



Methodological explanations

Official statistics on deaths, excess mortality, causes of death and notifiable diseases

Fourth edition, revised 9 March 2021

Neuchâtel, 2021

Published by:	Federal Statistical Office (FSO)	Layout concept:	DIAM section
Enquiries:	Health information service, gesundheit@bfs.admin.ch , +41 58 463 67 00	Diagram:	© FSO
Editor:	Klaus von Muralt, MEDIA	Graphics:	© FSO
Contents:	Christoph Junker and Rolf Weitkunat, GESB; Klaus von Muralt, MEDIA	Download:	www.statistics.admin.ch
Topic:	14 Health	Copyright:	BFS, Neuchâtel 2021 Reproduction with mention of source authorised except for commercial purposes.

List of contents

1	Introduction	3
2	Methodology: FSO Mortality monitoring (excess mortality)	3
3	Methodology FSO Cause of death statistics	4
4	Methodology Statistics from the notification system for infectious diseases (FOPH)	6
5	Methodology FSO Swiss Vital Statistics (BEVNAT)	6

1 Introduction

Four different official statistics enable conclusions to be drawn about the number of deaths in Switzerland over a given period of time:

- FSO Mortality monitoring (excess mortality)
- FSO Cause of death statistics
- Statistics from the notification system for infectious diseases (FOPH)
- FSO Swiss Vital Statistics (BEVNAT)

In the first instance, the weekly mortality monitoring is compiled by the Federal Statistical Office (FSO) based on the daily deaths reported to the civil registry offices.

Secondly, the FSO Cause of Death Statistics, which are based on the medical causes reported on death certificates. It currently takes about two years to compile the statistics, which cover all reported causes of death. The main causes are listed in the standard publications. In these, only the underlying disease is reported as the cause of death; any concomitant disease that may have contributed to death are not reported in most publications.

Thirdly, there are the statistics of infectious diseases compiled by the Federal Office of Public Health (FOPH) from the compulsory notification system. The deaths of people infected with Covid-19 are recorded based on notifications from doctors and laboratories. The FOPH records the deaths with the “Clinical reports after death” (as required for Covid-19) or through “additional reporting” (such as for tuberculosis), which is, however, not used for all notifiable diseases (e.g. not for influenza).

Fourthly, the FSO’s Vital Statistics, BEVNAT, provides annual and provisional monthly results for the number of deaths as well as births, marriages and divorces as they are reported in Infostar. Due to the increased need to quantify the extent of the pandemic, on 24 April 2020 the FSO also began publishing a weekly series based on the provisional number of deaths in BEVNAT.

2 Methodology: FSO Mortality monitoring (excess mortality)

Through its mortality monitoring, the FSO observes excess mortality, i.e. the weekly number of deaths above the usual value for the season. To do this, the number of deaths in a given year are estimated based on the trends seen in the previous five years; distribution across individual weeks is estimated on the basis of the median value for each individual cal-

endar week of the previous ten years. These estimates are separated for the under and over-65s. In recent years the FSO has been able to demonstrate several periods of “excess mortality”. The causal trigger is not directly mentioned in the data. Until now, however, it has always been possible to attribute a known “cause” such as influenza or heatwave or even the Covid-19 pandemic.

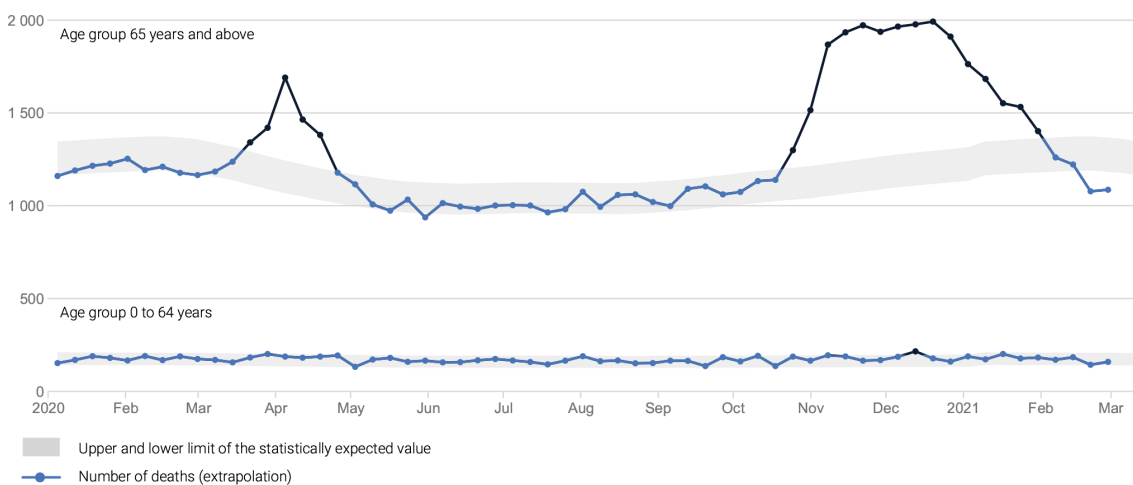
Due to random variation, not every divergence from the expected number of deaths actually constitutes excess mortality. Excess mortality is only determined when a deviation can no longer be explained by chance. To determine this, a 99% bandwidth is used around the expected value. Without systematic cause, the actual deaths should be beyond this range in only one out of 100 weeks by chance.

The mortality monitoring figures are based on the daily civil registry notifications, which are sent to the FSO for its Vital Statistics (BEVNAT) by the civil registry offices. The processing of notifications takes time. A sufficiently large percentage (> 85%) of deaths are usually registered after nine days. This allows an estimate to be made of the actual number of deaths based on a wide data base. The extent of excess mortality is calculated based on the difference between the estimated and expected number of deaths. It is therefore an estimate itself.

In the [FSO’s mortality monitoring](#) the number of deaths expected each week is estimated using the statistical model described above. This estimate is compared with the actual number of deaths in that same week. The diagram on the next page illustrates the situation on 09 March 2021.

Weekly number of deaths, 2020 – 2021

Weekly number of deaths



The number of deaths is extrapolated for the current period on the basis of cases reported up to the previous day, taking into account the time delay for submitting a notification. The data from the last two weeks are partially incomplete, subsequent information is still expected.

Data status: 09.03.2021

Source: FSO – Cause of death statistics

© FSO 2021

Figures are usually updated on Tuesday at 14:00; due to the way in which the data are processed, the published figures refer to the period up to nine days earlier. The data status of Tuesday 09 March is thus based on deaths up to and including Sunday 28 February.

The mortality monitoring itself does not contain any diagnoses. The reason for temporary excess mortality must be deduced from other data sources and clinical reports. There is no doubt that the excess mortality in spring 2020 and autumn/winter 2020/2021 is due to the current Covid-19 pandemic.

In addition, since 28 April 2020, the FSO has provided by its [experimental mortality monitoring](#) a regional report of excess mortality in the [seven major regions](#) as defined by the FSO (Eastern Switzerland, Zurich, Central Switzerland, Northwestern Switzerland, Espace Mittelland, Lake Geneva region and Ticino).

Since 15 May 2020, data has also been published for the 18 largest cantons (those with more than 100 000 inhabitants). Since 26 January 2021 the remaining eight cantons have also been included. From March 2021 graphs will also be available for all cantons. The precision of the estimates depends on the number of cases, i.e. for smaller cantons the range of the expected value is proportionately wider.

The different graphs of the experimental mortality monitoring reveal the evolution of excess mortality from 2020 onwards in a particular region or canton. These figures are also updated

every Tuesday at 14:00, following the same procedure as described above.

Publication of the excess mortality figures for the whole of 2020 is planned for 6 April 2021. In general, however, the comparison of entire years is not fully suited to the assessment of the pandemic's evolution because it takes into account not only periods with pandemic-related excess mortality but also periods without excess mortality.

3 Methodology

FSO Cause of death statistics

In its [Cause of Death Statistics](#) the FSO records the underlying disease, i.e. the disease that was at the beginning of the course of the disease and not the final event that ultimately led to death. Should a chronically ill person also catch an acute infection, the infection is recorded as an additional disease (provided it has been identified). However, in the standard publication, usually only the underlying disease is reported, in line with the rules of the World Health Organization (WHO).

Likewise, in the event of comorbidities, customarily only one underlying disease is reported in cause-of-death tables published worldwide. The reporting physician decides which diagnosis was the main causal contribution to death and records this on the medical cause of death certificate.

Diagnoses are written out in words on these certificates. Coding is based on the ICD-10 and is conducted by the Federal Statistical Office according to the rules defined by the WHO. For the sake of comparability between countries, all WHO member states adopt the same procedure. The coding process is complex and at the FSO usually takes about two years to complete. The figures for 2020 should therefore be available by the end of 2022.

As the standard publications do not contain any secondary diagnoses, due to the priority given to the underlying disease, it will not be possible to establish from these publications the number of deaths with Covid-19 as a secondary diagnosis. Covid-19 mostly only appears as cause of death if, prior to being infected with the Coronavirus, the person had no previous serious illness that could be considered an underlying cause. Each death appears only once in the Cause of Death Statistics. This is the only way to produce tables that are easy to understand. Special analyses are planned to take into account both the main diagnosis as well as that of Covid-19 as a secondary diagnosis.

With its mortality monitoring during the pandemic year 2020, the FSO reports excess mortality of several thousand people in the over-65 age group. However, in the standard publication for the Cause of Death Statistics for that year, only a fraction of these people will be subsequently reported with the cause of death "Covid-19" as the underlying disease. Persons who died in the course of a Covid-19 infection mostly had one or several pre-existing illnesses. According to WHO guidelines, the disease at the beginning of the causal chain is the disease that must be recorded as the main cause of death.

- [Latest press release on Cause of Death Statistics for 2018](#)
- [Publication on death and its main causes in Switzerland, 2016, published in January 2019](#)
(The next update of this publication with figures for 2018 is planned for 30 March 2021.)

All WHO member states gather data for the Cause of Death Statistics according to the annuality principle, i.e. the statistics are produced for one year at a time. For this reason, the Cause of Death Statistics cannot be used to assess fast-moving epidemiological events that require immediate health policy action based on real-time data.

An important reason why the FSO produces the Cause of Death Statistics according to the annuality principle is for comparability over time. The Cause of Death Statistics are one of the FSO's oldest statistics, providing reliable data on the most frequent causes of human death in Switzerland since 1876.

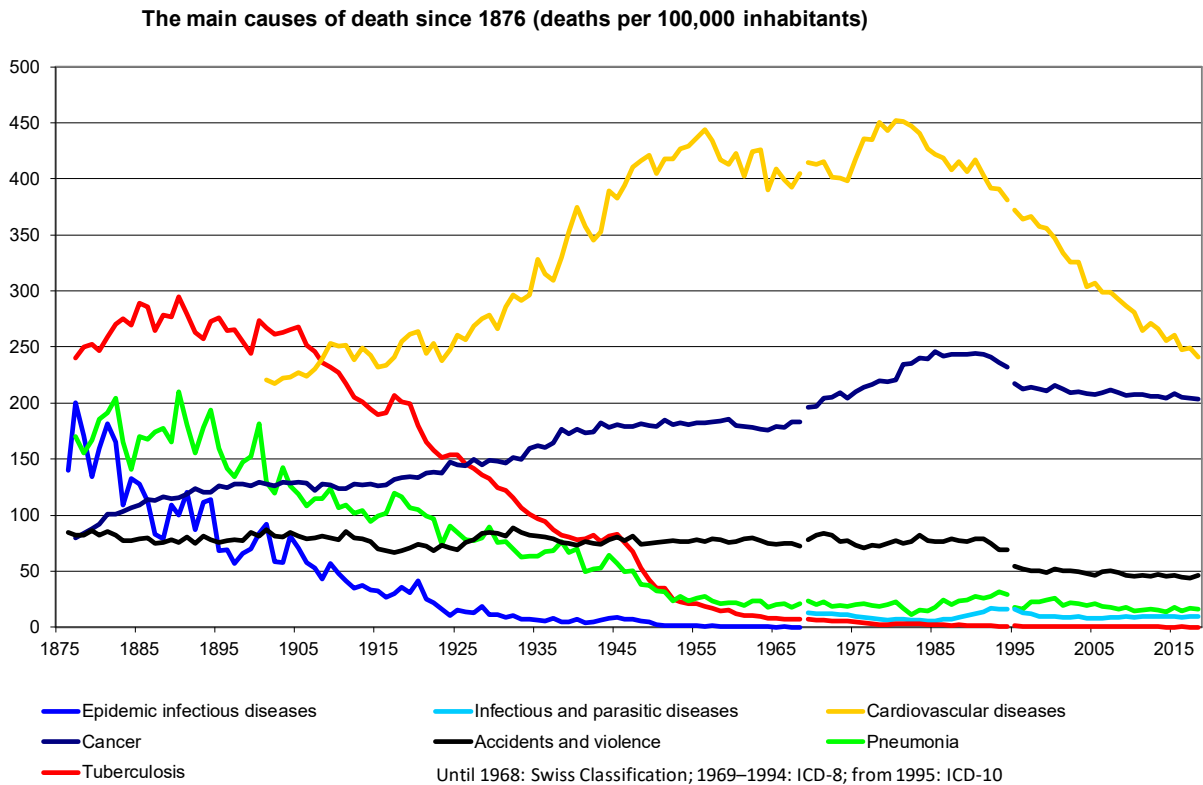
The evolution of causes of death is based on changes in the prevalence and the lethality of diseases over years and decades. This enables the evolution of causes of death to be considered from a more general perspective. Decision-makers can

thus adapt their policies in order to maintain and improve public health.

It should be mentioned that the methodology underlying the Cause of Death Statistics must remain unchanged over the years as this is the only way to guarantee longitudinal comparability.

To make comparisons between population groups and over time, the number of deaths in one year is considered in proportion to the mid-year population size. As the likelihood of dying rises exponentially with increasing age, age-specific rates are calculated for each age group. If a comparison is to be made based on a single figure, the impact of different population age structures must be taken into account. For population comparisons over time and space, this is achieved by age-specific rates being standardised. For the "direct standardisation", the age-specific rates are multiplied by the population proportions of the 'European standard population' before being added up to a single figure. The death rates calculated in this way are expressed per 100 000 inhabitants to improve readability.

The following graph shows the change in the number of deaths by the most important causes over time since 1876.



4 Methodology

Statistics from the notification system for infectious diseases (FOPH)

To keep them under control, outbreaks of infectious diseases require – as can be seen at the moment – immediate measures. The FOPH's statistics of infectious diseases are designed to provide a quantitative basis for such measures. Through reporting from doctors, laboratories and hospitals to the cantons and the FOHP, reports on people infected with Covid-19 are updated on a daily basis. The FOHP records deaths related to Covid-19 based on the "Clinical notification after death", which is issued for all people who died with a positive Corona test. No distinction is made as to whether Covid-19 was the underlying disease or whether there was comorbidity, i.e. whether someone died 'of' or 'with' the Coronavirus.

5 Methodology

FSO Swiss Vital Statistics (BEVNAT)

Based on civil status reporting, the [BEVNAT](#) statistics publishes statistics on births, deaths, marriages and divorces as well as registered partnerships and their dissolution. A difference to the mortality monitoring is that BEVNAT also includes deaths occurring abroad of persons resident in Switzerland. The mortality monitoring, in contrast, is comprised exclusively of deaths occurring in Switzerland of people resident in Switzerland. The provisional demographic figures for deaths, published on a weekly basis since 24 April 2020 with a processing time of nine days, are broken down by sex, age group, major region and canton. The provisional figures for natural population change for the whole of 2020 will be published on 6 April 2021. The definitive figures will follow on 22 June 2021.