Accelerating cancer omics and precision oncology in health care and research: a *Lancet Oncology* Commission

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We have made substantial progress in developing cancer treatments that target specific molecular vulnerabilities in an increasing number of cancer types.[1] Interrogation of complex genomic, transcriptomic, and metabolomic (referred to as omics) profiles, integrated with comprehensive clinical data, represents the essential next step to inform the development and application of selective approaches to cancer prevention, diagnosis, and treatment.[2] However, the majority of patients with cancer around the world, and particularly those living in resource-limited settings, cannot access molecular testing and targeted therapies due to regulatory, financial, logistical, educational, and clinical barriers. This widespread inaccessibility drives substantial health disparities both within and between countries and hampers the investigation of new preventative and therapeutic opportunities due to restricted access to biomarker-based clinical trials and translational research programmes.[1, 3, 4] In addition to the inadequacy of cancer molecular testing, therapeutic development is limited by the scarcity of crucial data concerning response and resistance mechanisms.

There are clear gains to be made from widespread health system-based molecular testing to improve outcomes and longer-term cost-effectiveness through the avoidance of ineffective therapies and associated adverse events. There are also substantial gains to be made through the accumulation of molecular data coupled with clinical information that are shared in an appropriate way (ie, phase 4 or real-world evidence can refine current best practice and inform ongoing therapeutic development). Although some efforts at national and global scales are accruing and collating genomic and clinical data, the data acquisition, analysis, and sharing are in a near universal state of disaggregation.[5, 6] To better serve the global population of approximately 8 billion people, and to provide equitable care, data diversity must be expanded, and worldwide datasets must be integrated at scale. Ensuring data are findable, accessible, interoperable, and reusable (FAIR) will allow researchers to efficiently leverage the wealth of genomic and clinical data currently generated in heterogeneous formats and by diverse organisations around the world.[7]

Responsible sharing of harmonised clinical and genomic data cannot disregard ethical issues related to patient privacy. Data privacy and data protection measures are increasingly evolving globally to safeguard patients from a hypothetical risk of data leakage and to address risk relative to their rights and freedoms. The advent of regulations such as the European General Data Protection Regulation (GDPR), which has become the gold standard of data protection regulations in many countries, has impeded data sharing and data aggregation abilities for health research, disadvantaging the group these regulations aim to protect—patients—by preventing progress in cancer research.[8] The GDPR has detrimental consequences for international data sharing due to the extraterritorial scope, which means that global collaborators must also comply with the regulation when accessing data originating within the EU.[9] Particularly for public entities, complying with these regulations is not feasible, which hampers the ability of international consortia (eg, International Cancer Genome Consortium Accelerating Research in Genomic Oncology [ICGC-ARGO]) from amalgamating data from different international jurisdictions and from further sharing these data with the international scientific community to progress scientific knowledge and improve public health.[10] It is imperative to balance these competing priorities.

Today, we announce the start of a new Commission in partnership with *The Lancet Oncology* and coordinated by ICGC-ARGO that will examine the challenges that impede progress in precision oncology for routine clinical implementation, research, and therapeutic development. This Commission will propose pragmatic solutions to assist health systems to deliver equitable, effective, and sustainable molecular-based cancer care. To that purpose, this Commission will bring together international stakeholders with relevant expertise across a range of priorities that collectively define how precision cancer medicine can be implemented in a feasible and affordable way; how cancer omics data can be retained in a more sustainable and accessible manner; how these data can be

shared more widely; and how these data can be better used for the benefit of people affected by cancer while respecting patient privacy and regulatory requirements. Priority areas will be addressed in specific sub-sections coordinated by representatives of ICGC-ARGO, the European Society for Medical Oncology, and the International Quality Network for Pathology. The proposed solutions will define a framework that will allow global implementation of effective and sustainable precision cancer care along with enhanced harmonised data collection and responsible data sharing. Multi-disciplinary and trans-disciplinary collaboration between global stakeholders, including engagement with the public, patients, and their families, will be essential to achieve the intended goals.
In conclusion, cancer is one of our toughest health and social issues and enabling precision oncology is a crucial mandate of our society. A global and equitable approach is absolutely pivotal to this purpose because health disparities are major drivers of inequalities in outcomes both within and between countries. This Commission has the ambitious goal of driving the future evolution of precision oncology and of improving the lives of people and their families affected by cancer.

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