



COVID-19

Five Years On

Directorate of Health
Chief Epidemiologist for Iceland

The COVID-19 pandemic began in late 2019, when the first cases were linked to a live animal market in Wuhan, China. The disease, caused by a novel coronavirus, initially manifested as a spate of pneumonia cases. On December 31, 2019, Chinese authorities notified the World Health Organization (WHO) about the outbreak. By January 30, 2020, the WHO declared a Public Health Emergency of International Concern (PHEIC).

At this juncture, we remember those who lost their lives to the pandemic and extend gratitude to health professionals, first responders, and the public for their sacrifices. The pandemic brought significant changes-many experienced loneliness, young people missed opportunities during critical formative years, and some continue to suffer from the long-term effects of COVID-19.



The WHO's Director-General offers a mixed answer: Yes and no. While nations have committed to learning from COVID-19 to build a healthier future, success depends on transparency, information sharing, cooperation, and trust.

Executive Summary

The COVID-19 pandemic, which emerged in late 2019, profoundly reshaped the world. The virus led to unprecedented public health and societal challenges, from its initial outbreak in Wuhan, China, to its global spread. Governments implemented widespread measures, such as lockdowns, activity restrictions, and mask mandates, while healthcare systems struggled under immense strain. Rapid vaccine development became a milestone, with mRNA technology at the forefront.

Over the past five years, the pandemic transitioned from acute crisis to endemic management. Variants like Delta and Omicron caused significant waves of infections, but immunity through vaccination and prior infections have reduced the severity of cases.

Key lessons include the importance of pandemic preparedness, global cooperation, and technological innovation. Iceland's response exemplified how robust coordination and public participation can mitigate impacts and achieve favorable outcomes. Building resilience in health systems and societies will be essential in addressing future pandemics.

The Initial Outbreak and Spread

From December 2019 to January 2020, the virus spread rapidly within Wuhan and to other parts of China. On January 23, 2020, Wuhan was placed under lockdown, but the virus had already spread internationally. Cases outside China were first reported in Thailand, Japan, and South Korea.

In January, the virus was sequenced, and a PCR test was developed. Initially named 2019-nCoV, the virus was later renamed SARS-CoV-2, but the disease was called COVID-19.

Distribution to Europe and globally

By late January and February 2020, the virus had reached Europe, with cases confirmed in Italy, France, and Germany. The first U.S. case was reported in Washington state.

Italy, especially Lombardy and Veneto, became the epicenter of Europe. The virus spread quickly through the continent, aided by international travel and delayed containment measures.

The first case in Iceland was diagnosed on [28 February 2020](#) in an Icelandic middle-aged male returning from a ski resort in Northern Italy. The man had mild symptoms but was placed in isolation in hospital as a precaution. The first domestic transmission was diagnosed on 6 March 2020.

The virus's rapid global spread was fueled by:

- **A new virus:** Routes of transmission, symptoms, and impact were poorly understood.
- **Cross-border travel:** Tourism accelerated the spread.
- **Delayed response:** Many nations underestimated the severity early on.
- **Asymptomatic transmission:** Infected individuals without symptoms unknowingly spread the virus.

On [March 11, 2020](#), the WHO declared a global pandemic. The virus had spread to nearly every country, health systems were overwhelmed, and unprecedented public health measures became necessary.

The COVID-19 pandemic evolved significantly from 2020 to 2023, marked by waves of infections, severe illness and deaths early on, the development and distribution of vaccines, the emergence of new variants, and shifts in public health strategies:

2020: The Onset of the Pandemic

- **Healthcare Strain:** Hospitals faced overcrowding, and personal protective equipment was scarce.
- **Restrictions:** Quarantine, isolation, lockdowns, travel restrictions, and masks were implemented globally amid uncertainty.
- **Economic Impact:** Businesses closed, unemployment rose, and economies slumped.
- **Vaccine Development:** By mid-2020, promising vaccines emerged, including using mRNA technology. Authorizations of vaccines marked a milestone in the pandemic response.

2021: Vaccines and Variants

- **Vaccination Campaigns:** Healthcare workers and vulnerable groups were prioritized.
- **Uneven distribution of vaccines:** Rich nations secured most of the vaccines, leaving poorer nations with limited access.
- **Variants of Concern:** Alpha, Beta, and Delta variants emerged. Delta, more contagious, caused widespread outbreaks even among vaccinated individuals. However, the vaccines reduced the number of deaths and the severity of illness.
- **Easing Restrictions:** Widespread vaccination allowed gradual easing of restrictions, though measures like masks and distancing remained in some areas.

2022: The Omicron Variant

- **Omicron Emergence:** Highly infectious subvariants (BA.2, BA.4, BA.5) dominated in 2022. Case numbers were high but immunity due to vaccines and prior infections reduced the severity of illness.
- **Booster Campaigns:** Booster doses were introduced to maintain immunity.
- **Public Health Shifts:** Restrictions were lifted, and governments transitioned to living with the virus.
- **Treatment Advancements:** Paxlovid and monoclonal antibodies became widely available, complementing vaccines.

2023: Transition to Endemic Status

- **Decline in Cases:** COVID-19 began to be treated as an endemic disease, akin to the flu.
- **Updated Vaccines:** Targeted booster doses were recommended for at-risk groups.
- **Global Cooperation:** Efforts focused on equitable vaccine and treatment access for underdeveloped regions.

2024: Living with COVID-19

- **New Variants:** Infections remained present and variants like KP.2, KP.3, and XEC emerged without significantly altering disease severity.
- **Adaptation to new circumstances:** Focus on vaccinations, updated public health policies, and international cooperation.

COVID-19 in Iceland

Iceland's response was characterized by coordination, robust monitoring, and evidence-based decision-making.

- Emphasis was placed on testing, isolation, quarantine, contact tracing, and vaccinations.
- The health service was under significant pressure but was not overwhelmed.
- Public participation and support for the measures was generally high.
- Vaccination rates were high, which [saved lives](#).
- The government learned from experience and made policy changes as new data emerged.
- The measures in Iceland were relatively mild, vaccinations were widespread, and the outcome was favorable in an international comparison.

In 2022, Iceland's Prime Minister's Office published a comprehensive review of crisis management during the pandemic. While health system resilience was not assessed or economic measures, calls for such evaluations have been made.

Overview of COVID-19 Pandemic Statistics in Iceland

2020:

Two waves occurred in 2020 (Figure 1) and the highest incidence was among 18–29 year olds. The lowest infection rates were in the youngest (12 years and younger) and oldest (70–89 years) groups, except for the very oldest (≥ 90 years). A total of over 6,000¹ individuals in Iceland were diagnosed with COVID-19 in 2020. The gender distribution was equal and has remained so. Most infections were considered to originate domestically, but 15% were traced to other countries.

A total of 315 people were hospitalized due to COVID-19, of which 53 were in intensive care (Figure 2). The number of admissions to intensive care was highest at the end of March and the beginning of April with an average of 10–14 people in intensive care each day.

Registration of deaths due to COVID-19 was coordinated internationally in 2020 to facilitate comparisons between countries. A total of 29 inhabitants of Iceland died due to COVID-19 in 2020, 15 men and 14 women. All were over sixty, most of them in the 80–89 years age group.

A vaccination campaign against COVID-19 began at the end of 2020. The first step was to vaccinate frontline healthcare workers and individuals in nursing homes and hospital geriatric wards.

¹ It is possible to be diagnosed with COVID-19 more than once. The defined interval for a COVID-19 episode or a case is 60 days. Thus, the number of cases diagnosed yearly is higher than the number of individuals.

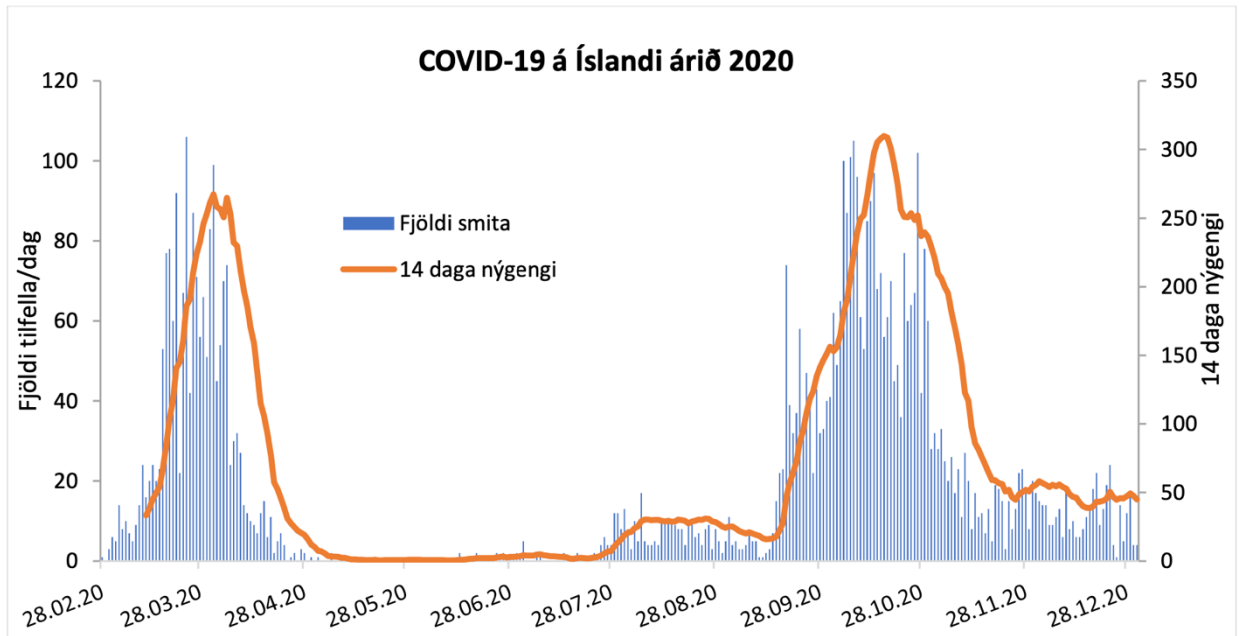


Figure 1. Number of cases and incidences in Iceland in 2020.

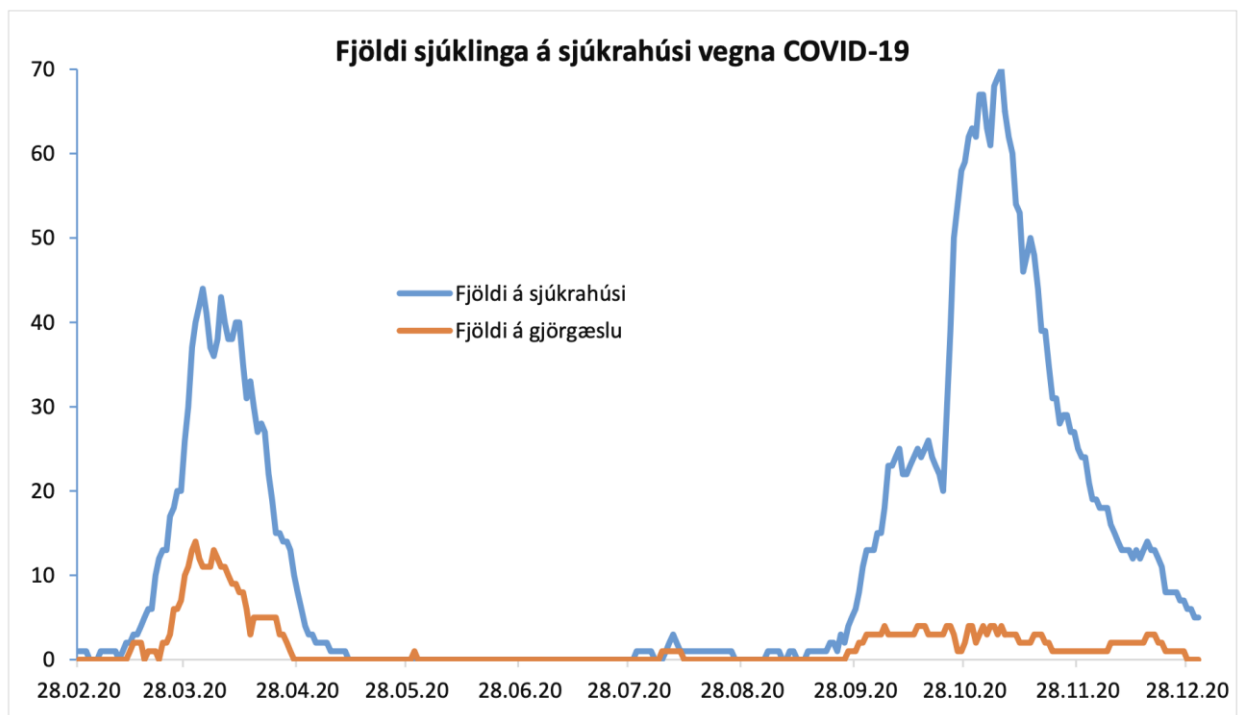


Figure 2. Patients admitted to hospital due to COVID-19 in Iceland in 2020.

2021:

In 2021, a total of 25,000 individuals were diagnosed with COVID-19. At the beginning of the year, diagnoses were relatively rare, but in mid-summer, the number increased with the emergence of the Delta variant and remained high for the rest of the year (Figure 3). The first Omicron cases were detected in Iceland at the end of November. Subsequently, the number of cases increased significantly and a new wave, the largest so far, began in mid-December.

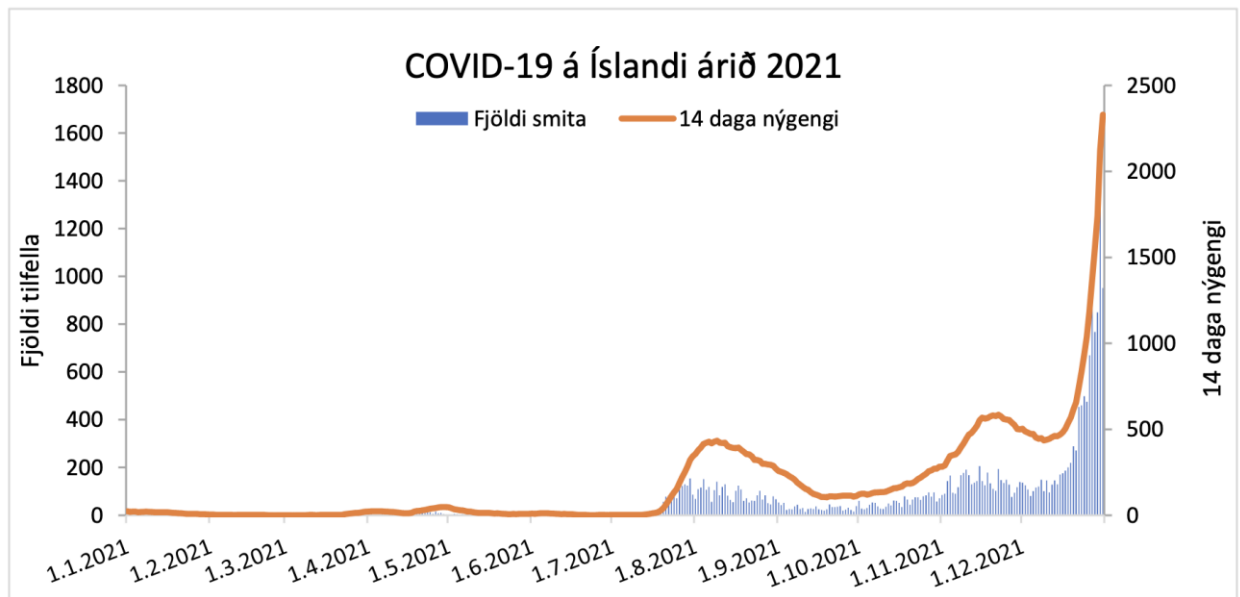


Figure 3. Number of cases and incidences in Iceland in 2021. Note Y-axis is different from Figure 1.

As vaccines arrived in Iceland in 2021, more priority groups were vaccinated and by mid-summer, everyone 16 years and older had been offered vaccination. Vaccinations of children aged 12–15 began in August. Participation in the vaccination was good and by the end of the year, over 90% of 12-year-olds and older had received two vaccinations.

In 2021, the highest incidence of cases was in 6–12-year-olds, but that age group had not yet been offered vaccination; The incidence was lowest in 80-year-olds and older. A total of 300 people were hospitalized due to COVID-19, of which 55 were in intensive care. The number of people hospitalized peaked in connection with waves of infection in the second half of the year (Figure 4).

Six people died due to COVID-19 in 2021: one woman and five men. Two were under sixty, two were aged 60–79 and one was 80 years or older.

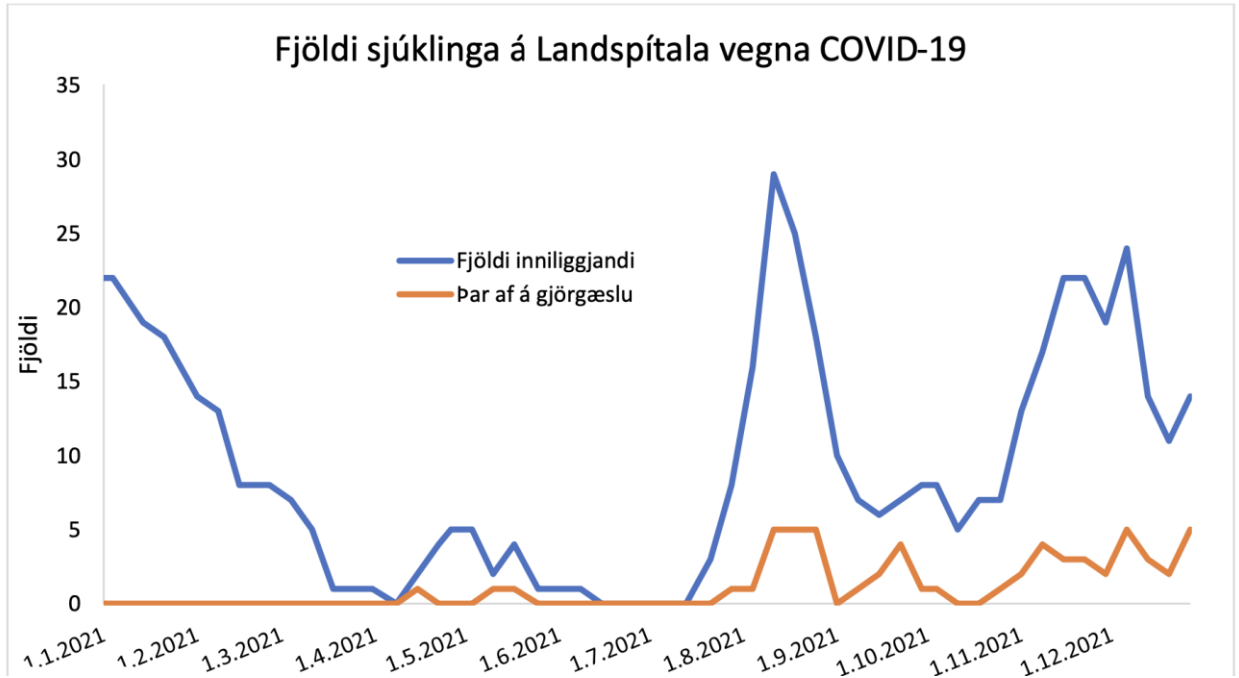


Figure 4. Patients admitted to hospital due to COVID-19 in Iceland in 2021. Note Y-axis is different from Figure 2.

2022:

The Omicron wave that began in mid-December 2021 continued to grow at the beginning of 2022 (Figure 5). The wave peaked at the end of February when the incidence of cases was the highest during the pandemic. In 2022, more than 121,000 individuals were diagnosed with COVID-19.

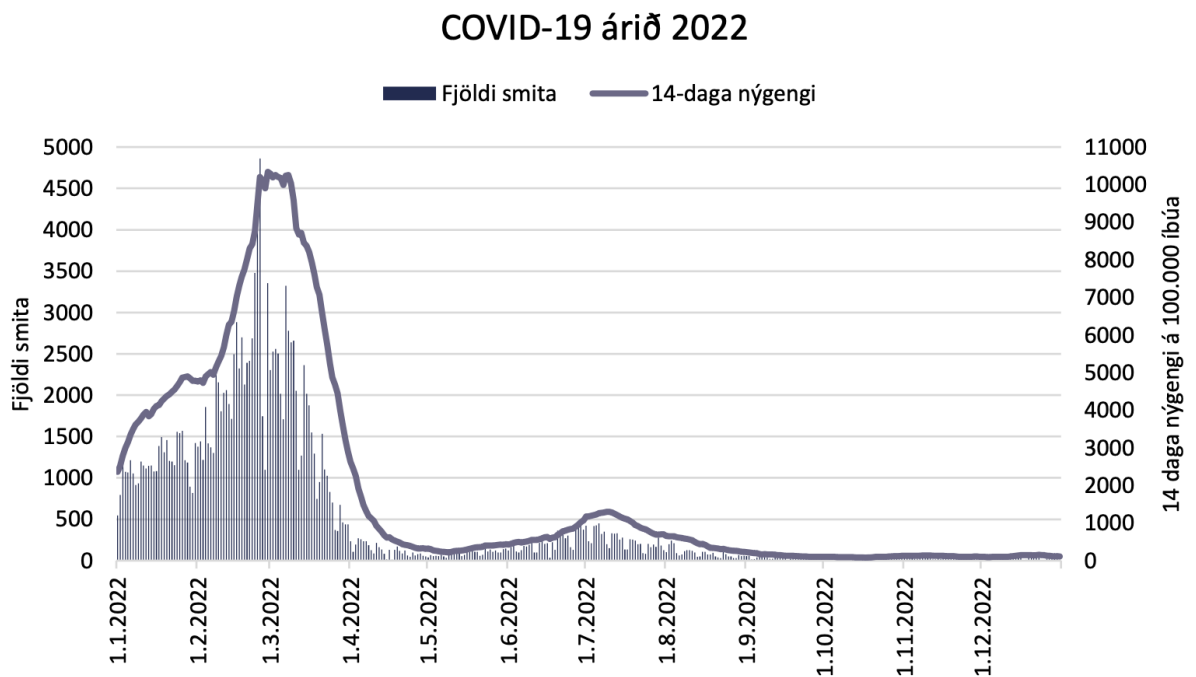


Figure 5. Number of cases and incidences in Iceland in 2022. Note Y-axis is different from Figures 1 and 3.

Due to the number of diagnoses, the healthcare system was under significant strain when case numbers were at their peak. However, proportionately fewer became seriously ill compared to previous years, mostly due to more widespread immunity in the community due to previous infections and vaccinations. A total of 1600 individuals were admitted to Landspítali University Hospital due to COVID-19, with just over 100 in intensive care. The number of people hospitalized peaked in connection with the Omicron wave at the beginning of the year and a smaller wave in the summer (Figure 6), fewer were admitted in the autumn and winter.

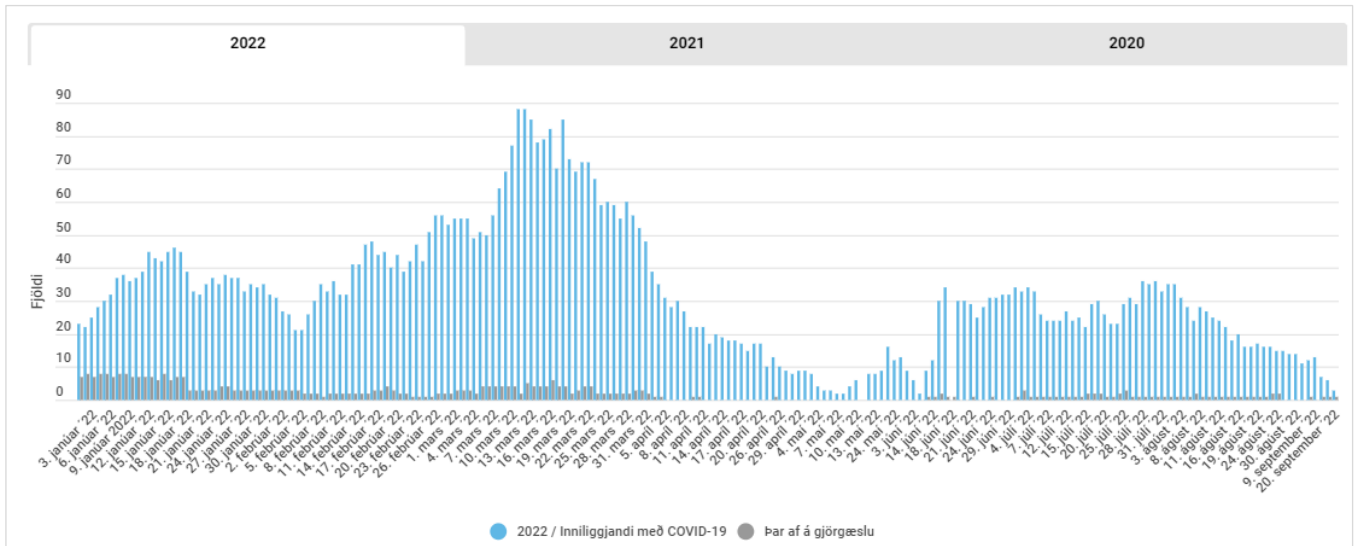


Figure 6. Patients admitted to Landspítali Hospital due to COVID-19 in 2022 until 20 September. Figure from Landspítali,

On February 25, 2022, all public infection control measures due to the COVID-19 pandemic in Iceland were lifted. The number of diagnoses gradually decreased but many continued to be diagnosed until the middle of the year.

At the beginning of 2022, vaccinations against COVID-19 were offered to 5–11-year-olds for the first time. At the same time, there was a rapid increase in infections due to the Omicron variant, which is the most likely explanation for the large difference in the number of children who received the first dose and the second dose, but children who were infected before the time for the second dose also did not all return to vaccination later.

A second booster dose was recommended for certain risk groups in the spring of 2022 to try to reduce serious illness in the most vulnerable individuals. In the autumn of 2022, a fourth to fifth dose was generally recommended for 60 years of age and older, in parallel with influenza vaccination.

In 2022, 213 individuals died due to COVID-19, 104 men and 109 women, which is the highest number of deaths from the disease recorded in Iceland in a single year. Most people died around March following the Omicron wave, but also in July linked to a smaller wave of infections. Of those who died, five were under sixty, 59 were aged 60–79 and 149 (70%) were 80 years or older.

Excess mortality is a measure of death from all causes beyond what could be expected for a given period, e.g. based on previous years or prediction of what could have been expected. In 2022, the total mortality

rate was higher than the average for the eight years (2012–2019) before the COVID-19 pandemic, with 705 deaths per 100,000 inhabitants compared to 647 per 100,000 during the reference period (8.9% higher mortality). In 2020 and 2021, however, the mortality rate was lower than in the reference period (about 3% lower each year).

On the Directorate of Health website, a [dashboard](#) on excess mortality and deaths due to COVID-19 is updated regularly. The scientific journal [Lancet](#) recently published an article on excess mortality due to COVID-19. The article states that the age-standardized excess mortality during the COVID-19 pandemic was the second lowest in Iceland in 2020–2023 or 1.95/10,000 inhabitants. The incidence was lowest in Sweden, 1.82/10,000 inhabitants, and the average for countries in Northern Europe was 6.6/10,000 inhabitants.

2023:

In 2023, just over 2,500 individuals were diagnosed with COVID-19, far fewer diagnoses than in 2020–2022 (Figure 7). Keep in mind that general testing was not ongoing as in previous years. There were a considerable number of admissions to hospital with and due to COVID-19 during the year (Figure 8).

In May 2023, the WHO declared that COVID-19 was no longer considered an acute threat to public health, but such a situation had been declared since the end of January 2020.

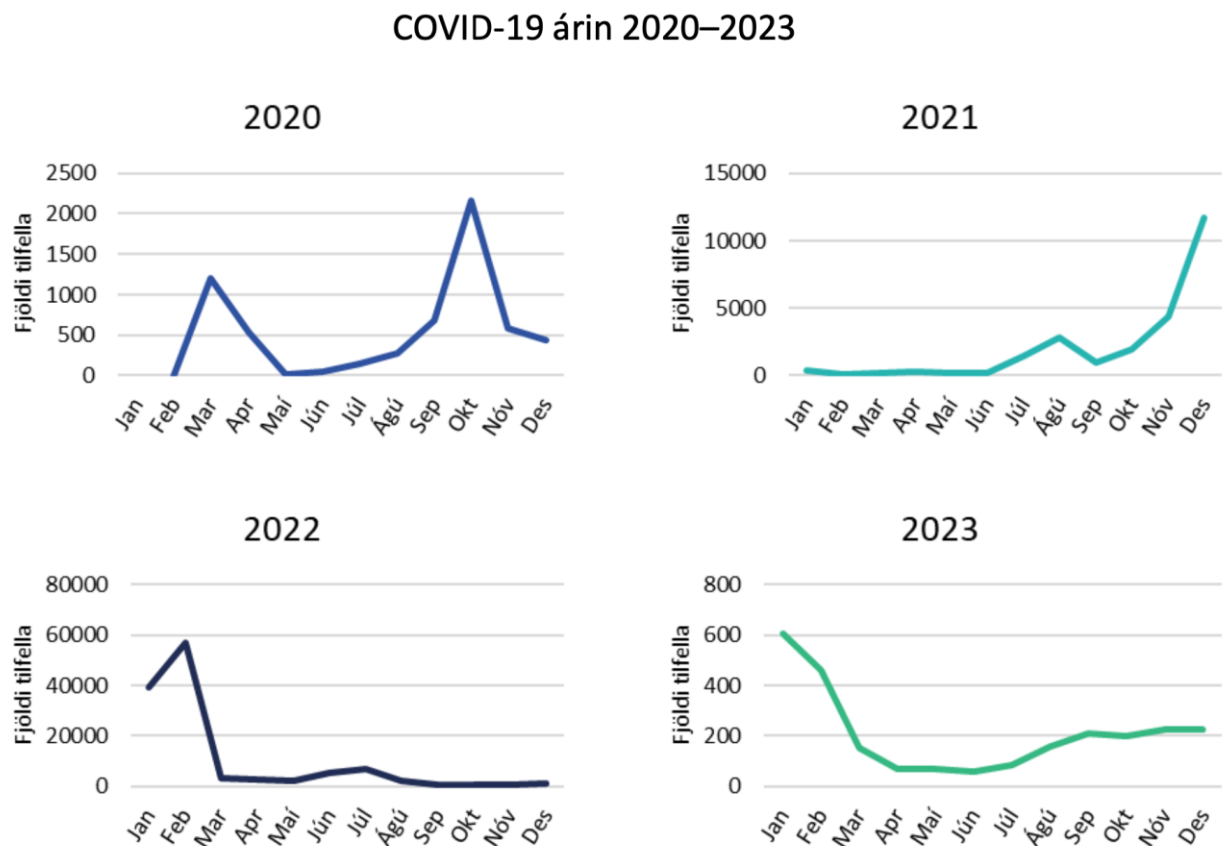


Figure 7. Number of COVID-19 cases 2020–2023. Note Y-axes vary between figures.

In the summer of 2023, the focus of COVID-19 vaccinations was shifted to the annual vaccination of most risk groups and offered in the autumn. Vaccinations of adults outside risk groups were limited to staff attending risk groups, including healthcare staff and staff in nursing homes.

A total of 47 individuals died due to COVID-19 in 2023, 24 men and 23 women. Of the 47 who died, two were under sixty, 14 were aged 60–79 and 31 (66%) were 80 years or older.

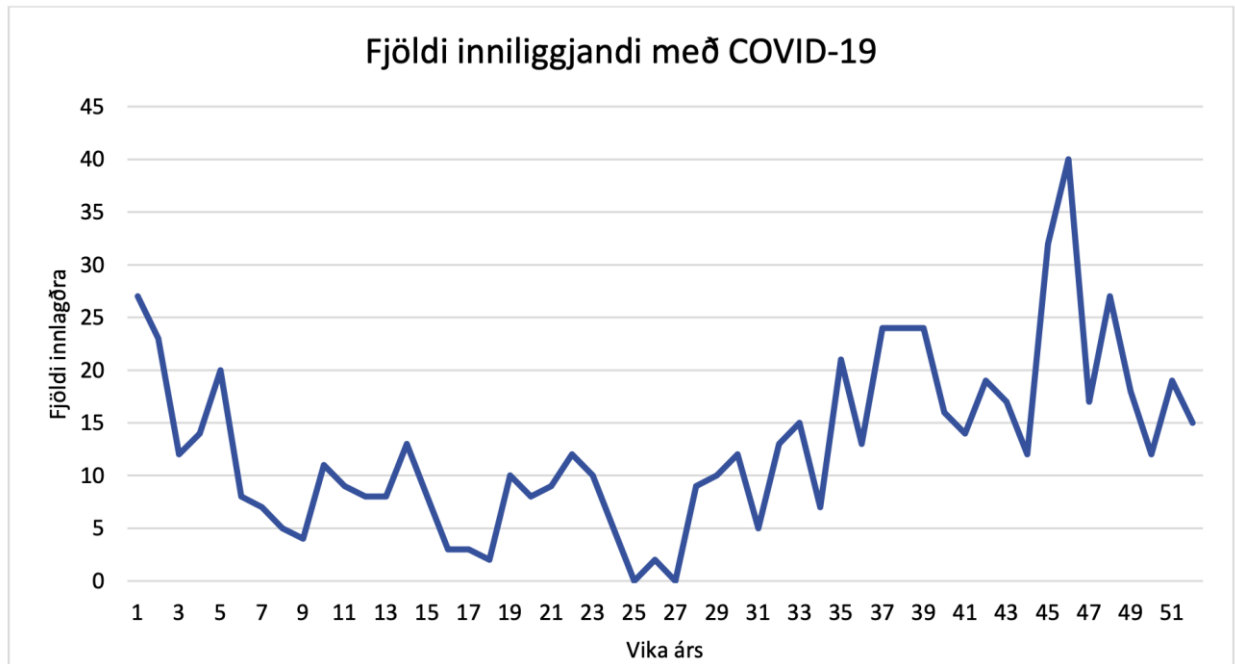


Figure 8. Hospitalized patients with COVID-19 at Landspítali in 2023. Note Y-axis is different from Figures 2 and 4.

2024:

Reported case numbers to the Chief Epidemiologist do not indicate the exact number of infections, as many people do not undergo a PCR test despite symptoms, or they use rapid tests at home. The PCR test that is used tests for all major respiratory viruses that circulate in the community. Diagnoses then function as a kind of screening and give an idea of the situation in society at any given time and whether an increase is underway.

Most tests for respiratory infections are now performed in hospitals, but around 950 individuals were diagnosed with COVID-19 in 2024. Most were 65 years and older, but the second most in the age group under five years; 476 individuals were admitted to Landspítali University Hospital with COVID-19 during the year.

Seasonal patterns have not become noticeable for COVID-19 but vaccinations for risk groups were recommended in the autumn of 2024 when an increased frequency of respiratory infections was expected. In recent years, the number of COVID-19 diagnoses has increased more in winter than in summer. In 2024, the number of diagnoses increased during the summer but then did not increase significantly until the end of 2024 (Figure 9).

According to preliminary figures, 16 people died due to COVID-19 in 2024, four aged 60–79 and 12 people aged 80 and older. However, the review of death certificates is not complete, so the numbers may change.

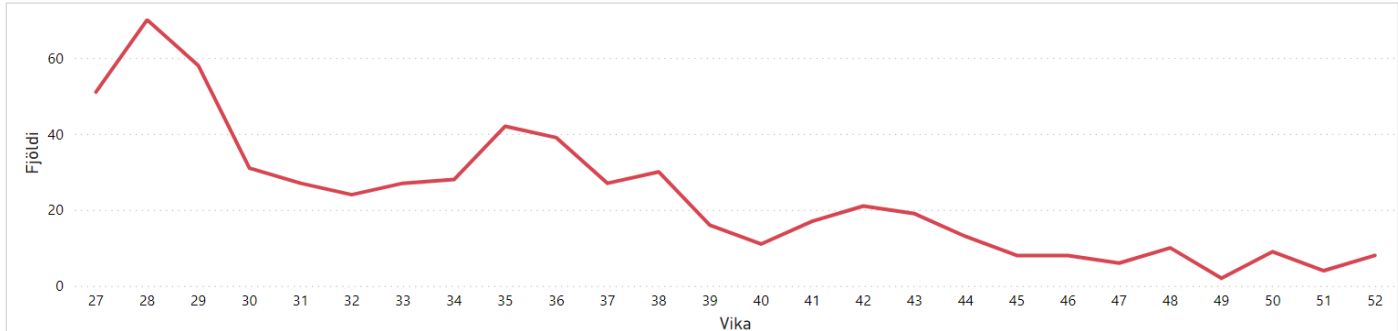


Figure 9. Number of COVID-19 diagnoses in 2024 from 1 July (week 27) until 31 December.

Lessons Learned

There are many lessons to be learned from the COVID-19 pandemic. The following list is not exhaustive, but a few important factors are:

- 1. Preparedness:**
 - Investment in surveillance systems, health infrastructure, and stockpiles is critical.
 - Preparedness plans must be updated and regular exercises conducted.
- 2. Vaccine Development:**
 - International collaboration and innovation were pivotal in rapid vaccine development and rollout.
- 3. Global Cooperation:**
 - Unequal vaccine access underscored the need for equitable resource distribution.
- 4. Public Health Measures:**
 - Quarantine, isolation, contact tracing, distancing, and masks were effective tools, especially pre-vaccine.
 - Clear and effective communication and information sharing are essential to ensure trust and cooperation between the public and stakeholders.
- 5. Resilience:**
 - Weaknesses in supply chains and social safety nets were exposed, which call for reforms.
 - Remote work and digital solutions, as well as the adaptability of individuals, institutions and companies, were key factors in keeping societies and operations running.

The Way Forward

1. Living with COVID-19:

- Regular outbreaks may persist, with annual vaccinations akin to flu shots

2. Global Collaboration and strengthening health systems:

- Investment in preparedness must be prioritized, as well as strengthening a health system that has the flexibility to expand operations when needed.
- International collaboration to address pandemics is essential.

3. Technological Innovation:

- Advances in mRNA technology could lead to breakthroughs in vaccines.
- Artificial intelligence and big data sets will enhance responses to future health threats.

4. Building Resilience:

- Education, awareness, and combating mis- and disinformation will foster public trust and preparedness.

The Chief Epidemiologist

References:

1. [World Health Organization \(WHO\) 30.12.2024](#)
2. [Chief Epidemiologist's Yearly Reports 2020–2023](#)
3. [Excess deaths and COVID-19-related deaths – Dashboard \(data obtained January 2025\)](#)
4. [Lessons identified for a future pandemic. Cunningham, Hopkins \(2023\)](#)
5. [Lives saved in the European Region. Meslé et al. \(2024\)](#)
6. [Excess mortality in Europe 2020-2023. Pizzato et al. \(2024\)](#)