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Moving towards people-centred healthcare systems: using discrete choice experiments to improve leadership decision-making

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There is little doubt that healthcare systems need to be transformed to keep up with the various challenges of variable budgets, growth of chronic diseases, shortfall of staff, the rise of digital services, changes in patient expectations, and disease outbreaks. In fact, a recent survey shows that 90% of healthcare leaders believe the recent pandemic will necessitate a review of the fundamentals of how healthcare is designed, run, and delivered.[1] The pandemic has also renewed calls for a transformation of healthcare systems to make them more people-centred – which has been a top-priority for the NHS for several years[2].

While the concept of patient and public involvement in healthcare is not new, it has gained substantial traction in the last few years. This sentiment has been echoed by institutions that work with healthcare institutions—e.g., consulting firms like McKinsey & Co.[3], academic researchers[4], and intergovernmental agencies such as the World Health Organisation[5]. Transforming systems to make them people-centred ranges from having health literacy programmes for patients and families, introducing new policies and work routines for providers, and introducing new technologies in health systems.[5] These reforms often require people to participate as partners in organisational transformation, evaluation, and redesign of care provided.[6] Dealing with such a wide scope of factors and including such diverse stakeholders requires healthcare leaders to have a comprehensive understanding of the attitudes and behaviours of all parties involved in the value chain.

However, healthcare leaders face a key challenge: uncovering the preferences and choices of people is not a straightforward endeavour. People base their decisions of adopting or utilising a product or service on multiple criteria. They evaluate and trade off various aspects of these offerings to make these decisions. In addition, people are heterogenous, not always rational in their choices, and differ in how they weigh the multiple criteria. In these cases, the often-used research methods can help only to a limited extent. For instance, qualitative methods are ideal for informing leadership decisions which require exploration, but their inability to produce quantifiable and generalisable insights makes it difficult for leaders to make decisions for large-scale interventions. On the other hand, quantitative methods such as surveys provide attitudinal data for leaders but do not capture how people would make actual decisions under trade-offs. In addition, the stated attitudes in surveys are often divergent from actual stakeholder goals, choices, and experiences[7].

Discrete choice experiments (DCEs) are a method specifically designed for studying such trade-offs [8,9] and are able to predict real-world choice with high accuracy[10]. They can capture how people value the various attributes of an offering while choosing and are flexible enough to be used in a wide range of contexts, such as market research and healthcare service design.[8,9,11–13] DCEs resolve some of the drawbacks of the other research methods. Unlike qualitative methods, they can provide insights for a large number of stakeholders, including identifying various clusters in the sample. Diverging from other quantitative methods, they can also provide a realistic decision-making scenario which reduces the gap between stated attitudes and observed behaviour. They offer a quick way to garner accurate results, enabling healthcare leaders to adeptly take decisions that involve various stakeholders.

Whilst DCE designs have been used in healthcare, their use is not as widespread among healthcare decision-makers[9] as they are in other fields such as marketing, transportation, and environmental economics[10] where their benefits are well recognised. Some of the DCE designs that have been observed in healthcare include understanding patient preferences for specific treatments and shared decision-making [14–16] or the community's preferences in the

delivery of health services[17]. In this commentary piece, we showcase the tool's applicability and usefulness for decision-makers who are at the leading edge of transforming their institutions. We outline the benefits and practical considerations when using this method and provide exemplars of its potential use by healthcare leaders.

Discrete Choice Experiments

In practice, people make decisions in terms of trade-offs rather than singular aspects of a product or service. Discrete choice experiments (DCE) are able to capture this. An intervention, campaign, product, or service offering is first reduced to its attributes to conduct a DCE. For instance, a DCE studying the uptake of influenza vaccines might have vaccine effectiveness, risk of severe side effects, and duration of protection as some of its attributes. These attributes are further broken down into various levels. So, the levels of effectiveness can be (e.g., 20%, 40%, 60%), while the risk of severe effects can be represented based on the number of patients who got it (e.g., 1,10, or 100 out of 1,000,000), and protection duration can be (e.g., 3, 6 or 12 months).[10] These attributes and levels are bundled to generate different configurations that are then offered to respondents as choice options. For instance, one vaccine option might have a 20% effectiveness but a 1 in a million chance of severe illness with a long protection duration. The other may offer higher protection but for a shorter duration with more risks.

The choice of levels is critical and can impact the results very heavily. Ideally, the levels should be technically feasible and realistic. The levels or attributes do not always have to be numerical variables or hierarchical in nature. They can also include nominal variables such as the brand of vaccine and the location of the vaccination centre. Reflecting how a patient might act in the real world, a DCE can also include a 'none' option to reflect respondents' preference of not choosing any intervention. In cases where prior literature does not provide such levels, a qualitative research stage prior to the actual DCEs is recommended to provide relevant attributes and levels for stakeholders. This means that methods such as interviews, focus groups, feedback probes, conversation cards, and observations, which are usually utilised for quality improvement and patient-centric design efforts [18,19] can seamlessly be integrated with DCEs.

Programming the attributes and levels has become convenient with the use of advanced software programmes. They allow much flexibility in how the researchers want their respondents to see the choice tasks. For instance, while most modern software allows for 8-10 attributes with several levels to be displayed, researchers might choose to only show 3-4 attributes at a time to participants. A smaller number of attributes reduces the effort respondents must put in while not decreasing the accuracy of the study. The programmes also allow for the attributes and levels to be randomised so that respondents across a sample see all levels and attributes, reducing fatigue and biases in responses.

In some cases, there might be two or more levels of certain attributes that are incompatible. For instance, institutions may be unable to deliver a particular aspect of healthcare at a specific price point. Or it may be the case that a certain side effect, even if not preferable, is inevitable with a type of treatment. Since respondents see levels of attributes as bundles rather than in isolation, conflicting levels can be programmed not to appear together in these concepts.

Like all research methods, DCEs have several limitations. The quality of data generated is highly dependent on the quality of the design – mainly the selection of relevant attributes and levels. In practice, people may consider a host of aspects while making decisions, but DCEs can only capture a realistic number of those. This might be overcome by utilising other

research methods ordinarily used in quality improvement efforts to ensure that the most important attributes are selected. In addition, the quality of the data is also influenced by contextual knowledge and prior exposure of study participants to the offerings. This could be controlled by the inclusion of relevant covariates in the design. Another limitation is that studies with a large number of attributes usually require a larger sample (with 300 generally being the minimum). Recruiting samples of this size might be difficult and sometimes costly. However, a well-designed DCE can provide valuable insights for decision-makers while also offsetting some of the limitations of the method.

DCEs and Leadership Decision-Making in Healthcare

DCEs have the potential to improve the decision-making of healthcare leaders across a wide range of contexts. Below we provide an overview of some key leadership decisions for which DCEs can provide valuable insights.

Design, Customisation and Communication of Healthcare Offerings

Understanding how patients engage with healthcare offerings is essential in maximising their reach to as many potential beneficiaries as possible. Patients often opt in or out of treatments based on a variety of factors such as side effects, recovery time, state of therapy and a host of other criteria. DCEs give insights into how respondents value attributes of an offering in relation to each other (e.g., recovery time might be more important than minor side effects) and the preferred levels within each attribute. Calculating how many times an attribute has been selected over alternatives gives an overview of stakeholder preferences for the entire offering. By quantifying the impact of different attributes and levels, DCEs allow healthcare leaders to make data-driven decisions. For instance, in a DCE with a nationally representative sample of US citizens (n=2359), 31.3% value healthcare at all costs (including high chances of bankruptcy), but 8.5% fear financial solvency issues and might not opt for certain cures.[20] Similarly, another DCE study conducted with German patients found that in the case of Hepatitis C, 67% of patients chose to opt for treatment if adverse effects were mild, but if they were expected to be severe, only 51% of patients would.[21]. Leaders could then, for instance, use these insights to redesign service delivery aspects such as out-of-hospital care to improve outcomes.

Moreover, DCEs allow leaders to further drill down and garner insights into patient choices at the individual and aggregate levels—e.g., how clusters of respondents or the whole sample make choices. They can also collect additional data on the individuals, such as demographics and risk profiles, to further refine clusters/segments of patients. This understanding enables customising offerings based on the needs and preferences of these patients. It also helps leaders to identify the groups they want to focus on and prioritise their needs and preferences.

Marketing communication decisions around various offerings can often be as important as their development. DCEs further allow leaders to construct simulations about the acceptance or adoption of various interventions, offerings or even purchase intentions where appropriate. This can aid in the development stage of the intervention where several ‘what-if’ questions can be addressed before rollout.[22] For example, the insights from these simulations can form the basis for various vital decisions that relate to strategies, including product development, pricing, segmentation, and positioning.[23] This can allow decision makers to reach out to various stakeholders differently, ensuring that their views are incorporated in the offerings maximising chances of success.

Furthermore, DCEs can be a valuable tool in making pricing decisions. Specifically, the understanding about the relative importance of different attributes can be used to inform

pricing decisions, such as determining the optimal price point for maximising alignment with patient preferences and needs. Likewise, the insights from DCEs could allow healthcare leaders to make informed decisions about how to set prices in order to balance cost considerations with access to care.

Adoption of Healthcare Technologies

Another area where DCEs could inform decisions is the use of new healthcare technology. For example, novel technologies like Artificial Intelligence (AI) and robotics are now being used to provide healthcare services to patients. A recent DCE, however, showed that patients are generally hesitant to use such technologies even when the accuracy and price are comparable[24]. Follow-up DCEs can be used to address if consumers are more open to AI-based healthcare depending on different attributes of the technology (e.g., accuracy, privacy, etc.). In another setting, using a DCE, healthcare professionals were asked whether they wanted to prescribe a hypothetical app from two options or not[25]. The study found that these professionals were more comfortable in prescribing these apps when it was endorsed by the NHS, had studies published about their safety and effectiveness, and if it was recommended by other healthcare professionals. They were also more likely to pay a higher price for these. But the results also showed that about one-tenth of respondents were unwilling to prescribe these technologies because of their own age or use of apps. As the studies above show, the appeal of new offerings is not universal, and preference for alternatives might not only be based on objectively similar or better offerings. DCEs allow for a better understanding of the drivers of the adoption of healthcare technologies, which are a critical element in ensuring the successful transformation of healthcare.

Management of Public Health Emergencies

DCEs can also be highly effective in the case of urgent public health situations, such as the Covid-19 pandemic, as they can be designed and implemented rapidly. In such contexts, fast acceptance of and compliance with these interventions is often of utmost importance to avoid potentially catastrophic consequences like the spread of a contagious disease. One example of using DCE in a public health emergency is the design of digital contact tracing apps in the early days of COVID. Drawing on a DCE with a representative sample of 2061 UK participants, researchers found that the adoption of the app varies significantly (from 51.1% to 77.6%) based on its attributes [26]. For example, while changing what institution has oversight of the app, from the government to NHS, increased adoption significantly, whether the app was anonymous or identifiable had limited importance for the respondents. Researchers also did a similar conjoint in Germany with some marked differences indicating the potential problems with direct implementation of DCE results from a different context.[27]

Another public health intervention which allows countries to limit viral transmission and move away from social distancing to everyday interactions is vaccine passports. Despite its benefits, the intervention has been challenged by citizens in many countries. In scenarios like this, DCEs could help in examining the design and implementation of such an intervention but also its purpose (i.e., what the passport will be used for). Studies in this domain could explore how people weigh the different incentives of this intervention. For instance, one study in the Netherlands (n = 747) found that while people were generally open about accepting vaccine passports but were not in favour of using them to give vaccinated citizens additional rights.[28] Gaining these insights can save time and money by ensuring that ineffective solutions are not developed or launched and result in better health outcomes on a large scale.

Overall, these use cases of DCEs showcase the value, flexibility, and applicability of the method in informing various healthcare leadership decisions. That is, DCEs are not only useful in measuring preferences while designing products or services but can be highly effective in measuring how people, whether patients or healthcare providers, engage with treatments or other restrictions.

Conclusions

Healthcare leaders are increasingly interested in designing healthcare systems that prioritize the needs and preferences of the public. To that end, a central question is how various stakeholders value different aspects of healthcare services and how they trade off these aspects when making choices. DCEs provide a rigorous method for examining these trade-offs and therefore hold immense potential in supporting transformation efforts towards people-centred healthcare systems. They capture the experience of stakeholders, consequently providing the basis for various experience-based service redesign and innovation efforts [7,18,19,29]

The snippets of research across domains of healthcare show how adaptable the designs of DCEs are for both large-scale settings (e.g., entire geographies) or limited settings such as institutions or departments. In addition, the balance that DCEs strike between accuracy and speed also presents it as an ideal tool for decision-making. DCEs can be designed and conducted rapidly; the data collection process is swift compared to other robust alternatives (e.g., pilot tests of different interventions or randomised controlled trials). Most critically, this speed advantage does not come at the expense of significant accuracy loss: DCEs are found to be a highly rigorous method of eliciting preferences.[11,30]

Incorporating various stakeholders' perspectives might promote the adoption of a decision because it adds to its credibility while also promoting a sense of ownership among the followers. For example, scholars found that customers who were involved in selecting new products experienced psychological ownership of the target product.[31] Notably, past research also showed that consumers developed positive attitudes even when they did not actively participate in decision-making, but simply observed that other consumers are taking part.[32,33] In times of transformation, either radical ones caused by communicable diseases or incremental but long-drawn ones brought about by technologies, the costs of getting it wrong are high. Healthcare leaders are not only faced with the potential to incur economic costs but also a loss of trust and confidence in institutions. DCEs can act as a quick and effective tool which aids leaders in navigating this challenging process and mitigating some of these risks.

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