

## Public health laboratory capacity

A resilient health system is able to generate a robust increase in essential services. When a pandemic, epidemic or other infectious disease occurs, identifying, containing and controlling it requires the scale up of laboratory services. This was evident during the COVID-19 pandemic, with diagnostic testing and genomic sequencing services under stress at the beginning of the pandemic. Genomic surveillance of SARS-CoV-2 (the virus that causes COVID-19) allows detection, monitoring and assessment of new virus variants (ECDC, 2021<sup>[1]</sup>). When it replicates, SARS-CoV-2 can manifest changes in its genome. Scaled up capacity is especially important when mutations are associated with changes in transmissibility or the effectiveness of countermeasures such as vaccines. The cost of sequencing has fallen over time but still requires substantial investment in staff, equipment and bioinformatics infrastructure.

A review of capacity for SARS-CoV-2 in EU countries identified most did not have the capacity to sequence the 5-10% of positive specimens suggested by the EC in January 2021 (ECDC, 2021<sup>[2]</sup>). Nineteen (of 27 EU/EEA countries) were sequencing less than 1% of positive specimens at the beginning of 2021. During 2021, there was a rapid expansion in sequencing: 1.8 million SARS-CoV-2 samples were sequenced in the 27 EU countries, Norway and Iceland. This was a 15-fold increase over 2020 and the percentage of positive tests sequenced increased from less than 1% in 2020 to an average of 7% across countries (4.3% weighted) in 2021 (Figure 8.5). There was, however, wide variation between countries. Six EU countries sequenced 10% or more of new cases and two EU countries sequenced less than 1%.

Sequencing an appropriate proportion of new cases over time also matters. The ECDC issued guidance for representative SARS-CoV-2 monitoring using genomic surveillance (ECDC, 2021<sup>[1]</sup>). Three countries met this guidance over 2021 for all weeks (Denmark, the Netherlands and Spain), while eight countries met this guidance for less than 10 weeks over 2021 (Figure 8.6). More countries were able to meet the thresholds in the later months of 2021 than earlier, demonstrating an increase in sequencing capacity.

Despite a rapid expansion in sequencing capacity in 2021, further improvements are crucial to ensure better and more timely evidence for decision-making in health systems and beyond. The ability to rapidly undertake sequencing and share the results is important to effective global responses.

### Definition and comparability

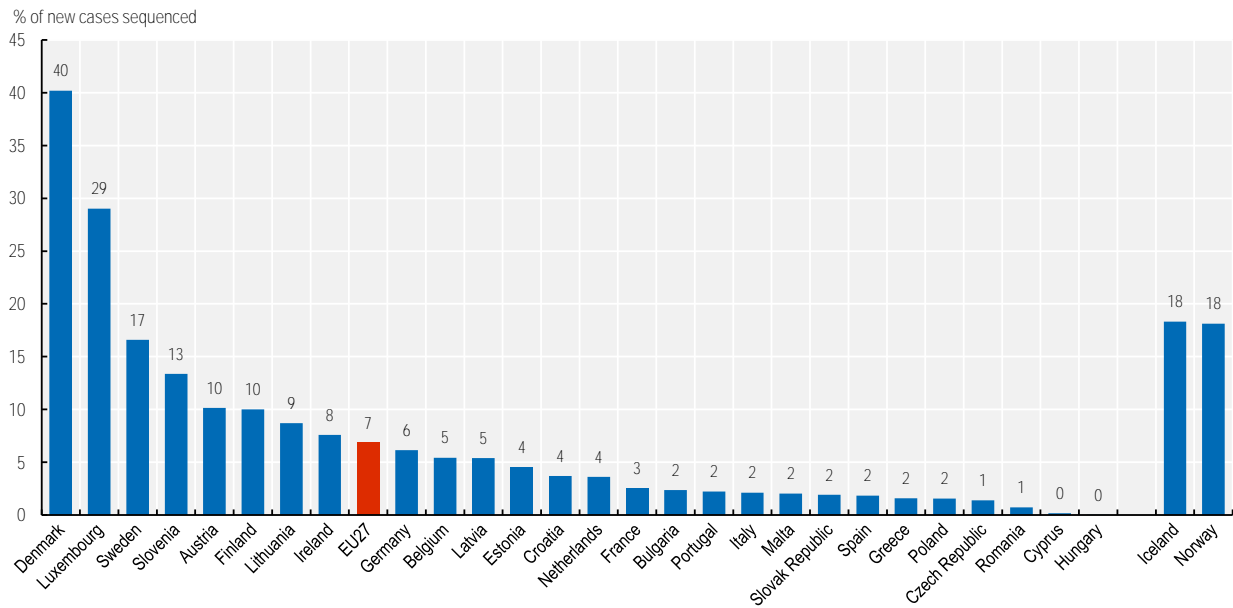
The results presented for this indicator come from the ECDC COVID-19 sequencing data (<https://www.ecdc.europa.eu/en/publications-data/data-virus-variants-covid-19-eueeea>). Positive cases and the subsequent sequencing are impacted by local testing strategies, laboratory capacity and the effectiveness of surveillance systems. Testing varied between countries, which impacts comparability. The portion of cases sequenced in 2021 is calculated as the aggregate of the weekly number of sequences conducted, divided by the aggregate of the weekly number of new cases. Timing of sequencing relative to testing may introduce a bias. Longer periods (for example, monthly rather than weekly) for the representative sampling alter the results. The number of weeks where the ECDC monitoring threshold was exceeded is based on the guidance for representative and targeted genomic SARS-CoV-2 monitoring released in May 2021. The threshold used was the recommended sample size needed to estimate a 2.5% minimum prevalence of a variant (ECDC, 2021<sup>[2]</sup>). No new cases or when 90% of the new cases were sequenced was counted as meeting the threshold.

### References

ECDC (2021), *Detection and characterisation capability and capacity for SARS-CoV-2 variants within the EU/EEA*, <https://www.ecdc.europa.eu/en/publications-data/detection-and-characterisation-capability-and-capacity-sars-cov-2-variants>. [2]

ECDC (2021), *Guidance for representative and targeted genomic SARS-CoV-2 monitoring*, <https://www.ecdc.europa.eu/en/publications-data/guidance-representative-and-targeted-genomic-sars-cov-2-monitoring>. [1]

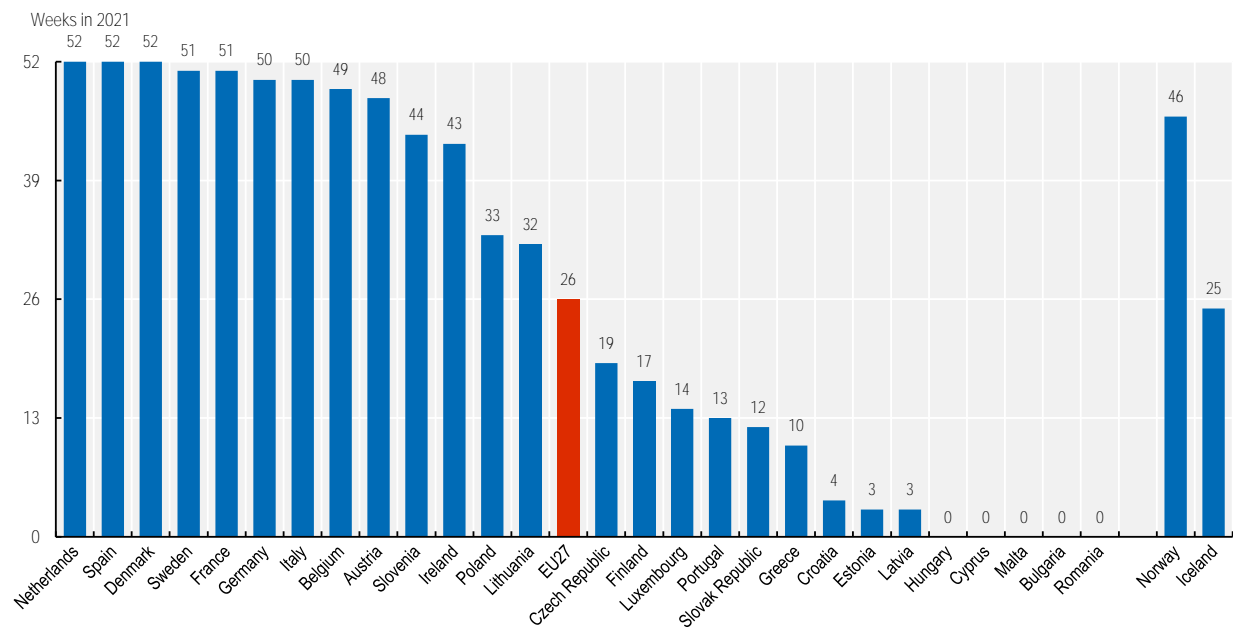
Figure 8.5. Percentage of new cases of COVID-19 sequenced, 2021



Note: The EU average is unweighted.  
Source: ECDC (2022).

StatLink <https://stat.link/w3rv5e>

Figure 8.6. Number of weeks where ECDC threshold for representative genomic SARS-CoV-2 monitoring was exceeded, 2021



Note: The maximum number of weeks was 52. The EU average is unweighted.  
Source: ECDC (2022).

StatLink <https://stat.link/3cs1ve>



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