

Age-Standardized Death Rates

To facilitate a level comparison between populations with distinct age structures we compute age-standardized death rate (SDR). As the standard population basis for our computation, we adopt two synthetic population variants, the 1976 and 2013 Revisions of the European Standard Population (ESP)¹, by 5-year age groups. Because the age structure of the two ESP variants ends with an open age interval, ending in 85+ years of age in the 1976 EPS Revision, and in 95+ years of age in the 2013 EPS Revision, this requires step-wise aggregation or extension to accommodate the age structure ending at 110+ years in HMD.

We use an ordinary Gompertz estimation of period mortality rates to extrapolate the standard population counts in the open age group by 5-year intervals, up to 110+, using 40 as the starting age for fitting of the hazard function (Riffe et al. 2019). The modelled age-specific rates are then converted to standardized life table survivorship values (see Eqs. 71-75) for 5-year age groups up to 110+ years representing the new extended European Standard Population. Conversely, for rate structures ending with earlier open age interval (as is often the case in HCD@HMD), stepwise back-aggregation is used. The resulting counts are rounded to the nearest 5 (except in the 100-104, 105-109, and 110+ age groups) for ease of presentation. The respective output of this exercise for both ESP revisions is shown in Tables 1 and 2.

Age-specific mortality rates have been multiplied by the hypothetical weights of the corresponding age groups of the standard population structure to derive the expected standard death counts. Dividing the sum of expected death counts across all ages by the total standard population (100,000) produced the age-standardized death rate. This procedure is carried out for all countries, years, and sexes. The SDR indicator is only produced on the basis of the abridged period life table mortality rates.

References

Riffe, T., Aburto, J. M., Alexander, M, Fennell, S., Kashnitsky, I., Pascariu, M., and Gerland P. *DemoTools: An R package of tools for aggregate demographic analysis*, 2019. URL <https://github.com/timriffe/DemoTools/>.

¹ <https://ec.europa.eu/eurostat/documents/3859598/5926869/KS-RA-13-028-EN.PDF.pdf/e713fa79-1add-44e8-b23d-5e8fa09b3f8f?t=1414782757000>

Table 1. European Standard Population 1976 and its adaptations to HCD@HMD

Age group	ESP 1976 (HCD AGF 1)	Extension to HCD AGF 2	Extension to HCD AGF 3	Extension to HCD AGF 4
0	1600	1600	1600	1600
1-4	6400	6400	6400	6400
5-9	7000	7000	7000	7000
10-14	7000	7000	7000	7000
15-19	7000	7000	7000	7000
20-24	7000	7000	7000	7000
25-29	7000	7000	7000	7000
30-34	7000	7000	7000	7000
35-39	7000	7000	7000	7000
40-44	7000	7000	7000	7000
45-49	7000	7000	7000	7000
50-54	7000	7000	7000	7000
55-59	6000	6000	6000	6000
60-64	5000	5000	5000	5000
65-69	4000	4000	4000	4000
70-74	3000	3000	3000	3000
75-79	2000	2000	2000	2000
80-84	1000	1000	1000	1000
85+/85-89	1000	600	600	600
90+/90-94		400	270	270
95+/95-99			130	95
100+				35

Table 2. European Standard Population 2013 and its adaptations to HCD@HMD

Age group	Aggregation to HCD AGF 1	Aggregation to HCD AGF 2	ESP 2013 (HCD AGF 3)	Extension to HCD AGF 4
0	1000	1000	1000	1000
1-4	4000	4000	4000	4000
5-9	5500	5500	5500	5500
10-14	5500	5500	5500	5500
15-19	5500	5500	5500	5500
20-24	6000	6000	6000	6000
25-29	6000	6000	6000	6000
30-34	6500	6500	6500	6500
35-39	7000	7000	7000	7000
40-44	7000	7000	7000	7000
45-49	7000	7000	7000	7000
50-54	7000	7000	7000	7000
55-59	6500	6500	6500	6500
60-64	6000	6000	6000	6000
65-69	5500	5500	5500	5500
70-74	5500	5500	5500	5000
75-79	4000	4000	4000	4000
80-84	2500	2500	2500	2500
85+/85-89	2500	1500	1500	1500
90+/90-94		1000	800	800
95+/95-99			200	145
100+				55