

SPECIAL COMMUNICATION

Welcoming the future: embracing novel technologies for a progressive health system

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Background: Novel technologies offer great possibilities for improving patient care, but their adoption varies across different European countries. To successfully integrate these advancements, it is crucial to prioritize patient interests and avoid getting side-tracked by issues that seek to preserve established positions or neglect collaboration. Next-generation sequencing and liquid biopsy in cancer patients hold substantial potential for early diagnosis and reducing suffering, but only if they are effectively implemented into routine health care.

Methods: An examination of the infrastructure and governance requirements in European member states was conducted to identify significant gaps and discrepancies in the readiness to capitalize on the benefits that these technologies can provide.

Results: These disparities highlight the existing inequalities and missed opportunities within the European Union (EU), which are further exacerbated by varying economic statuses.

Conclusions: As Europe undergoes a comprehensive review of its health policies and public spending between 2024 and 2025, it is an opportune time to prioritize ensuring that patients can access the advancements offered by technology and science.

Key words: health care, next-generation sequencing, public health genomics, personalized medicine

INTRODUCTION

The health care landscape in Europe is currently facing a multitude of challenges. As the region strives to recover from the disruptions caused by the coronavirus disease 2019 (COVID-19) pandemic, there is also a growing sense of urgency on all sides to reconsider health care spending, including from national finance ministers concerned about rising costs, and patients and health innovators concerned about care inadequacies. Against this backdrop, the field of clinical and translational research fields and health technologies continues to rapidly evolve. Additionally, Europe is undergoing significant changes in its political landscape, driven both by global events and its own internal processes,

culminating in crucial decision making between 2024 and 2025 that will shape the future for years to come. A newly elected European Parliament will take office in July 2024, and its modified composition—with increased numbers of far-right and Eurosceptic members—will exert influence on both the composition of the new European Commission that will take office in November 2024 and on the discussions with European Union (EU) leaders on the strategies and funding for the new 5-7 years. The risk for health care is that an emerging recognition of the importance of patient centricity will be stalled as more radical politicians push to limit EU activity—particularly for what may be portrayed as marginal issues undeserving of joint action.¹

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METHODOLOGY

The integration of next-generation sequencing (NGS) and public health genomics into health care systems was approached with a thorough and inclusive methodology. Multiple studies²⁻⁵ and statistical analyses were conducted to ensure a comprehensive assessment. The NGS Integration Readiness study, for instance, involved the collaboration of 32 experts who evaluated countries' preparedness in various areas including infrastructure, reimbursement, and

governance. Similarly, the Public Health Genomics Integration Readiness study utilized a Delphi study with representatives from 27 member states to assess the development stages across countries. These development stages, ranging from 1 (initial) to 5 (optimized) reflected the progress of each country in terms of governance, legislation, and clinical organization. By combining the insights from these studies, a holistic understanding of the current landscape and the potential for future integration of NGS and public health genomics into health care systems was achieved.

RESULTS AND DISCUSSION

Numerous studies⁶⁻⁸ indicate that despite the rhetoric surrounding patient benefit, there is a tendency to neglect opportunities in favor of pursuing other, often well-intentioned, policies and practices. Despite the potential that technologies such as NGS and liquid biopsy offer for diagnosis,⁹ few patients benefit because of failures by health care systems and policymakers to effectively and extensively implement them in routine clinical practice. Throughout Europe, no country has managed to establish all the necessary prerequisites for successful integration of NGS, and the majority of countries have significant gaps in their preparations in daily practice. It is possible to identify

the specific preparatory requirements and measure the extent to which each country meets them.¹⁰ A recent study conducted by Horgan et al. examined performance in relation to various factors and revealed significant disparities in national levels of achievement (Figure 1).

A comprehensive assessment was conducted utilizing all the mentioned studies to measure various factors related to the integration of NGS into health care systems. These factors included (i) infrastructure, (ii) of molecular tumor board practices, (iii) reimbursement provisions, (iv) governance arrangements, (v) education and training programs, (vi) health care workforce capacity, and (vii) data sharing capabilities.

The results of this assessment, as depicted in Figure 1, revealed a wide range of readiness levels across countries. Interestingly, even the highest-performing countries did not demonstrate full readiness in all domains.⁵

The variability in the fulfilment of these preconditions is reflected in the varying levels of developed capacity for integrating NGS into public health services at the national level. Disparities and gaps were identified in several areas, including the arrangements for cancer prevention, linkage to cancer heredity and epigenetics, processes preceding tumor development, and early cancer mechanisms.

There were differences of approach in the use of blood tests for early cancer detection and in recourse to

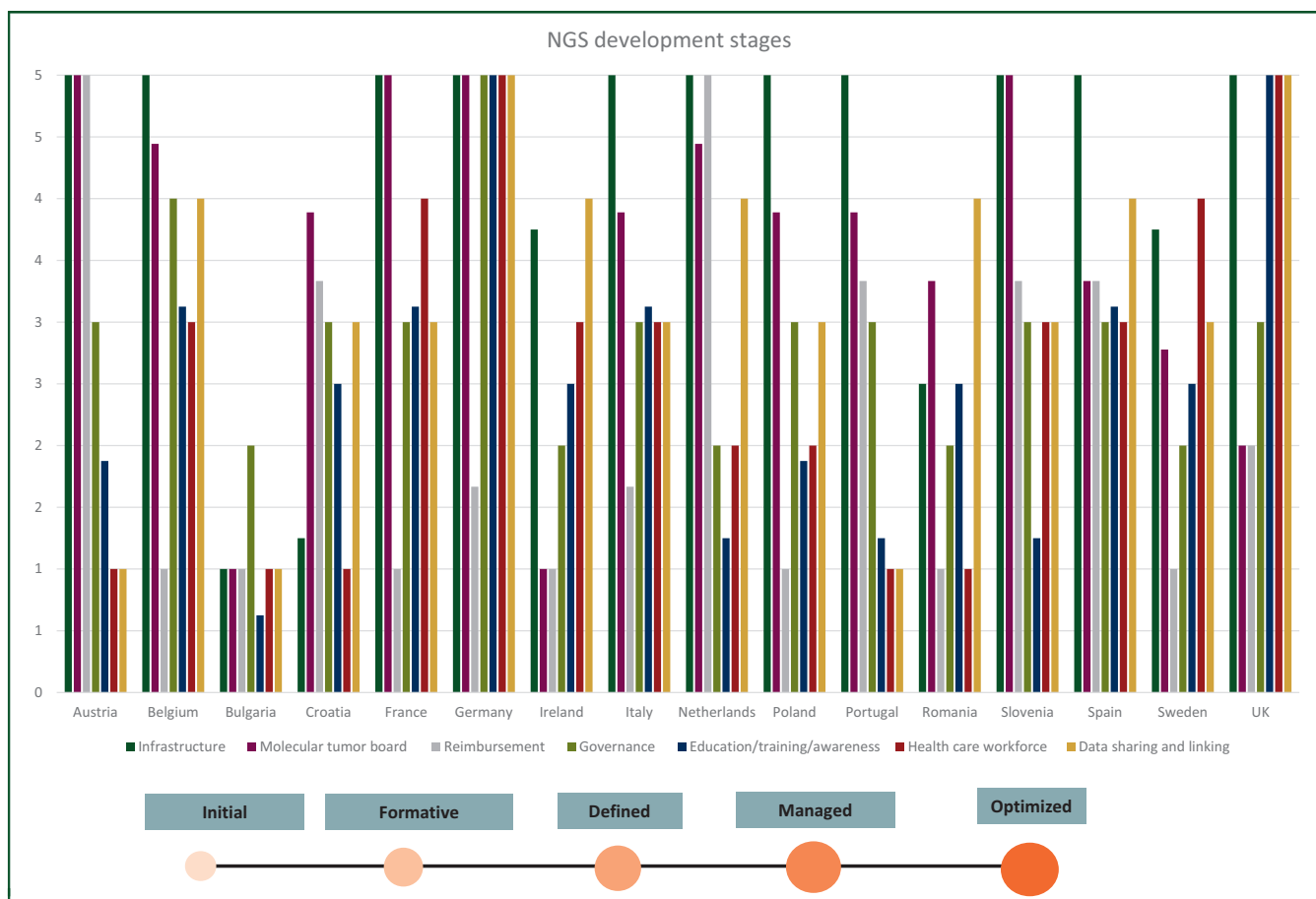


Figure 1. Development stages in NGS.

technologies for early diagnosis, and in national practices on personalized prevention and early cancer screening or in the utilization of blood tests to show sensitivity and resistance to different therapies. A similar picture of diversity emerges from the review of other crucial elements, including governance and strategy, investment and economic model, legislation and policy, public awareness and acceptance, clinical organization, clinical genomics guidelines, and data management standards and infrastructure.¹¹

The successful implementation of new technologies goes beyond meeting technical requirements such as infrastructure, equipment, or funding. It also hinges on ensuring sufficient utilization, expertise, and integration of the technology into routine care to truly benefit the patients it was designed for. The challenge of effectively integrating new technologies into complex and diverse health care systems with multiple stakeholder groups should not be underestimated. However, this complexity does not excuse the persistent and widespread failure to achieve desired outcomes.¹²

One of the main drawbacks to improved performance is the superficial attention given to patient interests. The term ‘patient interests’ is often very vague and can be interpreted in various ways, allowing different stakeholders to defend their own positions. Financial authorities, for example, may argue that investing in novel approaches risks diverting resources away from established practices, potentially harming patients. Health care professionals, confident in their tried and tested techniques, may believe that patients would be at risk if new approaches were imposed without sufficient evidence or that patients would experience undue emotional stress from screenings that reveal unexpected vulnerabilities. The need for public–private partnership in implementing novel technologies may also raise concerns about prioritizing patients’ interests over private profit. Even patient advocacy groups, accustomed to advocating for the collective interests of patients or those with specific diseases, may have strong reservations about processes that establish a more direct relationship between individual patients and their treating medical doctors. Successful implementation and integration of advanced technologies require a deliberate and honest approach that places the individual patient at the center of each experience, rather than treating them as just another member of a generalized group subjected to medical processes and systems. This approach cannot be left to chance; it must arise from a shared recognition among all stakeholders that policies and practices must align with the reality that the patient is the primary focus of every action and decision.¹³

CONCLUSION

The time is ripe for a rapid shift in perspective, and the current state of flux in European policy can be an opportunity for positive change. Favorable factors include health’s increased profile in political discussions, particularly due to the valuable role health care innovation played in mitigating the impact of the COVID pandemic. Additionally, significant legislation on pharmaceuticals, devices, health technology assessment, and health data sharing is nearing completion

and will be implemented from 2025 onwards. Risk factors are that Europe may become distracted from health care by issues such as defense, migration management, and climate change, and that rising Eurosceptic sentiment will militate against the common approaches essential to bringing advanced cancer strategies into widespread clinical practice—and leave patients underserved.⁵ However, the escalating conflicts in Europe’s neighboring regions have prompted new exploration of closer cooperation, including joint defense procurement, which is precisely the sort of thinking that opens up the possibility of re-evaluating the delivery of effective health care in Europe.¹⁴ By recentering our attention on the primary goal of health care, which is the well-being of the patient, a remarkable opportunity emerges. If we persist in prioritizing the value provided to patients during our deliberations, we can wholeheartedly embrace the introduction of groundbreaking and inventive technologies, instead of reluctantly accepting them or worse, rejecting or opposing them.

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DISCLOSURE

The authors have declared no conflicts of interest.

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