To what extent have digital inequalities been exacerbated by the pandemic?

Rebecca Hall, Hayley Sharrod-Cole and Imad Ahmed

Aims of the review

To identify the following:

- What evidence exists of pre-pandemic digital inequality.

- How the pandemic has exacerbated digital inequality.

- What measures were put in place to mitigate digital inequalities.

- How patients at risk of digital inequality are identifiable going forward.

- Recommendations and Next Steps.

Introduction

The COVID-19 pandemic is occurring within an environment of pre-existing social and economic inequalities in non-communicable diseases as well as inequalities in the social determinants of health. Not only are people in disadvantaged communities generally more prone to occupational exposure to the virus, but they also tend to have limited access to health care and higher rates of comorbidities. People living in more socio-economically disadvantaged neighbourhoods and minority ethnic groups have higher rates of almost all the known underlying clinical risk factors that increase the severity and mortality of COVID-19. Therefore, the prevalence and severity of COVID-19 has been magnified.[1] ONS data shows that all-cause mortality, by area deprivation, is similar to that for COVID-19, which supports that COVID-19 is being imposed on pre-existing health inequalities.

1. Background

Scoping of the literature quickly identified the variation and inconsistency in terminology so firstly it is essential to define what is meant by health/healthcare inequalities. There is a lot of cross talk using the same phrase "health inequality" when "health inequity" may be more apt. A health inequality typically is any measurable aspect of health that varies across individuals or according to socially relevant groupings. Absent from the definition of health inequality is any moral judgment on whether

observed differences are fair or just. In contrast, a health inequity is a specific type of health inequality that denotes an unjust difference in health. NHSEI define health inequalities as unfair and avoidable differences in health across the population, and between different groups within society.

Digital health services are defined as health services that use digital elements to affect the different phases of health care delivery, including health promotion, prevention, primary care, specialised care, long term care, social care, and self-care. This will encompass a broad array of intersecting services such as eHealth, mobile health, telemedicine, telecare, imaging, artificial intelligence and electronic health records.

Digital inclusion as defined by NHS Digital refers to digital skills i.e. the ability to use digital devices; connectivity i.e. access to the internet either through broadband, Wi-Fi or mobile; and accessibility i.e. the design of the service to meet the needs of all users including those dependent on assistive technology as well as awareness that such services exist. It is widely accepted that there are high levels of digital exclusion as well as digital health literacy in people from deprived communities.

Assessing the value of digital health care is incredibly complex not only due to the variation in digital health services, but also due to the applicability of current methods for evaluating digital services, and the varying intended and unintended consequences of digital implementation. There is some empirical evidence supporting improved outcomes following the use of digital health services although a full appraisal is beyond the scope of this review. For example, a systematic review of telehealth suggested that telehealth is effective in reducing patient mortality and hospital admissions for chronic heart failure, reducing hospital admissions for COPD, reducing blood pressure in hypertension, improving glycaemic control in diabetes and reducing symptoms in asthma.[2]

Similarly, a systematic review and meta-analysis by Flodgren et al in 2015 concluded that the use of telemedicine in the management of heart failure appears to lead to similar health outcomes as face-to-face or telephone delivery of care and that telemedicine improved glycaemic control in diabetic patients.[3] Inglis et al also performed a meta-analysis of telemedicine and structured telephone support in monitoring of chronic heart failure, and found both interventions to be effective in improving patient outcomes.[4] However all authors commented on the quality of the nature of the evaluation of digital health services reviewed and the current evidence-base on equity impacts of digital health services, which has the risk of worsening digital inequalities, is sparse. Health system goals will typically include quality, access, equity, efficiency, patient empowerment, responsiveness and affordability. It is unlikely that digital health services can fulfil all goals and there is invariably a trade-off. For instance, remote contact GP appointments may improve access to care services for

those living in rural areas, leading to more equitable access, but may concurrently reduce access for those in digital poverty or those who lack digital skills. Indeed, most studies show that while individuals of higher socio-economic status are the first to adopt and benefit most from the introduction of innovative technologies in health, thereby creating and widening existing inequities, the digital divide tends to affect the same individuals and population groups who are at risk of social and health inequities.

It has been recognised that in a world that is increasingly digital, digital exclusion leads to poor access to services and worse health outcomes.[5]

2. Was there evidence of pre-pandemic concerns around digital health care and equity/inequality?

For two decades before the COVID-19 pandemic had reached the UK, the motivation for the NHS to make better use of digital technology had already started to gain traction.

The Long Term Plan promised fully digitised secondary care services by 2024.[6] This followed The Future of Healthcare, the government's vision for digital, data and technology in health and social care DHSC 2018 which had placed a clear national and strategic focus on the actions required to support a digital NHS.[7] This policy paper for the future of digital healthcare contained just one short paragraph amongst it that acknowledged that any digital progression and innovation could potentially put those with the greatest health issues at risk of 'being left behind' but reinforced that any systems developed should be co-produced in order to exclude this possibility.

Both documents followed a string of policies that had already seen the timelines for creating a digital NHS pushed back, reflecting how the scale of the challenge had consistently been underestimated. In 2019 a new government unit, NHSX, was established, tasked with delivering an ambitious programme of work to lead the digital transformation of health and social care.

The Long Term Plan detailed that by 2023/24 patients would have a right to a 'digital-first' primary care consultation. Prior to the pandemic, around 80% of GP appointments took place face-to-face. As of June 2020, this had fallen to just under half, with around the same amount taking place over the telephone.[8] However, concern had existed in the literature prior to the pandemic around the impact of digital healthcare on inequality. Health inequalities and the social determinants of illness and disease had received growing attention within public health research a long time prior to the pandemic. This work was crucial in understanding the link between social inequalities and deleterious health outcomes.[9] This literature was a body of work that had focused attention on policymaking as

a route towards making meaningful changes to the fair distribution of healthcare services. In this context, digital health technologies had been positioned by governments around the world as central to the delivery of a fair healthcare system.

Rich et al (2019) highlighted that the presumption that conversion to digital health services from an analogue world would deliver on such ambitions needed careful analysis and verification.[10] They noted that there was a great variation in the way in which digital health is experienced by patients, it includes but is not limited to, web-based solutions, mobile phone and tablet applications, the integration of artificially intelligent platforms, the utilisation of wearable devices that track biometric information and the proliferation of social media environments, each of which may have varying impacts on health care equity. Their article presented findings from a discourse analysis of a selection of UK governmental policy documents on digital health, highlighting concerns about how digital access and equality are constituted through and absent within these documents. They argued there was a need for policymakers to engage with the social, cultural, geographical, political contexts that mediate, limit and provide opportunity for access and engagement with digital health technologies and the data they generate to understand the impact these innovations may have on digital healthcare inequality.

The authors acknowledged that discussions and consultations were beginning to take place as they had completed their research. However, before the results of these consultations could be concluded COVID-19 had emerged and the response to the pandemic saw a rapid shift to the adoption of digital approaches to working and engaging with populations. Therefore, it is now important to understand the pre-existing concerns and underlying factors contributing to digital inequalities and act immediately to avoid digital inequality contributing to health inequalities in the future.

3. What was the impact of the pandemic on those most likely to be excluded?

In March 2020, NHS England advised GPs of routine primary care services that could be suspended during the pandemic and that care should be delivered remotely wherever possible. There was a wholesale shift to virtual communication with patients. Under NHS guidance, remote consultation (via telephone, online message or video) was rapidly introduced to replace face-to-face consultation. However, there is evidence to support that the number of available remote consultations has not completely replaced face-to-face meaning capacity is reduced regardless of ability to access. There is evidence of pre-pandemic inequality in access to healthcare services. For example in England, the number of patients per general practitioner is 15% higher in the most deprived areas than that in the

least deprived areas.[11] It is known that people living in more socio-economically disadvantaged neighbourhoods and minority ethnic groups have higher rates of many chronic conditions, including hypertension, diabetes, asthma, chronic obstructive pulmonary disease, heart disease, liver disease, renal disease, cancer, cardiovascular disease, and obesity. As a result of health services having to focus on combating the pandemic, there has been a significant reduction in access to health care across the board. Given what we know about inequalities in morbidity and the need for health services, this will disproportionately impact on people with chronic long-term conditions, older people and people living in more deprived communities.

The impact of COVID-19 on health inequalities has been widely examined with the recent COVID-19 Marmot review offering a comprehensive review and recommendations.[12] Inequalities will not just be a result of virus-related infection and mortality, but also due to the health consequences of the policy responses that have been implemented. The loss of essential health services including preventive services, diagnosis, treatment, and rehabilitation, is likely to have disproportionate adverse health effects on disadvantaged or vulnerable populations. Inequalities in the impact of the reduction of these NHS services has not yet been evaluated but given inequalities in the access to health care and higher rates of comorbidities and higher burden of non-communicable diseases and in access to technology, it is likely that people from disadvantaged communities and groups will be disproportionally impacted.

A lack of health literacy leaves disadvantaged individuals and groups even more at the mercy of disinformation, polarization, and vulnerability concerning the virus and its pathology and prognosis especially during the pandemic when remote consultation has been rapidly introduced to replace face-to-face consultation. Limited language proficiency, due to educational and cultural barriers and/or immigrant status and exposure, detracts from effective communication between patients and health-care providers, accounting for additional health disparities.

To summarise, the burden of disruptions to health care services has disproportionately fallen on the individuals that are most likely to require care in the first place, and least likely to be able to substitute temporarily for other types of care, or to go without care completely. This has been recognised in phase three of the NHS response to the COVID-19 pandemic which sets out a series of measures to mitigate any inequalities arising from the lockdown. It states that NHS services must be restored inclusively and prioritised by need and action 2 of the recovery plan aims to restore services inclusively- specifically supporting those who may have had unequal access to diagnosis and treatment during the pandemic.

4. What guidelines have been issued regarding inclusive digital health care?

Multiple guidance documents and policy statements have highlighted the importance of digital inclusion in healthcare:

- The NHS Long Term Plan has made a commitment to reduce health inequalities and address unwarranted variation in care. Digital exclusion is an important form of inequality. Digital exclusion correlates with social disadvantages that include lower income, lower levels of education, and poor housing. It was stipulated that health inequalities will be addressed in the local plans being developed in response to the national Long Term Plan. The NHS Long Term Plan states that 'people will be empowered, and their experience of health and care will be transformed, by the ability to access, manage and contribute to digital tools, information and services'. The NHS Long Term Plan also aims to 'ensure these technologies work for everyone, from the most digitally literate to the most technology averse and reflect the needs of people trying to stay healthy as well as those with complex conditions'.[6]

- NHS Digital published 'A Digital inclusion guide for health and social care' that emphasised the commitment of the NHS, and the wider health and care system, to delivering information and services digitally wherever appropriate. This was last revised in July 2019 and indicates that it was already recognised pre-pandemic that many of the people who could most benefit from digital services are the least likely to be online.[13]

- The Topol review on 'Preparing the healthcare workforce to deliver the digital future' highlighted that the use of digital healthcare technologies potentially can exacerbate health inequalities, that could undermine the NHS principles of equal and equitable access to healthcare. It is therefore important to consider the impact of digital exclusion on vulnerable groups.[14]

- The Department of Health and Social Care published a policy paper on the future of healthcare in October 2018 that highlighted that 'Different people may need different services and some people will never use digital services themselves directly but will benefit from others using digital services and freeing resources to help them'. This paper highlighted the need to ensure accessibility to digital services for people with greatest health needs.[7]

During the pandemic, protecting the NHS became top priority for the UK government. Redesign of services to free up inpatient and critical care capacity was a major part of the health service's response to the pandemic. This included discharging thousands to free up beds, postponing planned treatment, shifting appointments online where possible as well as redeployment of staff.

One of the responses to the pandemic was to increase the uptake of digital services. NHS England released over 50 pieces of guidance to hospital specialists for the treatment of non-COVID-19 patients during the pandemic. How many of these related to inclusive digital healthcare?

In hospitals, GP practices and care settings, digital technologies have enabled the NHS, social care and public health authorities to continue serving the population during the COVID-19 pandemic.[15] From GP online and video consultations to NHS-approved apps - there has been a significant increase in the population's use of digital health services. However, the initial guidelines from NHS England on increasing the digitalisation of healthcare services did not focus on the impact of digital exclusion and its correlation with poor health outcomes.

Digital inclusion has been recognised as an important aspect in the recent NHS England guidance on response and recovery from the pandemic. In phase three of the health service's response to the COVID-19 pandemic, NHS leaders were asked to look at developing digitally enabled care pathways that "increases inclusion" as part of the next phase of the NHS COVID recovery plan.[16] NHS leaders were to review who is using new 111, primary, outpatient and mental health digitally enabled care pathways in a bid to improve inclusivity. The guidance stated that '"To monitor this, new care pathways should be tested for achieving a positive impact on health inequalities, starting with four: 111 First; total triage in general practice; digitally enabled mental health; and virtual outpatients". This data was due to be reviewed in March 2021 with a plan to develop agreed actions to ensure all patients receive the same level of access and care regardless of their digital preferences.

The 2021/22 priorities and operational planning guidance from NHS England emphasised the need to take further steps to develop population health management approaches that address inequalities in access, experience and outcomes, working with local partners across health, social care, and beyond.[17] The Implementation guidance document includes mitigating against digital exclusion as one of the five priorities.[18] Systems have been asked to ensure that face-to-face care is offered to patients who cannot use remote services; that more complete data collection is carried out, to identify who is accessing face-to-face, telephone, or video consultations, broken down by relevant protected characteristic and health inclusion groups; and impact of digital consultation channels on patient access is regularly assessed.

NHS England guidance on supporting pregnant women using maternity services during the coronavirus pandemic emphasised that information should be readily accessible to women, support people and their families, digitally and in accessible formats.[19] Operational guidance on clinical prioritisation of waiting lists for endoscopy and diagnostic procedures highlighted the importance of preventing worsening of health inequalities and avoiding digital inequalities.[20]

The above highlight the renewed focus on digital inclusion in healthcare systems. In this increasingly digital world, it is concerning that some will be left behind due to digital exclusion. NHS England's focus on ensuring mitigation for digital exclusion is an important step in working towards equity and equitability for all with regards to digital inclusion. The next step will be to collate data on the current impact of digital inequalities in the NHS and address them both at the local and national level.

5. **What evidence is there to support that changes to healthcare delivery during the pandemic exacerbated the digital divide?**

ONS data estimates that 10.0% of the adult UK population could be described as internet non-users. 55% of internet non-users are in the 75+ category, 24% 65-74 and 12% 55-64. In addition, 56% of non-users are disabled and 22.5% of non-users are described as 'economically inactive'. In East and West Midlands specifically, 71% and 76% of the population possessed 5 basic digital skills. 9% of the population in this area possessed 0/5 basic digital skills. The ONS data would imply that the older population would be adversely affected by digital healthcare delivery. However, a report by health foundation shows that older patients (aged 75+) accessed more GP appointments during the pandemic whilst younger patients had fewer appointments.

With the country placed in lockdown digital spaces rapidly became the main way to access information and services. However, as described above access to networks or connected devices and possession of the skills required to navigate computerized spaces optimally are not equal. In addition, during lockdown the public were told to 'stay at home, protect the NHS and save lives' - for fear of NHS services being overwhelmed. It is reported that four in ten people were too concerned about being a burden on the NHS to seek help from their GP. Data from the English Longitudinal Study of Ageing show that care-seeking behaviour changed radically in the early stages of the pandemic, with a significant proportion of patients with care needs not actively seeking help. 14% of those requiring GP care, and more than a third of those reporting that they needed community care services, did not contact these services.[21]

Attendances at A & E dramatically fell for both minor injuries and illness. All non-urgent elective operations were postponed for at least 3 months and according to the Royal College of Surgeons of England, referrals for NHS treatment fell significantly. As a result, there were 4.2 million patients waiting for consultant-led elective care in August 2020 compared to 4.4 million at the end of 2019. The reduction is due to fewer new pathways being started and is evidence of the decrease in referrals that have resulted from the pandemic.[22]

A WHO survey in August 2020 (105 responses from 159 countries) showed that the UK was not alone and reported that supply, demand, and accessibility issues have affected services across the globe. Reasons that affected supply of services issues were cancellation of elective services, staff redeployment, unavailability of services such as screening services, GP appointments, Outpatient (OP) clinics, closures of health facilities, supply chain issues and changes in treatment policies.[23] Societal measures such as a strict lockdown to combat the pandemic have affected people's socioeconomic situation as well as their ability to reach the health services they need. This includes financial costs of travel and loss of income. This disproportionately impacts those on low incomes, which ultimately affects women more because of the higher numbers of women in low-income jobs, especially single mothers supporting children. The WHO survey stated that 76% of countries reported a reduction in OP attendance citing reasons such as financial issues and lockdowns hindering access.[23]

Data from the English Longitudinal Study of Ageing show that many of the over-50 population were unable to access health care services during the early stages of the COVID-19 pandemic in England. A sixth of older people report having hospital treatment cancelled, with an additional one in ten unable to visit or speak to their GP. More worryingly the data shows that there are clear differences in the proportion of individuals whose care was cancelled by the deprivation level of the local area in which they live. Splitting individuals into five groups based on their 2015 index of multiple deprivation (IMD) score, those living in the most deprived fifth of areas were more likely to have hospital treatment cancelled (22.0%) than those living in the least deprived fifth of areas (15.8%). These differences can only be partially explained by differences in need for care in the most deprived areas. Access to community health and social care has also been severely disrupted.[21] Furthermore, there was evidence of unequal access to services with 37% of those living in the least deprived areas were not able to access services despite attempting to do so, increasing to 46% among those living in the most deprived areas. It is not clear whether this difference is due to or exacerbated by digital inequalities.

In conclusion digital inequalities already existed, yet the COVID-19 crisis has exacerbated them dramatically to the point that digital inequalities have been proposed as a social determinant of health.[24]

6. What guidance was issued to minimise risk of digital inequality during the pandemic?

As discussed, our review of the literature suggests there is sufficient evidence to conclude that digital exclusion should be considered across sectors as a social determinant of health, with the potential to exacerbate health inequalities if progress does not consider the structural, economic, social, and behavioural factors contributing to digital exclusion.

Possession of digital devices and access to fixed and mobile internet connections is a gateway to essential health information and care and many other key services including education, food delivery, employment, and social support, all of which indirectly impact health. Underlying inequalities in contact with digital technology and the internet if left unresolved, have the potential to exacerbate health and social inequalities in a digital era.

Davies et al (2020) reviewed studies which had looked at how countries could look to mitigate the impact of digital health inequality. They found evidence that some countries had attempted to make access to the internet a human right, however they argued that whilst unilateral policies can draw attention to an issue they cannot account for and manage the underlying complexities which lead to digital exclusion. They acknowledge to achieve this would take a multidisciplinary and multisectoral response.

As the UK emerged from the first lockdown in 2020 various organisations published their recommendations to learn from the rapid digital transformation that had occurred as a result of the pandemic and to advise how to mitigate against further widening the digital divide. The Good Things Foundation issued three key steps to fix the digital divide: the need to address the digital infrastructure, data poverty, and to develop an inclusive digital strategy. The Carnegie UK Trust produced twelve key recommendations recognising that our current comprehension of the impact of digital exclusion is limited due to lack of historic quality data. They use their recommendations to promote the need to learn from the pandemic and for policymakers to take ownership of working towards digital inclusion and equality.[25]

With an international focus, particularly on low-income countries, the Human Rights, Big Data and Technology Project has postulated five urgent principles for leaving nobody behind through technology in the COVID-19 response:

- guaranteeing internet access as a human right and a public good
- increasing the availability and acceptability of the digital infrastructure
- increasing the accessibility and affordability of digital services

- empowering people by addressing disinformation and hate speech without censorship
- ensuring that internet access is not a cause for more surveillance

As health and care systems seek to deliver services through digital platforms, it remains important to monitor and evaluate the levels of engagement to ensure that a focus on digital approaches does not inadvertently reinforce underlying inequalities in health, using some of the above strategies may help mitigate against this. However, it is worth noting that whilst these statements and guidance have been published, they were being published at a time when the health system was still coping with the dynamic and changing impacts of the pandemic and had sanctioned change to enable what it believed were systems to help patients and providers to continue to deliver the service. Therefore, a huge degree of research and data collection is still needed to assess if these recommendations do indeed deliver digital inclusion and equity.

In August 2020 ICSs (Integrated Care Systems) were asked to develop digitally enabled care pathways that increase inclusion. Each ICS was asked to assess engagement with different channels of delivery, how this has affected access and put in place mitigations to address any issues. There were 4 specific requests:

1. Provide quantitative data on level of uptake in different areas e.g., acute, mental health, and whether uptake can be linked to specific groups
2. Provide qualitative survey data regarding patient satisfaction
3. Document any local interventions to mitigate against digital exclusion and how these were implemented
4. Suggest what support ICSs need form NHS England and NHS Improvement

All 42 ICSs responded with the following key findings:

- There is limited evidence of use of data to drive improvement. Trusts reported that this was due to the pace and scale of change, and difficulty aggregating disparate datasets. Remote consultations are not interoperable with other IT systems, multiple platforms are in use, including different EPR (Electronic Patient Records) systems.
- Data on ethnicity is unreliable, time intensive to collect, deprivation data is not available and data on protected characteristics also not available.
- ICSs can generally quantify the number of remote consultations, across different services, using data from digital platform suppliers. However, this data cannot normally be linked to patient demographic data- this is because it is typically collected form the platforms themselves that are not linked. Nor can it show digital platform usage as a proportion of all

appointments.

- Routine NHS data, and digital supplier data, is not sufficient for monitoring 'digital exclusion', as it does not identify patients who are not accessing health services at all. A minority of ICSs attempted to identify areas in their local region where there are likely to be high proportions of 'digitally excluded' patients. Some ICSs also plan to develop 'population health management' tools- although no further detail on the potential tools was provided.

- Patients are generally satisfied with remote consulting. However, in most cases, survey respondents were 'self-selecting', and had the skills and devices to complete online 2 questionnaire forms. Several ICSs noted that they could not yet do 'outreach' surveys with digitally excluded people, because of social distancing restrictions.

The report included some pertinent potential actions which findings from our review would support:

1. Define a suitable 'population health management' approach, whereby digitally excluded patients are identified and proactively contacted.
2. Develop and promote a universal 'flag' system, for shared care records, to help providers identify which patients might be digitally excluded, or who are at risk of being so.
3. Develop meaningful 'metrics' to measure digital inclusion.
4. Define consistent criteria for assessing the usability and accessibility of digital platforms.

7. How have other sectors e.g. commercial and education succeeded in collecting data related to digital exclusion and or deprivation?

Sectors other than healthcare have been looking at addressing the digital divide. A 2014 report from BT on valuing digital inclusion analysed the social return on investment of digital inclusion. For individuals, getting online was noted to be worth £1,064 a year due to increased confidence, reduced social isolation, financial savings and opportunities in employment and leisure. For workers, getting online was worth £3,568 per year due to opportunities for remote working and increased opportunities to earn.[26] A 2016 analysis of Scottish data carried out by Ipsos MORI for Carnegie UK Trust showed the association of internet use with better health and wellbeing. Those who used the internet were more likely to have been to a cultural event, visited the outdoors for recreation, taken part in sport or volunteered. Conversely those who were not online were more likely to have visited their doctor once a month or more.[27]

The COVID-19 pandemic has had an unprecedented effect on education worldwide. Multiple studies and reports have reviewed the impact of the pandemic on education. There were multiple organisations involved in data collection. The most pertinent studies published were supported by the Cambridge partnership for education, National Foundation for Educational Research (NFER); Centre for Learning and Life Chances in Knowledge Economies and Societies (LLakes); Institute for fiscal studies, Sutton trust and Edurio.[28-33] Data on digital divide was available from Ofcom.[34] Ofsted and ONS had additional publications that reviewed the overall data and highlighted the impact of the pandemic on education.[35-37] These studies have reviewed access to devices and investigated parental support and access to adequate learning spaces. These reports provide evidence of a digital divide. Children who are digitally excluded due to lack of access to devices are also more likely to have more limited digital skills. There was evidence of the impact of parental and teacher factors, such as parental engagement and both teacher and parent skills.

The retail sector has used data to review and reduce the impact of the pandemic on these sectors and to find new ways of working.[38] The NHS is well placed as an organisation to collate and review data. But as identified in the recently published ICS report the data exists in siloes and is not easy to link at a patient level. This was supported by findings from the Summary of the Remote Consultations and 'Digital Exclusion' during the COVID-19 Pandemic 'Integrated Care System' (ICS) Summary Report.

This means it is not possible to identify and target those at risk of digital exclusion, i.e. those who are most likely to have been disproportionately impacted by the pandemic.

One of the aims of NHS Digital is to use data to improve understanding of health problems, support research, and improve the working of the NHS. The available datasets should be used in conjunction with the data held by social care and Ofcom to review the population data on digital inequalities to help address this in the future.

8. **How could we identify those most likely to have been excluded- i.e. those in most need going forward?**

The literature revealed that there have been multiple frameworks developed across the world to model the social determinants of health (SDOH). Dover and Belon (2019) looked to address some of the gaps in these frameworks by developing a Health Equity Measurement Framework (HEMF) which they felt gave a more encompassing view of the multitude of SDOH, including the drivers of health service utilisation. They envisioned this to be able then to be used to guide quantitative analysis for public health surveillance and policy development.[39]

As discussed throughout our paper the literature has shown that response to the COVID-19 pandemic, has resulted in governments and policymakers heralding digital health as an innovative health solution that can ensure on-going access to clinical care and allow public health measures that stem rapid viral transmission and spread. However, unexamined inequities in access to and implementation of digital health as well as the quality of care afforded by digital health can recapitulate and deepen the inequities and inequalities that have long existed within our health care system.

Crawford et al (2019) used the factors described by Dover and Belon in their HEMF and overlaid this with the digital determinants of health and digital equity to develop their Digital Health Equity Framework (DHEF). The framework aims to identify the digital determinants of health and their links to digital health equity. The digital determinants of health interact with other intermediate health factors, such as psychosocial stressors, pre-existing health conditions, health-related beliefs and behaviours, and the environment, along with the person's current health state and needs. They argue that COVID-19 has changed the approach to health equity, such that one must include digital health equity, and to do this successfully requires looking beyond individual factors to the health system itself.[40] This means needing to ensure that at every level, from health care providers to, health regulators, and government, that there is a system to be able to detect, understand, and work to improve the resourcing and quality of digital health care for all social groups to reduce digital health disparities and inequalities. However, such a system does not currently exist.

Despite the increasing focus on digital exclusion, there is still a paucity of data and literature to aid our understanding. The King's Fund and Public Health Wales looked at various organisations to try and understand through case studies how various projects had tried to address digital health inequalities. Whilst no clear unified strategy was established from this work there were some common themes which seemed to reduce exclusion, such as co-design and co-production of digital services, including digital health tools. The authors also concluded there were many unanswered questions and importantly digital health inequalities will not be static, that as new technologies and approaches are developed the digital health inequalities will also be impacted, change and need re-assessment and evaluation.[5]

Numerous articles in the literature have highlighted health inequalities during the COVID-19 pandemic and its continuing aftermath. However, the pandemic has offered an opportunity for the NHS and all integrated care systems to truly pledge to make a difference and address these health inequalities, including digital health inequality. Every level of the system should be striving to develop processes and measures to prevent blind spots and inattention in this regard. The celebrated curve of innovation cannot reinforce the social gradient of health, whereby people in less advantaged socioeconomic

positions have less access to digital health care, poorer quality of digital health care, or worse health outcomes.

It is well recognised that those requiring health care the least tend to use health care services more and indeed more effectively. The rapid shift towards digitalisation of services during the pandemic made access to services easier for those with lower levels of need. It also empowered those who may previously have been disadvantaged due to geographical barriers. Conversely, patients who were already in greater need of services were those least likely to have the skills they needed, or technology required to access these services, and therefore faced a double disadvantage.

Research during the pandemic shows that patients in areas of high social vulnerability are significantly more likely to experience barriers to online primary care and they are also more than twice as likely to experience language barriers to telehealth care in comparison with those with low social vulnerability, suggesting some evidence of intersectionality.[41] Although this data came from a US population, data from the Nuffield Trust supports the importance of intersectionality in understanding differences in access to care at GP surgeries during the pandemic. Patients at GP practices in England who were of Asian or Black ethnicity, living with a disability, and providing unpaid care of 50+ hours a week were four times less likely to try to book a GP appointment online via an app or website compared to patients in the same survey who were young (16-35 years), white, well (no long-term conditions), and working full time.[42] It is not yet clear how various patient characteristics may combine or interact to exacerbate digital inequalities.

Healthcare providers should be aware that not all patients will be able to engage with digital service delivery, and that other routes of access need to be maintained to avoid widening health inequalities. The logical next question is how can these individuals be identified? In line with recent recommendations, we propose the derivation of a metric that combines multiple proxy measures for risk of digital exclusion using existing coded data from the GP electronic record. This metric could be used to target access and prioritise patients appropriately. Such factors could include patient demographics - age, gender, ethnicity, patients with learning disabilities, sensory impairment, or severe mental illness, those coded as bed bound or living in care homes, patients coded as on an employment and support allowance (ESA), or personal independence payment, patients coded as illiterate or those who do not have English as a first language and those who do not have a mobile phone number attached to their record. This would be in line with priorities set out recently by NHS England for 2022 which focus on achieving a core level of digitalisation in all services. But at the same time places flexibility and inclusive access at the centre of care, recognising that 'one size doesn't fit all'.

Summary

- The response to the pandemic saw a rapid shift to the adoption of digital approaches to working and engaging with populations.
- The scale and pace of change made it difficult for Trusts to use data to drive improvement.
- The burden of disruptions to health care services has disproportionately fallen on the individuals that are most likely to require care in the first place and least likely to be able to substitute temporarily for other types of care, or to go without care completely.
- The initial guidelines from NHS England on increasing the digitalisation of healthcare services did not focus on the impact of digital exclusion and its correlation with poor health outcomes.
- There has been effort to collect data on digital exclusion and access to services, but data exists in siloes and is not easy to link at a patient level.
- Data on ethnicity is unreliable, time intensive to collect; deprivation data is not available and data on protected characteristics also is not available.
- Commercial sectors have not faced the same issues when collecting data.
- Existing data is not sufficient for monitoring 'digital exclusion', as it does not identify patients who are not accessing health services at all.

Recommendations

System

- The NHS should call for better quality data and indicators to look to properly evaluate digital exclusion.
- Utilise this data to identify and to design a metric that identifies people at risk of digital exclusion for proactive mitigation to be achieved.
- Continuously monitor the impact of digitalisation of healthcare services on digital exclusion and ensure that any new services or tools are inclusive by design, co-designed with those groups identified by the metric.

Place

- Tackling digital health inequality should be a key priority for all Integrated Care Systems and Boards. All ICSs should aim to produce a strategy detailing how they will combat digital exclusion.
- Collaborate with local organisations to empower, educate and enable those who are at risk of

digital exclusion to improve digital skills across the ICS.

- Create a network of digital health champions across the ICS who are dedicated to creating digital inclusion.

Cross-sector

- Embed digital inclusion into all reintroduction and recovery strategies from the pandemic. Joint place-based and system approaches are essential to eradicate digital exclusion.
- Healthcare organisations should partner with the local authority, social care and voluntary sector organisations to identify people at risk of digital exclusion and discuss and implement plans to mitigate this.
- As digital based systems across all systems become mainstream ways of access, population digital health literacy must become a priority for all sectors to recognise as their responsibility.

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