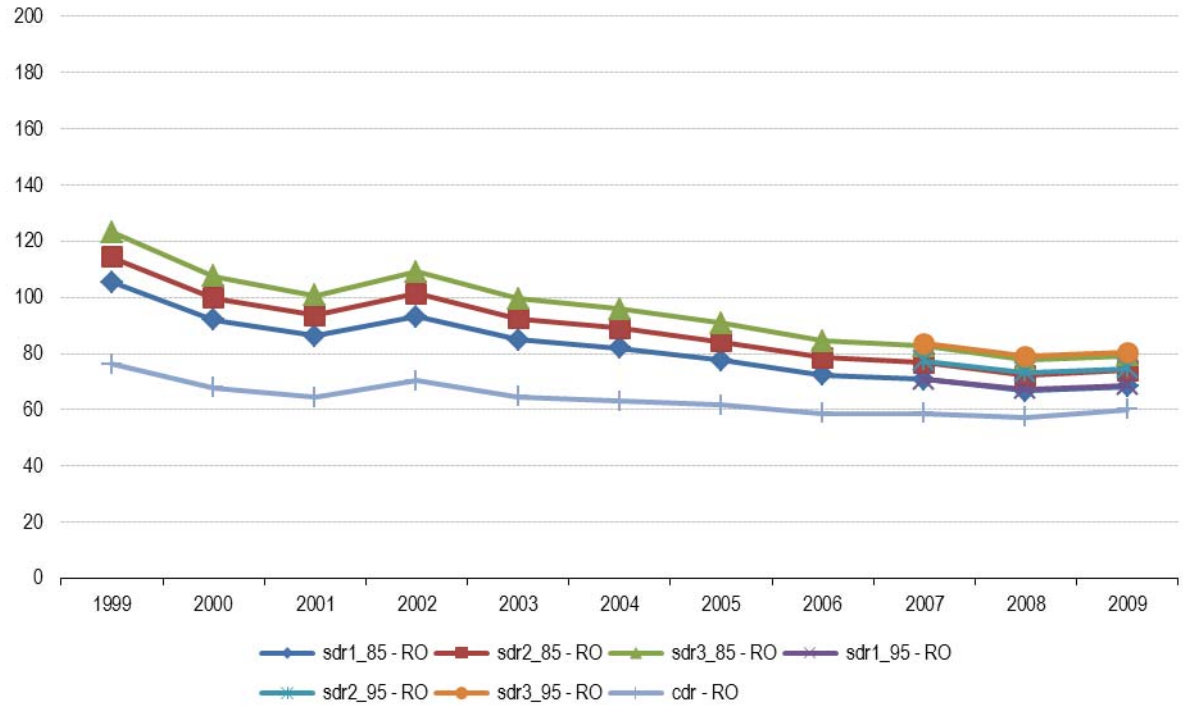
Diseases of the respiratory system – Poland



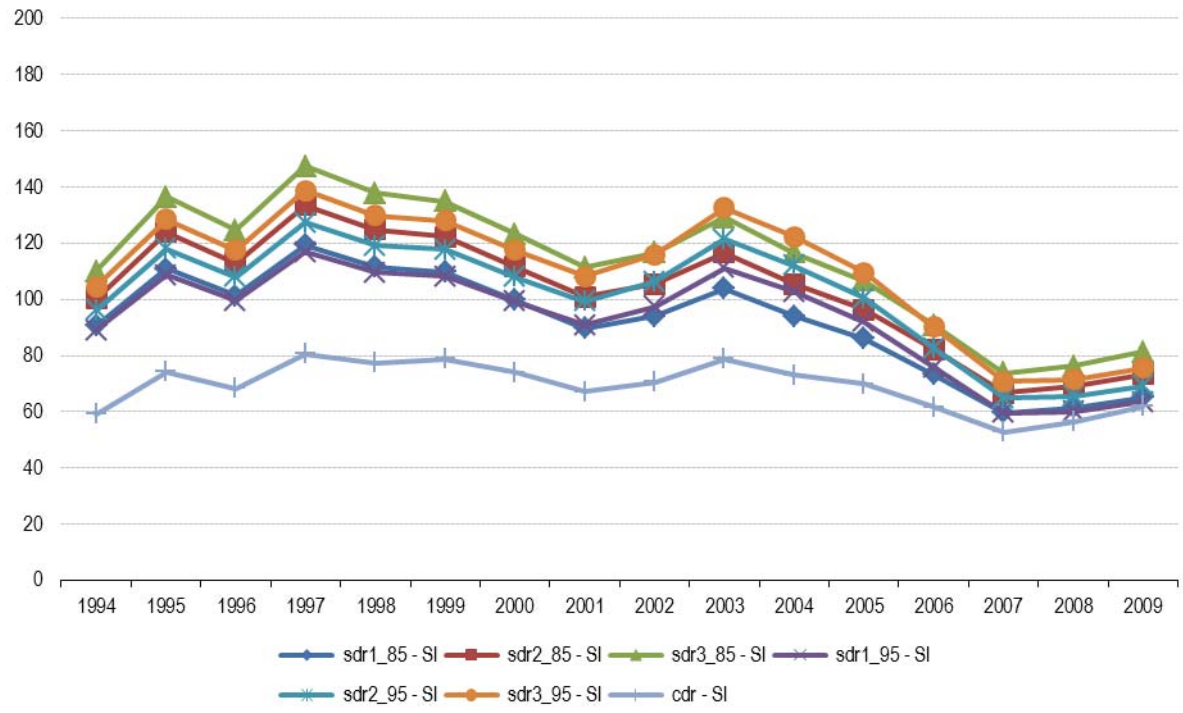
Diseases of the respiratory system – Portugal



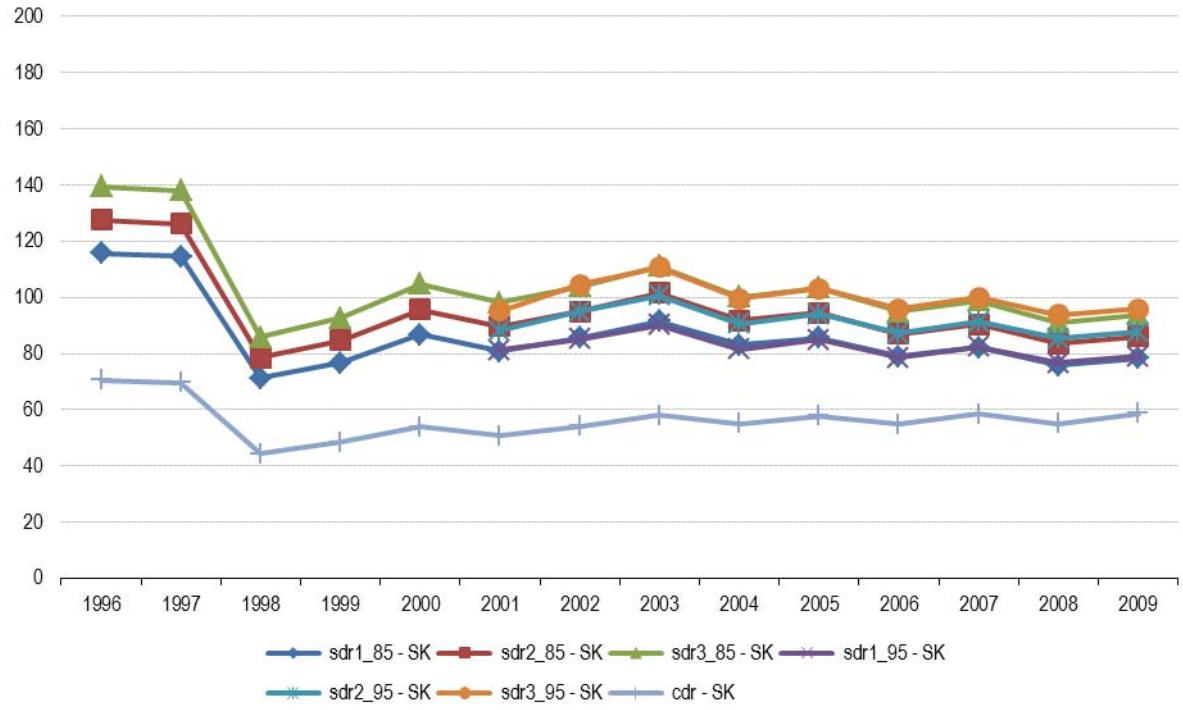
Diseases of the respiratory system – Romania



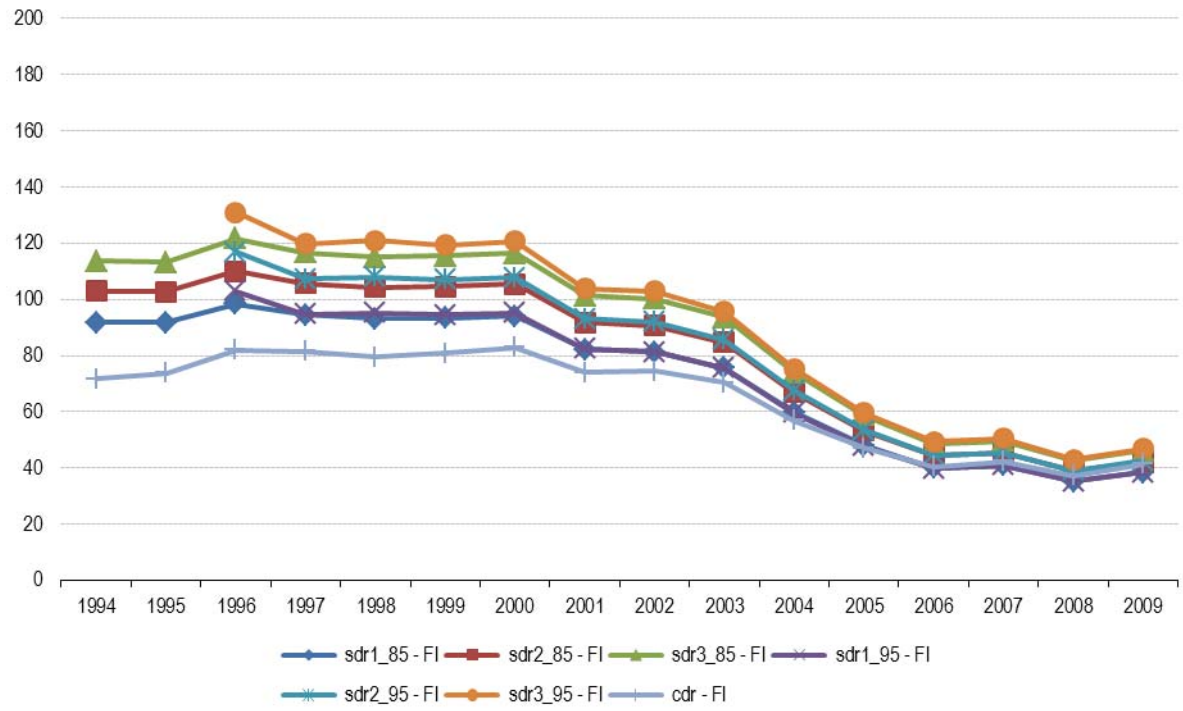
Diseases of the respiratory system – Slovenia



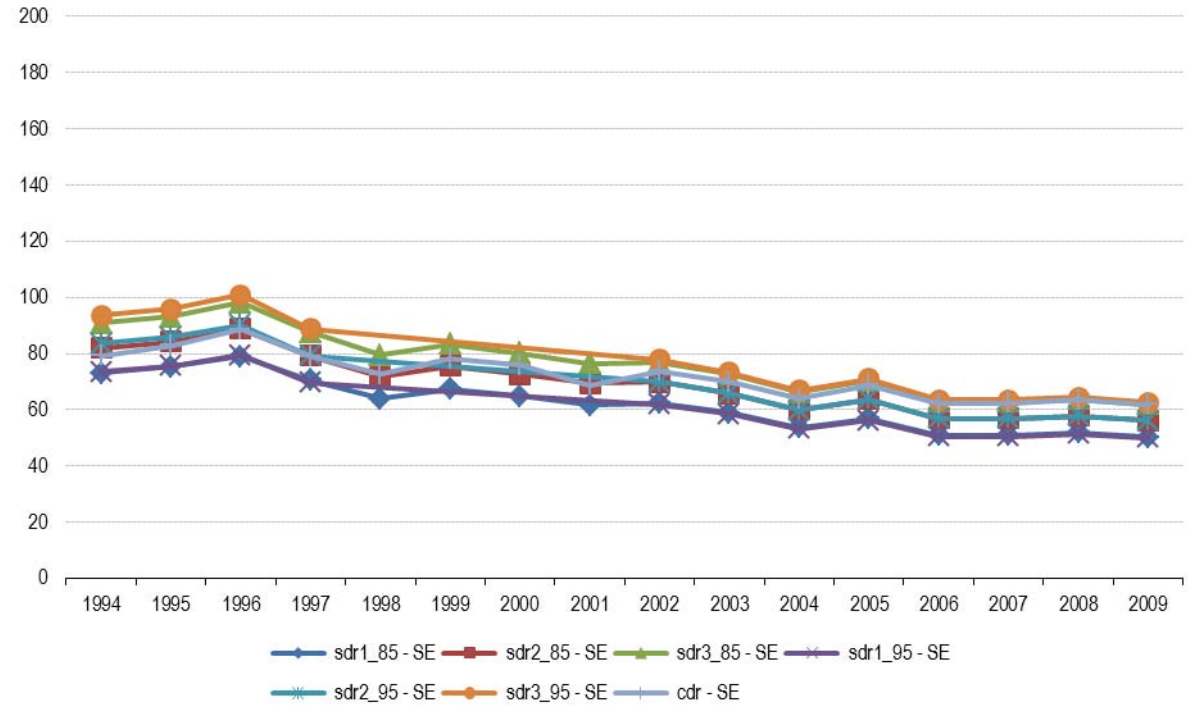
Diseases of the respiratory system – Slovakia



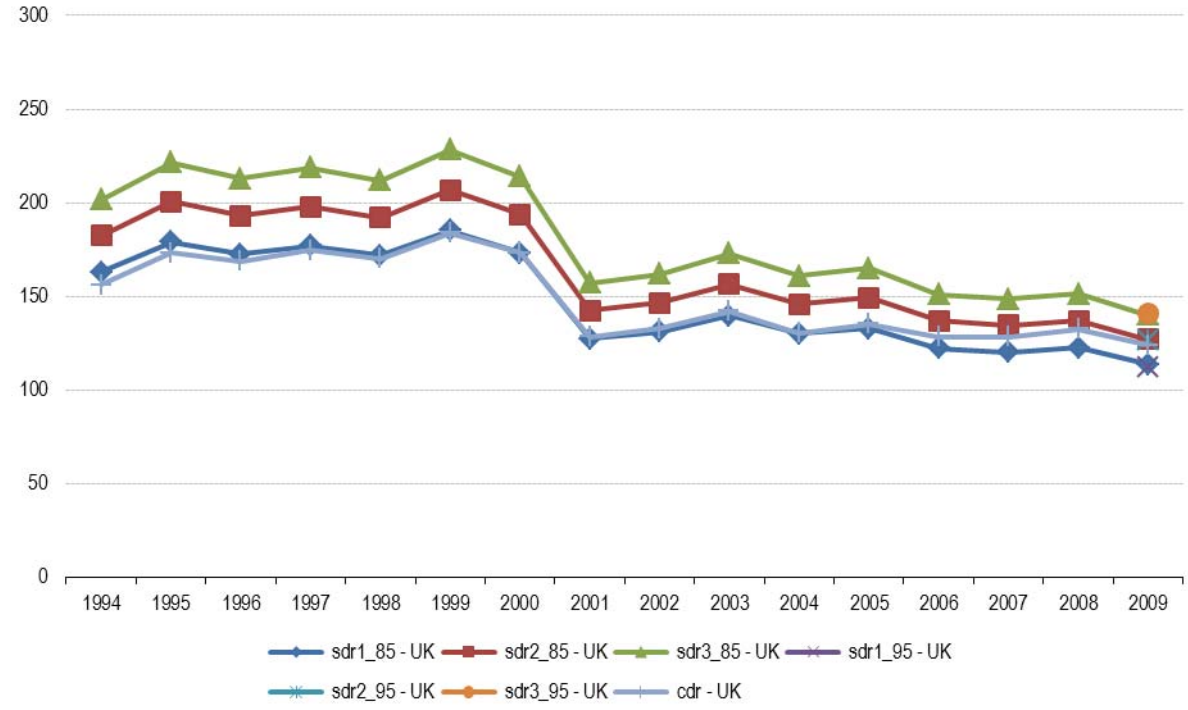
Diseases of the respiratory system – Finland



Diseases of the respiratory system – Sweden

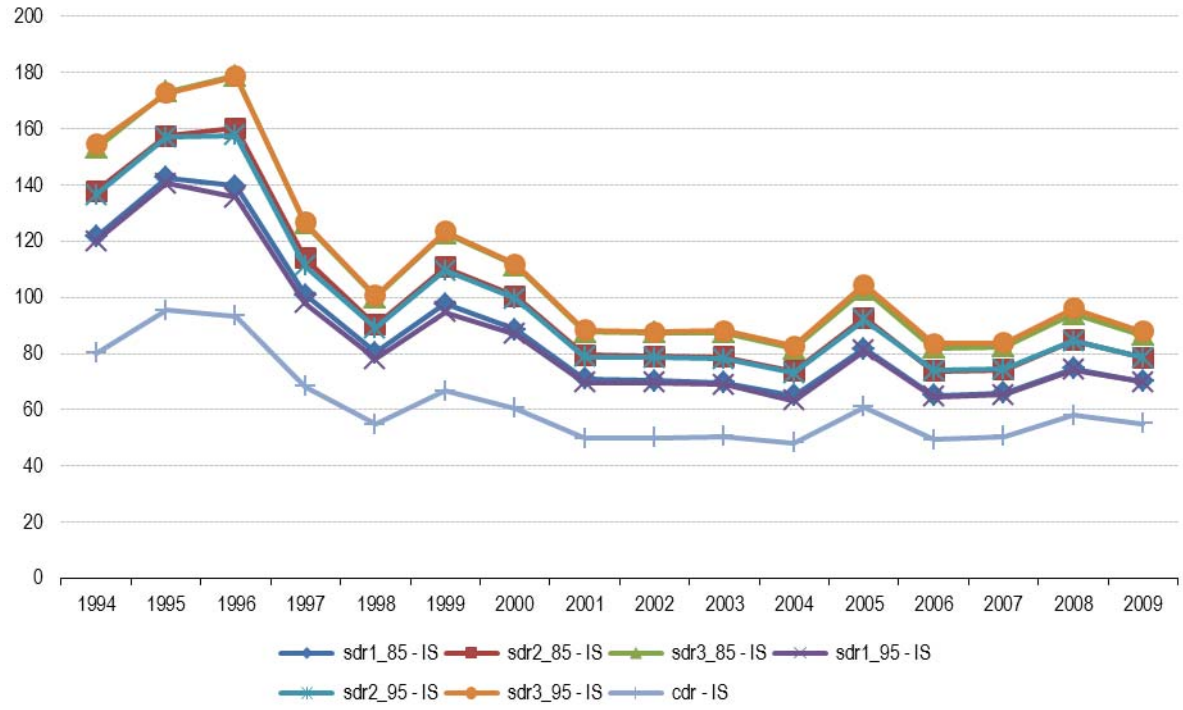


Diseases of the respiratory system – United Kingdom

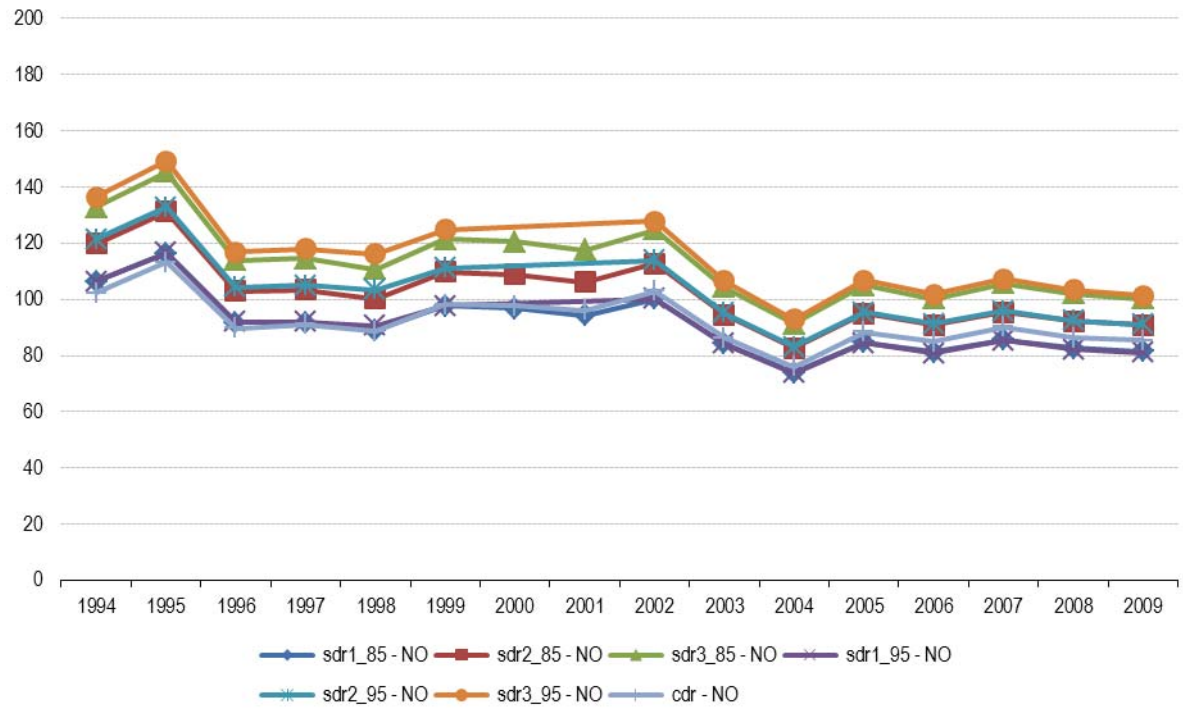


Note: For IE and UK the maximum value of the (Y) axis scale is 300. All the other similar graphs have 200 as maximum value.

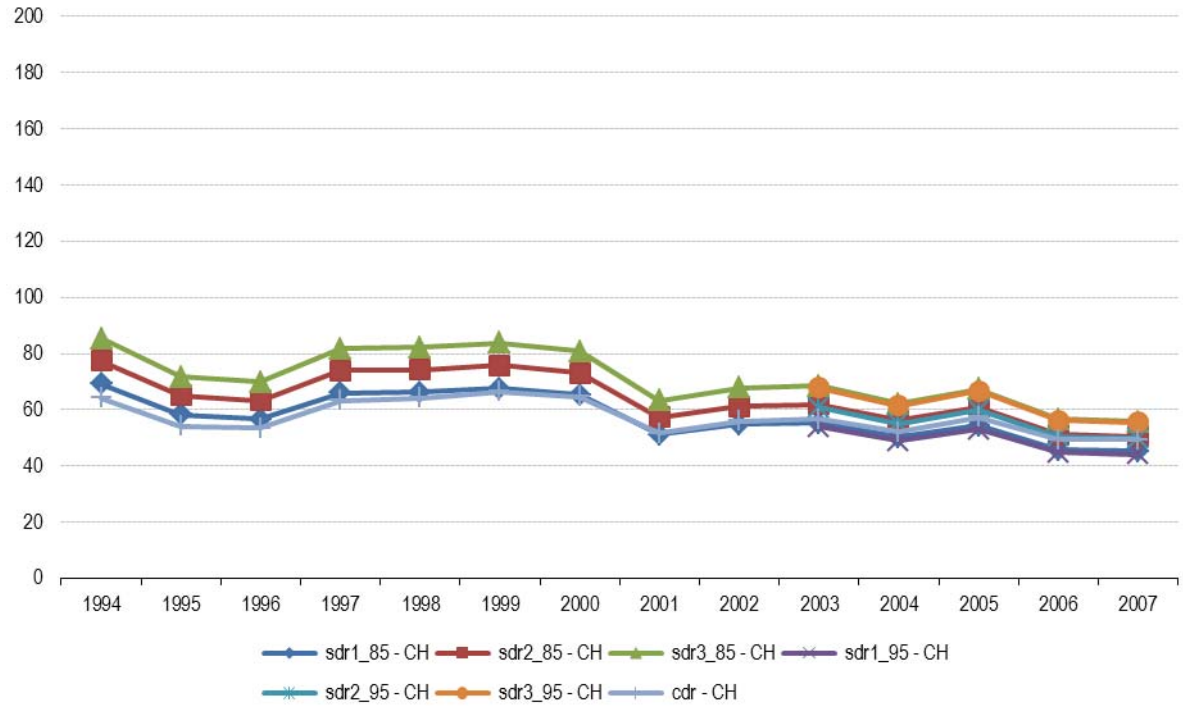
Diseases of the respiratory system – Iceland



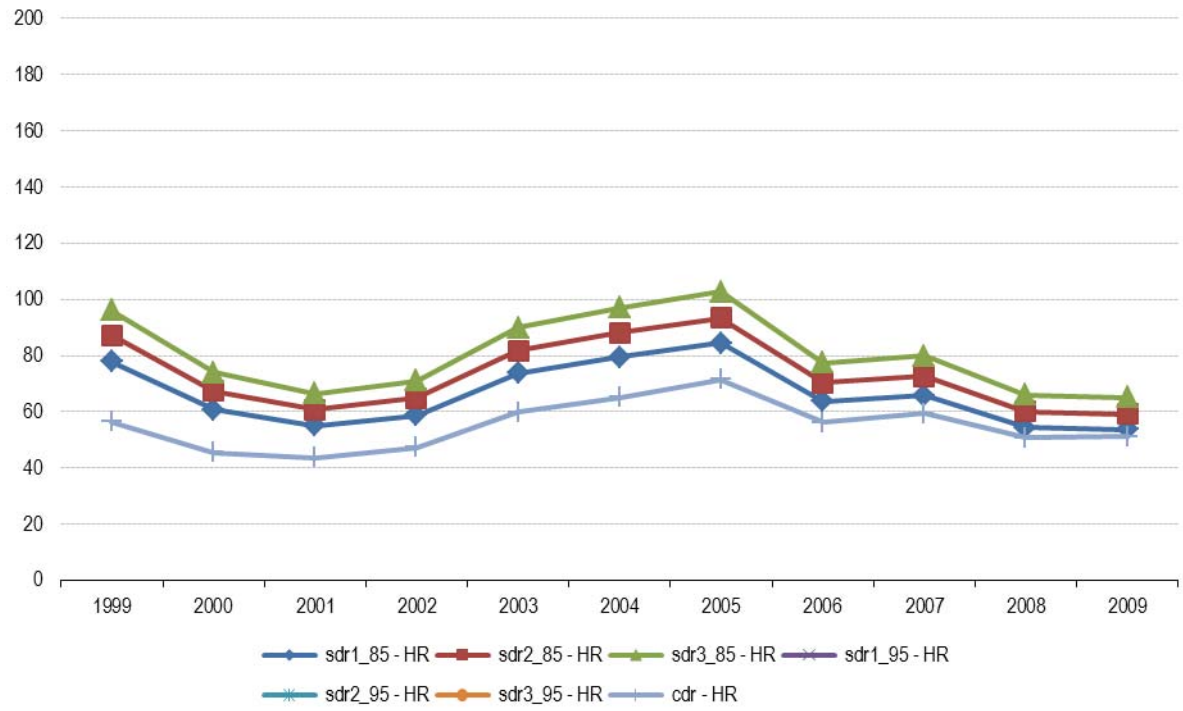
Diseases of the respiratory system – Norway



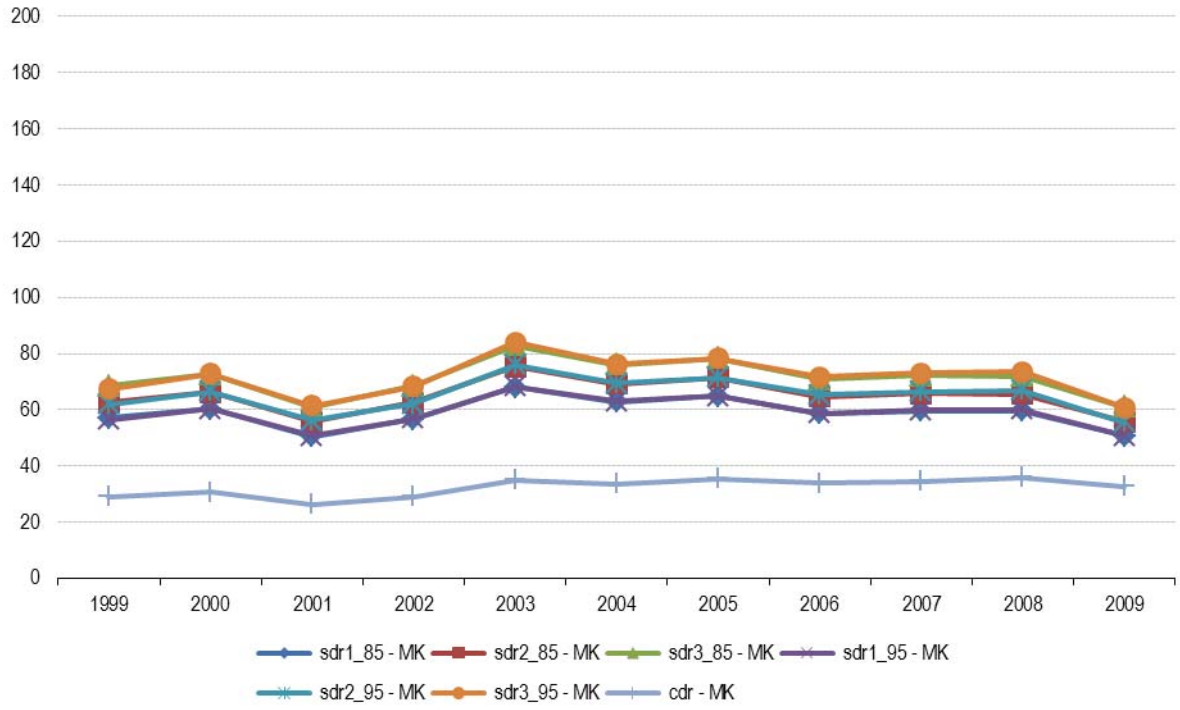
Diseases of the respiratory system – Switzerland



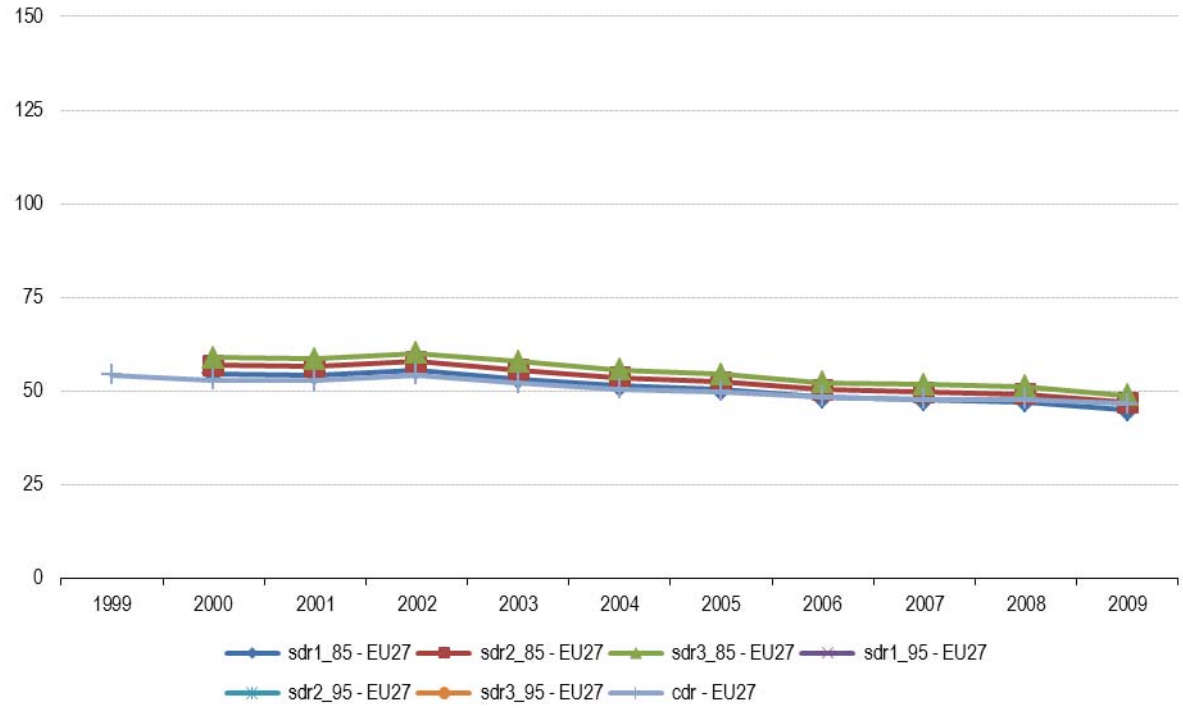
Diseases of the respiratory system – Croatia



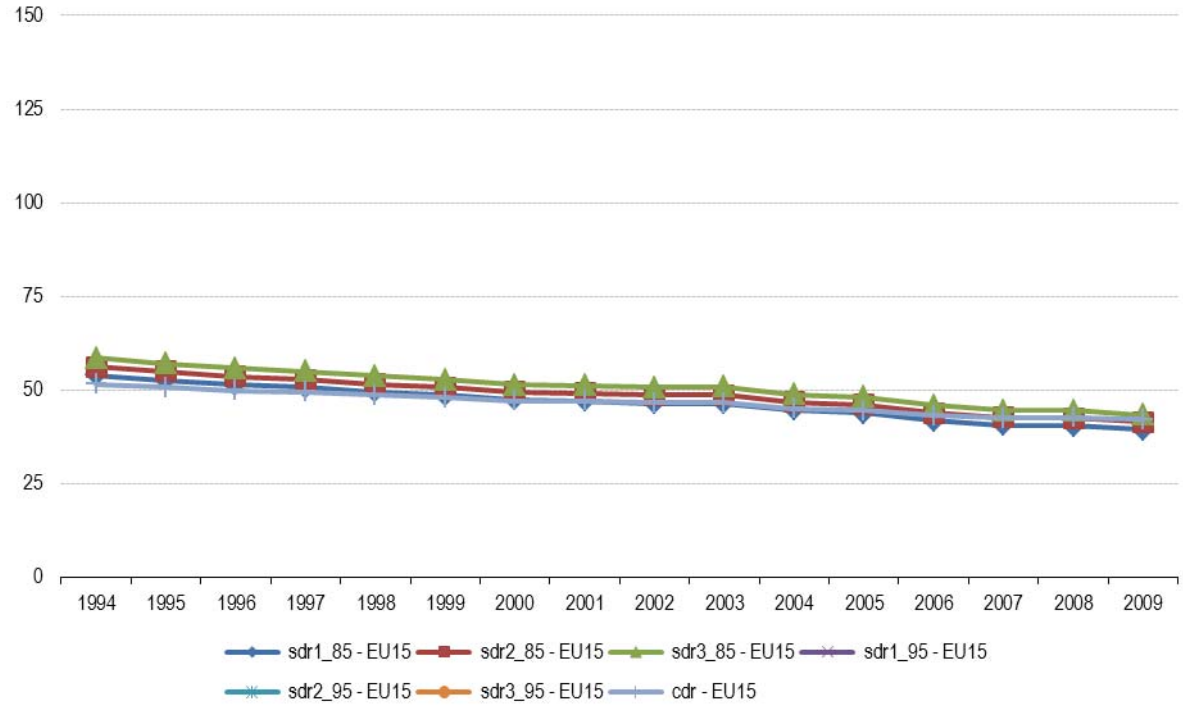
Diseases of the respiratory system – former Yugoslav Republic of Macedonia



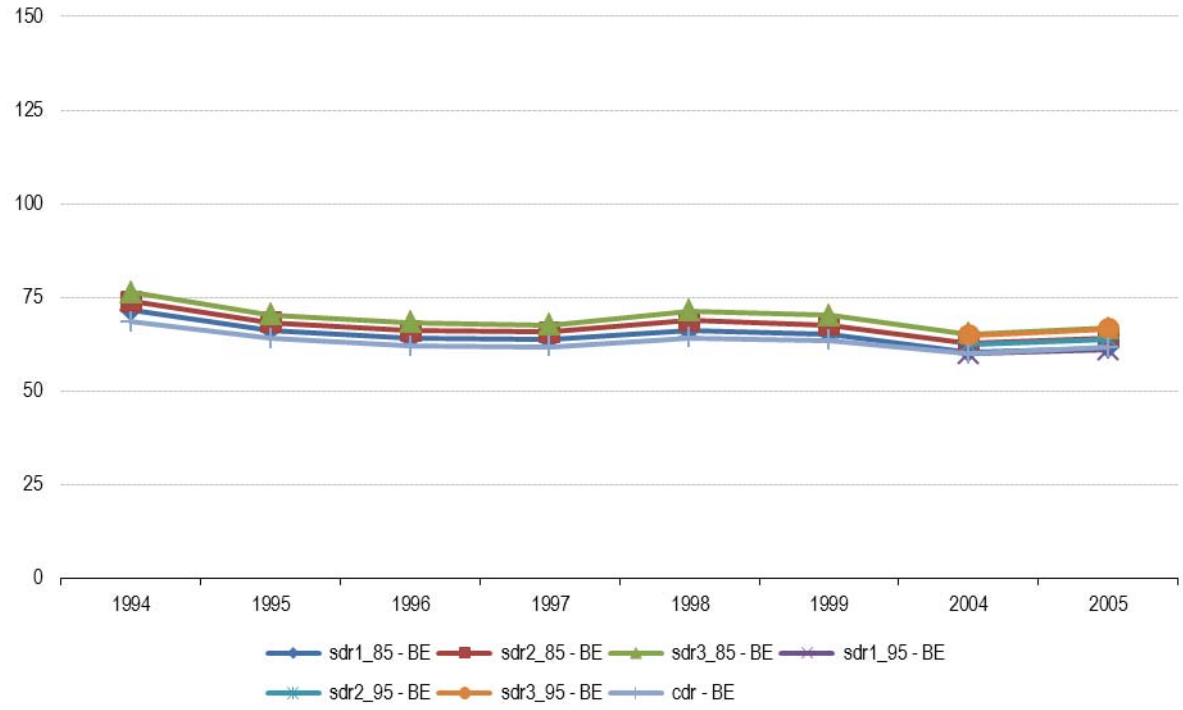
External causes of injury and poisoning – European Union 27 countries



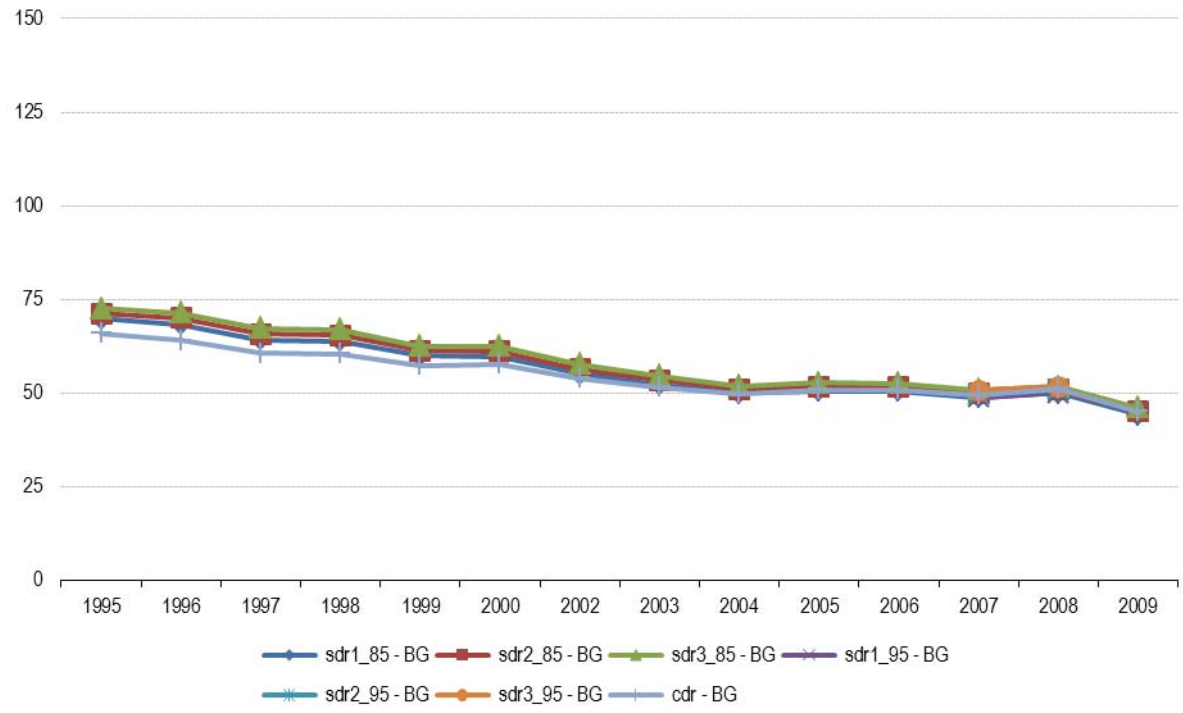
External causes of injury and poisoning – European Union 15 countries



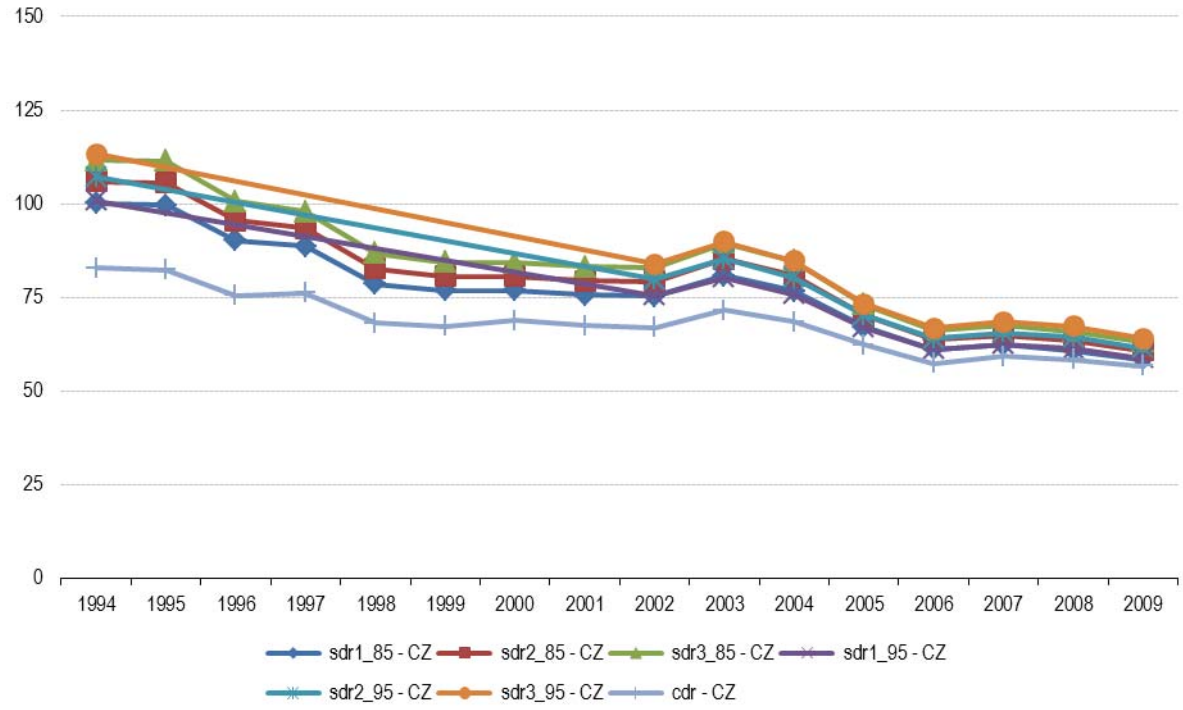
External causes of injury and poisoning – Belgium



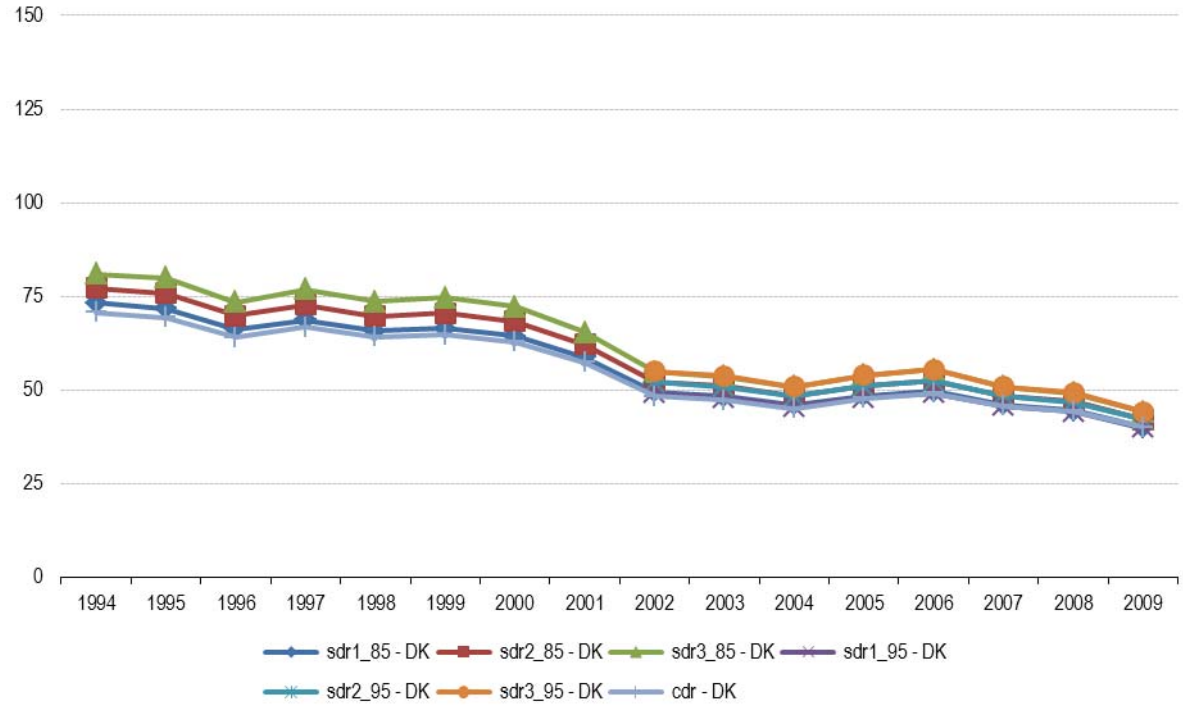
External causes of injury and poisoning – Bulgaria



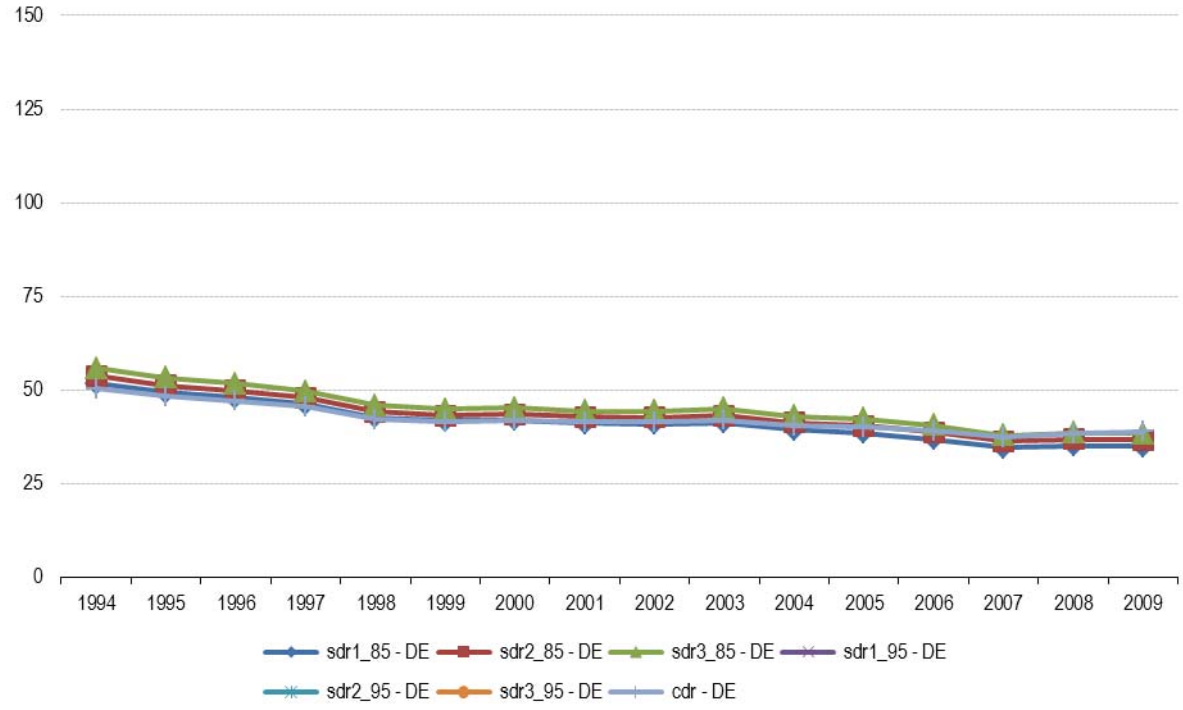
External causes of injury and poisoning – Czech Republic



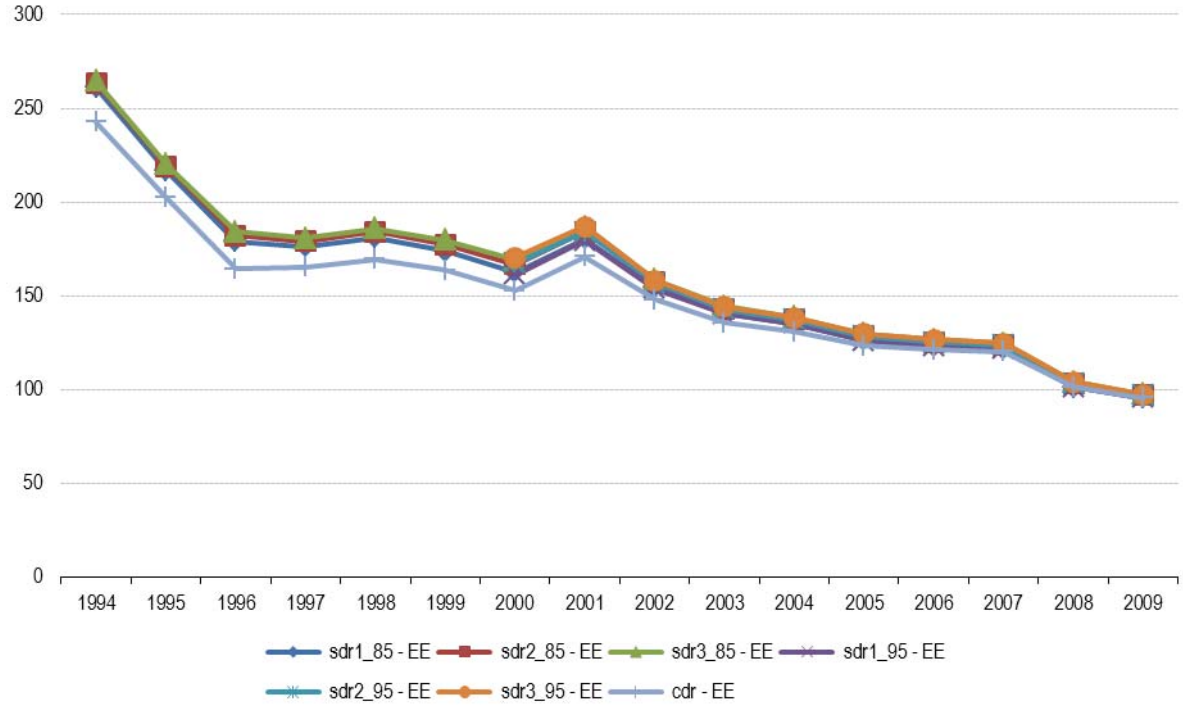
External causes of injury and poisoning – Denmark



External causes of injury and poisoning – Germany

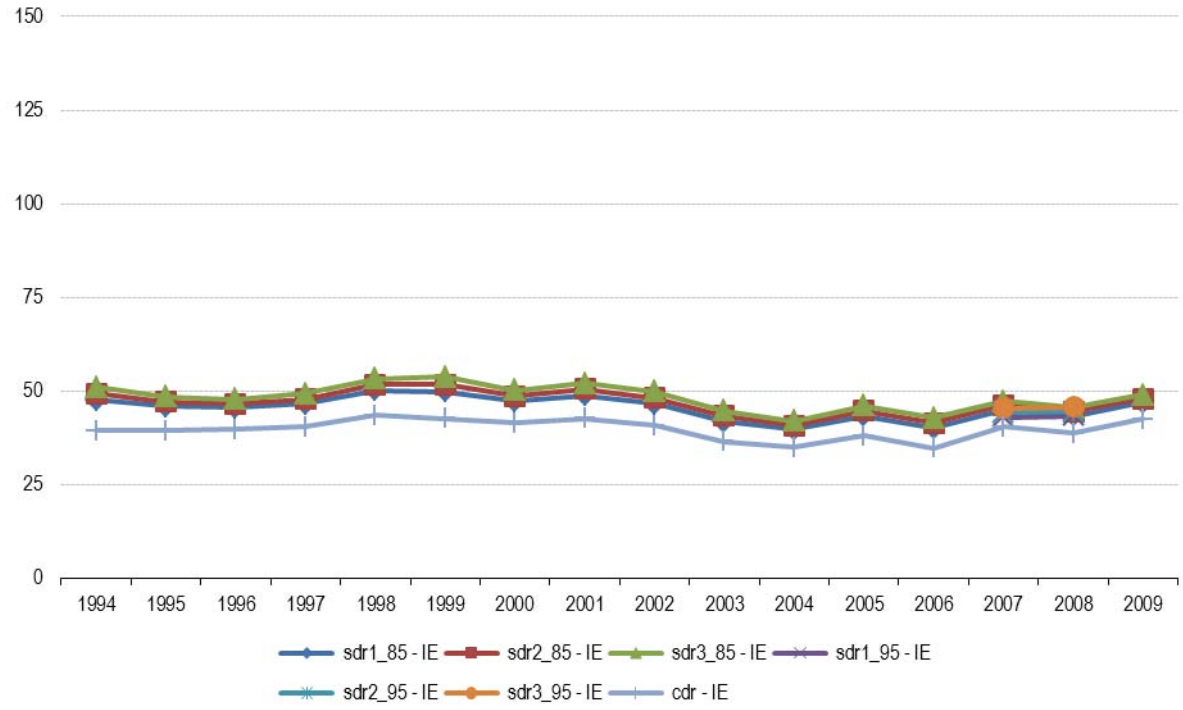


External causes of injury and poisoning – Estonia

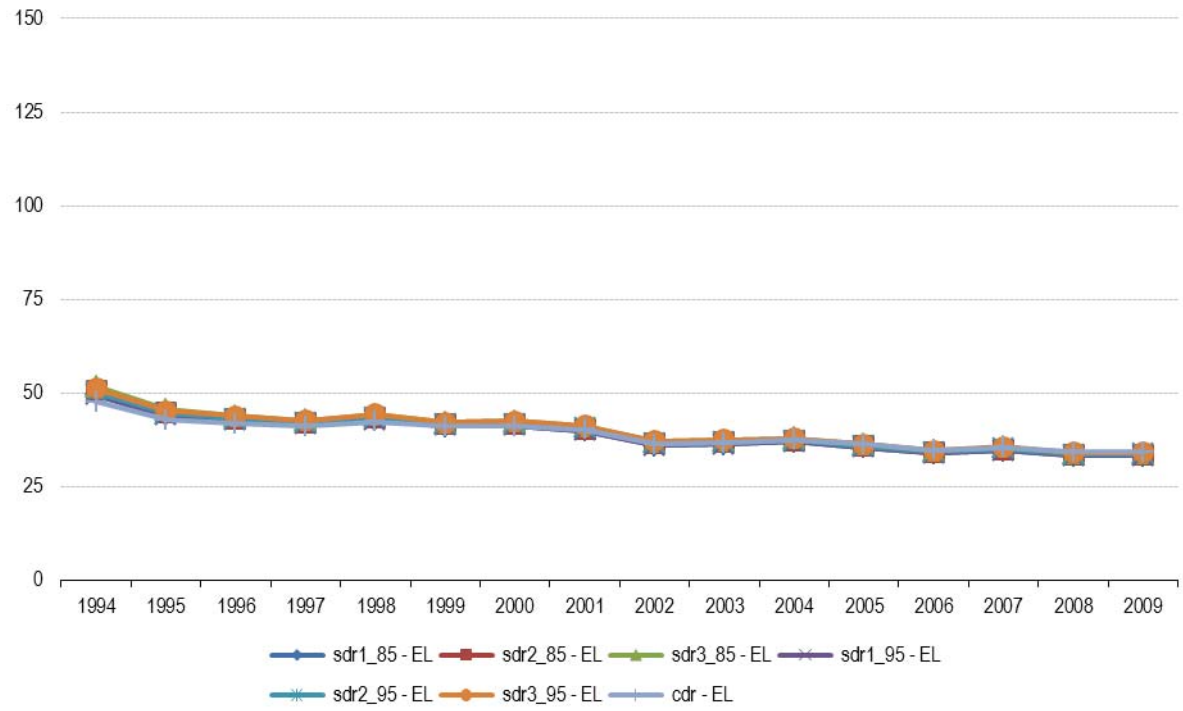


Note: For EE, LT and LV the maximum value of the (Y) axis scale is 300. All the other similar graphs have 150 as maximum value.

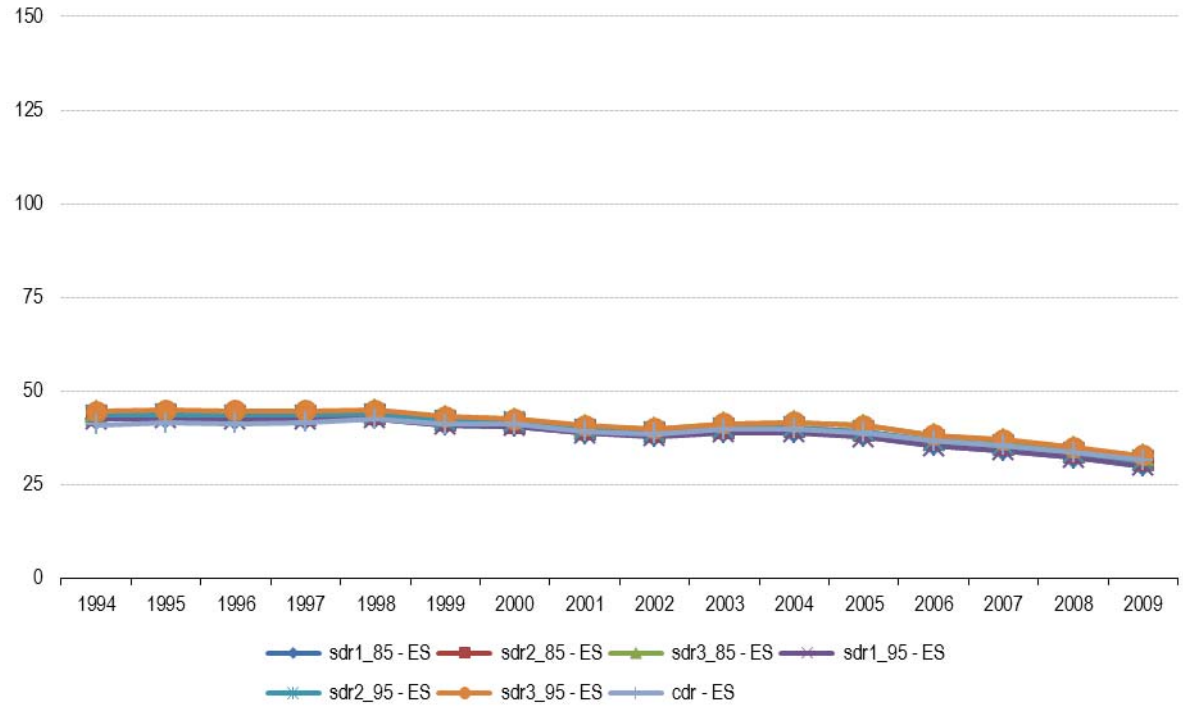
External causes of injury and poisoning – Ireland



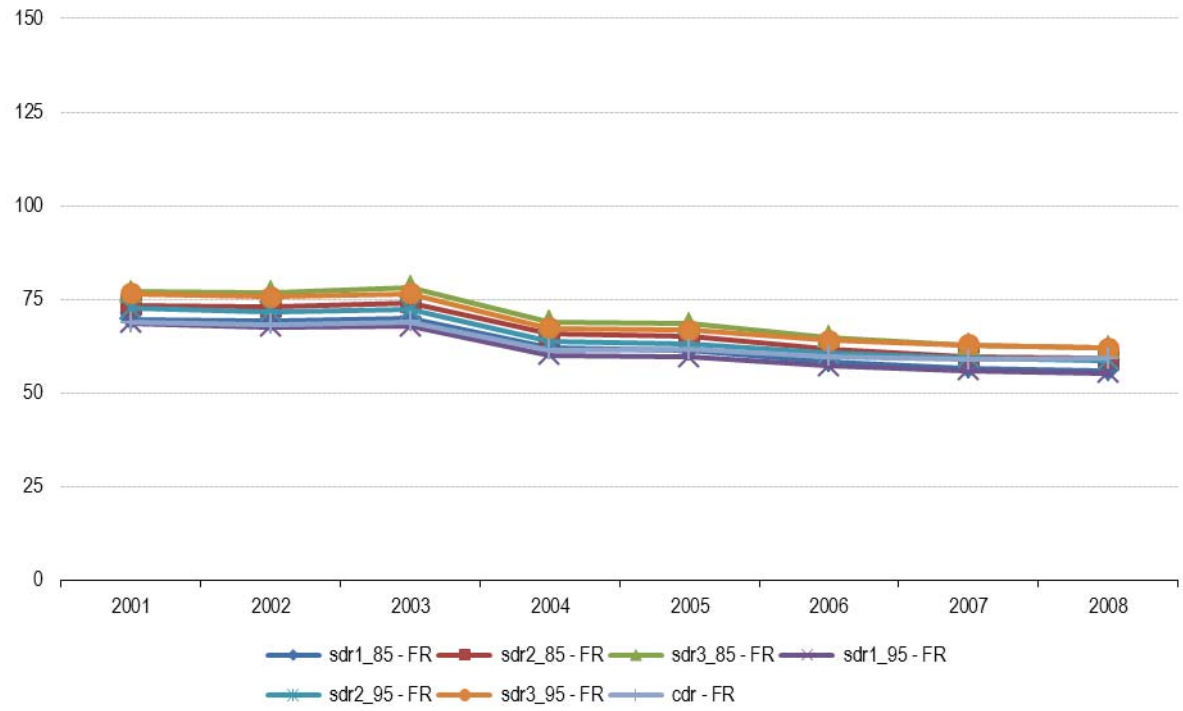
External causes of injury and poisoning – Greece



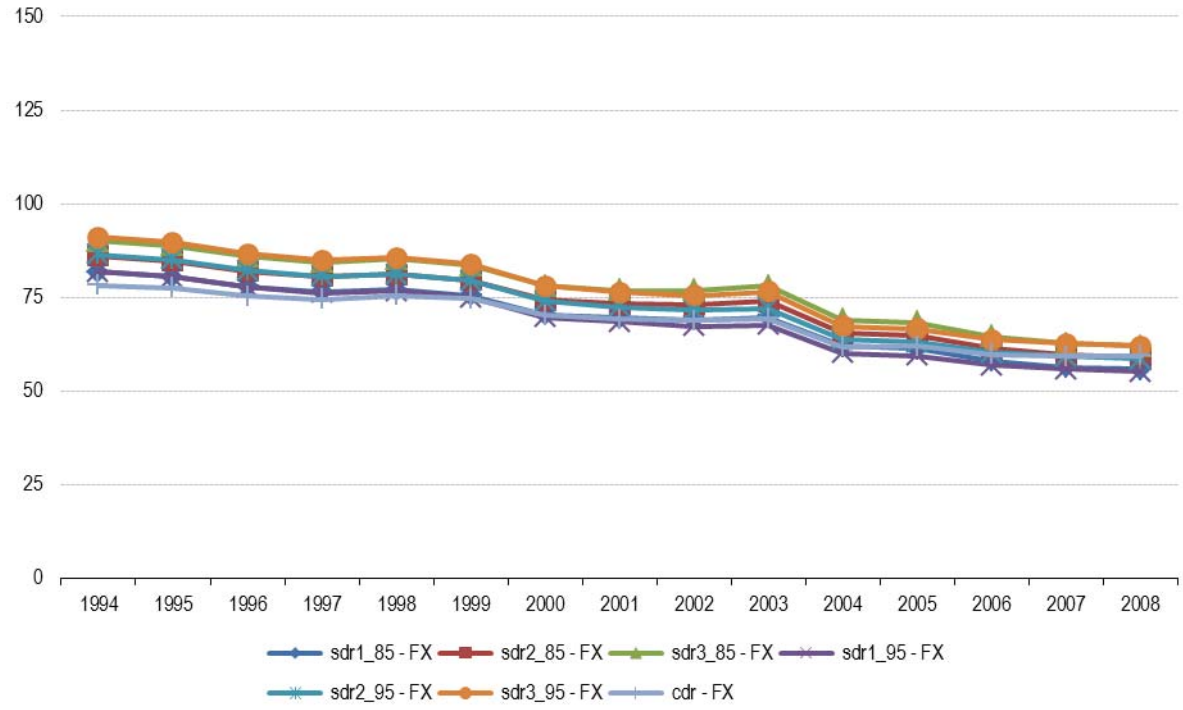
External causes of injury and poisoning – Spain



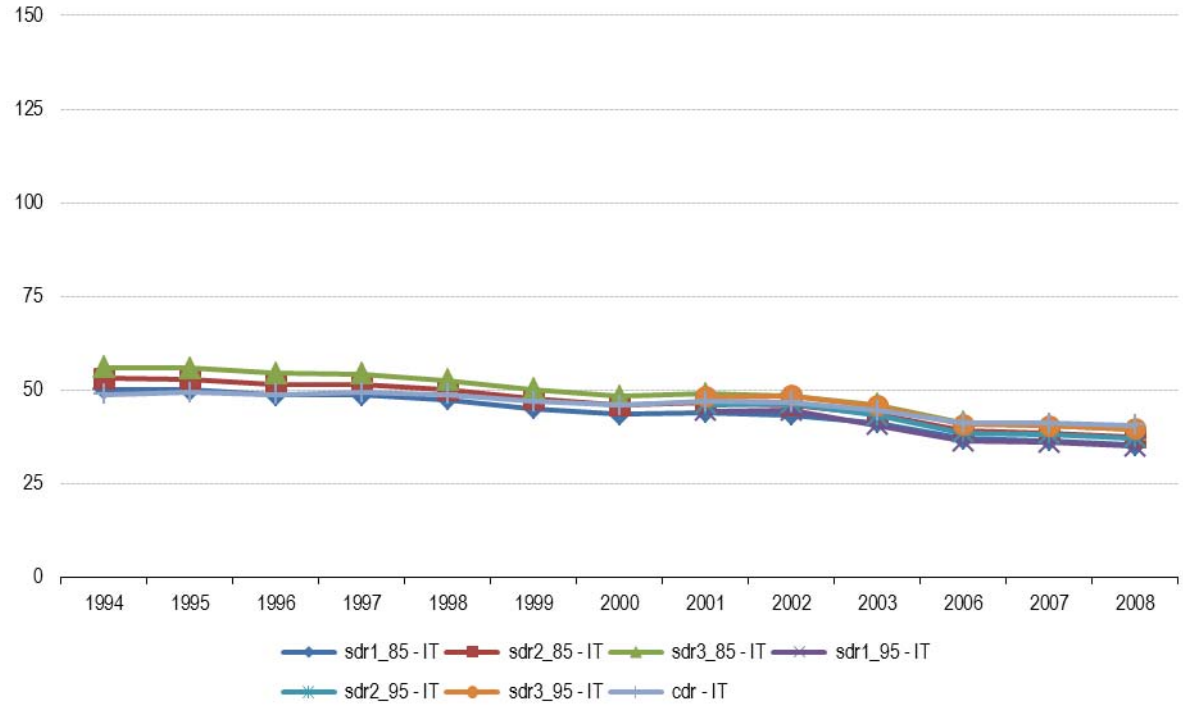
External causes of injury and poisoning – France



External causes of injury and poisoning – France (metropolitan)

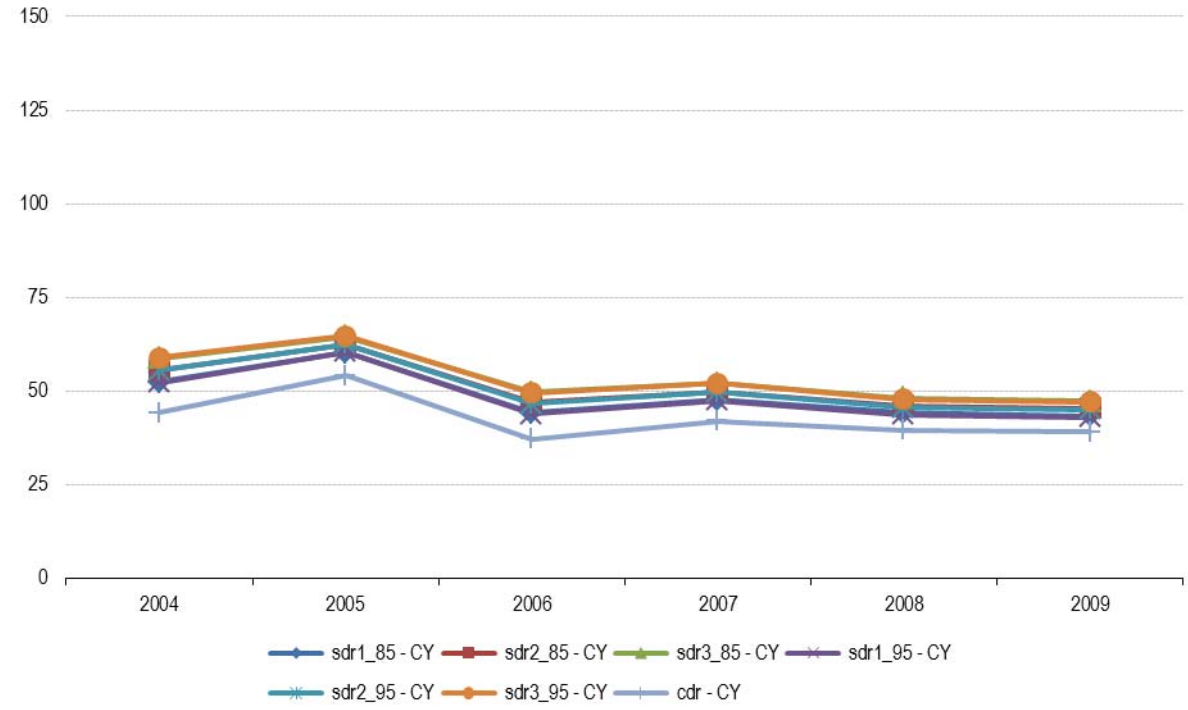


External causes of injury and poisoning – Italy

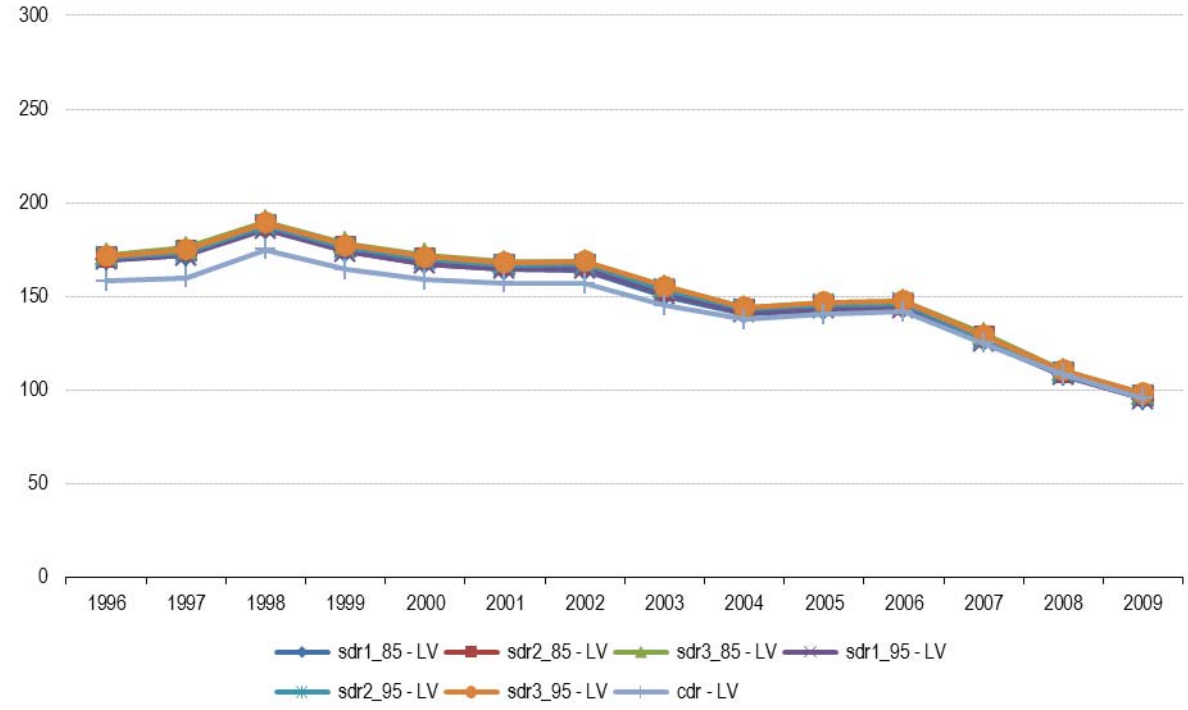


Note: cause-specific mortality data for Italy in the years 2004 and 2005 are not available

External causes of injury and poisoning – Cyprus

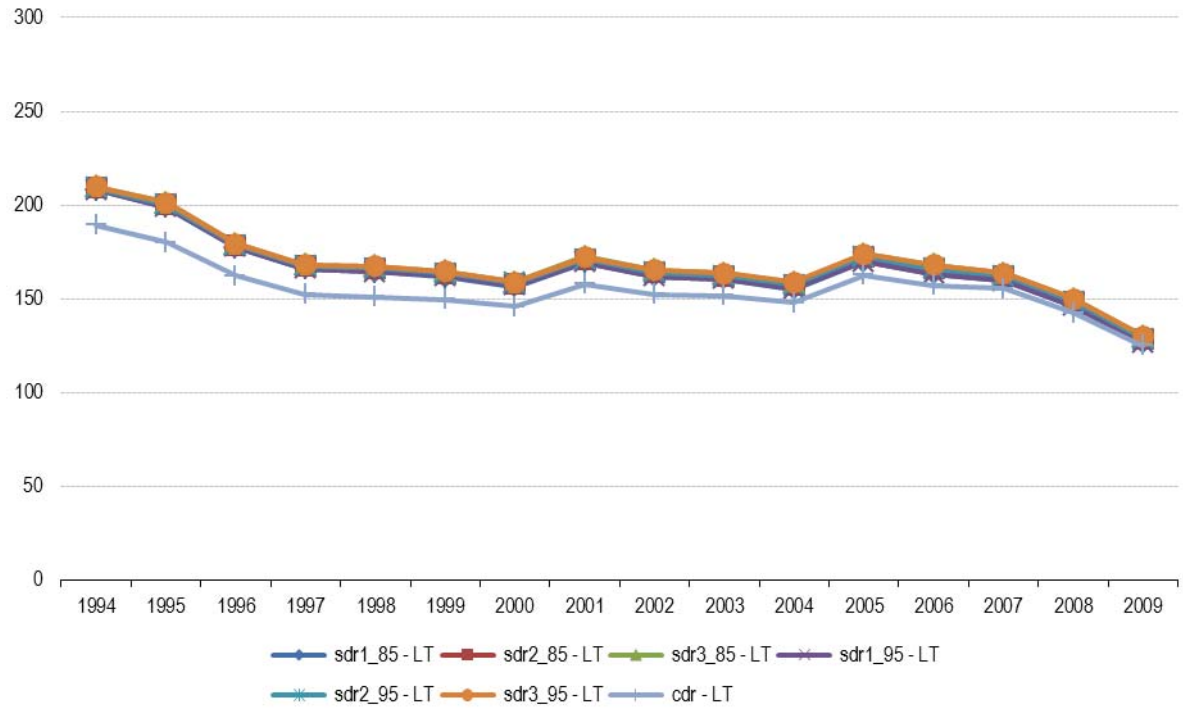


External causes of injury and poisoning – Latvia



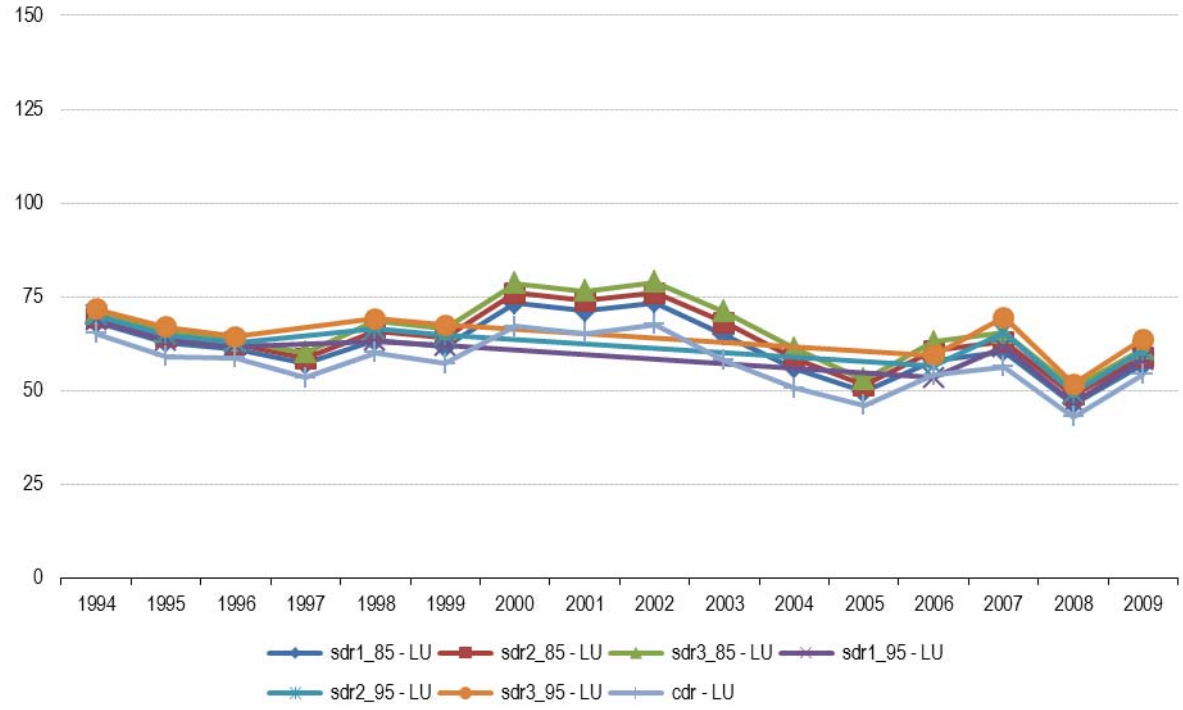
Note: For EE, LT and LV the maximum value of the (Y) axis scale is 300. All the other similar graphs have 150 as maximum value.

External causes of injury and poisoning – Lithuania

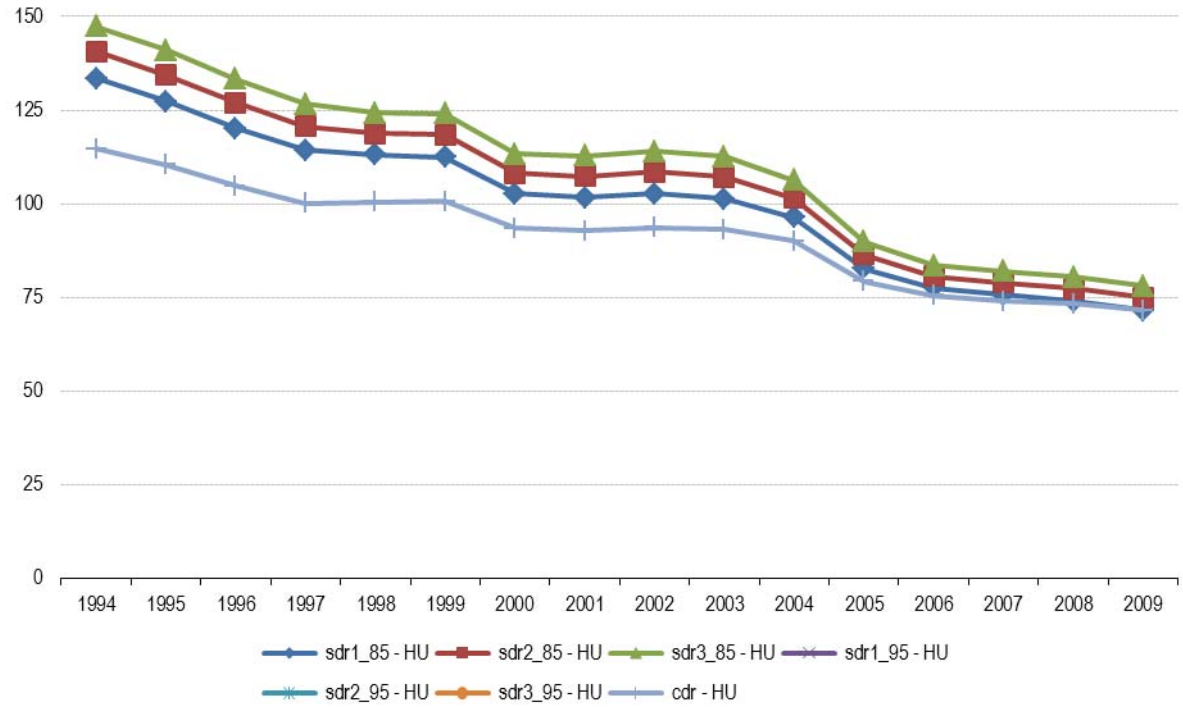


Note: For EE, LT and LV the maximum value of the (Y) axis scale is 300. All the other similar graphs have 150 as maximum value.

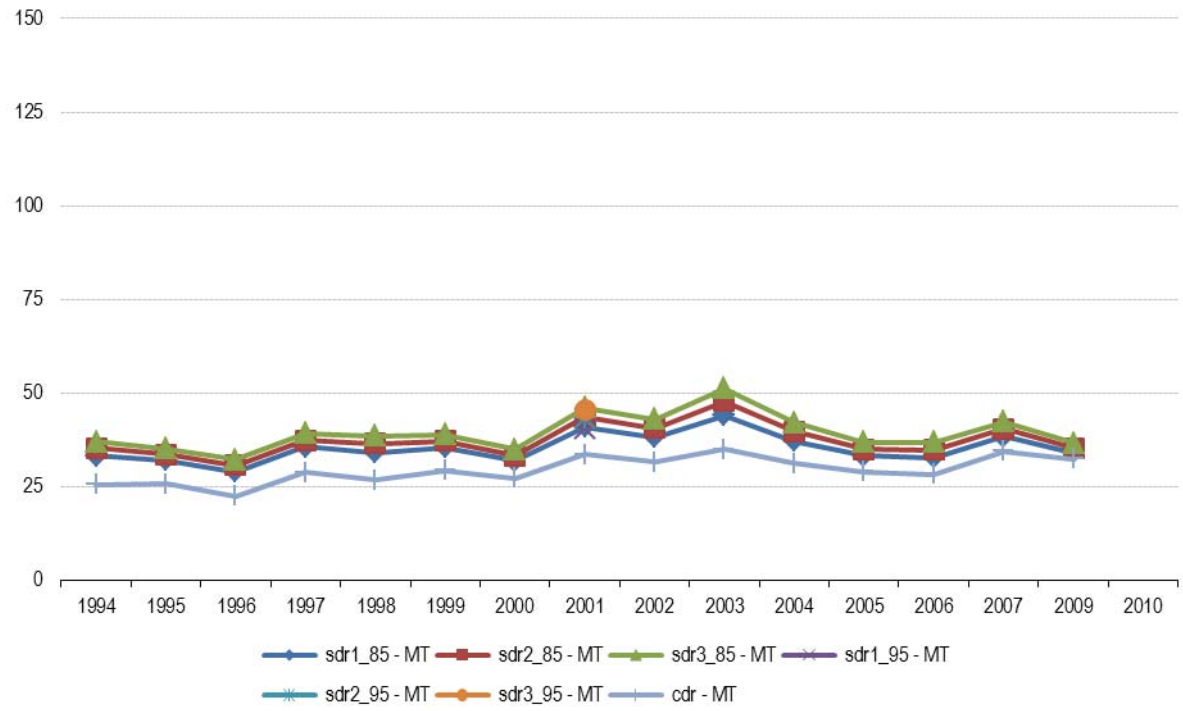
External causes of injury and poisoning – Luxembourg



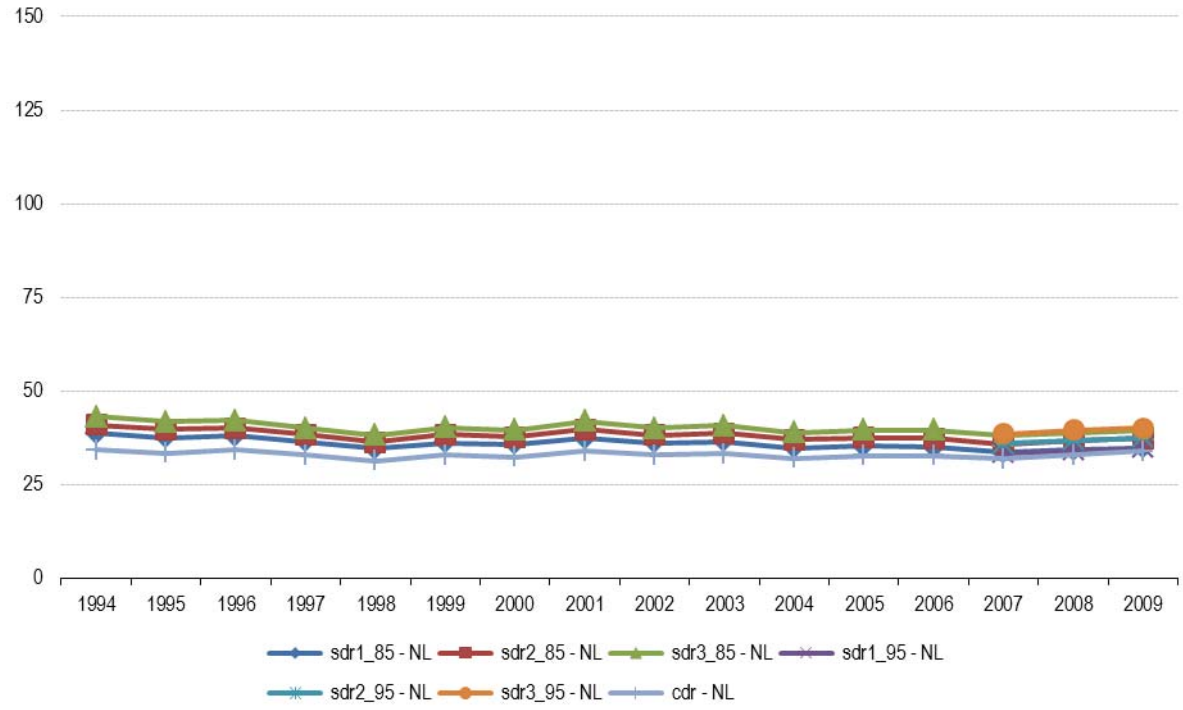
External causes of injury and poisoning – Hungary



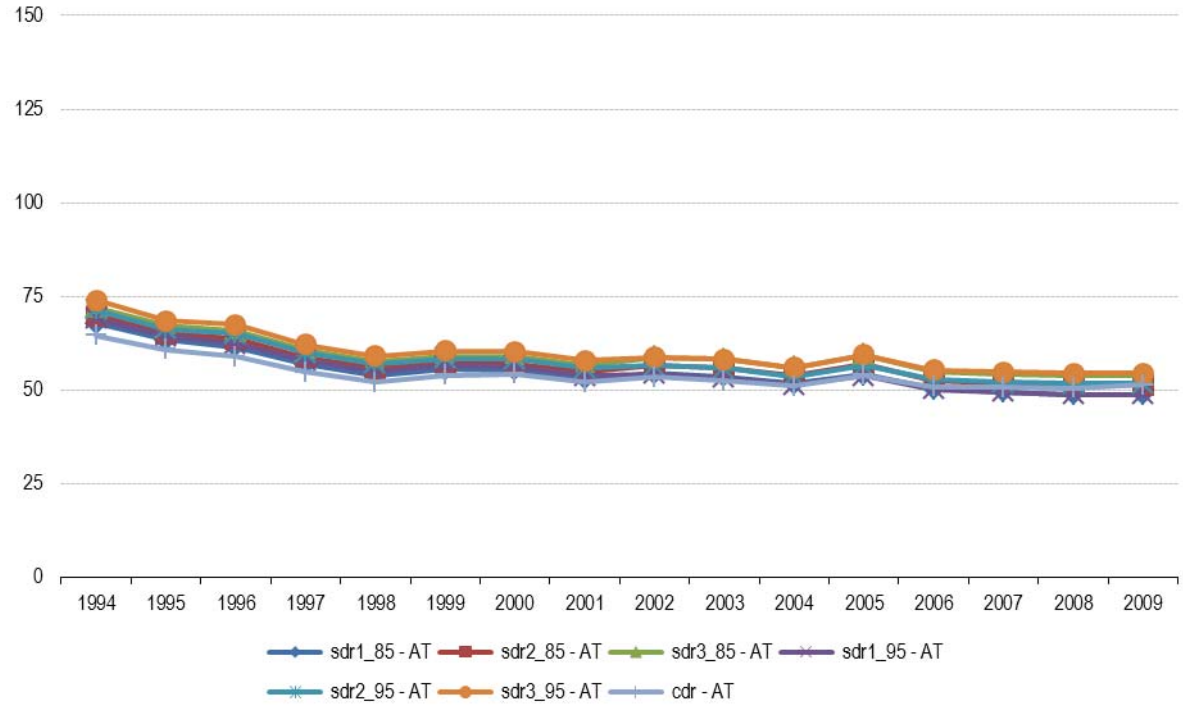
External causes of injury and poisoning – Malta



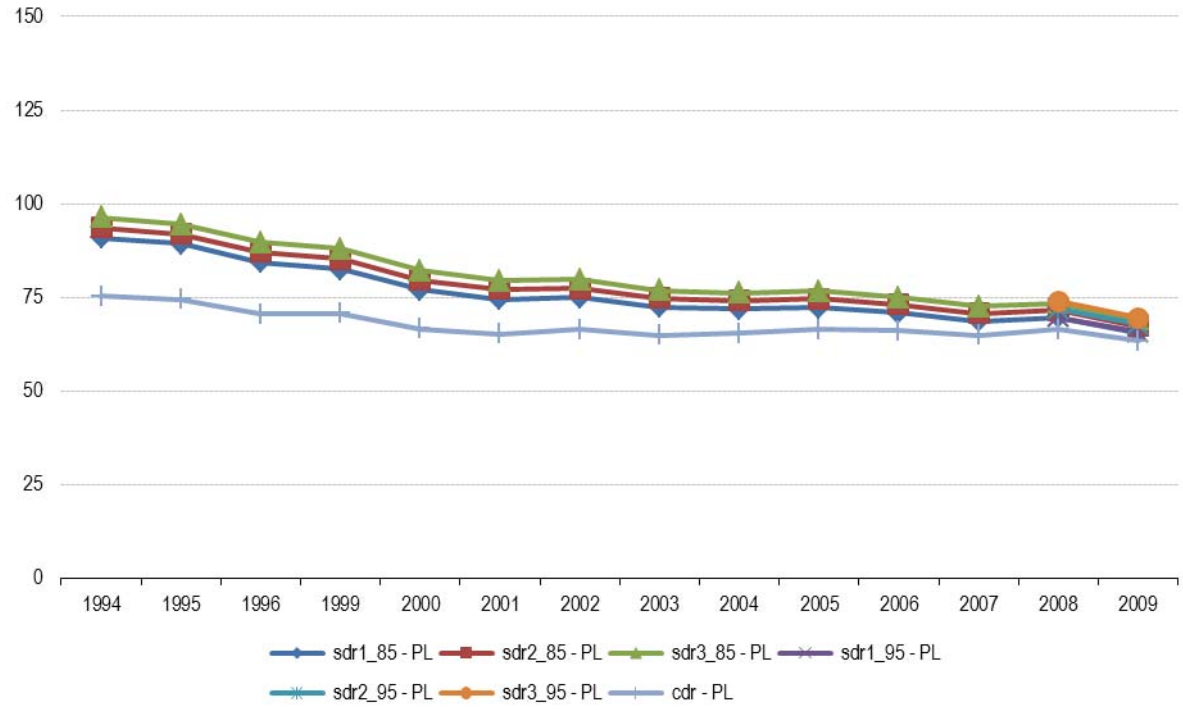
External causes of injury and poisoning – Netherlands



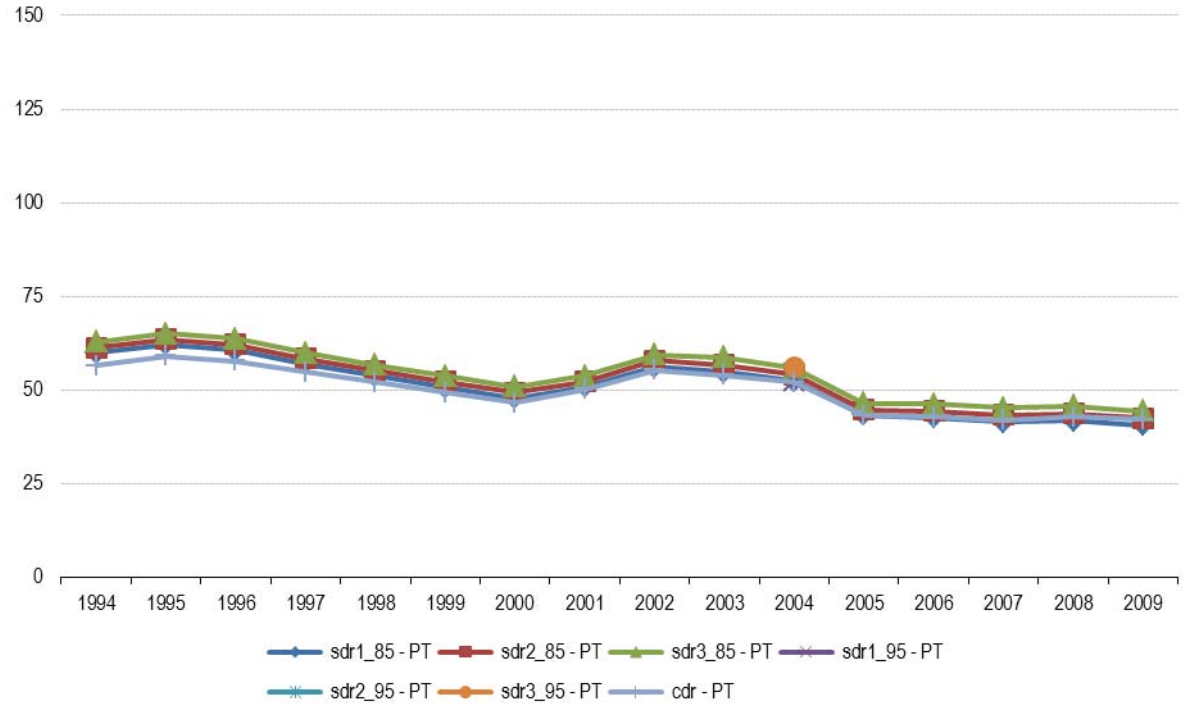
External causes of injury and poisoning – Austria



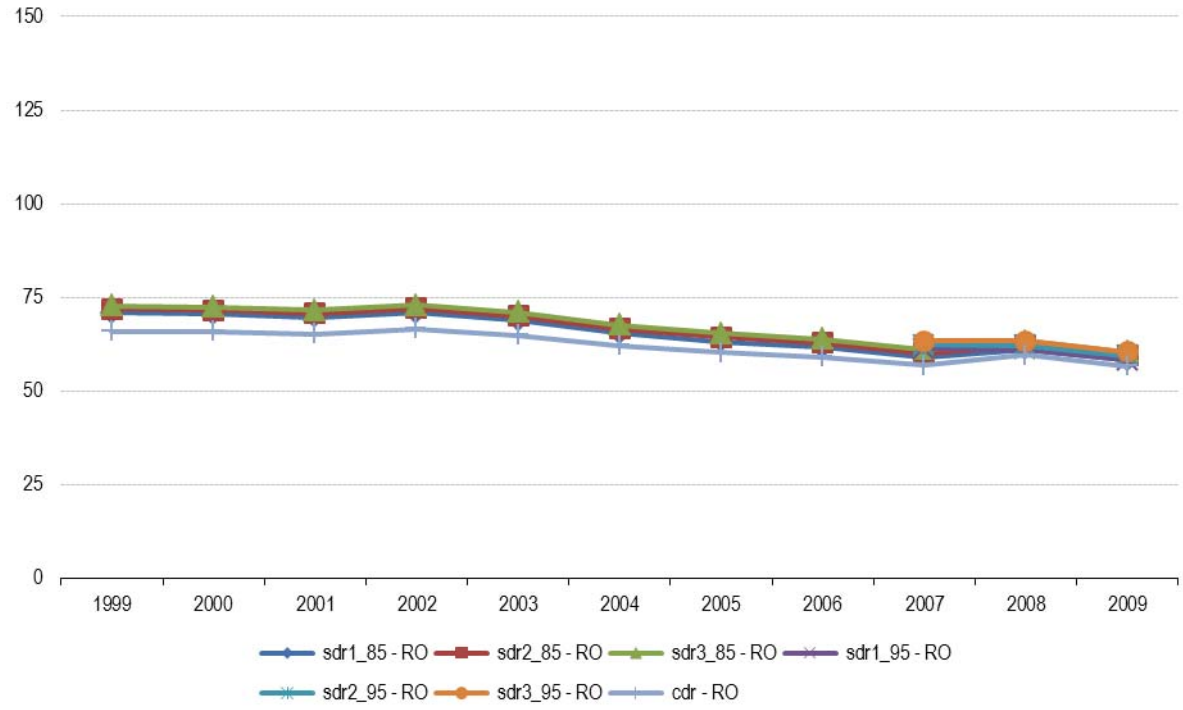
External causes of injury and poisoning – Poland



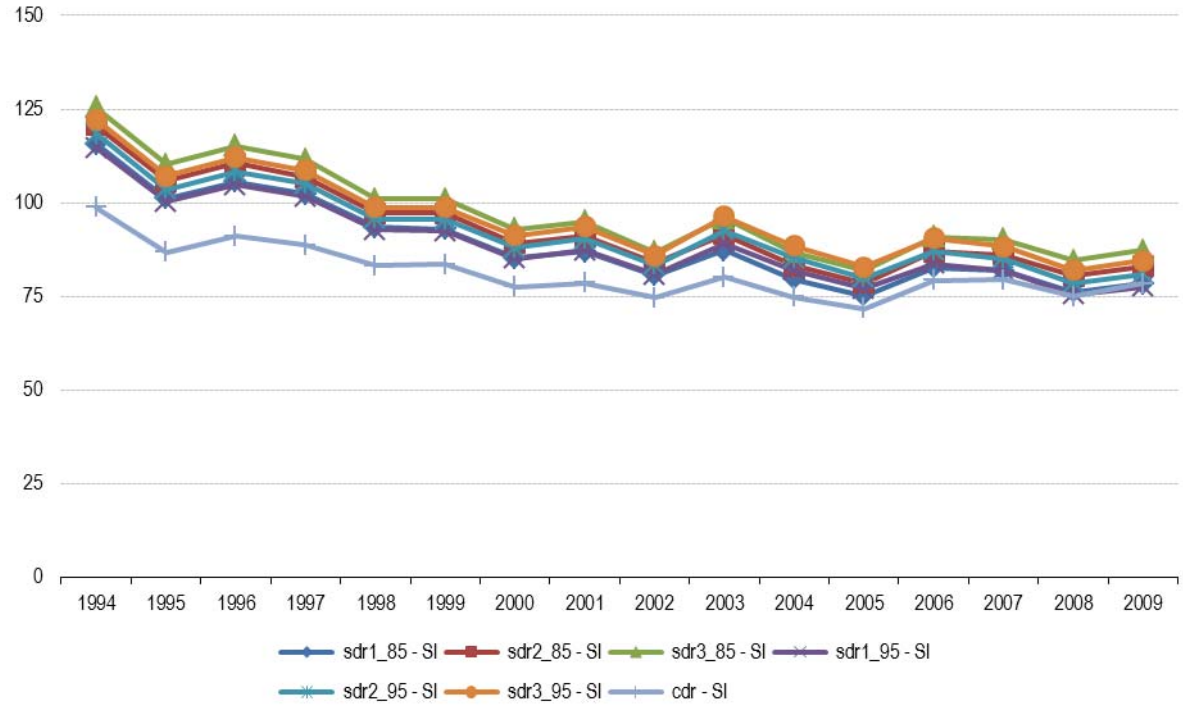
External causes of injury and poisoning – Portugal



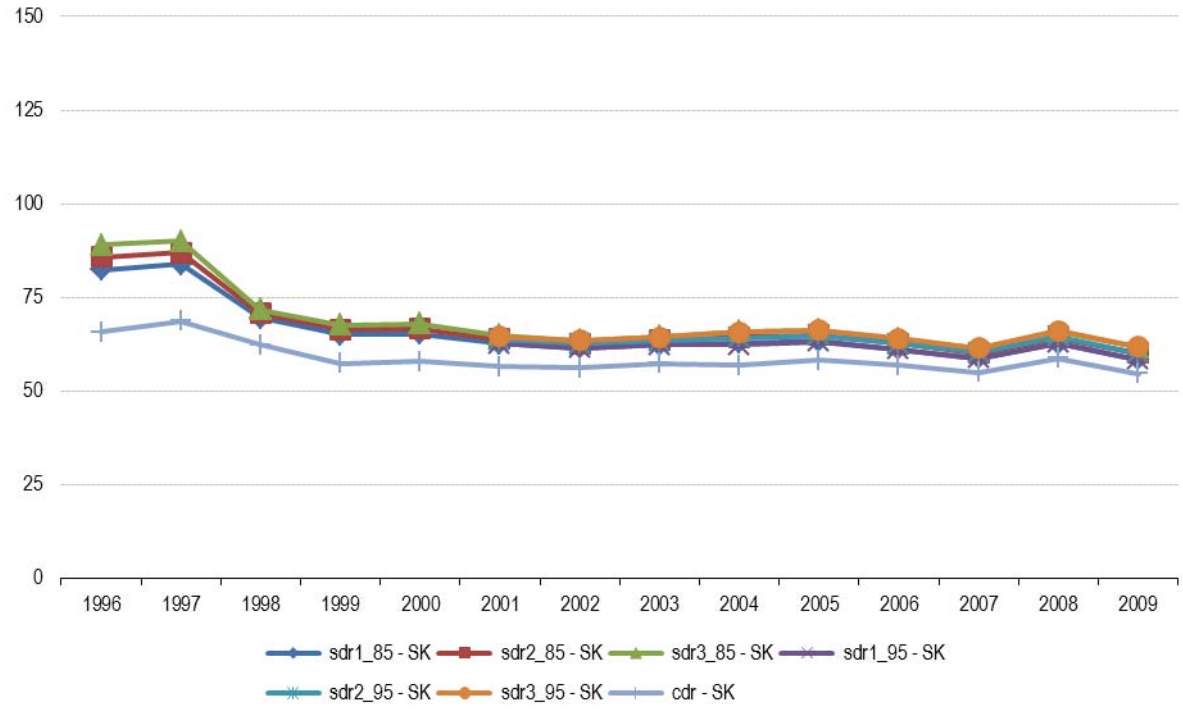
External causes of injury and poisoning – Romania



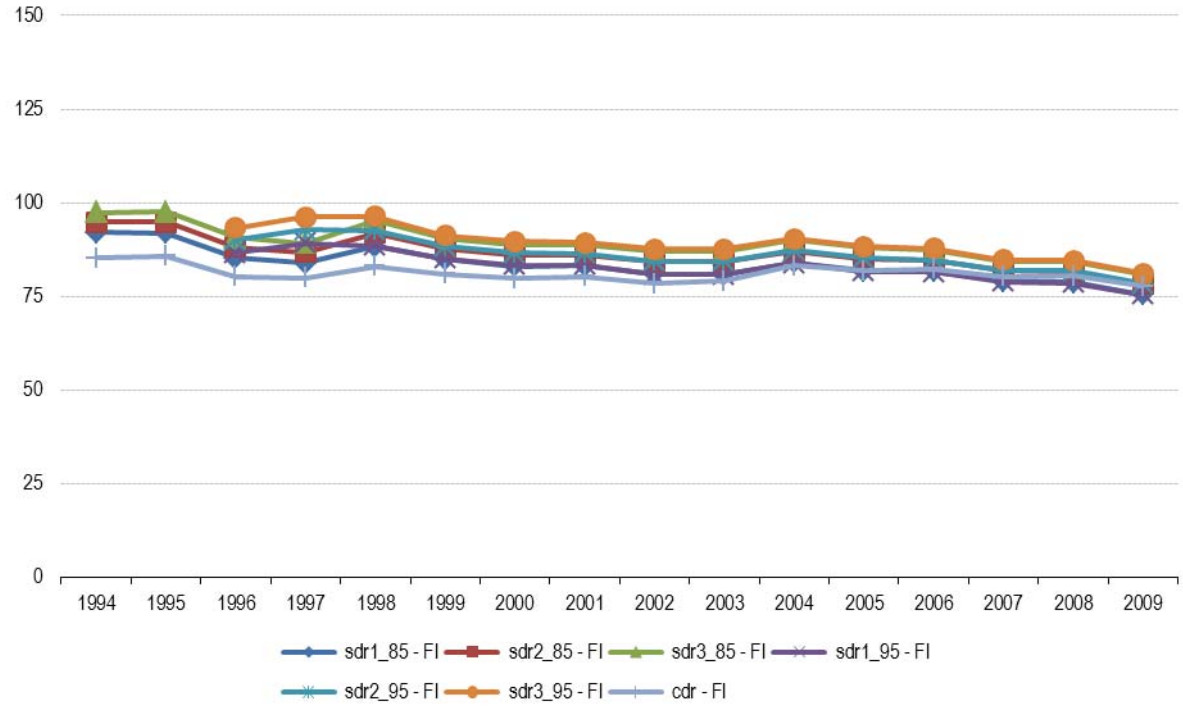
External causes of injury and poisoning – Slovenia



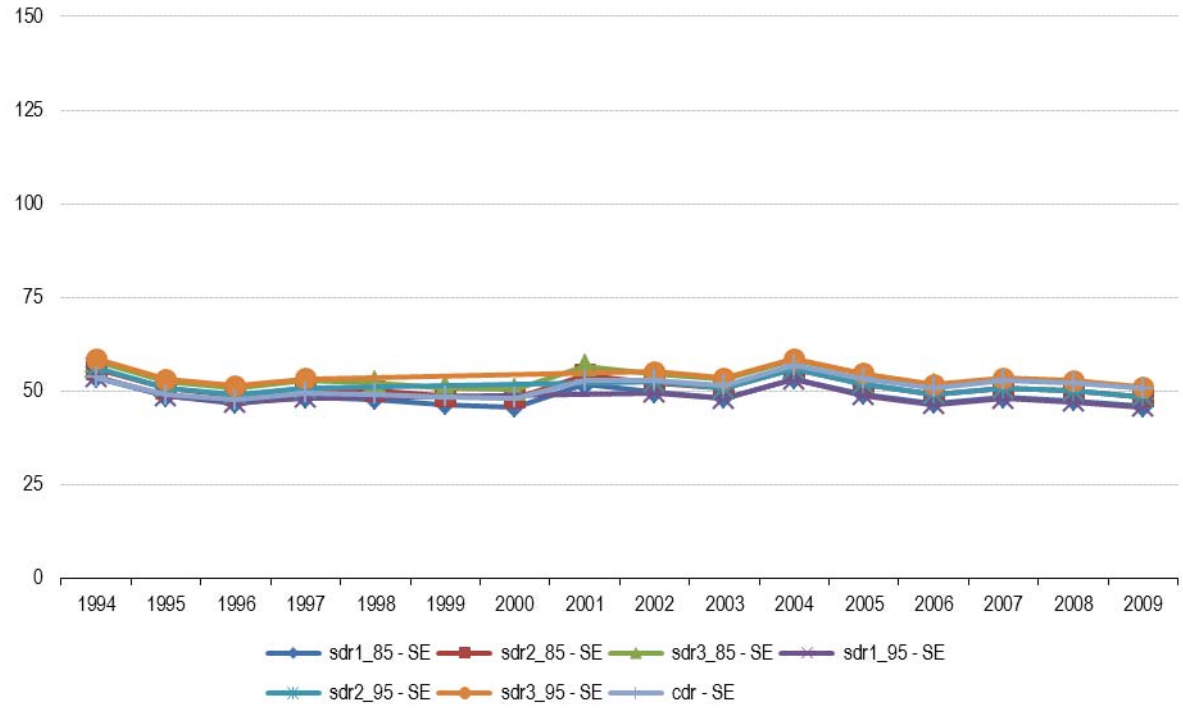
External causes of injury and poisoning – Slovakia



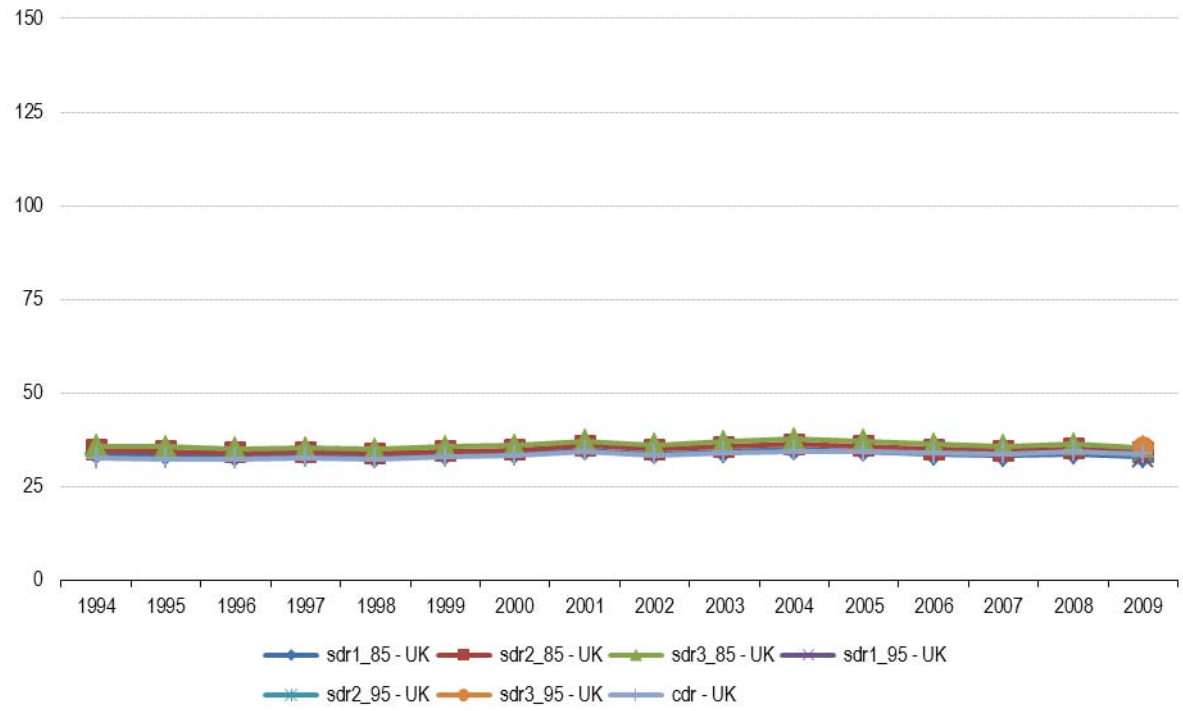
External causes of injury and poisoning – Finland



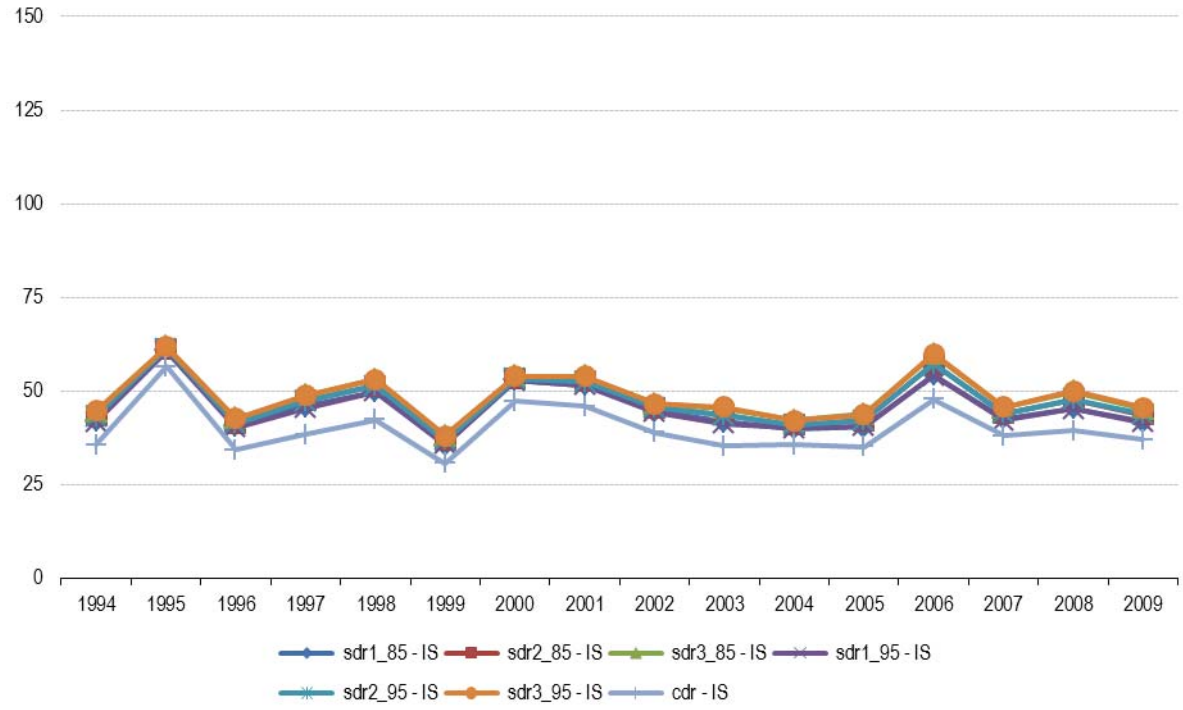
External causes of injury and poisoning – Sweden



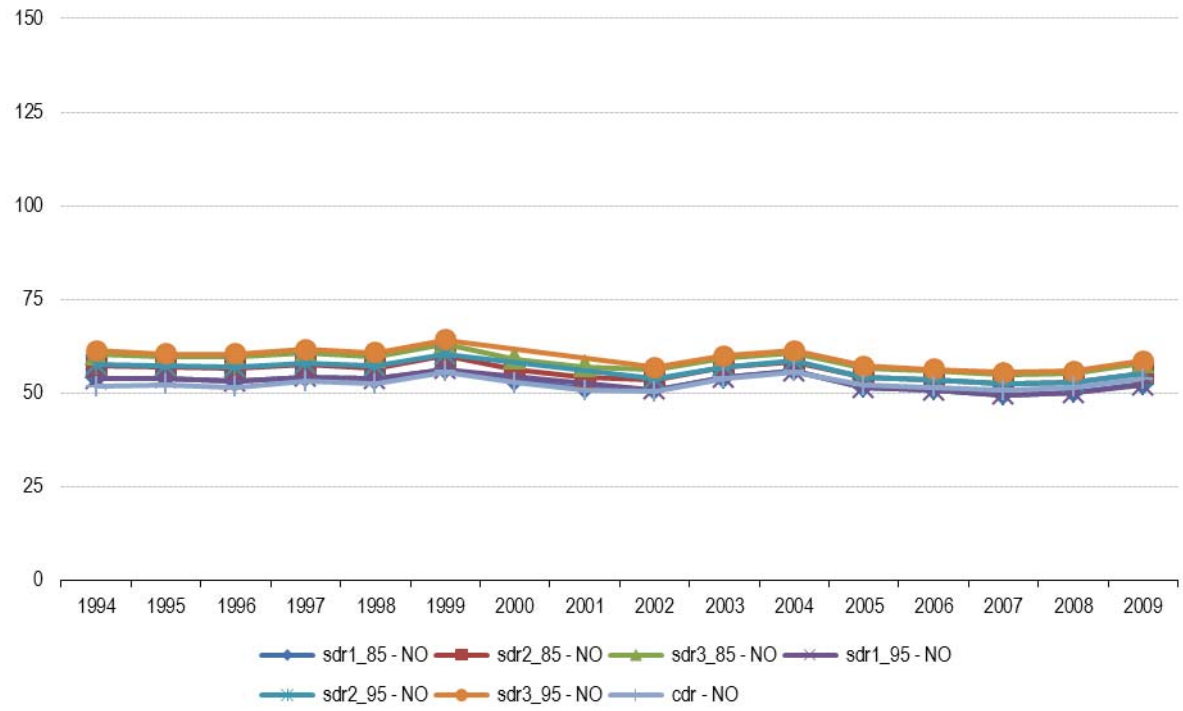
External causes of injury and poisoning – United Kingdom



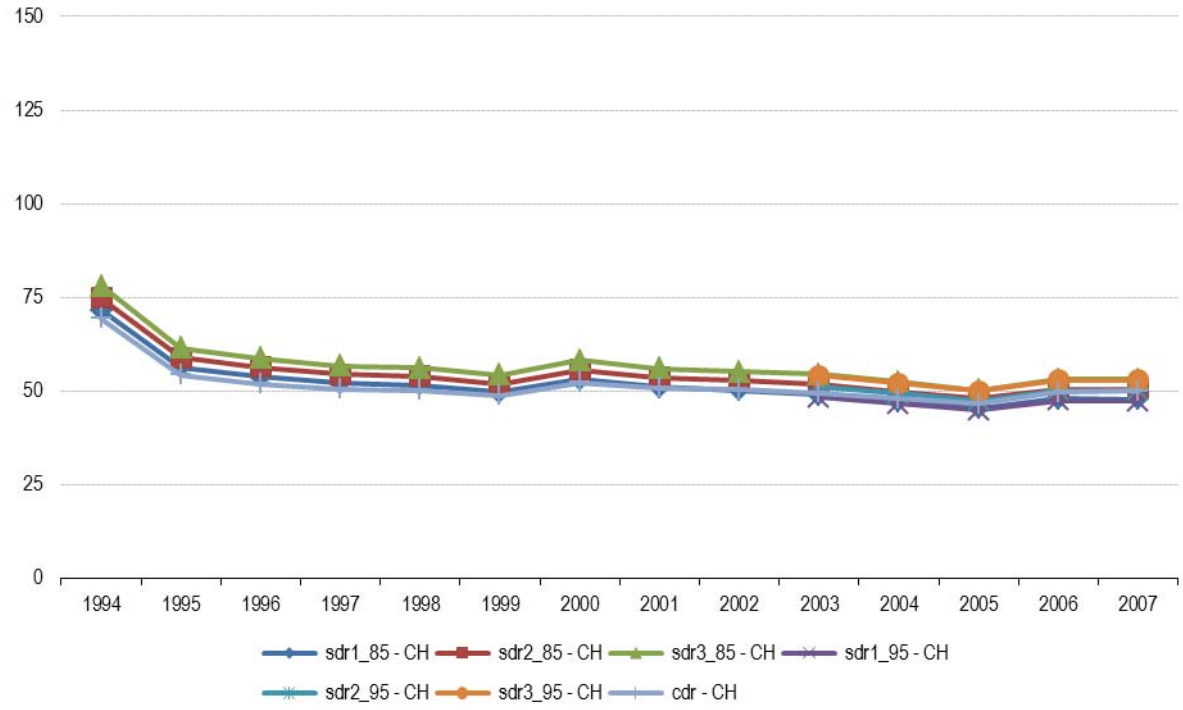
External causes of injury and poisoning – Iceland



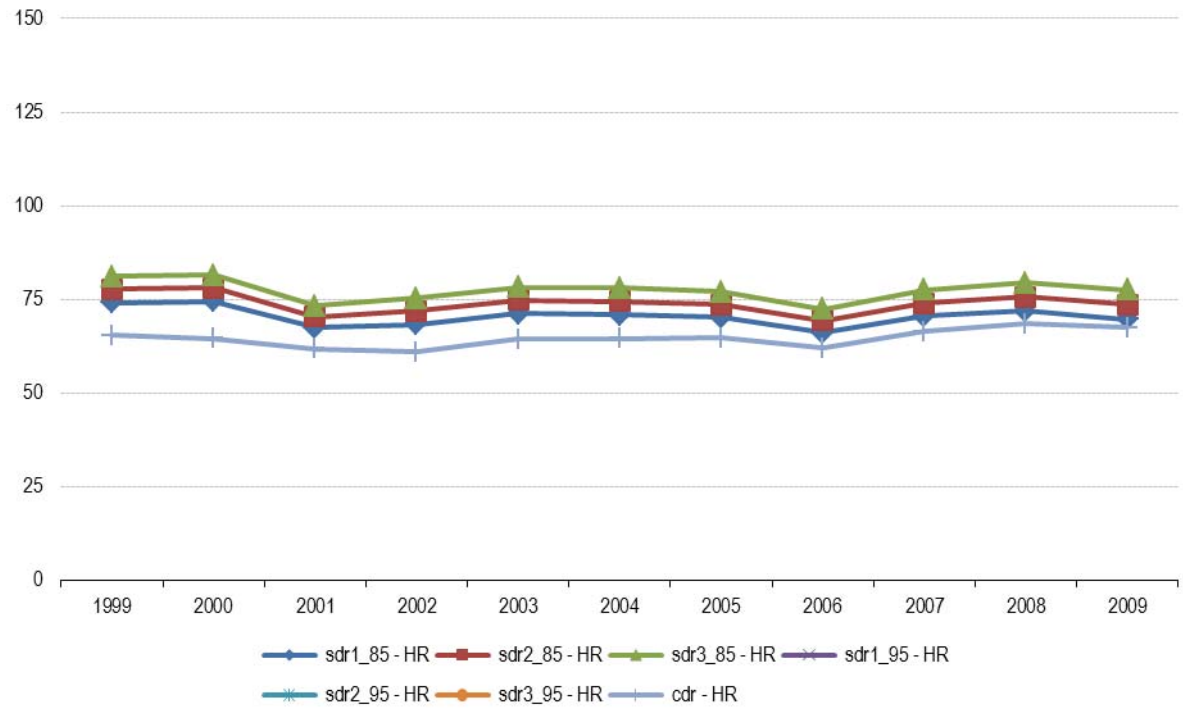
External causes of injury and poisoning – Norway



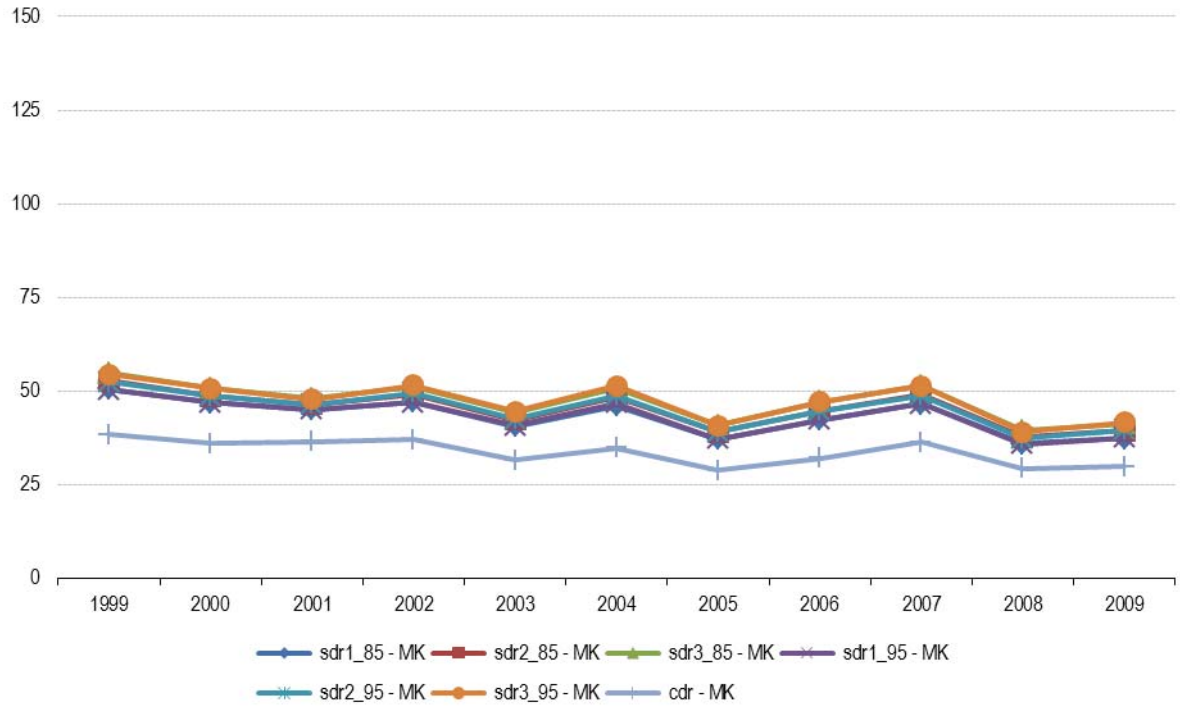
External causes of injury and poisoning – Switzerland



External causes of injury and poisoning – Croatia



External causes of injury and poisoning – former Yugoslav Republic of Macedonia



Annex F

Proposed EU-27 + EFTA standard population

Age Group (years)	Standard Population
0,0	1 000
1-4	4 000
5-9	5 500
10-14	5 500
15-19	5 500
20-24	6 000
25-29	6 000
30-34	6 500
35-39	7 000
40-44	7 000
45-49	7 000
50-54	7 000
55-59	6 500
60-64	6 000
65-69	5 500
70-74	5 000
75-79	4 000
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