

Health, Education and Prosperity for All: Wales as a Health Literacy Testbed

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This review explores the concept of health literacy with particular focus on children and young people within the context of research, policy and strategy in Wales. For the purpose of this review, children and young people are defined as those aged 0-16, from birth to the end of compulsory education.

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What is health literacy?

The field of health literacy, a term first proposed in the 1970s [1], has grown exponentially over the last few decades and received significant international policy focus in recent years. Whilst multiple definitions exist globally [2], the definition adopted within Wales in 2010 is “*the ability and motivation level of an individual to **access, understand, communicate and evaluate** both narrative and numeric information to promote, manage and improve their health status throughout their lifetime*” [3]. Health literacy is a modifiable factor that contributes to the promotion and maintenance of health and well-being throughout an individual’s life [4]. It encompasses a range of areas including health behaviours and lifestyle factors, health information and health services use, prevention, primary and secondary care and management of health conditions [5].

The conceptualisations of health literacy have primarily been developed based on the fields of public health and health promotion, and social sciences with a focus on information literacy and decision making. General literacy, “*the ability to read, write, speak and listen in a way that lets us communicate effectively and make sense of the world*” is required to effectively function and participate in society, and is one of the strongest predictors of overall health status [6,7]. The World Health Organization (WHO) have identified health literacy as a global priority, advocating that health literacy, like general literacy, should be viewed as a right and a fundamental competency necessary to function within modern society [8].

One of the foundational health literacy models proposed by Nutbeam in 2000 [9] and adopted within Wales [3] comprises of three domains: *functional, interactive and critical*:

- *Functional*: basic reading, writing and numeracy skills to understand health-related information.
- *Interactive*: more advanced cognitive literacy skills that enable an individual to interpret, extract and apply information from different forms of health communication.
- *Critical*: critically analysing and using health information to exert greater control over one’s health and life.

The health literacy needs of a population vary and are dependent on contexts, communities and populations. The WHO state that strengthening health literacy is a lifelong process and building the foundations for health literacy should begin in early childhood with a focus on education settings [10]. Childhood is a period of significant formative development, where knowledge, skills and capacities impacting health are acquired and health behaviours are established which can be tracked into adulthood. The WHO advocate embedding health literacy within educational frameworks and school curricula, involving all stakeholders (including learners, teachers, school staff, parents, health workers and politicians), through a process of development, implementation and evaluation [11].

In Wales, children and young people have been identified as a priority group in recent policy and Parliamentary Reviews [12,13]. Monitoring and tracking the health literacy needs of children and young people requires scalable and sustainable data collection and infrastructure. This can be used to inform the tailored design and evaluation of health literacy interventions at local, regional and national level, and identify policymaking priorities. At present, there is a significant gap in data and understanding of the health literacy needs within children and young people.

Why does health literacy matter?

Whilst data for Wales and the UK, and specifically children is lacking, a growing body of European and international evidence demonstrates the importance of health literacy on a range of health outcomes and healthcare savings costs. Data from across Europe suggests that between one half and one third of the population have low health literacy, those with low health literacy struggle to manage health information relevant to themselves and others in different contexts, for example disease prevention, health promotion, and health care [14]. Low health literacy of UK adults is associated with lower self-reported health status, and has been linked to poorer nutritional habits (i.e. fruit and vegetable consumption) and smoking status independent of age, education, gender, ethnicity and income [15].

International evidence suggests lower health literacy is associated with higher hospital admissions, duration of hospital stay and likelihood of readmission [16]. It is also a key factor in the management of long-term health conditions [17]. As such, low health literacy is a driver of higher healthcare costs and the NHS in Wales is the Welsh Government's largest area of expenditure. A significant cause of emergency hospital admissions in Wales is due to largely preventable non-communicable diseases (NCDs) [18]. Modifiable lifestyle factors increase risk such as smoking, poor nutrition and physical inactivity [19]. Health literacy is thus an important tool in the prevention and management of NCDs which are responsible for the majority of chronic diseases and nearly three quarters of deaths worldwide [20]. Reducing the impact of low health literacy on the health service is essential and has potential in large healthcare savings.

For children, childhood obesity and physical inactivity are two of the most significant risk factors for non-communicable disease prevention [21]. This is of great concern in Wales where over a quarter of children are overweight or obese and almost half of children (49%) do not meet physical activity guidelines [22]. Evidence has demonstrated a link between low health literacy and excess body weight, overweight and obesity in children [23], and children who engage in physical activities exhibit higher health literacy scores [24].

Importantly, one of the greatest potential outcomes of improving population health literacy is reducing health inequities and inequalities, which is a key priority in Wales. Health literacy is unequally distributed across populations, mirroring the social gradient of wider health outcomes and health behaviour research [25]. European evidence demonstrates that the highest

proportions of low health literacy are observed amongst the lowest socioeconomic groups, those with the lowest education and the poorest health outcomes [25]. The strongest predictors of low health literacy are financial deprivation, social status and education. As such, health literacy is recognised as a social determinant of health [26].

Given the prominence and importance of education in health literacy outcomes, this should also be considered in the context of education in Wales, especially with ongoing major education system-level reforms currently taking place, such as the start of the new *Curriculum for Wales (CfW)* from September 2022 [27,28]. Whilst PISA scores in Wales have stabilised (science/reading) or improved (mathematics) in the latest available data (2018), scores remain the lowest in the UK, Wales are outperformed by international counterparts and the deprivation gap persists [29,30]. The potential of improving health literacy to reduce health inequalities and inequities in Wales was highlighted in the 2010 scoping review and remains as pertinent now. Citizen-centred health literacy is not only a key goal of public health and health promotion, but a wider social policy responsibility and population priority [1].

Health literacy in policy and strategy

A global lens

At an individual level, adequate health literacy provides the resource for informed decision-making regarding health choices, behaviours and social determinants of health. However, health literacy is not the sole responsibility of individuals. Achieving high levels of health literacy requires the support of communities, settings, and government, and is influenced by societal and political contexts and priorities.

Health literacy is increasingly becoming commonplace within European and global policy, and the WHO advocate that governments should prioritise achieving a high level of health literacy as an explicit goal within both health and education policy [10]. It is viewed as a crucial pillar in achieving the 2030 UN Sustainable Development Goals, and the WHO put forward a mandate for health literacy [8]. It is discussed in the European Commission's *Together for Health* [31] in relation to citizen empowerment and as a priority area of the WHO Regional Office for Europe's *Health 2020: a European policy framework* [32]. Furthermore, the WHO Regional Office for Europe developed a roadmap to guide and support policymakers, organisations and communities in the adoption and implementation of policies or strategies on health literacy [33]. This recognises health literacy as an enabler of public health strategies and in achieving goals and outcomes of strategy and policy. In response, several countries have introduced health literacy action plans including Germany, Austria, Australia and Scotland [34]. No such health literacy investment or action plan currently exists in Wales, though the development of local, regional and national health literacy action plans, informed by the creation of a health literacy strategic taskforce could support this and be trialled regionally through the Swansea Bay City Deal [35].

The Welsh landscape

Overview

Identified as a priority in Wales in 2010 [3], the authors of the scoping review called for “*a long-term vision and commitment to measure health literacy at population level*” and noted an absence of evidence-based interventions that can achieve the goal of optimising and enhancing health literacy for all. Since this publication and despite international growth, nothing concrete has yet been implemented. Whilst we have seen wider education and public health developments and a policy and strategy shift across a range of domains spanning health and social care, well-being, economy and education, the prominence of health literacy as an explicit and distinct concept within policy and strategy has stalled. However, improving population health literacy provides strength in achieving policy visions and strategy goals.

Most recently (2022) it was identified as an Area of Research Interest (ARI) by the Senedd Cymru/Welsh Parliament’s Health and Social Care Committee to support work in line with the strategy for the Sixth Senedd [36,37]. *Increased levels of health literacy* is highlighted as a tool in achieving the strategy vision, through which *health inequalities and inequities* is a cross-cutting theme. Key pieces of health and social care, economy and education policy and strategy are summarised with focus on health literacy as an indirect enabler in achieving policy or strategy impact.

At the time of writing, this policy focus is framed in the context of challenging financial and budgetary environments at all levels of government and range of public services, especially in Wales [38]. In particular, we have seen the ongoing system-level financial impact of the COVID-19 pandemic and how this has been felt across the health and social care system in Wales. Furthermore, recent short-term investments in the health system by the Welsh Government appear to focus on specific priority areas to address immediate system-level pressures [39], with perhaps less focus on areas that could support and develop health literacy [40].

Health and Social Care

Following the 2010 scoping review, the Fairer Health Outcomes for All: Reducing Inequities in Health Strategic Action Plan (2011) was published as part of the Our Healthy Future strategic framework for public health [41]. This strategy, underpinned by prevention and early intervention, outlines a set of practical actions to reduce health inequities, one of which constitutes *Improving health literacy*. A central theme was giving children and young people a good start in life that supports their long-term health and wellbeing, reflecting priorities set out in the Marmot Review [42]. However, the full action plan is no longer available to view online.

A Healthier Wales (2021) [12] sets out a vision for “*keeping people healthy and well*”. It focuses on prevention and self-management, placing “*greater emphasis on preventing illness, on supporting people to manage their own health and wellbeing*”, with a clear citizen- and patient-

centred focus and the opportunity for co-creation and co-production of place-based health outcomes. This is encouraged through individual choice, control and autonomy in relation to lifestyle factors including smoking, diet and exercise, advocating for greater individual responsibility. Managing individual health and wellbeing requires individuals to make informed decisions regarding their actions and behaviours that impact their health status and wellbeing. A level of adequate personal health literacy is fundamental in order to **access, understand, communicate and evaluate** health-related information, though health literacy is not addressed within the plan. For children and young people, it recognises the importance of the CfW to build insights and knowledge development relating to lifestyle factors, especially with prominence of health and wellbeing in the new curriculum, driven by its four overriding purposes including *healthy, confident individuals* [43].

The *Well-being of Future Generations (Wales) Act 2015* [44] is a legally binding commitment to improving the well-being of people in Wales. Two of the seven wellbeing goals relevant to health literacy are *A healthier Wales* and *A more equal Wales*, alongside the five new ways of working. Progress is measured through national indicators, for example, *Percentage of adults/children with two or more healthy lifestyle behaviours*, this indicator is heavily reliant on health literacy, though no explicit mention of the term is included within the guidance and children are only assessed aged 11 and above.

The Public Health Outcomes Framework: Measuring the health and well-being of a nation (2016) [45] places significant focus on prevention, inequalities and inequities and the social determinants of health, these are all strongly correlated with health literacy. A key theme that directly aligns to the field of health literacy is *Individual responsibility - empowering and enabling people to take personal responsibility for improving their own health*. However, there lacks explicit mention of health literacy. This is likely due to a lack of measurement of health literacy in which to base and track outcomes and indicators. Developing a national measurement of health literacy, as highlighted within the 2010 scoping review would strengthen the power of assessment and priority tracking within the Public Health Outcomes Framework.

Economy

Prosperity for All [46], the Welsh Government's 2018 economic action plan demonstrates a clear commitment to promoting health and building healthy communities. With *Healthy and Active* one of four key themes underpinning this strategy, it recognises the links between building skills, employment and economic outcomes with improved health outcomes. This views health and well-being as one of the fundamental drivers and products of economic growth and prosperity for all, reflected further through another of the strategy's theme; *Ambitious and Learning*. One of the foundations for children and young people's skill development necessary for future employment is education, whilst educational attainment also predicts future health outcomes and is strongly associated with health literacy [47]. Thus, health, wellbeing and education are closely linked [48].

The strategy recognises the critical role of schools in embedding healthy and active behaviours and lifestyles. This can be achieved through optimising children’s health literacy as a social determinant of health and employment, and using education as a tool through the CfW to increase health literacy and drive children’s life trajectories. On the contrary, inadequate health literacy can have significant economic implications, placing additional pressure on an already overburdened health and social care system and services, negatively impacting the labour market and achieving true prosperity for all.

Education

Health literacy is not the sole responsibility of individuals. Societal and structural influences such as educational settings shape the choices of individuals [49][50]. Educational settings have been highlighted as one of three key areas of intervention for targeting approaches to enhance the health literacy of school-aged children [51]. Last year the WHO recognised formal education as a key driver in shaping health literacy interventions [52]. From an early age, children and young people can be provided the knowledge, skills and capacities to be empowered to make decisions that positively impact their health.

The most promising avenue for strengthening the health literacy of children in Wales is through ongoing significant national education reforms and the CfW [43], which sets out the guidance for learners aged 3 to 16 for a broad and balanced education. The wider vision of the curriculum is underpinned by *Four Purposes*; “*the starting point and aspiration for every child and young person in Wales*”, one of which is *healthy, confident individuals who are ready to lead fulfilling lives as valued members of society*. Adequate health literacy plays an important role in achieving this purpose, and health literacy is reflected within curriculum guidance, for example:

- *Apply knowledge about the impact of diet and exercise on physical and mental health in their daily lives*
- *Know how to find the information and support to keep safe and well*
- *Take measured decisions about lifestyle and manage risk*
- *Have the skills and knowledge to manage everyday life as independently as they can*

Another key development towards health literacy education policy prominence is the renewed statutory focus on *Health and Well-being* as one of six distinct curriculum areas of learning and experience. Within each area, the curriculum framework is guided by the statements of what matters, for *Health and Well-being* these are;

- *Developing physical health and well-being has lifelong benefits*
- *How we process and respond to our experiences affects our mental health and emotional well-being*
- *Our decision-making impacts on the quality of our lives and the lives of others*
- *How we engage with social influences shapes who we are and affects our health and well-being*

- *Healthy relationships are fundamental to our well-being*

Guidance on progression through the continuum of the *Health and Well-being* curriculum area are provided within the *descriptions of learning*. The development of health literacy from *functional, interactive* to *critical* domains is fundamental to learning progression. Tracking measures of health literacy offers potential to assess learner progression along their continuum of learning from ages 3-16. The WHO state that addressing health literacy of children and young people in schools strengthens learning, health and well-being, and improves life-long learning [11]. This has implications for another of the *Four Purposes* within the *CfW*, specifically the vision of *Ambitious, capable learners who are reading to learn throughout their lives*.

This education reform has seen a shift from a prescriptive national curriculum to one that offers autonomy to schools in local school-level curriculum design, reflecting the needs of its learners and wider community. In the case of health literacy, the WHO called for co-designed approaches, where the voices of users and of those who deliver interventions are incorporated into the design of health literacy services [52]. This is achievable in Wales, where schools can design curriculum areas aligned to their learners' health and wellbeing needs [53]. This is evidenced by national research platforms such as HAPPEN Wales¹ that are currently engaging with over 500 primary schools across Wales. Thus, this offers opportunities for co-creation and co-production of health literacy in Wales.

Education has long been regarded as a fundamental determinant of health, and educational settings as enabling environments. The *CfW* statutory focus on health and well-being offers an exciting opportunity to improve the collective health literacy of current and future generations. This is through opportunities for strengthened health education, alongside the development of knowledge, skills and capacities relating to *functional, interactive* and *critical* health literacy necessary for promoting and maintaining good health and quality of life. Schools across Wales could be viewed as "*health literacy arenas*", recognised by the WHO Regional Office for Europe as settings in which health literacy initiatives can be developed, carried out and evaluated. In order to be evaluated and the impact of the *CfW* to be tracked, measurement tools are required [33].

This focus on health literacy within the *CfW* is not restricted to impacting just learners in Wales. Health literacy is also a form of social and cultural capital [10,51], individual capability fostered through the *CfW* can be dispersed and transferred to families and communities through the concept of distributed health literacy [54]. Thus, this can enhance the collective health literacy and capacity of the population and empower them to act as informed participants in decision-making about their health and development [33,55]. This has also significant implications for achieving other policy and strategy visions including those in *A Healthier Wales* and *Prosperity for All*.

¹ www.happen-wales.co.uk

Health literacy in the context of COVID-19

The importance of health literacy through individual and collective decision making and agency was brought to the forefront during the COVID-19 pandemic, individuals were required to access, understand, appraise and apply pandemic-related information [56,57]. Thus, health literacy in the context of COVID-19 is significant as it played a role in empowering citizens and increasing community capacity, experts referred to health literacy as a “*social vaccine*” [58]. Research during this period highlighted the impact of the pandemic on children’s health behaviours and well-being [59,60]. Engagement in behaviours and adherence to public health measures and national guidance required a health literate society amongst a backdrop of scientific uncertainty [61]. Experts advocated that of the three domains of Nutbeam’s typology of health literacy, adequate *critical* health literacy was fundamental to achieve individual action for collective good [9,56]

For school-aged children, research conducted through HAPPEN Wales found a significant association between children reporting healthy behaviours such as eating breakfast, physical activity and sport club participation with being tested for, and testing positive for COVID-19 [62]. The authors suggested these findings may be indicative of proxy parental health literacy, parents with higher health literacy may be more likely to access, understand, interpret and apply pandemic-related information and for example, recognise their child’s infection symptoms and have the ability to access testing in healthcare settings. This reemphasises the importance of distributed health literacy.

Epidemic-infodemic: Key challenges and lessons from COVID-19

Reflecting on the challenges that emerged from COVID-19 and pandemic-related information enables the identification of priority areas within the field of general health literacy. In particular, the rapid spread of both valid and invalid pandemic-related information, termed an information epidemic (infodemic [63]), has implications for policy, public health and education. These include [56,64–66]

- Information overload, variation in messaging, how information was shared and by who. In the context of Wales, quality of bilingual health information must also be considered.
- The rapid spread of misinformation and disinformation, particularly through social media (digital health literacy).
- Uncertainty and hesitation of scientific knowledge and public health information, distrust of public health experts and politicians.

These remain ongoing challenges for policy makers and intervention implementers. Central to this is the need for simple, reliable, accessible and practical information [10]. Though this has been discussed more broadly, in the specific context of children and young people a key factor is education and curricula. The *CfW* offers opportunities to educate children and young people not only about reliable health information to encourage the adoption of healthy behaviours, but

develop general and specific health literacy skills from *functional*, *interactive* and *critical* relating to a range of narrative and numeric information.

The future of health literacy

Health literacy is a fundamental competency necessary to function within modern society. Increasing health literacy levels for the Welsh population offers one of the greatest potentials in reducing health inequalities and inequities, improving population outcomes and ensuring cost savings across the healthcare system. Wales has produced world-leading policy spanning health and social care, well-being, economics and education; Wales thus offers a tractable national-scale health literacy policy testbed. For children and young people, there are opportunities to for co-production and tracking of health literacy within existing Welsh policy, particularly through the CfW statutory focus on health and well-being and overarching curriculum purpose of developing *healthy, confident individuals*, strengthening the collective health literacy of current and future generations.

As progress has stalled since the 2010 scoping review and strategic action plans, it is important to reenergize health literacy as a national priority. This should be reflected as an explicit concept and goal within policy and strategy and inform the development of a national action plans, monitoring, tracking and data infrastructure. This dearth of health literacy assessment across segments of society in Wales, particularly in children, limits the ability to capture impacts of emerging policy and practice. However, Wales also showcases world-leading data and data infrastructure, and opportunities for population data linkage of health, economic, education and administrative data through the SAIL Databank [67,68] offer unique opportunities for Wales to position itself globally as a data-driven health literacy policy testbed.

This can enable cross-national and international comparisons and provide insight and understanding into what interventions, policies and strategies are required and to who, tailor interventions to target populations and to monitor and track the impact of these on individuals, communities and society.

Recommendations

This review proposes the following recommendations for consideration across research, policy and practice to build health literacy system capacity in Wales [69] :

- *Health literate citizens*: clear, long-term, citizen-centred health and social care policy focus on co-developing responsible health literate individuals in Wales.
- *Health literate systems*: strengthen research efforts, undertake robust and scalable research and capitalise population data linkage capabilities in Wales (e.g. SAIL Databank), enable national and international comparative data and insight.

- *Health literate policies*: explicit mention of health literacy in emerging policy and strategy, development of local, regional and national health literacy action plans, informed by the development of a health literacy strategic taskforce.
- *Health literate monitoring*: sustainable national assessment, monitoring and tracking of child health literacy. This can support health literate systems in addition to:
 - Assessment of learner progression within the Health and Wellbeing area of learning and experience
 - National impact evaluations of the *CfW* in enhancing health literacy
 - Understand the health literacy needs of children to inform the tailored design and evaluation of health literacy interventions at local, regional and national level
 - Identify and inform policymaking priorities and assess realisation of wider policy visions

References

- 1 Simonds SK. Health Education as Social Policy. <http://dx.doi.org/10.1177/10901981740020S102> 1974;**2**:1–10. doi:10.1177/10901981740020S102
- 2 Sørensen K, Van den Broucke S, Fullam J, *et al.* Health literacy and public health: A systematic review and integration of definitions and models. Published Online First: 2012. doi:10.1186/1471-2458-12-80
- 3 Puntoni S. Health Literacy in Wales A scoping document for Wales. Published Online First: 2010.<http://www.nap.edu/catalog/10883.html> (accessed 12 Jan 2023).
- 4 Gibney S, Bruton L, Ryan C, *et al.* Increasing health literacy may reduce health inequalities: Evidence from a national population survey in Ireland. *Int J Environ Res Public Health* 2020;**17**:1–17. doi:10.3390/ijerph17165891
- 5 Public Health England. Local action on health inequalities: Improving health literacy to reduce health inequalities. 2015. https://assets.publishing.service.gov.uk/media/5a80b62d40f0b62302695133/4b_Health_Literacy-Briefing.pdf (accessed 31 Oct 2023).
- 6 National Literacy Trust. What is Literacy? 2023.<https://literacytrust.org.uk/information/what-is-literacy/> (accessed 31 Oct 2023).
- 7 Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs. Health literacy: report of the Council on Scientific Affairs. Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, American Medical Association. *JAMA* 1999;**281**:526–7. doi:10.1001/jama.282.6.525
- 8 WHO. Health literacy. Heal. Promot. 2023.<https://www.who.int/teams/health-promotion/enhanced-wellbeing/ninth-global-conference/health-literacy> (accessed 26 Oct 2023).
- 9 Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int* 2000;**15**:259–67. doi:10.1093/HEAPRO/15.3.259
- 10 WHO Regional Office for Europe. Health literacy: The solid facts. 2013. <https://iris.who.int/bitstream/handle/10665/128703/e96854.pdf> (accessed 26 Oct 2023).
- 11 World Health Organization. Health literacy in the context of health, well-being and learning outcomes the case of children and adolescents in schools: the case of children and adolescents in schools. 2021. <https://iris.who.int/handle/10665/344901> (accessed 1 Nov 2023).
- 12 Welsh Government. A Healthier Wales: our Plan for Health and Social Care. 2021. <https://www.gov.wales/sites/default/files/publications/2021-09/a-healthier-wales-our-plan-for-health-and-social-care.pdf> (accessed 26 Oct 2023).
- 13 Welsh Government. The Parliamentary Review of Health and Social Care in Wales. 2018. <https://www.gov.wales/sites/default/files/publications/2018-01/Review-health-social-care-report-final.pdf> (accessed 31 Oct 2023).

- 14 Baccolini V, Rosso A, Di Paolo C, *et al.* What is the Prevalence of Low Health Literacy in European Union Member States? A Systematic Review and Meta-analysis. *J Gen Intern Med* 2021;**36**:753–61. doi:10.1007/S11606-020-06407-8/TABLES/3
- 15 Von Wagner C, Knight K, Steptoe A, *et al.* Functional health literacy and health-promoting behaviour in a national sample of British adults. *J Epidemiol Community Health* 2007;**61**:1086. doi:10.1136/JECH.2006.053967
- 16 Shahid R, Shoker M, Chu LM, *et al.* Impact of low health literacy on patients’ health outcomes: a multicenter cohort study. *BMC Health Serv Res* 2022;**22**:1–9. doi:10.1186/S12913-022-08527-9/TABLES/5
- 17 Edwards M, Wood F, Davies M, *et al.* The development of health literacy in patients with a long-term health condition: the health literacy pathway model. *BMC Public Health* 2012;**12**. doi:10.1186/1471-2458-12-130
- 18 Robbins AJ, Fowler AJ, Haines RW, *et al.* Emergency hospital admissions associated with non-communicable diseases 1998–2018 in England, Wales and Scotland: an ecological study. *Clin Med (Northfield Il)* 2021;**21**:e179. doi:10.7861/CLINMED.2020-0830
- 19 WHO. Noncommunicable diseases. 2023.https://www.who.int/health-topics/noncommunicable-diseases#tab=tab_1 (accessed 26 Oct 2023).
- 20 WHO. Noncommunicable diseases. 2023.<https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases> (accessed 26 Oct 2023).
- 21 NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents, and adults. *Lancet* 2017;**390**:2627–42. doi:10.1016/S0140-6736(17)32129-3
- 22 Richards AB, Mackintosh KA, Swindell N, *et al.* WALES 2021 Active Healthy Kids (AHK) Report Card: The Fourth Pandemic of Childhood Inactivity. *Int J Environ Res Public Health* 2022;**19**. doi:10.3390/IJERPH19138138
- 23 Chrissini MK, Panagiotakos DB. Health literacy as a determinant of childhood and adult obesity: A systematic review. *Int J Adolesc Med Health* 2021;**33**:9–39. doi:10.1515/IJAMH-2020-0275/MACHINEREADABLECITATION/RIS
- 24 Kanellopoulou A, Notara V, Antonogeorgos G, *et al.* Inverse Association Between Health Literacy and Obesity Among Children in Greece: A School-Based, Cross-Sectional Epidemiological Study. *Heal Educ Behav* 2021;**49**:54–65. doi:10.1177/1090198120982944/ASSET/IMAGES/LARGE/10.1177_1090198120982944-FIG1.JPEG
- 25 Sørensen K, Pelikan JM, Röthlin F, *et al.* Health literacy in Europe: Comparative results of the European health literacy survey (HLS-EU). *Eur J Public Health* 2015;**25**:1053–8. doi:10.1093/EURPUB/CKV043
- 26 Rowlands G, Shaw A, Jaswal S, *et al.* Health literacy and the social determinants of health: a qualitative model from adult learners. *Health Promot Int* 2017;**32**:130–8. doi:10.1093/HEAPRO/DAV093
- 27 Welsh Government. Our national mission: high standards and aspirations for all. Educ. Ski.

- 2023.<https://www.gov.wales/our-national-mission-high-standards-and-aspirations-all-html> (accessed 31 Oct 2023).
- 28 Welsh Government. Curriculum for Wales - Hwb. 2022.<https://hwb.gov.wales/curriculum-for-wales> (accessed 18 Aug 2023).
- 29 Dauncey M. How did Wales perform in PISA 2018? Senedd Res. 2019.<https://research.senedd.wales/research-articles/how-did-wales-perform-in-pisa-2018/> (accessed 26 Oct 2023).
- 30 Schleicher A. PISA 2018: Insights and Interpretations. 2019. <https://www.oecd.org/pisa/PISA-2018-Insights-and-Interpretations-FINAL-PDF.pdf> (accessed 31 Oct 2023).
- 31 Commission of the European Communities. Together for Health: A Strategic Approach for the EU 2008-2013. 2007. https://ec.europa.eu/health/ph_overview/Documents/strategy_wp_en.pdf
- 32 World Health Organization. Health 2020 A European policy framework and strategy for the 21st century. 2013. <http://www.euro.who.int/pubrequest> (accessed 2 Mar 2020).
- 33 Regional Office for Europe W. Draft WHO European roadmap for implementation of health literacy initiatives through the life course. Copenhagen: WHO Regional Office for Europe: 2019. https://www.euro.who.int/__data/assets/pdf_file/0003/409125/69wd14e_Rev1_RoadmapOnHealthLiteracy_190323.pdf (accessed 9 Jan 2023).
- 34 Council of Europe. Health literacy policy, mobilisation and capacity building. 2023.https://www.coe.int/es/web/bioethics/health-literacy-policy-mobilisation-and-capacity-building/-/highest_rated_assets/7B45G9LhFn3m/content/l-international-health-literacy-association-ihla-
- 35 Swansea University. £132 million Swansea Bay City Deal Campuses project approved - Swansea University. <https://www.swansea.ac.uk/medicine/enterprise-and-innovation/business-support-projects/accelerate-healthcare-technology-centre/£132-million-swansea-bay-city-deal-campuses-project-approved/> (accessed 31 Oct 2023).
- 36 Senedd Cymru. Area of Research Interest: Health Literacy. 2022.<https://senedd.wales/senedd-business/areas-of-research-interest/area-of-research-interest-health-literacy/>
- 37 Senedd Cymru. Health and Social Care Committee Sixth Senedd Strategy. 2021.
- 38 Welsh Government. Welsh Government protects health, transport and public services | GOV.WALES. 2023.<https://www.gov.wales/welsh-government-protects-health-transport-and-public-services> (accessed 31 Oct 2023).
- 39 Deans D, Davies D. Mark Drakeford makes ‘crisis’ cuts to prop-up NHS and trains - BBC News. BBC News. 2023.<https://www.bbc.co.uk/news/uk-wales-politics-67089977> (accessed 31 Oct 2023).
- 40 Stats Wales. NHS expenditure by budget category and year. Welsh Gov. 2023.<https://statswales.gov.wales/Catalogue/Health-and-Social-Care/Health-Finance/NHS-Programme-Budget/nhsexpenditure-by-budgetcategory-year> (accessed 31 Oct 2023).
- 41 Health Inequalities portal. Fairer Health Outcomes for All (FHOFA). A Reducing Inequities in Health Strategic Action Plan, UK - Health Inequalities. EuroHealthNet. 2023.<https://health-inequalities.eu/jwddb/fairer-health-outcomes-for-all-fhofa-a-reducing-inequities-in-health->

- strategic-action-plan-uk/ (accessed 31 Oct 2023).
- 42 Marmot M, Allen J, Goldblatt P, *et al.* Fair society, healthy lives (The Marmot Review): Strategic Review of Health Inequalities in English post-2010. 2010. doi:10.1016/j.puhe.2012.05.014
 - 43 Welsh Government. Curriculum for Wales. Educ. Wales. 2023.<https://hwb.gov.wales/curriculum-for-wales> (accessed 26 Oct 2023).
 - 44 Welsh Government. Well-being of Future Generations (Wales) Act 2015. 2015. <https://www.legislation.gov.uk/anaw/2015/2/contents>
 - 45 Public Health Wales. Measuring the health and well-being of a nation: Public Health Outcomes Framework for Wales. 2016. <https://www.gov.wales/sites/default/files/publications/2019-06/measuring-the-health-and-well-being-of-a-nation.pdf> (accessed 26 Oct 2023).
 - 46 Welsh Government. Prosperity for All: economic action plan. 2019. <https://www.gov.wales/sites/default/files/publications/2019-02/prosperity-for-all-economic-action-plan.pdf> (accessed 26 Oct 2023).
 - 47 Raghupathi V, Raghupathi W. The influence of education on health: An empirical assessment of OECD countries for the period 1995–2015. *Arch Public Heal* 2020;**78**:1–18. doi:10.1186/S13690-020-00402-5/FIGURES/17
 - 48 Public Health England. The link between pupil health and wellbeing and attainment: A briefing for head teachers, governors and staff in education settings. 2014. https://assets.publishing.service.gov.uk/media/5a7ede2ded915d74e33f2eba/HT_briefing_layout_vFINALvii.pdf
 - 49 The Lancet. Why is health literacy failing so many? *Lancet* 2022;**400**:1655. doi:10.1016/S0140-6736(22)02301-7
 - 50 Okan O, Paakkari L, Jourdan D, *et al.* The urgent need to address health literacy in schools. *Lancet* 2023;**401**:344. doi:10.1016/S0140-6736(23)00104-6
 - 51 Kickbusch I. Health literacy: An essential skill for the twenty-first century. *Health Educ* 2008;**108**:101–4. doi:10.1108/09654280810855559/FULL/PDF
 - 52 WHO. Health literacy development for the prevention and control of noncommunicable diseases. 2022. <https://iris.who.int/bitstream/handle/10665/364203/9789240055339-eng.pdf?sequence=1> (accessed 26 Oct 2023).
 - 53 HAPPEN Wales. Here’s what schools have to say about taking part in HAPPEN... -. 2023.<https://happen-wales.co.uk/happencasestudies/> (accessed 31 Oct 2023).
 - 54 McQueen D V., Kickbusch I, Potvin L, *et al.* *Health and modernity: The role of theory in health promotion*. Springer New York 2007. doi:10.1007/978-0-387-37759-9/COVER
 - 55 Roundtable on Health Literacy; Board on Population Health and Public Health Practice; Institute of Medicine. *Health Literacy: Improving Health, Health Systems, and Health Policy Around the World: Workshop Summary*. Washington DC: : National Academies Press (US) 2013.
 - 56 Abel T, McQueen D. Critical health literacy in pandemics: the special case of COVID-19. *Health Promot Int* 2021;**36**:1473–81. doi:10.1093/HEAPRO/DAAA141

- 57 Paakkari L, Okan O. COVID-19: health literacy is an underestimated problem. *Lancet Public Heal* 2020;**5**:e249–50. doi:10.1016/S2468-2667(20)30086-4
- 58 Okan O, Messer M, Levin-Zamir D, *et al.* Health literacy as a social vaccine in the COVID-19 pandemic. *Health Promot Int* 2023;**38**. doi:10.1093/HEAPRO/DAAB197
- 59 Marchant E, Todd C, James M, *et al.* Primary school staff perspectives of school closures due to COVID-19, experiences of schools reopening and recommendations for the future: A qualitative survey in Wales. *PLoS One* 2021;**16**:e0260396. doi:10.1371/JOURNAL.PONE.0260396
- 60 James M, Marchant E, Defeyter MA, *et al.* Impact of School Closures on the Health and Well-Being of Primary School Children in Wales UK; A Routine Data Linkage Study Using the HAPPEN Survey (2018-2020). *SSRN Electron J* 2021;**1**–19. doi:10.2139/ssrn.3775552
- 61 Spring H. Health literacy and COVID-19. *Heal Inf Libr J* 2020;**37**:171–2. doi:10.1111/HIR.12322
- 62 Marchant E, Lowthian E, Crick T, *et al.* Pre-COVID-19 pandemic health-related behaviours in children (2018–2020) and association with being tested for SARS-CoV-2 and testing positive for SARS-CoV-2 (2020–2021): a retrospective cohort study using survey data linked with routine health data in Wales, UK. *BMJ Open* 2022;**12**:e061344. doi:10.1136/BMJOPEN-2022-061344
- 63 Okan O, Bollweg TM, Berens EM, *et al.* Coronavirus-Related Health Literacy: A Cross-Sectional Study in Adults during the COVID-19 Infodemic in Germany. *Int J Environ Res Public Health* 2020;**17**:1–20. doi:10.3390/IJERPH17155503
- 64 Ofcom. Children and parents: media use and attitudes report 2023 - Ofcom. 2023. <https://www.ofcom.org.uk/research-and-data/media-literacy-research/childrens/children-and-parents-media-use-and-attitudes-report-2023> (accessed 31 Oct 2023).
- 65 Ofcom. Instagram, TikTok and YouTube teenagers' top three news sources - Ofcom. 2022. <https://www.ofcom.org.uk/news-centre/2022/instagram,-tiktok-and-youtube-teenagers-top-three-news-sources> (accessed 31 Oct 2023).
- 66 Okan O, Messer M, Levin-Zamir D, *et al.* Health literacy action framework for health emergencies and infodemics. *Inf Serv Use* 2023;**43**:115–30. doi:10.3233/ISU-230193
- 67 SAIL Databank. SAIL Databank - The Secure Anonymised Information Linkage Databank. 2020. <https://saildatabank.com/saildata/data-privacy-security/#anonymisation-process> (accessed 3 Mar 2020).
- 68 Jones KH, Ford DV, Thompson S, *et al.* A Profile of the SAIL Databank on the UK Secure Research Platform. *Int J Popul Data Sci* 2019;**4**. doi:10.23889/ijpds.v4i2.1134
- 69 Sørensen K, Levin-Zamir D, Duong T V., *et al.* Building health literacy system capacity: a framework for health literate systems. *Health Promot Int* 2021;**36**:i13–23. doi:10.1093/HEAPRO/DAAB153