HEALTH IN TRANSITION

Translating developmental origins of health and disease science to improve future health in Africa

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THE WORLD HEALTH ORGANIZATION'S 'HEALTH-PROMOTING SCHOOL' MODEL: A POTENTIAL AVENUE FOR DEVELOPMENTAL ORIGINS OF HEALTH AND DISEASE EDUCATION IN AFRICA

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Traditional health care strategies to manage illness are based on the tenets of prevention and cure. Health promotion is an urgent matter from both a health and economic standpoint, as most non-communicable diseases cannot be cured, and the future costs of management are prohibitive. Hence, a new focus on prevention involving youth has been widely called for, including by the Cape Town Manifesto.²

This chapter reviews the challenge and opportunities of engaging youth in health promotion related to the developmental origins of health and disease (DOHaD) agenda. It explores the potential for using the World Health Organization (WHO)'s

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2 International Society for developmental origins of health and disease (DOHaD). 2015. *The Cape Town Manifesto – November 2015: A healthy start builds a bright future*. International Society for DOHaD, Cape Town. [<https://bit.ly/3aJwzFD>].

‘Health-Promoting School’ model as part of health initiatives in Africa to promote the adoption of a DOHaD related health agenda.

At a societal level, effective disease prevention must often rely on the application of new science and technological innovation, plus legislation to dictate change. However, at an individual level, alterations in health behaviours are required to contain the epidemic of DOHaD-related non-communicable diseases, which can only be achieved through learning and increased awareness driving attitudinal change. The challenge facing DOHaD related health promotion is how we, as a society, can disseminate valid information widely and frame compelling arguments to engage and motivate individuals to improve their health and change their behaviours. The nature of DOHaD also predicates that the most fertile place to invest in prevention and health improvement strategies is the next generation.

The WHO estimates are that school-based health promotion has the potential to reach one billion children worldwide. Health-Promoting School programmes are a proven means of providing children with the knowledge and practical ways to improve their health and have been shown to positively impact a range of specific health issues and health behaviours. Importantly in the context of Africa, the integrated educational approach used in Health-Promoting School has proved to be applicable and beneficial even in low- and middle-income settings. Significantly in the context of prevention, children who participate in good Health-Promoting School programmes have been shown to develop improved resilience, self-esteem and self-efficacy; traits recognised to engender a greater desire and increased ability to exercise control over their lives, and characteristics all likely relevant to advancing the DOHaD agenda.

Introduction

Health-Promoting Schools provide classroom education and school-based activities that increase knowledge and develop behaviours that benefit the health of children; such schools are also an investment in the wellbeing of the broader community.³ The WHO has endorsed this school-based health promotion model, called for an increase in the number of Health-Promoting Schools worldwide, and advocates the adoption of “a whole-school approach to enhance the health and educational outcomes of children and adolescents through teaching and

3 World Health Organization (WHO). 2013a. What is a health promoting school? *School and Youth Health*. [http://who.int/school_youth_health/gshi/hps/en/index.html]; St Leger, L., Young, I., Blanchard, C. & Perry, M. 2009. Promoting health in schools from evidence to action. *International Union for Health Promotion and Education*. [<https://bit.ly/34wrB4L>].

learning experiences initiated in the schools”⁴ This enhancement is achieved by combining a range of complementary approaches in the context of everyday life directed towards knowledge and actions that increase control over factors known to determine future health. Encouraging children to adopt healthy lifestyle habits relevant to the prevention of illness and injury is a central objective. However, because it is recognised that positive experiences at school strongly influence how children develop in terms of their self-esteem, self-efficacy and sense of control over their lives, a formative Health-Promoting School environment is recognised to also contribute to future emotional health and psychosocial resilience.⁵

Today vast numbers of children worldwide experience deficiencies that negatively impact a broad range of health indicators. These deficiencies vary depending on the country concerned, but many can be addressed through Health-Promoting School initiatives, and the investment required is small taken in the context of the escalating burden of healthcare costs. Furthermore, even where national resources for health are sparse, and massive demands such as issues related to HIV/Aids dominate agendas, effective education and behavioural change have been achieved through school-based education, and the potential demonstrated for the model to be employed more widely. Importantly in the context of DOHaD, not only do school-based programmes provide access to the key target age group, exploring opportunities to implement the WHO’s Health-Promoting School programmes offers a unique opportunity for collaboration between stakeholders (e.g. ministries) who conventionally work in relative isolation.⁶ Evaluation of Health-Promoting School programmes indicates that a range of benefits are accrued across disciplines including Health, Education, Finance, and Social Services.⁷

4 WHO, 2013a.

5 Macnab, A.J., Gagnon, F. & Stewart, D. 2014a. Health Promoting Schools: Consensus, challenges and potential. *Health Education*, 114(3):170-185. [<https://bit.ly/34szNmL>]; Stewart, D., Sun, J., Patterson, C., Lemerle, K. & Hardie M. 2004. Promoting and building resilience in primary school communities: Evidence from a comprehensive ‘health promoting school’ approach. *International Journal of Mental Health Promotion*, 6:26-33. [<https://doi.org/10.1080/14623730.2004.9721936>].

6 Pentecost, M., Macnab, A.J., Mayekiso, A. & Ross, F. 2018. Beyond the dyad: making intervention DOHaD interventions more inclusive. *Journal of Developmental Origins of Health and Disease*, 9(1):10-14. [<https://doi.org/10.1017/S2040174417000629>]; Macnab, Gagnon & Stewart, 2014a.

7 Stewart-Brown, S. 2006. What is the evidence on school health promotion in improving health or preventing disease and, specifically, what is the effectiveness of the health promoting schools approach? *Health Evidence Network Report*. [<https://bit.ly/31o7iVp>]; Tang, K.C., Nurbeam, D., Aldinger, C., St Leger, L., Bundy, D., Hoffmann, A.M., Yankah, E., McCall, D., Buijs, G., Arnaout, S. & Morales S. 2008. Schools for health,

Health-Promoting School initiatives in sub-Saharan Africa

In a 2004 evaluation, Mukoma and Filsher identified that up to that time, no Health-Promoting School programmes had been described in Africa.⁸ However, at the international colloquium in Stellenbosch in November 2011, forty people from five continents came together at the Stellenbosch Institute for Advanced Study (STIAS) to share their global and regional experience about Health-Promoting Schools. They recognised that globally, a moral imperative exists to ensure that all children and adolescents are provided with the resources and environment necessary to enable them to reach their potential. High, low, and middle-income countries were represented; participants from South Africa, Uganda, and Rwanda described the experience with pilot programmes, and several elements of the Ugandan programme have been described in the literature. A consensus statement was created to summarise the current evidence, strategies, challenges, and potential of the WHO's Health-Promoting School model.⁹ It was evident that within sub-Saharan Africa the potential for the model to contribute to future health has not as yet been recognised, despite the existence of some of the most prevalent and severe global health problems in this region.¹⁰

A specific challenge for South Africa is that the school system is not healthy; there are recognised deficiencies regarding infrastructure, resources and lack of motivation amongst teachers. As a consequence, the promise and potential that sound educational programmes are known to provide are not being fulfilled. Two reports from 1998/1999 identified the need to establish Health-Promoting Schools in South Africa as a means of addressing the major challenge of improving the health status of all citizens, and particularly of youth and children.¹¹ Data indicated that 87.2 per cent of health and education professionals supported establishing

education and development: a call for action. *Health Promotion International*, 24(1):68-77. [<https://doi.org/10.1093/heapro/dan037>].

- 8 Mukoma, W. & Filsher, A.J. 2004. Evaluations of health promoting schools: a review of nine studies. *Health Promotion International*, 19(3):357-368. [<https://doi.org/10.1093/heapro/dah309>].
- 9 Macnab, A.J. 2013. The Stellenbosch consensus statement on Health Promoting Schools. *Global Health Promotion*, 20(1):78-81. [<https://doi.org/10.1177/1757975912464252>].
- 10 Sippel, L., Kiziak, T., Woellert, F. & Klingholz, R. 2011. Africa's demographic challenges. How a young population can make development possible. *Berlin Institute for Population and Development*. [<https://bit.ly/3gwQSyl>].
- 11 Vergnani, T., Filsher, A.J., Lazarus, S., Reddy, P. & James, S. 1998. Health promoting schools in South Africa: needs and prospects. *South African Journal of Child and Adolescent Mental Health*, 10(1):44-58. [<https://doi.org/10.1080/16826108.1998.9632345>]; Swart D, Reddy P. 1999. Establishing networks for health promoting schools in South

Health-Promoting School networks; how such networks should be structured and would function is described, and perceived barriers and strategies to address them outlined.¹² These reports also presented thirteen tasks critical to achieving Health-Promoting Schools in South Africa, and still provide a valuable template for those contemplating Health-Promoting School networks. Today, South Africa still lacks effective Health-Promoting Schools. However, a National Development Plan is currently looking at multiple ways to improve key issues in society, including health, education, and social integration. Importantly the exploratory process to investigate options for change are broad, and the overall plan has a longer than usual timeline (up to 2030). This plan offers a unique opportunity for agencies (ministries), traditionally functioning in 'silos', to collaborate in considering the potential for adopting a Health-Promoting School approach to implement broad changes their mandates have in common and together would have the potential to address many of the United Nations' 'Sustainable Development Goals' and within them several root causes of DOHaD-related non-communicable disease.

The necessity for such 'collaboration across sectors' in the context of Health-Promoting Schools has been recognised previously, and the development of Health-Promoting School networks identified as a way to encourage greater intersectoral cooperation.¹³ From the evidence of Health-Promoting School evaluations elsewhere, and particularly the experience of countries who have actively promoted Health-Promoting School activities, health benefits could be achieved in parallel with the recognised advantages of motivating girls and boys to pursue and value educational opportunities.¹⁴ There is also the investment value in

Africa. *Journal of School Health*, 69(2):47-50. [https://doi.org/10.1111/j.1746-1561.1999.tb06366.x].

12 Vergnani et al., 1998.

13 Macnab, A.J., Stewart, D. & Gagnon, F. 2014b. Health Promoting Schools: Initiatives in Africa. *Health Education*, 114(4):246-259. [https://doi.org/10.1108/HE-11-2013-0057].

14 Moon, A.M., Mullee, M.A., Rogers, L., Thompson, R., Speller, V. & Roderick, P. 1999. Helping schools to become health-promoting environments – an evaluation of the Wessex Healthy Schools Award. *Health Promotion International* 1000, 14(2):111-122. [https://doi.org/10.1093/heapro/14.2.111]; Stewart et al., 2004; Wyn, J., Cahill, H., Holdsworth, R., Rowling, L. & Carson, S. 2000. MindMatters, a whole-school approach promoting mental health and wellbeing. *Australian and New Zealand Journal of Psychiatry*, 34(4):594-601. [https://doi.org/10.1080/j.1440-1614.2000.00748.x]; Lee, A., Cheng, F. & St Leger, L.H. 2007a. Hong Kong Healthy School Team. The status of Health Promoting Schools in Hong Kong and implications for further development. *Health Promotion International*, 22(4):316-326. [https://doi.org/10.1093/heapro/dam029]; Inchley, J., Muldoon, J. & Currie, C. 2007. Becoming a health promoting school: evaluating the process effective implementation in Scotland. *Health Promotion International*, 22(1):65-71. [https://doi.org/10.1093/heapro/dal059].

social capital the Health-Promoting School model offers, with the demonstrated improvements in participating children's physical and mental health, and greater overall sense of control over their lives.¹⁵ These are all fundamentally important key elements for progress with national agendas to improve health and the wellbeing of society in any country, and goals which could be achieved with appropriate vision and collaboration with a relatively modest investment.¹⁶

Although health promotion has begun to be used in African countries as a means of increasing societal responsibility for health, programme delivery is often compromised by limited collaboration between the disciplines acting as health educators.¹⁷ Establishing more Health-Promoting Schools would provide a real opportunity to promote new avenues for collaboration between the district government officers responsible for community engagement related to health, education, gender, nutrition and agriculture. Health promotion has been described as the provision of a set of tools rather than a process.¹⁸ As a cohesive team, this group could implement school-based health promotion and deliver components of content, oversight, and support provided by outside agencies or centres of higher learning in other programmes. Such engagement would also enable these officials to become more student-centred and potentially enhance integration within the health care system. Importantly, more Health-Promoting Schools would benefit children; the age group that makes up such a large proportion of African populations currently, and the segment of the population recognised to be most at risk concerning their health literacy, but also with the highest potential to improve.¹⁹

- 15 Stewart et al., 2004; WHO. 2009. *Promoting health and development: closing the implementation gap*. Call to action, 7th Global Conference on Health Promotion, Nairobi, Kenya, October 26-30. [<https://www.who.int/mediacentre/events/meetings/7gchp/en/>].
- 16 Davidson, R.G., Rustein, S., Johnson, K., Suliman, E., Wagstaff, A. & Amouzou, A. 2007. Socioeconomic differences in Health, Nutrition, and Population within developing countries. Country reports on HNP and poverty, Washington, DC: World Bank Group. [<https://bit.ly/34r3pRc>].
- 17 Nyamwaya, D. 2003. Health Promotion in Africa: strategies, players, challenges and projects. *Health Promotion International*, 18(2):85-87. [<https://doi.org/10.1093/heapro/18.2.85>].
- 18 Nyamwaya, 2003.
- 19 Lee, A., Wong, M.C.S., Keung, V.M.K., Yuen, H.S.K., Chung, F. & Mok, J.S.Y. 2008. Can the concept of health promoting schools help to improve students' health knowledge and practices to combat the challenge of communicable diseases: Case study in Hong Kong? *BMC Public Health*, 8:42. [<https://doi.org/10.1186/1471-2458-8-42>].

Potential for Health-Promoting School initiatives

Health promotion and disease prevention are essential to reduce the healthcare burden on children and to positively impact future health in the context of DOHaD, particularly in developing countries and disadvantaged populations where investment in prevention is so much more economically realistic than the hope to pay the cost of future care. It is recognised that endeavour to promote healthy behaviours should begin early in life, and the desire to positively impact the health of children is a consistent theme, and thus the WHO advocates Health-Promoting Schools as a valid and successful model for achieving positive change.²⁰ Existing evidence can guide stakeholders in designing and implementing programmes that are both effective and have cost-benefit.²¹

Worldwide Health-Promoting Schools have the potential to positively impact over one billion children by creating a positive environment that fundamentally influences attitudes, beliefs, and behaviours, and the growing population of children and youth in Africa are a significant population that would benefit.²² The positive messages and practical interventions experienced by children in Health-Promoting School programmes can be reinforced throughout their remaining years in school, as it is recognised that schools strongly influence how children's self-efficacy, self-esteem, resilience, and sense of control over their lives develop. Some believe the potential benefits are more than families alone can impart because of positive exposure to the powerful influence of teacher support and peer networks.²³ The recent international colloquium at STIAS reviewed the educational and social science concepts underlying Health-Promoting Schools; factors that contribute to success or failure; health topics that can be used as 'entry points' to initiate programmes; and processes to document impact. The lessons learned reiterate many elements of the experience of others, but also emphasise the relative simplicity, low cost, and inherent flexibility of the Health-Promoting School model.²⁴

20 Lee, A. 2009. Health-promoting schools: evidence for a holistic approach to promoting health and improving health literacy. *Applied Health Economic Health Policy*, 7(1):11-17. [<https://doi.org/10.2165/00148365-200907010-00002>].

21 Stewart-Brown, 2006.

22 Macnab, A.J. & Mukisa, R. 2018. Priorities for African youth to engage in the DOHaD agenda. *Journal of Developmental Origins of Health and Disease*, 9(1):15-19. [<https://doi.org/10.1017/S2040174417000423>].

23 Stewart et al., 2004.

24 Macnab, 2013.

Novel educational initiatives are needed to address future health in the context of DOHaD; approaches must be found that resonate with youth, and engage school communities so that they choose to ‘own’ and sustain effective programmes.²⁵ Health Promoting Schools offer a means of educating the next generation innovatively and in a participatory way, enabling them to be more knowledgeable about their health, and aware of practical ways to positively influence their lifestyle and the future wellbeing of the next generation.

Mandate of the WHO’s Health-Promoting School model

The broad mandate of health promotion is to reduce unhealthy behaviours, improve preventive services and create a better social and physical environment. Schools that follow the WHO’s Health-Promoting School model are an investment with the potential to impact every child in the school positively, but also benefit the broader community beyond. Health-Promoting School initiatives combine a range of complementary approaches in the context of everyday life directed towards knowledge and action that enable individuals and communities to increase their control over determinants of health, and thereby improve their health and wellbeing.²⁶ A central objective is to encourage the adoption of healthy lifestyle habits in children. However, the ultimate goal of the WHO’s Health-Promoting School model is to establish ‘health literacy’.²⁷ This change in school culture and ethos is intended to continually strengthen the school’s capacity as a healthy setting for living, learning and working because it is recognised that how children develop is strongly influenced by their years at school,²⁸ and that positive experiences contribute to their future emotional health and psychosocial resilience.²⁹ The knowledge, attitudes and behaviours established in childhood are also known to have a significant impact, beneficial or otherwise, on behaviours and circumstances later, because the habits and attitudes of living established during these early years translate into adult life.

25 Pentecost et al., 2018; Macnab & Mukisa, 2018.

26 WHO, 2009; Davidson et al., 2007; Nutbeam, D. 2000. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15(3):259-267. [<https://doi.org/10.1093/heapro/15.3.259>].

27 Nutbeam, 2000; WHO: Department of Communicable Disease Prevention, Control and Eradication. 1997. *Promoting health through schools report of a WHO Expert Committee on Comprehensive School Health Education and Promotion*. WHO Technical Report Series, 870. [https://www.who.int/schistosomiasis/resources/who_trs_870/en/].

28 WHO, 1997.

29 Stewart et al., 2004.

This means that what young people learn can either have a positive or harmful impact in their later lives.³⁰ While this potential for schooling to drive future life choices is important in itself, in the context of DOHaD, we now know that such impact extends further, as parental knowledge and behaviours also determine key elements in the future health of their offspring.³¹

Children from disadvantaged sections of society are at particular risk, as they already experience deficiencies that negatively impact a broad range of health indicators.³² Hence, the call for investment to improve the health, wellbeing, and social competence of children is almost universal; this call is central to the challenge of the current United Nations' Sustainable Development Goals and is echoed by the voices of policymakers and parents worldwide. In this context, much can be achieved through health promotion at a community level, mainly through Health-Promoting Schools, and importantly such initiatives are well within the ability of even low-income countries, as the model focuses on positive change in the school and its immediate culture. Establishing Health-Promoting Schools requires a mindset change and refined educational investment, more than providing significant resources, engaging non-government organisations, or obtaining international funding. Because of this, the Health-Promoting School model is especially relevant where national resources for health are sparse, and massive demands such as HIV-related issues or Covid-19 contingencies dominate agendas.³³

What is a Health-Promoting School?

The history, evolution, and concepts underlying health promotion in schools, the factors that contribute to success or failure, and processes to document impact are well described.³⁴ The Stellenbosch consensus statement “summarized and

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- 30 Kendall, P.R.W., Mangham, C. & Young, D.W. 2004. An ounce of prevention. *Paediatrics and Child Health*, 9(3):151-152. [<https://doi.org/10.1093/pch/9.3.151>]; Daar, A.S., Singer, P.A., Persad, D.L., Pramming, S.K., Matthews, D.R., Beaglehole, R., Bernstein, A., Borysiewicz, L.K., Colagiuri, S., Ganguly, N. & Glass, R.I. 2007. Grand challenges in chronic non-communicable diseases. *Nature*, 450(7169):494. [<https://doi.org/10.1038/450494a>].
 - 31 Wagstaff, A. 2002. Poverty and health inequalities. *WHO Bulletin*, 80: 97-105. [<http://www.euro.who.int/document/e88185.pdf>].
 - 32 Davidson et al., 2007; Lister-Sharp, D., Chapman, S., Stewart-Brown, S. & Sowden, A. 1999. Health promoting schools and health promotion in schools: two systematic reviews. *Health Technology Assessment*, 3:1-207. [<https://bit.ly/2QhmaOQ>].
 - 33 Macnab, Gagnon & Stewart, 2014a.
 - 34 Stewart-Brown, 2006; Moon et al., 1999; Inchley, Muldoon & Currie, 2007; WHO, 2009; Viner, R.M., Ozer, E.M., Denny, S., Marmot, M., Resnick, M., Fatusi, A.

endorsed the WHO Health-Promoting Schools concept, and the organization's stated goal of increasing the number of Health-Promoting Schools worldwide".³⁵

The WHO defines a Health-Promoting School as one that:³⁶

- ☐ Continually strengthens its capacity as a healthy setting for living, learning and working;
- ☐ Fosters health and learning with all the measures at its disposal;
- ☐ Engages health and education officials, teachers, teachers' unions, students, parents, health providers and community leaders in efforts to make the school a healthy place;
- ☐ Strives to provide a healthy environment, school health education, and school health services along with school/community projects and outreach, health promotion programmes for staff, nutrition and food safety programmes, opportunities for physical education and recreation, and programmes for counselling, social support and mental health promotion;
- ☐ Implements policies and practices that respect an individual's wellbeing and dignity and provide multiple opportunities for success and acknowledge reasonable efforts and intentions as well as personal achievements; and
- ☐ Strives to improve the health of school personnel, families and community members as well as pupils; and works with community leaders to help them understand how the community contributes or undermines, health and education.

The literature available highlights the concepts, principles, and processes central to the broad range of ways in which the application of the Health-Promoting School model can be used to enrich the education of children worldwide and aid in enabling them to reach their potential.³⁷

& Currie, C. 2012. Adolescence and the social determinants of health. *The Lancet*, 379(9826):1641-1652. [[https://doi.org/10.1016/S0140-6736\(12\)60149-4](https://doi.org/10.1016/S0140-6736(12)60149-4)]; Young, I. 2005. Health promotion in schools – a historical perspective. *Promotion and Education*, 12(3-4):112-117. [<https://doi.org/10.1177/10253823050120030103>]; St Leger et al., 2009; Macnab, A.J., Kasangaki, A., Mbabali, M., Zavuga, R., Radziminski, N., Budden, H. & Gagnon, F. 2010. Brighter Smiles Africa. Translation of a Canadian community-based health-promoting school program to Uganda. *Education for Health*, 23(2):1-8. [<https://bit.ly/2QIYtVu>].

35 Macnab, 2013; WHO, 2013a.

36 WHO, 2013b.

37 WHO, 2013a; WHO, 2013b; Viner et al., 2012.

As identified by the WHO, Health-Promoting School programmes aim to educate children to be able to:

- Care for themselves and others.
- Make healthy decisions and take control over life's circumstances.
- Establish a health culture and school ethos that:
 - o Create conditions that are conducive to health (through policies, services, physical/social conditions).
 - o Build capacities for peace, shelter, education, food, income, a stable ecosystem, equity, social justice, and sustainable development.
 - o Promote prevention strategies to address the leading causes of death, disease and disability.
 - o Positively influence health-related behaviours: knowledge, beliefs, skills, attitudes, values and support.

There are, however, recognised variations in how the Health-Promoting School model can be applied. While the fundamental WHO model advocates the whole school approach, a 'top-down' process has also been employed principally to address health issues defined by national or local agencies as significant. Examples include school-based programmes that address smoking, obesity or HIV/Aids.

A 'bottom-up' approach has also been used in many instances to introduce the benefits of a Health-Promoting School using a single health issue of local relevance. Then with the successful implementation of a programme based on Health-Promoting School concepts to address this issue, schools are expected to take ownership of their programme, identify additional health topics of relevance to them, and expand their Health-Promoting School activities.

Examples of where this concept has been successful include the use of health promotion to improve oral health. When participating schools have identified success (through a combination of their viewpoint and formal evaluation processes), a range of issues have been added to their Health-Promoting School agenda. New topics addressed have included: personal hygiene, hand washing, prevention of diarrheal diseases, clean water and sanitation, malaria prevention, school food gardens, and nutrition.³⁸

38 Macnab, A.J. & Kasangaki, A. 2012. 'Many voices, one song': a model for an oral health programme as a first step in establishing a health promoting school. *Health Promotion International*, 27(1):63-73. [<https://doi.org/10.1093/heapro/dar039>]; Ioannou, S., Kouta, C. & Charalambous, N. 2012. Moving from Health education to health

Such a transition to address other community-specific issues speaks to the flexibility and relevance of using an oral health promotion model; the rationale, process for implementation, and methods of evaluation of this Health-Promoting School ‘entry point’ are discussed later.

The evidence base

The Stellenbosch consensus statement on the Health-Promoting School model identified that:³⁹

- There is evidence that both health promotion in schools (single-topic targeted programmes) and Health-Promoting Schools (a settings approach including skills, policies, environment, community, and support services) can affect positive change in the lives of school children and the communities in which they live.
- A Health-Promoting School can be transformative for individuals, schools, and communities, enabling and empowering them to attain higher levels of function, and ultimately be stronger citizens with higher capacity for contribution to society.
- A Health-Promoting School has the potential to reduce the burden of disease and improve the resilience of individuals and communities and is thus a mechanism for reducing long-term health care and social welfare costs.
- Adopting the Health-Promoting School model does not necessarily require the provision of significant resources, engagement of non-government organisations, or obtaining of international funding, but instead requires a change in mind-set or a paradigm shift and refinement of educational investment.
- The Health-Promoting School model has become a major theme in health and education strategy, providing a framework for school-based health promotion activity, widely accepted. In countries like Scotland, for instance, Health-Promoting School activity is now supported by a national Health-Promoting School unit established in 2002.⁴⁰ Health promotion units exist in the United Kingdom and Hong Kong, and in Australia, the Health-Promoting School rationale is well accepted with multiple programmes implemented

promotion. Developing the health education curriculum in Cyprus. *Health Education*, 112(2):153-169. [<https://doi.org/10.1108/09654281211203420>].

39 Macnab, 2013.

40 Inchley, Muldoon & Currie, 2007.

and evaluated. In Cyprus, the health education curriculum has moved from traditional health education focus on individual lifestyle or behaviour modification to approaches that recognise and address the determinants of health.⁴¹

Four themes have been identified that are central to effective Health-Promoting School implementation:⁴²

Ownership and empowerment

These are considered essential to success. Teachers and staff are empowered through 'shared ownership' of the change and innovation, and by a programme structure enabling each member's involvement in planning and strategic decision making; this makes staff more likely to 'buy-in' and establish a belief that a Health-Promoting School programme is 'rooted in the school'. As we have found in our projects, ownership is fostered by conscientious dialogue to identify issues relevant to the school, its pupils, and staff, and sharing of results with the school community that allows strategic change to be driven by the experience and priorities of the school. A project leader within the school (elsewhere described as the project 'champion') is the best resource to engage and motivate other staff, parents and the pupils, and relay the message that everyone in the school community has a valid role to play.

Leadership and management

Leadership by a 'champion' in the school embeds the programme in the school structure and life, and this individual effectively acts as 'the driver for change' central to the Health-Promoting School model. The joint management process for the programme is agreed by the initiating individuals or agency and the school, but day to day running and problem-solving in the programme should devolve to the school. However, programme support, follow up visits, motivation, and effective communication from those initiating the Health-Promoting School programme is a given requirement.

41 Lee, A., Cheng, F., Yuen, H., Ho, M., Lo, A., Leung, T. & Fung, Y. 2007b. Achieving good standards in Health Promoting Schools: Preliminary analysis one year after implementation of the Hong Kong Healthy Schools Award Scheme. *Public Health*, 121(10):752-760. [https://doi.org/10.1016/j.puhe.2007.01.014].

42 Inchley, Muldoon & Currie, 2007.

Collaboration

Establishing a common understanding of the underlying principles of the Health-Promoting School intervention and negotiating mutually agreed goals and expectations are valuable. This process clarifies what each partner has to offer and what they can expect to gain from involvement. Within most Health-Promoting school programmes, there are at least three spheres where effective collaboration is required:

- ☐ partnership working with external professionals;
- ☐ pupil participation (including pupil involvement in a Health-Promoting School planning committee, via pupil councils, and through buddy and monitor systems); and
- ☐ parent involvement.

Integration

It is important that Health-Promoting School programmes are not viewed as a 'discrete' activity or 'add on' but rather an opportunity to affect a new way of being that permeates all aspects of school life and links to the core objectives and ethos of the school. Integration is essential for sustainability. Fostering a sense of common purpose is another way of describing this process, aided by successes (however small) and the sense of programme ownership that tends to follow demonstrated and acknowledged progress and achievement. In this context, participating in the process of evaluation, having the results shared within the school and amongst parents, and participation in award schemes recognising the adoption of the Health-Promoting School-principles and programme achievement is constructive.⁴³

Factors which overlap and complement these themes have also been identified, and include:

- ☐ The need to involve parents and families in their children's health education;
- ☐ The involvement of the wider community;
- ☐ The importance of a comprehensive, coordinated, cross-curricular programme throughout the school curriculum;
- ☐ The need to combine health education with other health-promoting initiatives in the school;

43 Moon et al., 1999; Nelson, J., Martin, K., Nicholas, J., Easton, C. & Featherstone, G. 2001. Food growing activity in schools. *National Foundation for Education Research*, Slough, UK. [<https://www.nfer.ac.uk/food-growing-activities-in-schools/>].

- The need for a variety of teaching methods and strategies actively involving students in their learning, focussing on them as individuals and on their present needs; and
- The need to develop a constructive role for young people from the target population in all decision-making processes relating to health.⁴⁴

Literature addressing evidence of the effectiveness of Health-Promoting School programmes primarily relates to first-world experience with Health-Promoting Schools.⁴⁵ Mukoma found no evaluation from Africa in a review in 2004, but subsequently, there have been reports from several low and middle-income countries.⁴⁶ These include experience gained from the adaptation of a successful Health-Promoting School project in a Canadian aboriginal community into a useful model for engaging schools in rural Ugandan communities, providing practical examples likely to be useful to others considering the validity and relevance of the Health-Promoting School model. The lessons learned and

44 Moon et al., 1999; Lee et al., 2007a.

45 Stewart et al., 2004; Tang et al., 2008; Moon et al., 1999; Inchley, Muldoon & Currie, 2007; WHO, 2009; Viner et al., 2012; Young, 2005; St Leger et al., 2009; Nelson et al., 2001; Kwan, S.Y.L., Petersen, P.E., Pine, C.M. & Borutta, A. 2005. Health-Promoting schools: an opportunity for oral health promotion. *WHO Bulletin*, 83(9):677-685. [https://doi.org/S0042-96862005000900013]; Stewart, D.E. 2008. Implementing Mental Health Promotion in Schools: a Process Evaluation. *International Journal of Mental Health Promotion*, 10(1): 32-41. [https://doi.org/10.1080/14623730.2008.9721755]; Brown, T. & Summerbell, C. 2009. Systematic review of school-based interventions that focus on changing dietary intake and physical activity levels to prevent childhood obesity: an update to the obesity guidance produced by the National Institute for Health and Clinical Excellence. *Obesity Reviews*, 10(1):110-41. [https://doi.org/10.1111/j.1467-789X.2008.00515.x].

46 Mukoma & Filsher, 2004; Young, 2005; Macnab et al., 2010; Macnab & Kasangaki, 2012; Stewart, 2008; Brown & Summerbell, 2009; Baros, M.V.G., Nahas, M.V., Hallal, P.C., Farias, J.C., Florindo, A.A. & Baros, S.S.H. 2009. Effectiveness of a school-based intervention on physical activity for high school students in Brazil: The Saude na Boa project. *Journal of Physical activity and Health*, 6(2):163-169. [https://doi.org/10.1123/jpah.6.2.163]; Van Palenstein Helderman, W.H., Munck, L., Mushendw, S., Van't Hof, M.A. & Mrema, F.G. 1997. Effect evaluation of an oral health education programme in primary schools in Tanzania. *Community Dentistry and Oral Epidemiology*, 25(4): 296-300. [https://doi.org/10.1111/j.1600-0528.1997.tb00943.x]; Garbin, C.A.S., Garbin, A.J.I., Dos Santos, K.T. & Lima, D.P. 2009. Oral health education in schools: promoting agents. *International Journal of Dental Hygiene*, 7(3):212-216. [https://doi.org/10.1111/j.1601-5037.2009.00394.x]; Macnab, A.J., Mukisa, R., Mutabazi, S. & Steed, R. 2015. Malaria in Uganda: school-based rapid diagnostic testing and treatment. *International Journal of Epidemiology*, 45(6), December 1759-1762. [https://doi.org/10.1093/ije/dyw262].

evaluations of the effect of the programmes reiterate many elements of the experience of others, and also provide insights of potential value for broader application of the Health-Promoting School model to address the DOHaD agenda, particularly in sub-Saharan Africa and other low and middle-income countries; these lessons include:

- The relative simplicity and inherent flexibility of the Health-Promoting School model;
- The benefits of beginning by addressing a non-stigmatised and simple health issue;
- A modest level of intervention involving a single school can lead to broad community engagement;
- The majority of schools can incorporate the education and health practice components required for effective health promotion; and
- Success with the initial topic/intervention generates a change in school 'health culture' and policies that lead to expansion of health promotion activity to address other community-identified issues.

There is also growing evidence that health education in an effective Health-Promoting School programme has the potential to benefit a broader community. The individual children in the schools benefit, and so do teachers and the school as a whole, but as knowledge and practices introduced in school 'ripple' out to involve siblings and parents, the broader community benefits from what they assimilate and adopt as a wider audience. In this way, children can effectively act as agents of health-promoting change on both the school and at a local community level if given sufficient guidance.⁴⁷ We have heard children in our Ugandan programmes proudly telling fellow pupils from other schools at sports events about their Health-Promoting School activities, and teachers now report to reviewers conducting national surveys of educational institutions, that having a Health-Promoting School 'culture' is an important educational attribute to their school.⁴⁸

Important learning outcomes are also derived from participation in Health-Promoting School programme delivery by those initiating and sustaining effective

47 Simovska, V. & Carlsson, M. 2012. Health-promoting changes with children as agents: findings from a multiple case study research. *Health Education*, 112(3):292-304. [<https://doi.org/10.1108/09654281211217803>].

48 Macnab & Kasangaki, 2012. Ross, D., Cannon, W., Macnab, A.J. & Kasangaki, A. 2009. Global health experience in Uganda: a unique platform for entering dental school. *Journal of Investigative Medicine*, 57:151-152.

programmes. Examples are the educational opportunities, skills, and experiences gained by trainees from multiple disciplines who participate in Health-Promoting School programme delivery and evaluation; many of whom report the positive impact this had on their future career choice and scope of practice.⁴⁹ Education that occurs in the context of a Health-Promoting School is a 'two-way street' and these schools 'teach' the members of such teams a range of valuable lessons.

Essential first steps for engagement and sustained implementation

The Stellenbosch consensus statement recognised the importance of:

- Respectful dialogue and inclusive engagement with stakeholders as an essential component in the implementation of a Health-Promoting School approach;
- Identifying the central role of teachers and learners and the benefit of investing in other stakeholders, including government ministries (particularly health and education);
- Meaningful involvement of the school community as a whole to ensure the development of a shared common vision and mission;
- Effective communication, empowerment and an enabling environment that leads to community ownership of the programme;
- Adopting an appreciative inquiry or strength-based stance when analysing opportunities for health promotion projects, as this is generally more successful than traditional analysis planning methods; and
- Recognition that Health-Promoting Schools are possible even when only one person sees the potential and acts to initiate the change and champion the cause, but the chances of success improve where strategic partnerships are forged with all individuals and agencies with the potential to contribute.⁵⁰

49 Macnab et al., 2010; Worley, P.S., Prideau, D.J., Strasser, R.P., Silagy, C.A. & Magarey, J.A. 2000. Why should we teach undergraduate medical students in rural communities? *Medical Journal Australia*, 712(12): 615-617. [<https://doi.org/10.5694/j.1326-5377.2000.tb124131.x>]; Dharamsi, S., Woollard, R., Okullo, I., Kendall, P. & Macnab, A.J. 2014. Health promoting schools as learning sites for physicians in training. *Health Education*, 114(3):186-196. [<https://doi.org/10.1108/HE-09-2013-0048>].

50 Macnab, 2013.

In the author's experience, it is the initial dialogue to establish rapport and mutual trust, followed by due diligence to ensure that the goals identified are relevant to the community and 'resonate' with the pupils and staff, that predicate the success or failure of a Health-Promoting School initiative. For example, oral health intervention in an Alaskan community failed despite being better funded and resourced than ours, because when the programme was initiated the community did not identify with the purpose or conduct of the health promotion offered. All the planning and funding had been organised in a 'top-down' process with the key step of community engagement omitted:

- Effective processes to combine factual learning with an introduction to healthy practices and behaviours within a supportive environment (these can involve individual and group activities, use a range of expression or experience. Health-promoting programmes can address specific disease entities and health behaviours and promote wellness;
- Inclusion of health education topics in the curriculum through collaboration by members of the Health Promotion agency with the school and the school's teachers. Agency members contribute the key health facts, and 'messages' and teachers add elements in the local language and culturally appropriate visual aids. Novel and participatory activities are encouraged;
- In-class activities where teachers introduce and then regularly revisit the health education topics to underscore key concepts, and use visual aids;
- Initiation of daily in-school health practices by teachers. In an oral health promotion programme, for example, participatory tooth brushing by the whole class at each lunch break to teach and reinforce correct brushing techniques;⁵¹
- Agreement about program support by the initiating agency and a communication strategy to address day to day issues necessary to maintain momentum and focus, as sustaining a programme to the point of self-sufficiency takes time and continuity of practical and emotional support; and
- A continuous cycle of evaluation and feedback to promote the identification of 'what works and why', healthy evolution of the programme and mutually planned future directions for the Health-Promoting School initiative.

51 Macnab, A.J. 2015. Children's Oral Health: The opportunity for improvement using The WHO Health Promoting School Model. *Advances in Public Health*, 2015(651836). [<https://doi.org/10.1155/2015/651836>].

Entry points for initiating Health-Promoting School activities

While the stated goal of the WHO's Health-Promoting School model is to create a whole-school approach that alters the health culture and ethos of the school, one of the challenges is that this 'whole school approach' is often beyond the resources of those wishing to start Health-Promoting School activities to enhance the health and educational outcomes of children.⁵² This challenge applies to both educators interested in initiating a community-based Health-Promoting School programme, and policymakers exploring Health-Promoting School as a means of disease prevention or vector control.⁵³ Consequently, activities focussing on a single health issue that has been successfully piloted is relevant, as these offer 'entry points' to begin Health-Promoting School programmes, 'engage' the school community, and allow evaluation of the potential for a school to progress towards a broader change in its 'health culture'. Through subsequent expansion from a single health-promoting activity, such a school can ultimately progress to a whole-school approach.⁵⁴

Entry points range from simple topics free of stigma to highly complex issues. Suggested topics included oral health, hygiene, nutrition, obesity, diabetes, resilience, clean-up campaigns, tuberculosis, mental health, injury prevention, and gender equity and reduction of gender-based violence. Entry points need to be identified by the community as achievable and relevant to their priorities and needs. Early success with the initial topic often leads to confidence to address other relevant issues. Although primary schools serve as ideal starting venues, preschools, primary, secondary and post-secondary schools all have potential to become Health-Promoting Schools (post-secondary schools include colleges, universities, and trade schools). Initiatives aimed at enabling teachers to become more health-conscious may also identify an effective entry point.

Promotion of oral health is an example of a previously reported entry point to address a specific issue that has proved successful in itself and generated high levels of community 'ownership' that have then provided the impetus for school-based programmes to be sustained and expanded.⁵⁵ Oral health has recognised importance during pregnancy. Hence this topic offers a relevant starting point for programmes intended to inform and engage youth about DOHaD. Oral health promotion programmes have been introduced and evaluated in the USA,

52 Nutbeam, 2000.

53 Laverack, G. & Labonte, R. 2000. A planning framework for community empowerment goals within health promotion. *Health Policy and Planning*, 15(3): 255-262. [<https://doi.org/10.1093/heapol/15.3.255>].

54 Macnab, Gagnon & Stewart. 2014a; Macnab & Kasangaki, 2012.

55 Macnab, 2015.

Canada and Africa, and include cohorts from amongst children from First Nations (predominant indigenous peoples in Canada south of the Arctic Circle) and school children in rural Uganda.⁵⁶ Such programmes are novel in the context of prior experience with Health-Promoting Schools in that they address a topic which is of major relevance yet carries no social stigma. Importantly, the intervention required is non-controversial, involves manageable amounts of information, and is amenable to simple healthy practices such as effective tooth brushing and dietary practice education to reduce sugar consumption. Evidence of clinical improvement and behavioural change should be evident in a relatively short time frame and validated quantitative methods, and robust qualitative measures exist for evaluation of programme effectiveness. These are all key elements characterising a suitable entry point for Health-Promoting School activity.

Any school wanting to begin Health-Promoting School activity can look at oral health promotion as a suitable topic, as poor oral health in children is a global issue, school-based intervention is simple, with the required knowledge and health practice components defined, and valid evaluation options published. Other potential entry points studied that are relevant to the introduction of DOHaD concepts of school-age children include growth, nutrition and physical activity.

Growth

The growth patterns of individual children, and trends in the data from a community, reflect their health and nutritional status and are important health indices. We evaluated school children enrolled in a collaborative health-promotion programme in rural Uganda. Height, weight, and head circumference were measured and plotted against age-matched WHO child growth standards.⁵⁷ The WHO charts use data from multi-ethnic sampling (populations from six countries) to capture the genetic variability among continents and generate a single international growth standard. The concordance of this standard with clinical assessments underscores that this tool documents differences in nurture rather than nature, and hence enables disparities in physical growth to be determined,

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- 56 Macnab & Kasangaki, 2012; Kwan et al., 2005; Worthington, H.V., Hill, B.A., Mooney, J., Hamilton, F.A. & Blinkhorn, A.S. 2001. A cluster randomized controlled trial of a dental health education program for 10-year-old children. *Journal of Public Health and Dentistry*, 61(1):22-27. [<https://doi.org/10.1111/j.1752-7325.2001.tb03351.x>]; Macnab, A.J., Rozmus, J., Benton, D. & Gagnon, F. 2008. 3-year results of a collaborative school-based oral health program in a remote First Nation's community. *Rural and Remote Health*, 8:882. [<http://www.rrh.org.au>].
- 57 WHO: Multicentre Growth Reference Study Group. 2006. The WHO child growth standards based on length/height, weight and age. *Acta Paediatrica Supplement*, 450:76-85. [https://www.who.int/childgrowth/standards/Growth_standard.pdf].

providing a basis for appropriate community-based intervention (social, dietary, nutritional) and changes in healthcare policy.⁵⁸

Nutrition

Deficiencies in calorie consumption and sub-optimal dietary content are known to be key determinants of health worldwide and impair average growth and life expectancy. Importantly, a lack of key nutrients also causes significant learning difficulties that are remediable with appropriate dietary adjustment. Amongst 6-12-year-old children, food insufficiency is known to be associated with poorer mathematics scores, grade repetition, absenteeism, aggression, psychosocial dysfunction and difficulty getting along with other children.⁵⁹ A 24-hour validated dietary recall questionnaire was used that allows investigation of dietary diversity as a proxy measure of nutritional adequacy. The tool can be modified to incorporate local foods; a component we utilised as our study cohort lived in Africa.

The ease of collecting growth data and ability to use the WHO child growth standards to identify where a child would benefit from interventions to promote appropriate nurture make this a particularly valuable Health-Promoting School activity and one that is relevant world wide.⁶⁰ School communities can take ownership of the data on their pupil's growth data and use it to drive further health promotion activities deemed relevant and appropriate for the local community. For example, it is also a way of teaching children about growth charts and the issue of optimal weight gain in infants, and an opportunity to introduce the importance in the first two years of life for infants of sustained growth along their birth centile, and avoidance of both stunting and obesity. Schools can be taught to monitor the effects of both dietary deficiency and excess in pupils. The high percentage of children with below-average height and weight measurements (below the 50th centile) in the community we studied most probably reflects the impact of local social circumstances, sub-optimal nutrition, and infectious disease. At the school, we studied the parents independently chose to initiate a lunch programme to improve pupil's nutrition using produce grown in a garden that they decided to plant. This decision was the direct result of us sharing with them the information about their children's growth gathered by the school's Health-Promoting School programme, and having the negative impact of poor nutrition on educational

58 Onyango, A.W., De Onis, M., Caroli, M., Shah, U., Sguassero, Y., Redondo, N. & Carroli, B. 2007. Field-testing the WHO growth standards in four countries. *The Journal of Nutrition*, 137(1):149-152. [<https://doi.org/10.1093/jn/137.1.149>].

59 Jyoti, D.F., Frongillo, E.A. & Jones, S.J. 2005. Food insecurity affects school children's academic performance, weight gain, and social skills. *The Journal of Nutrition*, 135(12):2831-2839. [<https://doi.org/10.1093/jn/135.12.2831>].

60 WHO: Multicentre Growth Reference Study Group, 2006.

potential explained. This community ‘ownership’ of data and independent community-based action that results is an important reminder of how Health-Promoting Schools can drive positive change. This benefit can extend beyond the target school; other schools in the surrounding area have now planted similar gardens and initiated lunch programmes to supplement the diets of malnourished pupils; further evidence of the potential for Health-Promoting School initiatives to generate benefit in the broader community.

It is also important to note that the potential health benefits related to a school garden go beyond nutritional benefits related to the provision of vegetables to supplement a feeding scheme. As related research shows, there are physical, mental and emotional benefits related to providing children with opportunities to become involved with gardening and experience exposure to nature.⁶¹ These broader health benefits should not be overlooked; key findings of a systematic review of the international literature and survey of 1 300 UK learning institutions, are summarised in The Royal Horticultural Society Taskforce report ‘Food Growing in Schools’.⁶² It was found that through participation in school food-growing programmes children developed a broad range of skills that included: life skills (cooking and communication), financial and enterprise skills, and skills for employment, e.g. teamwork, and problem-solving. Also that these programmes improved pupil’s confidence, resilience, and self-esteem, and positively influenced motivation and behaviour, with increased enthusiasm for school and learning, and better attendance and completion of homework. Behaviour was better in and out of the classroom, and environmental awareness and pro-environmental behaviours were enhanced. Broad benefits were also noted in achievement across the curriculum, particularly for science learning, as well as language skills, maths and food technology, and overall there was greater readiness to learn. In a one-year programme involving six West Yorkshire schools, 84 per cent of students increased their skills, learning on average 15 new ones during the project. Vulnerable children with special educational needs also benefit from gardening in school, often ‘finding their voice and re-engaging with education’.⁶³

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- 61 Charles, C. & Louv, T. 2009. Children’s Nature Deficit: What we know – and don’t know. *Children and Nature Network*. [<https://bit.ly/2Qgs0A6>]; Moss, S. 2012. *Natural Childhood*. Report of the National Trust, UK. [<https://bit.ly/2EeyWeK>].
- 62 Nelson et al., 2001; Harrison, R., Duffy, D., Benton, D. & Macnab, A.J. 2006. ‘Brighter Smiles’: Health promotion and service-learning in a remote First nation’s community. *Canadian Journal of Public Health*, 97(3):237-240. [<https://bit.ly/3laBHy5>]; Henry Doubleday Research Association. 2012. Food Growing in Schools – Taskforce Report. *Garden Organic*. Full Report. 1-66. [<https://bit.ly/3l9LTaa>].
- 63 Royal Horticultural Society. 2012. Moving up, growing on: Gardening for a better future. [<https://bit.ly/3gkvBYh>].

The use of a dietary diversity questionnaire can add to the evaluation of growth parameters or be conducted as an independent activity. One such tool, included in guidelines from the Food and Agricultural Organisation of the United States, provides a quick, easy, and objective way of identifying potential nutritional concerns, with modification possible to include classification of locally predominant foods.⁶⁴ Hence this activity has broad relevance worldwide, and specific applicability for education related to DOHaD dietary concepts. Results can guide nutrition education and evaluate changes in dietary practices over time. While energy intake amongst the children we studied appeared adequate, the lack of dietary diversity identified places them at risk of nutrient deficiencies, including those associated with a compromised ability to read and learn. Education and resources on how to improve their nutrition were provided to their adult caregivers. Follow up one year later indicated that food variety had increased, with more fruit and milk products added.

Physical activity

Physical inactivity is a growing public health concern and increasingly linked to preventable conditions such as obesity. Obesity and the association with the increasing prevalence of type 2 diabetes make Health-Promoting School initiatives linked to physical activity relevant to introducing children to the fundamentals of DOHaD, and links between weight issues and non-communicable diseases. A review of worldwide trends in childhood overweight and obesity using data on school-age populations in 25 countries and for pre-school populations in 42 countries reported that the prevalence of childhood overweight has increased in almost all countries for which data are available.⁶⁵ While obesity and overweight have increased most dramatically in economically developed countries and urbanised populations, estimates indicate that within the next 20 years, morbidity and mortality in Africa, because of diabetes, will be a higher than from malaria. A reminder that no population is immune and innovative programmes and policies are known to be needed at global, regional and national levels to confront the problem. In this context, as with all other Health-Promoting School initiatives, dialogue to ensure relevance and planning by groups that include youth representatives, are essential to achieve the ‘resonance’, community-engagement and ultimate community-ownership necessary for any Health-Promoting School-based initiative

64 Kennedy, G., Ballard, T. & Dop, M. 2013. *Guidelines for measuring household and individual dietary diversity*. Food and Agricultural Organization of the US Nutrition and Consumer Protection Division. [<http://www.fao.org/3/a-i1983e.pdf>].

65 Wang, Y. & Lobstein, T. 2006. Worldwide trends in childhood overweight and obesity. *International Journal of Pediatric Obesity*, 1(1):11-25. [<https://doi.org/10.1080/17477160600586747>].

to succeed. Importantly, it has been shown from multiple case study research that children can act as agents of change on both a school and community level in programmes aimed at preventing obesity, provided they are engaged effectively and given sufficient guidance.⁶⁶

Methods of evaluation

While there is consensus that “the existing evidence can guide stakeholders in designing and implementing Health-Promoting School programmes that are both effective and cost-effective, it is also clear that there is a need for more robust evidence and methods for evaluating a broader range of long-term outcomes”.⁶⁷

Comprehensive and pluralistic evaluation methodology and independent evaluation have been called for, and Dooris has identified that for evidence to be useful, it should not only demonstrate what works, but how and under what conditions it works.⁶⁸ To date, most Health-Promoting School programmes have only been evaluated using some of the recommended elements. However, a broad range of measures and principles have been used, and many can be applied in evaluation beyond the ones for which they were originally employed. Examples include many of the following measures used originally to evaluate oral health programmes.⁶⁹

Quantitative indices

These where available are the ‘gold standard’; many tools exist that can be applied verbatim or used in a modified form.⁷⁰ Cohorts can be evaluated at baseline before programmes begin, and then annually after that. Appropriately collected and analysed such data are robust and allow valid comparisons to be made within and between national cohorts, and even with international data sets.

66 Simovska & Carlsson, 2012.

67 Macnab, 2013.

68 Mukoma & Filsher, 2004; Lister-Sharp et al., 1999; Petersen, P.E. & Kwan, S. 2004. Evaluation of community-based oral health promotion and oral health disease prevention – WHO recommendations for improved evidence in public health practice. *Community Dental Health*, 21(Supplement 4):319-329. [<https://bit.ly/3kmbpYa>]; Dooris, M. 2006. Health promoting settings: future directions. *Promotion and Education*, 13(1):4-6. [<https://bit.ly/3kfmPNm>].

69 Macnab, 2015.

70 WHO. 1987. Oral health surveys: Basic methods. 3rd edition. Geneva. pp.4-6.

Questionnaires

These document demographics, collect quantitative data on knowledge and behaviours, and responses to specific questions can be obtained at baseline and from interval repeat surveys. An example is a simple yet elegant tool for evaluating hand washing as a means of improving hygiene.⁷¹ Other examples include measures of quality of life.⁷² Accuracy can be improved by teachers being involved in the wording of questionnaires designed to ensure appropriate language level and terms, and where necessary having them translate the questions into the local language or be present to explain the meaning and interpret pupils' responses. One limitation of questionnaire data in Africa is that many children do not know their birthdate.

Self-report

Open-ended questions often yield valuable and unanticipated responses. These can be content coded or used as qualitative data. For example, when asked what changes our Health-Promoting School programme had made regarding their oral health, the predominant response from children was that their mouths no longer 'smelled bad'. This observation, although subjective, is relevant as it equates with the reduced incidence of gingivitis documented.⁷³

Interviews

While time-consuming, this form of evaluation is well tried and tested. Interviews with teachers evaluate what benefits or barriers they saw from becoming a Health-Promoting School. The evidence of transfer of knowledge by children to other family members and the community at large is also principally gathered in this way, as are statements regarding confidence gained from success with Health-Promoting School programmes. We have also previously reported the value of a video interview process.⁷⁴

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- 71 Zang, C., Mosa, A.J., Hayward, A.S. & Matthews, S.A. 2013. Promoting clean hands among children in Uganda: A school-based intervention using 'tippy-taps'. *Public Health*, 127(6):586-589. [https://doi.org/10.1016%2Fj.puhe.2012.10.020].
 - 72 Gherunpong, S., Tsakos, G. & Sheiham, A. 2004. Developing and evaluating an oral health-related quality of life index for children: the CHILD-OIDP. *Community Dental Health*, 21(2):161-169. [https://bit.ly/31qhWLj].
 - 73 Quirynen, M., Dadamio, J., Van Den Velde, S., De Smit, M., Dekeyser, C., Van Tornout, M. & Vanderkerckhove, B. 2009. Characteristics of 2000 patients who visited a halitosis clinic. *Journal of Clinical Periodontology*, 36(11): 970-975. [https://doi.org/10.1111/j.1600-051X.2009.01478.x].
 - 74 Macnab, A.J., Kasangaki, A. & Cannon, W. 2012. Videotaped interviews as medium to enhance program evaluation, *Health Promotion International*, 27(1):63-73, [https://doi.org/10.1093/heapro/dar039].

Workshops/parental groups

A range of project stakeholders can be brought together in this way. Such sessions provide an opportunity to share results, obtain feedback of the impact, relevance, and future potential for Health-Promoting School programmes, and hear counterpoint between the school, family and community viewpoints. Such dialogue to share results and plan future directions is particularly valued.

These are all valuable evaluation measures. However, it needs to be remembered that in addition to asking the right question(s) and choosing the best tool(s), enough time has to be allowed for the effectiveness of any Health-Promoting School programme to become apparent. It is also vital to engage with policymakers to plan evaluation relevant to future policy and practice; and in this context to generate evidence of “what works, why it works, and under what conditions it works”.⁷⁵ An element found to help in the process of review is the instigation of award schemes that assess the performance of a school against defined Health-Promoting School themes and provide schools with targets to achieve. Examples are those described from the UK and Hong Kong.⁷⁶ Lee has identified the benefits and also the significant human resources and cost associated with award schemes, and has now developed a self-assessment version.⁷⁷

Opportunities for novel approaches

The WHO’s Health-Promoting School model is inherently flexible; the most dynamic programmes evolve spontaneously and lend themselves to opportunities for innovation.

- ☐ Institutes of higher learning can both support and become Health-Promoting Schools.
- ☐ Health-Promoting Schools offer a novel 'real world' environment for trainees from institutes of higher learning.
- ☐ Innovative use of technology, such as social media, can communicate success, motivate participants and contribute to engagement.
- ☐ A virtual ‘wall’ on which participants share stories and photographs can empower schools and inspire for new approaches.

⁷⁵ Dooris, 2006.

⁷⁶ Moon et al., 1999; Lee et al., 2007a

⁷⁷ Lee et al., 2007b.

- Lead focussed discussion sessions with pupils. Including participating children, and especially adolescents, in all phases of design and delivery, adds valuable insight, increases potential relevance and often provides novel opportunities.
- Lead focussed discussion sessions with pupils. This form of dialogue has established that pupils identify the economic benefits of having healthy offspring as a powerful potential incentive for youth to engage in DOHaD-based health promotion.⁷⁸ Similarly asking pupils whom they would listen to as ‘messengers’ for DOHaD health promotion has identified the impact of celebrities endorsing messages through the medium of music videos.⁷⁹
- Forge alliances between government departments and agencies to include multiple disciplines, professionals and sectors. Such ‘bridging strategies’ are one of the most powerful factors influencing the success of Health-Promoting Schools, as such alliances promote healthier public policy as well as more cost-effective, equitable and higher quality collective action to promote wellness.

Future directions

The application of DOHaD science in Africa to impact NCDs and improve health across generations requires investment in the long term;⁸⁰ investment to develop relationships, forge partnerships, establish common ground, and generate synergy. Clearly it will take several years for effects of life-course education programs employing the Health Promoting School model to be evident, and longer still for their full impact to be realized.

To have any chance of success, the culture and merits of Health-Promoting Schools will need to be understood and embraced at a government level by the education sector to have any chance of success. Ideally, participation in the WHO’s Health-Promoting School programmes will come to be seen as a creative educational opportunity with independent merit and broad benefits, rather than an imposed

78 Macnab & Mukisa, 2018.

79 Macnab, A.J. & Mukisa, R. 2018. Celebrity endorsed music videos: innovation to foster youth health promotion. *Health Promotion International*, 34(4):716-725. [<https://doi.org/10.1093/heapro/day042>].

80 Norris, S.A., Balasubramanian, D., Byass, P., Kimani-Murage, E. & Macnab, A.J., Pauw, C., Singhal, A., Yajnik, C., Akazili, J., Levitt, N. 2017. Understanding and acting on the developmental origins of health and disease in Africa would improve health across generations. *Global Health Action*, 10(1):1334985. [<https://doi.org/10.1080/16549716.2017.1334985>].

process that adds duties and responsibilities to an already overburdened school system. Where broad or system-wide school-based health promotion is adopted, the creation of a central resource agency that aids and facilitates all elements of the process is a constructive approach, as is evident in practices in Scotland and Hong Kong, and in some of the English and Australian models.⁸¹

Teachers will be needed who understand the goals and potential of Health-Promoting Schools; such individuals will participate more fully and be more likely to sustain their commitment. Those who speak to the attraction of this form of health promotion among educators say that success with an effective Health-Promoting School initiative generates confidence, raises the stature of the school, and almost always motivates communities to address new health promotion issues. However, to be successful in the context of DOHaD will require communities firstly to gain an understanding of the scale and importance of DOHaD-related issues. Then, in schools where confidence and ownership can be generated, the WHO's Health-Promoting School model offers opportunities to engage youth in education regarding the DOHaD agenda.

Society's understanding of DOHaD and the potential for school-based programmes to have a positive impact can perhaps be fostered by what is already known about the benefits of education. Education is the pathway to progress in many aspects of life, particularly in low and middle-income countries, including improved health. Any process that promotes a desire for education and keeps children in school to complete their studies contributes to future health and prosperity. While education of both boys and girls is essential in the context of DOHaD, promoting the education of girls is an example of probably the best investment that can be made globally.⁸²

Women derive multiple health benefits from being educated. One example is that motivating girls to stay in school longer, results in delayed childbearing and thus better obstetric and child health outcomes.⁸³ Hence, educated women have smaller

81 Macnab, Gagnon & Stewart, 2014a.

82 Pentecost et al., 2018; Davies, J.I., Macnab, A.J., Byass, P., Norris, S.A., Nyirenda, M., Singhal, A., Sobngwi, E. & Daar, A. 2018. Developmental Origins of Health and Disease in Africa – influencing early life. *Lancet Global Health*, 6(3):e244-e245. [[https://doi.org/10.1016/S2214-109X\(18\)30036-6](https://doi.org/10.1016/S2214-109X(18)30036-6)]; Sippel et al., 2011.

83 Wolf, S., McCoy, D.C. & Godfrey, E.B. 2016. Barriers to school attendance and gender inequality: Empirical evidence from a sample of Ghanaian schoolchildren. *Research in Comparative and International Education*, 11(2):178-93. [<https://doi.org/10.1177/1745499916632424>].

families, and development opportunities for their families and entire societies grow with a decline in birth rates.⁸⁴

The children of educated mothers also have significant advantages. Infant survival is more dependent on the level of maternal education than the income of the household.⁸⁵ A mother who can read and write is more likely to have her children immunised than one who is uneducated, and also to understand the importance of clean water and how to prevent diarrhoeal diseases better. Completion of six years of maternal schooling is associated with lower odds of a mother's children developing malarial parasitaemia, particularly in rural areas, in eight sub-Saharan countries.⁸⁶ And not only does a child of an educated mother have fewer siblings and tend to be healthier, he/she also has a higher likelihood of attending school, and will have more active maternal encouragement to do so.⁸⁷

Countries that are achieving lower birth rates today can invest more in their young people. Such investment can include additional education and programmes related to the understanding of DOHaD-related health issues, provided governments are part of the DOHaD awareness equation. Potentially, future generations will then profit from improved health and a reduction in non-communicable diseases, and in turn become part of the cycle of continuously improving opportunities for education, better health, and increasing levels of productivity.

As identified by the Berlin Institute for Population and Development, countries must recognise education to be the key factor for long-term progress with their development. Human capital increases through education, and it is a proven means of decreasing both morbidity and mortality. People empowered by education are better able to provide for their wellbeing, including their health and economic progress, and therefore are a benefit to society as a whole.⁸⁸

Hence the relevance of education to the DOHaD agenda, and the potential of Health Promoting Schools as an avenue for delivery.

84 Sippel et al., 2011.

85 Vergnani et al., 1998.

86 Siri, J.G. 2012. The independent effects of maternal education and household wealth on malaria risk in children. International Institute for Applied Systems Analysis. *Ecology and Society*, 19(1):33. [<http://doi.org/10.5751/ES-06134-190133>].

87 Mare, R. & Maralani, V. 2005. *How do women's educational attainments affect the educational attainment of the next generation?* California Center for Population Research. [<https://escholarship.org/uc/item/4b41k472>].

88 Sippel et al., 2011.

Conclusion

Health promotion using the WHO's Health-Promoting School model provides both knowledge and practical skills that enable individuals and the communities they live in to impact key determinants of health positively. Those who are knowledgeable and skilled can avoid many illnesses and injuries, and are more likely to choose a lifestyle and practices that decrease their dependence on government-funded healthcare delivery and therefore the WHO advocates Health-Promoting Schools as an investment in global child health. There is an urgent need to educate our young people about the DOHaD agenda and promote in them knowledge and behaviours aimed at reducing the global burden of non-communicable diseases. The evidence on health promotion through schools is that this is an avenue that is relevant to the context of DOHaD, and hence should be further explored and promoted wherever appropriate.