Informing NHS policy in 'digital-first primary care': a rapid evidence synthesis

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Scientific summary

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Background

In 'digital-first primary care' models of health-care delivery, a patient's first point of contact with a general practitioner or other health professional is through a digital channel, rather than a face-to-face consultation. Patients are able to access advice and treatment remotely from their home or workplace via a number of different technologies. The greater use of technology and digital tools and services in UK health care has been advocated by various stakeholders on the basis of the potential benefits to the NHS, such as improving service delivery, decreasing demand and increasing financial efficiency.

As digital-first services have increased in number and reach, so have questions about their implementation and actual impact on patients, staff and services. NHS England approached the Health Service and Delivery Research Evidence Synthesis Centre to help identify published evidence of potential relevance to digital-first primary care. An iterative process of scoping the literature was agreed and a review subsequently conducted in two stages:

1. scoping and summary of the evidence
2. narrowing the evidence base and rapid evidence synthesis.

This rapid scoping exercise was undertaken to provide a high-level overview of the available evidence, including a number of existing reviews of the literature. Although a full systematic review was not possible, given the time and resources available, some aspects of systematic review research methodology were applied to introduce a level of transparency and reproducibility not typically associated with this kind of briefing.

Objectives

Stage 1: scoping and summary of the evidence

The aim of stage 1 was to conduct an initial scoping search and summarise existing evidence.

Stage 2: narrowing the evidence base – rapid evidence synthesis

After examining the scoping material from stage 1, NHS England produced the following list of questions:

- What are the benefits of digital modes and models of engagement between patients and primary care? To patients, general practitioners, the system?
    - As general practitioner workload and workforce is the main threat to primary care, how do we use these innovations to alleviate this, rather than only increase patient convenience and experience?
    - Which patients can benefit from digital (online) modes and models of engagement between patients and primary care?
    - What channels work best for different patient needs and conditions?
    - Are there differences in synchronous and asynchronous models?
- How to integrate 'digital-first' models of accessing primary care within wider existing face-to-face models?
- How to contract such models and how to deliver them? (e.g. geography size, population size).

Methods

Stage 1: scoping and summary of the evidence

In July 2018, searches of electronic databases (MEDLINE, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, the Health Technology Assessment database and PROSPERO were searched in July 2018), relevant research, policy and government websites, and the National Institute for Health Research Health Service and Delivery Research programme database of ongoing and completed projects were carried out to identify systematic reviews relating to digital health in primary care. Records that met the following criteria were considered eligible for inclusion.

Study design

Systematic reviews, meta-analyses and other forms of evidence syntheses. Reviews could include primary studies of any design. Though the searches focused on evidence syntheses, any related primary studies encountered were also included when relevant. However, this study did not systematically search for relevant primary research evidence.

Population

Any primary care medical staff and (1) patients (or their caregivers) of any age and/or (2) other medical professionals.

Interventions

As the known literature rarely conceptualised interventions as 'digital primary care', any form of non-face-to-face interaction, including e-mail, online/video, messaging, artificial intelligence-led systems or triage. Reviews that included telephone consultation alongside digital forms of interaction were included at this stage. Reviews focusing predominantly or solely on the following were excluded:

- Improving adherence to treatment or rates of attendance through the use of reminders.
- Remote monitoring or self-management of conditions without some form of two-way interaction being a key component.
- Remote treatment, coaching or rehabilitation focused interventions (e.g. remote therapy for mental health conditions).

Outcomes

Impact on care in terms of effectiveness and safety patient access/convenience, system-level efficiencies and related issues, such as workforce retention, training and satisfaction. In terms of patient access, this includes a better understanding of which patients are able to use digital consultations and what conditions are/are not appropriate for non-face-to-face engagement.

Stage 2: narrowing the evidence base – rapid evidence synthesis

In order to address the revised questions identified by NHS England (see *Objectives*), a rapid synthesis was conducted of the most relevant evidence identified from the stage 1 scoping exercise. Documents that were included in stage 2 met the following criteria:

- systematic reviews/evidence syntheses, including evidence on the use of digital (online) modes and models of engagement between patients and primary care (telephone/audio alone was excluded unless it was alongside digital modes)
- ongoing research and any incidentally identified primary studies focused on the use of digital (online) modes and models of engagement in any health-care setting.

Critical appraisal

Critical appraisal of included evidence was conducted using relevant assessment tools and reporting standards. These included the Database of Abstracts of Reviews of Effects database selection criteria for systematic reviews, the Realist And Meta-narrative Evidence Syntheses: Evolving Standards for the reporting of realist syntheses and the Critical Appraisal Skills Programme checklist for qualitative research. No evidence was rejected on the basis of critical appraisal. Findings of the critical appraisal were tabulated and used to inform judgements about the internal and external validity of included research results presented in the thematic synthesis.

Synthesis

The seven research questions identified by NHS England formed the basis of a thematic framework. When empirical evidence and/or related conclusions were identified in the evidence, they were coded, grouped and synthesised according to the following themes:

- Benefits of digital modes and models of engagement between patients and primary care:
  - issues relating to general practitioner workload and workforce
  - patients subgroups that can(not) benefit
  - the effects of different channels for different groups/settings
  - differences between synchronous and asynchronous models.
- Integration of digital-first models within wider existing face-to-face models.
- Issues relevant to contracting delivering digital-first models (e.g. geography size, population size).

When included publications looked at health care in general, only evidence applicable to primary care was coded and synthesised. Similarly, when publications included evidence relating to traditional telephone consultations, this was coded only when the data could also be applicable to digital modes of engagement.

Results

Stage 1: results of the initial scoping work

In total, 2846 records were screened and 92 included in stage 1. All the included documents were summarised in a brief narrative overview, alongside a spreadsheet that could be ordered or filtered according to the key characteristics, such as technology type or health-care setting (e.g. primary care or health care in general).

Many reviews of digital alternatives to face-to-face consultations were identified; however, many were primarily concerned with 'mainstream' technologies, such as telephone consultation/triage. Only a minority specifically focused on primary care.

Most reviews very narrowly evaluated the introduction or use of a class of technology (e.g. internet video consultation), rather than the integration of such technologies as part of a broader reorganisation or reimagining of services.

Recent publications funded by NHS England, the Nuffield Trust and the National Institute for Health Research Health Services and Delivery Research programme were highlighted, alongside recent and ongoing primary studies, and relevant open calls for research proposals.

The spreadsheet was sent to NHS England together with a summary of the key evidence.

Stage 2: results of the rapid evidence synthesis

Of the 92 stage 1 documents, the findings from seven reviews and eight primary studies were included in the stage 2 rapid synthesis. Five reviews were produced by UK-based authors. One conceptual review and three primary studies were conducted as part of a single National Institute for Health Research Health Service and Delivery Research programme of work examining alternatives to face-to-face consultations in UK general practice. Two other primary studies were also conducted in a UK primary care setting. Evidence on a range of technologies was synthesised, including telephone consultations, video, e-mail and e-visits, in addition to digital/online symptom checkers and health advice/triage services.

Themes relating to the benefits of digital modes and models of engagement between patients and primary care included absence of reliable evidence; uptake of alternative consultation models; impact on clinical practice and patient health outcomes; safety, harms and quality-of-care outcomes; impact on consultation dynamic; financial costs and cost-effectiveness; diagnostic accuracy; information, triage and signposting; and health and patient professional experience and satisfaction.

Themes relating to integration of digital-first models within wider existing face-to-face models included health professional concerns about alternative consultation models; infrastructure and logistics; patient–professional relationships; professional identity; policies and procedures around the implementation of alternative consultation models; and unintended consequences.

What are the benefits of digital modes and models of engagement between patients and primary care?

Nature of the identified evidence

Much of the literature on digital modes and models of engagement focuses either on the inherent characteristics of the technology or the views and perceptions of users. Unfortunately, there is little objective outcome data to evaluate the benefits and risks of digital modes and models of engagement against standard practice in primary care. When evidence is available, it is extremely limited, often from just one or two studies, often conducted in a non-UK primary care setting.

The available evidence suggests that uptake of existing digital modes and models of engagement is currently very low, but evidence is either sparse or contradictory for patient health outcomes; quality of care; access to care; continuity of care; breaches of privacy or confidentiality; financial costs and cost-effectiveness; diagnostic accuracy; accuracy of triage and signposting.

Effects of digital modes and models of engagement

Alternative modes and models of engagement change the interpersonal dynamic of the traditional primary care consultation. Many of the rich sense stimuli of a face-to-face consultation are lost, though digital modes of engagement allow patients to share recorded images and sounds to aid remote assessment and diagnosis. Some evidence suggests that video consultations are shorter, and result in less information being shared and fewer problems being discussed than face-to-face consultations. However, other evidence suggests that video consultation may be preferable for patients who feel apprehensive about face-to-face encounters with general practitioners or other practice staff.

Patients were often satisfied with alternatives to face-to-face consultation that provided convenience, flexibility and control, particularly when dealing with ‘simple’ problems. Some evidence suggested that face-to-face consultations were more highly rated than alternatives when time was needed for discussion, making decisions and for taking problems seriously. Patients expressed concerns about confidentiality, for example in relation to web requests being viewed by non-clinical staff. General practitioners satisfaction rates suggested that face-to-face remains the preferred ‘gold standard’, with substantially lower ratings for video consultation. Both patients and general practitioners commonly encountered technical problems with video consultation.

There does not appear to be evidence to suggest harms, but the few studies measuring this for digital modes of engagement were generally short term and small scale. There is also some evidence to suggest increased general practitioner caution when using alternative consultation models, leading to 'safety netting' behaviours, such as higher than usual antibiotic prescribing.

As general practitioner workload and workforce is the main threat to primary care, how do we use these innovations to alleviate this, rather than only increase patient convenience and experience?

There appears to be little quantitative evidence on the impact of e-mail on overall workload in primary care, whereas findings on e-visits and e-consultation are mixed. There is some evidence that online triage tools can divert demand away from primary care services, but results vary between interventions and outcome measures. One recent UK study suggested that video consultations were time neutral for clinicians [Donaghy E, Atherton H, Hammersley V, McNeilly H, Bikker A, Robbins L, Campbell J, McKinstry B. *British Journal of General Practice* 2019;**69**(686). https://doi.org/10.3399/bjgp19X704141].

The impact of alternative consultations on the number and duration of follow-up consultations is not well established, and authors of the most recent UK studies recommend that future evaluations specifically measure any 'knock-on' effects in the 2 weeks following a digital consultation.

Which patients can benefit from digital (online) modes and models of engagement between patients and primary care

The available evidence consistently suggests that patients who use alternative consultation methods are younger and healthier and have higher levels of education, employment and income than patients who use traditional primary care services. This particularly appears to be the case for digital modes of communication. This has raised concerns about the potential for digital modes and models of engagement in primary care to reduce access for older patients with complex health needs, as well as patients from more deprived areas. However, there is some evidence that – for those with access and the ability to use digital services – alternative consultation methods may be popular among some older patients and patients with mobility or anxiety issues.

It should be noted that much of the empirical evidence about the impact on subgroups is from a health professional perspective, rather than a patient perspective.

What channels work best for different patient needs and/or conditions?

There appears to be little in-depth comparison of the differential effects of different channels of engagement in primary care. The main distinction in the literature is between technologies that rely primarily on verbal or textual interaction. Often the advantages and disadvantages of each mode are theoretical, rather than empirical.

Telephone consultations are challenging for people with hearing or speech problems, learning difficulties or cognitive impairment, or who do not have English as a first language. There does not appear to be strong evidence about whether or not digital modes of engagement can mitigate any of these challenges.

Are there differences in synchronous and asynchronous models?

Much of the identified literature emphasises the theoretical rather than empirical differences between synchronous and asynchronous models. Synchronous models retain some advantages of interpersonal interaction between patient and clinician. Asynchronous models lose these advantages and are generally unsuitable for urgent health needs. However, asynchronous models can provide flexibility for both clinicians and patients, and may be preferred by patients with anxiety or communication difficulties.

How to integrate 'digital-first' models of accessing primary care within wider existing face-to-face models

The identified publications did not provide information on how to integrate digital models into primary care, but a number of barriers to implementation of digital modes and models of engagement have been identified.

Health professionals have expressed concerns about workload changes; patient access and equity; security, confidentiality and privacy issues; and medico-legal concerns around medical errors and medical negligence, due to the absence of physical examinations and the potential for miscommunication. With the possible exception of patient access and equity, there appears to be limited empirical data to either substantiate or allay these concerns.

Several studies identified technical barriers to the implementation of digital models of engagement, with one author citing 'the heavily firewalled, low bandwidth systems of the NHS' [Atherton H, Brant H, Ziebland S, Bikker A, Campbell J, Gibson A, *et al.* The potential of alternatives to face-to-face consultation in general practice, and the impact on different patient groups: a mixed-methods case study. *Health Serv Deliv Res* 2018;**6**(20). https://doi.org/10.3310/hsdr06200]. Beyond having adequate information technology infrastructure to deliver digital engagement, primary care staff felt that adequate implementation of such technology would also require integration with established appointment and electronic record systems.

Some studies observed that the presence of an established relationship between general practitioner and patient facilitated alternative forms of consultation.

General practitioners and nurses value the clinician–patient relationship and some have identified physical proximity as an important factor in its development. One author suggests that 'any new technology needs to enhance what the professional sees as their core role, otherwise it is unlikely to be accepted into practice' [Atherton H, Brant H, Ziebland S, Bikker A, Campbell J, Gibson A, *et al.* The potential of alternatives to face-to-face consultation in general practice, and the impact on different patient groups: a mixed-methods case study. *Health Serv Deliv Res* 2018;**6**(20). https://doi.org/10.3310/hsdr06200].

The absence of clear local policies, procedures and guidance relating to alternative models of engagement can create inconsistencies in practice that lead to inefficiency and inequality. Problems noted in the literature include unclear contingency planning for staff absence or technical failure; lack of promotion of consultation options to eligible patient groups; and lack of targeted training for administrative staff.

How to contract such models and how to deliver: what geography size, population size?

Available evidence typically focused on the impact of alternative consultation models in the context of individual primary care practices. The identified evidence did not inform contracting these models at a regional or national level.

Conclusions

Rapid scoping of the literature suggests that there is little high-quality evidence relating to 'digital-first primary care', as defined by NHS England. The broader evidence on alternatives to face-to-face consultation addresses certain policy-maker concerns, such as the possible impact of new technologies on workload and workforce, inequalities, local implementation and integration with existing services. However, although this evidence gives an insight into the views and experiences of health professionals in relation to such concerns, quantitative empirical data are lacking.

As well as obtaining better empirical data on the effects of 'digital primary care', policy-makers may want to engage directly with the concerns of health professionals around practitioner core roles, workload, medico-legal issues, patient access, equity, security, confidentiality and privacy issues. Engagement with professionals might also address the perceived technological barriers to implementation.

Some of the questions of interest to policy-makers, such as how the delivery and funding of primary care services might be reconfigured as a consequence of digital consultation methods, cannot be answered by research evidence alone and may require in-depth engagement with all primary care stakeholders.

Implications for research

A broad scope qualitative or mixed-methods review of the literature is unlikely to be of great value in informing future decisions about digital-first primary care. This exercise has identified recent reviews of both digital/online symptom checkers and triage services, and alternatives to face-to-face communication. However, much of the primary evidence relates to approaches and technologies that have changed since their evaluation, and new technologies continue to emerge.

A major difficulty for establishing an evidence base relating to digital technologies in general is the rate of innovation and the time needed for evaluation. Future research into the digital delivery of clinical interventions may need to reconcile 'digital' and 'clinical' evaluation paradigms, integrating questions of usability with clinical objectives.

Evaluation of any new health technology that changes the means of triage, diagnosis or consultation needs to measure outcomes that matter to patients, professionals and the broader health service. Alternative forms of engagement may impact on clinical practice, diagnostic accuracy, safety, harms, quality of care, consultation dynamic, costs and organisational factors. Future studies should carefully consider the proximal and distal impacts of new engagement technologies to ensure that appropriate forms of outcome data are collected.

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This report

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