

Amenability of Health Burdens to Digital Interventions

Risks and opportunities for practitioners and policy makers

The aim of this report is to inform policy around the potential of digital health to address current and future NHS pressures, exploring whether areas of high disease burden are amenable to digital (particularly mobile health) interventions. We use a scoping review approach, in combination with interviews of opinion leaders. Findings are synthesised alongside case studies on mental health, older people and digital health in China. This rapid-response report covers only a fraction of this vast and rapidly changing field of research and development, and our conclusions and recommendations are consequently tentative.

Main findings

While there is substantial and growing digital activity in the health sector, relatively little is known about its benefits to patients and clinicians, and to relieving pressure on the NHS. This review of mobile health (mHealth) interventions finds in general a serious lack of good evaluative evidence.

We conclude that practitioners and policy makers must approach digital technologies in the same way as all other health care interventions – balancing benefits, risks and costs. Among our key findings:

- Digital health has the *potential* to relieve pressure on frontline professionals in the health and care system. But such interventions tend to address single diseases, not reflecting emerging trends in multiple morbidities, which need to be better identified and addressed.
- The risk of unequal access to digital interventions must be addressed early if policy makers are to avoid widening existing health inequalities.
- Digital interventions may be able to address health problems, for example by replacing existing processes, but if they are not used by patients and welcomed by health care professionals they will not reduce overall costs, and could potentially add to them.
- While there is potential for digital health interventions to reduce demand on NHS services, for example by improving lifestyle behaviours and increasing levels of self-management of chronic conditions, the evidence base for effectiveness remains at an early stage, and benefits may be seen only in the medium to long-term.
- Mental health has the most substantial high-quality evidence base for digital intervention. Using digital platforms to deliver existing evidence-based interventions, for example cognitive behavioural therapy, permits greater reach. The

best evidence of benefit is from digital interventions supplementing rather than replacing face-to-face mental health interventions.

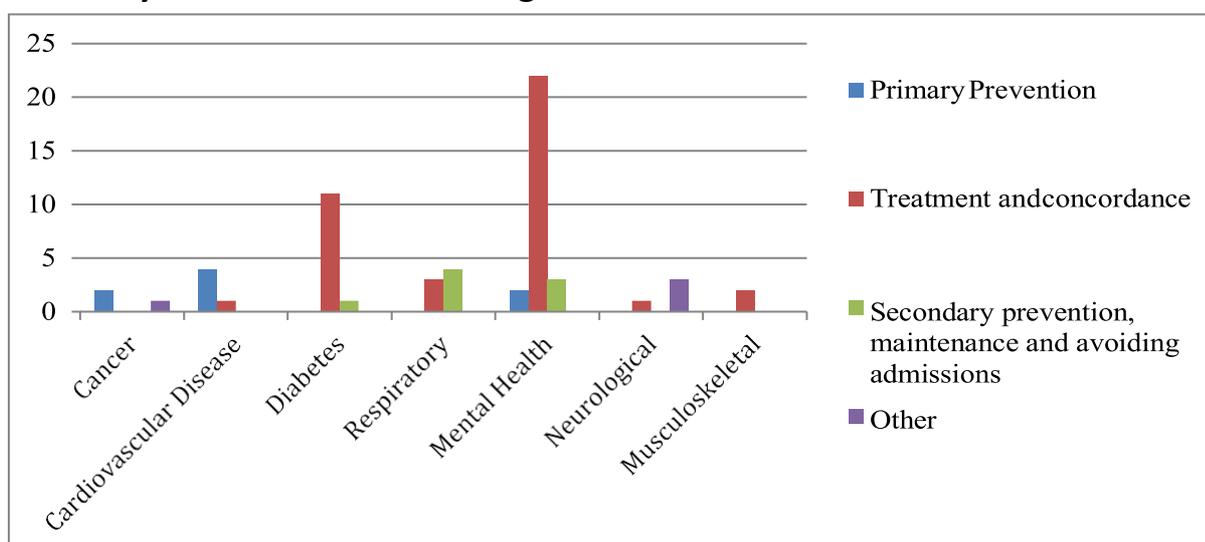
- Musculoskeletal conditions may be amenable to short courses of face-to-face physiotherapy supplemented by digital reminders and instructions, to increase effectiveness and reduce clinician contact time for rehabilitation.
- Digital platforms could also support acute illness or injury requiring short to medium-term rehabilitation or other therapeutic interventions. Cardiac and stroke rehabilitation programmes, for instance, could be supported in this way, although the research evidence on such digital interventions is at an early stage.
- For long-term chronic illnesses, the research found that digital interventions currently support prevention – such as smoking cessation apps to reduce cancer risk – and can assist patients who require extended adherence regimes such as the self-management of asthma or diabetes. Other digital interventions focus on early detection – such as melanoma.
- In neurological conditions such as epilepsy and Parkinson’s disease, digital interventions and sensor technology can support diagnosis and rehabilitation, optimise treatment and help avoid adverse events.

Identifying the health burdens

The following table ranks the top healthcare burdens on the NHS, along with diabetes (which is increasing sharply in disease burden, a trend which is projected to continue). These are all amenable to some form of digital technology intervention.

Causes	DALYs lost per 100,000 population	Rank	Burden of Disease (programme budgeting)		Rank
			%	£billion	
Cancer	4589	1	6.0%	5.68	3
Cardiovascular/Circulatory diseases	4376	2	7.3%	6.90	2
Musculoskeletal disorders	4224	3	5.6%		4
Mental and behavioural disorders	3133	4	11.9%	11.28	1
Chronic respiratory diseases	1924	6	4.9%	4.69	7
Neurological Disorders	1639	7	4.7%	4.44	8
<i>Diabetes</i>	<i>337</i>	<i>-</i>	<i>1.6%</i>	<i>1.54</i>	<i>-</i>

Amenability of health burdens to digital interventions



Digital interventions within the broad areas of mental health and diabetes are most likely to focus on treatment and concordance, in contrast to cancer and cardiovascular disease, where the area most researched is prevention.

- **Cancer:** Most digital health interventions focus on prevention, particularly on changing risky behaviours such as smoking.
- **Cardiovascular disease:** digital intervention research has tended to focus on self-management of hypertension and reducing cardiovascular risk – essentially primary and secondary prevention strategies.
- **Diabetes:** interventions have focused on self-management (treatment and concordance, e.g. insulin dose calculators, virtual support) using internet or mobile phone apps, and secondary prevention (promoting physical activity).
- **Respiratory disease:** All completed studies relate to asthma self-management, including reminders and text messages to improve treatment concordance and medication adherence. Ongoing trials include two for COPD, one using digital interactive materials to promote physical activity and the second using digital pens to record symptoms.
- **Neurological conditions:** Digital interventions reflect the diversity of the conditions. Interventions include digital tools for self-management of epilepsy; wearable sensors and accelerometers for Parkinson’s and acquired brain injury to detect patterns of movement and functional activity, which are particularly relevant in diagnosis and treatment of these conditions.
- **Musculoskeletal conditions:** despite its significant impact on NHS, there are few digital interventions, with only a few studies of self-management and treatment concordance in arthritis.

The biggest users of health care are those with more than one clinical condition; making multiple morbidity a major driver of health care costs. Co-morbidities and complexities create real-life challenges for digital health that should not be underestimated.

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