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THE ROLE OF DIGITAL HEALTH EQUITY AUDITS IN PREVENTING HARMFUL INFODEMIOLOGY

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Abstract

Background: Health disparities persist and are influenced by digital transformation. Although digital tools offer opportunities, they can also exacerbate existing inequalities, a problem amplified by the COVID-19 pandemic and the related infodemic. Health Equity Audit (HEA) tools, such as those developed in the United Kingdom, provide a framework to assess equity but require adaptation for the digital context. Digital Determinants of Health (DDoH) are increasingly recognized as crucial factors influencing health outcomes in the digital era.

Objective: This editorial proposes an approach to extend HEA principles to create a specific framework, named Digital Health Equity Audit (DHEA), designed to systematically assess and address health inequities within the design, implementation, and evaluation of digital health technologies, with a focus on DDoH.

Methods: A cyclical DHEA model based on existing HEA principles is proposed, integrating them with digital health equity frameworks. The DHEA cycle comprises six phases: 1) Scoping the audit and mobilizing the team (including community members); 2) Developing the digital health equity profile and identifying inequities (assessing DDoH at individual, interpersonal, community, and societal levels); 3) Identifying high-impact actions to address DDoH and inequities; 4) Prioritizing actions for maximum equity impact; 5) Implementing and supporting change; 6) Evaluating progress, impact, and refining. The method emphasizes multi-level interventions and stakeholder engagement.

Results: The main result is the articulation of the DHEA framework itself: a structured, 6-phase cyclical model to guide organizations in the analysis and proactive mitigation of digital health-related disparities. The framework explicitly integrates the assessment of Digital Determinants of Health (DDoH) across multiple levels (individual, interpersonal, community, societal) and promotes the development of targeted interventions to ensure digital solutions promote equity.

Conclusions: The DHEA model offers an integrated approach to consider social, epidemiological, health, and technological variables, aiming to reduce health inequities through the conscious use of new technologies. It is emphasized that digital technologies can be the cause or the solution to inequalities; DHEA is proposed as a tool to foster equity. Its systematic adoption, along with a collaborative approach (co-design) and trust-building, can help ensure the benefits of health digitalization are equitably distributed, while strengthening trust in institutions. Continued attention is needed to manage emerging challenges such as infodemiology in the era of Big Data and AI. Clinical Trial: NN

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PROMOTING THE USE OF DIGITAL HEALTH EQUITY AUDITS ALSO TO AVOID HARMFUL INFODEMIOLOGY

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KEYWORDS

Equity, digital, audit

INTRODUCTION

The concept of a Health Equity Audit (HEA), as part of a guidance issued by Public Health England (PHE) in the context of their Health Equity Assessment Tool (HEAT), and as updated in May 2021, helps to articulate a clear framework to address health inequalities and also has potential to be extended to the broader field of digital health [1]. Specifically, the PHE guidance defined how the objective of HEAs is to evaluate whether resources are distributed equitably, with respect to the health needs of different population groups; they systematically examine health inequalities and access to services for particular groups or areas. Audits also ensure that actions to address health inequalities are incorporated into planning decisions; prioritize actions to address health inequalities; and finally address how they can evaluate the impact of the actions on reducing inequalities.

These tools, despite having been widely used in the United Kingdom since the 2000s and subsequently neglected due to organizational changes in the British Healthcare system, are currently recommended by the PHE, which, following the inequalities evidenced during the COVID-19 pandemic, renewed interest in adopting the tool for healthcare purposes, which could also be adapted to various applications of digital health technologies (see Text Box 1 for definition of digital health) [2, 3].

As the field of health disparities has matured to reach a crucial element of healthcare management and quality, we have simultaneously witnessed the effects of digital transformation on health status

as well as healthcare [4, 5, 6, 7]. This necessitates the need for re-examination of the utility of HEAs in the design, implementation, and evaluation of digital health technologies. These inequalities have amplified during the COVID pandemic also thanks to the misinformation caused by the infodemic that even pushed the WHO to call a conference on the topic. Importantly, the convergence of factors —volume and speed of information, misinformation, and disinformation flow combined with political polarization makes the goal of forging a community of evidence-based practice for infodemic management one that we share as well [8].

Text Box 1: Different Definitions of Digital Health

According to the NIH (National Institutes of Health), digital health refers to the use of information and communication technologies in medicine and other health professions to manage diseases and health risks and promote well-being [9]. For the European Union, digital health and care refers to tools and services that use information and communication technologies (ICT) to improve the prevention, diagnosis, treatment, monitoring and management of health-related problems to health and to monitor and manage lifestyle habits that affect health. Digital health and care facilitates the use of emerging and innovative technologies, and has the potential to improve access and quality of that care, as well as increase the overall efficiency of the healthcare sector [10].

World Health Organization [11] has three key objectives to promote the adoption and expansion of digital health and innovation:

1. Promote data sharing and support the implementation of digital solutions that contribute to informed decision-making.
2. Improve knowledge through the best scientific communities.
3. Assess and connect countries' needs with the supply of innovations.

Access to digital technologies in health (including access to internet, technological tools, digital agendas and systems, digital literacy, etc.) has also become an increasingly important determinant of health, and has a special relationship with the social determinants of health (SDoH). Emerging evidence from the scientific literature recognizes that access to digital technologies is now a determinant of health outcomes [12, 13]. As digital determinants of health (DDoH) become increasingly recognised [14, 15], a framework for digital health equity audit, including the evaluation of key DDoHs, is needed.

OPPORTUNITIES TO EXTEND HEA TOOLS

In this editorial we propose an approach to extend HEA tools to shared international objectives of synergistically promoting both health equity and digital health adoption and access, framed as a Digital Health Equity Audit (DHEA). This strategy is rooted in the WHO’s objectives of equity and

digitalization as described above and proposes the synthesis of a tool that combines HEA concepts with stated goals of digital health equity as published in other academic literature, and modelled based on that proposed by the Agency for Healthcare Research and quality in a comprehensive framework [16]. However, we must consider that new digital approaches have the potential to address some of the structural challenges for marginalized populations, but the digitalization of healthcare can also harm health equity if this digitally enabled ecosystem moves forward without proactive engagement, planning and implementation [5]. We support the implementation of a similar approach also focusing on improving the health status of the population in relation to the use of technologies and in the context of Health Technology Assessments (HTAs).

The Digital Health Equity Audit (DHEA) Cycle

Building upon standard Health Equity Audit principles, the DHEA cycle integrates the **Framework for Digital Health Equity** to specifically address how digital technologies impact health disparities. It emphasizes understanding and acting upon the **Digital Determinants of Health (DDoH)** across multiple levels (individual, interpersonal, community, societal) to ensure digital health solutions promote equity rather than widen gaps.

The DHEA Cycle Phases:

1. **Scope the Audit and mobilize the Team:**
    - **Action:** Form a diverse working group including community members (especially from disparity populations), clinicians, IT specialists, designers, policymakers, and public health professionals.
    - **Integration:** Define the specific digital health tool, service, or system being audited (e.g., a new patient portal feature, a telehealth service). Agree on priority populations and potential equity concerns, explicitly considering the Framework for Digital Health Equity [15] and its emphasis on populations adversely affected by health differences (racial/ethnic minorities, low-income, rural, SGM, individuals with disabilities).
    - *Example:* Auditing a new telehealth platform for primary care. The team includes patient representatives from low-income neighbourhoods, accessibility experts, primary care physicians, and IT developers. Priority: Ensure equitable access and usability for seniors and non- non-native speakers.

-

2. **Develop the Digital Health Equity Profile & Identify Inequities:**
    - **Action:** Gather data to create a profile of the target population's interaction with the specific digital health tool/service and the broader digital environment. Use surveys, interviews, usage data, population health data, and community assessments.
    - **Integration:** This profile must assess relevant DDoH across the four levels:
        - **Individual:** Digital literacy, tech access (device/internet), digital self-efficacy, attitudes/trust towards technology.
        - **Interpersonal:** Implicit tech bias from providers, patient-provider communication via digital tools, family/caregiver tech interdependence.
        - **Community:** Broadband availability/affordability, local tech support resources (libraries, community centers), healthcare system's digital infrastructure quality, relevant community tech norms.
        - **Societal:** Tech policies (reimbursement, privacy), data/design standards (accessibility, language), algorithmic bias, social norms around technology.
    - **Action Cont.:** Analyze the profile to pinpoint specific inequities – where are there avoidable, unfair differences in digital access, usage, experience, or outcomes between population groups?
    - **Example:** The profile for the telehealth platform reveals seniors have lower adoption rates. Analysis identifies key DDoH barriers: lower digital literacy and lack of affordable broadband (Individual/Community), coupled with clinician assumptions about seniors' ability/interest (Interpersonal Implicit Tech Bias). An inequity is identified: Seniors face avoidable barriers to accessing telehealth compared to younger, higher-income groups.
3. **Identify High-Impact Actions to Address DDoH & Inequities:**
    - **Action:** Brainstorm potential interventions to address the specific DDoH barriers and inequities identified in Phase 2. Review evidence for effective strategies.
    - **Integration:** Focus on developing multi-level interventions that target "upstream" determinants (Community and Societal levels) where possible, as these often have a broader and more sustainable impact on equity, as highlighted by the summarized text. Consider actions addressing individual skills, interpersonal interactions, community resources, and systemic policies/design.
    - **Example:** Actions for the telehealth inequity:

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- *Individual:* Offer digital literacy training tailored for seniors, provide loaner tablets.
- *Interpersonal:* Train clinicians on identifying and mitigating implicit tech bias.
- *Community:* Partner with local libraries/senior centers for tech support hubs, advocate for expanded community broadband initiatives.
- *Societal:* Advocate for policies ensuring telehealth platforms meet high accessibility standards (WCAG: Web Content Accessibility Guidelines).

4. **Prioritize Actions for Maximum Equity Impact:**
    - **Action:** Evaluate the potential actions based on criteria such as potential impact on reducing the identified inequity, feasibility, cost, community acceptability, and alignment with organizational goals.
    - **Integration:** Prioritize actions most likely to address root causes (upstream DDoH) and benefit disparity populations disproportionately. Ensure the prioritization process involves stakeholders, especially from affected communities.
    - **Example:** Prioritize partnering with senior centers for training/support (Community/Individual - high impact, feasible) and advocating for better broadband (Community/Societal - high upstream impact, longer-term) over simply providing tablets without support (Individual - less sustainable).
5. **Implement & Support Change:**
    - **Action:** Develop an implementation plan, allocate necessary resources (funding, staffing, partnerships), and execute the prioritized actions.
    - **Integration:** Ensure resources specifically address the DDoH barriers (e.g., funding for digital navigators, accessible design implementation, community infrastructure partnerships). Foster synergy between the implementation team, decision-makers, and the target community through ongoing communication and feedback loops. Adapt based on initial rollout experiences.
    - **Example:** Secure funding for trainers at senior centers, deploy accessible platform updates, launch clinician training modules, establish a feedback channel with senior users.
6. **Evaluate Progress, Impact & Refine:**
    - **Action:** Monitor the implementation process and evaluate the impact of the actions against the initial objectives and the identified inequities.
    - **Integration:** Define specific, measurable indicators that track changes in DDoH (e.g.,

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digital literacy scores, broadband access rates, device ownership) and health equity outcomes related to the digital tool (e.g., telehealth utilization rates stratified by age/income/race, patient satisfaction scores by demographic group, changes in relevant health metrics for disparity groups). Use evaluation findings to refine actions, inform future DHEA cycles, and demonstrate accountability.

- **Example:** Track telehealth appointment completion rates for seniors vs. other groups, pre/post digital literacy assessment scores for participants, qualitative feedback on usability, number of broadband sign-ups through advocacy efforts. If senior utilization remains low, revisit Phase 2/3 to identify potentially missed DDoH barriers.

Fig. 1

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CONCLUSIONS

The DHEA model is an integrated model that takes into account social, epidemiological, health and technological variables. The integration of knowledge and resources, together with the involvement of institutional levels and the population, should produce a health gain for the majority of the population, reducing health inequities thanks to new technologies and strengthening trust in government institutions and healthcare. The systematic adoption of integrated and digitalized tools for reading the system could certainly contribute to the evaluation of the effectiveness of interventions [17]. However, the digitalization of health services in 2025 is increasingly important and its massive implementation is expected in the following years. But the enormous amount of data that we will have to manage and that will be fueled by all the flows that have entered, are converging and will converge in AI all over the world, will lead to a rapid and proportionally difficult to control

diffusion of infodemiology. The increased convenience, accessibility and penetration of Internet services have significantly transformed the ways in which people obtain information on health-related issues. The rapid proliferation of information and communication technology tools has led to an era of unprecedented accessibility to vast repositories of information, especially through online communication channels and social media platforms [18]. In summary, we could therefore affirm that new technologies can be the cause of inequalities or the solution to health inequalities. We would like the DHEA tool to be a tool that helps to have greater equity at all levels so that one day everyone can benefit from the advantages of technologies and can, through them, implement their own health and well-being. Facilitators include building trust (e.g., providing evidence for health messages), while barriers include user reluctance to accept support. The main recommendations are adopting a collaborative working approach (involving users, developers, healthcare professionals, policymakers, etc., often through co-design) and using effective advertising to raise awareness of available support. Aware of the great advantages of the widespread, adequate and fair use of the continuous technological and digital innovations available to science, we must never forget that *they are the tool and not the goal…*

APPENDIX

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Digital Health Equity Audit (DHEA).

