

Commentary

The sickening truth of the digital divide: Digital health reforms and digital inequality.

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Abstract

The use of digital technology has become increasingly commonplace within the United Kingdom, with many public services, including healthcare, becoming 'digital by default' in response to COVID-19 pandemic and pledged government objectives. Digital healthcare delivery has shown to be a beneficial mode of delivery, yet it is unclear whether the benefits of digital healthcare are experienced evenly throughout society. Individuals from lower income households, individuals residing in areas with poor digital infrastructure, and individuals without adequate digital skills are at risk of being excluded from digital healthcare. It is imperative that the determinants of digital inequality are addressed to ensure that vulnerable members of society can access healthcare that is increasingly being delivered digitally. To achieve this, stakeholders spanning many sectors should collaborate to understand and address the impact that digital inequality has upon health inequality.

Keywords: digital healthcare, digital divide, health transformation, health equity, health inequality

Successive UK governments have attempted to transform the National Health Service (NHS) (Nuffield Trust, 2021), and have done so, in part, by embracing opportunities provided by digital healthcare delivery (Shah *et al.*, 2020). Digital healthcare is now ubiquitous (Edirippulige, 2009), with many services operating as 'digital by default' (Helsper, 2011; Schou & Pors, 2019). The shift from traditional to digital healthcare delivery has been accelerated by the ongoing Covid-19 pandemic (De' *et al.*, 2020; World Health Organization, 2020). This shift is likely to proliferate in line with the NHS (2019) Long Term Plan, that aims to deliver most primary healthcare digitally by 2029. As digital healthcare delivery advances, evidence for both its cost effectiveness and ability to improve healthcare access have been highlighted (Dixon *et al.*, 2016; Barbabella *et al.*, 2016). For example, a recent survey described how 34% of internet users were able to self-manage their health (Lloyds Bank, 2021). The benefits of digital healthcare are well documented and incorporated into many aspects of healthcare including

telemedicine, digitalised devices, and biometric monitoring (Lupton, 2014). However, more critical accounts consider how digital services can disempower the poor by violating their rights and autonomy (Eubanks, 2019), thus entrenching the marginalisation of disadvantaged communities (Jandoo, 2020). Digital inequality and, in turn, health inequality, may ironically be designed into well-intended initiatives. For example, initiatives and laws aimed to connect underserved populations, such as superfast broadband (Hutton & Baker, 2021) and the universal service objective (Hutton, 2021) have failed to connect 10% of the UK population (NHS Digital, 2021) who remain excluded from digital health provision (Whitacre *et al.*, 2015). This suggests that other determinants, need to be explored to protect the right to universal health care as the UK health system reforms itself once more.

Access to digital healthcare and affordability

The affordability of connectivity influences access to digital technologies (West, 2015; Maceviciute & Wilson, 2018). This is likely to have serious implications for the delivery of digital healthcare, with one in five, (19%), of UK households unable to afford connectivity (Ofcom, 2020), coinciding with rising connectivity costs (Friemel, 2016). Financial barriers to accessing digital technology disproportionately burden lower income households (Office for National Statistics, 2019). This means there are financial barriers to low-income households accessing digital health, who are more likely to experience ill-health (Marmot 2002).

Rural areas are often characterised by low income (Truman, 2016) and poverty (Fecht *et al.*, 2018; Rural Services Network, 2019). According to Scharf and colleagues (2005), deprivation increases the risk of digital exclusion amongst rural communities, a situation likely to be compounded by the increased cost of obtaining connectivity in rural areas (Ali, 2020). This means many rural communities are 'priced out' of digital technologies (Rural Services Network, 2021), preventing them from accessing digital healthcare. The affordability of digital infrastructure should be addressed during the design and implementation of digital health initiatives to ensure the delivery of healthcare is based on need, rather than income.

Access to connectivity and digital healthcare

Digital infrastructure determines access to digital healthcare among rural residents (Wielandt & Taylor, 2010; Bauerly *et al.*, 2019), who are often located farther from telephone exchanges which determine internet quality (Park, 2017). Consequently, providing connectivity to sparsely populated rural communities is difficult and costly (The Environment, Food and Rural Affairs Committee, 2020, Greenstein, 2020). Instead, connectivity providers tend to be heavily concentrated in urban locations (Saldana *et al.*, 2017), where providers can take advantage of economies of scale (Gill & Goh, 2010). As a result, rural communities are often underserved by digital infrastructure (Ruiz-Martínez & Esparcia, 2020) and broadband providers (Roberts *et al.*, 2017), with 9.5 million people (17% of the UK population) receiving a reduced, if any, service compared to their urban counterparts (Department for Environment, Food and Rural Affairs, 2019). This is an example of 'profit-based discrimination' (Reddick *et al.*, 2020), which has implications for an equitable health system (Gulliford *et al.*, 2002). The health sector, now and in the future, may have limited, if any, influence over digital health provision in rural areas. This entrenches the marginalisation of low income rural communities, because despite being overrepresented by ill-health (Richman *et al.*, 2019; Lankila *et al.*, 2012) they cannot access digital health services.

Access to digital healthcare and digital literacy

A lack of digital skills also affects access to digital healthcare (Tinder Foundation, 2016) and

proliferates the effects of the digital divide (Gangadharan, 2020). Worryingly, NHS Digital (2021) acknowledged that 22% of the population (11.9 million people) lack digital skills needed to navigate, appraise, and share information (Terry *et al.*, 2019). These skills are necessary within environments characterized by digital technologies (Laar *et al.*, 2017; Ragnedda, 2018), like healthcare (Hermes *et al.*, 2020). Rural populations, who lack of digital training hubs, are more likely to lack digital skills (Phillp and Williams, 2019, One Digital, 2021). One reason there are inadequate numbers of digital training hubs in rural areas is the lack of digital infrastructure (Williams *et al.*, 2016), which is essential for implementing and maintaining rural digital hubs (European Network for Rural Development, 2018). This absurdity highlights the compounding nature of the digital divide (Deursen *et al.*, 2017). Any opportunities presented by digital healthcare delivery are unlikely to benefit populations that are not 'digitally ready' (Nguyen *et al.*, 2019). To ensure digital healthcare is attainable for all, assessment of local digital needs should be undertaken, and adequate training and support tailored to local contexts.

Cornwall, an example of the digital divide and its impact on health provision in rural England

Cornwall is a coastal county in England that has one of the lowest population densities in England at 1.5 persons per hectare (Local Government Association, 2019), with 40% of the population residing in rural settlements of less than 3000 people (Cornwall Council, 2015). A demographic that is likely to make the installation of digital infrastructure challenging and costly. Compounding this, Cornwall is characterized by high levels of poverty (Fecht *et al.*, 2018; Noble *et al.*, 2019), and low income (Jefferies & Council, 2017). Income within Cornwall is 21% less than the UK average, with median annual earnings estimated at £19,763 (Cornwall Council, 2020). Cornish residents are at risk of being 'priced out' of digital technologies, with 9.9% of residents attributing cost as a reason for non-adoption (SERIO, 2013). Furthermore, Cornwall has historically been characterised by digital 'not spots' (Abbott-Garner *et al.*, 2019), with 15% with Cornish residents reporting a lack of internet access (Kennedy, 2018).

To strengthen digital infrastructure within Cornwall, initiatives such as the Convergence program have made superfast broadband available to Cornish residents (European Regional Development Fund Convergence, 2013). Despite an increased availability of digital infrastructure, Cornish residents are less likely to have made recent use of the internet (ONS, 2020), which may reflect a lack of digital literacy skills amongst its populations. For instance, the Cornwall and Isles of Scilly Leadership Board (2019) found that less than half (44%) of adults in Cornwall had used basic digital skills during a three-month period. Cornwall faces barriers that reinforce digital exclusion which are likely to implicate the digital healthcare delivery throughout the county. These barriers could potentially exacerbate health inequalities for Cornish residents that already exhibit an average life expectancy nine years less than the national average. (Southwest Academic Health Science Network, 2021). Without addressing determinants that drive the digital divide, like affordability, connectivity and lack of digital skills, Cornwall serves as an example of a county at risk of experiencing structural violence, an avoidable situation that occurs when groups of people are limited in their ability to meet their basic needs (Vorobej, 2008).

Recommendations

Addressing the determinants of the digital divide is a moral imperative, as digital exclusion become exclusion from health services it contributes towards ill health and health inequality (O'Donnell *et al.*, 2018; United Nations Economic and Social Commission for Asia and the Pacific, 2018) further marginalising disadvantaged communities. Solutions that narrow the digital divide can minimise the impact of other inequalities (Matters, 2019) and are a compelling

way of meeting the Sustainable Development Goals (United Nations, 2019). For instance, the International Fund for Agricultural Development (2013) describes how such interventions can reduce marginalization among rural dwellers. To achieve similar outcomes, sectors need to work collaboratively (Citizens Online, 2021) so that shared priorities can be met (Public Health England, 2019). Multisectoral solutions to the digital divide must avoid a 'one size fits all' approach (Lichy *et al.*, 2014), and adapt to different contexts (Damodaran & Sandhu, 2016), including rural contexts (European Network for Rural Development, 2018). Improvements in the ability to access healthcare (Naslund *et al.*, 2017 & Point Topic, 2013) could reduce mortality and morbidity (Science and Technology Select Committee, 2019). More work must be done to connect individuals who are burdened by the digital divide, both literally and metaphorically speaking, so that health remains a human right (World Health Organisation, 2017), rather than a commodity.

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Madi is a clinical research fellow at Falmouth University and is particularly interested in research surrounding health policy, health inequality, digital exclusion, food systems and conflict. Madi has been practicing adult nursing for several years since graduating from Plymouth University in 2014. Whilst working as a nurse, Madi completed a master's degree in public health at Kings College London University in 2021 focusing her research on neurosurgical inequalities between high and lower-and middle-income countries.

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Anna transitioned from the public sector to Higher Education as a Senior Research Fellow in 2017 and currently leads 4 large transdisciplinary research projects (one of which is transnational). Anna has a health, social care and education professional background and most recently operated at Directorate Leadership Level for 5 years in the Education Health and Social Care Directorate of Cornwall Council - the second largest unitary authority in the UK. Her career has spanned roles from Head of Service, operational and senior manager, clinician, educator, public health children's lead, strategic partnership lead, and organisational redesign.