Evaluating the international performance of diagnostics systems for addressing antimicrobial resistance in 174 countries and territories: a systematic global analysis

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Background

Robust national diagnostics systems, particularly the widespread implementation of rapid and affordable point-of-care testing, are essential for optimising antimicrobial use and mitigating antimicrobial resistance. The focus of diagnostics research for antimicrobial resistance has largely concerned laboratory and clinical studies, however global public health policy requires a comprehension of diagnostics systems internationally. To date, there exists no comprehensive international assessment of the performance and adequacy of diagnostics systems for managing antimicrobial resistance.

Methods

This global analysis involved systematic review, a quantitative evidence synthesis of national data sources and principal component analysis to generate an international comprehension of the performance of national diagnostics systems to mitigate antimicrobial resistance. In the systematic review, four online databases (Cochrane Database of Systematic Reviews, Embase, Global Health and MEDLINE) and the grey literature were searched, for publications of any type, between database inception to August 16, 2024. The research team developed a framework for quantification allowing each country to be assigned a score, combining 35 indicators, based on findings from the systematic review and further evidence synthesis. These data were equally weighted and summarised by principal component analysis to generate country scores from 0–100, indicating the relative strength of a national diagnostics system.
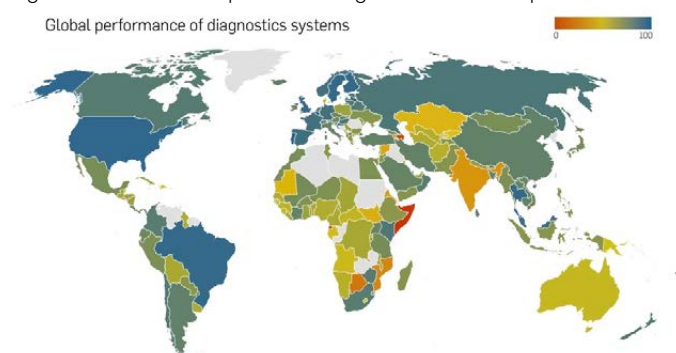
Results

From 10,078 records identified, 354 publications were included, covering findings from 174 countries and territories. Belgium had the highest overall score (92.22), followed by Portugal (90.26) and the USA (88.48). Equatorial Guinea had the lowest country score (5.81), which scored significantly lower than the preceding nations of São Tomé and Príncipe (12.40) and Somalia (17.44).

Conclusions

Diagnostics appears to have been an overlooked instrument in managing antimicrobial resistance mitigation, and political attention towards their funding and enhanced access is insufficient. Rapid, cost-effective, and readily available diagnostics have the capacity to transform modern medicine, and are essential for mitigating antimicrobial resistance. In all locations, diagnostics systems require urgent strengthening to enable optimal antimicrobial use, improve global health security and achieve universal health coverage.

Figure 1. World heat map summarising the international performance of diagnostics systems for mitigating antimicrobial resistance

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Impact of French public health alerts in a specialty laboratory

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Background

The Direction Générale de Santé (DGS), a department of the French Ministry of Health, issues information on health emergencies occurring in France.

These messages take the form of "DGS-Urgent" and are distributed by mail to all liberal health professionals.

In the field of medical biology, these recommendations mainly concern infectious diseases, due to their transmissible and epidemic nature.

We have studied the impact of the "DGS-urgents" of the last 12 months on the number of samples sent for PCR testing for the targeted pathogens.

Methods

We extracted from the database of a specialty laboratory the number of samples received nationwide for PCR requests concerning pathogens targeted by a "DGS-urgent" alert in the last 12 months: Mycoplasma pneumoniae, measles, Dengue fever, pertussis, MPOX.

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