# E-therapies in England: What is being used in the NHS?

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<th>Journal:</th>
<th>BMJ Open</th>
</tr>
</thead>
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<tr>
<td>Manuscript ID</td>
<td>bmjopen-2016-014844</td>
</tr>
<tr>
<td>Article Type:</td>
<td>Research</td>
</tr>
<tr>
<td>Date Submitted by the Author:</td>
<td>21-Oct-2016</td>
</tr>
<tr>
<td>Complete List of Authors:</td>
<td>Bennion, Matthew; University of Sheffield, Department of Psychology</td>
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<td>Hardy, Gillian; University of Sheffield, Department of Psychology</td>
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<td>Moore, Roger; University of Sheffield, Department of Computer Science</td>
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<td>Millings, Abi; University of Sheffield, Department of Psychology</td>
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<tr>
<td><strong>Primary Subject Heading:</strong></td>
<td>Mental health</td>
</tr>
<tr>
<td><strong>Secondary Subject Heading:</strong></td>
<td>Mental health, Public health, Health services research, Health informatics</td>
</tr>
<tr>
<td><strong>Keywords:</strong></td>
<td>NHS, e-therapies, England, depression, anxiety, stress</td>
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M R Bennion, G Hardy, R K Moore, A Millings

Corresponding Author

Mr Matthew Russell Bennion, Department of Psychology, University of Sheffield, Sheffield, UK. m.bennion@sheffield.ac.uk, 0114 222 4399

Co-Authors

Professor Gillian Hardy, Department of Psychology, University of Sheffield, UK

Professor Roger K Moore, Department of Computer Science, University of Sheffield, UK

Dr Abi Millings, Department of Psychology, University of Sheffield, UK

Keywords: NHS; e-therapies; depression; anxiety; stress

Word count: 3,758

Abstract

Objective: To document the range of web and smartphone apps used and recommended for stress, anxiety, or depression, by the National Health Service (NHS) in England.

Design: The study was conducted using FOI requests and systematic website searches.

Data sources: Data were collected via Freedom of Information (FOI) requests to NHS services between 13th February 2015 and 31st March 2015, and searches conducted on NHS apps library websites between 26th March 2015 and 2nd November 2015.

Data Collection/Extraction Methods: Data were compiled from responses to: i) FOI requests sent to all Improving Access to Psychological Therapies (IAPT) services and NHS Mental Health Trusts in England; and ii) NHS apps library search results.

Results: There are 14 different web apps, and 37 smart phone apps, for depression, anxiety or stress available either through referral services or the NHS Mental Health Apps Library. The apps used and recommended vary by area, and by point of access (apps library vs. IAPT or Trust).

Conclusions: Future research is required to establish the evidence base for the apps that are being used in the NHS in England. There is a need for service provision to be based on evidence and established guidelines.

Keywords: NHS; e-therapies; depression; anxiety; stress

STRENGTHS AND LIMITATIONS OF THIS STUDY
• We present the first comprehensive list of e-therapies used and recommended for common mental health problems across the NHS in England, gathered through systematic means.

• FOI requests rely upon the expertise of those responsible with handling FOI requests in any given organisation. FOI responses may have varied in their degree of thoroughness, and this information was not always available to the research team.

• Some respondents gave overarching detail of their provider’s e-therapy provisions, while other responses were broken down at the level of individual IAPT services hosted by a given IAPT Provider.
INTRODUCTION

The combination of increased demand and financial pressures has forced health services to explore new and innovative methods of delivery at minimum cost. The internet and connected devices offer one potential solution to this challenge, which governments have begun to recognise, encouraging the use of digital services (see Australia’s digital hospital [1]) and internet mental health services in Norway and Sweden [2]. However, it is unclear to what extent these initial steps are exploiting the digital potential in some countries. In the UK, according to a survey published in 2014, only 2% of the population reported any digitally enabled transaction with the National Health Service (NHS) despite an estimated 59% of UK citizens possessing a smartphone and 84% of adults using the internet [3]. In England, the under-use of digital platforms in the NHS has been recognised by the publication of a five-year plan to reshape care delivery and utilise technology in the delivery of all kinds of health care [4].

The current paper focuses on e-therapy in England, where the landscape of digital mental health service provision is not well delineated. This can be attributed to several factors: inadequate reporting; changing service recommendations; nationwide reorganisations of service provision infrastructure; and the rapid development and growth of the digital sphere itself. What is clear, though, is the increasing need for such services: a 2014 survey suggested that one in ten people in England wait more than a year for mental health assessment [5], and in the UK as a whole it is estimated that by 2030 there will be 2 million more adults with mental health problems [6]. E-therapy has the potential to reduce waiting lists, make treatment more cost effective, reduce the time and expense of travel, stimulate self-management [7,8] and decrease the workload of mental health professionals [9,10].

The current study is based on requests made under the provisions of the UK Freedom of Information Act 2000 in 2015, and systematic enquiries on NHS websites. Under the
Freedom of Information (FOI) act, publicly funded bodies are obliged to respond to requests for certain information from members of the public. The resultant data documents the current state of digital mental health service provision in England, identifying what e-therapies are used and recommended across the NHS.

There are multiple ways in which e-therapies have been defined and categorised in the literature. Riper et al. [11] describes e-mental health as “the use of information and communication technology (ICT)—in particular the many technologies related to the Internet—when these technologies are used to support and improve mental health conditions and mental health care”. Other researchers have categorised e-therapies according to the amount of therapist support in them [12], or the exact manner in which the web is used to aid delivery [13].

Modes of delivery have also changed, with technological advances. Early e-therapy was sometimes packaged on CD-ROM and operated in a ‘stand-alone’ fashion on a PC, whereas practically all such tools are now accessed in one of two forms: as a web-based application (‘web app’), accessed via a conventional web browser, or else as a smartphone/tablet app, installed on (typically) the service user’s mobile device. The distinction is somewhat arbitrary, but since smartphone apps represent a relatively more recent development in the digital domain, and a significant one too, in terms of popular uptake, it is convenient for this paper to consider e-therapy as divided into two main categories: web apps and smartphone apps.

Policy History

The National Institute for Health and Care Excellence (NICE) is a non-departmental public body, responsible to but operationally independent of the UK Department of Health. Its function is to provide guidance to the NHS in England (although its advice often extends
to the other constituent nations of the UK) for clinical practice, including what treatments
should be offered for diseases, on the basis of published evidence. This remit includes the
use of health technologies for mental ill-health. NICE recommendations stand until they are
revised or replaced. In 2006, NICE issued its first specific guidelines for e-therapy,
recommending two computerised cognitive behaviour therapy (cCBT) web apps for the
treatment of mild to moderate depression and for panic/phobia, for which it was deemed there
was sufficient evidence of clinical effectiveness. In 2009 these specific recommendations
were withdrawn by NICE. At the time of writing (August 2016), NICE guidance for mental
health practitioners is that cCBT can be offered for persistent subthreshold, or mild to
moderate depression [14]; however, reference to specific tools (with published evidence) has
been replaced by general guidelines for cCBT [14,15]. CCBT is recommended for research
purposes only for generalised anxiety disorder (GAD) [16] and is not recommended at all for
adult phobias [17].

Recent Technological Developments

Since the first NICE recommendations for e-therapies [14], the use of smartphone
and tablet computer has fundamentally altered the way that people interact with technology.
On these devices a plethora of health- and mental health-related apps are available at very
little or no cost to the user. However, the quality and effectiveness of these apps is often
questionable, with no general requirement to demonstrate beneficial outcomes through
clinical trials or other means. While recent policy changes mean that currently, some stand-
alone software including smartphone apps installed onto a device for a medical purpose are
now considered a “medical device” [18,19] and must be registered with the MHRA,
registration is not in itself an indication of efficiency [20].

Meanwhile, the next generation of web apps includes features such as social
networking which can lead to complex and dynamic interactions among users and
technology. Unfortunately, the pace of change in smartphone and web health app
development frequently renders the research community unable to evaluate programs fast
enough to endorse or reject new interventions on the basis of evidence as potentially effective
components in routine care. This shifting policy and technological landscape means that
consulting NICE guidelines is no longer an effective way to find out which e-therapies are
being routinely used and recommended across the NHS in England.

Access to Digital Mental Healthcare in the NHS in England

Understanding the digital mental health service landscape requires consideration of
the methods of access to NHS recommended digital healthcare in England. There are several
points of access including both referral and self-help routes.

Referral.

*Improving Access to Psychological Therapies.*

Much of the primary mental health care provision in the NHS in England currently
comes through Improving Access to Psychological Therapies (IAPT) programme. IAPT was
launched in 2007 to improve access to NICE-recommended psychological therapies for
depression and anxiety disorders [21]. IAPT services are provided on a local basis,
sometimes alongside other health services, and offer direct routes to assessment and
treatment by specialist mental health professionals without the need for GP referral.

Due to current NICE guidelines making general, rather than specific
recommendations regarding e-therapies, practitioners in IAPT services are free to judge
which apps are appropriate to use. Consequently, it is unclear which e-therapies are currently
being recommended to and used by clients. Because mental health services in England are no
longer exclusively provided by the NHS - charities, social enterprises, non-profit and limited
companies can also provide IAPT services – variation compounds this lack of clarity.
NHS Mental Health Trusts.

In addition, IAPT services can also be provided by Mental Health Trusts, which cater for severe mental health problems [22]. In the same period in which rapid technical developments have fundamentally changed the way that people expect to access services in general, the NHS in England has undergone profound infrastructural changes in mental healthcare provision. Collectively, these factors make for a very unclear picture of what e-therapies are used and recommend by the NHS across England.

Self-help.

In addition to accessing digital mental services via traditional face to face services (IAPTs or NHS Mental Health Trusts), there are also two avenues through which the NHS has sought to guide people’s use of digital self-help for mental health concerns.

NHS Health Apps Library.

In keeping with the NHS goals of becoming “more digitised”, and with providing service users with access to tools to support their own well-being, The NHS Commissioning Board launched the NHS Health Apps Library in March 2013 [23]. The library was a sub section of the NHS Choices website and provided a portal through which the public could access a selection of smartphone and tablet apps reviewed by the NHS. However, the library was shut down on the 16th of October 2015 after the publication of two papers that questioned the methods of evaluation of the apps recommended by the library. Specifically, the evaluation of apps’ data security [24] and clinical effectiveness [25] were criticised.

NHS Online Mental Health Apps Library.

NHS Choices in March 2015 published a webpage entitled Online Mental Health Services [26]. This page existed separately from the now-defunct NHS Health Apps Library, and, at the time of writing (August 2016), provides a list of six apps, all web apps, that have
“been approved for use by the NHS”, although by whom and upon what basis is unclear, and in fact seems to run counter to current NICE advice.

The Current Study

Digital mental health care provision within the NHS in England is a diverse. Ever-evolving services provide different means of accessing digital healthcare products that are themselves the products of a highly dynamic marketplace, and with which official recommendations and advice struggles to keep pace. The key objective of this paper is to illuminate the current state of digital mental health care in England by documenting what e-therapies are used and recommended by the NHS, thus providing a starting point for evaluation of current practice.

METHODS

Design

We documented web and smartphone apps used and recommended in the NHS for stress, anxiety, and depression. Our data sources were fourfold. Using FOI Requests, we requested a list of which web apps were being used and recommended in (i) NHS IAPT services and (ii) NHS Mental Health Trusts. We also reviewed (iii) the NHS health apps library and (iv) the NHS mental health apps library to identify apps (and web apps) that were currently (or recently) being endorsed by the NHS. In our FOIs to NHS IAPT and Trusts, we also asked for information about involvement in research, piloting, or development of e-therapies, to capture not only the current practice, but insight into the slightly larger temporal window of very recent past, current, and likely future developments.
Procedure

Improving Access to Psychological Therapies.

On the 10th of February 2015, a list of IAPT services within England was requested through a FOI email to NHS Choices, asking for the contact details of all IAPT services within the country. This yielded a list of 295 IAPT services, of which only 116 were sufficiently detailed to identify their overarching IAPT service provider. Each service’s provider was located via an internet search and overall, 111 IAPT service providers were identified.

On the 13th of February 2015, an FOI email request was sent to each of the 111 IAPT service providers. The questions asked are reported in online supplementary Table S1. According to the FOI Act, requests must be answered within 20 working days of receipt. No responses were received after this time.

NHS Mental Health Trusts.

Many IAPT services are hosted by NHS Mental Health Trusts. It is possible that the answers given by IAPT services may be missing elements that are only be answerable at a NHS Trust level. For example, an IAPT service hosted by a Trust may not be aware of its host’s activities around research and development. Therefore, FOI emails were also sent to each Trust, using a list of 51 NHS Mental Health Trusts compiled from the NHS Choices mental health trust listing page on the 3rd of March 2015. The questions asked are reported

1 277 had websites. Some records had a generic website link to the general IAPT website (n = 122), while others had addresses that displayed a no page found (n = 31) or failed to reach any web page at all (n = 7). This left 117 out of 277 IAPT services with a valid web address.
in see online supplementary Table S2. No responses were received after the mandated response window.

NHS Apps Libraries.

On the 26th of March 2015 web and smartphone apps were identified by carrying out four searches on the NHS Health Apps Library under the search terms “Mental Health”, “Depression”, “Anxiety”, “Stress”. Additionally, the apps listed when clicking on the navigation menu category “Mental Health” were also collected. The apps listed on the NHS Mental Health Apps Library (on the 2nd of November 2015) were also collected. The details page of each app was evaluated to determine the app’s primary focus and features, against the following inclusion criterion: the app had to be intended to target symptoms of depression, anxiety, or stress. This criterion was also applied to apps gathered by the two data sources outlined below.

RESULTS

We present the data from each of the sources separately in the following sections. For IAPT and Trusts, we present data pertaining to: i) response rates; ii) use of web and smartphone apps; iii) reports of being involved in research, piloting, or development of apps; and iv) whether they support online self-referral (IAPT only). For apps libraries, we report the apps which met our inclusion criterion. The final list of e-therapies reported as being used or recommended by IAPT or Trusts in England, or listed on the NHS Apps libraries for common mental health problems, is summarised in Table 1.
Table 1. All web and smartphone apps reported to be used or recommended by the NHS for common mental health problems

<table>
<thead>
<tr>
<th>App</th>
<th>Payment Model</th>
<th>Web or phone based (w/p)</th>
<th>N of IAPTs using/recommending (% of 191 IAPT services)</th>
<th>N of Trusts using/recommending (% of 51 Trusts)</th>
<th>Listed in NHS Health Apps Library (y/n)</th>
<th>Listed in Mental Health Apps Library (y/n)</th>
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<tbody>
<tr>
<td>Living Life to the Full</td>
<td>Free to access</td>
<td>w</td>
<td>94 (49.2%)</td>
<td>24 (47.1%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>MoodGym</td>
<td>Free to access</td>
<td>w</td>
<td>46 (24.1%)</td>
<td>10 (19.6%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Big White Wall</td>
<td>Paid for by provider (but only available in some areas) or end user</td>
<td>w</td>
<td>39 (20.4%)</td>
<td>12 (23.5%)</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>Beating the Blues*</td>
<td>Paid for by provider (but only available in some areas) or end user</td>
<td>w</td>
<td>34 (17.8%)</td>
<td>13 (25.5%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>SilverCloud Health</td>
<td>Paid for by provider (but only available in some areas)</td>
<td>w</td>
<td>27 (14.1%)</td>
<td>5 (9.8%)</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>Ieso Digital Health Ltd</td>
<td>Paid for by provider (but only available in some areas)</td>
<td>w</td>
<td>22 (11.5%)</td>
<td>5 (9.8%)</td>
<td>y</td>
<td>y</td>
</tr>
</tbody>
</table>
available in some areas)

<table>
<thead>
<tr>
<th>App</th>
<th>Payment Details</th>
<th>w</th>
<th>(10.5%)</th>
<th>y</th>
<th>n</th>
<th>5 (9.8%)</th>
<th>n</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear Fighter</td>
<td>Paid for by provider (but only available in some areas) or end user</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>HeadSpace</td>
<td>Paid for by end user</td>
<td>p</td>
<td>11 (5.8%)</td>
<td></td>
<td></td>
<td>3 (5.9%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Buddy App**</td>
<td>Paid for by provider</td>
<td>w</td>
<td>6 (3.1%)</td>
<td></td>
<td></td>
<td>2 (3.9%)</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>Don’t Panic!</td>
<td>Free to access</td>
<td>p</td>
<td>5 (2.6%)</td>
<td></td>
<td></td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Sleepio</td>
<td>Paid for by provider (but only available in some areas) or end user</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>MyMoodTracker</td>
<td>Paid for by end user</td>
<td>p</td>
<td>2 (1.0%)</td>
<td></td>
<td></td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Mindfulness Bell</td>
<td>Paid for by end user</td>
<td>p</td>
<td>2 (1.0%)</td>
<td></td>
<td></td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Moodkit – Mood</td>
<td>Paid for by end user</td>
<td>p</td>
<td>2 (1.0%)</td>
<td></td>
<td></td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>Mobile Application</td>
<td>Accessibility</td>
<td>Usage</td>
<td>Rating</td>
<td>Notes</td>
<td></td>
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<tr>
<td>Thought Diary Pro</td>
<td>Paid for by end user</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WellMind</td>
<td>Free to access</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moodometer</td>
<td>Free to access</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kooth</td>
<td>Free to access (but only available in some areas)</td>
<td>w</td>
<td>2 (1.0%)</td>
<td>2 (3.9%)</td>
<td>n</td>
<td>y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBTReferee</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep Cycle</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iCBT</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thought Diary</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stay Alive</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take a break!</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mindshift</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>Access Model</td>
<td>Paid by End User</td>
<td>User Experience</td>
<td>Insurance</td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Moodscope</td>
<td>Free to access, stepped payment</td>
<td>w</td>
<td>1 (0.5%)</td>
<td>1 (2.0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DigitalMeds</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How Are You App</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mindfulness by Digipill</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mindlogr</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panic Attack Aid</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phobia Free</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleepora</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress Management App</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WorkGuru</td>
<td>Paid for by end user</td>
<td>w</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
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<tr>
<td>Worry Watch</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
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</tr>
<tr>
<td>MindEd</td>
<td>Free to access</td>
<td>w</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
<td></td>
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</tr>
<tr>
<td>Application</td>
<td>Access</td>
<td>w</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td>y</td>
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<td>Puffell</td>
<td>Free</td>
<td>w</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
<td></td>
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</tr>
<tr>
<td>Virtual Hope Box</td>
<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
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<tr>
<td>Aventurine Mood Improver</td>
<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
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<td>y</td>
<td>n</td>
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<tr>
<td>Black Rainbow</td>
<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
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<tr>
<td>Depression Calculator</td>
<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
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<tr>
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<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
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<td>0 (0%)</td>
<td>0 (0%)</td>
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<td>n</td>
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<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
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<tr>
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<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
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<tr>
<td>Hello Brain Health</td>
<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
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<tr>
<td>Moodbug</td>
<td>Free</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
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</tbody>
</table>
Notes

* Beating the Blues developer Ultrasis went into administration in October 2015. The program is now linked with 365 Health and Wellbeing ltd who have been unreachable for comment.

** Buddy Enterprises has ceased operations and as a result of this Buddy App has been discontinued.
Improving Access to Psychological Therapies Services

The FOI responses from IAPT services were inconsistent. Some providers answered at an overarching provider level while others gave granular detail regarding each of their service locations. In our results, we assumed that when a provider responded at top level that they referred to all their IAPT service locations. A total of 61 out of 111 IAPT service providers responded, accounting for 191 IAPT services. Two providers, one a charity and the other a Community Interest Company (CIC - a UK limited company whose objective is to benefit the community it serves, using any profits and assets for that purpose), refused to respond to the FOI on the grounds that the act did not apply to them; a further two acknowledged receiving the FOI request but did not follow up with a response to the questions asked, and 13 indicated that their services had been discontinued, merged with, or passed to another IAPT provider. A total of 33 IAPT providers did not respond at all to the FOI request. These comprised public sector organisations: n=8 (24.2%); third sector organisations: n=13 (39.4%); and private sector organisations: n=12 (36.4%). The majority of the non-responders were non-public sector organisations (n=25; 75.8%).

One hundred and sixty-nine of the 191 (88.5%) IAPT services for which responses were obtained recommend or used web apps and of those, 41 (24.3%) use at least one of the NICE [27] recommended cCBT programs. IAPT services, in addition, highlighted 16 different web apps, of which 11 met the inclusion criterion (Table 1). Fifty (26.2%) of the IAPT services recommend or use smartphone apps, and 21 smartphone apps were specifically named, of which 15 met the inclusion criterion (Table 1).

Twelve IAPT services indicated they were carrying out research into web apps, 10 stated they were piloting web apps and 2 said that they were in the process of developing their own. Regarding smartphone apps, 15 IAPT services indicated they were carrying out
research into smartphone apps, 2 stated they were piloting smartphone apps and 10 said that they were in the process of developing their own. Regarding online self-referral, 138 (72.3%) of the 191 IAPT services support this via email or online form.

NHS Mental Health Trusts

All 51 Mental health trusts responded to the FOI request. Thirty-nine of the 51 (76.5%) Trusts recommend web apps and of these 14 (35.9%) use NICE (2006) recommended cCBT. Seventeen web apps were highlighted by Trusts, and of these, 13 met the inclusion criterion (Table 1). Fifteen (29.4%) of the 51 Trusts recommend or use smartphone apps. Trusts named 14 specific smartphone apps, of which 9 met the inclusion criterion. (Table 1).

One trust indicated it was carrying out research into web apps, two stated they were piloting web apps and one said that it was in the process of developing its own. Regarding smartphone apps, 2 Trusts indicated they were carrying out research into smartphone apps, two indicated they were piloting smartphone apps and seven said they were in the process of developing their own.

Apps Libraries

In the NHS Health Apps Library, a list of 44 web/smartphone apps were identified, 12 of these did not satisfy the inclusion criterion, 2 were excluded for not having an accessible app library information page and a further 3 for not having an accessible app store link, leaving 27. All 7 web apps listed in the NHS Mental Health Apps Library on the 2nd of November 2015 met the inclusion criterion. Only 3 apps were present in both libraries (1).

DISCUSSION

The present paper is the first attempt to document all the e-therapies used and recommended by the NHS in England at a particular window in time. While the list of e-
therapies is changeable over time, the present paper provides future researchers, commissioners, and policymakers with a baseline of information from which to build. The data presented raise several interesting issues relating to the accessibility of service information, NICE guidelines on e-therapies, and ways of evaluating e-therapies.

Data Accessibility and Quality

This study relied heavily on the provisions of the UK FOI Act (2000) for the collection of data. The reorganisation of the provision of mental health services in England has led to the increased participation of private and third sector provider organisations. Unlike public bodies, these organisations are not obliged to respond to FOI requests. Indeed, over half of the organisations that did not respond to the FOI request were limited companies or charities. As more areas of the NHS are outsourced to external providers, inaccessibility of service information is likely to increase. There is therefore a need for the FOI Act to apply to all NHS services, be they publicly or privately run, to ensure a level of transparency that allows both positive and negative aspects of services to be made visible to the public and researchers alike.

Regarding the quality of the data collected, in certain cases, the FOI requests were answered with datasets that contained missing or inaccurate data. For instance, in the IAPT dataset supplied by NHS choices, which is searched by service users of the NHS Choices website, only 46.4% of services had provided a contact email and only 52.5% had a website link detailing more information about the service location. There is a clear need for the NHS to improve its data curation procedures to meet the aspiration of becoming truly digitally enabled.
NICE guidelines on e-therapies

NICE (2006) recommended two eCBT programs for use within NHS services. The publication of subsequent NICE recommendations (2009b) resulted in the withdrawal of endorsement of any specific app, shifting responsibility for choosing e-therapies to service providers. Because of this there are now 14 different web apps, and 37 smart phone apps, for depression, anxiety or stress, available either through referral services or the NHS Mental Health Apps Library. These e-therapies are not consistently used or recommended across the country representing variability in service provision by geographical location. There are also notable differences between the four most used apps by IAPTs and Trusts, and the apps currently listed in the Mental Health Apps Library and previously listed in the Health Apps Library, with 3 of the 4 most used by IAPTs and Trusts not appearing in either library. Most notably, the top two apps used by IAPTs and Trusts are free to access, and yet are not listed in the current (or previous) NHS library. Perhaps this indicates different decision processes being used by IAPTs and Trusts compared to NHS library curators. Additionally, the current Mental Health Apps library features many apps that are only free in some areas of England, requiring user payment in others. This has implications for patient choice and service equality. Furthermore, 11.5% of IAPT services and 23.5% of Trusts do not use or recommend web apps at all. It is not clear whether this reflects the absence of specific NICE guidelines, or a general lack of digitally enabled service provision.

Ways of evaluating e-therapies

To help address the gap in NICE guidelines, it is crucial to investigate whether the apps currently being used are effective. While the pace of large scale evaluative research (e.g., RCTs) lags behind that of advancing technology, there are other, more practical options for collecting and synthesising useful data. We make two specific recommendations. Firstly, the minimal dataset collected by IAPT [29] which is used to build a picture of the current
activity within IAPT services [30] should be made sufficiently fine-grained to isolate the
impact of individual apps on end users. This relatively small change to routine data collection
practices would provide an instant evidence base against which all the e-therapies listed in the
present paper could be evaluated. Secondly, for each e-therapy listed in the present paper, a
systematic literature review should be conducted, to synthesise any existing effectiveness
data.

There are also alternative methods of evaluating e-therapies, which, while they do not
address effectiveness specifically, can provide useful insight into the integrity of the content,
data security measures, and the acceptability to end users. Researchers have begun to discuss
and propose methods of evaluating e-therapies. MindTech’s Framework for Mental Health
Digital Products [31] aids users in the process of evaluating, comparing and contrasting
programs by providing a list of all possible and relevant issues. Other methods of analysis
and evaluation might include syphoning of review data from the app stores. While it cannot
speak to effectiveness, rating scores and download numbers may give indications about
acceptability.

CONCLUSIONS

As e-therapies are continually evolving, their place within NHS services will also
continue to change. However, there is a pressing need for proper evaluation of the
effectiveness of the e-therapies used and recommended by the NHS, to support evidence-
based practice, and help to overcome the gaps remaining in the NICE guidelines on apps for
common mental health problems. The present paper has provided a starting point for this
work, by documenting all the web- and smartphone- based apps currently being used or
recommended by the NHS in England.
**FOOTNOTES**

**Twitter** Follow Matthew Bennion at @matthewrbennion, Prof Roger K Moore at @rogerkmoore.

**Contributors** MRB and AM conceived of and designed the research. MRB collected and analysed the data. MRB and AM interpreted the results and drafted the manuscript, and AM, GH and RKM revised it. All authors approved the final version of the article. All authors had access to all study data and take responsibility for data integrity and accuracy of the analysis.

**Funding** This work was supported by a PhD studentship awarded by the University of Sheffield to the first author, and Economic and Social Research Council grant number ES/L001365/1.

**Competing interests** The last author was formerly an employee (2010-2012) and minor shareholder of Ultrasis UK Ltd (makers of ‘Beating the Blues’), which went into administration in October 2015.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data sharing statement** Additional data for this article have been provided as supplementary. There is no additional unpublished data.

**Disclaimers:** The content is solely the responsibility of the authors and does not represent the views of the NHS England.
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Table S1. Freedom of Information Request Questions asked of IAPT Service Providers

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<thead>
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<th>Question</th>
<th>Wording</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>According to the dataset I have obtained from NHS Choices, you host the following services [service names]. Please can you confirm whether this list is complete and add any additional services that are not listed? (Including address and postcode).</td>
</tr>
<tr>
<td>3.</td>
<td>If these services are not run directly by the NHS please state who runs them and what they are (e.g. Social Enterprise, Limited Company, third sector group).</td>
</tr>
<tr>
<td>4.</td>
<td>If you provide an IAPT a service on behalf of another organisation (such as a care commissioning group, foundation trust or other) please state the organisation’s name.</td>
</tr>
<tr>
<td>5.</td>
<td>Please state the types of referral used by your organisation / IAPT i.e. GP, Self-Referral, Other.</td>
</tr>
<tr>
<td>6.</td>
<td>If you offer a self-referral service do you have an online self-referral method such as a contact email address or a form on your website?</td>
</tr>
<tr>
<td>7.</td>
<td>Please state any e-therapies, computerised therapies, Internet-delivered therapies, online therapies, or advice/guidance websites for mental health issues that your organisation / IAPT service use or recommend to service users. For example, these might include, but are not limited to internet-delivered cognitive behaviour therapy with or without therapist support, internet-delivered therapy</td>
</tr>
</tbody>
</table>
based on an approach other than cognitive behaviour therapy, online or email therapy/counselling, online social support networks, or informational websites.

8. Please state any smart phone apps your organisation / IAPT service use or recommend to service users. For example, these might include specific apps from the NHS Choices Health Apps Library, or others that professionals in your service recommend.

9. In 2013/14 could you give the total number of people your service saw under IAPT and also give a figure as to how many of those were aged 50 or over.
Table S2. Freedom of Information Request Questions asked of NHS Trusts

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<tr>
<td>1.</td>
<td>Please state any e-therapies, computerised therapies, Internet-delivered therapies, online therapies, or advice/guidance websites for mental health issues that your trust use or recommend to service users. For example, these might include, but are not limited to internet-delivered cognitive behaviour therapy with or without therapist support, internet-delivered therapy based on an approach other than cognitive behaviour therapy, online or email therapy/counselling, online social support networks, or informational websites. Format this as a list indicating which are recommended and which are used by the trust.</td>
</tr>
<tr>
<td>2.</td>
<td>Please state any smart phone apps your trust use or recommend to service users. For example, these might include specific apps from the NHS Choices Health Apps Library, or others that professionals in your service recommend. Format this as a list indicating which are recommended and which are used by the trust.</td>
</tr>
<tr>
<td>3.</td>
<td>For the period 2013/14 could you state the total number of people your trust treated for depression / anxiety and also give a figure as to how many of those were aged 65 or over.</td>
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M R Bennion, G Hardy, R K Moore, A Millings

Corresponding Author

Mr Matthew Russell Bennion, Department of Psychology, University of Sheffield, Sheffield, UK. m.bennion@sheffield.ac.uk, 0114 222 4399

Co-Authors

Professor Gillian Hardy, Department of Psychology, University of Sheffield, UK

Professor Roger K Moore, Department of Computer Science, University of Sheffield, UK

Dr Abigail Millings, Department of Psychology, University of Sheffield, UK

Keywords: NHS; e-therapies; depression; anxiety; stress

Word count: 4,123

Abstract

Objective: To document the range of web and smartphone apps used and recommended for stress, anxiety, or depression, by the National Health Service (NHS) in England.

Design: The study was conducted using FOI requests and systematic website searches.

Data sources: Data were collected via Freedom of Information (FOI) requests to NHS services between 13th February 2015 and 31st March 2015, and searches conducted on NHS apps library websites between 26th March 2015 and 2nd November 2015.

Data Collection/Extraction Methods: Data were compiled from responses to: i) FOI requests sent to all Improving Access to Psychological Therapies (IAPT) services and NHS Mental Health Trusts in England; and ii) NHS apps library search results.

Results: There are 13 different web apps, and 35 smart phone apps, for depression, anxiety or stress available either through referral services or the NHS Mental Health Apps Library. The apps used and recommended vary by area, and by point of access (apps library vs. IAPT or Trust).

Conclusions: Future research is required to establish the evidence base for the apps that are being used in the NHS in England. There is a need for service provision to be based on evidence and established guidelines.

Keywords: NHS; e-therapies; depression; anxiety; stress

STRENGTHS AND LIMITATIONS OF THIS STUDY
• We present the first comprehensive list of e-therapies used and recommended for common mental health problems across the NHS in England, gathered through systematic means.

• FOI requests rely upon the expertise of those responsible with handling FOI requests in any given organisation. FOI responses may have varied in their degree of thoroughness, and this information was not always available to the research team.

• Some respondents gave overarching detail of their provider’s e-therapy provisions, while other responses were broken down at the level of individual IAPT services hosted by a given IAPT Provider.
INTRODUCTION

The combination of increased demand and financial pressures has forced health services to explore new and innovative methods of delivery at minimum cost. The internet and connected devices offer one potential solution to this challenge, which governments have begun to recognise, encouraging the use of digital services (see Australia’s digital hospital [1]) and internet mental health services in Norway and Sweden [2]. However, it is unclear to what extent these initial steps are exploiting the digital potential in some countries.

In the UK, according to a survey published in 2014, only 2% of the population reported any digitally enabled transaction with the National Health Service (NHS) despite an estimated 59% of UK citizens possessing a smartphone and 84% of adults using the internet [3]. In England, the under-use of digital platforms in the NHS has been recognised by the publication of a five-year plan to reshape care delivery and utilise technology in the delivery of all kinds of health care [4].

The current paper focuses on e-therapy in England, where the landscape of digital mental health service provision is not well delineated. This can be attributed to several factors: inadequate reporting; changing service recommendations; nationwide reorganisations of service provision infrastructure; and the rapid development and growth of the digital sphere itself. What is clear, though, is the increasing need for such services: a 2014 survey suggested that one in ten people in England wait more than a year for mental health assessment [5], and in the UK as a whole it is estimated that by 2030 there will be 2 million more adults with mental health problems [6]. E-therapy has the potential to reduce waiting lists, make treatment more cost effective, reduce the time and expense of travel, stimulate self-management [7,8] and decrease the workload of mental health professionals [9,10].

The current study is based on requests made under the provisions of the UK Freedom of Information Act 2000 in 2015, and systematic enquiries on NHS websites. Under the
Freedom of Information (FOI) act, publicly funded bodies are obliged to respond to requests for certain information from members of the public. The resultant data documents the current state of digital mental health service provision in England, identifying what e-therapies are used and recommended across the NHS.

There are multiple ways in which e-therapies have been defined and categorised in the literature. Riper et al. [11] describes e-mental health as “the use of information and communication technology (ICT)—in particular the many technologies related to the Internet—when these technologies are used to support and improve mental health conditions and mental health care”. Other researchers have categorised e-therapies according to the amount of therapist support in them [12], or the exact manner in which the web is used to aid delivery [13].

Modes of delivery have also changed, with technological advances. Early e-therapy was sometimes packaged on CD-ROM and operated in a ‘stand-alone’ fashion on a PC, whereas practically all such tools are now accessed in one of two forms: as a web-based application (‘web app’), accessed via a conventional web browser, or else as a smartphone/tablet app, installed on (typically) the service user’s mobile device. The distinction is somewhat arbitrary, but since smartphone apps represent a relatively more recent development in the digital domain, and a significant one too, in terms of popular uptake, it is convenient for this paper to consider e-therapy as divided into two main categories: web apps and smartphone apps.

**Policy History**

The National Institute for Health and Care Excellence (NICE) is a non-departmental public body, responsible to but operationally independent of the UK Department of Health. Its function is to provide guidance to the NHS in England (although its advice often extends
to the other constituent nations of the UK) for clinical practice, including what treatments
should be offered for diseases, on the basis of published evidence. This remit includes the
use of health technologies for mental ill-health. NICE recommendations stand until they are
revised or replaced. In 2006, NICE issued its first specific guidelines for e-therapy,
recommending two computerised cognitive behaviour therapy (cCBT) web apps for the
treatment of mild to moderate depression and for panic/phobia, for which it was deemed there
was sufficient evidence of clinical effectiveness. In 2009 these specific recommendations
were withdrawn by NICE. At the time of writing (August 2016), NICE guidance for mental
health practitioners is that cCBT can be offered for persistent subthreshold, or mild to
moderate depression [14]; however, reference to specific tools (with published evidence) has
been replaced by general guidelines for cCBT [14,15]. CCBT is recommended for research
purposes only for generalised anxiety disorder (GAD) [16] and is not recommended at all for
adult phobias [17].

Recent Technological Developments

Since the first NICE recommendations for e-therapies [14], the use of smartphone
and tablet computer has fundamentally altered the way that people interact with technology.
On these devices a plethora of health- and mental health-related apps are available at very
little or no cost to the user. However, the quality and effectiveness of these apps is often
questionable, with no general requirement to demonstrate beneficial outcomes through
clinical trials or other means. While recent policy changes mean that currently, some stand-
alone software including smartphone apps installed onto a device for a medical purpose are
now considered a “medical device” [18,19] and must be registered with the MHRA,
registration is not in itself an indication of efficacy [20].

Meanwhile, the next generation of web apps includes features such as social
networking which can lead to complex and dynamic interactions among users and
technology. Unfortunately, the pace of change in smartphone and web health app
development frequently renders the research community unable to evaluate programs fast
enough to endorse or reject new interventions on the basis of evidence as potentially effective
components in routine care. This shifting policy and technological landscape means that
consulting NICE guidelines is no longer an effective way to find out which e-therapies are
being routinely used and recommended across the NHS in England.

Access to Digital Mental Healthcare in the NHS in England

Understanding the digital mental health service landscape requires consideration of
the methods of access to NHS recommended digital healthcare in England. There are several
points of access including both referral and self-help routes.

Referral.

*Improving Access to Psychological Therapies.*

Much of the primary mental health care provision in the NHS in England currently
comes through Improving Access to Psychological Therapies (IAPT) programme. IAPT was
launched in 2007 to improve access to NICE-recommended psychological therapies for
depression and anxiety disorders [21]. IAPT services are provided on a local basis,
sometimes alongside other health services, and offer direct routes to assessment and
treatment by specialist mental health professionals without the need for GP referral.

Due to current NICE guidelines making general, rather than specific
recommendations regarding e-therapies, practitioners in IAPT services are free to judge
which apps are appropriate to use. Consequently, it is unclear which e-therapies are currently
being recommended to and used by clients. Because mental health services in England are no
longer exclusively provided by the NHS - charities, social enterprises, non-profit and limited
companies can also provide IAPT services – variation compounds this lack of clarity.
NHS Mental Health Trusts.

In addition, IAPT services can also be provided by Mental Health Trusts, which cater for severe mental health problems [22]. In the same period in which rapid technical developments have fundamentally changed the way that people expect to access services in general, the NHS in England has undergone profound infrastructural changes in mental healthcare provision. Collectively, these factors make for a very unclear picture of what e-therapies are used and recommend by the NHS across England.

Self-help.

In addition to accessing digital mental services via traditional face to face services (IAPTs or NHS Mental Health Trusts), there are also two avenues through which the NHS has sought to guide people’s use of digital self-help for mental health concerns.

NHS Health Apps Library.

In keeping with the NHS goals of becoming “more digitised”, and with providing service users with access to tools to support their own well-being, The NHS Commissioning Board launched the NHS Health Apps Library in March 2013 [23]. The library was a sub section of the NHS Choices website and provided a portal through which the public could access a selection of smartphone and tablet apps reviewed by the NHS. However, the library was shut down on the 16th of October 2015 after the publication of two papers that questioned the methods of evaluation of the apps recommended by the library. Specifically, the evaluation of apps’ data security [24] and clinical effectiveness [25] were criticised.

NHS Online Mental Health Apps Library.

NHS Choices in March 2015 published a webpage entitled Online Mental Health Services [26]. This page existed separately from the now-defunct NHS Health Apps Library, and, at the time of writing (August 2016), provides a list of six apps, all web apps, that have
“been approved for use by the NHS”, although by whom and upon what basis is unclear, and in fact seems to run counter to current NICE advice.

The Current Study

Digital mental health care provision within the NHS in England is a diverse. Ever-evolving services provide different means of accessing digital healthcare products that are themselves the products of a highly dynamic marketplace, and with which official recommendations and advice struggles to keep pace. The key objective of this paper is to illuminate the current state of digital mental health care in England by documenting what e-therapies are used and recommended by the NHS, thus providing a starting point for evaluation of current practice.

METHODS

Design

We documented web and smartphone apps used and recommended in the NHS for stress, anxiety, and depression. Our data sources were fourfold. Using FOI Requests, we requested a list of which web apps were being used and recommended in (i) NHS IAPT services and (ii) NHS Mental Health Trusts. We also reviewed (iii) the NHS health apps library and (iv) the NHS mental health apps library to identify apps (and web apps) that were currently (or recently) being endorsed by the NHS. In our FOIs to NHS IAPTs and Trusts, we also asked for information about involvement in research, piloting, or development of e-therapies, to capture not only the current practice, but insight into the slightly larger temporal window of very recent past, current, and likely future developments. All e-therapies were appraised against the inclusion criterion of being targeted to alleviate the symptoms of depression, anxiety, or stress. To meet this criteria, the developer of the app had to be locatable via a Google search when entering the app name as the search term, and the app had
to reference the targeted conditions in its marketing literature or be based on a therapeutic tool known to benefit the targeted conditions.

**Procedure**

**Improving Access to Psychological Therapies.**

On the 10th of February 2015, a list of IAPT services within England was requested through a FOI email to NHS Choices, asking for the contact details of all IAPT services within the country. This yielded a list of 295 IAPT services, of which only 116 were sufficiently detailed to identify their overarching IAPT service provider\(^1\). Each service’s provider was located via an internet search and overall, 111 IAPT service providers were identified.

On the 13th of February 2015, an FOI email request was sent to each of the 111 IAPT service providers. The questions asked are reported in online supplementary Table S1.

According to the FOI Act, requests must be answered within 20 working days of receipt. No responses were received after this time.

**NHS Mental Health Trusts.**

Many IAPT services are hosted by NHS Mental Health Trusts. It is possible that the answers given by IAPT services may be missing elements that are only be answerable at a NHS Trust level. For example, an IAPT service hosted by a Trust may not be aware of its host’s activities around research and development. Therefore, FOI emails were also sent to

\(^1\) 277 had websites. Some records had a generic website link to the general IAPT website (n = 122), while others had addresses that displayed ‘no page found’ (n = 31) or failed to reach any web page at all (n = 7). This left 117 out of 277 IAPT services with a valid web address.
each Trust, using a list of 51 NHS Mental Health Trusts compiled from the NHS Choices mental health trust listing page on the 3rd of March 2015. The questions asked are reported in see online supplementary Table S2. No responses were received after the mandated response window.

NHS Apps Libraries.

On the 26th of March 2015 web and smartphone apps were identified by carrying out four searches on the NHS Health Apps Library under the search terms “Mental Health”, “Depression”, “Anxiety”, “Stress”. Additionally, the apps listed when clicking on the navigation menu category “Mental Health” were also collected. The apps listed on the NHS Mental Health Apps Library (on the 2nd of November 2015) were also collected.

RESULTS

We present the data from each of the sources separately in the following sections. For IAPTs and Trusts, we present data pertaining to: i) response rates; ii) use of web and smartphone apps; iii) reports of being involved in research, piloting, or development of apps; and iv) whether they support online self-referral (IAPTs only). For apps libraries, we report the apps which met our inclusion criterion. The final list of e-therapies reported as being used or recommended by IAPTs or Trusts in England, or listed on the NHS Apps libraries for common mental health problems, is summarised in Table 1.
Table 1. All web and smartphone apps reported to be used or recommended by the NHS for common mental health problems

<table>
<thead>
<tr>
<th>App</th>
<th>Format</th>
<th>Payment Model</th>
<th>Web or phone based (w/p)</th>
<th>N of IAPTs using/recommending (% of 191 IAPT services)</th>
<th>N of Trusts using/recommending (% of 51 Trusts)</th>
<th>Listed in NHS Health Apps Library (y/n)</th>
<th>Listed in Mental Health Apps Library (y/n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Life to the Full</td>
<td>Online modular self-help</td>
<td>Free to access</td>
<td>w</td>
<td>94 (49.2%)</td>
<td>24 (47.1%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>MoodGym</td>
<td>Online modular self-help</td>
<td>Free to access</td>
<td>w</td>
<td>46 (24.1%)</td>
<td>10 (19.6%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Big White Wall</td>
<td>Online forum with tools, courses and one to one messenger based chat</td>
<td>Paid for by provider</td>
<td>w</td>
<td>39 (20.4%)</td>
<td>12 (23.5%)</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>Beating the Blues</td>
<td>Online modular self help</td>
<td>Paid for by provider</td>
<td>w</td>
<td>34 (17.8%)</td>
<td>13 (25.5%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>App Name</td>
<td>Type of Service</td>
<td>Payment Model</td>
<td>Results 1</td>
<td>Results 2</td>
<td>End User Access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------</td>
<td>------------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SilverCloud Health</td>
<td>Online modular self-help with therapist support</td>
<td>Paid for by provider</td>
<td>w 27</td>
<td>5</td>
<td>n y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ieso Digital Health Ltd</td>
<td>Online one to one messenger based chat with a professional</td>
<td>Paid for by provider</td>
<td>w 22</td>
<td>5</td>
<td>y y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear Fighter</td>
<td>Online modular self-help</td>
<td>Paid for by provider</td>
<td>w 20</td>
<td>5</td>
<td>n y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HeadSpace</td>
<td>Meditation via app or online</td>
<td>Paid for by end user</td>
<td>p 11</td>
<td>3</td>
<td>n n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buddy App^b</td>
<td>Tool to support face-to-face therapy</td>
<td>Paid for by provider</td>
<td>w 6</td>
<td>2</td>
<td>y y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Panic!</td>
<td>Self-help resources</td>
<td>Free to access</td>
<td>p 5</td>
<td>1</td>
<td>n n</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^b Buddy App is a tool to support face-to-face therapy.
<table>
<thead>
<tr>
<th>Application/Tool</th>
<th>Description</th>
<th>Paid for by user</th>
<th>Positive (1%)</th>
<th>Negative (0%)</th>
<th>Value (1%)</th>
<th>Access (y/n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MyMoodTracker</td>
<td>Mood tracker</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Mindfulness Bell</td>
<td>Meditation</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Moodkit – Mood</td>
<td>Tools to improve mood</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>Improvement Tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thought Diary Pro</td>
<td>Thought diary</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>WellMind</td>
<td>Tools to help with</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td></td>
<td>depression, stress, anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moodometer</td>
<td>Tool to support face-to-face</td>
<td>p</td>
<td>2 (1.0%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td></td>
<td>therapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kooth</td>
<td>Online one to one messenger</td>
<td>w</td>
<td>2 (1.0%)</td>
<td>2 (3.9%)</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td></td>
<td>based chat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>available in some areas</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>with a professional for</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>children and young</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
adults aged 11 to 19

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
<th>Payment Method</th>
<th>p</th>
<th>1 (0.5%)</th>
<th>0 (0%)</th>
<th>n</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBTReference</td>
<td>Journal to assist face-to-face CBT</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>iCBT</td>
<td>Tool for self-help using CBT</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Thought Diary</td>
<td>Thought diary</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Stay Alive</td>
<td>Tools to prevent suicide</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Take a break!</td>
<td>Meditation app</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Mindshift</td>
<td>Tools to help with anxiety</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Moodscope</td>
<td>Tool to monitor mood</td>
<td>Free to access, stepped payment</td>
<td>w</td>
<td>1 (0.5%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>DigitalMeds</td>
<td>Binaural Beat technology</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>App Name</td>
<td>Description</td>
<td>Paid for by</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
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<tr>
<td>-------------------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How Are You App</td>
<td>Mood tracker</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Mindfulness by Digipill</td>
<td>Meditation</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Mindlogr</td>
<td>Video journal</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Panic Attack Aid</td>
<td>Tools to help with panic</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Phobia Free</td>
<td>Augmented Reality (AR)</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Stress Management App</td>
<td>Tools to help with stress</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>WorkGuru</td>
<td>Tools to help with stress</td>
<td>w</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Worry Watch</td>
<td>Journal for anxiety</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Tool Name</td>
<td>Description</td>
<td>Access</td>
<td>Rating</td>
<td>Available</td>
<td>Effective</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>MindEd</td>
<td>Online advice and support</td>
<td>Free to access</td>
<td>w</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puffell</td>
<td>Online advice and support</td>
<td>Free to access</td>
<td>w</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual Hope Box</td>
<td>Tools to compliment face-to-face</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aventurine Mood Improver</td>
<td>Tool for self-help using CBT</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
</tr>
<tr>
<td>Black Rainbow</td>
<td>Advice and audio for relaxation</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
</tr>
<tr>
<td>Depression Calculator</td>
<td>PHQ-9 screening tool</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
</tr>
<tr>
<td>Five Ways to Wellbeing</td>
<td>Tools for wellbeing</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
</tr>
<tr>
<td>Ginsberg</td>
<td>Activity and mood diary</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
</tr>
<tr>
<td>App/Tool</td>
<td>Description</td>
<td>Access</td>
<td>Rating</td>
<td>Recommendation</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>----------------------------------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy Healthy App</td>
<td>Tools for wellbeing</td>
<td>Free</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HealthStored</td>
<td>Health tracker</td>
<td>Free</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy Living</td>
<td>Guide to healthy living</td>
<td>Free</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hello Brain Health</td>
<td>Brain exercises for better health</td>
<td>Free</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moodbug</td>
<td>Mood tracker</td>
<td>Free</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAM: Self-help for Anxiety</td>
<td>Tools to help with anxiety</td>
<td>Free</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress &amp; Anxiety Companion</td>
<td>Tools to help with anxiety</td>
<td>Free</td>
<td>0 (0%)</td>
<td>y n</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**
a Beating the Blues developer Ultrasis went into administration in October 2015. The program is now linked with 365 Health and Wellbeing ltd who have been unreachable for comment.

b Buddy Enterprises has ceased operations and as a result of this Buddy App has been discontinued.
Improving Access to Psychological Therapies Services

The FOI responses from IAPT services were inconsistent. Some providers answered at an overarching provider level while others gave granular detail regarding each of their service locations. In our results, we assumed that when a provider responded at top level that they referred to all their IAPT service locations. A total of 61 out of 111 IAPT service providers responded, accounting for 191 IAPT services. Two providers, one a charity and the other a Community Interest Company (CIC - a UK limited company whose objective is to benefit the community it serves, using any profits and assets for that purpose), refused to respond to the FOI on the grounds that the act did not apply to them; a further two acknowledged receiving the FOI request but did not follow up with a response to the questions asked, and 13 indicated that their services had been discontinued, merged with, or passed to another IAPT provider. A total of 33 IAPT providers did not respond at all to the FOI request. These comprised public sector organisations: n=8 (24.2%); third sector organisations: n=13 (39.4%); and private sector organisations: n=12 (36.4%). The majority of the non-responders were non-public sector organisations (n=25; 75.8%).

One hundred and sixty-nine of the 191 (88.5%) IAPT services for which responses were obtained recommend or used web apps and of those, 41 (24.3%) use at least one of the NICE [27] recommended cCBT programs. IAPT services, in addition, highlighted 16 different web apps. Six were excluded for not meeting the inclusion criterion (Figure 1) leaving 10 included web apps (Table 1). Fifty (26.2%) of the IAPT services recommend or use smartphone apps, and 21 smartphone apps were specifically named. Seven did not meet the inclusion criteria (Figure 1), leaving 14 included smartphone apps.

Twelve IAPT services indicated they were carrying out research into web apps, 10 stated they were piloting web apps and 2 said that they were in the process of developing their own. Regarding smartphone apps, 15 IAPT services indicated they were carrying out research into
smartphone apps, 2 stated they were piloting smartphone apps and 10 said that they were in
the process of developing their own. Two IAPTs indicated using patient webinars but did not
disclose details of their content. Regarding online self-referral, 138 (72.3%) of the 191 IAPT
services support this, either via email or online form.

NHS Mental Health Trusts

All 51 Mental health trusts responded to the FOI request. Thirty-nine of the 51
(76.5%) Trusts recommend web apps and of these 14 (35.9%) use NICE recommended cCBT
[28]. Seventeen web apps were highlighted by Trusts, 5 of which did not meet the inclusion
criterion (Figure 1). This left 12 included web apps. (Table 1). Fifteen (29.4%) of the 51
Trusts recommend or use smartphone apps. Trusts named 14 specific smartphone apps, 6 of
which did not meet the inclusion criterion (Figure 1), leaving 8 included smartphone apps
(Table 1).

One trust indicated it was carrying out research into web apps, two stated they were
piloting web apps and one said that it was in the process of developing its own. Regarding
smartphone apps, 2 Trusts indicated they were carrying out research into smartphone apps,
two indicated they were piloting smartphone apps and seven said they were in the process of
developing their own.

Apps Libraries

In the NHS Health Apps Library, a list of 44 web/smartphone apps were identified, 18
of these did not meet the inclusion criterion (Figure 1) leaving 26 included apps. Out of the 7
web apps listed in the NHS Mental Health Apps Library on the 2nd of November 2015 6 met
the inclusion criterion and 1 did not (Figure 1). Only 3 apps were present in both libraries
(Table 1).
DISCUSSION

The present paper is the first attempt to document all the e-therapies used and recommended by the NHS in England at a particular window in time. While the list of e-therapies is changeable over time, the present paper provides future researchers, commissioners, and policymakers with a baseline of information from which to build. The data presented raise several interesting issues relating to the accessibility of service information, NICE guidelines on e-therapies, and ways of evaluating e-therapies.

Data Accessibility and Quality

This study relied heavily on the provisions of the UK FOI Act (2000) for the collection of data. The reorganisation of the provision of mental health services in England has led to the increased participation of private and third sector provider organisations. Unlike public bodies, these organisations are not obliged to respond to FOI requests. Indeed, over half of the organisations that did not respond to the FOI request were limited companies or charities. As more areas of the NHS are outsourced to external providers, inaccessibility of service information is likely to increase. There is therefore a need for the FOI Act to apply to all NHS services, be they publicly or privately run, to ensure a level of transparency that allows both positive and negative aspects of services to be made visible to the public and researchers alike.

Regarding the quality of the data collected, in certain cases, the FOI requests were answered with datasets that contained missing or inaccurate data. For instance, in the IAPT dataset supplied by NHS choices, which is searched by service users of the NHS Choices
website, only 46.4% of services had provided a contact email and only 52.5% had a website link detailing more information about the service location. There is a clear need for the NHS to improve its data curation procedures to meet the aspiration of becoming truly digitally enabled.

**NICE guidelines on e-therapies**

NICE (2006) recommended two cCBT programs for use within NHS services. The publication of subsequent NICE recommendations (2009b) resulted in the withdrawal of endorsement of any specific app, shifting responsibility for choosing e-therapies to service providers. Because of this there are now 13 different web apps, and 35 smart phone apps, for depression, anxiety or stress, available either through referral services or the NHS Mental Health Apps Library. These e-therapies are not consistently used or recommended across the country representing variability in service provision by geographical location. There are also notable differences between the four most used apps by IAPTs and Trusts, and the apps currently listed in the Mental Health Apps Library and previously listed in the Health Apps Library, with 3 of the 4 most used by IAPTs and Trusts not appearing in either library. Most notably, the top two apps used by IAPTs and Trusts are free to access, and yet are not listed in the current (or previous) NHS library. Perhaps this indicates different decision processes being used by IAPTs and Trusts compared to NHS library curators. Additionally, the current Mental Health Apps library features many apps that are only free in some areas of England, requiring user payment in others. This has implications for patient choice and service equality. Furthermore, 11.5% of IAPT services and 23.5% of Trusts do not use or recommend web apps at all. It is not clear whether this reflects the absence of specific NICE guidelines, or a general lack of digitally enabled service provision.
Ways of evaluating e-therapies

To help address the gap in NICE guidelines, it is crucial to investigate whether the apps currently being used are effective. While the pace of large scale evaluative research (e.g., RCTs) lags behind that of advancing technology, there are other, more practical options for collecting and synthesising useful data. We make two specific recommendations. Firstly, the minimal dataset collected by IAPT [29] which is used to build a picture of the current activity within IAPT services such as assessments, sessions, scales, should be revised. It currently requires data on whether a client is using an e-therapy, but it does not indicate which one [30]. A more fine-grained approach, where not only e-therapy use, but also which one, was recorded, would provide the ability to isolate the impact of individual apps on end users. This relatively small change to routine data collection practices would provide an instant evidence base against which all the e-therapies listed in the present paper could be evaluated. Secondly, for each e-therapy listed in the present paper, a systematic literature review should be conducted, to synthesise any existing effectiveness data.

There are also alternative methods of evaluating e-therapies, which, while they do not address effectiveness specifically, can provide useful insight into the integrity of the content, data security measures, and the acceptability to end users. Researchers have begun to discuss and propose methods of evaluating e-therapies. MindTech’s Framework for Mental Health Digital Products [31] aids users in the process of evaluating, comparing and contrasting programs by providing a list of all possible and relevant issues. The Mobile Application Rating Scale (MARS) [32] enables expert raters to review apps for engagement, functionality, visual aesthetics, information quality and subject quality of health apps and has been tested on Mindfulness apps [33]. Other methods of analysis and evaluation might include syphoning review data from the app stores. While it cannot speak to effectiveness, rating scores and download numbers may give indications about acceptability.
Presently the NHS does not have a process in place to endorse apps. However The National Information Board is working to develop a Health App Assessment process [34]. This process will eventually enable the NHS to endorse apps. However the consequences of endorsement are currently unknown. Endorsement may result in market dominance by those gaining NHS approval, stunting the market and truncating innovation.

**E-therapy tailored to specific demographics**

The majority of the web/phone applications included in this review were not tailored to a specific demographic. One e-therapy Kooth was designed for young people aged 11 to 19. There were no e-therapies found for older adults aged over 65. It may be possible that some of the modular based e-therapies listed have the potential to support these groups through customised modules. It would be useful for future research to collect data on specific provision for different demographics, both in terms of e-therapies available, and those employed by NHS services for specific demographics (e.g. Child and Adolescent Mental Health Services).

**CONCLUSIONS**

As e-therapies are continually evolving, their place within NHS services will also continue to change. However, there is a pressing need for proper evaluation of the effectiveness of the e-therapies used and recommended by the NHS, to support evidence-based practice, and help to overcome the gaps remaining in the NICE guidelines on apps for common mental health problems. The present paper has provided a starting point for this work, by documenting all the web- and smartphone- based apps currently being used or recommended by the NHS in England. Future research should seek to examine the e-therapies identified within this paper and systematically review them for their clinical effectiveness. It is also important that changes are made to i) enable better reporting of digital
mental health service provisions within IAPT services, and ii) build an evidence base with which to evaluate the effectiveness of different e-therapies.
Twitter Follow Matthew Bennion at @matthewrbennion, Prof Roger K Moore at @rogerkmoore, Dr Abigail Millings @Relp_Science

Contributors MRB and AM conceived of and designed the research. MRB collected and analysed the data. MRB and AM interpreted the results and drafted the manuscript, and AM, GH and RKM revised it. All authors approved the final version of the article. All authors had access to all study data and take responsibility for data integrity and accuracy of the analysis.

Funding This work was supported by a PhD studentship awarded by the University of Sheffield to the first author, and Economic and Social Research Council grant number ES/L001365/1.

Competing interests The last author was formerly an employee (2010-2012) and minor shareholder of Ultrasis UK Ltd (makers of ‘Beating the Blues’), which went into administration in October 2015.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement Additional data for this article have been provided as supplementary. There is no additional unpublished data.

Disclaimers: The content is solely the responsibility of the authors and does not represent the views of the NHS England.
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Figure 1: PRISMA Flow Diagram of app data collection

PRISMA Flow Diagram of app data collection
432x402mm (149 x 149 DPI)
### Table S1. Freedom of Information Request Questions asked of IAPT Service Providers

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<th>Question</th>
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<tr>
<td>1.</td>
<td>According to the dataset I have obtained from NHS Choices, you host the following services [service names]. Please can you confirm whether this list is complete and add any additional services that are not listed? (Including address and postcode).</td>
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<tr>
<td>3.</td>
<td>If these services are not run directly by the NHS please state who runs them and what they are (e.g. Social Enterprise, Limited Company, third sector group).</td>
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<td>4.</td>
<td>If you provide an IAPT a service on behalf of another organisation (such as a care commissioning group, foundation trust or other) please state the organisation’s name.</td>
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<tr>
<td>5.</td>
<td>Please state the types of referral used by your organisation / IAPT i.e. GP, Self-Referral, Other.</td>
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<tr>
<td>6.</td>
<td>If you offer a self-referral service do you have an online self-referral method such as a contact email address or a form on your website?</td>
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<td>7.</td>
<td>Please state any e-therapies, computerised therapies, Internet-delivered therapies, online therapies, or advice/guidance websites for mental health issues that your organisation / IAPT service use or recommend to service users. For example, these might include, but are not limited to internet-delivered cognitive behaviour therapy with or without therapist support, internet-delivered therapy</td>
</tr>
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based on an approach other than cognitive behaviour therapy, online or email therapy/counselling, online social support networks, or informational websites.

8. Please state any smart phone apps your organisation / IAPT service use or recommend to service users. For example, these might include specific apps from the NHS Choices Health Apps Library, or others that professionals in your service recommend.

9. In 2013/14 could you give the total number of people your service saw under IAPT and also give a figure as to how many of those were aged 50 or over.
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<tr>
<td>1.</td>
<td>Please state any e-therapies, computerised therapies, Internet-delivered therapies, online therapies, or advice/guidance websites for mental health issues that your trust use or recommend to service users. For example, these might include, but are not limited to internet-delivered cognitive behaviour therapy with or without therapist support, internet-delivered therapy based on an approach other than cognitive behaviour therapy, online or email therapy/counselling, online social support networks, or informational websites. Format this as a list indicating which are recommended and which are used by the trust.</td>
</tr>
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<td>2.</td>
<td>Please state any smart phone apps your trust use or recommend to service users. For example, these might include specific apps from the NHS Choices Health Apps Library, or others that professionals in your service recommend. Format this as a list indicating which are recommended and which are used by the trust.</td>
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<tr>
<td>3.</td>
<td>For the period 2013/14 could you state the total number of people your trust treated for depression / anxiety and also give a figure as to how many of those were aged 65 or over.</td>
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# PRISMA 2009 Checklist

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<td>Structured summary</td>
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<td>Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.</td>
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<td><strong>INTRODUCTION</strong></td>
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<td>Rationale</td>
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<td>Describe the rationale for the review in the context of what is already known.</td>
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<tr>
<td>Objectives</td>
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<td>Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).</td>
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<td><strong>METHODS</strong></td>
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<td>Protocol and registration</td>
<td>5</td>
<td>Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.</td>
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<td>Eligibility criteria</td>
<td>6</td>
<td>Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.</td>
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<tr>
<td>Information sources</td>
<td>7</td>
<td>Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.</td>
<td>10</td>
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<tr>
<td>Search</td>
<td>8</td>
<td>Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.</td>
<td>10-11</td>
</tr>
<tr>
<td>Study selection</td>
<td>9</td>
<td>State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).</td>
<td>10-11</td>
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<tr>
<td>Data collection process</td>
<td>10</td>
<td>Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.</td>
<td>10-11</td>
</tr>
<tr>
<td>Data items</td>
<td>11</td>
<td>List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.</td>
<td>11</td>
</tr>
<tr>
<td>Risk of bias in individual studies</td>
<td>12</td>
<td>Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.</td>
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<tr>
<td>Summary measures</td>
<td>13</td>
<td>State the principal summary measures (e.g., risk ratio, difference in means).</td>
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<td>Synthesis of results</td>
<td>14</td>
<td>Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I² for each meta-analysis).</td>
<td>n/a</td>
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</table>
### RESULTS

**Study selection**
- Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.

**Study characteristics**
- For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.

**Risk of bias within studies**
- Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).

**Results of individual studies**
- For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.

**Synthesis of results**
- Present results of each meta-analysis done, including confidence intervals and measures of consistency.

**Risk of bias across studies**
- Present results of any assessment of risk of bias across studies (see Item 15).

**Additional analysis**
- Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).

### DISCUSSION

**Summary of evidence**
- Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).

**Limitations**
- Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).

**Conclusions**
- Provide a general interpretation of the results in the context of other evidence, and implications for future research.

### FUNDING

**Funding**
- Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.

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For more information, visit: www.prisma-statement.org.
E-therapies in England for stress, anxiety or depression:
What is being used in the NHS? A survey of mental health services.

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E-therapies in England for stress, anxiety or depression: What is being used in the NHS? A survey of mental health services.

M R Bennion, G Hardy, R K Moore, A Millings

Corresponding Author

Mr Matthew Russell Bennion, Department of Psychology, University of Sheffield, Sheffield, UK. m.bennion@sheffield.ac.uk, 0114 222 4399

Co-Authors

Professor Gillian Hardy, Department of Psychology, University of Sheffield, UK

Professor Roger K Moore, Department of Computer Science, University of Sheffield, UK

Dr Abigail Millings, Department of Psychology, University of Sheffield, UK

Keywords: NHS; e-therapies; depression; anxiety; stress

Word count: 4,123
E-therapies in England for stress, anxiety or depression: What is being used in the NHS? A survey of mental health services.

Abstract

Objective: To document the range of web and smartphone apps used and recommended for stress, anxiety, or depression, by the National Health Service (NHS) in England.

Design: The study was conducted using FOI requests and systematic website searches.

Data sources: Data were collected via Freedom of Information (FOI) requests to NHS services between 13th February 2015 and 31st March 2015, and searches conducted on NHS apps library websites between 26th March 2015 and 2nd November 2015.

Data Collection/Extraction Methods: Data were compiled from responses to: i) FOI requests sent to all Improving Access to Psychological Therapies (IAPT) services and NHS Mental Health Trusts in England; and ii) NHS apps library search results.

Results: A total of 61 (54.95%) out of the then 111 IAPT service providers responded, accounting for 191 IAPT services, and all 51 of the then NHS Mental Health Trusts responded. The results were that 13 different web apps and 35 different smartphone apps for depression, anxiety or stress were available through either referral services or the online NHS Apps Libraries. The apps used and recommended vary by area and by point of access (online library/IAPT/Trust).

Conclusions: Future research is required to establish the evidence base for the apps that are being used in the NHS in England. There is a need for service provision to be based on evidence and established guidelines.

Keywords: NHS; e-therapies; depression; anxiety; stress
STRENGTHS AND LIMITATIONS OF THIS STUDY

- We present the first comprehensive list of e-therapies used and recommended for common mental health problems across the NHS in England, gathered through systematic means.

- FOI requests rely upon the expertise of those responsible with handling FOI requests in any given organisation. FOI responses may have varied in their degree of thoroughness, and this information was not always available to the research team.

- Some respondents gave overarching detail of their provider’s e-therapy provisions, while other responses were broken down at the level of individual IAPT services hosted by a given IAPT Provider.
INTRODUCTION

The combination of increased demand and financial pressures has forced health services to explore new and innovative methods of delivery at minimum cost. The internet and connected devices offer one potential solution to this challenge, which governments have begun to recognise, encouraging the use of digital services (see Australia’s digital hospital [1]) and internet mental health services in Norway and Sweden [2]. However, it is unclear to what extent these initial steps are exploiting the digital potential in some countries. In the UK, according to a survey published in 2014, only 2% of the population reported any digitally enabled transaction with the National Health Service (NHS) despite an estimated 59% of UK citizens possessing a smartphone and 84% of adults using the internet [3]. In England, the under-use of digital platforms in the NHS has been recognised by the publication of a five-year plan to reshape care delivery and utilise technology in the delivery of all kinds of health care [4].

The current paper focuses on e-therapy in England, where the landscape of digital mental health service provision is not well delineated. This can be attributed to several factors: inadequate reporting; changing service recommendations; nationwide reorganisations of service provision infrastructure; and the rapid development and growth of the digital sphere itself. What is clear, though, is the increasing need for such services: a 2014 survey suggested that one in ten people in England wait more than a year for mental health assessment [5], and in the UK as a whole it is estimated that by 2030 there will be 2 million more adults with mental health problems [6]. E-therapy has the potential to reduce waiting lists, make treatment more cost effective, reduce the time and expense of travel, stimulate self-management [7,8] and decrease the workload of mental health professionals [9,10].

The current study is based on requests made under the provisions of the UK Freedom of Information Act 2000 in 2015, and systematic enquiries on NHS websites. Under the
Freedom of Information (FOI) act, publicly funded bodies are obliged to respond to requests for certain information from members of the public. The resultant data documents the current state of digital mental health service provision in England, identifying what e-therapies are used and recommended across the NHS.

There are multiple ways in which e-therapies have been defined and categorised in the literature. Riper et al. [11] describes e-mental health as “the use of information and communication technology (ICT)—in particular the many technologies related to the Internet—when these technologies are used to support and improve mental health conditions and mental health care”. Other researchers have categorised e-therapies according to the amount of therapist support in them [12], or the exact manner in which the web is used to aid delivery [13].

Modes of delivery have also changed, with technological advances. Early e-therapy was sometimes packaged on CD-ROM and operated in a ‘stand-alone’ fashion on a PC, whereas practically all such tools are now accessed in one of two forms: as a web-based application (‘web app’), accessed via a conventional web browser, or else as a smartphone/tablet app, installed on (typically) the service user’s mobile device. The distinction is somewhat arbitrary, but since smartphone apps represent a relatively more recent development in the digital domain, and a significant one too, in terms of popular uptake, it is convenient for this paper to consider e-therapy as divided into two main categories: web apps and smartphone apps.

Policy History

The National Institute for Health and Care Excellence (NICE) is a non-departmental public body, responsible to but operationally independent of the UK Department of Health. Its function is to provide guidance to the NHS in England (although its advice often extends
to the other constituent nations of the UK) for clinical practice, including what treatments
should be offered for diseases, on the basis of published evidence. This remit includes the
use of health technologies for mental ill-health. NICE recommendations stand until they are
revised or replaced. In 2006, NICE issued its first specific guidelines for e-therapy,
recommending two computerised cognitive behaviour therapy (cCBT) web apps for the
treatment of mild to moderate depression and for panic/phobia, for which it was deemed there
was sufficient evidence of clinical effectiveness. In 2009 these specific recommendations
were withdrawn by NICE. At the time of writing (August 2016), NICE guidance for mental
health practitioners is that cCBT can be offered for persistent subthreshold, or mild to
moderate depression [14]; however, reference to specific tools (with published evidence) has
been replaced by general guidelines for cCBT [14,15]. CCBT is recommended for research
purposes only for generalised anxiety disorder (GAD) [16] and is not recommended at all for
adult phobias [17].

Recent Technological Developments

Since the first NICE recommendations for e-therapies [14], the use of smartphone
and tablet computer has fundamentally altered the way that people interact with technology.
On these devices a plethora of health- and mental health-related apps are available at very
little or no cost to the user. However, the quality and effectiveness of these apps is often
questionable, with no general requirement to demonstrate beneficial outcomes through
clinical trials or other means. While recent policy changes mean that currently, some stand-
alone software including smartphone apps installed onto a device for a medical purpose are
now considered a “medical device” [18,19] and must be registered with the MHRA,
registration is not in itself an indication of efficacy [20].

Meanwhile, the next generation of web apps includes features such as social
networking which can lead to complex and dynamic interactions among users and
technology. Unfortunately, the pace of change in smartphone and web health app
development frequently renders the research community unable to evaluate programs fast
enough to endorse or reject new interventions on the basis of evidence as potentially effective
components in routine care. This shifting policy and technological landscape means that
consulting NICE guidelines is no longer an effective way to find out which e-therapies are
being routinely used and recommended across the NHS in England.

Access to Digital Mental Healthcare in the NHS in England

Understanding the digital mental health service landscape requires consideration of
the methods of access to NHS recommended digital healthcare in England. There are several
points of access including both referral and self-help routes.

Referral.

Improving Access to Psychological Therapies.

Much of the primary mental health care provision in the NHS in England currently
comes through Improving Access to Psychological Therapies (IAPT) programme. IAPT was
launched in 2007 to improve access to NICE-recommended psychological therapies for
depression and anxiety disorders [21]. IAPT services are provided on a local basis,
sometimes alongside other health services, and offer direct routes to assessment and
treatment by specialist mental health professionals without the need for GP referral.

Due to current NICE guidelines making general, rather than specific
recommendations regarding e-therapies, practitioners in IAPT services are free to judge
which apps are appropriate to use. Consequently, it is unclear which e-therapies are currently
being recommended to and used by clients. Because mental health services in England are no
longer exclusively provided by the NHS - charities, social enterprises, non-profit and limited
companies can also provide IAPT services –variation compounds this lack of clarity.
NHS Mental Health Trusts.

In addition, IAPT services can also be provided by Mental Health Trusts, which cater for severe mental health problems [22]. In the same period in which rapid technical developments have fundamentally changed the way that people expect to access services in general, the NHS in England has undergone profound infrastructural changes in mental healthcare provision. Collectively, these factors make for a very unclear picture of what e-therapies are used and recommend by the NHS across England.

Self-help.

In addition to accessing digital mental services via traditional face to face services (IAPTs or NHS Mental Health Trusts), there are also two avenues through which the NHS has sought to guide people’s use of digital self-help for mental health concerns.

NHS Health Apps Library.

In keeping with the NHS goals of becoming “more digitised”, and with providing service users with access to tools to support their own well-being, The NHS Commissioning Board launched the NHS Health Apps Library in March 2013 [23]. The library was a sub section of the NHS Choices website and provided a portal through which the public could access a selection of smartphone and tablet apps reviewed by the NHS. However, the library was shut down on the 16th of October 2015 after the publication of two papers that questioned the methods of evaluation of the apps recommended by the library. Specifically, the evaluation of apps’ data security [24] and clinical effectiveness [25] were criticised.

NHS Online Mental Health Apps Library.

NHS Choices in March 2015 published a webpage entitled Online Mental Health Services [26]. This page existed separately from the now-defunct NHS Health Apps Library, and, at the time of writing (August 2016), provides a list of six apps, all web apps, that have
“been approved for use by the NHS”, although by whom and upon what basis is unclear, and in fact seems to run counter to current NICE advice.

The Current Study

Digital mental health care provision within the NHS in England is a diverse. Ever-evolving services provide different means of accessing digital healthcare products that are themselves the products of a highly dynamic marketplace, and with which official recommendations and advice struggles to keep pace. The key objective of this paper is to illuminate the current state of digital mental health care in England by documenting what e-therapies are used and recommended by the NHS, thus providing a starting point for evaluation of current practice.

METHODS

Design

We documented web and smartphone apps used and recommended in the NHS for stress, anxiety, and depression. Our data sources were fourfold. Using FOI Requests, we requested a list of which web apps were being used and recommended in (i) NHS IAPT services and (ii) NHS Mental Health Trusts. We also reviewed (iii) the NHS health apps library and (iv) the NHS mental health apps library to identify apps (and web apps) that were currently (or recently) being endorsed by the NHS. In our FOIs to NHS IAPTs and Trusts, we also asked for information about involvement in research, piloting, or development of e-therapies, to capture not only the current practice, but insight into the slightly larger temporal window of very recent past, current, and likely future developments. All e-therapies were appraised against the inclusion criterion of being targeted to alleviate the symptoms of depression, anxiety, or stress. To meet this criteria, the developer of the app had to be locatable via a Google search when entering the app name as the search term, and the app had

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to reference the targeted conditions in its marketing literature or be based on a therapeutic
tool known to benefit the targeted conditions.

Procedure

Improving Access to Psychological Therapies.

On the 10th of February 2015, a list of IAPT services within England was requested
through a FOI email to NHS Choices, asking for the contact details of all IAPT services
within the country. This yielded a list of 295 IAPT services, of which only 116 were
sufficiently detailed to identify their overarching IAPT service provider\(^1\). Each service’s
provider was located via an internet search and overall, 111 IAPT service providers were
identified.

On the 13th of February 2015, an FOI email request was sent to each of the 111 IAPT
service providers. The questions asked are reported in online supplementary Table S1.
According to the FOI Act, requests must be answered within 20 working days of receipt. No
responses were received after this time.

NHS Mental Health Trusts.

Many IAPT services are hosted by NHS Mental Health Trusts. It is possible that the
answers given by IAPT services may be missing elements that are only be answerable at a
NHS Trust level. For example, an IAPT service hosted by a Trust may not be aware of its
host’s activities around research and development. Therefore, FOI emails were also sent to

\(^1\) 277 had websites. Some records had a generic website link to the general IAPT website (n =
122), while others had addresses that displayed ‘no page found’ (n = 31) or failed to reach
any web page at all (n = 7). This left 117 out of 277 IAPT services with a valid web address.
each Trust, using a list of 51 NHS Mental Health Trusts compiled from the NHS Choices mental health trust listing page on the 3rd of March 2015. The questions asked are reported in see online supplementary Table S2. No responses were received after the mandated response window.

NHS Apps Libraries.

On the 26th of March 2015 web and smartphone apps were identified by carrying out four searches on the NHS Health Apps Library under the search terms “Mental Health”, “Depression”, “Anxiety”, “Stress”. Additionally, the apps listed when clicking on the navigation menu category “Mental Health” were also collected. The apps listed on the NHS Mental Health Apps Library (on the 2nd of November 2015) were also collected.

RESULTS

We present the data from each of the sources separately in the following sections. For IAPTs and Trusts, we present data pertaining to: i) response rates; ii) use of web and smartphone apps; iii) reports of being involved in research, piloting, or development of apps; and iv) whether they support online self-referral (IAPTs only). For apps libraries, we report the apps which met our inclusion criterion. The final list of e-therapies reported as being used or recommended by IAPTs or Trusts in England, or listed on the NHS Apps libraries for common mental health problems, is summarised in Table 1.
Table 1. All web and smartphone apps reported to be used or recommended by the NHS for common mental health problems

<table>
<thead>
<tr>
<th>App</th>
<th>Format</th>
<th>Payment Model</th>
<th>Web or phone based (w/p)</th>
<th>N of IAPTs using/recommending (% of 191 IAPT services)</th>
<th>N of Trusts using/recommending (% of 51 Trusts)</th>
<th>Listed in NHS Health Apps Library (y/n)</th>
<th>Listed in Mental Health Apps Library (y/n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Life to the Full</td>
<td>Online modular self-help</td>
<td>Free to access</td>
<td>w</td>
<td>94 (49.2%)</td>
<td>24 (47.1%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>MoodGym</td>
<td>Online modular self-help</td>
<td>Free to access</td>
<td>w</td>
<td>46 (24.1%)</td>
<td>10 (19.6%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Big White Wall</td>
<td>Online forum with tools, courses and one to one messenger based chat</td>
<td>Paid for by provider</td>
<td>w</td>
<td>39 (20.4%)</td>
<td>12 (23.5%)</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>Beating the Bluesa</td>
<td>Online modular self help</td>
<td>Paid for by provider</td>
<td>w</td>
<td>34 (17.8%)</td>
<td>13 (25.5%)</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Provider</td>
<td>Service Type</td>
<td>Cost</td>
<td>w</td>
<td>y</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SilverCloud Health</td>
<td>Online modular self-help</td>
<td>Paid by provider</td>
<td>27</td>
<td>(14.1%)</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with therapist support</td>
<td>(but only available in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>some areas)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ieso Digital Health Ltd</td>
<td>Online one to one messenger based</td>
<td>Paid by provider</td>
<td>22</td>
<td>(11.5%)</td>
<td>y</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>chat with a professional</td>
<td>(but only available in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>some areas)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear Fighter</td>
<td>Online modular self-help</td>
<td>Paid by provider</td>
<td>20</td>
<td>(10.5%)</td>
<td>y</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(but only available in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>some areas) or end user</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HeadSpace</td>
<td>Meditation via app or online</td>
<td>Paid by end user</td>
<td>11</td>
<td>(5.8%)</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buddy App&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Tool to support face-to-face therapy</td>
<td>Paid by provider</td>
<td>6</td>
<td>(3.1%)</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Panic!</td>
<td>Self-help resources</td>
<td>Free to access</td>
<td>5</td>
<td>(2.6%)</td>
<td>n</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>b</sup> Tool to support face-to-face therapy
<table>
<thead>
<tr>
<th><strong>App Name</strong></th>
<th><strong>Description</strong></th>
<th><strong>Pricing</strong></th>
<th><strong>Available</strong></th>
<th><strong>Features</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>MyMoodTracker</td>
<td>Mood tracker</td>
<td>Paid for by end user</td>
<td>p 2 (1.0%) 1 (2.0%)</td>
<td>n n</td>
</tr>
<tr>
<td>Mindfulness Bell</td>
<td>Meditation</td>
<td>Paid for by end user</td>
<td>p 2 (1.0%) 0 (0%)</td>
<td>n n</td>
</tr>
<tr>
<td>Moodkit – Mood Improvement Tools</td>
<td>Tools to improve mood</td>
<td>Paid for by end user</td>
<td>p 2 (1.0%) 0 (0%)</td>
<td>y n</td>
</tr>
<tr>
<td>Thought Diary Pro</td>
<td>Thought diary</td>
<td>Paid for by end user</td>
<td>p 2 (1.0%) 0 (0%)</td>
<td>n n</td>
</tr>
<tr>
<td>WellMind</td>
<td>Tools to help with depression, stress, anxiety</td>
<td>Free to access</td>
<td>p 2 (1.0%) 1 (2.0%)</td>
<td>n n</td>
</tr>
<tr>
<td>Moodometer</td>
<td>Tool to support face-to-face therapy</td>
<td>Free to access</td>
<td>p 2 (1.0%) 0 (0%)</td>
<td>n n</td>
</tr>
<tr>
<td>Kooth</td>
<td>Online one to one messenger based chat</td>
<td>Free to access (but only available in some areas)</td>
<td>w 2 (1.0%) 2 (3.9%)</td>
<td>n y</td>
</tr>
</tbody>
</table>
adults aged 11 to 19

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
<th>Payment Model</th>
<th>% (Year 1)</th>
<th>% (Year 2)</th>
<th>Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBTReferee</td>
<td>Journal to assist face-to-face CBT</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>n</td>
</tr>
<tr>
<td>iCBT</td>
<td>Tool for self-help using CBT</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>n</td>
</tr>
<tr>
<td>Thought Diary</td>
<td>Thought diary</td>
<td>Paid for by end user</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>n</td>
</tr>
<tr>
<td>Stay Alive</td>
<td>Tools to prevent suicide</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>n</td>
</tr>
<tr>
<td>Take a break!</td>
<td>Meditation app</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>n</td>
</tr>
<tr>
<td>Mindshift</td>
<td>Tools to help with anxiety</td>
<td>Free to access</td>
<td>p</td>
<td>1 (0.5%)</td>
<td>n</td>
</tr>
<tr>
<td>Moodscope</td>
<td>Tool to monitor mood</td>
<td>Free to access, stepped payment</td>
<td>w</td>
<td>1 (0.5%)</td>
<td>n</td>
</tr>
<tr>
<td>DigitalMeds</td>
<td>Binaural Beat technology</td>
<td>Paid for by end user</td>
<td>p</td>
<td>0 (0%)</td>
<td>n</td>
</tr>
<tr>
<td>Application Name</td>
<td>Description</td>
<td>Paid for by end user</td>
<td>Rating</td>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------------------</td>
<td>----------------------</td>
<td>--------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>How Are You App</td>
<td>Mood tracker</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>Mindfulness by Digipill</td>
<td>Meditation</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>Mindlogr</td>
<td>Video journal</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>Panic Attack Aid</td>
<td>Tools to help with panic attacks</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>Phobia Free</td>
<td>Augmented Reality (AR)</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>Stress Management App</td>
<td>Tools to help with stress</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>WorkGuru</td>
<td>Tools to help with stress at work</td>
<td>w</td>
<td>0 (0%)</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>Worry Watch</td>
<td>Journal for anxiety</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>Tool</td>
<td>Description</td>
<td>Access</td>
<td>Weighted</td>
<td>Non-weighted</td>
<td>Score</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------</td>
<td>--------</td>
<td>----------</td>
<td>--------------</td>
<td>-------</td>
</tr>
<tr>
<td>MindEd</td>
<td>Online advice and support</td>
<td>Free</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
</tr>
<tr>
<td>Puffell</td>
<td>Online advice and support</td>
<td>Free</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
</tr>
<tr>
<td>Virtual Hope Box</td>
<td>Tools to compliment face-to-face</td>
<td>Free</td>
<td>0 (0%)</td>
<td>1 (2.0%)</td>
<td>n</td>
</tr>
<tr>
<td>Aventurine Mood Improver</td>
<td>Tool for self-help using CBT</td>
<td>Free</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>Black Rainbow</td>
<td>Advice and audio for relaxation</td>
<td>Free</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>Depression Calculator</td>
<td>PHQ-9 screening tool</td>
<td>Free</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>Five Ways to Wellbeing</td>
<td>Tools for wellbeing</td>
<td>Free</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>Ginsberg</td>
<td>Activity and mood diary</td>
<td>Free</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>App/Service</td>
<td>Description</td>
<td>Access</td>
<td>Rating</td>
<td>Rating</td>
<td>Publish</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------</td>
<td>--------------</td>
<td>--------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>Happy Healthy App</td>
<td>Tools for wellbeing</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>HealthStored</td>
<td>Health tracker</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>Healthy Living</td>
<td>Guide to healthy living</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>Hello Brain Health</td>
<td>Brain exercises for better health</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>Moodbug</td>
<td>Mood tracker</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>SAM: Self-help for Anxiety</td>
<td>Tools to help with anxiety</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
<tr>
<td>Stress &amp; Anxiety Companion</td>
<td>Tools to help with anxiety</td>
<td>Free to access</td>
<td>p</td>
<td>0 (0%)</td>
<td>y</td>
</tr>
</tbody>
</table>

Notes
a Beating the Blues developer Ultrasis went into administration in October 2015. The program is now linked with 365 Health and Wellbeing Ltd who have been unreachable for comment.

b Buddy Enterprises has ceased operations and as a result of this Buddy App has been discontinued.
Improving Access to Psychological Therapies Services

The FOI responses from IAPT services were inconsistent. Some providers answered at an overarching provider level while others gave granular detail regarding each of their service locations. In our results, we assumed that when a provider responded at top level that they referred to all their IAPT service locations. A total of 61 out of 111 IAPT service providers responded, accounting for 191 IAPT services. Two providers, one a charity and the other a Community Interest Company (CIC - a UK limited company whose objective is to benefit the community it serves, using any profits and assets for that purpose), refused to respond to the FOI on the grounds that the act did not apply to them; a further two acknowledged receiving the FOI request but did not follow up with a response to the questions asked, and 13 indicated that their services had been discontinued, merged with, or passed to another IAPT provider. A total of 33 IAPT providers did not respond at all to the FOI request. These comprised public sector organisations: n=8 (24.2%); third sector organisations: n=13 (39.4%); and private sector organisations: n=12 (36.4%). The majority of the non-responders were non-public sector organisations (n=25; 75.8%).

One hundred and sixty-nine of the 191 (88.5%) IAPT services for which responses were obtained recommend or used web apps and of those, 41 (24.3%) use at least one of the NICE [27] recommended eCBT programs. IAPT services, in addition, highlighted 16 different web apps. Six were excluded for not meeting the inclusion criterion (Figure 1) leaving 10 included web apps (Table 1). Fifty (26.2%) of the IAPT services recommend or use smartphone apps, and 21 smartphone apps were specifically named. Seven did not meet the inclusion criteria (Figure 1), leaving 14 included smartphone apps.

Twelve IAPT services indicated they were carrying out research into web apps, 10 stated they were piloting web apps and 2 said that they were in the process of developing their own. Regarding smartphone apps, 15 IAPT services indicated they were carrying out research into
smartphone apps, 2 stated they were piloting smartphone apps and 10 said that they were in the process of developing their own. Two IAPT s indicated using patient webinars but did not disclose details of their content. Regarding online self-referral, 138 (72.3%) of the 191 IAPT services support this, either via email or online form.

**NHS Mental Health Trusts**

All 51 Mental health trusts responded to the FOI request. Thirty-nine of the 51 (76.5%) Trusts recommend web apps and of these 14 (35.9%) use NICE recommended cCBT [28]. Seventeen web apps were highlighted by Trusts, 5 of which did not meet the inclusion criterion (Figure 1). This left 12 included web apps. (Table 1). Fifteen (29.4%) of the 51 Trusts recommend or use smartphone apps. Trusts named 14 specific smartphone apps, 6 of which did not meet the inclusion criterion (Figure 1), leaving 8 included smartphone apps (Table 1).

One trust indicated it was carrying out research into web apps, two stated they were piloting web apps and one said that it was in the process of developing its own. Regarding smartphone apps, 2 Trusts indicated they were carrying out research into smartphone apps, two indicated they were piloting smartphone apps and seven said they were in the process of developing their own.

**Apps Libraries**

In the NHS Health Apps Library, a list of 44 web/smartphone apps were identified, 18 of these did not meet the inclusion criterion (Figure 1) leaving 26 included apps. Out of the 7 web apps listed in the NHS Mental Health Apps Library on the 2nd of November 2015 6 met the inclusion criterion and 1 did not (Figure 1). Only 3 apps were present in both libraries (Table 1).
DISCUSSION

The present paper is the first attempt to document all the e-therapies used and recommended by the NHS in England at a particular window in time. While the list of e-therapies is changeable over time, the present paper provides future researchers, commissioners, and policymakers with a baseline of information from which to build. The data presented raise several interesting issues relating to the accessibility of service information, NICE guidelines on e-therapies, and ways of evaluating e-therapies.

Data Accessibility and Quality

This study relied heavily on the provisions of the UK FOI Act (2000) for the collection of data. The reorganisation of the provision of mental health services in England has led to the increased participation of private and third sector provider organisations. Unlike public bodies, these organisations are not obliged to respond to FOI requests. Indeed, over half of the organisations that did not respond to the FOI request were limited companies or charities. As more areas of the NHS are outsourced to external providers, inaccessibility of service information is likely to increase. There is therefore a need for the FOI Act to apply to all NHS services, be they publicly or privately run, to ensure a level of transparency that allows both positive and negative aspects of services to be made visible to the public and researchers alike.

Regarding the quality of the data collected, in certain cases, the FOI requests were answered with datasets that contained missing or inaccurate data. For instance, in the IAPT dataset supplied by NHS choices, which is searched by service users of the NHS Choices...
website, only 46.4% of services had provided a contact email and only 52.5% had a website link detailing more information about the service location. There is a clear need for the NHS to improve its data curation procedures to meet the aspiration of becoming truly digitally enabled.

**NICE guidelines on e-therapies**

NICE (2006) recommended two cCBT programs for use within NHS services. The publication of subsequent NICE recommendations (2009b) resulted in the withdrawal of endorsement of any specific app, shifting responsibility for choosing e-therapies to service providers. Because of this there are now 13 different web apps, and 35 smart phone apps, for depression, anxiety or stress, available either through referral services or the NHS Mental Health Apps Library. These e-therapies are not consistently used or recommended across the country representing variability in service provision by geographical location. There are also notable differences between the four most used apps by IAPTs and Trusts, and the apps currently listed in the Mental Health Apps Library and previously listed in the Health Apps Library, with 3 of the 4 most used by IAPTs and Trusts not appearing in either library. Most notably, the top two apps used by IAPTs and Trusts are free to access, and yet are not listed in the current (or previous) NHS library. Perhaps this indicates different decision processes being used by IAPTs and Trusts compared to NHS library curators. Additionally, the current Mental Health Apps library features many apps that are only free in some areas of England, requiring user payment in others. This has implications for patient choice and service equality. Furthermore, 11.5% of IAPT services and 23.5% of Trusts do not use or recommend web apps at all. It is not clear whether this reflects the absence of specific NICE guidelines, or a general lack of digitally enabled service provision.
Ways of evaluating e-therapies

To help address the gap in NICE guidelines, it is crucial to investigate whether the apps currently being used are effective. While the pace of large scale evaluative research (e.g., RCTs) lags behind that of advancing technology, there are other, more practical options for collecting and synthesising useful data. We make two specific recommendations. Firstly, the minimal dataset collected by IAPT [29] which is used to build a picture of the current activity within IAPT services such as assessments, sessions, scales, should be revised. It currently requires data on whether a client is using an e-therapy, but it does not indicate which one [30]. A more fine-grained approach, where not only e-therapy use, but also which one, was recorded, would provide the ability to isolate the impact of individual apps on end users. This relatively small change to routine data collection practices would provide an instant evidence base against which all the e-therapies listed in the present paper could be evaluated. Secondly, for each e-therapy listed in the present paper, a systematic literature review should be conducted, to synthesise any existing effectiveness data.

There are also alternative methods of evaluating e-therapies, which, while they do not address effectiveness specifically, can provide useful insight into the integrity of the content, data security measures, and the acceptability to end users. Researchers have begun to discuss and propose methods of evaluating e-therapies. MindTech’s Framework for Mental Health Digital Products [31] aids users in the process of evaluating, comparing and contrasting programs by providing a list of all possible and relevant issues. The Mobile Application Rating Scale (MARS) [32] enables expert raters to review apps for engagement, functionality, visual aesthetics, information quality and subject quality of health apps and has been tested on Mindfulness apps [33]. Other methods of analysis and evaluation might include syphoning review data from the app stores. While it cannot speak to effectiveness, rating scores and download numbers may give indications about acceptability.
Presently the NHS does not have a process in place to endorse apps. However The National Information Board is working to develop a Health App Assessment process [34]. This process will eventually enable the NHS to endorse apps. However the consequences of endorsement are currently unknown. Endorsement may result in market dominance by those gaining NHS approval, stunting the market and truncating innovation.

E-therapy tailored to specific demographics

The majority of the web/phone applications included in this review were not tailored to a specific demographic. One e-therapy Kooth was designed for young people aged 11 to 19. There were no e-therapies found for older adults aged over 65. It may be possible that some of the modular based e-therapies listed have the potential to support these groups through customised modules. It would be useful for future research to collect data on specific provision for different demographics, both in terms of e-therapies available, and those employed by NHS services for specific demographics (e.g. Child and Adolescent Mental Health Services).

CONCLUSIONS

As e-therapies are continually evolving, their place within NHS services will also continue to change. However, there is a pressing need for proper evaluation of the effectiveness of the e-therapies used and recommended by the NHS, to support evidence-based practice, and help to overcome the gaps remaining in the NICE guidelines on apps for common mental health problems. The present paper has provided a starting point for this work, by documenting all the web- and smartphone- based apps currently being used or recommended by the NHS in England. Future research should seek to examine the e-therapies identified within this paper and systematically review them for their clinical effectiveness. It is also important that changes are made to i) enable better reporting of digital
mental health service provisions within IAPT services, and ii) build an evidence base with
which to evaluate the effectiveness of different e-therapies.
Twitter Follow Matthew Bennion at @matthewrbennion, Prof Roger K Moore at @rogerkmoore, Dr Abigail Millings @Relp_Science

Contributors MRB and AM conceived of and designed the research. MRB collected and analysed the data. MRB and AM interpreted the results and drafted the manuscript, and AM, GH and RKM revised it. All authors approved the final version of the article. All authors had access to all study data and take responsibility for data integrity and accuracy of the analysis.

Funding This work was supported by a PhD studentship awarded by the University of Sheffield to the first author, and Economic and Social Research Council grant number ES/L001365/1.

Competing interests The last author was formerly an employee (2010-2012) and minor shareholder of Ultrasis UK Ltd (makers of ‘Beating the Blues’), which went into administration in October 2015.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement Additional data for this article have been provided as supplementary. There is no additional unpublished data.

Disclaimers: The content is solely the responsibility of the authors and does not represent the views of the NHS England.
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34 National Information Board. WORK STREAM 1.2 ROADMAP. Enable me to make the right health and care choices. Providing citizens with access to an assessed set of NHS and social care ‘apps’ Work. 2015.
Figure 1: PRISMA Flow Diagram of app data collection

PRISMA Flow Diagram

430x399mm (300 x 300 DPI)
Table S1. Freedom of Information Request Questions asked of IAPT Service Providers

<table>
<thead>
<tr>
<th>Question</th>
<th>Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>According to the dataset I have obtained from NHS Choices, you host the following services [service names]. Please can you confirm whether this list is complete and add any additional services that are not listed? (Including address and postcode).</td>
</tr>
<tr>
<td>3.</td>
<td>If these services are not run directly by the NHS please state who runs them and what they are (e.g. Social Enterprise, Limited Company, third sector group).</td>
</tr>
<tr>
<td>4.</td>
<td>If you provide an IAPT a service on behalf of another organisation (such as a care commissioning group, foundation trust or other) please state the organisation’s name.</td>
</tr>
<tr>
<td>5.</td>
<td>Please state the types of referral used by your organisation / IAPT i.e. GP, Self-Referral, Other.</td>
</tr>
<tr>
<td>6.</td>
<td>If you offer a self-referral service do you have an online self-referral method such as a contact email address or a form on your website?</td>
</tr>
<tr>
<td>7.</td>
<td>Please state any e-therapies, computerised therapies, Internet-delivered therapies, online therapies, or advice/guidance websites for mental health issues that your organisation / IAPT service use or recommend to service users. For example, these might include, but are not limited to internet-delivered cognitive behaviour therapy with or without therapist support, internet-delivered therapy</td>
</tr>
</tbody>
</table>
based on an approach other than cognitive behaviour therapy, online or email therapy/counselling, online social support networks, or informational websites.

8. Please state any smart phone apps your organisation / IAPT service use or recommend to service users. For example, these might include specific apps from the NHS Choices Health Apps Library, or others that professionals in your service recommend.

9. In 2013/14 could you give the total number of people your service saw under IAPT and also give a figure as to how many of those were aged 50 or over.
Table S2. Freedom of Information Request Questions asked of NHS Trusts

<table>
<thead>
<tr>
<th>Question</th>
<th>Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Please state any e-therapies, computerised therapies, Internet-delivered therapies, online therapies, or advice/guidance websites for mental health issues that your trust use or recommend to service users. For example, these might include, but are not limited to internet-delivered cognitive behaviour therapy with or without therapist support, internet-delivered therapy based on an approach other than cognitive behaviour therapy, online or email therapy/counselling, online social support networks, or informational websites. Format this as a list indicating which are recommended and which are used by the trust.</td>
</tr>
<tr>
<td>2.</td>
<td>Please state any smart phone apps your trust use or recommend to service users. For example, these might include specific apps from the NHS Choices Health Apps Library, or others that professionals in your service recommend. Format this as a list indicating which are recommended and which are used by the trust.</td>
</tr>
<tr>
<td>3.</td>
<td>For the period 2013/14 could you state the total number of people your trust treated for depression / anxiety and also give a figure as to how many of those were aged 65 or over.</td>
</tr>
</tbody>
</table>
### STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of cross-sectional studies

<table>
<thead>
<tr>
<th>Section/Topic</th>
<th>Item #</th>
<th>Recommendation</th>
<th>Reported on page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title and abstract</td>
<td>1</td>
<td>(a) Indicate the study’s design with a commonly used term in the title or the abstract</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Provide in the abstract an informative and balanced summary of what was done and what was found</td>
<td>2</td>
</tr>
<tr>
<td>Introduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Background/rationale</td>
<td>2</td>
<td>Explain the scientific background and rationale for the investigation being reported</td>
<td>4-9</td>
</tr>
<tr>
<td>Objectives</td>
<td>3</td>
<td>State specific objectives, including any prespecified hypotheses</td>
<td>9</td>
</tr>
<tr>
<td>Methods</td>
<td></td>
<td></td>
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<tr>
<td>Study design</td>
<td>4</td>
<td>Present key elements of study design early in the paper</td>
<td>9-11</td>
</tr>
<tr>
<td>Setting</td>
<td>5</td>
<td>Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection</td>
<td>10-11</td>
</tr>
<tr>
<td>Participants</td>
<td>6</td>
<td>(a) Give the eligibility criteria, and the sources and methods of selection of participants</td>
<td>10-11</td>
</tr>
<tr>
<td>Variables</td>
<td>7</td>
<td>Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable</td>
<td>N/A</td>
</tr>
<tr>
<td>Data sources/</td>
<td>8*</td>
<td>For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group</td>
<td>10-11</td>
</tr>
<tr>
<td>measurement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bias</td>
<td>9</td>
<td>Describe any efforts to address potential sources of bias</td>
<td>N/A</td>
</tr>
<tr>
<td>Study size</td>
<td>10</td>
<td>Explain how the study size was arrived</td>
<td>10-11</td>
</tr>
<tr>
<td>Quantitative variables</td>
<td>11</td>
<td>Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why</td>
<td>11</td>
</tr>
<tr>
<td>Statistical methods</td>
<td>12</td>
<td>(a) Describe all statistical methods, including those used to control for confounding</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Describe any methods used to examine subgroups and interactions</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) Explain how missing data were addressed</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(d) If applicable, describe analytical methods taking account of sampling strategy</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(e) Describe any sensitivity analyses</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Participants 13* (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed 20-22
(b) Give reasons for non-participation at each stage 20-22
(c) Consider use of a flow diagram 22
Descriptive data 14* (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders 10-11
(b) Indicate number of participants with missing data for each variable of interest 10-11, 20-22
Outcome data 15* Report numbers of outcome events or summary measures N/A
Main results 16 (a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included N/A
(b) Report category boundaries when continuous variables were categorized N/A
(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period N/A
Other analyses 17 Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses N/A
Discussion
Key results 18 Summarise key results with reference to study objectives 22-25
Limitations 19 Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias 22-25
Interpretation 20 Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence 22-25
Generalisability 21 Discuss the generalisability (external validity) of the study results N/A
Other information
Funding 22 Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based 27

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

E-therapies in England for stress, anxiety or depression: what is being used in the NHS? A survey of mental health services

M R Bennion, G Hardy, R K Moore and A Millings

BMJ Open 2017 7:
doi: 10.1136/bmjopen-2016-014844

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