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France 2020: 68,000 excess deaths attributable to COVID-19

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The COVID-19 pandemic is having a significant impact on the demography of France. Deaths have increased substantially, and births have decreased with a lag of 9 months. Commenting on the demographic situation of 2020, Gilles Pison and France Meslé explain more specifically why the number of deaths attributed to COVID-19 in 2020 far exceeds the increase in deaths from all causes between 2019 and 2020.

There were 654,000 deaths in metropolitan France in 2020 [1, 2] compared to 599,000 in 2019, up 55,000 (9.2%). Part of this increase, around 13,000 deaths, is due to population ageing and is observed annually if life expectancy does not increase. Therefore, the number of excess deaths in 2020 as a consequence of the COVID-19 pandemic stands at around 42,000. This is 23,000 fewer than the 65,000 attributed to COVID-19 by the French public health agency (Santé publique France) [3]. The difference is even slightly larger because the agency counts deaths in hospital and in care homes, but not in private homes. Home deaths from COVID-19 are assumed to be rare, but the exact number is unknown. Based on rates observed in other countries—4% in Sweden, 5% in England and Wales, and 6% in the United States [4]—they represent an estimated 5% of the total. Factoring in these adjustments, the number of French COVID-19-related deaths in 2020 comes to slightly more than 68,000, or one in a thousand people.

68,000 COVID-19-related deaths in 2020

Why is this total much higher than INSEE's figure of 42,000 excess deaths from all causes with respect to 2019, after deducting the 13,000 deaths due to population ageing? The answer lies in the decrease in other causes of death. The 2019–2020 seasonal flu epidemic did not produce any notable excess mortality at the beginning of 2020, unlike the previous winter (2018–2019), during which 12,000 additional deaths were recorded, mainly in the first months of 2019, with 8,000 deaths directly attributable to flu [5]. With fewer cars on the road due to lockdown, road traffic deaths were also lower in 2020.

But comorbidity is another important factor. Many COVID-19-related deaths occurred among people in poor health and already affected by other diseases. Some of them would have died in 2020 in any case, even without the COVID-19 pandemic. Their deaths would have been attributed to another cause, such as diabetes, cardiovascular disease, chronic respiratory failure, etc. Consequently, the numbers of deaths from these various causes will probably decrease in 2020. The extent of this phenomenon will remain unknown until exhaustive data on causes of death become available.

The excess deaths observed from 2019 to 2020 in metropolitan France have lowered life expectancy at birth [1], down 0.4 years for women (from 85.6 years to 85.2 years) and 0.6 years for men (from 79.8 years to 79.2 years).

Two waves of excess mortality in 2020

The excess mortality in 2020 occurred in two waves, one in the spring and the other in the autumn. The scale of each wave can be compared with the excess

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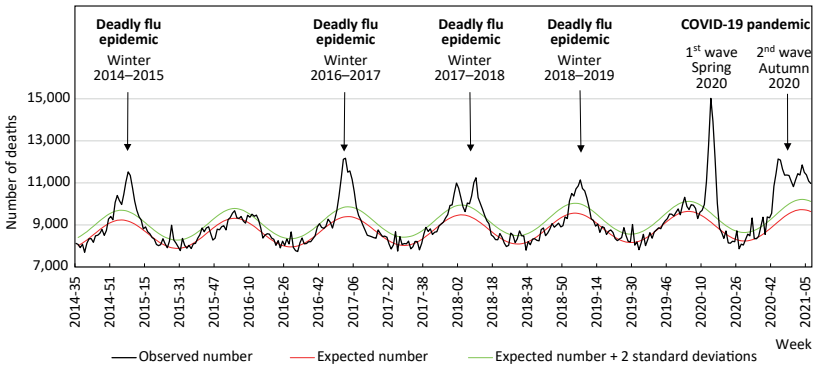
mortality peaks of the 5 preceding years, all of which were linked to seasonal flu epidemics (Figure 1). The French public health agency indirectly estimates the excess mortality associated with each wave by comparing the deaths observed each week with the 'expected' number of deaths calculated via the average seasonal profile of previous years [3].

Since 2014, four high flu-related mortality peaks (Figure 1) have been observed (winters of 2014–2015, 2016–2017, 2017–2018, and 2018–2019). Excess mortality due to the winter epidemics of 2015–2016 and 2019–2020 was much lower.

Figure 1. Expected and observed weekly numbers of deaths in France, August 2014 – February 2021



G. Pison, F. Meslé, *Population & Societies,* no. 587, INED, March 2021.

Note: The curve of 'expected' numbers of deaths (in red) corresponds to the habitual seasonal profile estimated on years without deadly epidemics of flu or COVID-19 [3]. The bottom green curve corresponds to excess deaths that are two standard deviations above the habitual profile.

Source: Adapted from Santé publique France and INSEE [3].

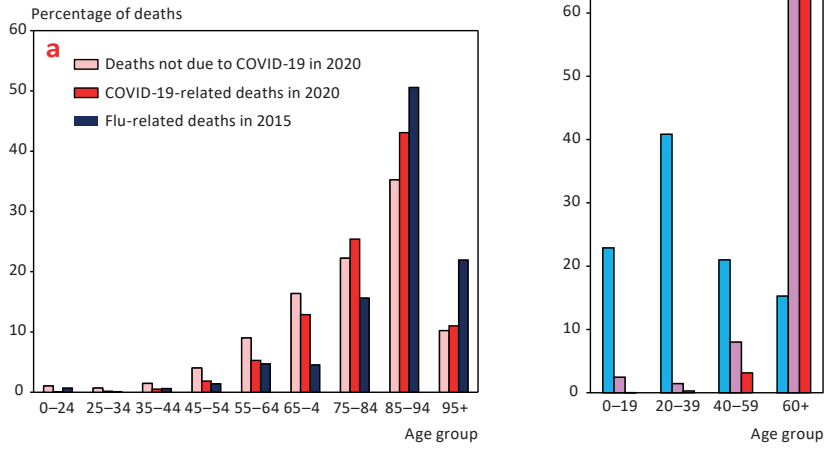
Around 20,000 excess deaths occurred in the winters of 2016–2017 and 2017–2018, and 12,000 in the winter of 2018–2019 [5]. An estimated 70% of excess mortality is attributable directly to flu during the deadliest epidemics, or 14,000 deaths in 2016–2017 and in 2017–2018, and 8,000 in 2018–2019. The excess mortality in 2020 linked to the spring wave of COVID-19 is equivalent to that of the deadly flu epidemics of 2016–2017 and 2017–2018, although the COVID-19 peak is higher and covers a shorter period. Excess mortality was much higher in the autumn wave, even if only deaths occurring in 2020 are considered. The peak is lower, but more spread over time. The total excess deaths including those of 2021 is doubtless already higher than that of the flu epidemics of recent years.

High COVID-19 death toll among older adults, but barely higher than for other causes of death

To understand the factors behind the pandemic and not just measure its scale, it is insufficient simply to count the deaths occurring in the year and identify those due to COVID-19. We also need to know the number of deaths by sex and age. INED's online database on the demography of COVID-19 deaths features the profile of deaths by sex and age for various countries, including France. Updated each week, it provides information on sources, definitions, and data quality [4]. We can use this information to determine whether the victims of COVID-19 are mostly older adults, as is often claimed, or whether the virus is lethal at all ages. We find that the age distribution of COVID-19-related deaths is quite similar to that of overall mortality. It has been widely claimed that most COVID-19 victims are older adults. This is true, but other causes of death are almost equally lethal at advanced ages (Figure 2A). Fortunately, today, death occurs mostly in old age, and deaths at younger ages are rare. COVID-19-related deaths follow a similar overall pattern. By contrast, the age profile of the risk of dying is different from that of

Figure 2. Age-distribution of deaths (%), France

Interpretation: Figure 2A: among all COVID-19-related deaths occurring up to 1 November 2020, 11% concerned people aged 95 or over. This age group accounted for 9% of deaths from all causes in 2018 and 22% of flu deaths in 2015. Figure 2B: the over-60s accounted for 96% of all deaths; this age group represented 88% of Hong Kong flu victims in 1968–1970 and 15% of Spanish flu victims in 1918–1919.



G. Pison, F. Meslé, *Population & Societies,* no. 587, INED, March 2021.

Note: These figures do not show mortality or case-fatality rates, but the distribution of ages at death.

Sources: For the Spanish flu, health statistics for France, 1918 and 1919. For the Hong Kong flu, INED, series of deaths by cause, reclassified in ICM-9. For COVID-19 (2020), INSERM CépiDc (deaths up to 1 November 2020) and INED: https://dc-covid.site.ined.fr/en/ (13 February 2021) [4].

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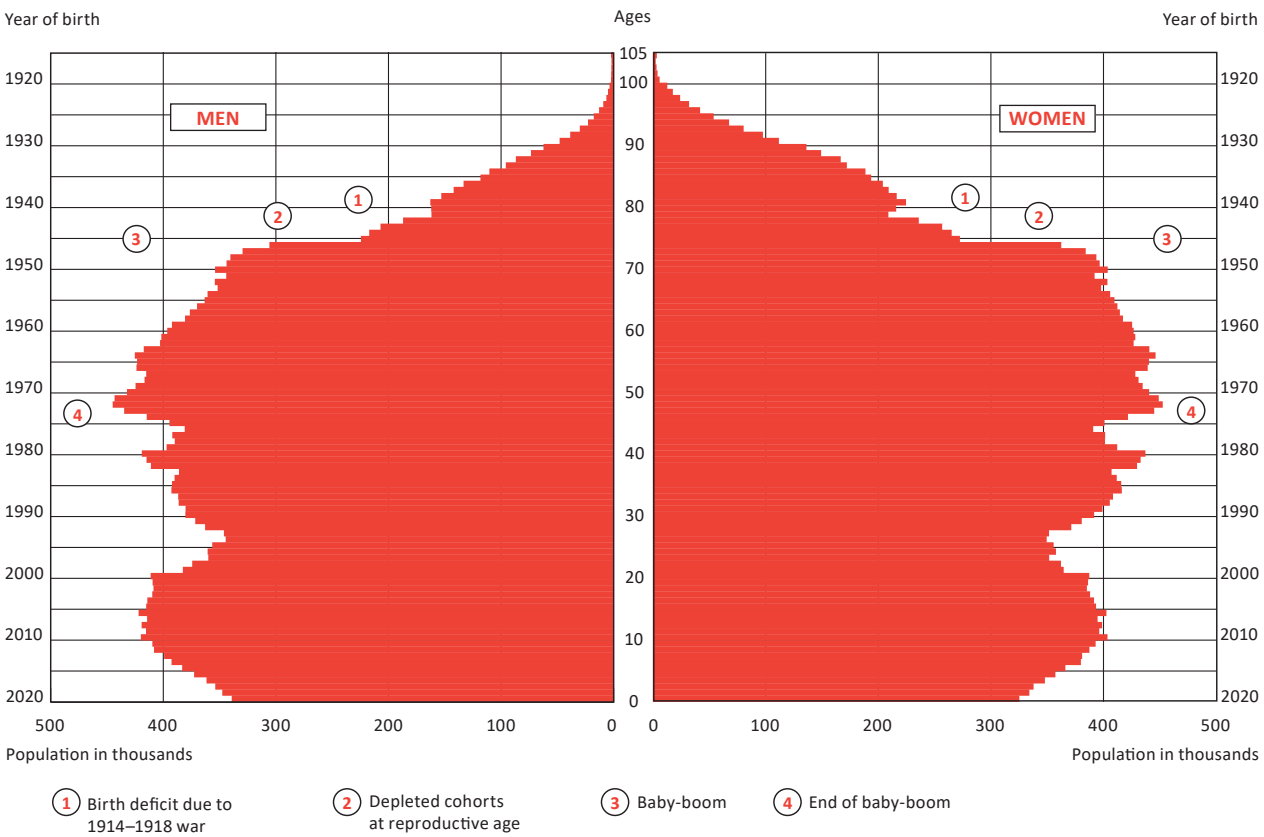
Population of France - Provisional estimate on 1 January 2021



(G. Pison and F. Meslé, *Population & Societies*, no. 587, INED, March 2021)

Table. Demographic indicators 1950 to 2020, metropolitan France

	1950	1960	1970	1980	1990	2000	2010	2013	2014	2015	2016	2017(p)	2018(p)	2019(p)	2020(p)
Births (m)	862	820	850	800	762	775	802	782	781	760	745	730	720	714	697
Deaths (m)	534	521	542	547	526	531	540	558	547	582	581	594	597	599	654
Natural increase (m)	328	299	308	253	236	244	262	223	234	179	164	137	123	115	43
Net migration (m)	35	140	180	44	80	70	43	107	39	53	88	60	60	60	103
Total growth (m)	363	439	488	297	316	314	305	331	273	230	230	215	189	181	146
Adjustment [1] (m)	—	—	—	—	–53	94	—	—	—	–63	–81	–98	–99	–99	–34
Birth rate (t)	20.6	17.9	16.7	14.9	13.4	13.1	12.8	12.2	12.2	11.8	11.5	11.3	11.1	11.0	10.7
Death rate (t)	12.8	11.4	10.7	10.2	9.3	9.0	8.6	8.7	8.5	9.0	9.0	9.2	9.2	9.2	10.0
Infant mortality rate (r)	52.0	27.4	18.2	10.0	7.3	4.4	3.5	3.5	3.3	3.5	3.5	3.6	3.6	3.6	3.3
Total fertility rate (e)	2.95	2.74	2.48	1.94	1.78	1.87	2.02	1.97	1.97	1.92	1.89	1.86	1.84	1.84	1.79
Life expectancy:															
Males (a)	63.4	67.0	68.4	70.2	72.7	75.3	78.0	78.8	79.3	79.0	79.3	79.5	79.6	79.8	79.2
Females (a)	69.2	73.6	75.9	78.4	81.0	82.8	84.7	85.0	85.4	85.1	85.3	85.4	85.5	85.7	85.2
Marriages [2] (m)	331	320	394	334	287	298	245	233	235	230	227	228	228	221	148
Marriage rate (t)	7.9	7.0	7.8	6.2	5.1	5.0	3.9	3.6	3.7	3.6	3.5	3.5	3.5	3.4	2.2
Population [3] (m)	42,010	45,904	51,016	54,029	56,841	59,267	63,070	64,028	64,301	64,469	64,639	64,738	64,822	64,898	65,236
Under 20 [2] (m)	12,710	14,991	16,772	16,380	15,605	15,068	15,440	15,589	15,652	15,646	15,616	15,562	15,479	15,390	15,429
65 and over [2] (m)	4,796	5,347	6,598	7,466	8,039	9,561	10,667	11,649	11,989	12,311	12,620	12,910	13,179	13,453	13,661
Under 20 [2] %	30.3	32.7	32.9	30.3	27.5	25.4	24.5	24.3	24.3	24.3	24.2	24.0	23.9	23.7	23.7
65 and over [2] %	11.4	11.6	12.9	13.8	14.1	16.1	16.9	18.2	18.6	19.1	19.5	19.9	20.3	20.7	21.0

(a) years – (e) children per woman – (m) in thousands – (p) provisional – (r) per 1,000 live births – (t) per 1,000 population.
(1) Population estimates for the years 1990 and 2000 and for the years 2015–2020 were adjusted to establish accounting consistency between the 1990, 1999, and 2006 censuses (for 1990 and 2000) and between the censuses of 2014 and the following years for the years 2015–2020 (see Sylvain Papon and Catherine Beaumel, 2021 [1]).
(2) Including same-sex marriages from 2013.
(3) At year-end.
Source: INSEE, Division des enquêtes et études démographiques (http://www.insee.fr)

recent epidemics of seasonal flu, which is less lethal among young and middle-aged people.

Major historical pandemics can be compared by looking at age-at-death profiles. For the 1918–1919 Spanish flu pandemic, the estimated death toll varies between 200,000 and 400,000 people in France—0.5% to 1.0% of the population—but with most victims among children and young adults (Figure 2B). Older people were less severely affected because already partly immunized by earlier flu epidemics [6]. The Hong Kong flu pandemic, which led to 40,000 deaths in France in 1968–1970, of which 25,000 were directly attributable to the virus, had a different mortality profile [6], with an age profile of deaths similar to that of the COVID-19 pandemic, but affecting a greater proportion of young people.

While the age profile of the risk of dying from COVID-19 is similar to that of overall mortality, one should not underestimate the seriousness of pandemic. The death toll in 2020 is appalling, with the loss of 68,000 lives in France in just a single year, despite the measures taken to curb the spread of the virus.

Box. Demographic situation of France in 2020

The population of France on 1 January 2021 was an estimated 67.4 million, of which 65.2 million in metropolitan France (mainland France and Corsica) and 2.2 million in the overseas *départements* and regions [1]. In metropolitan France, the population grew by 146,000 in 2020 (up 0.22%). One-third of this increase was attributable to a surplus of births over deaths and two-thirds to net migration, i.e. the difference between migration inflows and outflows, which INSEE estimated at 103,000.

Fewer births in 2020 than in 2019

The total fertility rate fell slightly between 2019 and 2020, from 1.83 to 1.79 children per woman. This decrease, combined with that of the number of women of reproductive age, led to a drop in births in metropolitan France to 697,000 in 2020, down from 714,000 in 2019.

The trend towards later childbearing observed over the last 4 decades is continuing, and the mean age of women who gave birth in 2020 was 30.9 years. Mean age at childbirth has increased steadily since 1977, when it stood at 26.5 years.

Cohort fertility trends show that the women born in 1970, who turned 50 in 2020 and have now completed their reproductive lives, had 2.00 children. Women born in 1980, who turned 40 in 2020, have already had 1.99 children, and the total should reach 2.05 by the time they are 50. The youngest cohorts still have many childbearing years ahead of them, so it is risky to predict their completed fertility, but it might remain at around two children per woman.

A large drop in births forecast for 2021

The number of births is likely to fall sharply in 2021 because of the COVID-19 pandemic. With the rise in unemployment and high levels of uncertainty about the future, many couples wishing to have a child have postponed their childbearing plans. The decrease in births was already visible in late 2020 and early 2021. There were 7% fewer December births in 2020 than in December 2019 [2], most of the children born in this month having been conceived in March 2020, some just before the start of the first lockdown on 17 March, and some just after. Likewise, there were 13% fewer babies born in January 2021 than in January 2020, almost all of whom were conceived during the first lockdown. The statistics for subsequent months will show whether this is an ongoing trend.

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Abstract

The number of deaths recorded in France in 2020 was up 55,000 from 2019, significantly less than the 68,000 deaths attributed to COVID-19 in 2020. This difference is due to the decline in other causes of death, such as influenza and road accidents. Other causes are also likely to have declined, such as diabetes, cardiovascular disease, and chronic respiratory failure. While some of the frail people suffering from these diseases have indeed died from COVID-19, they would have died in 2020 even without the pandemic, and their death would have been attributed to a different cause.

Keywords

mortality, causes of death, COVID-19, epidemics, deaths by age, seasonal variations, births, France

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