

PUBLIC HEALTH LABORATORY CAPACITY TO CONTROL INFECTIOUS DISEASES THREATS

Infectious diseases and resistance to antibiotics are global public health threats. Resilient health systems depend on the ability to detect emerging diseases accurately in time to stop outbreaks and avert major international crises such as the recent Ebola epidemic (Albiger, 2018). Public health preparedness requires adequate capacity of microbiology laboratories to: 1) ensure rapid infection diagnostics to guide treatment, detect and control epidemics; 2) characterise infectious agents for designing effective vaccines and control measures; and 3) monitor the impact of prevention of infections and containment of antimicrobial resistance (AMR).

The ECDC is operating the EULabCap (European Laboratory Capability Monitoring System) to assess whether laboratory systems in EU/EEA countries have the critical capabilities and capacities for reliable communicable disease and antimicrobial resistance surveillance and control at Member State and EU levels (ECDC, 2018). In 2016, the EULabCap Index average for EU countries was 7.5 on a maximum scale of 10 (Figure 8.5). Country scores ranged from a low of 5.6 in Cyprus to a high of 9.6 in France. These results indicate that the EU has strong public health microbiology services that largely meet communicable disease surveillance and response requirements. However, only 18 EU countries (and Norway) showed sufficient laboratory capacity levels (defined as intermediate to high score) for at least 10 of the 12 EULabCap targets (ECDC, 2018).

National improvements in the areas of vulnerability have taken place in 24 EU countries since 2015. Steady increases in the EULabCap Index, and a narrowing score range between countries, indicate convergence towards more balanced laboratory capacities across countries.

Capabilities to diagnose EU notifiable diseases and antimicrobial resistance as well as laboratory contribution to surveillance networks are well in line with EU legislation and case definitions across the EU. Capacities for detection and surveillance of antimicrobial resistance improved steadily between 2013 and 2016 with wider use of standardised methods (Figure 8.6). EU capabilities of national reference laboratories for rapid detection of (re-) emerging diseases and drug resistance and participation in outbreak investigations also progressed over the years (Figure 8.7).

Some remaining gaps and inefficiencies still need to be addressed, including the development of clinical guidance for and adequate utilisation of diagnostic tests, upgrading surveillance programme to integrate

microbial genomic sequencing methods and digital connectivity of laboratory information with public health monitoring systems at national and EU levels (ECDC, 2018; Revez, 2018).

Definition and comparability

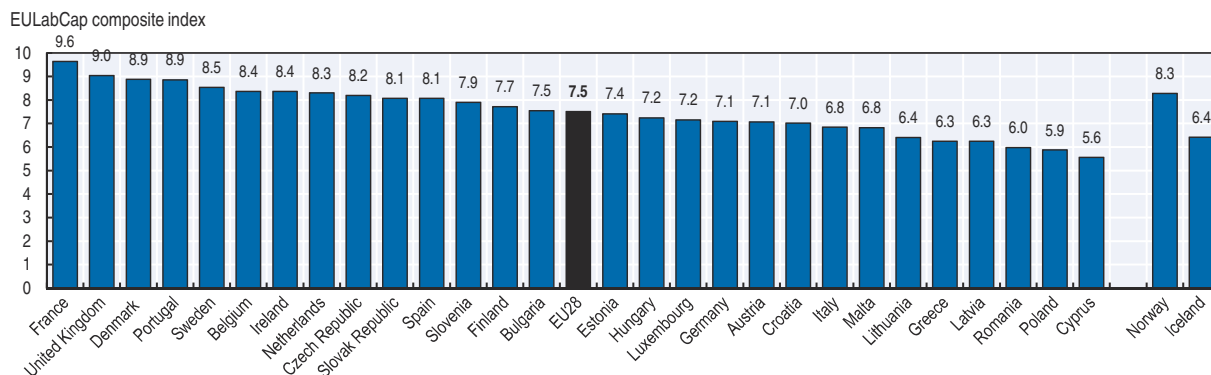
The results presented here are derived from the EULabCap monitoring surveys conducted annually in EU countries, Iceland and Norway by ECDC jointly with National Microbiology Focal Points since 2013. The EULabCap Index is a composite index composed of 60 technical indicators of laboratory structure, service range and outputs related to 12 public health targets aligned with EU policies and international standards and health regulations. The target measures are aggregated into the EULabCap Country system index, with 10 being the maximum score. The methodology is described in further detail in the EULabCap report (ECDC, 2018).

Data completeness is robust with 100% of countries and 97% of indicators data reported. However, the following limitations should be taken into account: 1) variable relevance for applicability of some indicators according to differences in national health systems or epidemiology; 2) country self-reported data; 3) indirect measurement of national capacity using EU-reported surveillance data; and 4) threat to comparability over time caused by annual updates of indicators following laboratory technology innovation.

References

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- ECDC (2018), "EU Laboratory Capability Monitoring System (EULabCap) – Report on 2016 survey of EU/EEA country capabilities and capacities", Stockholm, https://ecdc.europa.eu/sites/portal/files/documents/2016_EULabCap_EUreport_web_300418_final.pdf.
- Revez, J. et al. (2018), "Survey on the Use of Whole-Genome Sequencing for Infectious Diseases Surveillance: Rapid Expansion of European National Capacities, 2015-2016", *Frontiers in Public Health*, Vol. 5, Issue 347.

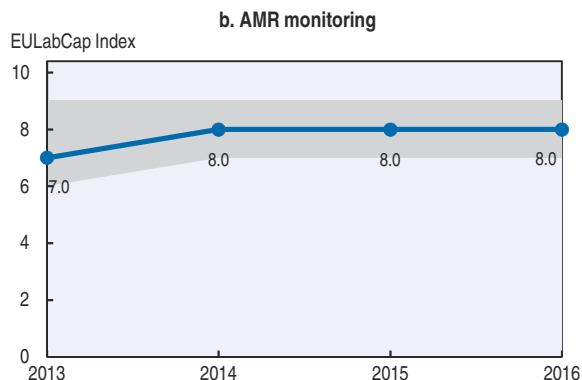
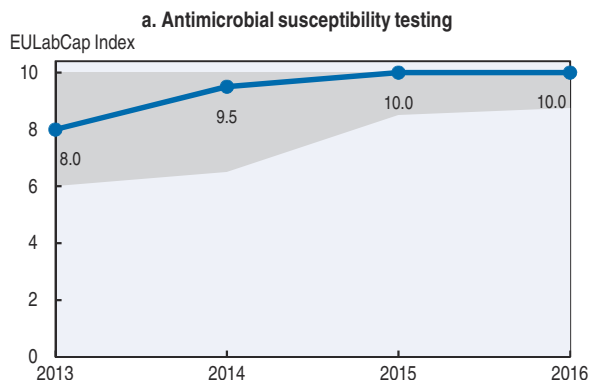
8.5. Composite index of national public health laboratory capacities, 2016



Note: The maximum score for this indicator is 10.
Source: ECDC (2018).

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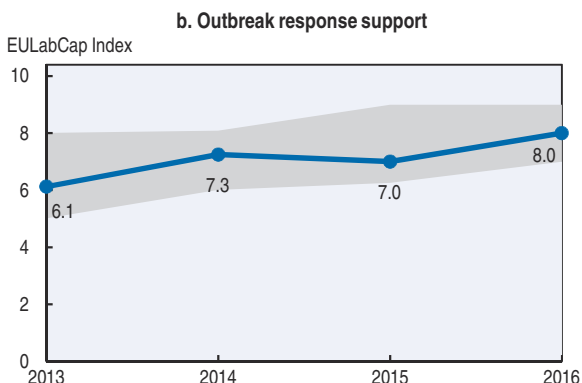
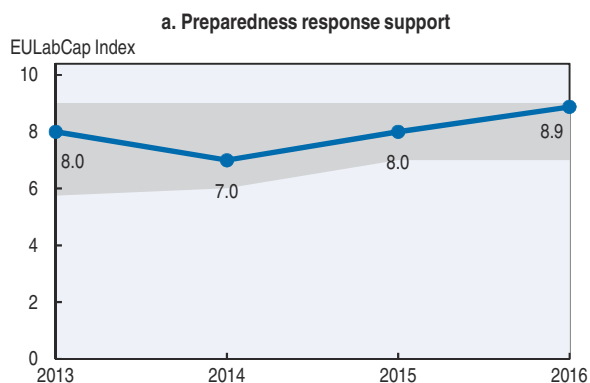
8.6. Antimicrobial susceptibility testing and resistance monitoring, average across EU countries, 2013 to 2016



Note: The shaded area shows the minimum and maximum values.
Source: ECDC (2018).

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8.7. (Re-) emerging disease preparedness and outbreak response support, average across EU countries, 2013 to 2016



Note: The shaded area shows the minimum and maximum values. Preparedness refers to capabilities of laboratories to detect and characterise various infectious diseases.
Source: ECDC (2018).

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