

OBSERVATORY OF THE IMPACTS OF THE HEALTH CRISIS RELATED TO COVID-19

October 2022

Note: This Observatory aims to measure the health and economic consequences of the Covid-19 epidemic in the Principality. It has been set up to complement the reports produced by Monaco Statistics in November 2020 and January 2021.





Thus, this publication presents a monthly analysis of health, mortality and birth data and is enriched quarterly with data on the economy and employment in the Principality.

For this edition:

- the health data are stopped at the end of September 2022;
- mortality and birth rate data are updated to September 2022;

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KEY DATES

	September	October
Monaco 	-On the 4th: 14,409 confirmed cases of COVID-19 including 63 deaths.	-On the 2nd: 14,642 confirmed cases of COVID-19 including 63 deaths. -On the 5th: announcement of the forthcoming arrival in the Principality of bivalent vaccine booster doses targeting the Omicron BA.4 and BA.5 variant.
France 	-The 6th: 33,572,945 confirmed cases of COVID-19 including 150,744 deaths.	-On the 6th: 34,599,922 confirmed cases of COVID-19 including 151,742 deaths.
Italy 	-On the 6th: 21,944,877 confirmed cases of COVID-19 including 175,872 deaths.	-On the 6th: 22,648,063 confirmed cases of COVID-19 including 177,300 deaths.
World 	-The 6th: 603,164,436 confirmed cases of COVID-19 including 6,482,338 deaths.	-On the 4th: 12,723,216,322 doses of vaccine were administered. -On the 6th: 616,951,418 confirmed cases of COVID-19 including 6,530,281 deaths.

1 Health data

1.1 Covid-19 health monitoring indicators

The health monitoring data for Covid-19 are as of 30 September 2022. They come from the Ministry of Health and Social Affairs, which groups together data from the Department of Health Affairs, the Centre Hospitalier Princesse Grace, the Epidemiological Investigation Unit, the Home Monitoring Unit, town doctors, pharmacies, the Monaco Scientific Centre and medical analysis laboratories.

The scope of the data presented concerns the residents of the Principality. Before the 7th of May 2022, only people with a positive RT-PCR (Reverse transcription polymerase chain reaction) test were defined as Covid-19 cases. Since this date, positive antigenic tests carried out in the Principality's pharmacies have also been used to officially identify Covid-19 cases.

Table 1. Covid-19 monitoring indicators for Monaco residents as of 30 September 2022

No. of cumulative cases	14,637
of which no. of recontaminations	1,231
Share of infected residents	34.2%
Cumulative no. of hospitalisations	665
Share of hospitalisations on the no. of cumulative cases	4.5%
Cumulative no. of cases in intensive care	64
Share of cases in intensive care out of the no. of hospitalisations	9.6%
Share of cases in intensive care out of the no. of cumulative cases	0.4%
Cumulative no. of deaths	63
Share of deaths out of the no. of cumulative cases	0.4%

Sources: Ministry of Health and Social Affairs, Monaco Statistics

As of 30 September 2022, the cumulative number of cases since the beginning of the epidemic reached 14,637, including 1,231 recontaminations, representing 8.4% of cases. Thus, the proportion of infected residents stood at 34.2%¹.

4.5% of cases required hospitalisation, i.e. 665 cases in total, including 64 in intensive care. The average length of hospitalisation² was 12.2 days overall and 11.3 days for patients who did not stay in intensive care.

The 63 deaths (32 males and 31 females) represented 0.4% of cumulative cases. The average age at death was 84.3 years overall (82.0 years for men and 86.7 years for women). More than two thirds of the deceased residents (71.4%) were aged 80 years and over. 16 deaths concerned people of Monegasque nationality.

Table 2. Covid-19 monitoring indicators for Monaco residents per year (as of 30 September 2022)

	2020	2021	2022
Number of cases	875	4,292	9,470
Number of hospitalisations	81	241	343
Number of intensive care	19	39	6
Number of deaths	3	35	25
Mean age	46.2	39.7	42.4

Sources: Ministry of Health and Social Affairs, Monaco Statistics

As of 30 September 2022, 9,470 people were infected with Covid-19 in the year, compared to 5,167 in 2020 and 2021 combined.

In the first nine months of 2022, the number of hospital admissions (343) was higher than the cumulative number observed in 2020 and 2021 (322), and there were 25 deaths compared to 35 in the entire year 2021.

The average age of those infected was 42.4 years in the first nine months of 2022, compared with 39.7 years in 2021 and 46.2 years in 2020.

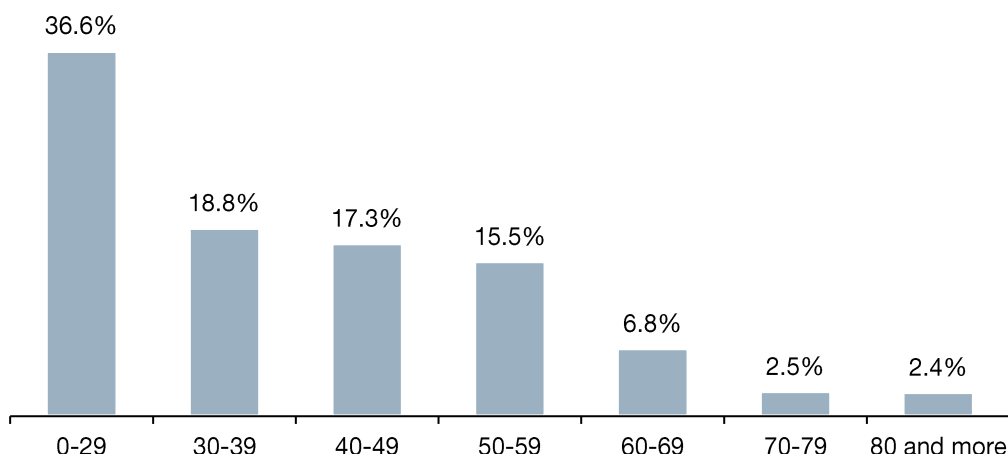
¹ Based on the most recent resident population estimate (as of 31 December 2021) of 39,150 inhabitants.

² The lengths of stay include those of patients in the Covid unit as well as those for other reasons.

1.1.1 Recontaminations

Since the beginning of the epidemic, 1,231 cases concern residents who have already been infected. Recontaminations are almost evenly distributed: 52.2% women and 47.8% men.

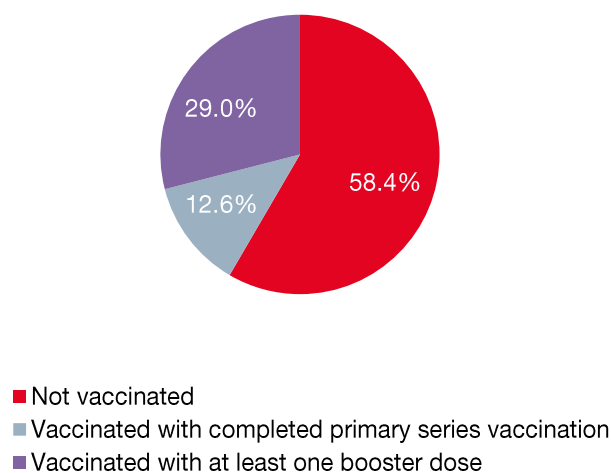
Figure 1. Distribution of recontaminations by age group for Monaco residents



Sources: Ministry of Health and Social Affairs, Monaco Statistics

As of 30 September 2022, 36.6% of recontaminations have been identified among people under the age of 30. The proportion of re-infections decreases with age: residents over 60 represented only 11.8% of cases.

Figure 2. Distribution of recontaminations according to vaccination status for Monaco residents



Sources: Ministry of Health and Social Affairs, Monaco Statistics

As of 30 September 2022, almost 60% of recontaminations involved unvaccinated people, more than one in four residents vaccinated with at least one booster dose³ and 12.6% with a complete primary vaccination⁴.

³ Vaccination with at least three injections of a two-dose protocol or a second injection of a single-dose protocol.

⁴ Vaccination with two injections of a two-dose protocol or one injection of a single-dose protocol.

1.1.2 Situation in September 2022

Table 3. Monthly number of Covid-19 cases for Monaco residents

	August 2022	Share	September 2022	Share
No. of unvaccinated cases	90	32.8%	79	31.5%
No. of cases with completed primary series vaccination	33	12.0%	18	7.2%
No. of cases with at least one booster dose	151	55.1%	154	61.4%
No. of cases	274	100%	251	100%
<i>of which no. of recontaminations</i>	49	17.9%	56	22.3%

Sources: Ministry of Health and Social Affairs, Monaco Statistics

251 new cases of Covid-19 were recorded among residents of Monaco in September 2022 compared to 274 in August. 31.5% of September's cases (79) concerned unvaccinated residents, a share equivalent to that of the previous month (32.8% or 90 cases).

People with a complete primary vaccination **Erreur ! Signet non défini.** represent 7.2% of the cases (18 patients) compared to 12.0% in August (33 cases). More than half of the cases (154 cases representing 61.4%) had a vaccination schedule with at least one booster dose **Erreur ! Signet non défini.** in September, a slightly higher proportion than in August (55.1% for 151 cases).

The proportion of recontaminations has increased to 22.3% of cases in September after 17.9% in August.

Table 4. Monthly number of Covid-19-related hospitalisations and resuscitations for residents of Monaco

	August 2022	September 2022
No. of hospital admissions	19	11
No. of hospital admissions unvaccinated	7	4
No. of hospital admissions with completed primary series vaccination	2	0
No. of hospital admissions with at least one booster dose	10	7
No. of cases in intensive care	1	0
No. of deaths	0	2

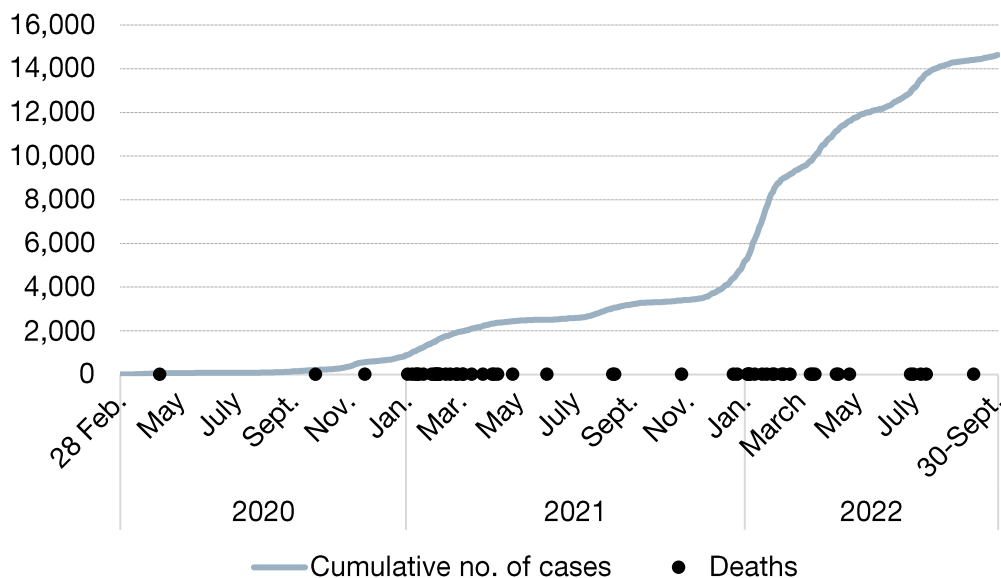
Sources: Ministry of Health and Social Affairs, Monaco Statistics

There were 11 Covid-19 related resident hospitalisations in September 2022 compared to 19 the previous month. Among these 11 hospitalisations, 4 were of unvaccinated individuals and 7 were of patients with at least one booster dose.

There were 2 Covid-19-related deaths in September 2022.

1.1.3 Evolution of the epidemic

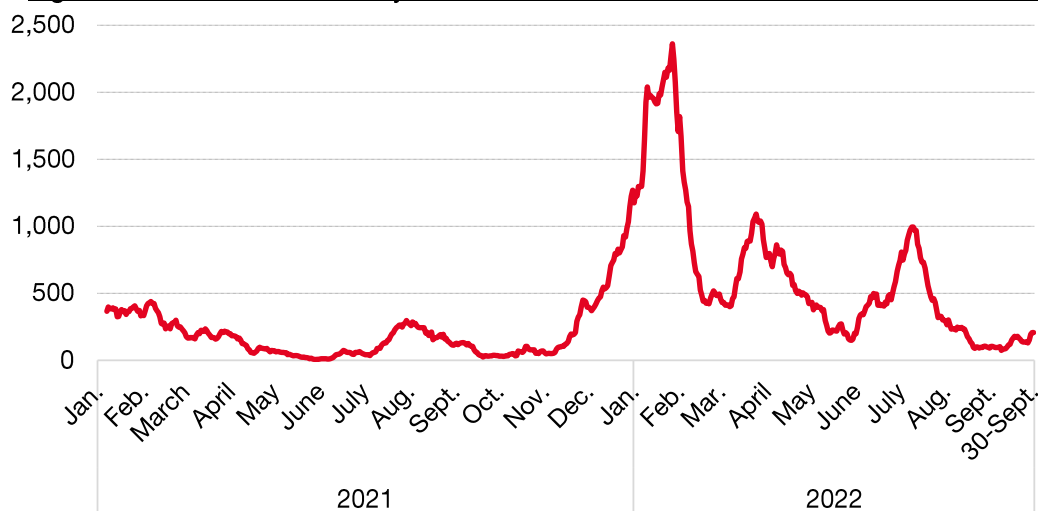
Figure 3. Evolution of the number of cumulative cases and deaths linked to Covid-19 for residents of Monaco



Sources: Ministry of Health and Social Affairs, Monaco Statistics

As of 30 September 2022, the cumulative number of cases since the start of the pandemic has reached 14,637, with a sharp acceleration in early 2022.

Figure 4. Evolution of the daily incidence rate⁵ of Covid-19 for residents of Monaco

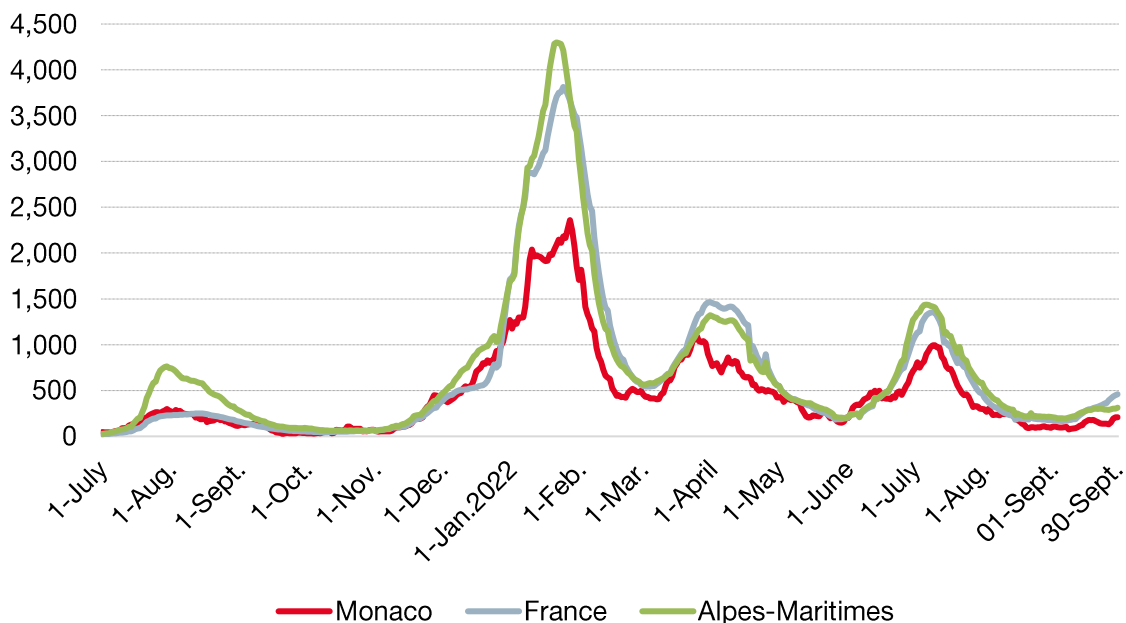


Sources: Ministry of Health and Social Affairs, Monaco Statistics

After reaching an all-time high of 2,360 at the end of January 2022, and a sharp drop in February, the incidence rate rose again to 1,091 on 25 March. The rate gradually declined until the end of May (202 on 31 May). After a new peak (994) during the first two weeks of July, the incidence rate decreased to 92 on 31 August. In September, it rebounded slightly to 207 at the end of the month.

⁵ The daily incidence rate corresponds to the number of positive tests over the last 7 days per 100,000 inhabitants, i.e.: $100,000 \times \frac{\text{number of positive cases over 7 days}}{\text{estimated number of inhabitants}}$. The most recent estimate of the resident population (as of 31 December 2021) is 39,150 inhabitants.

Figure 5. Changes in the daily incidence rate of Covid-19 in Monaco, France and the Alpes-Maritimes

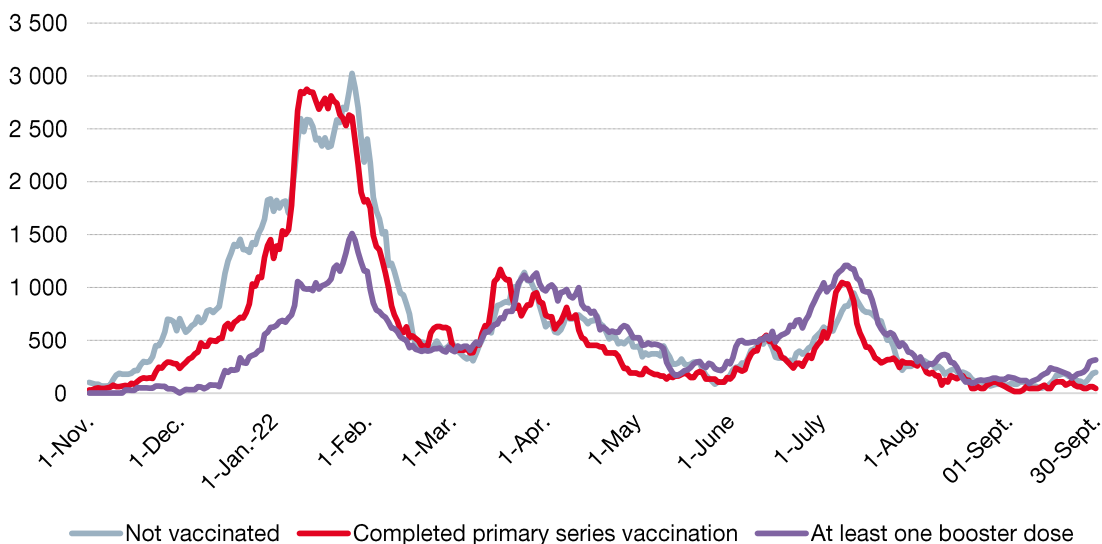


Sources: Ministry of Health and Social Affairs, Santé publique France, Monaco Statistics

During the first half of July 2022, the 7th epidemic wave continued in most European countries. The incidence rates of the three geographical areas increased significantly and as of 9 July stood at: 994 in the Principality of Monaco, 1,414 in the Alpes-Maritimes and 1,352 in France.

Subsequently, these indicators dropped significantly to reach 74 in Monaco, 204 for the Maralpins and 174 in France on 8 September. Since the second half of September, these three incidence rates have remained below those observed in July, but have risen slightly (207 in Monaco, 311 in the Alpes-Maritimes and 459 in France on 30 September).

Figure 6. Changes in the daily incidence rate of Covid-19 for residents of Monaco of 12 years old and over according to vaccination status



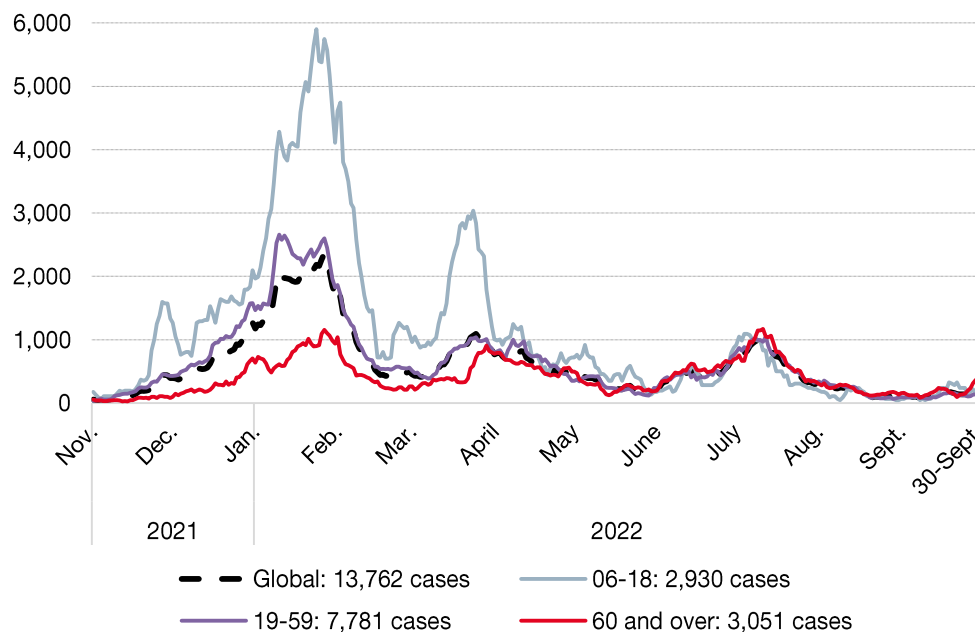
Note: In this graph, three vaccination statuses are distinguished for residents:

- Not vaccinated which includes those who are not vaccinated or are only partially vaccinated (one injection of a two-dose protocol);
- Completed primary series vaccination, which includes residents with a 2nd injection of a two-dose protocol or an injection of a single dose protocol;
- At least one booster dose which is a 3rd injection of a two-dose protocol or a 2nd injection of a single-dose protocol.

Sources: Ministry of Health and Social Affairs, Digital Services Department, Monaco Statistics

From November 2021 until the end of February, the incidence rate of unvaccinated residents was higher than that of residents with a complete primary series vaccination, which was itself higher than the one of residents with at least one booster dose. From the end of February 2022, the gap narrows and the three rates are quite close.

Figure 7. Comparison of incidence rates by age group of Covid-19 of Monaco residents



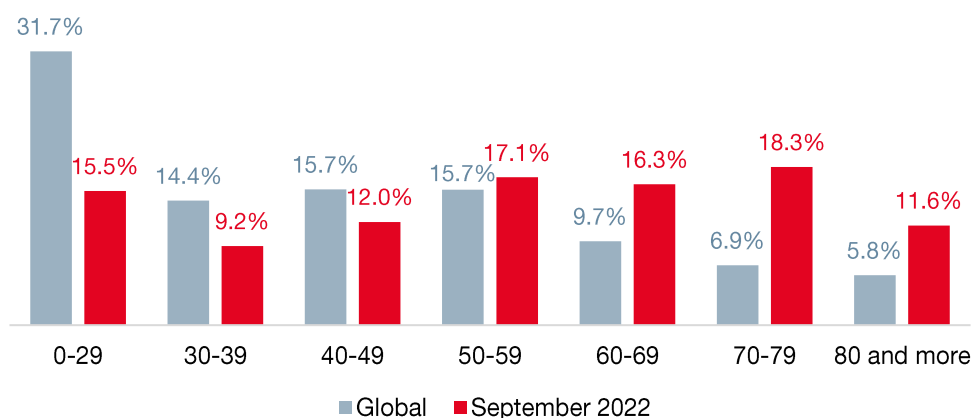
Note: As children under 6 years old are not systematically tested, they are not represented on this graph.

Sources: Ministry of Health and Social Affairs, Monaco Statistics

The evolution of the incidence rates of minors (6-18 years old) and over-60s differs from that of the rest of the population:

- From November 2021 onwards, the incidence rate for 6-18 year olds rose dramatically. It peaked at 5,901 on 24 January compared to 175 on 1 November. The gap with the overall rate had never been so high since the beginning of the pandemic. The incidence rate then fell back to around 700 in mid-February. It then rose again, reaching a peak of 3,038 on 24 March. In June there was a further increase, with the rate reaching 1,093 in early July, before steadily decreasing. As of 30 September, it was 131;
- The rate for those aged 60 and over becomes comparable to the overall rate since spring 2022, whereas it has been significantly lower since December 2021. As of 11 July, the incidence rate was 1,170, before gradually falling to 132 on 31 August; In September, there is a further increase with a rate of 365 at the end of the month.
- The incidence rate for 19-59 year-olds, relatively close to the overall rate, peaked at 2,658 on 10 January 2022. As of 30 September, it was well above the rate of the previous month, at 207, compared to 92 on 31 August.

Figure 8. Comparison of the age distribution of Covid-19 cases



Sources: Ministry of Health and Social Affairs, Monaco Statistics

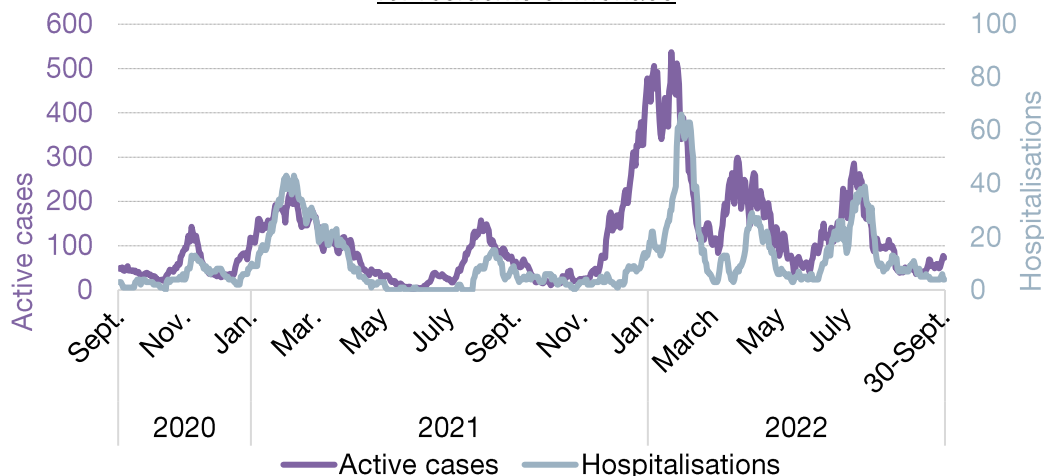
The age distribution of cases in September 2022 differed from that observed since the beginning of the epidemic.

People under 30 years of age represent 15.5% of cases in September compared to about one third overall.

In September, almost two-thirds of cases concerned residents aged 50 and over, compared to almost 40% since the beginning of the epidemic.

1.1.4 Characteristics of Covid-19-related hospitalisations of Monaco residents

Figure 9. Evolution of active cases and hospitalisations linked to Covid-19 for residents of Monaco

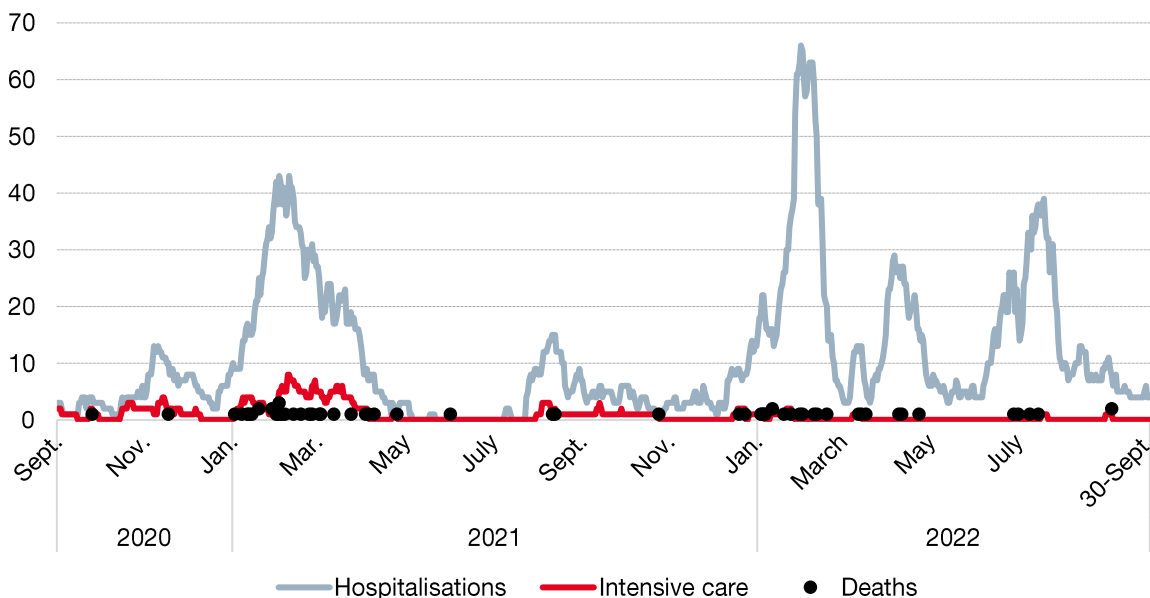


Sources: Ministry of Health and Social Affairs, Monaco Statistics

Since September 2020, the number of cases and the number of hospitalisations have been correlated, with a slight lag concerning the 5th (winter 2022) and the 6th wave (spring 2022).

As of 30 September, the Principality of Monaco had 4 hospitalisations of residents for 73 active cases.

Figure 10. Trends in Covid-19-related hospitalisations, resuscitations and deaths for residents of Monaco



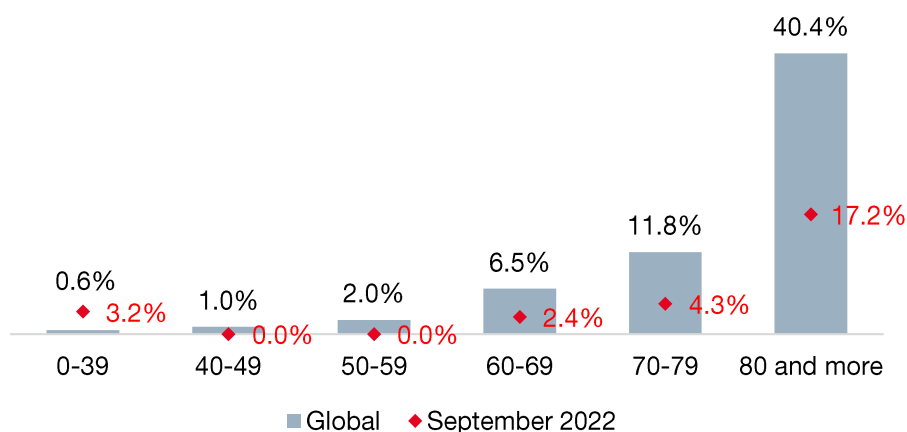
Note: Cases in intensive care are also counted as inpatients.

Sources: Ministry of Health and Social Affairs, Monaco Statistics

Since mid-December 2021, the peaks in hospitalisations (66 on 1 February 2022, 28 on 6 April and 39 on 9 July) have not led to an increase in the number of intensive care. As of 30 September, none of the 4 residents hospitalised is in intensive care.

Since December 2021, there have been 27 Covid-19-related resident deaths.

Figure 11. Share of Covid-19-related hospitalisations by age group



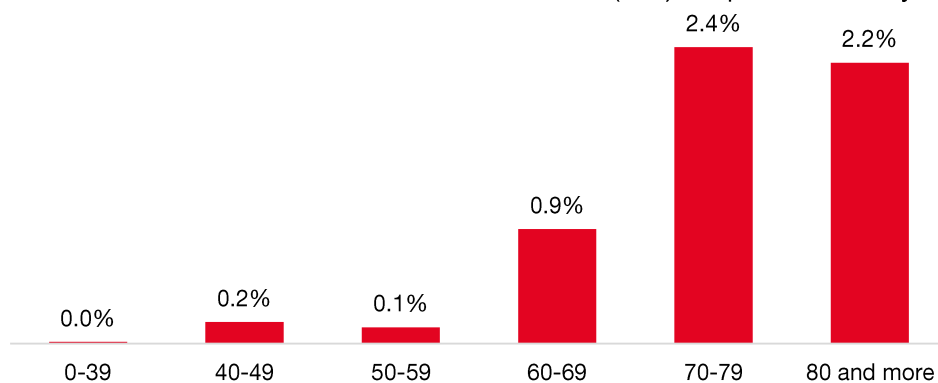
Interpretation: in September 2022, 17.2% of people over 80 years old who contracted Covid-19 required hospitalisation, compared to 40.4% since the beginning of the epidemic.

Sources: Ministry of Health and Social Affairs, Monaco Statistics

The proportion of hospitalisations increases with age. Since the beginning of the epidemic, 0.6% of cases under 40 years of age have been hospitalised, compared to 6.5% between 60 and 69 years of age, 11.8% between 70 and 79 years of age and 40.4% after 80 years of age.

In September 2022, the share of people hospitalised was lower or equal to the overall figure for each age group except for 0-39 year olds.

Figure 12. Share of Covid-19-related intensive care unit (ICU) hospitalisations by age group



Sources: Ministry of Health and Social Affairs, Monaco Statistics

Since the beginning of the epidemic, ICU hospitalisations represent 0.9% of cases between 60 and 69 years old, 2.4% of cases between 70 and 79 years old and 2.2% for residents over 80 years old.

1.2 Vaccination

The vaccination campaign started on 31 December 2020 in the Principality⁶ with the Pfizer/BioNTech's Comirnaty (messenger RNA-based vaccine), which requires the injection of two doses 21 days apart for people who have not previously been infected by the disease and a single dose for those who have already had Covid-19.

Since 10 June 2021, vaccination has been open to any person aged 12 and over and subsequently to non-residents working in the Principality. At the beginning of January 2022, children aged between 5 and 11 years, resident or attending school in the Principality, at risk of contracting severe forms of Covid-19 or living in the environment of an immunocompromised person could also begin to be vaccinated at the National Immunisation Centre.

In addition, an additional booster dose can also be given to people aged 18 years and over, provided that it has been more than four months since the last dose of Covid-19 vaccine was given.

Since 22 March 2022, Novavax's Nuvaxovid vaccine (a so-called "subunit" vaccine) is also available. The primary vaccination schedule for this vaccine requires 2 doses, 3 weeks apart.

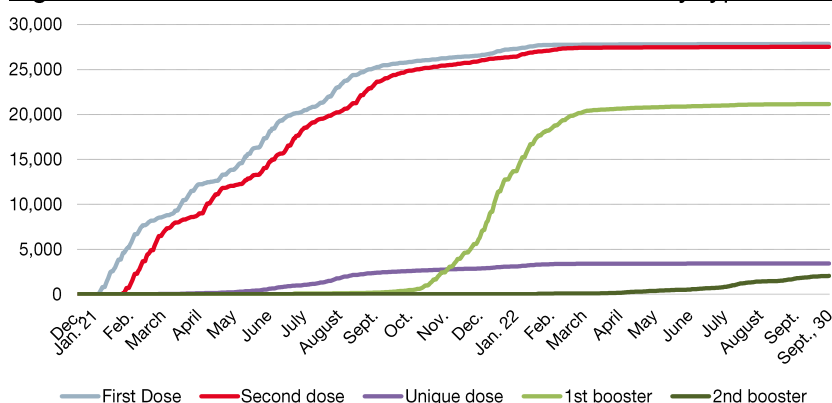
At the end of March 2022, a 2nd booster dose was generalised without prescription for people aged 65 and over, and from mid-April for people aged 60 and over. A delay of about 4 months between the last injection or the last contamination and the 2nd additional dose must be respected.

Vaccination data is as of 30 September 2022.

Note: The data presented in this study are consolidated for each publication, which explains the differences that may appear in relation to previously published statistics.

1.2.1 Evolution of vaccination

Figure 13. Evolution of the number of vaccine shots by type of dose



Sources: Ministry of Health and Social Affairs, Digital Services Department, Monaco Statistics

As of 30 September 2022, 82,024 vaccine shots have been administered to people aged 12 years and older. This includes more than 27,800 first doses, more than 27,500 second doses and more than 3,400 unique doses⁷. The number of first booster doses was 21,165 and second booster doses were 2,056.

Vaccination is gender-equal, as 50.7% of injections were given to women.

Table 5. Distribution of shots by country of residence as of 30 September 2022

	Type of doses					Total
	First	Second	Unique	1st booster	2nd booster	
Monaco	22,145	21,981	2,109	17,496	1,969	65,700
France	5,498	5,352	1,303	3,575	83	15,811
Italy	142	137	16	66	0	361
Others*	61	57	2	28	4	152
Total	27,846	27,527	3,430	21,165	2,056	82,024

* Others including not filled in

Sources: Ministry of Health and Social Affairs, Digital Services Department, Monaco Statistics

Of the 82,024 doses administered in total, 15,811 were administered to people living in France and 361 to Italian residents.

⁶ Source: <https://covid19.mc/en/>

⁷ Unique doses: People previously infected with Covid-19 are offered a single dose of vaccine, as they retain an immune memory. This single dose of vaccine thus acts as a booster after infection.

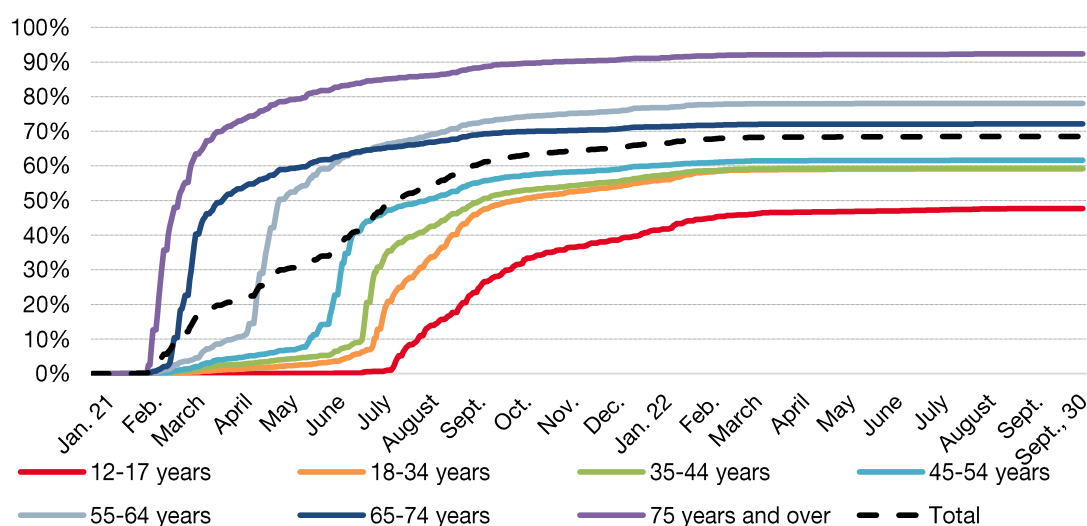
1.2.2 Vaccination coverage

The vaccination coverage presented below concerns the resident population of Monaco. It includes:

- All injections given in the Principality to residents;
- Part of the injections given abroad to residents: on the one hand, cases where the first dose was given abroad and then declared to the Vaccination Centre in order to be able to give the second dose in the Principality and, on the other hand, cases where the 2 doses were given abroad and then declared to the Vaccination Centre in order to request a health pass or to have recourse to serological monitoring.

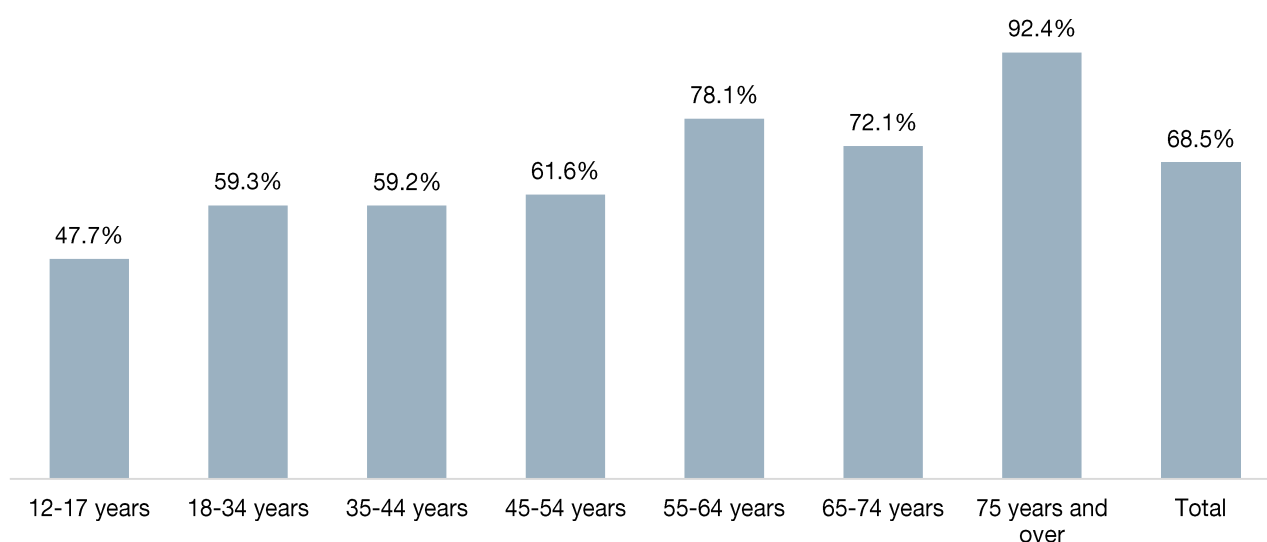
However, it is not possible to know which residents were vaccinated abroad and did not report to the vaccination centre. Thus, the vaccination coverage of residents remains underestimated by this unquantifiable part of residents vaccinated abroad and not declared.

Figure 14. Evolution of the completed primary vaccination coverage rate⁸ for residents by age group



Sources: Ministry of Health and Social Affairs, Digital Services Department, Monaco Statistics

Figure 15. Completed primary vaccination coverage rate for residents by age group as of 30 September 2022



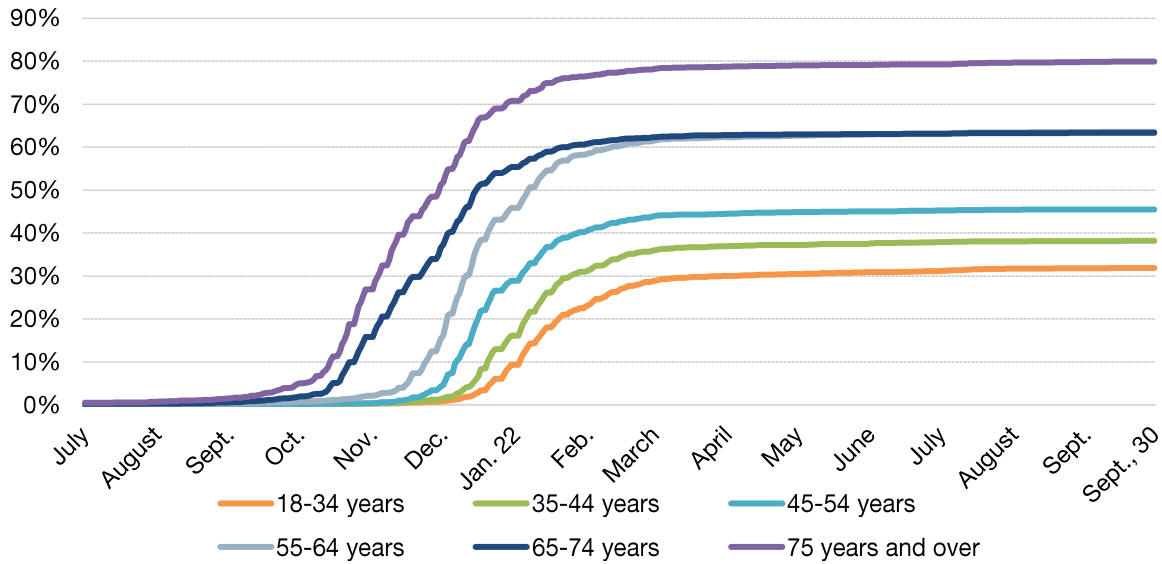
Sources: Ministry of Health and Social Affairs, Digital Services Department, Monaco Statistics

As of 30 September 2022, the completed primary vaccination coverage rate is 68.5% for the resident population of 12 years old and over.

It is above 59% for all age groups from 18 years onwards. It is above 78% among 55-64 years old and exceeds 92% among those aged 75 and over. Nearly one resident in two of 12-17 years old has a complete primary vaccination schedule.

⁸ Completed primary vaccination coverage rate: Share of the population vaccinated with a second shot of a two-dose schedule or one shot of a single-dose schedule.

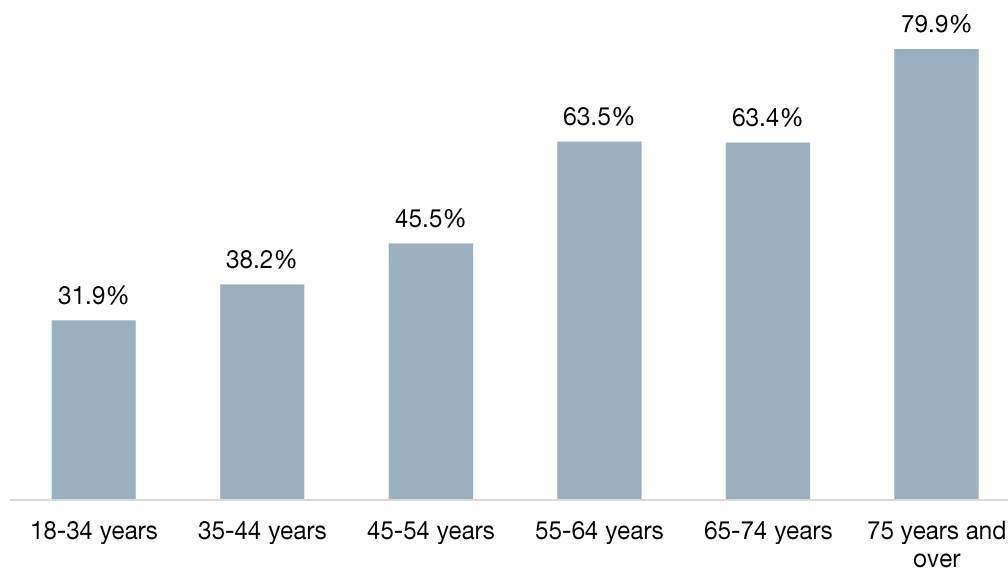
Figure 16. Evolution of the vaccination coverage rate with at least one booster⁹ of residents by age group



Note: As the 1st booster mainly concerns people aged 18 and over, only these age groups are presented.

Sources: Ministry of Health and Social Affairs, Digital Services Department, Monaco Statistics

Figure 17. Vaccination coverage rate with at least one booster of residents by age group as of 30 September 2022



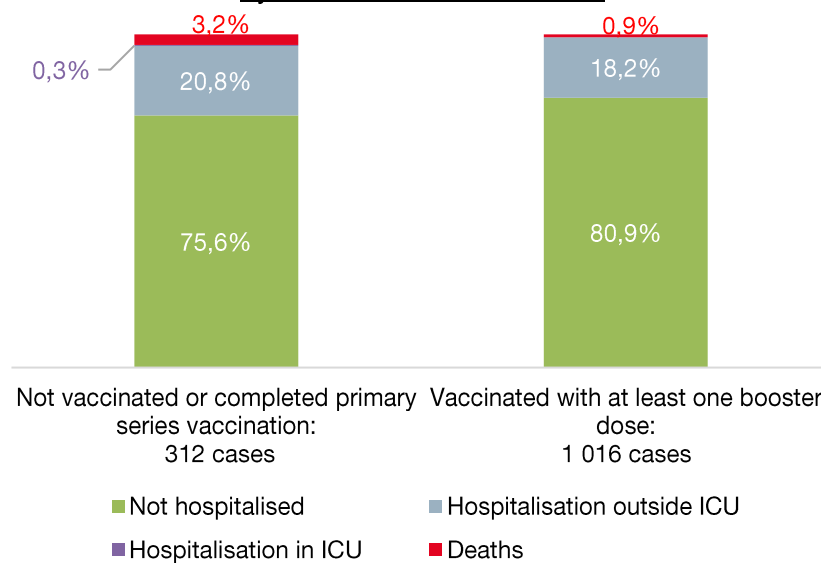
Sources: Ministry of Health and Social Affairs, Digital Services Department, Monaco Statistics

As of 30 September 2022, the vaccination rate with at least one booster dose is approaching 80% for residents aged 75 years old and over, and it is above or equal to 63% for all age groups above 55 years old.

⁹ Vaccination coverage with at least one booster: Share of the population vaccinated with a third injection of a two-dose schedule or a second injection of a single-dose schedule

1.2.3 Impact of vaccination on positive cases

Figure 18. Distribution of Covid-19 cases of 70 years old and over by vaccination status in 2022



Sources: Ministry of Health and Social Affairs, Monaco Statistics

In 2022, among residents aged 70 years and older, 3.2% of unvaccinated or who have a completed primary series schedule died, more than three times the number of those vaccinated with at least one booster dose (0.9%). As regards hospitalisations, these proportions are 20.8% and 18.2% respectively. Of the unvaccinated residents, 0.3% were hospitalised in ICU.

2 Mortality and birth rate

It is important to note that the deaths and births presented here are in the sense of the actual date of the event: a birth or death occurring at the end of the month but registered by the Town Hall at the beginning of the following month will be considered in the month in which the event occurred.

The data presented in this Observatory are therefore consolidated from one month to the next, which explains the slight differences that may appear in relation to previously published statistics.

The results presented should be interpreted with caution given the small size of the numbers studied.

2.1 Analysis of deaths

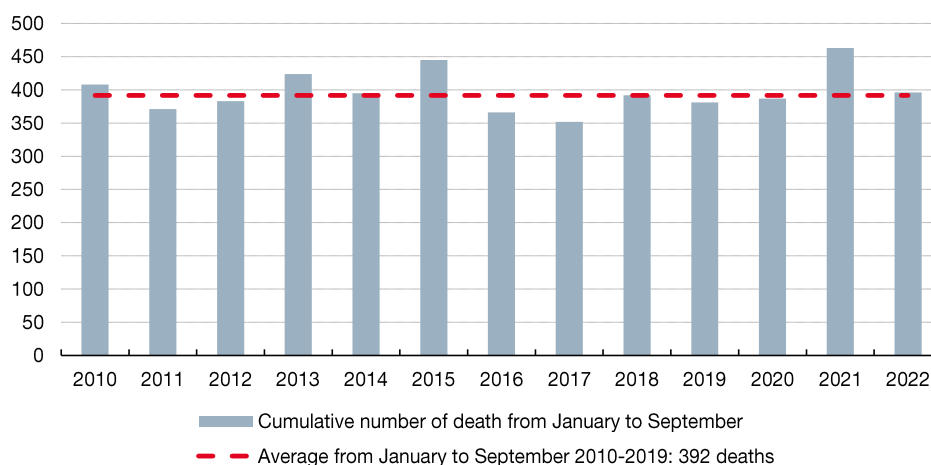
As a reminder, the cause of death is not available in the Civil Registry data.

The over/under-mortality corresponds to a two-sided confidence interval of the 2010-2019 average of deaths at the 99% threshold following a Student's law. By comparing it with the mortality observed between 2020 and 2022, it makes it possible to represent a significant excess or deficit of deaths compared with the normal.

2.1.1 Deaths in Monaco, all places of residence combined

These are all deaths registered in Monaco, regardless of place of residence.

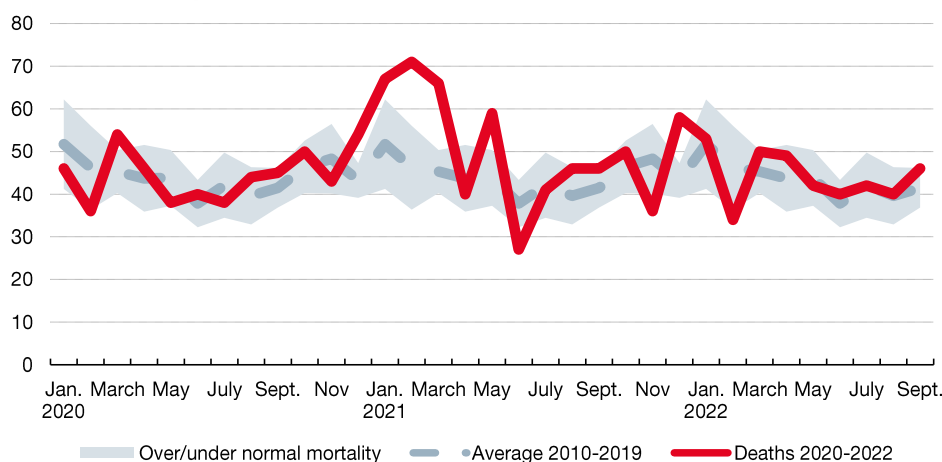
Figure 19. Cumulative number of deaths between January and September in Monaco



Sources: Town Hall, Monaco Statistics

From January to September 2022, 396 deaths were recorded in Monaco, which corresponds to the average from 2010 to 2019 and a decrease of 14.5% compared to the same period in 2021, which had 463 deaths.

Figure 20. Number of deaths per month in Monaco



Interpretation: in September 2022, 46 deaths were recorded in Monaco for a normal over/under mortality of between 37 and 46 deaths.

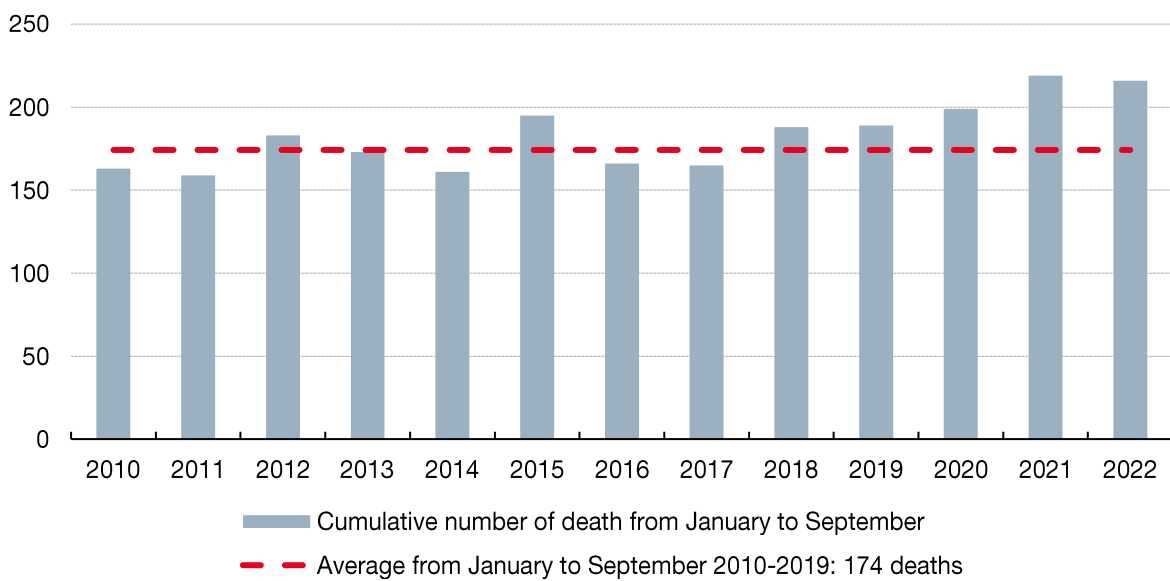
Sources: Town Hall, Monaco Statistics

With 46 deaths, September 2022 is at its normal over mortality threshold from 2010 to 2019.

2.1.2 Deaths of residents in Monaco

These are only deaths of residents in Monaco. Deaths of residents outside Monaco are therefore not included.

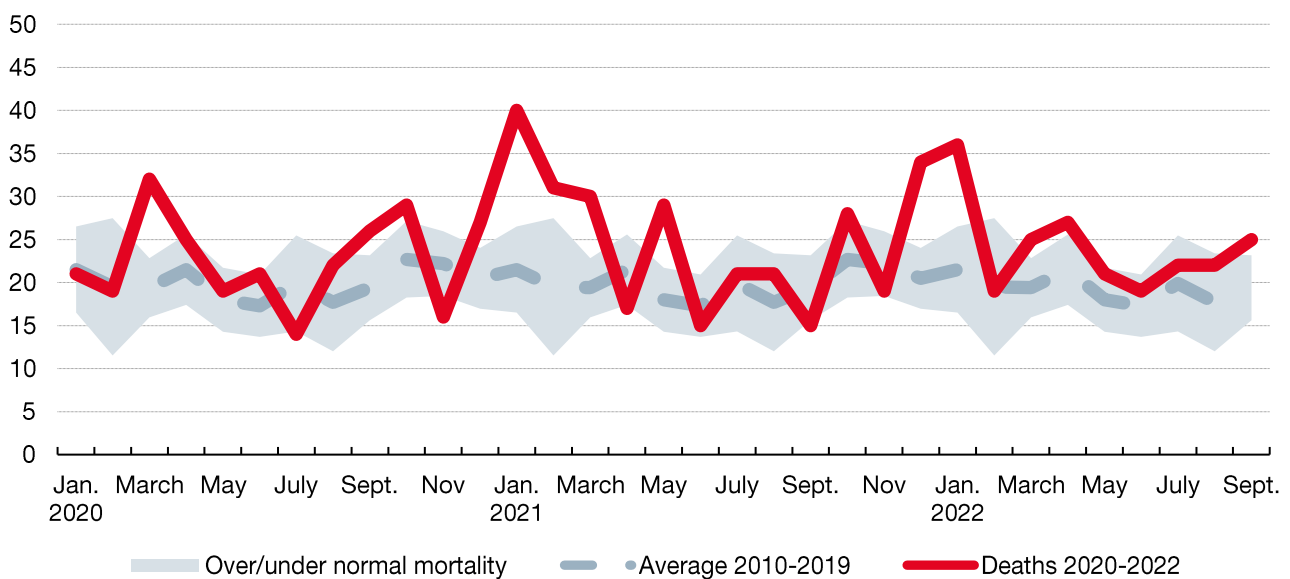
Figure 21. Cumulative number of deaths of residents between January and September in Monaco



Sources: Town Hall, Monaco Statistics

In the first nine months of 2022, 216 resident deaths were recorded, 42 more than the 2010-2019 average. This is the second highest number of deaths in the first nine months since 2005 (the beginning of the observation period).

Figure 22. Monthly number of deaths of residents in Monaco



Interpretation: in September 2022, 25 resident deaths were recorded in Monaco compared to an average of 19 between 2010 and 2019, for a normal over/under mortality of between 16 and 23 deaths.

Sources: Town Hall, Monaco Statistics

In September 2022, the number of resident deaths (25) is higher than the normal over mortality (23). At the same period last year, 15 deaths were recorded.

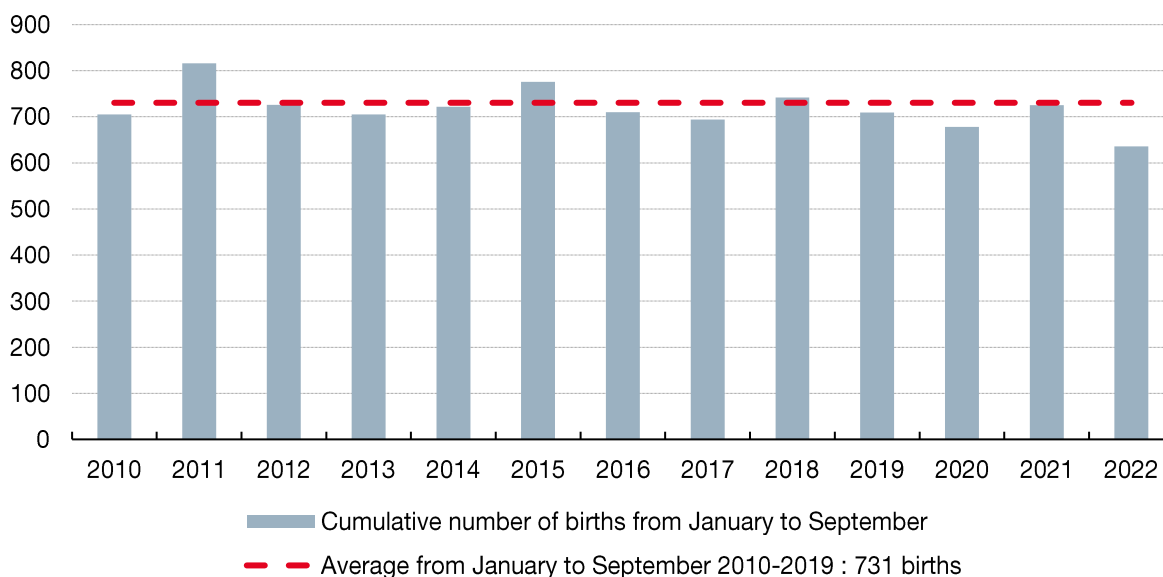
2.3 Analysis of births

The over/under birth rate is a two-sided confidence interval of the average 2010-2019 birth rate at the 99% threshold following a Student's law. By comparing it to the observed birth rate between 2020 and 2022, it allows a significant surplus or deficit of births to be represented in relation to the normal.

2.3.1 Births in Monaco, all places of residence combined

These are all births registered in Monaco, regardless of place of residence.

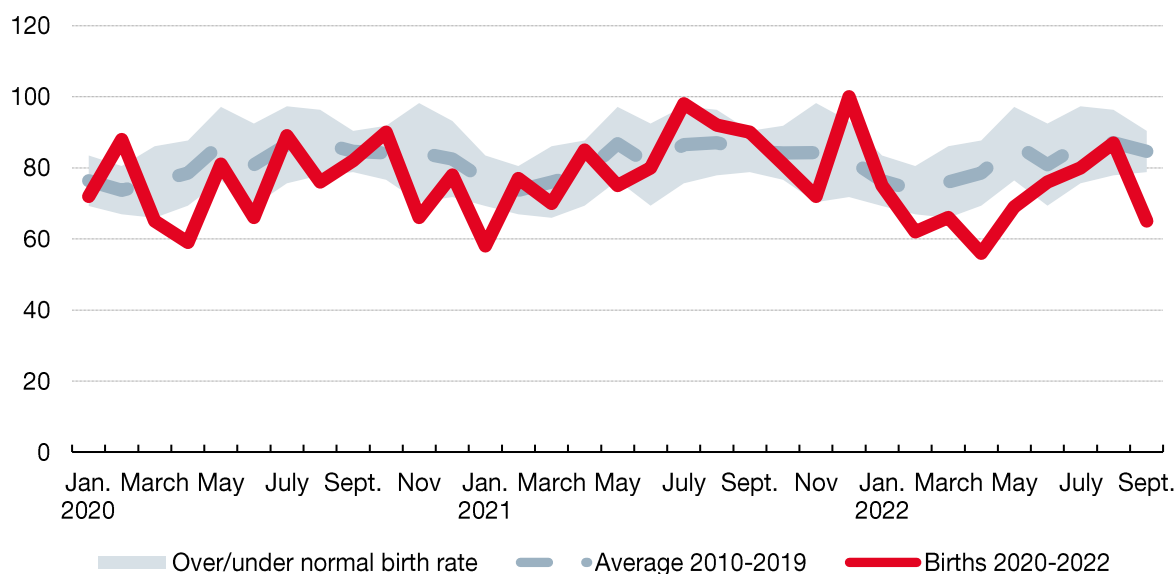
Figure 23. Cumulative number of births between January and September in Monaco



Sources: Town Hall, Monaco Statistics

With 636 births recorded in Monaco between January and September 2022 compared with an average of 731 between 2010 and 2019, the birth rate is at its lowest level since 2005.

Figure 24. Number of monthly births in Monaco



Interpretation: in September 2022, 65 births were registered in Monaco compared to an average of 85 between 2010 and 2019, for a normal over/under birth rate of between 79 and 90 births.

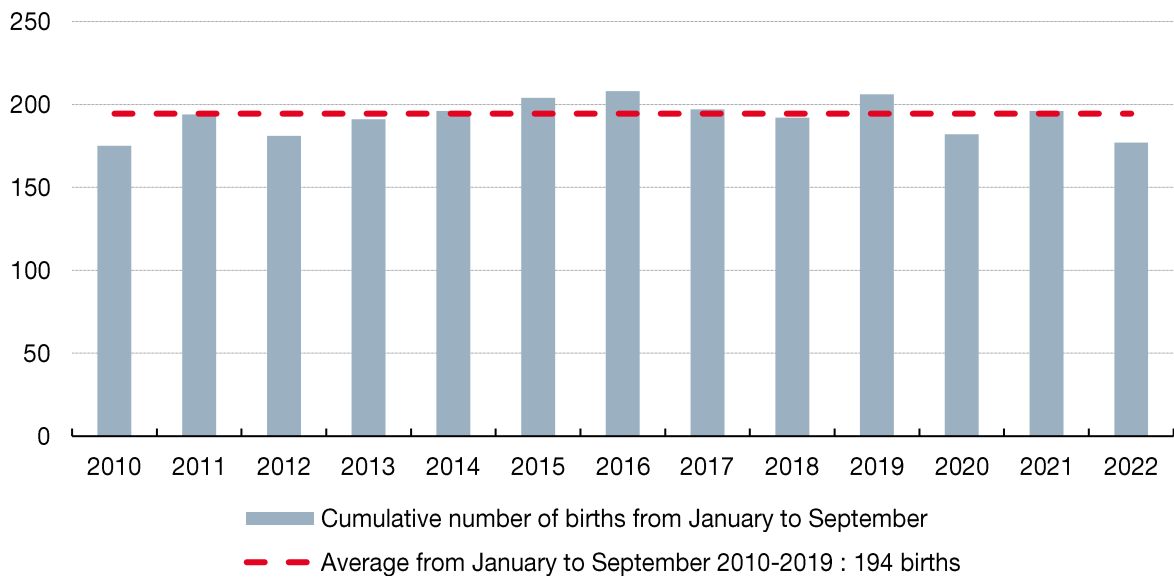
Sources: Town Hall, Monaco Statistics

After recording 87 births in August, the number of births in September (65) was well below its 2010-2019 average (85), as it was the case during the first seven months of this year. At the same time last year, the Principality recorded 90 births.

2.3.2 Births of residents in Monaco

These are only births to residents of Monaco (resident father and/or mother).

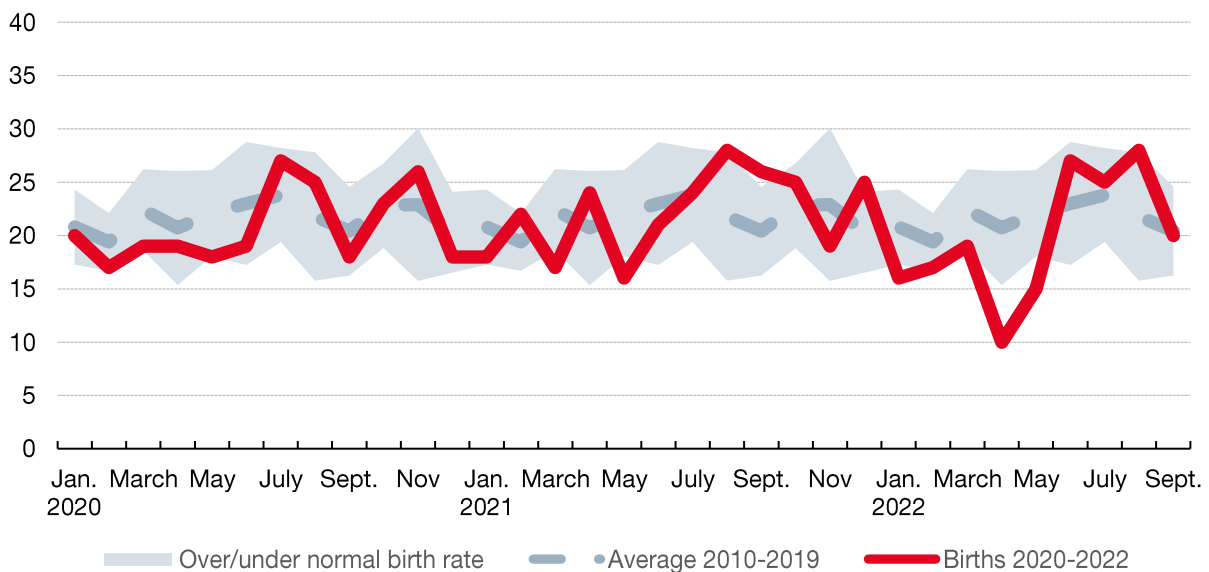
Figure 25. Cumulative number of births of residents between January and September in Monaco



Sources: Town Hall, Monaco Statistics

As of 30 September, 177 resident births were registered in 2022, 17 fewer than the 2010-2019 average.

Figure 26. Number of monthly births of residents in Monaco



Interpretation: in September 2022, 20 resident births were recorded in Monaco, for a normal over/under birth rate of between 16 and 25 births.

Sources: Town Hall, Monaco Statistics

After being below the normal under-birth rate for the first 5 months of 2022, the number of resident births has been in the upper limit of the normal over/under birth rate range since June. In September 2022, 20 births were registered, exactly its 2010-2019 average.

Observatory of the impacts of the COVID-19 health crisis

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