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Guest Editorial

Levelling up digital mental health: from proliferation to precision

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Summary

Despite rapid growth, digital mental health tools rarely deliver meaningful clinical impact. Psychiatrists' attitudes to technology and private–industry partnerships are key. To embed safe, effective technologies into real-world psychiatric care, a shift from proliferation to precision is required. Co-production, equity, implementation science and academia–industry–clinical partnerships need emphasis.

Keywords

Diagnostic medicine; evidence-based mental health; health informatics; medical technology; mental health services.

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Digital promise amid persistent inequity

Digital technologies are increasingly positioned as a solution to widening mental health disparities, by improving access and thereby reducing health inequalities.[1] Applications, artificial intelligence, wearables, health and well-being apps and minimally invasive technologies are now embedded in public discourse, policy ambitions and commissioning strategies and are a key part of the digital National Health Service (NHS). Nevertheless, despite rapid proliferation, population-level mental health outcomes – particularly for people with severe mental illness and neurodevelopmental conditions – have not improved at the pace anticipated. The central question is no longer whether technology can contribute to mental healthcare, but whether it is being deployed in ways that are clinically meaningful, equitable and fit for real-world complexity.[1] Although this Editorial focuses primarily on clinical applications of digital mental health, these technologies may also contribute to population mental health through prevention, early intervention, mental health literacy and scalable self-management support, when evidence-based and equitably implemented.

Current digital mental health ecosystems risk amplifying existing inequalities unless they are re-oriented towards co-produced implementation science. Levelling up requires better alignment around the needs of the individual and population, clinician and patient pathways, all co-produced using lived experience.[2]

Every digital intervention, in advance, needs to answer at least one of the following: what clinical decision does this inform? What uncertainty does it reduce? What action does it trigger? What harm does it prevent? Who is deciding what harm means, and is it measurable? If none apply, the tool is not a clinical intervention, regardless of how elegant the technology may be.

Mental health and neurodevelopmental need: background and scale

Mental health need continues to rise against a backdrop of workforce shortages and system strain. The UK has approximately 8 psychiatrists per 100 000 population, well below its European counterparts. Community services increasingly shoulder complex care with limited specialist support. The move from institutional to community-based care, although ethically and socially necessary, has not been matched by the necessary investment in community services or specialist capability. These pressures are magnified for neurodevelopmental populations, who experience higher rates of mental illness, physical comorbidity, premature mortality and fragmented care pathways.

Digital tools are often framed as the 'silver bullet' solution, yet they are frequently designed for populations with high health literacy, stable cognition and minimal comorbidity. Those with the greatest need are therefore least likely to benefit.

If we are serious about equity, then people with intellectual disability, autism, psychosis, fluctuating capacity and complex comorbidity must no longer be framed as 'challenging populations' and instead be treated as proving ground. A system that works for these groups could work for everyone. Currently there is a large mismatch between how often programmes are designed for groups with high literacy, stable cognition and minimal comorbidity, given that these represent a much smaller proportion of the overall population with serious mental health needs.

A system that works only for digitally literate, cognitively stable, self-motivated users is not scalable mental healthcare. This implies accessibility first, not retrofitted; proxy and carer workflows designed in, not bolted on; tolerance for intermittent engagement; and safety mechanisms for deterioration, not just engagement optimisation. These are the terms that should define whether a technology deserves to exist.

The explosion of digital mental health technologies

The digital mental health landscape is characterised by extraordinary diversity. Screening tools, mood-trackers, mindfulness platforms, therapy apps, condition-specific tools and lifestyle interventions are readily available. These tools may support self-management, early identification or low-intensity intervention of stress, anxiety and mild depression.[3]

Few tools are embedded into formal care pathways, fewer still have any evidence base or sustained clinical evaluation and even fewer are designed for people with cognitive impairment, communication differences or fluctuating capacity.

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Clinical, patient and technical challenges: is technology fit for purpose?

Four intersecting challenges determine whether digital tools succeed or fail.

Clinical challenges include lack of diagnostic clarity, limited integration with electronic health records, staff and service barriers, concerns about clinical safety and unclear accountability, and absence of decision support aligned with guidelines. Digital tools often sit outside the clinical gaze, generating data without interpretation or action.

Patient challenges include digital exclusion, accessibility barriers, motivation, trust and relevance. Many individuals and families prioritise quality of life, social participation and psychological safety over symptom reduction alone. Technologies that do not align with these priorities are unlikely to be adopted.

Technical challenges include cost-effectiveness, interoperability, explainability of artificial intelligence outputs, data governance and sustainability. Black-box models (interventions that may be effective but not fully understood), particularly in neurodevelopmental contexts, risk undermining trust unless outputs are interpretable and clinically meaningful.

Societal challenges include the acceptance of technology once it is released into the real world. Regardless of what technology is designed to do, society is the entity that decides whether it is of value. Technologies that do not consider how they may be used in the context of daily life risk their sustainability.

What is missed: complexity, context and co-production

Much of what is missed in digital mental health innovation relates to complexity. Mental illness rarely occurs in isolation: it intersects with neurodevelopmental conditions, physical health, social adversity and environmental stressors. Digital interventions are frequently evaluated as discrete products rather than as components of complex interventions.

Co-production remains inconsistently applied. Although patient and public involvement is often described, genuine power-sharing – for example, with people with intellectual disability and their families – remains the exception.[4]

Technology acceptance is a determinant of clinical efficacy, safety and sustainability. It requires careful consideration that is often devalued in the development process and not understood sufficiently to ensure meaningful impact in the community that it aims to help. This is tightly linked to co-production, where technological development can be informed by stakeholders' individual and social values. Technology has the power to greatly impact one's autonomy. If done incorrectly it may result in reduced autonomy, especially in users with reduced mental capacity.

Rethinking care models: from episodic to continuous, from clinician-led to shared

Traditional mental healthcare models are episodic, clinician-initiated and face to face. Digital technologies enable alternative models that are patient-initiated, continuous and hybrid. Patient-accessed and co-authored records, secure messaging, symptom-tracking and decision support tools offer opportunities to detect deterioration earlier, predict change, personalise interventions and reduce unnecessary appointments.

However, these models demand a re-imagining of professional roles, governance and risk tolerance. Without clear pathways analogous to those governing pharmacological interventions, digital tools risk remaining adjuncts rather than integral components of care.

Medications do not sit 'alongside' care. Digital tools intended for clinical populations should be no different. This requires integration into electronic health records, alignment with clinical guidelines, clarity on who reviews outputs and when, and shared ownership across teams rather than isolated champions. Levelling up generally means designing digital systems that reduce cognitive load, not add dashboards. It could be argued, however, that sometimes cognitive load for the professional is needed initially, but will reduce following training and use, to the extent that it will cost professionals' less cognitive load.

'Personalisation and precision' have become comforting but empty words. In practical terms, digital mental health should focus on three things. First, identify who benefits because not everyone should receive the same digital intervention. Stratification by mental health or neurodevelopmental profile, risk, context and capacity is not exclusionary but ethical. However, one should be mindful of ensuring that patient stakeholders have a strong say in developing and choosing personal preferences. This is important to foster bidirectional trust and engagement with emerging technologies. Second, when it matters, continuous monitoring is useful only if it detects change, and precision lies in identifying inflection points such as early deterioration, relapse signatures and treatment response windows. Third, data without consequence are simply noise, and precision requires predefined thresholds linked to actions, whether clinical review, carer notification, intervention adjustment or reassurance. To enable such focus on digital mental health, effective definition of measurable metrics of success must be a priority.

Precision: emerging examples

Neurodevelopmental populations offer a compelling test case for digital health. Advances in explainable artificial intelligence have begun to identify neurobiological signals associated with autism,[5] with improvements in electroencephalogram (EEG) monitoring illustrating how technologies can close diagnostic and monitoring gaps when routine investigations are insufficient, particularly those delivered in the community.[6] Explainable artificial intelligence in autism has the potential to deliver clinically relevant, interpretable biomarkers by identifying brain regions linked to diagnosis rather than relying on subjective clinical–behavioural assessments. Community EEG monitoring shows how longitudinal, real-world data can improve diagnostic yield when clinic tests are insufficient, particularly for underserved groups. Both examples reduce uncertainty, guide decisions, enhance autonomy and improve equity and access.

These approaches demonstrate several key principles: alignment to specific clinical questions; longitudinal, multi-modal, real-world data capture; regulatory approval; and integration with clinical decision-making. Crucially, they are designed not merely to collect data, but to release the individual to enhanced autonomy, safety and quality of life.

Levelling up: what must be considered – obvious and not so obvious

Levelling up digital mental health requires confronting uncomfortable questions. Are we reaching the right populations, or simply

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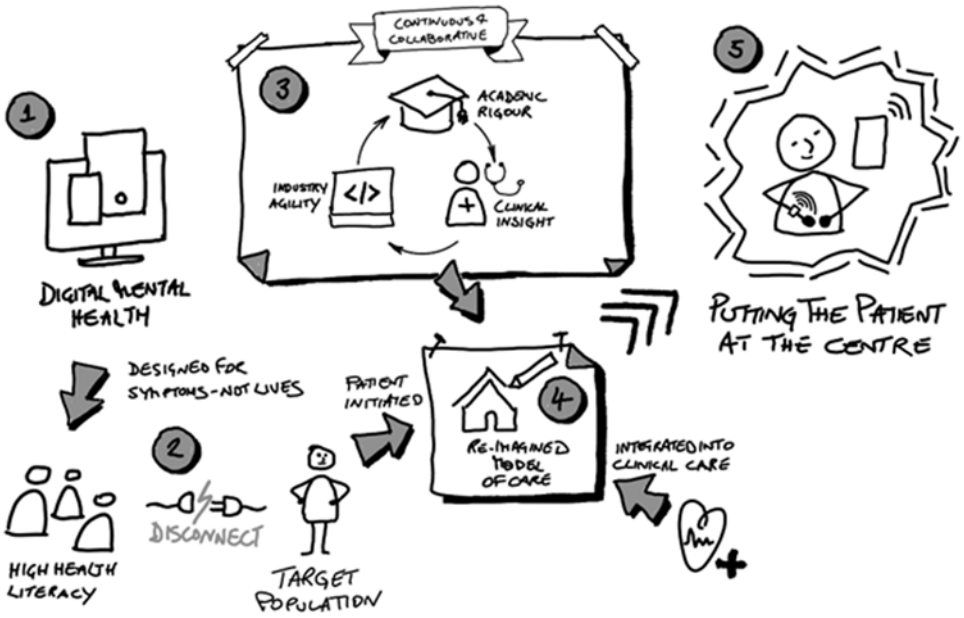


Fig. 1 Digital mental health must shift from fragmented tools to integrated, patient-centred care. Numbers denote key themes: (1) current landscape, (2) unmet needs/mismatch, (3) collaboration, (4) re-imagined integrated care and (5) patient-centred outcomes. Arrows represent connection, progression and iterative feedback.

those easiest to engage? Are technologies reinforcing echo chambers shaped by ideology, commercial incentives or media narratives? History offers cautionary tales. Early regulation of automobiles constrained innovation through fear rather than foresight. Digital mental health risks similar missteps if governed by reactive rather than anticipatory frameworks. Innovation, however, needs to be balanced with the need for digital safety to ensure that digital tools are effective, reliable and acceptably safe.

A major challenge for clinical researchers is speed. Clinical interventions take years to develop, years to evaluate and more years to implement. For digital interventions, this becomes irrelevant because technology changes so quickly.

Implementation science as the missing discipline

Perhaps the most critical gap is implementation science. Unlike medications, digital interventions lack standardised pathways for evaluation, commissioning, scaling and de-implementation. Success must be defined in advance using meaningful measures that extend beyond symptom reduction, including recovery, quality of life, functioning, safety, equity, user experience and wider system impact.

Traditional clinical evaluation timelines are mismatched to digital innovation. The solution is not to abandon rigour, but to reframe where rigour lives. This implies adaptive trial designs, living evaluations, post-market evidence generation, predefined stopping rules for harm or futility, and success criteria that include equity, not just efficacy. Digital interventions should be evaluated as complex interventions from the outset, with context treated as a variable rather than a nuisance. Implementation science is not the final step but the scaffolding.

Digital mental health tools should be treated as complex interventions, requiring iterative evaluation, contextual adaptation and long-term stewardship.[7] Without this, the field risks innovation without impact.

Implementation science alone will be insufficient without clarity on what we are implementing, and how to ensure that speed does not compromise rigour. The distinction between regulated medical devices and unregulated wellness applications is not merely technical: it is fundamental to patient safety and clinical credibility. Digital mental health tools, particularly those with complex functionalities or intended for clinical populations, must be subject to the same rigorous standards as other medical interventions.[8]

A credible digital mental health ecosystem requires clear regulatory categorisation, proportionate but firm standards for clinical claims, transparency about limitations and uncertainty, and consequences for misuse or over-reach. The current blurring between wellness apps and medical devices benefits vendors, but it does not benefit patients, clinicians or systems. Poor or no regulation could slow adoption far more when trust inevitably collapses.

To achieve a vibrant and credible digital ecosystem, academia, clinical services and industry partners need to collaborate effectively. Start-ups and other commercial entities are crucial in this regard, bringing agility, user-centred design and commercial drive that can be powerfully combined with the scientific rigour of academic research and the real-world insights of clinical practice.[9] This nexus, where academic credibility meets commercial innovation and clinical expertise, is where evidence can be built and solutions implemented more rapidly.

Nonetheless, such partnerships must be built on a foundation of shared principles, including transparency about conflicts of interest, aligned expectations around timelines and outcomes and a focus on patient outcomes rather than commercial incentives. By creating this collaborative framework, we can move beyond the current landscape of proliferation without purpose. The digital tools we develop must not only be technologically sophisticated but also clinically meaningful, ethically sound and, crucially, centred on the needs of the people they are designed to serve.

The most corrosive feature of digital mental health is perpetual pilotism (i.e. small studies, short funding cycles, unclear understanding of acceptance, limited integration and then abandonment). Levelling up requires long-term stewardship with clear ownership, defined de-implementation pathways, funding models that reward maintenance rather than novelty and collaboration

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among academia, services and industry that is explicit about incentives and conflicts. Most of what needs to change is not technical but cultural. We reward novelty with usefulness, engagement over outcome, speed over fit and scale over suitability. Digital mental health will continue to disappoint until those incentives change.

From proliferation to purpose: re-imagining digital mental health around the patient

Figure 1 summarises the paper's argument that digital mental health must shift from fragmented tools to integrated, patient-centred care.

Digital technologies have undeniable potential to address mental health disparities, particularly in overstretched systems. Levelling up demands a shift to precision over novelty, co-production over assumption and implementation over aspiration. The task is not to resist technology, but to shape it to ensure that it serves those with the greatest need, enhance rather than fragment care and contribute meaningfully to recovery and quality of life.

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Data availability

Data availability is not applicable to this article as no new data were created or analysed in this study.

Author contributions

R.S. – conceptualisation, investigation, methodology, project administration, resources, supervision, validation, visualisation, writing – original draft, review and editing. J.R.T. – investigation, project administration, validation, visualisation, writing – original draft. C.J.J. – investigation, project administration, validation, visualisation, writing – original draft. R.A.L. – conceptualisation, investigation, validation, visualisation, writing – review and editing. L.A. – visualisation, writing – review and editing. K.A. – visualisation, writing – review and editing. A.B. – visualisation, writing – review and editing. R.T.A. – visualisation, writing – review and editing. E.M. – validation, visualisation, writing – original draft, review and editing.

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Declaration of interest

There is no direct conflict of interest for any of the authors. R.S. is a member of the *British Journal of Psychiatry Open* (RCPsych) editorial board and is Associate Dean for Academic Training for RCPsych. He did not take part in the review or decision-making process of this paper. He has received institutional research, travel support and/or honoraria for talks and expert advisory boards from LivaNova, UCB, Eisai, Veriton Pharma, Bial, Angelini, UnEEG and Jazz/GW Pharma outside the submitted work. He holds, or has held, competitive grants from various national grant bodies including Innovate, Economic and Social Research Council, EPSRC, National Institute of Health Research, NHS Small Business Research Initiative and other funding bodies, including charities, all outside this work. A.B. is RCPsych Associate Registrar for Digital Mental Health. R.T.A. is a member of the *British Journal of Psychiatry* editorial board but did not take part in the review or decision-making process of this paper. J.R.T. is co-founder and managing director of Neuronostics Ltd and a theme lead for enabling technologies of the Epilepsy Research Institute. C.J.J. is the developer and inventor of the Bionics Bus, which has received research support from EPSRC. R.A.L. has been chief investigator in studies for Janssen and Boehringer Ingelheim. No other author has any conflict of interest.

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