



Utilisation of Health Technologies for Physical Health of People with Learning Disabilities: Point of Care Testing

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Abstract The World Health Organisation defines health technologies as the “*application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of lives.*” Innovative health technologies have immense potential to improve human health and well-being. However, their advent does not guarantee equitable health outcomes. Not all individuals have equal access to health technologies resulting in different health

outcomes for those individuals. Barriers to adoption, implementation, access, research and design can lead to exclusion and perpetuate the health inequalities already experienced by vulnerable or marginalised groups, for example those with intellectual disabilities (ID). Point of care testing (POCT) is a health technology used to monitor physical health and has been available for almost a decade. POCT is reported to be minimally invasive, can be conducted in a wide range of settings, enables shorter time to clinical decision making, improved self-management of health conditions and patient empowerment. Despite the benefits of POCT, adoption, use, awareness and research of the use of this technology in people with ID to monitor physical health appears to be scant. This article will explore the application of POCT in this group of individuals for whom evidence informs us die up to 25 years earlier when compared to the general population, and physical health disease account for the overwhelming majority of premature deaths. This is a narrative review exploring the use of POCT for physical health of people with ID.

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Health Technologies

The World Health Organization (WHO) defines health technologies as the “*application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of lives*” (WHO 2007, p. 106; emphasis added) (WHO (World Health Organisation). *Health Technologies. Resolut. WHA60.29. World Health Organ., Geneva, 2007*). Contrary to expectation the inequalities in health appear to be increasing in many of the world’s most developed countries during a time of intensive and innovative development in technology (Beckfield et al., 2015; Mackenbach, 2012; Piot, 2012). As the use of innovative health technologies intensifies, the link between technology and health is gaining increased attention (Casper & Morrison, 2010; Cockerham, 2005; Lupton, 2016; Swan, 2009).

The use of technology in the delivery of health services has increased significantly over the last few decades (McGibbon & Peter, 2008) accompanied by advancements in personalised medicine and the use

of big data for health. Examples include telemedicine, digital and smartphone apps, personal and wearable devices, artificial intelligence, pharmacogenomic testing and point of care testing (POCT). Such innovations are in general seen as positive developments bringing about improvements in disease prevention, screening, diagnosis, monitoring, interventions and prognosis for health conditions and public health (see Table 1 below for examples). However, implementation of these should be examined in detail, specifically, with regards the broader societal implications (Barclay et al., 2014; Lupton, 2015; Rogers, 2003; Woolf et al., 2007). Whilst it seems that such technologies are leading to improvements in public health this could be at the cost of creating and perpetuating inequalities in health (Phelan & Link, 2013; Rogers, 2003).

The importance of understanding the potential implications that accelerating development and emphasis on a variety of technological innovations has on the health of society has been explored in the literature (Piot, 2012). Other research has investigated the association between health inequalities and

Table 1 Examples of health technology that have resulted in improved outcomes for health

Health technology	Description	Outcomes
Telemedicine: virtual fracture clinics (Auld, n.d.; Bellringer et al., 2017); Brogan et al., (2017)	Virtual fracture clinic for acute fracture and soft tissue injuries in a patient-centred, standardised, safe and effective way. Included a telephone consultation and self-management through use of online resources, with subsequent appointments only where clinically indicated Over 50% of the 8000+ new patient fracture clinic appointments over a one-year period (2017) were via the virtual fracture clinic and discharged after receiving virtual care	Improved adherence to fracture clinic guidelines Safe with no related serious complications There were significant cost saving versus non-virtual usual care
Smartphone app: computerised cognitive behavioural therapy (CBT) (Zachariae et al., 2016)	Computerised CBT for insomnia treatment, as a fully automated, advanced algorithm-driven program or app being used without any support from a human therapist	Shown to be an effective treatment with effects comparable to those found for face-to-face therapy
Web app: online chlamydia pathway (OCP) (Estcourt et al., 2017)	The OCP, an eSexual Health Clinic, which was an automated online clinical consultation model with electronic prescribing, partner notification, health promotion and surveillance. Enabled self-directed (including self-swabbing) online care integrated within a specialist sexual health service	Authors report that the results of the study showed that this intervention was safe, feasible and acceptable Met national standards and regulatory requirements Clinical outcomes were comparable to usual care for individuals with chlamydia

innovative technologies (Chang & Lauderdale, 2009; Glied & Lleras-Muney, 2008; Korda et al., 2011; Yao et al., 2022). These studies demonstrate that early adopters benefit most from the introduction of innovative health technologies. This exacerbates inequalities in health where they were previously very low or non-existent. In some cases this may even result in an inversion of these inequalities. Evidence for this phenomenon is further substantiated by studies that show greater inequalities in health among any populations who have health conditions for which efficacious preventive or treatment interventions have been developed (Phelan et al., 2004).

Other factors that have been identified as being important include (Yao et al., 2022) (i) age as a determinant of whether digital health technologies are or are not used, especially in the older adult population (ii) race and ethnicity; the positive impact of eHealth or mobile health initiatives being limited in Black communities (iii) accessibility; individuals residing in rural areas are affected by poor access to and the limited availability of digital health technologies as a consequence of limited internet broadband coverage (iv) socioeconomic status; differences exist in the acquisition and adoption of health technologies by different groups of individuals based on a combination of income and education and (v) individuals who have poor health; the presence of health conditions have been observed to hinder access to health technologies. This is as a result of limited access at a physical level or due to lack of confidence in health advice and health decision-making at a psychological level.

Health inequities are reported to be reflected in two aspects (Yao et al., 2022). First, access to and availability of health technologies by different social groups with studies reporting unfair distribution. This has come to be known as the '*digital divide*' where those who can access such interventions are separated from those who cannot. Second, impact on health outcomes due to a lack of or limited access to digital health technologies. Studies report impacts on disease incidence rates and mortality highlighting long-term health conditions. A good example here would be that the average blood sugar level of diabetic patients who use innovative health technologies is generally lower

or the limited utilisation of robotic lobectomy due to sociodemographic factors which leads to significant treatment differences in patients with lung cancer.

Several automated but 'low tech' interventions have been used for many years in the care of people with ID (Sheehan & Hassiotis, 2017). Such interventions include alarm systems that monitor activity and behaviour e.g., a door sensor that generates an alert when a vulnerable person leaves the house at night. Newer technologies e.g., wearable smart devices may help people with ID manage their physical health with the help of tele-monitoring and remote management (Langkamp et al., 2015). At the time of writing there were currently two apps available with a specific focus on ID (Sheehan & Hassiotis, 2017) (i) 'My Health Guide' is an electronic health passport that supports information sharing and understanding—this is being trialled in United Kingdom (UK) health services and (ii) 'My Choice Pad' which contains signs and symbols which can be used to support communication.

More recently a published study reported on the use of Smart phones by people with ID (Arun & Jain, 2022). This study found that people with ID can learn information like others if there is availability of Smart phones during the daytime and proper training and assistance provided by parents or sibling (Arun & Jain, 2022). A project exploring the use of artificial intelligence to improve the health and wellbeing of people with ID was started in 2022; the DECODE project (National Institute for Health and Care Research: DECODE, 2022) (Data-driven machine-learning aided stratification and management of multiple long-term COnditions in adults with intellectual disabilities). This project is using machine learning aided analysis of multiple long-term conditions in people with ID (National Institute for Health and Care Research: DECODE, 2022).

Health Inequalities in People with Intellectual Disabilities

Intellectual disabilities are lifelong conditions that manifest during the developmental years and are characterized by limitations in adaptive functioning and

below-average general intellectual function (Salvador-Carulla et al., 2011). People with ID have lifelong deficits in cognitive and adaptive functioning that impinge on a variety of everyday activities (*American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-5).*, 2013). Studies report the global prevalence at around 1% (McKenzie et al., 2016); approximately 1.5 million adults in England have ID. ID has significant and well-documented impact on health and well-being (Beange et al., 1995; Beange & Bauman, 1990; Forsgren et al., 1996; Lennox & Kerr, 1997; Van Schroyen et al., 1997). People with ID have a significantly reduced life expectancy compared to the general population. Premature deaths are 42% higher for this group of people when compared to the general population (Heslop et al., 2013).

People with ID are at higher risk of developing physical health conditions compared to general population, including diabetes, hypertension, hypothyroidism and cardiovascular disease (CVD) (Heslop et al., 2013). The incidence of risk of factors for these health conditions is also higher. For example, the incidence of obesity, a known risk factor for diabetes, is higher in people with ID with 37% having a body mass index over 30 compared to 30.1% in the general population (*NHS Digital. Series/Collection. Health and Care of People with Learning Disabilities Experimental Statistics, Other Reports and Statistics.*, 2022). People with ID have higher rates of hospital admissions resulting from diabetes related conditions that could be managed in an outpatient or community setting (Balogh et al., 2015). Thyroid disorders are associated with insulin resistance which has been reported to be the major cause of impaired glucose metabolism in type 2 diabetes. People with ID are twice as likely to have hypothyroidism compared to the general population (*NHS Digital (2019) Health and Care of People with Learning Disabilities: Experimental Statistics: 2017 to 2018, 2019; Public Health England. Health Inequalities: Thyroid Disorders.*, 2019).

The aim of the UK Confidential Inquiry into the Deaths of People with LD (CIPOLD) (Heslop et al., 2013) was to review the patterns of care that people with ID received in the period leading up to their deaths. This was done to identify errors or omissions contributing to these deaths and to provide improved evidence on avoiding premature death. The report explicates factors that contribute to the increased

vulnerability of premature death that people with ID experience. There are inequities in access to health care at all points including disease prevention, screening, diagnosis, monitoring and interventions. This is substantiated by other reports and research with evidence of “diagnostic overshadowing” also being prevalent (Merrick & Merrick, 2007).

Health Checks for People with Intellectual Disabilities

The implementation of health checks has been recommended internationally (Robertson et al., 2014) as one component of government health policy measures to try to improve the identification and subsequent management of health conditions (Robertson et al., 2014). In the UK this takes the form of the Learning Disability Annual Health Check (*Guidance. Annual Health Checks and People with Learning Disabilities*, 2016). The concordance of general practitioner (GP) surgeries to provide this health check in primary care is monitored by primary care organisations.

The health check is comprised of various parts (A Summary and Overview of the Learning Disability Annual Health Check Electronic Clinical Template, 2017) including functional life skills, cancer screening and sexual health. A baseline assessment includes physical health checks for body mass index, blood pressure and elements of health promotion. Major organ systems (e.g., cardiovascular system) and long-term conditions (e.g., diabetes) are also reviewed as part of this comprehensive health check. Various blood tests may be requested either prior to or following a health check, as is relevant to the patient’s current health status and background medical history. These blood tests can provide valuable additional information when planning further care. Currently, there are no quality of life (or similar) outcome measures stated in the health check.

Evidence suggests that the provision of health checks to people with ID in primary care is effective in identifying previously unmet, unrecognised and potentially treatable health conditions including those associated with premature mortality (*Public Health England. Annual Health Checks for People with Learning Disabilities*, 2010) (see Table 2 for examples) and therefore addressing inequities in delivery of healthcare (*Public Health England.*

Table 2 Examples of studies which provide direct evidence for the role of health checks in identifying unmet physical health needs, interventions and related health gains for people with intellectual disabilities

Setting	Principle demonstrated	Details of population of people with ID and outcomes
Primary care UK	Unmet needs	GP/practice nurse health check (Martin et al. 1997a, b) Total of 79 people with ID 66 (84%) were found to have a previously undetected medical condition, with a high prevalence of ear wax (35%), cardiovascular problems (18%), endocrine problems (6%) and the need for minor surgery (8%)
Range of settings UK	Interventions	Health checks conducted in a range of settings for 568 adults and children with ID (McConkey and Moore 2002) led to 318 (54%) being referred to their own GP for further assessment and treatment for reasons including blood pressure and hypertension (7%); eye problems including cataracts (4%); blood tests (5%); and blood lipid checks (5%)
Day centre UK	Health gains	Study explored health outcomes of health screening for 35 adults with ID at a community nurse-led drop-in session at a day centre (Hunt et al. 2001) Health gains over a period of 12 months included: A total weight loss of 157 lb (range 4–20 lb) for 25 individuals who had been identified as overweight or obese Constipation relieved (n=3) Being treated for anaemia (n=4), hypothyroidism (n=2), and diabetes (n=1)
School for individuals with special needs Australasia	Unmet needs	32 adolescents with ID (Lennox et al. 2008) 'Comprehensive Health Assessment Programme' (CHAP) implementation resulted in: 134 unmet health needs were identified (mean 5.1, range 0–9) The most common problems noted were inadequate immunization, need for blood tests, abnormal weight (overweight (n=3), obese (n=3) and underweight (n=10)) and dental conditions (n=8)
School for individuals with special needs Australasia	Interventions	Use of the CHAP with 32 adolescents with ID resulted in 37 planned GP actions (mean 1.4 per participant) (Lennox et al. 2008) Most frequent actions were: Referrals to medical specialists (n=6) Blood tests (n=6) Dental review (n=4) Tetanus immunisations (n=3)
Primary care United States of America (USA)	Unmet needs	An in-home intervention comprised of a comprehensive geriatric assessment by an advanced practice nurse for 70 people with ID (Hahn and Aronow 2005) 365 health problems were identified requiring intervention (mean 5.2, range 1–14) Those identified for 10% or more of participants were: obesity (34%); constipation (21%); overweight (17%); seizure disorder (17%); incontinence (16%); sleep (14%); arthritis (11%); hypertension (11%); cardiovascular problems (10%); and underweight (10%)

Annual Health Checks for People with Learning Disabilities, 2010). However, concerns have been raised about uptake, quality, and access of health checks (Robertson et al., 2014). Data collected

between 2014 and 2015 indicates that only 43.2% of people with ID had a health check (*Official Statistics Health and Care of People with Learning Disabilities: 2014 to 2015*, 2016). Systematic reviews

(Robertson et al., 2011, 2014) report barriers from healthcare professionals' perspectives include the implementation of health checks themselves but also actions in response to needs identified by the checks.

For people with ID, barriers to attending health checks include arranging an appointment at a time and place that is convenient to the person with ID as well as their informal carer who may need to attend with them. Furthermore, associated issues around travel (e.g., transportation cost) and feeling nervous when attending for a check which is exacerbated by longer waiting times and a lack of provision of information in an accessible and easy to read format.

Reviews of evidence (Robertson et al., 2011, 2014) also highlight the importance of the need to address gaps in service including the need to increase awareness of the needs of people with ID amongst health professionals and enhancing support worker and organisational knowledge. Reasonable adjustments suggested in national UK guidance (*Guidance Blood Tests for People with Learning Disabilities: Making Reasonable Adjustments—Guidance.*, 2017) to tackle these issues include preparing the person with ID and identifying and addressing their needs. This is also crucial in enabling the person to give informed consent. Avoidance (e.g., using alternative routes to needles such as a nasal spray for a vaccine), amelioration (application of topical anaesthetics to numb the skin) and clinical holding are also suggested (*Guidance Blood Tests for People with Learning Disabilities: Making Reasonable Adjustments—Guidance.*, 2017). However, despite the robustly evidenced need for blood tests there is a lack of published research into strategies to directly or indirectly address the barriers to getting them done (Robertson et al., 2014).

Point of Care Testing

In parallel with global initiatives in health promotion and to reduce the impact of modifiable risk factors for health conditions attention has been focused on the adoption of health technology to improve disease prevention, screening, diagnosis, monitoring and interventions (Fink et al., 2014; Next Steps on the NHS Five Year Forward View., 2017). POCT is testing that is performed near or at the site of the patient and be used to process basic biochemistry and haematology.

POCT is not new, but advancements mean that a greater range of parameters can be assessed/checked. Devices are now smaller in size, the collection of samples is less invasive with the equipment being less complex to use, and people have been able to use them to monitor their own health conditions (Luppa et al., 2016).

Benefits of POCT reported in the literature in community-based and primary care settings include shorter time to clinical decision making as results of tests being available much quicker or immediately, improved self-care management, for example, through better glycaemic control. Also, improved monitoring of medication thus enabling practitioners to change medication on the spot in response to results (Fink et al., 2014). Studies report high levels of satisfaction with the use of POCT among patients (Al Hayek et al., 2021) healthcare professionals (Faulds et al., 2021; Shephard et al., 2012) and decision-makers in healthcare (Shephard et al., 2012). One large multicentre, randomised, controlled trial (Laurence et al., 2010) reported statistically significant greater satisfaction amongst patients who had POCT. In addition, the use of POCT had a more positive effect on their relationship with their GP compared to having venepuncture for blood tests. POCT could be beneficial where access to a laboratory is not feasible, practical or readily available e.g., community-based healthcare settings such as community pharmacy settings (Albasri et al., 2020).

POCT uses minimally invasive approaches to sampling often requiring only a capillary sample or very small venous sample. Prior to the availability of POCT the most common method for taking bloods was venepuncture which involves a needle being inserted into a vein. POCT devices are often compact and mobile and can be used outside a traditional clinical setting, for example, in a patient's home. Despite these advantages, implementation of POCT in clinical practice is not widespread (Lingervelder et al., 2021). Barriers identified for utilisation of POCT in clinical practice for the care of patients include concerns about balance between cost and benefits, accuracy of results and managing the quality assurance requirements (Shaw, 2015).

POCT is generally more costly than traditional laboratory-based testing (e.g., device cost, reagents for validating instruments, quality control materials, proficiency testing costs, creating an interface

between POCT devices/software and patient electronic medical record, staff training, cost of the time clinical scientists to support and facilitate). However, this must be balanced against cost savings for missed appointments and potential costs, health benefits and impact on therapeutic alliance between the patient and the healthcare professional of treating previously undetected and unmanaged health conditions.

Other disadvantages cited for POCT (*Management and Use of IVD Point of Care Test Devices*, 2021) include inadequate quality of analysis, poor record keeping, lack of result interpretation, unnecessary duplication of equipment, failure to detect erroneous results, data recording may be complex and less robust—less recording of results in patient records. Many of these can be overcome by robust selection and procurement of POCT devices validated for clinical use and standard operating procedures with oversight from appropriate professionals (e.g., clinical scientist) and training of staff.

Guidelines on the provision of health checks for people with ID were reviewed in 2017 and POCT is now included as an option for obtaining blood tests for health checks, but scant information has been provided on the practical use for people with an ID or in community ID settings (A Summary and Overview of the Learning Disability Annual Health Check Electronic Clinical Template, 2017; Step-by-Step Guide to Health Checks for People with a Learning Disability, 2017). POCT is available for clinical use for many of the blood tests listed in these guidelines including glycosylated haemoglobin (HbA1c), serum lipids, urea and electrolytes, thyroid stimulating hormone and full blood count. These tests are essential for screening and diagnosis for many long-term conditions including diabetes, thyroid diseases and CVD as well as a necessary part of the metabolic and cardiometabolic monitoring of medication that might be prescribed for people with ID e.g., antipsychotics.

Point of Care Testing for Blood Tests in People with Intellectual Disabilities

Blood tests using venepuncture can cause anxiety for people with ID (Martin et al., 1997a, b; Perry et al., 2010). Studies which involved talking to people following a health check found that whilst most of them

(81%) liked seeing their doctor, over a third (34%) indicated a dislike of needles or refused a blood test (Martin et al., 1997a, b). CIPOLD (Heslop et al., 2013) found that almost a sixth (16%) of people with ID were described as having a significant fear of contact with medical professionals such that it might affect healthcare interventions. This included a fear of needles, and it designated addressing needle anxiety a priority (Heslop et al., 2013). Reasonable adjustments recommended to support blood tests using venepuncture (*Guidance Blood Tests for People with Learning Disabilities: Making Reasonable Adjustments—Guidance*, 2017) include desensitisation, amelioration using topical anaesthetics and clinical holding. POCT is also recommended as a reasonable adjustment (*Public Health England. Guidance Blood Tests for People with Learning Disabilities: Reasonable Adjustments Case Studies*, 2017).

POCT uses a small volume of capillary blood usually from a finger prick sample and is therefore not as intrusive and painful as venepuncture (Hoffman et al., 2023), testing can be undertaken in a range of settings and by a range of healthcare professionals (Lei & Prow, 2019; *Management and Use of IVD Point of Care Test Devices*, 2021). This availability of a minimally invasive tool for diagnosis or screening and its potential role for vulnerable or in those groups where utilisation of venepuncture has proved challenging raises the question of whether this might be of value for people with an ID.

As far as we are aware there is one published research study on the use of POCT for blood tests for people with ID (Giles et al., 2020). Participants in this study were people with ID and healthcare professionals. Informal carers were not included in this study. Analysis of qualitative data collected from participants identified a lack of awareness and experience of POCT. Also, on seeing the devices and discussing their use there was strong support and acceptability for their use so long as individual needs were addressed (Giles et al., 2020). In this study strategies identified for successful use of POCT devices included the use of specific adjustments e.g., the presence of a known informal carer, pre-testing information in an appropriate format and accounting for individuals' preferences (Giles et al., 2020).

A systematic review of the experiences of people with ID of primary care health checks, screenings and GP consultations is that people with ID wanted to be

given choice, control, and support in managing their health. Empowerment and disempowerment, communication, interpersonal factors and access and adaptations were also reported as being important (Gregson et al., 2022).

Long-term health conditions, which POCT testing could support, are more prevalent in people with ID. Diabetes, necessitating HbA1c to diagnose and manage, is more prevalent in people with ID than the general population (McVilly et al., 2014). People with ID are estimated to be two to three times more likely to develop diabetes compared to the general population (Emerson, 2011; MacRae et al., 2015; Oyetoro et al., 2023). Furthermore, people with ID have higher rates of hospital admission due to diabetes-related conditions that are usually managed in the community or in primary care (Dunn et al., 2018).

However, given the high rates of refusal and not being able to obtain samples of blood as discussed earlier in this article, we postulate that published data on prevalence of long-term health conditions that necessitate blood tests might not be accurate. Indeed given the high prevalence of associated conditions such as obesity, then published data may underestimate the true prevalence. This provides another potential application of POCT; if the use of POCT for assessment of pre-diabetes or diabetes is acceptable for those who would otherwise refuse venepuncture then this may facilitate the provision of more robust and accurate data on the prevalence of diabetes and other conditions e.g., CVD. This could then inform future research and health provision.

What is also not known is whether clinicians' choice of treatment or intervention is altered by their lack of ability to conduct regular blood tests in people with ID because venepuncture is their only currently available option, and this option is not acceptable to or refused by the person with ID. There may also be additional advantages for healthcare services and clinicians in resulting in reduced frequency of unattended or missed appointments.

The paucity of published studies means there is a lack of published evidence to support implementation or effectiveness of POCT for people with ID. This lack of evidence represents an additional contributory factor for health inequality in this vulnerable population.

Studies carried out in healthcare professionals exploring the use of POCT in the general population (Huddy et al., 2021) report that barriers, other than those cited earlier in this article, to their use include availability of patient-level data to demonstrate that the use of POCT can make a difference to patient care within a population. Factors that might facilitate use of POCT includes data from local pilot studies to show that a POCT programme can work in a particular local practice (Huddy et al., 2021).

Data on the extent of POCT for blood tests for individuals in the general population are difficult to get hold of due to the wide range of tests available and the broad range of contexts in which they can be used. A cross sectional study of five countries conducted in 2014 reported (Howick et al., 2014) that whilst only 17% of 1109 respondents surveyed were using POCT for HbA1c, 61% indicated that they would like to use it in the future if it were available to them in their practice. However, comparisons between the general population and people with ID might not be helpful as there are many differences between these groups e.g., needs, extent and prevalence of long-term health conditions and rates of refusal of blood tests and fear of needles.

Between 1999 and 2016 at least 29 high quality studies have been carried out (Schnell et al., 2017) exploring the use of POCT for HbA1c in the general population. In these studies the following areas were explored diabetes management, treatment adaptation, glycaemic control, patient satisfaction, cost effectiveness and accuracy. This provides an indication of the extent of research conducted using POCT for a long-term condition in the general population.

A recent meta-analysis reports global prevalence of ID as ranging from 0.05 to 1.55% (McKenzie et al., 2016). According to NHS England data from 2019 (*NHS England and NHS Improvement. Performance against the Learning Disability Improvement Standards Findings from the Benchmarking Exercise.*, 2019) there are a total of 213 organisations that identify themselves as a specialist ID service provider. Using data from Public Health England (2016) and population data from the Office for National Statistics (2020) MENCAP state that there are 1.5 million people with an ID in the UK (*MENCAP. How Common Is Learning Disability?*, n.d.). Data that might be used to try and understand the potential applicability of POCT for people with ID is not easily accessible.

For example, the number of blood tests conducted as part of the health check, the number of blood tests that were indicated as part of the health check but refused or the number of blood tests that necessitated the use of reasonable adjustments due to anxiety or fear of needles used for venepuncture. An internet search revealed that there are two NHS trusts in the UK using POCT for blood tests for physical health, however, data associated with this could not be found (*Guidance Blood Tests for People with Learning Disabilities: Making Reasonable Adjustments—Guidance.*, 2017).

In December 2017 the UK government's Secretary of State for Health and Social Care commissioned 'The Topol Review: Preparing the healthcare workforce to deliver the digital future', as part of the draft health and care Workforce Strategy for England to 2027 (Topol, 2019). The review advises on key aspects of digital health in the NHS, for example, 'how technological and other developments (including genomics, artificial intelligence, digital medicine and robotics) are likely to change the roles and functions of clinical staff in all professions over the next two decades to ensure safer, more productive, more effective and more personal care for patients.' The main review was published in 2019 (Topol, 2019) with a separate report on mental health stakeholder engagement to inform the main review (Foley & Woollard, 2019). People with ID or the needs of people with ID were not mentioned in either report.

Recommendations

Greater evidence is needed relating to process of POCT device selection, uptake, and impact as well as views of people with ID and informal carers. To this end the authors of this review would like to make the following recommendations:

- Encourage that health services or academic institutions to disseminate data from pilot or small-scale studies of POCT in people with ID.
- Call for robust mixed methods, qualitative and quantitative peer reviewed research exploring the use of POCT in people with ID and its impact on outcomes for health and wellbeing. This should include all key stakeholders i.e., people with ID,

their informal carers, and a broad range of health-care professionals (e.g., doctors, nurses, pharmacists). Specific outcomes that could be included in such studies include pain scoring using an appropriate formal pain assessment tool and/or distress experienced by people with ID with the use of POCT compared to traditional venepuncture. Also, an exploration as to whether the severity of ID has any effect on the acceptability of POCT when compared to traditional venepuncture.

- National consensus guidelines on the use of POCT in people with ID to support use for the annual health check.
- Improved access and awareness for healthcare professionals and NHS trusts that provide care for people with ID.
- Accessible information for people with ID and their informal carers about POCT.
- Recognition by researchers and ID specialists that the use of POCT for blood tests may have implications beyond the annual health check. For example, it may provide real world data on the true prevalence of physical health conditions which has otherwise been absent from the evidence base due to the high rates of refusal of traditional venepuncture. This may in turn facilitate service provision for these conditions.
- Future reviews conducted, similar to the Topol review, should include a specific and separate focus on people with ID.

Conclusions

People with ID are at higher risk of long-term physical health conditions including diabetes and CVD. However, data on use of POCT for blood tests is sorely lacking. This represents a significant health inequality, and little is known about the impact of POCT in disease prevention, screening, diagnosis, monitoring, interventions and prognosis for this population.

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