POPULATION DEVELOPMENT IN CZECHIA IN 2020

David Morávek[1] – Jana Koukalová[2]

Abstract
The population development of Czechia in 2020 was significantly affected by the COVID-19 epidemic. Epidemiological measures or the pandemic itself were reflected in almost all monitored demographic processes, and in many cases long-term trends were interrupted. In addition, existing minimums or maximums were rewritten within the period of the last ten years. The article focuses on the main demographic processes, namely births, deaths, marriages, divorces and migration. The beginning of the examined period is the year 2011, in which the census took place, and then the following years, especially the period 2015–2020.

Keywords: demographic development, population, age structure, nuptiality, divorce, fertility, mortality, migration, Czechia

https://doi.org/10.54694/dem.0295 **Demografie,** 2021, **63 (4): 246–261**

POPULATION BY AGE AND MARITAL STATUS

In 2020, the population in Czechia increased by 7,838 from 10,693,939 (as of 1 January) to 10,701,777 inhabitants (as of 31 December). This was the smallest year-on-year increase in the last decade, apart from the exceptional decrease in 2013. Since the beginning of 2011, when the population was first based on the results of the Census, the Czech population has grown by 215 thousand persons. The population growth was caused by international migration not only in total for the period 2011–2020 but also in the year 2020 (see Table 1). The balance of international migration in 2020 reached 26,927 persons and was thus 17,3 thousand lower than in the previous year, but still higher than in 2011–2016. The natural change in the total caused a decrease in the number of inhabitants. A significant natural decrease of 19,1 thousand persons was recorded in 2020, which was the highest since the beginning of the century. In other years, the natural change caused an increase in population only marginally.

In 2020, the number of people in the elderly, child and adolescent age groups of the population continued to grow, while the number of persons of working age decreased. From the point of view of five-year age groups, most people were aged 40–44 years, for the fifth year in a row. Despite the specificity of 2020, the population in the three main age groups continued to develop in the same trajectories as in previous years. During 2020, the number of persons aged 0–14 years grew by 9,5 thousand to 1,72 million and thus represented 16.1% of the total population. In addition, the number of persons aged 65 and older

1) Czech Statistical Office, Demographic Statistics Unit, Na padesátém 81, 100 82 Prague 10, Czech Republic; Prague University of Economics and Business, Faculty of Informatics and Statistics, Department of Demography, W. Churchill Sq. 1938/4, 130 67 Prague 3 – Žižkov. Contact: david.moravek@czso.cz.

2) Czech Statistical Office, Demographic Statistics Unit, Na padesátém 81, 100 82 Prague 10, Czech Republic; Charles University, Faculty of Science, Department of Demography and Geodemography, Albertov 6, 128 43 Prague – 2, Czech Republic. Contact: krestanova.jana@gmail.com.

Table 1 Vital statistics, 2011 and 2015–2020

Indicator	2011	2015	2016	2017	2018	2019	2020
Natural increase	1,825	–409	4,913	2,962	1,116	–131	–19,089
Net migration	16,889	15,977	20,064	28,273	38,629	44,270	26,927
Total increase	18,714	15,568	24,977	31,235	39,745	44,139	7,838
Per 1,000 population							
Natural increase	0.2	0.0	0.5	0.3	0.1	0.0	–1.8
Net migration	1.6	1.5	1.9	2.7	3.6	4.1	2.5
Total increase	1.8	1.5	2.4	2.9	3.7	4.1	0.7

Source: Czech Statistical Office.

continued to grow by 26,7 thousand to 2,16 million. The share of the elderly population exceeded one-fifth for the first time. However, for both groups of persons, the growth rate in 2020 was the lowest in the decade. The working-age population has been declining for the twelfth year in a row; however, its year-on-year decreases have been more modest in the last three years than at the beginning of the decade. As in previous years, the working-age population represented the largest group of persons (6,82 million, or 63.8% of the total population in 2020). All this, together with the declining number of the working-age population, contributes to ageing of the population, which can be documented by relevant indicators of age distribution (see Table 2). The average age of the population, which has been steadily increasing since the early 1980s, increased by one tenth year-on-year to 42.6 years in 2020. Over the last decade, since the beginning of 2011, it has grown by less than two years, by 1.8 years for men and 1.7 years for women. The difference between the average age of men and women thus decreased slightly from 3.0 to 2.8 years, when in 2020 the average age of men was 41.1 years and the average age of women was 44.0 years. Moreover, the median age increased more than the average age of the population during the years 2011–2020, by 3.5 years from 39.8 years to 43.3 years. Since 2016, the median age has exceeded the average age of the population (by 0.7 years in 2020). The index of ageing, which is expressed as the number of persons

Table 2 Age distribution and characteristics of population, 2011 and 2015–2020 (as at 31 Dec.)

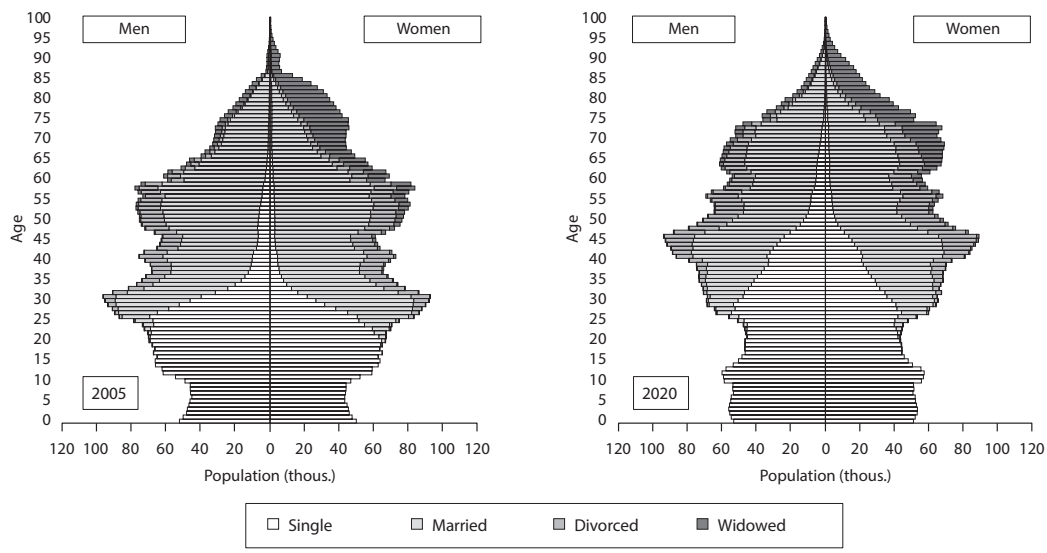
Indicator	2011	2015	2016	2017	2018	2019	2020
Total	10,486.7	10,553.8	10,578.8	10,610.1	10,649.8	10,693.9	10,701.8
0–14	1,521.8	1,623.7	1,647.3	1,670.7	1,693.1	1,710.2	1,719.7
15–64	7,328.0	6,997.7	6,942.6	6,899.2	6,870.1	6,852.1	6,823.7
65+	1,637.0	1,932.4	1,988.9	2,040.2	2,086.6	2,131.6	2,158.3
Percentage of total population							
0–14	14.5	15.4	15.6	15.7	15.9	16.0	16.1
15–64	69.9	66.3	65.6	65.0	64.5	64.1	63.8
65+	15.6	18.3	18.8	19.2	19.6	19.9	20.2
Characteristics of age distribution							
Average age	40.9	41.9	42.0	42.2	42.3	42.5	42.6
Median age	39.8	41.5	41.9	42.3	42.6	43.0	43.3
Index of ageing[1)]	107.6	119.0	120.7	122.1	123.2	124.6	125.5
Total age dependency ratio[2)]	55.4	61.4	63.2	64.8	66.3	67.8	69.0

Source: Czech Statistical Office; authors' calculations.
Note: 1) The number of persons aged 65+ years per hundred persons aged 0–14 years.
2) The number of children (0–14 years old) and older persons (65 years or more) per hundred persons in economic activity (15–64 years old).

aged 65+ per hundred persons aged 0–14, increased within the period from 108 to 126 seniors. The total age dependency ratio – the number of persons aged 0–14 years old and persons aged 65 years and older per 100 population aged 15–64 years – has also been growing steadily in the last decade. The growth of the index was mainly a reflection of the development of the number of the elderly population, which grew significantly in relation to the number of people of working age.

The age structure of the population is formed by unequally numerous generations of persons of individual years of birth. Apart from the influence of mortality in older age, it is mainly a consequence of the fluctuating development of the birth rate, which subsequently affects its development. The change in the age-distribution of the population by marital status continued in 2020 in the direction of long-term trends. Although after 2013 (with the exception of 2020) the level of marriage increased, its decline in the previous two decades and the persistently high level of divorce and decline in mortality and changes in age-distribution are behind the increased proportion (absolute and relative) of single and divorced persons in the population. The share of married persons, including widowed, decreased (see Figure 3). Measures against the spread of the COVID-19 epidemic led to the postponement of marriages and the trend of an increase in the number and share of single persons and a decrease in the share (absolute and relative) of married persons in 2020. The structure of persons by marital status has changed over time not only in the overall representation of individual categories of marital status in the population aged 15+, but also in terms of five-year age groups, with different degrees of intensity and different trajectories. The structure of the population has changed the most for persons between the ages of 30 and 44 over the last decade as generations born in the 1970s, who were crucial to changes in demographic behaviour since 1989, have passed through these age groups. The shares of married persons decreased the most because of a reduction the level of marriage and the postponement of marriage to a later age. The results of the population balance by marital status at the end of 2020 showed a more significant increase in the share of single persons and, conversely, a decrease in the share of married persons in the population than in previous years. The largest part of the population of persons aged 15 and over was represented

Figure 1 Population by age, sex and marital status, 2005 and 2020 (as at 31 Dec.)



Source: Czech Statistical Office.

by married persons, namely 46.1%. Additionally, 32.1% of persons were single, 13.7% were divorced and 8.1% were widowed.

NUPTIALITY

While in the previous six years the number of marriages increased every year, in 2020 there were 45,415 couples who entered into marriage, which was 9.5 thousand less than a year earlier (see Table 3). A significant year-on-year decrease in marriages (by 17%) was caused mainly by epidemiological measures, namely regulations on the possibility and size of wedding ceremonies in terms of the number of participants. The annual total of marriages had a declining trend from the 1990s until 2013, when it reached a historical minimum of 43,5 thousand. This was followed by a six-year period when, on the contrary, there was an increase in the number of marriages. By 2019, the annual total of marriages had risen to 54,870, the highest since 2008. The last decrease was by more than 10% in 1994; since 2011 the year-on-year changes have ranged from −4% to +6%. The largest group consisted of so-called protogamous marriages, i.e. of two single persons, which in the year 2020 amounted to 29,694 marriages or 65.4% of the total number of marriages. Additionally, 11,601 men (25.5% of all grooms) and 11,441 women (25.2% of all brides) entered into their second or further marriage. A year-on-year decrease was recorded in both groups of marriages, respectively. In relative terms, it was more noticeable in first-order marriages, whose number decreased by 19% for both men and women, while the number of higher-order marriages decreased by 13% for both sexes. As in previous years, so-called remarriages for men and women belonged to the second order. From the point of view of marital status, divorced persons dominate in marriages of a higher order. In general, widows rarely enter into a new marriage. The decrease in marriages was also reflected in the level of marriage, which decreased for both single and divorced persons. While keeping the intensity of marriage of singles at the level of 2020, only 51.9% of men and 60.8% of women would enter into their first marriage before the age of 50, which was less by seven p.p. than in the situation of 2019. The mean age of men and women at the beginning of their first marriage, which did not change significantly in previous years, increased year-on-year by 0.5 to 32.6 years for men and by 0.6 to 30.4 years for women.

The seasonal profile of marriage was specific in 2020, when a historical minimum of monthly marriages was recorded in March. On the contrary, attractive data in the calendar supported stronger numbers of marriages in February and October compared to previous years. However, marriages are not evenly distributed throughout a calendar year. Couples most often enter into marriage from June to September (64–69% in 2011–2019) and least often from December to February (6–8% in 2011–2019). In 2020, a slightly higher concentration of marriages was within the four most popular months, which reached 70.9%, up 6.2 p.p. year-on-year, but there was also a higher share of marriages entered into during the winter months from December to February. These three least popular months for marriages in 2020 accounted for a whole tenth of the total of marriages,

Table 3 Marriages, 2011 and 2015–2020

Indicator	2011	2015	2016	2017	2018	2019	2020
Total marriages	45,137	48,191	50,768	52,567	54,470	54,870	45,415
Protogamous marriages (%)	64.3	67.8	67.5	67.7	67.2	66.9	65.4
Remarriages (%) – men	26.1	23.5	24.0	23.8	24.1	24.2	25.5
– women	25.9	23.2	23.2	23.3	23.6	24.0	25.2
Total firtst marriage rate – men (%)	53.5	55.1	56.2	57.6	58.8	59.0	51.9
– women (%)	61.0	62.4	64.3	65.4	66.9	67.5	60.8
Mean age at first marriage – men	32.2	32.4	32.2	32.2	32.2	32.1	32.6
– women	29.6	29.8	29.9	29.8	29.8	29.8	30.4

Source: Czech Statistical Office; authors' calculations.

while a year earlier it was only 6%. Overall, March (647) and April (742) were recorded as the weakest calendar months in terms of the number of marriages, and conversely August (10,084) and September (8,629) as the strongest months. The number of marriages entered into in March 2020 represented the lowest monthly total in the history of the independent Czech state spanning more than a century. The decrease in marriages during the spring months was not compensated by the end of the year.

DIVORCE

According to data obtained from the Ministry of Justice of the Czech Republic, a total of 21,734 divorces were registered in 2020, which was 2,407 less than in the previous year and the least (not only) in the last decade (see Table 4). As in the case of marriages, the epidemic situation contributed to the lower number of divorces, however the number of divorces had a slightly declining trend in previous years. This was the lowest annual number of divorces since 1970. The irregular decrease in divorce rates over the last decade mainly reflects the declining number of marriages in previous decades and changes in the intensity of divorce rates over the duration of the marriage. However, the lower number of marriages terminated by divorce could also be due to epidemiological measures, namely limitation of the activity of courts in times of emergency, as indicated by the very specific distribution of divorces into individual months of the year, or postponement of divorces to a later time. Most men and women are divorced for the first time. In the year 2020 it was the first divorce for 17,612 men (81.0% of all divorced persons) and 17,685 women (81.4% of all divorced persons). The remaining one-fifth (4,122 divorced men and 4,049 divorced women) have already undergone a repeated divorce (or divorce of a higher order). A total of 12,719 marriages with minor children and 9,015 marriages without minor children were divorced. The year-on-year decrease in the number of divorces was 10.7%, respectively 9.0%. Since the beginning of the decade, the percentage of divorces with minor children on the total number of divorces has fluctuated between 56% and 59% (58.5% in 2020). A total of 20,187 children were affected by divorce, which was 2,457 fewer children than in the previous year thanks to a significant year-on-year decrease in all divorces. The average number of minors per divorce with minors has thus increased, from 1.50 to 1.59 children since the beginning of the decade.

The number of divorces in a given duration of marriage relative to the number of marriages concluded before a given number of years is regularly the highest between three and six years after marriage and then gradually decreases with increasing length of marriage (see Table 5). In the period 2011–2020, the most significant changes in the intensity of divorce rates over the last decade were recorded in the shortest period, in the interval 0–4 years, where it decreased from 2.12 to 1.49 divorces per 100 marriages (or by 30%). The level of divorce rates also decreased slightly and fluctuated over time for marriages lasting between five to nine years (from 2.20 to 1.94 divorces), 15–19 years (from 1.32 to 1.18 divorces) and 20–24 years (from 1.00 to 0.86 divorces).

Table 4 Divorces, 2011 and 2015–2020

Indicator	2011	2015	2016	2017	2018	2019	2020
Total divorces	28,113	26,083	24,996	25,755	24,313	24,141	21,734
Percentage of repeated divorces – men	19.4	19.3	19.7	19.3	19.1	19.2	19.0
– women	19.1	18.8	19.2	18.6	18.7	18.0	18.6
Divorces without minors	12,282	11,090	10,270	10,559	10,120	9,905	9,015
Divorces with minors	15,831	14,993	14,726	15,196	14,193	14,236	12,719
– percentage of total	56.3	57.5	58.9	59.0	58.4	59.0	58.5
Number of minors in divorced marriages	23,716	23,187	22,855	23,752	22,294	22,644	20,187
Average number of minors per divorce with minors	1.50	1.55	1.55	1.56	1.57	1.59	1.59

Source: Czech Statistical Office; authors' calculations.

Table 5 Divorces by duration of marriage, 2011 and 2015–2020

Duration of marriage (years)	2011	2015	2016	2017	2018	2019	2020
0–4	2.12	1.94	1.82	1.82	1.70	1.74	1.49
5–9	2.20	2.34	2.26	2.36	2.19	2.11	1.94
10–14	1.62	1.70	1.69	1.78	1.72	1.72	1.60
15–19	1.32	1.29	1.24	1.33	1.26	1.32	1.18
20–24	1.00	0.96	0.94	0.97	0.96	0.93	0.86
25–29	0.57	0.55	0.57	0.61	0.59	0.56	0.54
30+	0.22	0.25	0.24	0.26	0.26	0.28	0.25
Total divorce rate (%)	46.2	46.5	45.2	47.2	44.8	44.8	40.6
Mean duration of marriage at divorce (years)	12.9	13.0	13.1	13.2	13.4	13.5	13.7

Source: Czech Statistical Office; authors' calculations.

In addition, in the last three years the intensity of divorce decreased in the interval of 25–29 years (from 0.61 in 2017 to 0.54 divorces in 2020). Conversely, the number of divorces per 100 marriages has increased over the last decade for marriages lasting 30 years or more (from 0.22 to 0.25 divorces). If the intensity of divorce in individual lengths of marriage remained at the level of 2020, 40.6% of marriages would end in divorce, which was by 4.2 p.p. less year-on-year and the lowest since the beginning of the century. In the period 2011–2019, on the other hand, the values of the indicator ranged from 44.5% to 47.8%, with the maximum recorded in 2013. Compared to 2019, the intensity of divorce rates decreased in all durations of marriage. The mean duration of marriage at divorce has been increasing for more than two decades with smaller fluctuations; between the years 2011 and 2020 it increased by 0.8 years from 12.9 years to 13.7 years, and the last year-on-year increase was 0.2 years.

FERTILITY

A total of 110,200 live births were recorded as new inhabitants in Czechia, which was 2,000 less than in the previous year but 1,527 more children than in 2011 (see Table 6). In 2012 and 2013, the number of births decreased slightly, for the next four years it increased to 114,405 in 2017 and since then it has decreased again. The number of live births was lower for both first-born and second-born children and children born in the third or higher order. However, the structure of live births by birth order has been relatively stable over the last ten years. Of all live births, the first-born children accounted for 46.9% to 48.7% (47.6% in 2020), which was the highest percentage of all live births. Then, the second-born children accounted for 36.6% to 38.9% (37.6% in 2020) and live births of the third and higher order accounted for 14.1% to 15.1% (14.8% in 2020) of all live births. The absolute number of live births of all orders decreased year-on-year in 2020. A total of 431 children were born dead in 2020, which was 29 more than a year earlier. On average, a total of 387 children were born dead each year between 2011 and 2020, with higher numbers since 2012 mainly due to a change in the definition of stillbirths. From the point of view of the mother's marital status, children born to married women have long predominated, and this was no different in 2020, when 56,792 children were born to married women, more than half (51.5%) of all live births. Over the last ten years, the proportion of children born to married women has gradually decreased from 58.2% in 2011 to 51.0% in 2017. Since then, it has remained at almost 52%. While in the last five years the share of single mothers has ranged between 43% and 44%, until ten years ago their representation was only around one third (35.6% in 2011). A relative and absolute year-on-year decrease in 2020 was recorded in the case of divorced mothers, whose representation decreased from 4.3% to 4.1% compared to the previous year. The proportion of live births to divorced women has been declining continuously over the past ten years; in 2011 they gave birth to 6.0% of live births. Widowed women contribute only marginally to the number of live births; in 2020 they gave birth to 127 children (or 0.1% of all live births).

Table 6 Births, 2011, 2015–2020

Indicator	2011	2015	2016	2017	2018	2019	2020
Births	108,990	111,162	113,083	114,789	114,419	112,633	110,631
Live births	108,673	110,764	112,663	114,405	114,036	112,231	110,200
– first order	46.9	48.1	48.7	48.7	48.0	47.8	47.6
– second order	38.8	37.3	36.7	36.6	37.2	37.6	37.6
– third and higher order	14.3	14.7	14.6	14.7	14.7	14.6	14.8
Marital status of mother – single	38,666	46,887	48,807	50,379	49,956	49,137	48,799
– married	63,252	57,788	57,930	58,314	58,698	58,138	56,792
– divorced	6,514	5,911	5,730	5,539	5,227	4,818	4,482
– widowed	241	178	196	173	155	138	127
Stillbirths	317	398	420	384	383	402	431

Source: Czech Statistical Office.

The structure of live births by birth-order differs depending on whether the children were born in or outside a marriage. Firstly, of the total number of live births in marriage, 38.7% were born in the first order, 44.6 % in the second order and 16.7 % in the third and higher order. The structure has not changed much in the last ten years. Second order children dominate children born in marriage, while children born outside marriage have the highest share of first order children. Secondly, at the beginning of the past decade, the proportion of children born outside marriage was 41.8%, then increased until 2017, when it reached 49.0%, then decreased slightly in 2018 and 2019 for the first time in 30 years of continuous growth. In 2020, after a two-year decline, the percentage of live births outside marriage increased by 0.3 p.p. to 48.5%. The increase was mainly due to a higher percentage of live births outside marriage among firstborns (from 57.3% to 58.1%). Overall, almost half of live births are currently born outside marriage. In 2020, 58.1% of children of the first order, 38.9% of children of the second order and 41.9% of children of the third and higher order were born outside marriage.

The total fertility rate remained unchanged at 1.71 children per woman for the third year in a row in 2020 (Table 8). Ten years ago, in 2011, it decreased year-on-year to 1.43 (from 1.49), but then continued to grow to the current level. The highest relative year-on-year increase was recorded between 2013 and 2014, when total fertility increased by almost 5% (from 1.46 to 1.53 children per woman). In the next three years the total fertility rate grew at an average year-on-year rate of 3.7%, then growth slowed, resp. stopped. The mean age of mothers at childbirth has continued to rise over the last decade, but the growth has been smaller than in the previous two decades. Between 2011 and 2020, it increased by 0.5 years from 29.7 years to 30.2 years. The mean age of mothers at the childbirth remained at the same level as in the previous year. Compared to 2011, the mean age of mothers at childbirth in the first order increased by 0.7 years to 28.5 years. The mean age of mothers at childbirth in the second order increased by 0.4 years to 31.3 years in the same period, while the mean age of mothers at childbirth in the third and higher order fluctuated between 33.2 – 33.4 years (33.3 years

Table 7 Live births outside marriage by birth order, 2011, 2015–2020

Indicator	2011	2015	2016	2017	2018	2019	2020
Percentage of live births outside marriage	41.8	47.8	48.6	49.0	48.5	48.2	48.5
– first order	53.1	58.0	58.5	58.6	57.9	57.3	58.1
– second order	29.9	37.5	38.2	39.0	39.0	39.2	38.9
– third and higher order	37.0	40.8	41.7	42.3	42.0	41.5	41.9

Source: Czech Statistical Office.

Table 8 Fertility indicators, 2011, 2015–2020

Indicator	2011	2015	2016	2017	2018	2019	2020
Total fertility rate	1.427	1.570	1.630	1.687	1.708	1.709	1.707
– first order	0.699	0.787	0.829	0.858	0.856	0.852	0.849
– second order	0.535	0.570	0.582	0.600	0.619	0.624	0.622
– third and higher order	0.192	0.212	0.219	0.230	0.234	0.233	0.236
Net reproduction rate	0.689	0.759	0.787	0.816	0.829	0.826	0.830
Mean age of mother at childbirth	29.7	30.0	30.0	30.0	30.1	30.2	30.2
– first order	27.8	28.2	28.2	28.2	28.4	28.5	28.5
– second order	30.9	31.2	31.2	31.3	31.3	31.3	31.3
– third and higher order	33.3	33.4	33.3	33.4	33.4	33.4	33.3

Source: Czech Statistical Office; authors' calculations.

in 2020). The net reproduction rate has also remained at the same level for the last three years (2018–2020), namely 0.83 girls per woman.

In contrast to previous years, when fertility peaked in women at the age of 30, the maximum fertility rate was recorded at the age of 29 in 2020 (see Figure 2). In the last decade, its value has ranged between 117 children born per 1,000 women of a given age (in 2011 and 2013) and 129 (in 2017). In 2020 it was at a similar level as in the previous year – 127 children per 1,000 women of a given age. The rate of first-order fertility has increased over the last ten years in almost the entire reproductive age range of women, with the exception of women aged 16–20 years. From a relative point of view, the fertility rate increased the most in women aged 35 and over (to 1.5 times or more). In second-born children, there was a decrease in the fertility rate in women aged 17, 20 and 30 years. The fertility rate increased, relatively mostly again in the oldest age categories, starting at the age of 37. Fertility rates by age in children of the third and higher order were higher in 2020 compared to 2011 across all ages.

Figure 2 Age-specific fertility rates of women by age and by birth order, 2011 and 2020

Source: Czech Statistical Office; authors' calculations.

The age with the maximum fertility rate in the period between 2011 and 2020 was 28 or 29 years for the first order; the only exception was the year 2020, when the highest fertility rate was reached at the age of 27. The highest fertility rate of the second order was recorded in all years at the age of 31 or 32 years, in the third order at the age of 34 or 35 years, with the exception of 2013, in which it was already at the age of 33 years. The structure of total fertility by birth order does not change significantly.

MORTALITY

In 2020, a total of 129,289 inhabitants in Czechia died, which was 16,927 (or 15.1%) more than in the previous year and at the same time 18,159 (or 16.3%) more than the 2015–2019 average (Table 9). The last time the total number of deaths exceeded 129 thousand was in 1990, and the last time the number of deaths exceeded that of 2020 occurred 34 years ago, in 1986. Throughout the decade 2011–2020, the number of deaths due to ageing of the population had an increasing tendency with two fluctuations in 2014 and 2016, when there was a year-on-year decrease. Compared to 2019, in 2020 there was a decrease in the number of deaths of children under one year of age – a total of 249 of them died, which was 39 less year-on-year and the least in the last decade. Infant mortality in 2020 fell to 2.3‰ and was the lowest recorded level of infant mortality. In 2011–2019, its values oscillated around 2.6‰. The decline in the past year was driven more by neonatal mortality, which affects children over four weeks of age. Boys tend to have higher infant mortality rates than girls; in 2020 it reached 2.7‰, and 1.8‰ for girls.

Worsened mortality conditions led to a significant decrease in life expectancy at birth in 2020, by 1.0 year for men and by 0.7 years for women year-on-year, when life expectancy reached 75.3 years for men and 81.4 years for women. While in 2011–2019 life expectancy at birth had a growing trend, it decreased between 2019 and 2020, which grossly corresponded to the value from 2013 for men and the value from 2015 for women. In 2020, life expectancy turned out to be declining for all ages. If, for example, we look at the age of 65, which is generally considered the retirement age, men aged 65 had an average of 15.2 years expected to live in 2020, which was 1.1 year less than in the previous year. The life expectancy of women aged 65 was lower by 0.8 years, namely 19.2 years of age.

As a result of the COVID-19 epidemic, the year 2020 deviated from the typical mortality seasonality profile. The number of deaths in the individual months and their year-on-year development were significantly affected. Record high numbers of deaths were concentrated in the last three months of the year, when the "autumn wave" of the coronavirus epidemic broke out in Czechia. While in the first eight months the number of deaths was still around the average of recent years with a normal variance, in September it started to deviate more from the five-year average and in October it already exceeded record values. In 2020, most people died in November (15,751), which represented a year-on-year increase of 70.5%, then in October (14,189) and December (14,165). The monthly number of deaths exceeded 14,000 for the first time since December 1995, and the November maximum was similar to January 1970. The months with the lowest number of deaths were May (8,795)

Table 9 Deaths, 2011, 2015–2020

Indicator	2011	2015	2016	2017	2018	2019	2020
Deaths	106,848	111,173	107,750	111,443	112,920	112,362	129,289
Deaths under one year of age	298	272	317	304	292	288	249
Infant mortality rate (‰)	2.7	2.5	2.8	2.7	2.6	2.6	2.3
Life expectancy at birth – men	74.7	75.6	76.0	76.0	76.1	76.3	75.3
– women	80.8	81.5	81.8	81.8	81.9	82.1	81.4
Life expectancy at 65 – men	15.5	15.8	16.1	16.1	16.1	16.3	15.2
– women	18.9	19.3	19.7	19.6	19.7	19.9	19.2

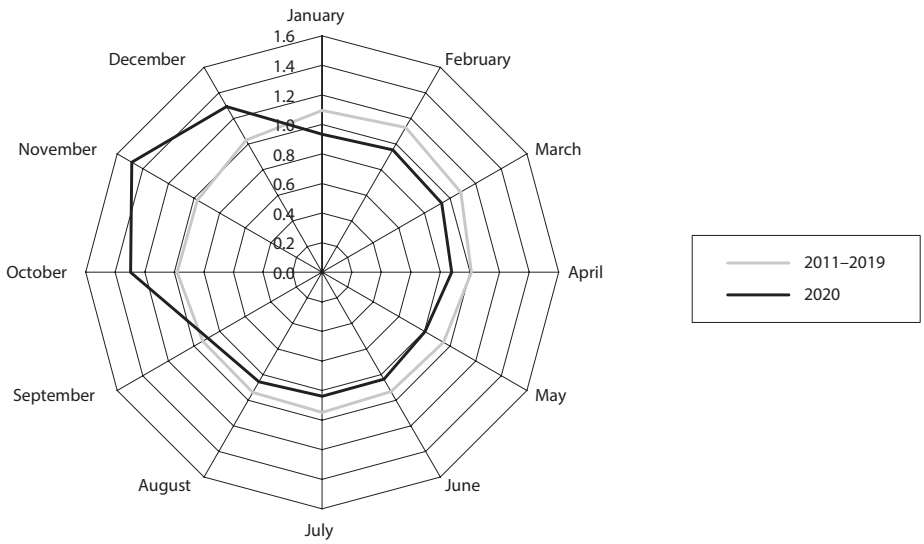
Source: Czech Statistical Office.

and June (8,847). When adjusted for the same number of days in each month of the year, most deaths were in February, resp. generally in the winter months along with March, and the least number of deaths was in the period from May to September (see Figure 3).

The development of the age structure of deaths over time, in addition to the mortality, also influences the development of the age structure of the population itself, especially the shift of numerically stronger or weaker generations to older age. Indicators of life tables can eliminate the influence of the age structure of the population on the number of deaths. In comparison with the male part of the population in the last decade, the deceased women were concentrated in a narrower interval at an older age (see Figure 4), in correspondence with the situation of empirical deaths and similarly as in previous years. Between 2011 and 2019, there was a relatively smooth shift in the curve of the life table deaths (not in childhood and infancy) towards an increase in the life table deaths at a very old age with its decrease in earlier and middle senior age, when the turning point was approximately the modal age. The epidemic situation in 2020 and changes in the probability of death caused a different development between 2019 and 2020. The curve of the life table deaths of women de facto returned to the state of 2011 (only slightly shifted to the right). For men it returned to the level of 2011 at most ages above the modal age, and for ages 67–88 years an even higher number of life table deaths in 2020 than in 2011 was recorded. The age with the highest life table deaths in 2020 was 87 years for women and 82 years for men. In comparison with 2011 and 2020, the modal age at death in women increased by only one year, in men it remained the same (between 2011 and 2019, however, it increased by two years for both sexes).

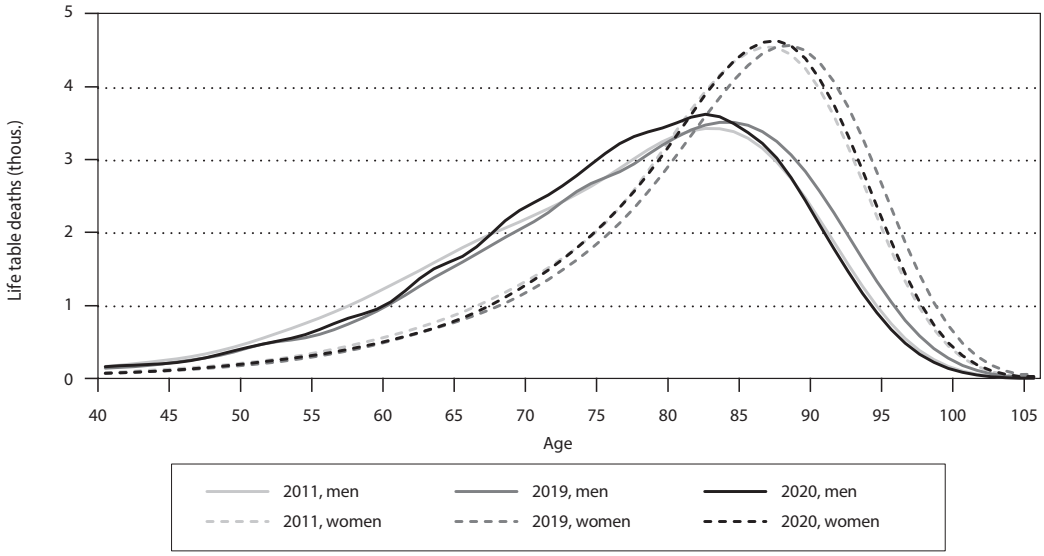
As seen in Figure 5, the increase in the life expectancy of men at birth between 2011 and 2019 was mostly due to a reduction in mortality in the 55–59 age group. The wider age range from 50 to 69 years then included an increase in life expectancy by 0.9 years, while overall their life expectancy at birth increased by 1.6 years. For women, the older age groups contributed more to the increase in life expectancy at birth in the same time period – the decrease in mortality between the ages of 75 and 89 ensured an increase of 0.6 years out of a total increase of 1.3 years between 2011 and 2019, improving the mortality of women aged 80–84 years. The decrease

Figure 3 Deaths – monthly indices, average of the period 2011–2019, 2020



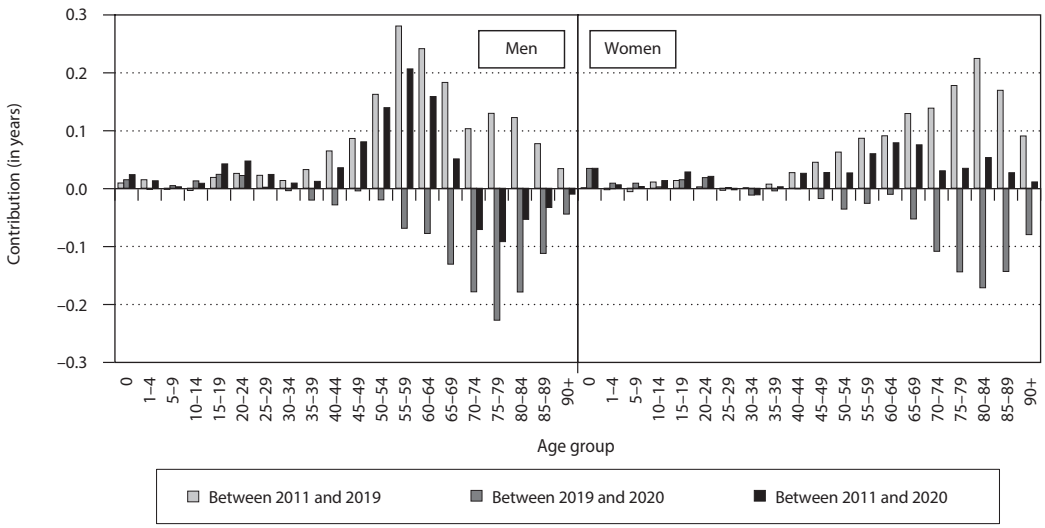
Source: Czech Statistical Office; authors' calculations.

Figure 4 Life-table deaths by sex and age, 2011, 2019 and 2020



Source: Czech Statistical Office.

Figure 5 Contributions of age groups to the difference in life expectancy by sex, 2011, 2019 and 2020



Source: Czech Statistical Office; authors' calculations.
Note: Method of calculating according to Pressat (1985).
Differences – between 2011 and 2019: +1.62 years (men), +1.27 years (women); between 2011 and 2020: +0.59 years (men), +0.54 years (women); between 2019 and 2020: –1.03 years (men) and –0.72 years (women).

in the life expectancy of men between 2019 and 2020 was due to a worsening of mortality in all age groups with relevant mortality rates (except the infancy age), with the deepest decline recorded in the 75–79 age group (by 0.2 years) and adjacent five-year age categories (all three together caused a decrease of 0.6 years). From the point of view of the decade defined by 2011 and 2020, the life expectancy at birth for men increased by 0.6 years between these extreme time points, as the positive development of mortality in the 65–69 age group contributed to growth. However, for older men their higher mortality in 2020 than in 2011 had a negative effect on the overall development of life expectancy at birth. The decrease in the life expectancy of women between 2019 and 2020 was mainly due to the change in the mortality rate in the same age groups, which on the contrary contributed the most to its increase between 2011 and 2019 (age groups 75–79, 80–84 and 85–89). The age groups in the range of 75–89 years included 0.5 years out of the overall decrease in the life expectancy of women between 2019 and 2020 (by 0.7 years). When combined for the entire decade (2011–2020), a positive effect of an increase in life expectancy of 0.5 years is evident in all age groups with a relevant mortality rate, mostly in the 55–69 age group.

Mortality by cause of death

Cause of death statistics are not fully comparable over time. Since 2013, there has been a significant update of the International Classification of Diseases (ICD-10) as well as adjustments in the process of data collection and processing in Czechia. From the data for 2018, the statistics on causes of death reflected the transition to a new version of IRIS software (used internationally to select the underlying cause of death) conditioned by the adoption of the ICD-10 update valid on 1 January 2018. In 2020, the ICD-10 (and the IRIS) was operatively updated on the disease COVID-19, which is treated as influenza and for which was assigned the code U07 from Chapter XXII. *Codes for special purposes* reserved in the emergency classification for selecting the underlying cause of death. In 2020, based on the standardized mortality rates (Table 10) the groups of causes of death in both men's and women's populations were ranked in the same way as the absolute number of deaths for these groups of causes, with the only exception being when endocrine, nutritional and metabolic diseases ranked sixth in men, while according to the absolute number of deaths they ranked seventh (they switched places with diseases of the digestive system). The same was the case in the previous year 2019. Between 2019 and 2020, the values of standardized mortality rates for individual groups of causes of death (the ICD chapters) moved in the same trajectories as the absolute numbers of deaths. For men, mortality increased for all common groups of causes except external causes and neoplasms (a decrease of 2.6% and 1.8%, respectively). The largest increase in mortality (excluding COVID-19) was recorded for endocrine, nutritional and metabolic diseases (by 8.3%) and circulatory diseases (by 7.2%), while for respiratory and digestive diseases the increase in mortality was lower (by 2.7% and 1.9%, respectively). In terms of the development of the whole decade, the negative development of men in 2020 did not outweigh the trend of improving mortality rates for circulatory system diseases, when in 2020 men had a lower mortality rate than in 2011 (by 19.7%). There was also a decrease in standardized men's mortality between 2011 and 2020 for external causes (by 13.5%) and neoplasms (by 11.9%). For women, mortality increased in 2020 (excluding COVID-19) from nervous system diseases (by 14.7%), endocrine, nutritional and metabolic diseases (by 14.4%) and circulatory system diseases (by 6.4%), other causes of death decreased (by 2–5%). In addition, for women, the negative development in 2020 did not reverse the long-term positive trend in the case of mortality from diseases of the circulatory system (a decrease of 22.6% between 2011 and 2020). The long-term development of standardized mortality from the last year-on-year (between 2019 and 2020) for women also differed for respiratory diseases, which generally increased over the decade (between 2011 and 2020 by 20.3%), but decreased year-on-year by 4.9%.

Table 10 Standardised mortality rates*) by selected causes of death (per 100,000), 2011 and 2020

Underlying cause of death (code according ICD-10)	Men		Women	
	2011	2020	2011	2020
Deaths – total	1 682.1	1 718.8	1 090.9	1 084.3
Neoplasms (C00–D48)	412.9	363.8	236.0	213.2
– Malignant neoplasm of colon, rectum and anus (C18–C21)	60.1	47.2	30.1	23.8
– Malignant neoplasm of pancreas (C25)	26.7	25.6	18.9	18.8
– Malignant neoplasm of trachea, bronchus and lung (C33–C34)	98.7	73.4	31.6	30.7
– Malignant neoplasm of prostate (C61)	45.0	40.0	33.1	29.0
Endocrine, nutritional and metabolic diseases (E00–E90)	37.0	70.5	32.1	55.3
– Diabetes mellitus (E10–E14)	31.4	60.3	26.7	45.7
Diseases of the nervous system (G00–G99)	30.0	46.7	22.5	41.5
– Alzheimer disease (G30)	14.1	26.3	13.5	29.4
Diseases of the circulatory system (I00–I99)	850.2	682.5	615.7	476.6
– Ischaemic heart diseases (I20–I25)	456.8	336.8	302.7	204.7
– Acute myocardial infarction (I21–I22**)	117.0	54.1	60.0	23.5
– Heart failure (I50)	69.8	87.6	46.8	64.5
– Cerebrovascular diseases (I60–I69)	158.1	93.7	138.2	72.9
– Atherosclerosis (I70)	56.1	21.0	45.2	15.9
Diseases of the respiratory system (J00–J99)	109.9	123.6	51.3	61.7
Diseases of the digestive system (K00–K93)	63.9	64.0	39.0	36.3
External causes of morbidity and mortality (V01–Y98)	96.9	83.9	37.2	32.4
– Transport accidents (V01–V99, Y85)	12.8	9.9	4.2	2.9
– Intentional self-harm (X60–X84, Y870)	27.0	20.4	4.8	3.9
COVID-19 (U07)	-	160.8	-	78.5
Other	81.2	123.0	57.0	88.8

Note: *) The European population standard issued by Eurostat (2013) was used for standardization.
**) Since 2018, subsequent myocardial infarction I22 has used the acute form I21 instead as the underlying cause of death.
Source: Czech Statistical Office; authors' calculations.

INTERNATIONAL MIGRATION

The volume and structure of migration flows were affected by epidemiological measures restricting movement across the country's borders and amendments to the Act on the Residence of Foreigners in the Czech Republic. A total of 55,661 persons immigrated to Czechia from abroad, of which 32,914 were men and 22,747 were women (see Table 11). Although there were 9,910 (or 15%) fewer immigrants year-on-year, their number was still above average compared to the average from 2015–2019 and the entire decade. Most immigrants in the last intercensal period (2011–2020) came from abroad to Czechia in 2019 (65.6 thousand), the least in 2011 (22.6 thousand). The number of emigrants in 2020 reached 28,734, of which 19,484 were men and 9,250 were women, and increased for the fourth year in a row. While in 2017 the annual increase was 1%, and about 10% in 2018 and 2019, in 2020 the increase was 35% when there were absolutely 7,433 thousand more emigrants than the year before. A higher number of emigrants than in 2020 was last recorded in 2013 (30.9 thousand). The balance of international migration in 2020 reached 26,927 persons and was almost equally distributed between men (13,430) and women (13,497). Compared to 2019 (a balance of 44.3 thousand), the increase in population by international migration was 17.3 thousand lower

and the lowest in the last four years. However, it was higher compared to 2011–2016. During the last decade of 2011–2020, the largest increase in persons due to international migration was in the previous year 2019. Once, in 2013, a decrease in the population due to international migration was registered (–1.3 thousand).

From the point of view of age-distribution (in five-year age groups), people aged 25–29 have come to Czechia from 2012 on a regular basis. The other groups were immigrants aged 20–24 years and 30–34 years, with more persons in the last three years being 30–34 years old. Together, these three groups, 20–34 years, accounted for almost half of all immigrants (46% in 2020, 43–50% in other years of the decade). The whole group of people of working age (15–64 years) then included 82–90% of all immigrants. Their share was the highest in 2020, in which at the same time the lowest proportion of children under the age of 15 was registered in the whole decade. These accounted for less than 9% of immigrants (9.3% to 15.7% in other years). Seniors aged 65 and over traditionally represent a very small group of immigrants, amounting to 1–2%. The situation was no different in 2020 (1.7%), although the absolute number of immigrants of this age increased slightly. On the other hand, the number of immigrant children under the age of 15, as well as people of working age between 15–64 years, decreased in 2020. The average age of immigrants increased year-on-year for the sixth year in a row, exceeding 32 years for the first time since 2001. As in previous years, the age categories of 25–29, 30–34 and 20–24 contributed the most to the increase in international migration in 2020. The number of persons of this age increased by almost 16,0 thousand during 2020 but was 26% less than in 2019. The amount of children under the age of 15 (3.5 thousand) who immigrated did not deviate too much from the average of the previous five years; the year-on-year decrease of 18% was mainly due to its above-average amount in 2019.

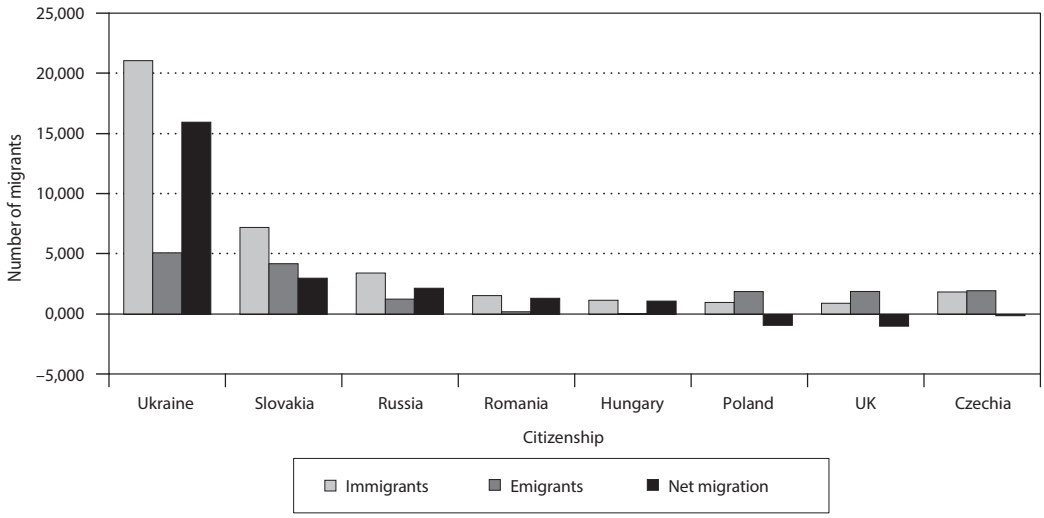
The structure of migrants according to their citizenship did not change much year-on-year in 2020, as the migration balance was, as in 2019, the highest among Ukrainian citizens, the second highest among Slovak citizens and the third among Russian citizens. Romanians again recorded the fourth highest balance, while Hungarians made the top five instead of Bulgarians. Similarly, there was no year-on-year change in immigrants, when the five most numerous groups of immigrants were Ukrainians, Slovaks, Russians, Czechs and Romanians. However, it was different when it came to emigrants, where Slovaks came in second to Ukrainians in 2020, Czechs descended from second place to third, and specifically the fourth and fifth most numerous groups consisted of emigrants with British and Polish citizenship. The change in the structure is mainly due to the implementation of the amendment to the Act on the Residence of Foreigners, where citizens of Great Britain and Poland, but also Slovakia, Germany, Austria and the Netherlands, were the ones who dominated among completed temporary stays lasting more than ten years. With the exception of Slovaks in all these named groups

Table 11 International migration, 2011, 2015–2020

Indicator	2011	2015	2016	2017	2018	2019	2020
Immigrants	22,590	34,922	37,503	45,957	58,148	65,571	55,661
– men	12,440	19,022	20,817	26,839	34,621	39,904	32,914
Emigrants	5,701	18,945	17,439	17,684	19,519	21,301	28,734
– men	3,109	10,502	9,417	9,964	11,201	12,348	19,484
Volume of migration	28,291	53,867	54,942	63,641	77,667	86,872	84,395
Net migration	16,889	15,977	20,064	28,273	38,629	44,270	26,927
0 –14	2,214	3,406	3,270	3,328	3,684	4,241	3,498
15–64	14,357	12,443	16,581	24,748	34,758	39,805	24,166
65+	318	128	213	197	187	224	–737

Source: Czech Statistical Office.

Figure 6 International migration by selected citizenship*), 2020



Note: *) Citizenships whose number of immigrants, emigrants or net migration was among the top five in 2020.
Source: Czech Statistical Office.

of EU citizens, the number of registered emigrants exceeded the number of immigrants, and the balance of international migration in 2020 was negative for foreigners with these citizenships.

CONCLUSION

Demographic events in 2020 in Czechia, as in other countries of the world, were affected by worsened epidemiological conditions due to the COVID-19 pandemic, especially after the introduction of the necessary measures to prevent its spread in the population. When comparing the years 2019 and 2020, the most unfavourable epidemiological situation resulted in a worsening of the mortality of the Czech population. The life expectancy of both men and women has fallen by about one year, while in the past its values have had a long-term upward trend. Although the number of children born decreased year-on-year, on the other hand the total fertility rate remained unchanged. The number of marriages decreased significantly because of the measures in place against the spread of COVID-19, namely regulations on the possibility and size of wedding ceremonies in terms of the number of participants. As in the case of marriages, the epidemic situation contributed to a lower number of divorces, however the number of divorces had a slightly declining trend in previous years. The volume and structure of migration flows were affected by epidemiological measures restricting movement across the country's borders and amendments to the Act on the Residence of Foreigners in the Czech Republic. Because the pandemic has not disappeared from our lives, it can be expected that demographic events will be affected in the coming years. In this context, some of the conclusions drawn from this article may be premature and it is therefore necessary to observe the further development of the population. In addition, the question arises as to what other factors, known or unknown, may influence population development from various perspectives, such as economic, social or political, etc.

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DAVID MORÁVEK

Graduated from the Faculty of Informatics and Statistics at the Prague University of Economics and Business, where he is currently enrolled in the PhD Statistics program. Since 2018, he has been working at the Department of the Demographic Statistics Unit of the Czech Statistical Office. He is interested in the study of mortality and population forecasting.

JANA KOUKALOVÁ (KŘESŤANOVÁ)

Graduated from a master's program in demography and since 2015 has been a PhD student of demography at the Faculty of Science, Charles University. Since 2016, she has been working in the Department of Demographic Statistics at the Czech Statistical Office. She specialises in the analysis of demographic development and especially nuptiality and divorce rates.