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Research Letter

Pandemic Spread of COVID-19 Mutant Variants Will Facilitate Next-generation Sequencing Capacities for Personalised Medicine in Urologic Oncology

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New contagious mutant variants of the SARS-CoV-2 virus have caused coronavirus disease (COVID-19) outbreaks in several countries worldwide and thus changed the face of the pandemic. To combat this public health emergency, the World Health Organization (WHO) Emergency Committee recommended that states should increase worldwide capacities for SARS-CoV-2 genetic sequencing to enhance global understanding of the ongoing virus evolution [1].

Increased global capacities for next-generation sequencing (NGS) might lead to a positive side effect on the expansion of personalised medicine in urologic oncology. In this context, the PARP inhibitor olaparib has recently been approved by the US Food and Drug Administration and the European Medicines Agency as the first personalised treatment in the field of urologic oncology for patients with castration-resistant prostate cancer (PCa) progressing after new hormonal treatment [2]. Prescription of olaparib is dependent on detection of a *BRCA1* or *BRCA2* mutation via NGS. Germline testing for *BRCA2* and other DNA damage repair genes associated with cancer predisposition syndromes is recommended for patients with a family history of cancer and should be considered for all patients with metastatic PCa [3]. Moreover, men with localised PCa should also be considered for germline testing if at least two close blood relatives on the same side of the family have been diagnosed with tumours linked to hereditary cancer predisposition syndromes.

We investigated the global preparedness for performing NGS for PCa patients and hypothesised that preparedness might differ between continents. To quantify the relation-

ship between NGS capacity and PCa incidence, we retrieved NGS market size data from 2020 for Africa, Asia-Pacific, Europe, Latin America, and North America [4] and estimated new PCa cases in 2020 for these continents from the WHO global cancer observatory [5]. We then calculated the preparedness ratio for NGS in PCa patients using the following formula:

$$\text{Preparedness ratio} = \frac{\text{NGS market size in 2020 (US dollars)}}{\text{PCa new cases in 2020}}$$

Figure 1 highlights that North America has the best preparedness ratio, accounting for 37% of the NGS global market size and 17% of global PCa new cases. All other continents had lower proportions of the global NGS market size than proportions of global PCa new cases: Europe, 32% versus 33%; Asia-Pacific, 22% versus 28%; Latin America, 8% versus 15%; and Middle East and Africa, 2% versus 7%.

As it has already been predicted that the global NGS market will grow by an annual compound growth rate of 19%, reaching US\$ 8.5 billion by 2025, these numbers will probably be surpassed because of increasing demand for NGS testing for COVID-19 mutant variants. This increased demand for the NGS market will result in increased capacities and once the pandemic has resolved and the demand drops, costs for NGS in personalised medicine in urologic oncology will decrease. While global new cases of prostate (1 414 259), bladder (573 278), kidney (431 288), testis (74 458), and penile cancers (36 068) amount to 2 529 351 million new cases for genitourinary malignancies in 2020, our data show that the ensuing lower costs for NGS



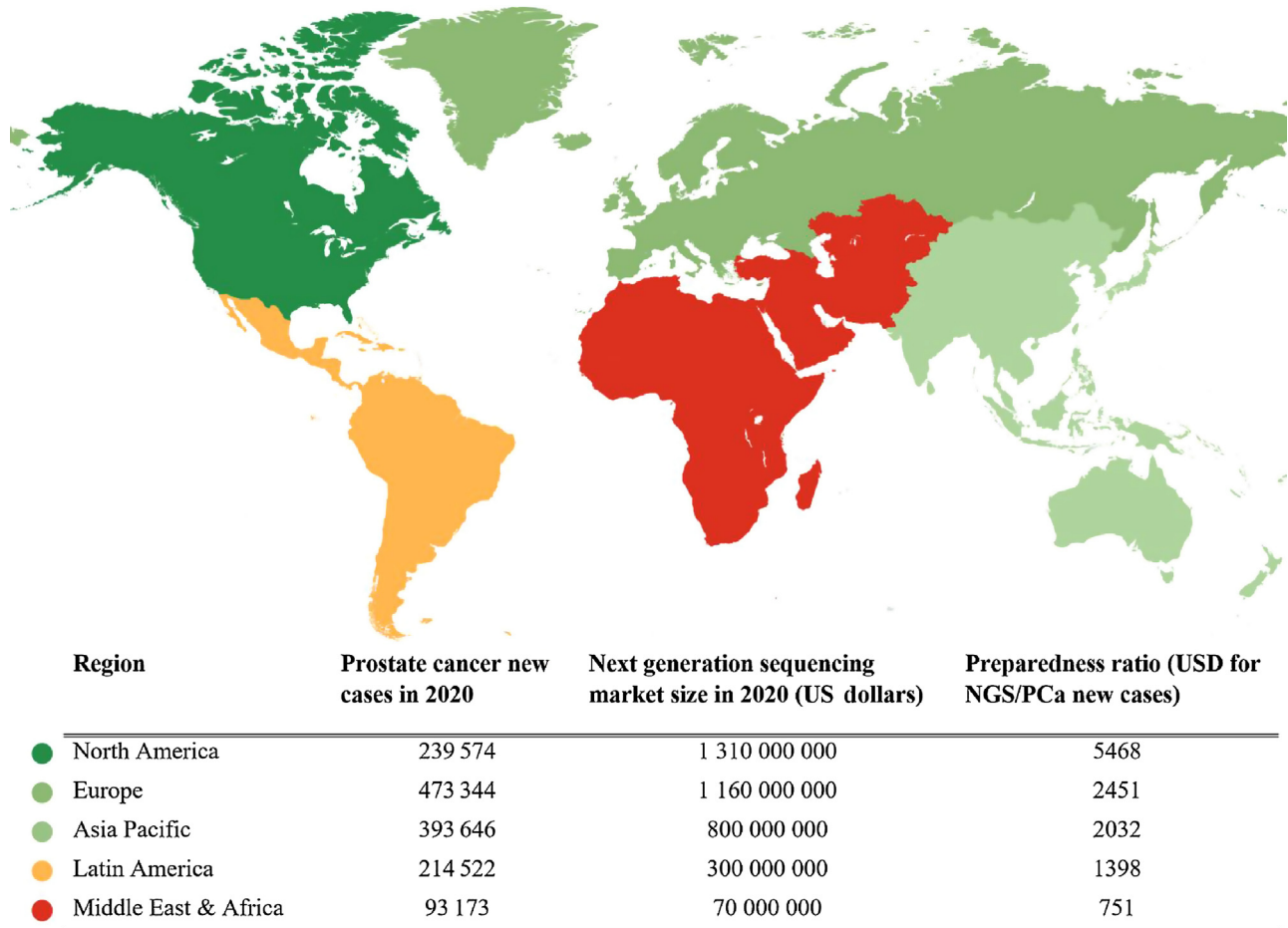


Fig. 1 – World map showing preparedness for next-generation sequencing (NGS) for prostate cancer (PCa) patients. The preparedness ratio is the financial capacity in US dollars per new prostate cancer diagnosis per year.

will facilitate and accelerate the integration of personalised medicine in urologic oncology care.

Conflicts of interest: The authors have nothing to disclose.

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