The Value of Technology to Reduce Barriers to Clinical Trial Diversity and Facilitate the Development of Patient-Centric Medicine

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Introduction

Historically, participants of clinical trials have not been fully representative of the target patient population, with women, ethnic minorities, and the elderly being consistently under-represented. This lack of diversity in clinical research can significantly impact our understanding of the effectiveness and safety of a treatment in the underrepresented subgroups, and can result in a body of clinical knowledge that is not generalisable to the real-world patient population. Therefore, this can be considered a medical and moral issue.

Increasing digitilisation of clinical trials and advances in technology offer the opportunity to run more patient-centric trials and increase the representation of a wider patient population in clinical research.

Objectives

This research aimed to explore how advances in technology can increase patient-centricity in clinical trials, reduce the burden of trial participation, and increase access to a broader and more diverse pool of patients.

Methods

An online research programme utilising the Lightning Insights platform was conducted with HTA and budget-holding stakeholders in the US, UK, Germany, and France. Telephone interviews were also conducted with specialist oncologists in the US, UK, and Germany. The research explored stakeholder perceptions of the barriers to clinical trial diversity, the key implications of a lack of trial diversity on both patients and society, and how technology can enable clinical trial cohorts to be more representative of real-world patient populations.

Results

91% of stakeholders believed that clinical trials are typically not representative of all patient sub-populations, with only one payer (from France) considering clinical research carried out in public hospitals to be representative of all types of patient sub-populations. Payers across countries reported minority ethnic and racial groups and the elderly to be the most under-represented patient sub-populations in clinical trials.

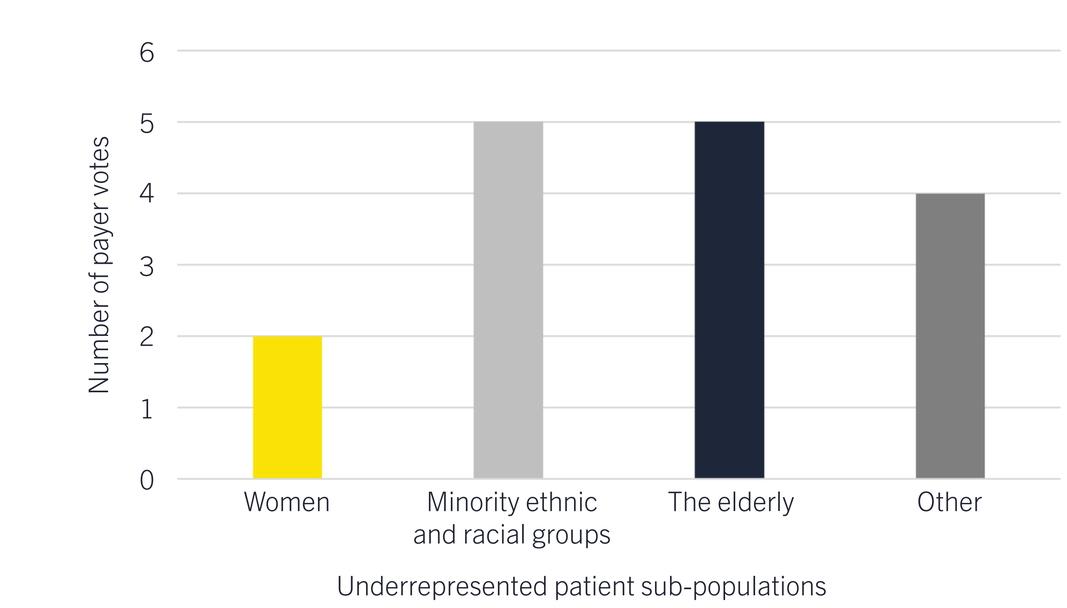

Figure 1. Payer perceptions of traditionally underrepresented patient sub-populations in clinical trials

Payer and KOL respondents also reported that less fit patients and those with multi-morbidity are often underrepresented in clinical trials.

> *"They want totally healthy people and exclude those that aren't because they don't want to have a big scale on the toxicity."*
>
> **Oncologist, DE**

As illustrated in Figure 2, multiple factors are considered to be barriers to diversity in clinical trials. In particular, logistical and practical barriers to trial enrolment (such as access to transport, mobility, and support networks) were viewed as having a high influence on clinical trial diversity by the majority of payer and KOL respondents.

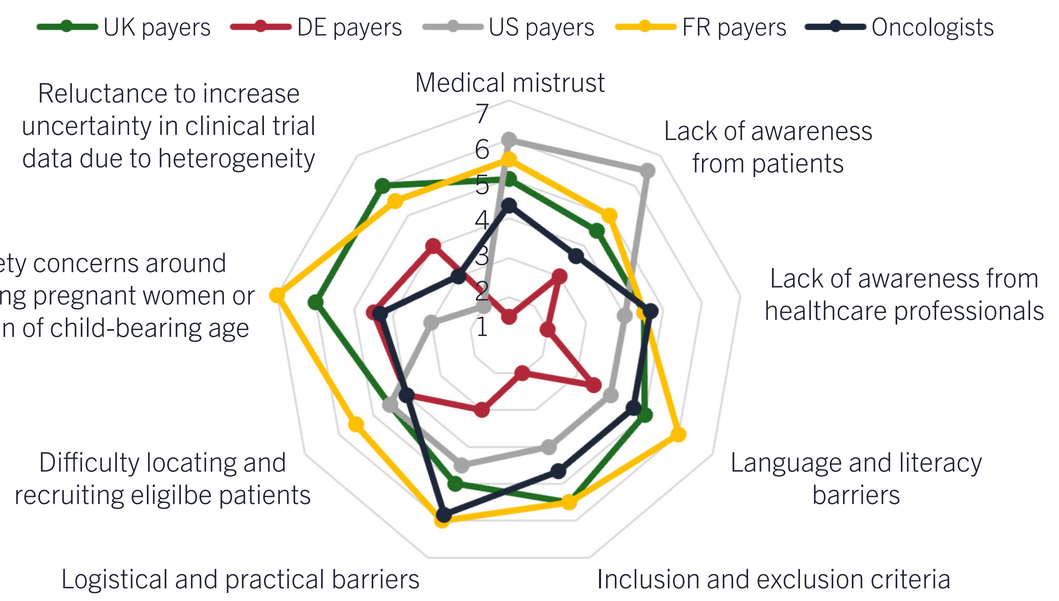

Figure 2. Stakeholder perceptions on barriers to diversity in clinical trials. (1 = low influence on trial diversity, and 7 = high influence on trial diversity)

Telemedicine and remote consultation with physicians, and the use of EHRs, were consistently valued by payers in terms of their potential to support the diversity and representativeness of clinical trial enrolment.

Similarly, KOLs considered telemedicine and remote consultations with physicians to be both highly influential and easy to implement. At-home/ portable diagnostics and smartphones and wearables (using digital health apps) were rated as highly influential by KOLs, but their implementation was considered more challenging. Synthetic data to create visual cohorts was consistently considered as having a low influence on the clinical development process, as well as being difficult to implement.

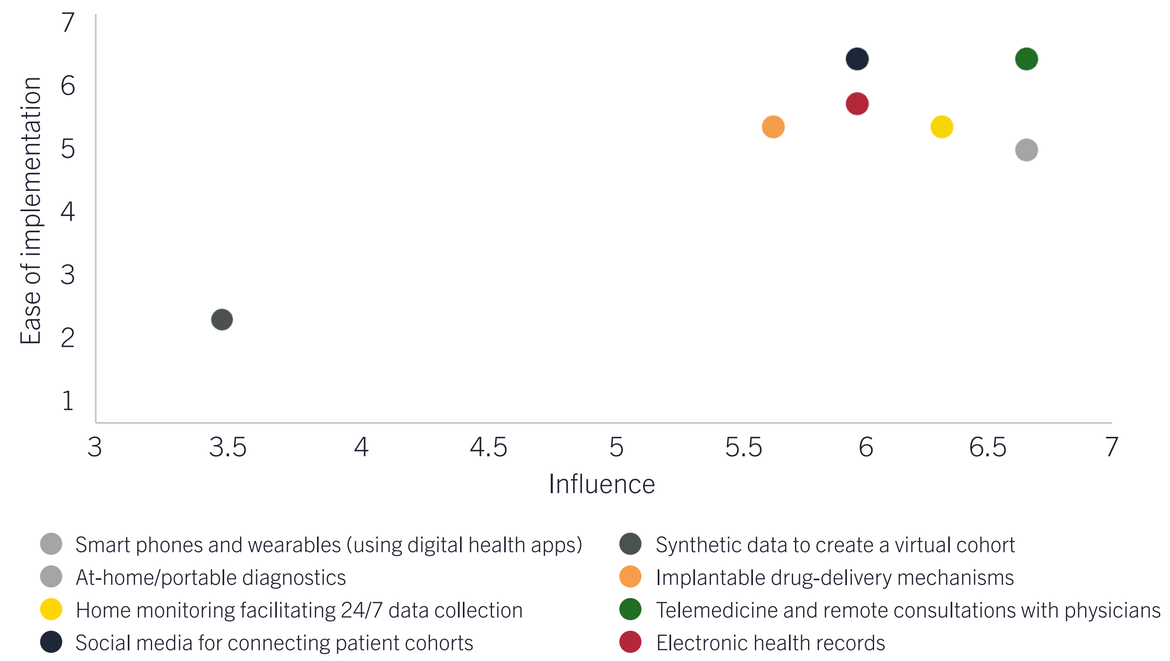

Figure 3. Assessment of technologies according to their potential influence and ease of implementation for improving clinical trial diversity. *(Influence: 1 = low potential to influence the clinical development process and 7 = high potential to influence the clinical development process; Ease of implementation: 1 = difficult to implement and 7 = easy to implement)*

Stakeholders viewed the following to be important ways in which technology can facilitate increased representation of all relevant patient subgroups in clinical trials:

- Faster and more efficient identification, recruitment, and enrollment of patients
- Recruitment of patients across multiple global locations
- Increasing patient-centricity and patient engagement within clinical trials to reduce patient drop-out

Discussion

Stakeholders across key global markets acknowledge that patient cohorts involved in clinical research in oncology often lack diversity. In particular, minority ethnic and racial groups were highlighted as being underrepresented in clinical trials, which is often interlinked with socio-economic factors that can contribute to their ability to take time off work, travel to clinical trial sites and incur out of pocket costs.

Language and communication barriers were considered a large determinant in the lack of ethnic diversity, influencing medical mistrust from patients and the willingness of PIs to recruit certain patients. KOLs also noted communication difficulties as a consideration when recruiting the elderly, alongside the increased likelihood of frailty, comorbidities, and lower performance status.

KOLs did not generally consider women to be an underrepresented group in oncology clinical trials, unless they were categorised as elderly, single parents, or those of a low social economic demographic.

Implications of a lack of diversity

KOLs noted that a lack of diversity has implications on the generalisability of results to the real-world patient population, and can lead to treatment gaps, unsafe dosing recommendations and reduced access to innovative treatments in underrepresented groups. Furthermore, it may cause medical mistrust in minority populations who are not represented in clinical trials, potentially having a knock-on effect on treatment compliance.

> *"RCTs are seen as the gold standard but the results may not be applicable to many who will receive the treatment."*
>
> **Former NICE appraisal committee member, UK**

The value of technology

Telemedicine and access to remote consultations with physicians were considered by all stakeholders to be highly influential in their potential to improve trial diversity. The COVID-19 pandemic has led to an increase in telemedicine, with a noted improvement to routine clinical practice management that could be extrapolated to clinical trials. Other technologies may also have the potential to influence diversity in clinical trials, but their implementation may be challenging if traditionally underrepresented patient sub-populations have limited access to, and education on how to use these technologies. In general, stakeholders were unfamiliar with the use of synthetic data in clinical trials, and lacked trust in the reliability of AI algorithms to create virtual cohorts.

> *"Education of patients on how to use technologies is required if they are to be implemented effectively."*
>
> **Oncologist, UK**

Other methods of increasing diversity in clinical trials

Outside of technology, other strategies could be implemented to increase representation in clinical trials. Regulatory requirements can have a role in encouraging sponsors to ensure increased representation in clinical trials. Currently, there are limited formal procedures to ensure that the demographics of the trial cohort is considered objectively when evaluating the data package in Europe or the UK. However, in the USA, there is a mandate from the FDA to encourage pharmaceutical companies to ensure minority patients are represented in clinical trials, and some trials are now allowing extended periods of enrolment to certain minorities to meet this requirement. Across markets, however, direct regulations to enforce diversity, such as quotas, may be considered pragmatically challenging and potentially unethical.

Finally, stakeholders across countries emphasised the importance of engaging with patients to support increased diversity in clinical trials. For example, community outreach and social media programmes aimed at educating patients about the importance and benefits of clinical trials, as well as increasing role models and representation of underrepresented groups amongst clinical trial staff are considered key ways to increase patient's willingness to participate in clinical trials.

Abbreviations. AI: Artificial Intelligence; EHR: Electronic Health Record; FDA: US Food and Drug Administration; HTA: Health Technology Assessment; KOL: Key Opinion Leader; NICE: National Institute of Health and Care Excellence; PI: Principle Investigator; RCT: Randomised Control Trial