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This Technology Should be Compared With?… And Who For? The Digital Health Population Conundrum

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BACKGROUND AND OBJECTIVES

Digital health technologies (DHTs) have become common interventions within healthcare over the past decade. DHTs can often be used across a wide range of pathways, rather than in the treatment of specific health conditions. As the DHT may change existing processes or pathways of care, this can lead to there not being a clearly defined comparator in health economic evaluation [1].

Health economic evaluation can be used to highlight the impact of investment in DHTs, while facilitating efficient use of limited resources. However, economic evaluation applied inconsistently or illogically, such as not using the most appropriate comparator, can hinder the decision-making process. This research describes how this issue can be approached when evaluating the health economic impact of DHTs and some of the potential limitations.

METHODS

A pragmatic literature review was conducted to identify research that had sought to provide clarity or outlining frameworks for the evaluation of digital health technologies. This included unstructured searches of PubMed and Google Scholar. Extraction focused on frameworks that identified issues and/or solutions associated with either appropriate population or comparators for DHTs.

A series of expert panel discussions and interviews were undertaken to discuss approaches to evaluating digital health technologies, including the approach to capturing the population and selecting the relevant comparators. This was informed by the pragmatic literature review, especially to understand where stakeholders may disagree with current published literature. The discussions and interviews captured people from a range of experience, including people with health-economic consulting, academic and public sector perspectives.

RESULTS

Regardless of the purpose of the DHT, the choice of comparator will be a function of how the intervention interacts with non-digital health care [2]. For example, the DHT may complement or substitute other types of health care delivery or administration systems. In settings where the intervention is implemented in an area where a DHT is already operating, the relevant comparator may be simpler to identify, unless the new DHT has a wider aspect that the current DHT does not cover [1].

Stakeholder engagement highlighted a key issue linking the population and comparator: whether the DHT distorts the population in the care pathway. For example, if a DHT increases access to a care pathway, then it may result in more people using the pathway, which could change the underlying population (such as by disease severity or age). In some cases, changing the population may also change what is considered 'standard care', especially if the severity of the population changes. In some cases, the digital health may only be adjunct to standard care, meaning that the care pathway has not changed.

Hence, it is important that any economic evaluation can incorporate and reflect differences in characteristics [3]. Clinical advice should be sought when designing any evaluation plan, to understand the possible 'spillovers' that may happen with the DHT.

Figure 1: Key considerations for DHT evaluation

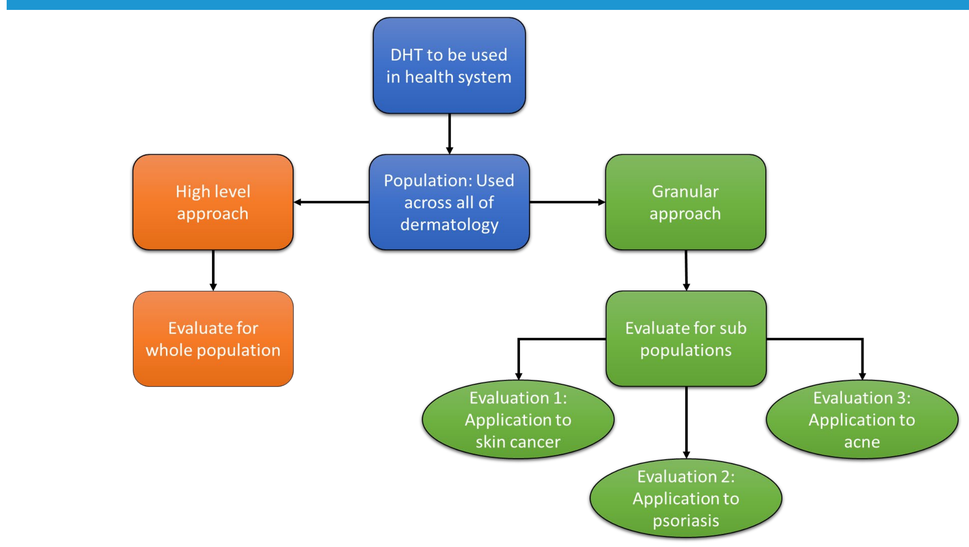
- **Would the population be the same with the DHT? Does the DHT distort the population?**
- **Does the DHT have a specific comparator, or does it impact a specific care pathway?**
- **Does the care pathway differ across regional and local practices?**
- **Is the effectiveness of the DHT expected to differ significantly by subpopulation?**

Stakeholder engagement also identified two approaches to conceptualising economic evaluations of DHTs where the scoped population was less specific. The first approach is to narrow the population in the evaluation to a specific indication, omitting some of the DHTs potential benefit. The second is to keep the population as broadly defined as possible, but to simplify the health economic evaluation to key costs, resources use, and health outcomes. This approach leads to omitting many of the potential benefits through simplifying the modelled decision problem. The appropriate choice is likely to be determined on a case-by-case basis for each specific DHT, depending on the variation and generalisability of the care pathway.

Table 1: Comparison across different interventions

	Pharmaceuticals	Medical Devices	Digital Health Technologies	Implications of differences for modelling
Population	This is often defined by the therapeutic indication (licenced if available). Population size calculated using national or local sources.	The people using the device or having it used on them. Population size calculated using national or local sources. May also differ due to the nature of the intervention, but this issue is more common to DHTs	The people using the technology or having it used on them. Population size calculated using national or local sources. May differ due to the nature of the intervention. For example, home testing / sampling when compared with clinic or GP testing.	If the population changes with the implementation of the digital health, the underlying prevalence, severity of disease or other characteristics could impact the effectiveness of the intervention
Comparators	All relevant comparators that would be used for the same indication (if for a NICE submission, based on the NICE scope)	All relevant comparators	All relevant comparators	Implications and difficulties for selecting the correct comparator, depending on the value proposition, changes to the care pathway, regional differences in care and isolating the impact of some DHTs being adjunctive to standard care.

Figure 2: Evaluation of DHTs with wide populations



CONCLUSIONS

DHTs may require much more localised, flexible models and a detailed scoping of the population and comparators than other healthcare interventions. To identify the full benefit of the DHT, evidence generation should look to capture broader populations where possible. However, this may not always be possible. Decision makers should be supported to develop a framework to identify and discuss the risk, generalisability and un-quantifiable benefit of adopting DHTs with wider populations. Future research should consider how distorting populations within care pathways from implementing DHTs should impact study design and data collection, in order to determine the true effectiveness of DHTs.

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