Well-Being and Mental Wellness

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Summary and Keywords

The scientific landscape of wellbeing and mental wellness has developed significantly through interdisciplinary cross-pollination by researchers in molecular genetics, neuroscience, sociology, economics, including traditional and complementary medicine. The public health challenge lies in using this diverse body of scientific evidence to reframe wellbeing and mental wellness within a 21st-century global public health framework that incorporates evidence-based modalities alongside Western biomedical practice. Evidence on modalities, case studies, policy examples, and emerging directions in societal objectives in wellbeing and mental wellness are discussed in the context of a way forward that focuses on individual self-care, development of resilience, lifespan pathways for wellbeing, and a different economic calculus in framing public health priorities and policies.

Keywords: first thousand days, SDGs, wellbeing, wellness, thriving, resilience, happiness, mental well-being, mental wellness, human potential, brain plasticity

Introduction

In 2017, the World Health Organization (WHO) produced the WHO Mental Health Atlas with data from questionnaires completed by 177 of WHO's 194 member states (World Health Organization [WHO], 2018) and used to monitor the development and implementation of WHO's *Comprehensive Mental Health Action Plan 2013–2020* (WHO, 2013).

The WHO Atlas reported that the level of public expenditure on mental health in low- and middle-income countries was low, and more than 80% of funds went to mental health hospitals. The allocation for human resources for mental health services has an extreme variation between low- and high-income countries (from 1 in low-income countries to 72 in high-income countries), whereas globally, the median number of mental health workers is 9 per 100,000 population (WHO, 2018). The number of mental health beds per 100,000 population is less than 8 in low- and lower-middle-income countries but over 50 in high-income countries (WHO, 2018). In the sector of mental health promotion and prevention, only 63% of WHO member states have a minimum of two functioning multisectoral mental health promotion and prevention programs at a national level, even though 72% of

member states have a dedicated policy or plan for mental health, and 57% have a stand-alone mental health law (WHO, 2018).

The WHO has taken the position that mental health

> is a state of wellbeing in which every individual realizes his or her own potential can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community.
>
> (WHO, 2019)

With mental health given its due importance in the UN Sustainable Development Goals (SDGs), for the first time leaders of the world have acknowledged that mental health promotion wellbeing, and the prevention and treatment of substance abuse, is likely to have a positive impact on communities and countries where millions of people require much-needed help. Goal 3 of the SDG framework, for example, is to ensure healthy lives and promote wellbeing for everyone and at all ages. Target 3.4 calls on countries to reduce premature mortality from non-communicable diseases by a third, through prevention, treatment, and mental health and wellbeing promotion by 2030. Target 3.5 calls on governments to reinforce and increase efforts in the prevention and treatment of substance abuse, including narcotic drug abuse and the use of alcohol at harmful levels.

The Lancet in 2007 consolidated decades of interdisciplinary studies and practice in a multitude of contexts and raised a call to action to stakeholders globally to “scale up services for people affected by mental disorders (including substance use disorders, self-harm, and dementia)” (Patel et al., 2018, p. 1553). The call to improve mental health services included a focus on disadvantaged communities living in low- and middle-income countries, where rights to care and dignity left much room for improvement. As The Lancet Commission reassessed the global mental health agenda, ten years on, and considering the SDGs, the global burden of disease related to mental disorders has “risen in all countries in the context of major demographic, environmental, and socio-political transitions” (Patel et al., 2018, p. 1553).

The opportunity is at hand to reconceptualize a global mental health agenda (in light of the SDGs and the Comprehensive Mental Health Action Plan from WHO), based on protecting the rights of people with psychosocial disabilities, through the consolidation of evidence from a variety of scientific disciplines and the adoption of ubiquitous digital technology. Additionally, the world leaders convened in New York on September 23, 2019, for the High-Level Meeting on Universal Health Coverage, at the margins of the UN General Assembly, and in their political declaration committed to implementing measures to promote and improve mental health and wellbeing as an essential component of universal health coverage addressing such areas as comprehensive and integrated services for the prevention and treatment of mental health conditions, specifically suicide prevention; substance abuse; and social determinants, in line with the human rights concept.

The Lancet Commission provided a four-pillar agenda to reframe global mental health at a population level. The Commission reported that:

Mental health is a global public good and is relevant to sustainable development in all countries regardless of their socio-economic status.

Second, mental health problems exist along a continuum from mild, time-limited distress to chronic, progressive, and severely disabling conditions. The binary approach to diagnosing mental disorders, although useful for clinical practice, does not accurately reflect the diversity and complexity of the mental health needs of individuals or populations.

Third, the mental health of each individual is the unique product of social and environmental influences, in particular during the early life course, interacting with genetic, neuro-development, psychological processes and affecting biological pathways in the brain.

Fourth, mental health is a fundamental human right for all people that requires a rights-based approach to protect the welfare of people with mental disorders, those at risk of poor mental health and an enabling environment that promotes mental health for all. (Patel et al., 2018, p. 1553)

Crisis in Non-Communicable Disease

The number of years lived with disability (YLD) from non-communicable diseases (NCDs) increased between 1990 and 2017 by 61.1% (James et al., 2018). A series paper on “syndemics,” published in *The Lancet* in 2017, refers to synergistic health problems that affect the health of populations under the influence of persistent social and economic inequalities. Medical anthropologists developed the term “syndemics” as a call for researchers and policymakers to alter their conceptual frameworks to understand risk factors better and improve the implementation of prevention and intervention programs. The purpose of the call is to account for the health burdens of transitioning populations, particularly in low- to middle-income countries (LMIC) (Mendenhall, Kohrt, Norris, Ndetei, & Prabhakaran, 2017). For example, diabetes is not only a syndemic interaction with poverty but may include structural factors such as forced migration, unemployment, gender inequality, racism, and a lack of social capital in a local context (Corburn & Hildebrand, 2015).

This crisis in NCDs is multifaceted because it requires a framework that can harness the power of “medicine, health systems, and human rights by bringing multiple fields together to recognise, describe, and appropriately intervene in the complex various disease burdens that afflict susceptible populations” (Mendenhall et al., 2017, p. 952).

A compelling example of using a syndemic framework to understand the crisis in NCDs is based on epidemiological evidence where depression is common among those with diabetes compared with the general population in LMICs. In India, anthropological research, referenced by Mendenhall et al. (2017), describes how depression is experienced differ-

ently among the rich and the poor. This is exacerbated by a variety of social factors that contribute to mental illness for those living with diabetes. Social isolation affects upper-middle-class Indian mothers, whereas financial insecurity in low-income mothers causes high levels of stress and psychological distress, which tend to result in depression (Mendenhall et al., 2017).

When researchers and policymakers consider the gravitas of the global syndemic of NCDs, a convergent model to address mental health by unifying the evidence from developmental science, neuroscience, intervention science, and epidemiology may provide a way forward (Patel et al., 2018).

In this article, the authors bring together the life course perspective (the first 1,000 days of life) and new developments in neuroscience, to reframe mental health and wellness in the context of brain plasticity throughout the adult lifespan, and address the insufficient care gap in mental health against a backdrop of the development of evidence-based, self-directed pathways toward growth and resilience in mental wellness.

Epidemiology and Global Public Policy

Mental and substance-use disorders are responsible for approximately 8% of the global burden of disease, with 700 million people worldwide falling victim to preventable causes (Ferrari et al., 2014; Whiteford et al., 2013). The burgeoning field of psychiatric epidemiology since the 1990s and a systematic review of the global prevalence of common mental disorders provided aggregated estimates for the prevalence of common mental disorders across a combined population of 829,673 participants, with 63 countries taking part in the survey. Of these, 106 surveys were from high-income countries (HIC), and 68 surveys from 37 low- to middle-income counties (LMIC) (Steel et al., 2014).

Despite limitations in the data, such as the presence of inter-survey heterogeneity and samples with potentially differing underlying population age structures between HIC and LMIC, the key findings paint a clear picture of the global epidemiology of mental health (Steel et al., 2014). The data indicate that one in five adults (17.6%) experienced a common mental disorder within the preceding 12 months and almost 30% across their lifespan. Across both HIC and LMIC, women were more at risk of experiencing a mood or anxiety disorder. In contrast, men were more likely to experience alcohol or other substance misuse disorder.

to Concerning lifetime prevalence, English-speaking HIC returned a higher prevalence, at 39.7% compared to other HIC and LMIC contexts. This may be due to the “English speaking sample including persons of more senior age who has passed through a more extended period of risk, particularly in comparison with surveys undertaken within LMICs” (Steel et al., 2014, p. 489).

Although these figures underestimate the actual burden of disease because of the universal complexity of diagnosing and reporting mental illness based on a narrow definition of

disease burden that excludes the impact it has on families and society, it is mostly due to the limited and far from equitable global provision of mental health services (Gilbert, Patel, Farmer, & Lu, 2015).

Through the use of the Creditor Reporting System, Gilbert et al. (2015) reported that the amounts and patterns of development assistance for global mental health (DAMH) in developing countries between 2007 and 2013 saw an increase but remained low both in absolute terms and in terms proportionate to the total development assistance or health. The average annual DAMH funding provided from 2007 to 2013 was US$133.57 million, which is less than 1% of the total financing of development assistance for health. Mental health has not received significant development assistance despite sustainable mental healthcare being integrated into the existing health systems at a relatively low cost (Gilbert et al., 2015).

A fundamental critique of the global policy is the interpretation by policymakers, planners, and researchers of the *treatment gap* as referring entirely to curative clinical interventions that exclude all effective psychosocial wellness modalities (Pathare, Brazinova, & Levav, 2018). As the use of the term “treatment” often prioritizes a biomedical approach to mental health disorders and the often-overlooked needs of children and adolescents with highly unattended physical comorbidity and early mortality, Pathare et al. (2018) proposed a holistic approach in the care continuum called the mental health care gap. Hence the Mental Health Care Gap = Treatment Gap (biomedical approach) + Psychosocial Care Gap + Physical Care Gap (Pathare et al., 2018, p. 464).

A study of treatment provision in HIC (Australia, Canada, England, United States) to reduce the prevalence of common mental disorders, found “none of the four countries had any evidence for a reduction in the prevalence of disorders or symptoms.” Instead “there were indications of changes in the opposite direction in Australia, England and the United States”(Jorm, Patten, Brugha, & Mojtabai, 2017). This review by Jorm et al. (2017) shows that in Canada, the United States, and Australia, treatment was not of an adequate standard. Another critical point was that in Australia, England, and the United States, treatment was often received by people who did not meet the criteria for a diagnosis (Jorm et al., 2017).

Defining Well-Being and Mental Wellness

A diverse set of scientific disciplines, such as psychology, sociology, and economics, have contributed to the task of defining wellbeing. The pursuit of a definition dates back to the time of Aristotle. He considered hedonic “‘happiness to be a vulgar ideal’ and preferred eudemonic wellbeing as the ultimate state of human potential” (Ryan & Deci, 2001, in Hanc, McAndrew, & Ucci, 2019, p. 145). A practical example of interdisciplinary work is a collaboration between researchers and practitioners from the Mental Wellness Initiative (MWI) of the Global Wellness Institute, resulting in a white paper, mapping contemporary

wellness pathways and evidence, as well as future implications for mental health and wellbeing (Bodeker et al. 2018).

The MWI's white paper *Mental Wellness: Pathways, Evidence and Horizons* conceptualize wellness in terms of a general sense of wellbeing in the physical, social, occupational, spiritual, financial, and environmental aspects of our lives. The process of maintaining mental wellness is viewed as lifelong and involves developing the skills and knowledge to make conscious choices about living a healthy, purposeful, and fulfilling life. This lifelong process enables individuals to realize their potential, cope with daily stresses, work productively, and contribute meaningfully to family, community, and society (Bodeker et al., 2018).

The Better Life Initiative of the Organisation of Economic Co-operation and Development (OECD, 2011) identifies three pillars for understanding and measuring people's wellbeing:

Material living conditions (or economic wellbeing), which determine people's consumption possibilities and their command over resources.

Quality of life, which is defined as the set of non-monetary attributes of individuals that shapes their opportunities and life chances and has intrinsic value under different cultures and contexts.

The sustainability of the socioeconomic and natural systems where people live and work, which is important for wellbeing to last over time. Sustainability depends on how current human activities impact on the stocks of different types of capital (natural, economic, human, and social) that underpin wellbeing.

Psychological Perspectives of Well-Being

The stream of research that defines wellbeing by the degree of positive feelings experienced, such as happiness, and the perception of one's overall life (whether the individual is satisfied or not) is *emotional* wellbeing (Dodge, Daly, Huyton, & Sanders, 2012; Magyar & Keyes, 2019). The next stream of research, known as *psychological* wellbeing, according to Magyar and Keyes (2019), is based on eudemonic wellbeing and includes modalities of positive functioning where individuals realize their potential in terms of autonomy and personal growth. Those who are high in emotional wellbeing feel good about life while those who have high psychological wellbeing or social wellbeing function well in daily routine and are resilient (Magyar & Keyes, 2019; Patel et al., 2018).

Mental wellness can be "defined as an asset or resource that enables positive states of wellbeing and provides the capability for people to achieve their full potential" (Patel et al., 2018, p. 1562). The challenge to demarcate the differences between mental wellness and disorder is such that individuals could struggle with symptoms of mental disorder but at the same time also be able to maintain a degree of mental health parallel to their expectations of life satisfaction, flourishing, and achieving their potential. According to Pa-

tel et al. (2018), the association between mental health and disorder is not linear, even though it may seem that they exist on a continuum.

In a scoping review by Christmas and Khanlou (2018) on the definition of youth resilience, mental health is seen as “a state of wellbeing in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community” (WHO, 2016). The notion of “normal stresses of life” stands in contrast to the definition of resilience provided by Tusaie, Puskar, & Sereika (2007, quoted in Christmas & Khanlou, 2018), where good mental health or resilience is the capability to adapt better than expected in the face of significant adversity or risk. The ambiguity of definition can lead to an incomplete understanding and the inability to measure wellbeing and mental wellness. Panter-Brick (2014, p. 432, quoted in Christmas and Khanlou, 2018) defined resilience “as the process of harnessing key resources to sustain wellbeing.” Well-being has also been framed as a state instead of a construct: “a condition of a system in which the essential qualities are relatively stable” (Reber, 1995, p. 750). Building on this, Hanc et al. (2019, p. 230) offer a definition of wellbeing that is “the balance point between an individual’s resource pool and the challenges faced.”

A multidimensional construct of the definition of wellbeing with the term “flourishing” or “optimal functioning” is a common approach in wellbeing research (Hanc et al., 2019). Seligman, Parks, and Steen (2004) aligned their definition of wellness to endeavors that strive to capture the complex nature of human flourishing (through positive emotion, engagement, relationships, meaning, and accomplishment) instead of preventing or ameliorating “mental illness” (Hanc et al., 2019).

Sociological Perspectives of Well-Being

Keyes (1998, p. 122) defined wellbeing as “the appraisal of one’s circumstance and functioning in society” and proposed five dimensions that capture the global definition of social wellbeing: social integration, social contribution, social coherence, social actualization, and social acceptance. Veenhoven (2008) proposed that reality is constructed between and among social agents, and subjective wellbeing is a cognitive construct:

> Ancient thinkers viewed happiness as a far more social phenomenon, co-produced and collective rather than the individualised notion that we see today.
>
> (Hanc et al., 2019, p. 770)

Social capital is also considered a dimension of wellbeing, a determinant linked to subjective wellbeing intertwined with interrelationships such as marriage, family, friendships, work colleagues, and neighbors; and with concepts such as engagement with the broader society, trustworthiness, and trust (Hanc et al., 2019).

Economic Perspectives of Well-Being

Amartya Sen's research in capacity and capabilities asserts that wellbeing can be assessed by understanding the individual's capabilities to act and that the evaluation of that individual should be based on the context of the opportunities available and not his or her achievements (Hanc et al., 2019). The New Economics Foundation (NEF) (Michaelson, Mahony, & Schifferes, 2012) has been successful at bridging hedonic elements of wellbeing with economists' theories of capabilities. The NEF proposed that the feeling of "happiness" can enable improved overall wellbeing by building personal resources and capabilities and triggering positive responses in moments of crisis. The NEF asserts that the interaction between the internal drivers (such as health, optimism, and self-esteem) and external drivers (income, housing, education, and social networks) enables functioning at an individual level, resulting in the experience of positive emotions and "flourishing" (Hanc et al., 2019).

In microeconomics, a larger pool of choice is assumed to contribute to a higher quality of life, where individuals can make decisions that maximize their wellbeing (Kahneman, 2003, in Hanc et al., 2019). Diener and Seligman (2004) clarify this apparent contradiction, which equates to a higher level of wellbeing, with income as a proxy:

> One challenge for a society based on wellbeing is that individuals do not have ready and concrete models of how to pursue the goal of greater wellbeing, other than following the economic model. When people are asked what would improve the quality of their lives, the most frequent response is higher income. It is not clear to people how they would achieve greater positive emotions and life satisfaction. Until there are concrete and proven steps toward these non-economic aims, people are unlikely to abandon the dominant economic paradigm.
>
> (Diener & Seligman, 2004, p. 25)

The *OECD Framework for Statistics of the Distribution of Household Income, Consumption and Wealth* (2013a) presents several options for measurement and makes a case for the development of economic indicators as proxies for wellbeing, in particular addressing two options: a macro-approach (which has its roots in national accounts and, in particular, the accounting-based standards laid out in the System of National Accounts); and a micro-approach (which has its roots in microeconomics and particularly in the study of poverty and its effect on different socioeconomic groups within society), probably more relevant when assessing societal impacts.

Measuring Wellness

Population measures of wellness are based on objective indicators of progress and have been challenged by researchers in several behavioural and social science disciplines (Diener & Seligman, 2004; Huppert et al., 2009; Layard, 2011), who have recommended that they are supplemented with subjective measures of how respondents experience life. Ob-

jective indicators such as gross domestic product (GDP), financial status, consumption, crime rate, and education are most often associated with people's experiences when measuring happiness or life satisfaction (Huppert et al., 2009).

In 2011, The UN General Assembly passed the resolution *Happiness: Towards a Holistic Approach to Development*, urging member nations to follow the example of Bhutan for measuring happiness and wellbeing, and calling happiness a "fundamental human goal" (United Nations [UN], 2011). In 2012, Bhutan's prime minister Hon. Jigme Thinley and the UN secretary-general Ban Ki-Moon convened the High-Level Meeting on Well-Being and Happiness to encourage the spread of Bhutan's Gross National Happiness (GNH) philosophy (UN, 2012). Shortly after the high-level meeting, March 20 was declared to be International Day of Happiness by the UN in 2012 with resolution 66/28.

The World Happiness Report (Helliwell, Huang, & Wang, 2019), which has contributed to our knowledge of wellbeing with analysis on how happiness is defined and distributed globally, is concerned with how people evaluate their lives holistically instead of via domain-specific wellbeing outcomes (de Neve & Ward, 2017). Happiness is studied through the lens of social inequality; for example, "those who feel their livelihood is at risk systematically report lower levels of subjective wellbeing than those who report having high levels of perceived job security (de Neve & Ward, 2017, p. 18).

Studies on inequality mainly focus on how income and wealth are distributed. Helliwell et al. (2019) argued that income is insufficient in scope as an indicator of overall quality of life, and income inequality is a limited measure of overall inequality. For example, inequalities in the distribution of health have direct effects on the levels of life satisfaction beyond perceptions of wellbeing based on income alone. Another example is when social trust measures are lower where income inequality is greater and is best measured through inequality of subjective wellbeing (Helliwell et al., 2019).

The research on the connection of one or more dimensions of religion and health has been extensive, but not between the concept of spirituality and health (Peterman et al., 2002). Many of the studies on the role of religion in health (e.g., in living with cancer) used measures that were not validated or reliable (Peterman, Fitchett, Brady, Hernandez, & Cella, 2002). The study of the role of spirituality in health has come as researchers are finding that there has been a change in the baby boomer generation with regard to religion, which can be described as a "defection from organized religion and worship and a more personal search for spiritual fulfilment" (Huppert et al., 2009, p. 49). By examining spirituality instead of specific religious beliefs, as many of the tools were designed to measure Christian denominations, researchers could be more inclusive in their studies of the vast diversity of religious traditions and those that identify as spiritual, but not religious (Peterman et al., 2002).

In a report to the French government, Stiglitz, Sen, and Fitoussi (2017) stated that what is measured has a direct impact on how interventions are designed to improve wellbeing. Beyond a simplistic focus on the dichotomy of positive-negative emotions, wellbeing is characterized as a set of indicators across multiple domains instead of a single factor

(Forgeard, Jayawickreme, Kern, & Seligman, 2011; Frey & Stutzer, 2010; Kern, Waters, Adler, & White, 2015).

Based on Seligman's (2011) work, a model of flourishing called PERMA was introduced to measure indicators in an educational setting (Kern et al., 2015). The indicators measured in this model are positive emotions [P], engagement [E], relationships [R], meaning [M], and accomplishment [A] (citation for PERMA). *Positive emotions* are defined as life outcomes such as satisfaction, hope, gratitude, physical vitality, and activity. *Engagement* measures psychological interest and an active approach to life. *Relationships* measures the feelings of connection and being supported by others. *Meaning* measures individual sense of personal purpose, daily accomplishments, and social support; and *accomplishment* identified people's level of perseverance and success in areas such as marriage, career, and self-mastery or self-determination (Ryan & Deci, 2001). These multidimensional measures to assess wellbeing and its gauge on the subjective perspectives of wellbeing will potentially support successful promotion of wellbeing.

The Economist Intelligence Unit found that cost-effectiveness—or return of investment (ROI) of wellness programs in the corporate sector—is no longer a primary measure used by employers. Employers, however, still lack adequate information to evaluate their top wellness program objectives (i.e., improving employee health as an indirect driver of productivity, morale, and engagement), caused by a lack of guarantee on how employee privacy and data sharing concerns can be resolved (Economist Intelligence Unit, 2014). *The Future of Wellness at Work Report* from the Global Wellness Institute indicates that the evaluation of employees' perception of their company as caring about their health and wellness (which only 37% did), resulting in the significant improvement of the employees' overall health and job engagement/satisfaction (Global Wellness Institute, 2016).

In Meiselman (2016), ten dimensions of wellness were identified from 20 published wellness models. These wellness dimensions, though lacking in critical reflection on their Western middle-class perspective, are grouped into five broader categories; Physical, Social, Emotional/Psychological, Intellectual, and Spiritual (Meiselman, 2016).

A randomized controlled trial of 5,000 participants of a multiyear research project claimed zero benefits from a corporate wellness program after its first year of implementation. The study found that measuring ROI was not as suitable as measuring the value on investment (VOI) of employee wellness programs. The factors that are used to measure effectiveness with a VOI model are improved culture of wellness, increased employee education on wellness (i.e., improved sleep, rest, eating less fast food), improved health status (i.e., more and better nutritional choices), and regular positive feedback from employees who benefited from the wellness program (Kohll, 2018). Limitations to this study, however, must be acknowledged. Although this is a multiyear study, data were only collected in the first year, employees who participated in the program were already leading healthy lifestyles, and the outcome measures were related to health behaviors—which may be too complex a behavior change outcome to aim for.

The Organisation for Economic Co-operation and Development Guidelines for measuring subjective wellbeing urged investigators to measure cognitive evaluations of one's life as well as positive and negative emotions. The guidelines enable a more comprehensive measure of people's quality of life and a more nuanced understanding of its determinants (OECD, 2013B).

Another helpful perspective from the corporate sector on what should be measured in wellness programs is a list of five key factors:

1. Employee levels of engagement with the wellness program
2. Tracking of minimum improvements in employee health trends
3. Employee access to health services
4. Employee performance at work
5. Employee work satisfaction

Such indicators are useful in measuring the effectiveness on wellness programs for employees (Rook, 2015).

Early-Life Prevention: The First 1,000 Days of Life

Wellness strategies before conception and during pregnancy, as well as in early childhood, all combine to tip the scales toward health (including mental health) rather than disease.

The future of an individual's mental health may be affected during the developmental process and calls for the examination of the phenomena that lead both to positive and negative influences of the state of mental health later in the lifespan. The focus here is the developmental stage of early life, from conception, or even preconception, to newborn and two-year-old children: this period is now recognized as "the first 1,000 days of life."

This article looks at specific mechanisms that have been shown to mediate molecular signalling and cause biological perturbations with a deleterious impact on health during early human developmental phases. Furthermore, parental epigenetic inheritance and exposures to stressors during pregnancy have been recurrently associated with the offspring's onset of non-communicable diseases (NCDs), including neurodegenerative diseases.

Environmental Plasticity and Predictive Adaptive Response

Much of what a pregnant woman encounters in her daily life is shared in some fashion with her fetus, and the fetus incorporates these into his or her own body and mind. The events during this time will permanently influence the functioning of the organs and the

wiring of the brain—the so-called fetal programming and neurodevelopment that represent the blueprint of the individual's future existence. It has been a revolutionary shift; from a paradigm in which DNA was a static and unchangeable program to build our body, to a DNA that is vulnerable and modifiable by everything that surrounds human beings (the environment) even before the parental germ line fuses.

The interplay between inherited genes and the exogenous stimuli through gene-environment interaction represents the organism's effort to fine-tune the genome functioning by producing phenotypic profiles adapted to the predicted changing environment (Gluckman & Hanson, 2004). In fact, during the ontogenetic development of most species, including humans, the process of plasticity induces phenotypic variations that provide a fit adaptation to the ever-changing environment (Bateson, Gluckman, & Hanson, 2014). Through molecular mechanisms, including epigenetic control of DNA expression (Godfrey, Lillycrop, Burdge, Gluckman, & Hanson, 2007), the organism responds to environmental stimuli that do not cause changes in the genome. Environmental distress causes perturbation of biological development with differential sensitivity, and according to tissue-specific critical windows of susceptibility. This phenomenon is known as adaptive developmental plasticity (Bateson et al., 2004; West-Eberhard, 2003). The program transmitted by parents and prior generations have the potential to be completely modified by the environment. The environment includes air, water, earth, food, the physical exercise practised, the connections between human beings, and even the music an individual listens to on a mobile phone.

All these interactions allow a differential expression of an individual's DNA based on the positive or negative stimuli from the environment, generating a reaction from the person's biological system and determining who the person is and how he or she is doing. The magnitude of these stimuli on the body is incredibly more intense during the early phases of life when the plasticity is highest.

But there is another environment, perhaps more profound and more powerful: the environment of emotions. A mother's emotions during pregnancy condition the micro-RNA that in turn regulate gene expressions of the fetus and the future offspring of this fetus, for three generations.

Positive emotions, which provide a proper development of the brain, can set up excellent conditions; however, negative ones, such as maternal stress, fear, and anxiety, may produce a disruption in the brain development, whose outcome can be irreversible disorders later in life, such as schizophrenia or Parkinson's disease.

Emotions are a fundamental epigenetic factor that acts on what is called the *connectome*, the system of neural networks, the connections within the brain, and the nervous system. The emotions are thoroughly shaped by connectomes, and 100 billion interconnected neurons, including the senses, are connected with the connectome. When people touch each other, when a mother touches her baby, when human beings look at each other, when the mother looks at her baby and smiles at him—these emotions activate the whole body and act on the DNA. DNA responds to emotions because, as pointed out, it is an adaptive DNA

that learns from experience. It is a powerful phenomenon called *interdependence*. Human beings are connected. The mother and the baby are connected, and it is a connection of memories, looks, smiles, and touches.

Each day people have the opportunity to modify their relationships by changing their daily activity and behaviour. Only a few days after birth, a baby can recognize 70 different types of its mother's smiles. A 30-second hug activates oxytocin and many other hormones that will dramatically shape the way the baby will relate to his or her family, to friends, and the world.

It has been suggested that developmental plasticity may lead to a postnatal phenotype predicted by the conditions of early life and that a mismatch between prediction and subsequent reality leads to later health problems (Godfrey et al., 2007). The plasticity of tissues is mainly affected by environmental exposure during development in utero, although in some other cases (respiratory, immune systems, and the brain) tissue development extends into childhood. As tissues develop, sensitivity to environmental insults and functional changes drop, leading to an increased susceptibility to diseases later in life (Barouki, Gluckman, Grandjean, Hanson, & Heindel, 2012).

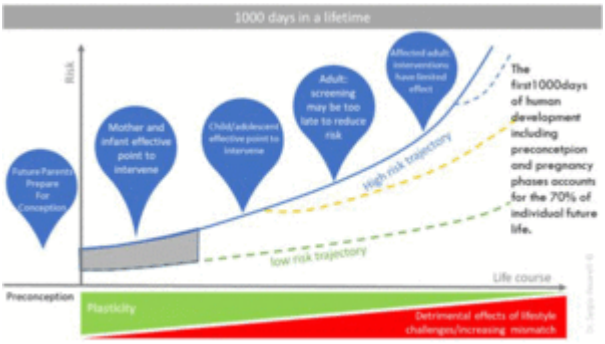

Figure 1. The First 1,000 Days of Life—the most optimal stage for public health and mental wellness intervention.

The Parental Role

Parental environmental exposures affecting gametes may play an essential role in determining the newborn's phenotypes. As tissues develop, sensitivity to environmental insults and functional changes gradually decrease, leading to the second phase of susceptibility to diseases later in life (Barouki et al., 2012).

The effect of parental epigenetic inheritance on various chronic conditions is confirmed by increasing evidence. Several major neurodevelopmental disorders are linked to paternal and maternal epigenetic inheritance. Exposures to stressors during pregnancy has been recurrently associated with offspring's onset of cardiovascular (atherosclerosis, hypertension, coronary heart disease, and heart failure), metabolic disease (reduced fetal growth, obesity, and diabetes) (Bell, 2017; Gehring, Tamburic, Sbihi, Davies, & Brauer,

2014; Harris & Seckl, 2011; Jimenez-Chillaron, Ramon-Krauel, Ribo, & Diaz, 2016). The impact has also been documented in neurological (vasomotor disorders, attention deficit, impaired cognition, a potential delay of temporal processing acuity, and reduced brain volume in children), renal (chronic kidney disease) (Yzydorczyk et al., 2017), mental and psychiatric conditions (Ambeskovic, Roseboom, & Metz, 2017), with gender differences.

Rational Preventive Interventions in the First 1,000 Days

Practical preventive interventions for populations can be created to significantly lower the burden of healthcare costs and increase the quality of life, but these require a change in mindset. The target of interventions needs to focus on an individual (the fetus/infant) who is not responsible for his or her lifestyle. It involves an environment (that often can be rarely or only narrowly changed) that is much wider than the fetus/infant's immediate surroundings.

Such efforts require a systemic approach representing a challenge for governments and stakeholders, and it may generate a dramatic social, health, and economic impact. The private sector shares responsibilities with public institutions while foreseeing an opportunity to redesign market strategies toward more ethical products. Technological development and societal advances must work in parallel with education for a systemic integration of prevention strategies, highlighting their societal importance and high-impact status.

Mental health and wellness underpin all health and wellbeing and optimize the conditions for a resilient and thriving population; preventive efforts should continue to focus on the first 1,000 days, providing a game-changing perspective shift to develop more efficient healthcare systems. A consistent, sustainable, commitment and active investment by governments, industry, academic and civil society represents a prerogative to tackle preventable health issues and inequities globally.

So far, priority efforts to prevent NCDs have primarily focused on adult individuals' risk factors (poor diet, physical inactivity, smoking, and alcohol consumption) while almost ignoring early stages of development for individuals.

Ultimately, the assessment of the feasibility, efficacy, effectiveness, and efficiency of preventive strategies, inspired by the first 1,000 days paradigm with a life-course and multilevel outcome perspective, represents an essential step to support specific policy activities objectively.

In the 21st century, there is an agreement that the first 1,000 days of life, from conception to the second year of life, are the most critical determinants of health of individuals and probably account for 70% of good health and wellness in life.

When faced with the issue of the prevention of NCDs, including mental health and wellness, there should be the realization that prevention must begin early in life, even before conception. It is also remarkable how lifestyles, including parental behaviour, and the environment play a vital role in the early developmental process of life, and these impact the individual directly. The implications are that the wellness world and wellness practices, so profoundly rooted in prevention practices, can play a critical role in the world to have positive impact from the beginning of life; and it is an individual and societal responsibility to educate and empower the population with this life-changing perspective.

Neuroplasticity and Mental Wellness

Until the last several decades, the “hard science” explanation for the impact of wellness practices evaded scientists; this changed with the advent of revolutionizing research technologies in brain imaging and molecular genetics. In the book entitled *Decade of the Brain*, published during the 1990s, knowledge of the most complex structure in the universe underwent a paradigm shift (Goldstein, 1993). Although the scientific community had been convinced that the human brain was fixed and incapable of change on reaching adulthood and that people were born with a fixed number of brain cells that would decline inevitably with age, new evidence emerged that proved this paradigm was not only inaccurate but far from the truth. It was discovered that stem cells exist in the adult brain and are shown to have the capacity to develop into mature functional neurons that aid in memory and learning in a remarkable process called *neurogenesis*. In line with this new evidence, there is substantial knowledge that can explain how wellness habits promote our brain to change and rewire itself through a lifelong process termed *neuroplasticity*.

Neuroplasticity refers to the ability of the nervous system to adapt, change, and rebuild, and is strongest during our first five years of life. The agile nature of neural cells occurs on multiple levels, ranging from microscopic to the observable and behavioural. On the other hand, brain plasticity is also vulnerable to harmful, dysfunctional, and undesirable adaptations and change, despite its ability to make favourable positive changes. Therefore, in this critical period of activity-dependent plasticity, neural connections are formed at an immensely rapid pace. This window of heightened plasticity, our first five years of life, provides us with the invaluable ability to learn with enormous ease. Even new skills may be acquired through mere observation, immersion, and interaction in our social environment. During the developmentally sensitive periods of “use it or lose it,” neural connections become stronger and more permanent through repeated use. Weak or unused neural connections may Prune off, and hence repetition is the key to learning and mastery.

The impact of stress on a developing brain, such as on a child or an adolescent, can have a lifelong effect and is avoidable when provided with the right wellness support. Psychosocial stressors in childhood, such as poverty, parental separation and divorce, emotional neglect, psychological, physical or sexual abuse, mental illness and substance abuse in the home environment, are capable of negative rewiring in the development of

our prefrontal cortex. The prefrontal cortex is the part of the higher-level brain regions that benefit from wellness practices.

When the prefrontal cortex is exposed to experiential stimuli (i.e., sensory, emotional, and intellectual) at moderate levels of stress, the brain is capable of optimal performance. Too little or too much arousal impairs functioning. The ability to challenge oneself outside the comfort zone promotes neuroplasticity in favour of growth and resilience. Therefore, the deliberate and active maintenance of this perpetual back-and-forth state of balance between optimal stress and restorative rest is vital for driving positive neuroplastic changes.

Figure 2. Yerkes-Dodson Law: Inverted U-relationship between stress/arousal level and performance (see Teigen, 1994).

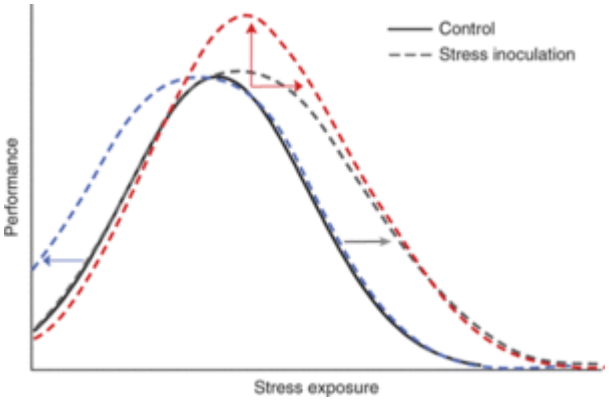

Figure 3. Stress inoculation shifts the inverted U-shaped curve to promote resilience (reused with permission (see Russo, Murrough, Han, Charney, & Nestler, 2012).

Committing to a life of mental wellness is instrumental to thriving in the 21st century. In order to meet the evolving needs of our present and the future, the brain's plasticity must be harnessed toward positive growth. Wellness-based neuroplasticity enables people to achieve self-actualization and ultimately undergo a transformation toward self-transcendence. Only when this dimension of wellbeing is realized are people able to set aside their

own needs to help others fulfil theirs. To this end, people will be able to create a sustainable, integrated, and harmonious path toward personal and global wellness.

Overview of Wellness Modalities

Wellness modalities are a range of activities and programs that have positive effects on somatic, psycho, and emotional wellbeing. This section provides a general introduction to a few modalities that experienced a surge in research activities, now translated to the broader population.

The microbiome of the human gut comprises bacteria, protozoa, fungi, nematodes, and viruses, among others (Wang & Wang, 2016). Disruption of the gut-brain axis is indicated in the pathogenesis of a diverse range of diseases, including Parkinson's disease and irritable bowel syndrome (Wang & Wang, 2016). There are more than 500 million information-transmitting neurons embedded in the wall of the human gut, outnumbering those in the spinal cord by five to one. These information-transmitting neurons provide the body with "a second brain," known as the enteric nervous system (ENS).

The ENS connects with the central nervous system (CNS), the brain, the spinal cord, and the autonomic nervous systems (ANS), creating a bidirectional gut-brain axis (GBA), which links physiological, behavioural, and cognitive functions with intestinal digestion, absorption, and excretion. The vagus nerve is central to this gut–brain axis. The nerve contains 80% of afferent fibres and 20% of efferent fibres, and innervates the entire digestive tract. Chronic stress in the early stages of life induces dysbiosis in rats through modifications of intestinal permeability and may later sensitize adult rats to visceral hypersensitivity (Moussaoui et al., 2017). Stress inhibits the vagus nerve and stimulates the nervous system to produce inflammatory disorders and thus favour dysbiosis by disrupting homeostasis (Bonaz, Bazin, & Pellisier, 2018). Gut disorders, known as functional gastrointestinal disorders (FGIDs) are associated with the prevalence of both depression and anxiety, and these increase with both the number of FGIDs and the frequency and severity of GI symptoms (Pinto-Sanchez et al., 2015).

Nutrition and the Brain

The immune system, oxidative biology, brain plasticity, and the microbiome–gut–brain axis are critical targets for nutritional interventions. The most effective way to provide resiliency against the pathogenesis of mental disorders is higher intakes of whole foods, whole grains, lean meat, nuts, and legumes, with avoidance of processed foods (Sarris, Mischoulon, & Schweitzer, 2012). Dietary habits modulate the function of the immune system, which is also implicated in mental disorders, operates with the support of nutrient cofactors and is implicated in mental disorders, and operates with the support of nutrient cofactors and phytochemicals (Sarris et al., 2012).

The relationship between unhealthy dietary patterns and poorer mental health in children and adolescents (increased consumption of processed foods) has been independently associated with a higher likelihood of risk of depression and anxiety, as has better mental health with a good-quality diet (O'Neil et al., 2014). The evidence is clear that supplements such as omega-3 fatty acids, S-adenosyl methionine (SAMe), N-acetyl cysteine (NAC), zinc, vitamin B (including folic acid), and vitamin D influence neurochemical modulation that in turn benefits the management of mental disorders (Jacka, 2017; Sarris et al., 2012).

Landmark research by Professor A. David Smith of Oxford University has found that affordable vitamin B supplements stopped shrinkage of the area of the brain, the medial temporal lobe, that contribute to Alzheimer's disease. A combination of vitamin B6 (20 mg), B12 (500 mcg), and folic acid (800 mcg) slowed the process of decline associated with Alzheimer's disease by eightfold compared to those on the placebo. The evidence strongly indicative that vitamin B supplements may be slowing or potentially arresting the disease process associated with early-stage cognitive decline and the first treatment of its kind to show this (Douaud et al., 2013).

Inflammation and Mental Health

Inflammation might be a common mechanism underlying the comorbidities between depression, schizophrenia, coronary heart disease, and diabetes mellitus. Sugar, saturated fats, trans fats, refined carbohydrates, red meat, and alcohol have all been found to cause inflammation in the body, which in turn is associated with pain, cancer, diabetes, obesity, and arthritis. Mood disorders such as depression and anxiety, as well as more severe conditions such as autism, dementia, and even schizophrenia, have all been linked to inflammation of the brain (Danzter, O'Connor, Freund, Johnson, & Kelley, 2008).

Wellness approaches tackling inflammation focus mainly on diet and supplements. Numerous studies have demonstrated the potent anti-inflammatory effects of turmeric, which in turn accounts for this being one of the most significant selling products in the wellness supplement market (Zecha, 2017). Anti-inflammatory foods include fruits and vegetables high in antioxidants and polyphenols.

Dr Francesco Branca in the BBC (Branca, 2019) referred to obesity and malnutrition as a burden on emerging countries where failing food systems is a new reality, thereby increasing poor mental health outcomes, especially for children. In addition, *The Lancet* and the WHO makes the point that those food systems contribute to nutritional psychiatry and are at the core of mental health and wellbeing (Branca, 2019; Mendenhall et al., 2017).

Rest

Using a newly developed Living Well Index, researchers from Oxford Economics and the National Centre for Social Research in the United Kingdom (Oxford Economics & National Centre for Social Research, 2019) reported that a good night's sleep is worth more than quadrupling disposable income and is the most significant single contributor to living better (Sainsbury's & Oxford Economics, 2018).

Researchers from the University of Basel found a connection between the brain, the different phases of the moon and how it affects human biology, particularlysleep, and subsequently, physical and mental health (Cajochen et al., 2013). The effects of the lunar cycle, possibly due to disturbances of the Earth's electromagnetic field or to changes of the lunar gravitational force on Earth, are purported to affect the "biological tide," which results in an altered autonomic neural activity and cardiovascular activity during different lunar phases (Chakraborty, 2014).

Meditation

Meditation was a poorly understood personal development technique of both the East and West until 1970, until *Science* published the first rigorous scientific research paper showing that during meditation, oxygen consumption and heart rate decreased, skin resistance increased, and the electroencephalogram showed specific changes in certain brain frequencies. Led by Dr R. K. Wallace, a study that measured the physiological effects of the Transcendental Meditation (TM) technique, distinguished meditation from other resting states, and began the steady growth of meditation research that has progressed unabated for the almost half a century that followed (Wallace, 1970).

Studies on the technique studied by Wallace have found reductions in anxiety (Tomljenovic, Begic, & Mastrovic, 2016) and post-traumatic stress (Rees, Travis, Shapiro, & Chant, 2014), and improvement in the mental health of caregivers. In a study on survivors of the Japanese earthquake-tsunami of 2011, advances were made in both psychological and physical symptoms when following instructions in the TM meditation technique (Yoshimura et al., 2015).

In studies on mindfulness meditation, researchers found some forms of meditation may have salutary effects on telomere length and hormonal factors that may promote telomere maintenance by reducing cognitive stress, stress arousal and increasing positive states of mind (Conklin et al., 2018; Epel, Daubenmier, Moskowitz, Folkman, & Blackburn, 2009).

Massage

According to the U.S. National Institutes of Health National Center for Complementary and Integrative Health (NCCIH), much of the scientific research on massage therapy is preliminary or conflicting. Still, much of the evidence points toward beneficial effects on pain and other symptoms associated with several different conditions. Evidence suggests that these effects are short term and that people need to continue receiving massages for the benefits to endure (NCCIH, 2019).

A 2010 meta-analysis of 17 clinical trials concluded that massage therapy might help to reduce depression. According to a 2012 NCCIH-funded clinical trial a brief twice-weekly yoga and massage session for 12 weeks was associated with a decrease in depression, anxiety, back and leg pain in pregnant women with depression (NCCIH, 2019). For generalized anxiety disorder, massage therapy may help temporarily reduce pain, fatigue, and other symptoms associated with fibromyalgia, but the evidence is not definitive (NCCIH, 2019).

Aroma

Aromatherapy uses essential oils, which contain a mix of active ingredients (concentrated extracts taken from the roots, leaves, seeds, or blossoms of plants), and this mix determines how it is used. Some oils are used to promote physical healing, for example, to treat swelling or fungal infections. Others are used for emotional value, which may enhance relaxation. Orange blossom oil, for example, contains a large amount of an active ingredient that is thought to be calming. Smell loss occurs with both Parkinson’s disease and Alzheimer’s, and studies have indicated that a diminishing sense of smell can be an early sign of the onset of both conditions, occurring several years before motor skill problems develop (Doty, 2017).

The University of Maryland’s Center for Integrative Medicine reports evidence suggesting that citrus oils may strengthen the immune system and that peppermint oil may help with digestion. Fennel, aniseed, sage, and clary sage have estrogen-like compounds that may help relieve symptoms of premenstrual syndrome and menopause.

Technology is keeping pace with this growth in aromatherapy. One such innovation is Cyrano, described as a “digital scent speaker and mood modification platform.” Cyrano is a small device that connects to a smartphone and releases a “symphony” of distinct smells from one place. With a few presses of a button, users can match the scent to whatever their mood is. The increasing availability of essential oil-based products and technologies makes self-managed aromatherapy an available home-based option and hence democratizes a dimension of the wellness industry, often perceived as out of reach for the majority.

Being in Nature

A cross-cutting theme in this article is *complexity*. A recommended approach to working with complexity is to embrace the uncertainties of intervention and policy implementation addressing syndemics (Khan et al., 2018). What do climate, anxiety, and children have in common? Depression and post-traumatic stress disorder are connected to global concerns of climate change, affecting children's mental health as well as their physical health (Clayton, Manning, Krygsman, & Speiser, 2017; Wiley, 2019). As the air that we breathe becomes more polluted and may reduce child life expectancy, for example, in Birmingham (Matthews-King, 2019), many adults, youth, and—interestingly—children experience *eco-anxiety*. Eco-anxiety is a recent psychological disorder afflicting people who show concerns about the environmental crisis (Castelloe, 2018). Research by Kassouf suggests that people include their interaction with the Earth as a new object relation and use ecotherapy as a treatment modality to channel a client's emotional energy toward aspects of the natural environment. Activities such as gardening, forest bathing, and community recycling projects are examples of tackling mental health challenges associated with climate change (Kassouf, 2017).

The *British Medical Journal* published a study in 2005 that built on the concept of biophilia (Wilson, 1984) as well as that of Gregory Bateson's theoretical framework for improving health through conserving nature, also known as ecotherapy, or restoring health through contact with nature (Burls & Caan, 2005).[1]

In a review of 67 studies on nature immersion, also known as "forest bathing" and "Shinrin-Yoku," findings pointed to a reduction in human heart rate and blood pressure and an increase in relaxation for participants exposed to natural green spaces (Bodeker et al., 2018). From a qualitative and psychological perspective, Danish participants reported a sense of safety, calm, and overall general wellbeing following exposure or engagement with nature. South Korean participants with a known alcohol addiction and high pretest scores of depression benefited more from the Forest Therapy Camp than participants with lower pretest scores of depression and alcohol abuse. Differences in culture, gender, education, marital, or economic status were not associated with confounding factors in many of the empirical studies (Hansen, Jones, & Tocchini, 2017).

In considering the benefits of ecotherapy from a public policy perspective, green spaces have been noted to achieve unanticipated social capital and natural capital outcomes (Burls, 2007). The 7th-century master of Chinese medicine and encyclopedist Sun Simiao advised that fresh air, daily walks in natural landscapes, and food from a fresh, wholesome garden cultivated in part by the owner were the fundamentals of creating and maintaining good health.

Altruism

Based on scientific evidence (Dulin & Hill, 2003; Liang, Krause, & Bennett, 2001), it is entirely plausible that altruism enhances mental health. Altruism is a character trait or behaviour that pertains to the emotionally kind—those who are charitable in action toward others (in moderation)—and is yet to be studied by mainstream public health researchers (Oman, Thoresen, & McMahon, 1999) for its beneficial impact of positive emotional states at a population health level (Post, 2005). The American Psychological Association highlights six dimensions of health, of which emotions (emotional wellbeing), thoughts, and action (psychological and behavioural wellbeing) are factors closely co-related to altruism (Anderson, 2003) and enhance health by their ability to push aside negative emotions. Altruism, or unselfish love toward others, repels feelings of "sadness/depression, fear/anxiety, and anger/hostility" according to Anderson (2003, p. 243). The generosity that comes from a love of humanity is protective against "the big three" negative emotions—anger, fear, and grief—which are a result of a preoccupation with the self (Anderson, 2003). Transcending the self through acts of kindness and generosity is confirmed to protect against morbidity and mortality, reducing the stress on the immune function, reducing cortisol levels and blood pressure, and regulating endorphin production and norepinephrine levels (Post, 2005).

Cited in de Neve et al.'s (2019) research on pro-sociality in the workplace, an experiment at a large Australian bank (Anik, Aknin, Norton, Dunn, & Quoidbach, 2013) found that employees who randomly allocated their bonuses in the form of small financial contributions to local charities, "showed significant, immediate improvements in job satisfaction and happiness compared to employees who were not given these bonuses" (de Neve et al., 2019, p. 102).

Social Laughter

Researchers from the University of Oxford, through a series of experiments, found that pain thresholds, an indicator of endorphins being released into the bloodstream, were significantly higher after laughter. Dunbar et al. (2012) suggested that "laughter through an endorphin-mediated opiate effect, may play a crucial role in social bonding (Dunbar et al., 2012, p. 1161). A subsequent study found that social laughter "increased pleasurable sensations and triggered endogenous opioid release in thalamus, caudate nucleus, and anterior insula" (Manninen et al., 2017, p. 6125)

Global Wellness Policy

European Union

In European countries, worksite health and wellness (WHW) policy covered physical and mental wellbeing, psychosocial issues, and the working environment. Greece, for exam-

ple, focused on physical wellbeing, whereas in Lithuania, the focus was stronger on social wellbeing. Respondents of an EU-wide survey reported having legislation in place relating to some aspects of WHW and having a strategy for WHW in place, and noted that countries were involved in promoting a range of WHW activities. Some of these activities are (a) guidelines on WHW and healthy lifestyle; (b) healthy eating; (c) exercise and smoking cessation campaigns; (d) drug and alcohol prevention; and (e) health examinations such as eye tests, glaucoma and cancer screening (Guazzi et al., 2014).

United States of America

Workplace Health in America 2017 is the first government survey of workplace health and wellness programs in 13 years. The study found 69% of worksites had a health and wellness program that had been operating for three years or longer. Stress management programs were offered in 20% of worksites, and 14% provided programs to address excessive alcohol and other drug misuse (Centers for Disease Control and Prevention, 2019).

United Kingdom

The British government's strategy for public health in England laid out in the *Healthy Lives, Healthy People* paper (Secretary of State for Health, 2012) called for a new approach to public health with mental health as an integral and complementary part of a proposed new direction. The paper places health improvement as everyone's responsibility, where factors of self-esteem, confidence, and resilience are seen as key to health behaviour change. This self-care focus is aligned with wellness philosophy and its emphasis on self-guided pathways to wellbeing (Thompson, Watson, & Tilford, 2018).

A subsequent British survey of GPs found almost three-quarters are seeing between one and five people a day suffering from loneliness, which is a contributing factor to damaging health impacts such as cardiovascular disease, strokes, and dementia. The prime minister's office noted that around 200,000 older people had not had any social interactions with a friend or relative in more than a month (Gov.UK, 2018) and prompted the government to launch a loneliness strategy and a ministerial portfolio. The long-term plan by the National Health Service (NHS) is to allocate funding to connect patients to a variety of activities, including walking clubs, art groups, cooking classes, and so on. Support was received from high-profile businesses such as Sainsbury's, Transport for London, Co-op, British Red Cross, National Grid, and the Civil Service, all of which pledged to reduce loneliness in the workplace and support employees' health and social wellbeing (Gov.UK, 2018).

Latin America

Hispanic school children living in the United States have a lack of intervention programs explicitly designed to meet the nutrition needs that physical activity requires. The Wellness Policy from the Child Nutrition and Women's, Infants and Children Reauthorization Act of 2004 requires that schools produce and implement wellness policies that, since

2006–2007, tackle nutrition and sedentary behaviour because of the high rates of childhood obesity and subsequently poor mental wellbeing among Hispanic children (Sawyer & Oria, 2007). Resources to help schools develop wellness policies such as the CDC's School Health Index and USDA's Changing the Scene guidelines. Besides, wellness policy development tools, training from Action for Healthy Kids also includes specific Spanish programs: My Pyramid for Kids, MiPiramide, and What to Eat (Sawyer & Oria, 2007).

Chile

Promondo Corporate Wellness, led by Professor Volney Henriquez, has celebrated 28 years of promoting wellness in the workplace. Its study laboratory measured the impact of employee wellness on absenteeism and presenteeism. The results of its Productivity Plus Survey contributed to the development of an intervention to address "musculoskeletal pathologies, treatments for better sleep, reduction of work shifts, plans for prevention of risks and safety at work, salary improvement, dynamics of approach between workers and management (psychosocial risk), psychological support for workers and family, and treatments for addiction" (Henriquez, 2019). Promondo has also shared all its data and experiences with the National Productivity Commissions, to add validated metrics to increase investment in health and labour welfare.

Brazil

Empowering Women's Wellness

In Rio de Janeiro, business partners Shula Melamed and founder Bella Bablumian created an innovative methodology for health that was designed to be neither boring nor arduous. They report that their program is not composed of circuits, diets, and pills, but is one that guides their clients toward "effortless wellness with intuitively healthy behaviours." The company's focus is to help women become more in tune with natural needs and desires, and to fulfill the body's blueprint for a complete healthy being. For example, they view stress, when used in the right way, as a positive source of energy and fitness.

Community Mental Health: Projeto Quatro Varas

An influential and innovative community mental health model in Fortaleza-Ceara, northeast of Brazil, is called "*Projeto Quatro Varas*," and was co-founded by Dr Adalberto Barreto, a psychiatrist and mental health researcher, and his brother, Airton Barreto, a lawyer. Dr Barreto generated the Community Therapy (CT) methodology to provide community care grounded in both societal and academic understanding. He developed the CT program initially in the favela of Fortaleza, after carrying out research showing that local *curanderos* (Traditional Healers), who use herbs and other traditional cultural remedies, have a positive impact on community health (Neville, 2008).

The CT program consisted of a range of components, including collective therapy circles, "living pharmacies," (i.e., herbal medicines), and curing houses with complementary treatments. He studied the importance of *parteiras* (traditional female obstetricians), the

value of *raizeiros* (medicinal plants) and *rezadeiras* (prayers) (XXX), and the cultural treatment of death, marital conflicts, and neighborhood disputes.

The CT approach has now become widely diffused throughout Brazil and is used among many different groups and populations, mainly through formal partnerships established between the Universidade Federal do Ceara and various levels of federal, state, and municipal health services. In research conducted in 10,000 community therapy circles and 100,000 consultations, 88% of attendees had experienced improvement through community therapy and its support system. Based on these research findings and the success of more than 600,000 therapeutic sessions, Dr. Barreto managed to get community therapy approved as national public health policy, and trained 1,100 government public health and social assistance employees (Barreto & Grandesso, 2010).

A Model of "Leadership Through Love, Dedication, and Respect, to Improve Population Wellness"

The founder and CEO of Cecilia Negrini, a consultancy in the health sector in 2018, wrote that the impeachment of the former Brazilian president, Dilma Roussef, was not the end of corruption in the country. The people of Brazil lack inspiring leaders, and this had caused severe consequences in several sectors in society, creating significant losses in personal wellness and quality of life. Cecilia proposed the Servant Leadership model, coupled with coaching, to develop leaders in Brazil who are an example of character and justice, and an inspiration for their population. Servant Leaders is a concept of leadership as service to others, formulated by Robert K. Greenleaf (Greenleaf, 2002). The Servant Leader coaching has been implemented in hospitals, clinics, and medical centres, as clients of Cecilia Negrini, with outcomes that validate the effectiveness of the methodology (Negrini, 2018).

Asia

Throughout Asia, mental disorder results in productivity losses that hurt national economies. In low-to middle-income countries (LMIC), fewer than 20% of people living with a common mental disorder such as depression or anxiety have access to adequate mental health treatment and care. Economic studies have also revealed the massive burden on national economies of lost productivity attributable to a high prevalence of mental disorders. Many studies in LMIC have demonstrated that effective, and affordable treatments can be provided in low resource settings. Economic modelling has shown that investments in mental health services produce substantial economic, social, and health returns (Arango et al., 2018; Vigo et al., 2019).

A mental wellness strategy is preventive and focuses on building resilience at every level of society, such as schools, workplace, and in the retired population, based on self-care or self-help, group support, and community-based programs. Evidence is there to support the efficacy of Asian traditions of wellbeing, such as meditation, yoga, and Tai Chi, and including individually tailored nutrition programs along with support from the local commu-

nity and interest groups in the prevention and management of mental health conditions by individuals themselves (Huang, Feng, Li, & Lu, 2017; Solloway et al., 2016).

Asia is home to many of the wellness modalities that are now foundational in the global wellness repertoire, and has been identified by Global Wellness Institute research as the region showing the highest growth rate in the wellness economy. Yet Asia appears to be suffering from a deficit in wellbeing within its shores.

Research by the Asian Century Institute has found that only 14% of Asian respondents are thriving in three or more elements, which is a score less than the global average and equal to that of the former Soviet Union. Asia also scored poorly for a sense of purpose, which consists of liking what you do each day and feeling motivated to achieve personal goals. Only 13% of Asians are thriving in this aspect, equaling the Middle East and North Africa for the world's lowest score on this point. The continent also scored poorly for social wellbeing, with only 19% thriving, but scored close to the world's average when it comes to financial, community, and physical wellbeing (West, 2014).

Bhutan Gross National Happiness Index

The term Gross National Happiness (GNH) Index, coined by the ruler of Bhutan, King Jigme Singye Wangchuk in 1972, gave more importance to this index than to the Index of gross domestic product. The construction of the GNH includes nine domains: psychological wellbeing, health, education, time use, cultural diversity and resilience, good governance, community vitality, ecological diversity and resilience, and living standards. The index is based on the Alkire–Foster method of multidimensional measurement adapted for this purpose. The analysis explored levels of happiness by subsections of the demographic and what policies can do to increase happiness and sufficiency among the unhappy and marginally happy people (Centre for Bhutan Studies & GNH Research, 2016).

United Arab Emirates

In 2010, Dubai launched the UAE Vision 2021 policy, highlighting six priority areas for the government:

1. Cohesive society and preserved identity
2. Safe public and fair judiciary
3. Competitive knowledge economy
4. First-rate education system
5. World-class healthcare
6. Sustainable environment and infrastructure. (Mathias, Fargher, & Beynon, 2018)

Dubai's ruler, H. H. Sheikh Mohammad, advised federal employees that "the government's role is to make the nation and the people happy." In fostering this vision, he incorporated the National Agenda and, in 2016, formulated the position of Minister of State for Happiness and Wellbeing. The minister introduced a Happiness Index to measure the nation's happiness with government services, through the use of smart devices

(Mathias et al., 2018). A National Program for Happiness and Positivity was also developed with the following goals: (a) incorporating happiness and positivity at work, (b) developing tools for measuring happiness and its progress, and (c) fostering a political environment to make happiness and positivity a lifestyle (Schwartzstein, Hall, Chang, Sameh, & Thapar, 2018).

The National Program for Happiness covers four agendas and 16 portfolios. Its website states:

> The Happiness Agenda will pursue an objective, scientific approach to influencing happiness for the whole city. With a dedicated focus to measuring people's happiness, our teams are continually researching and refining a scientific model for city happiness that is informed by city-data. We are developing a live, target-driven measurement tool to monitor satisfaction and happiness levels for the whole city. Big data insights are not limited to the technology sector. By implementing customer satisfaction and sentiment analysis tools for the entire city, the Happiness Agenda will empower decision-makers to act for people' happiness in real-time, supported by data
>
> (National Program for Happiness & Wellbeing, 2020)

Aging Well

Some countries in the Asia-Pacific region are now taking the lead to offer a regional model such as Japan's Asia Health and Wellbeing Initiative (AHWIN). AHWIN provides data and resources on population aging and elderly care in Asia to help aging Asian societies by providing Japanese knowledge and expertise on nursing care and social welfare systems, as well as expanding related business opportunities as a nation at the forefront of super-aging communities. Japan is also in the process of mainstreaming its traditional *Ikigai*—"purpose in life" philosophy across all government ministries. *Ikigai* can be about the joy a person finds in day-to-day living, or about values in life, a pragmatic, unique, and individualized method of perceptions of one's purpose in living (Mitsuhashi, 2018).

A New Accounting

In New Zealand, from 2019, the government will present an annual "wellbeing budget" to gauge the long-term impact of policy on the quality of people's lives. New Zealand Prime Minister Jacinta Arden announced that

> the Wellbeing Budget will broaden the Budget's focus beyond economic and fiscal policy by using the Treasury's Living Standards Framework to inform the Government's investment priorities and funding decisions. The Government will

> measure and report against a broader set of indicators to show a more rounded measure of success, as a country and as a Government.
>
> (Parker, 2019)

Arden argued for a shift beyond short-term cycles and for seeing politics through a lens of "kindness, empathy and wellbeing."

Workplace Wellness

Workplace or corporate wellness will become a U.S.$7.4 billion market by the end of 2024, according to Transparency Market Research (Corporate Wellness Market, 2016). Employees are increasingly expecting wellness programs within their workplace, particularly millennial job seekers who are driving this growth along with the abundance of new technologies adopted as part of living well.

Malaysia, a country with the highest NCD rates in Southeast Asia, saw a shift in government policy that in April 2019 required all public servants to take a 15-minute exercise break every day (Singh, 2019). In India, corporations are increasingly offering wellness programs for their employees, such as health check-ups, dietary advice, personalized counselling sessions, and tele-counselling sessions. Although it is just in the beginning stages, these wellness programs are proven tools for change in the workplace. As more and more employees are making wellness a priority, employers have little choice but to adapt to the changing landscape of work and wellness. Yoga has been trialled and found useful in the treatment of diabetes according to two studies conducted in India. The studies found that a yoga-based lifestyle for the remission of prediabetes and prevention of diabetes was adequately productive for normal and overweight/obese groups. Yoga, therefore, can be utilized as a part of workplace wellness policy to complement the efforts made by employees outside of work (Arumugam et al., 2019; Nagarathna et al., 2019)

The Contribution of Big Data to Well-Being Science and Policy

Big data in the context of well-being and mental wellness refers to the large data sets that contain multiple observations about individuals, often gathered without consent. The use of mood analysis, for example, counting the positive and negative effect of words used in Twitter feeds, Facebook posts, and many other social media profiles—whether through mobile phone apps or websites—are becoming more common (Bellet & Frijters, 2019). The potential gain from the use of big data, other than to tell current levels of mood and life satisfaction, is to enable government and corporate entities to deliberately manipulate programs or policies aimed at specific communities such as workplaces, childcare facilities, or potential voters (Bellet & Frijters, 2019).

Gallup Report and Global Findex

The Gallup Report's indexes of positive and negative experiences measure feelings and emotions not captured by traditional methods used in the gross domestic product (GDP) reports. According to de Neve et al. (2018), the use of measures of subjective well-being in economic research is burgeoning. The 2019 Global Emotions Report, for example, is based on 151,000 interviews with adults in more than 140 countries in 2018. Jon Clifton, the global managing partner at Gallup, gives an example of why this measure provides a data set that paints a better picture of global well-being and mental wellness. He says that

> if you interview two women, one with a child and another without a child – which one has more stress? On average, it's the woman with the child. But if you asked them to rate their overall lives—which one is higher? It's also the woman with the child. So, the woman with more stress also rates her life higher.
>
> (Global Emotions Report, 2019, p. 1)

The Global Findex (in partnership with the World Bank) is an evidence-based indicator of global efforts to promote financial inclusion. The Global Findex Database (2017) used to track progress toward the United Nations Sustainable Development Goals (indicator 8.10.2), and the World Bank's Goal to Universal Financial Access by 2020 included the G20 Digital Financial Inclusion Indicators. The most recent survey in 2017 shows that 1.2 billion adults globally have opened a bank account since 2011. Approximately 69% of adults worldwide, 3.8 billion people, now have a bank account with a physical bank or with a mobile money provider. Research that uses subjective well-being data as a welfare measure indicates that economic downturns have a "greater influence on wellbeing than equivalent economic growth" (de Neve et al., 2018).

Where to Next?

The call to improve mental health services in a crisis of NCDs in WHO's Mental Health Atlas and the Mental Health Action Plan 2013–2000 (2013) is based on the high burden of global mental health disorder. Mental health disorder is not just about clinical conditions but also considers factors such as demographics, environment, and sociopolitical transitions, particularly in low-to middle-income countries (LMIC). The Lancet Commission identified a four-pillar agenda to reference global mental health at a population level, where the approach in addressing mental health *syndemics* requires systems thinking and interdisciplinarity in public health programs and interventions (Mendenhall et al., 2017).

The inadequate attention to financial needs of mental health programs in 63% of WHO member states, brings to the fore a glaring challenge of insufficient resources, training of healthcare professionals, and a lack of supporting community health workers with the right technology and skills to create local solutions for a local context.

The crisis in NCDs, along with the global burden of mental health disorders, requires preventive strategies, approaches that build resilience in separate but interconnected levels of society (i.e., educational institutions, workplaces, and aged care facilities), and integrates a wide variety of wellness modalities through well-trained public health practitioners and policymakers. Efforts to reduce sedentary behaviour—even in hospitals during acute care (also known as “deconditioning syndrome”)—as a result of fear of falls is proven to be detrimental to recovery (McNally et al., 2017). As we implement this new framework of mental health promotion, questions remain over how to measure effectiveness or success and what the indicators are that give us a 360-degree view of the mental health of an individual as well as a population. What does the training of public health practitioners look like when we consider the complexity of global mental health disorder and the rising rates of NCDs in low- to middle-income countries?

This article has brought to the discourse on well-being and mental wellness an evolving paradigm, informed by evidence, measured with validated tools, and already in implementation in different parts of the world, including in both civil society and the corporate sector. An understanding of the importance of the first 1,000 days of life, the neuroplasticity of our brain, and the potential for mental wellness to play an integral role in how people grow, play, work, and live are changing the way people frame health promotion in the 21st century. The vast array of wellness modalities such as yoga, meditation, sleep, nutrition (Firth et al., 2019), technology, and the availability of real-time data are yet to be incorporated into our vision of the future of public health education and program design.

Figure 4. Schema of interdisciplinarity in addressing the global burden of mental health disorder.

Implications for Public Health Education

The Mailman School of Public Health (MPH) 2009 review of the Master of Public Health Program found no school-wide requirements with developing interdisciplinary skills in leadership, communication, and systems thinking. However, some departments and tracks may have incorporated the skills independently (Begg, Galea, Bayer, Walker, & Fried, 2014). As a result, after ten subcommittees and the involvement of 170 faculty in

the renewal of Columbia's MPH program, a pattern emerged in the mapping of core skills that are required for the school's graduates to tackle the public health challenges of 2020 to 2050. In the context of the 21st-century crisis in NCDs and the syndemics that fuel its rising rates, Mailman designed courses to foster decision-making skills as well as critical and creative thinking. Students were challenged to specialize in an area outside their disciplinary concentration. The idea behind this initiative is to expand the latitude in interdisciplinary training (Begg et al., 2014).

The WHO Report in 2006 stressed the importance of interdisciplinary collaboration (WHO, 2006). The report encouraged key stakeholders to step outside disciplinary silos and "work together through inclusive alliances and networks—local, national and global—across health problems, professions, disciplines, ministries, sectors and countries" (Jogerst et al., 2015, p. 241). To tackle tough problems and acknowledge the complexity of the challenges facing public health administrators, interdisciplinary collaboration becomes a foundation for reflection and action, spurring organizational change from within through innovation in leadership (Kegan, Kegan & Lahey, 2009; Snowden, 2002). Relevant to this section is the identification of two Interprofessional Global Health competencies from a systematic review of curricula around the world. One of these is the ability to describe how cultural context influences the perception of health and disease; the second has to do with the skills to co-design or co-create strategies with local communities in using local assets and resources to improve health and well-being through the recruitment of diverse stakeholders and work within a team (Jogerst et al., 2015). At the undergraduate level of global health education, findings from a systematic review of universities providing comprehensive health education recommend developing an interdisciplinary framework toward addressing the socioeconomic determinants of health and health inequalities (Drain et al., 2017). Brewer (2017, p. 2) argued that public health professionals addressing global health challenges should partner with not just "engineers or lawyers, but philosophers, artists, anthropologists, and historians." Brewer (2017, p. 2) calls on the National Institutes of Health to fund the preservation of ancient texts of Chinese herbal medicine as only a few discoveries of the past decades have as "profound an impact as on health globally as that made by YouTube and others."

One avenue that can be quite effective in addressing the global burden of mental health disorder is for public health practitioners to use the competencies discussed earlier to partner with educational settings and teachers in the development and implementation of mental health interventions. The importance of embedding mental health content into existing education and health policy in low- to middle-income countries is well recognized (Kutcher et al., 2015). From the perspective of salutogenesis (Mittelmark et al., 2017) thinking about mental health promotion in a framework that is comprehensible, manageable, and meaningful for the public is a sustainable pathway for intervention. Comprehensibility, manageability, and meaningfulness stem from the recognition that promoting a climate of unconditional positive regards and empathy, as well as developing the participants' unique capacities and extending coping resources to go beyond educational programs and health literacy interventions (Mittelmark et al., 2017).

Another aspect to consider in achieving innovation in the education and public health programs is the inclusion of altruism, generous emotions, as behavioural goals so that they take their rightful place in addressing mental health efforts in schools and workplaces. It is possible that volunteerism, as an attribute of altruistic behaviour, becomes a standard prescription for an aging population faced with social isolation and loneliness, as reported in the United Kingdom (Gov.UK, 2018)

A movement to do good, as part of a public health agenda to focus on civic engagement may require longitudinal studies to understand how best to manage population-level programs based on the nurturing of benevolent effect and helpfulnessu without causing adverse effects such as “burn-out” syndrome and being overwhelmed.

Conclusion

There is little doubt that our understanding of the social determinants of health—and in this case of well-being and mental wellness—is less “determining” and may only be “influential.” When the possibilities for reframing the Global Mental Health framework in an age of molecular genetics, neuroplasticity, and traditional and complementary medicine are considered, an understanding begins to form that there is no turning back from an interdisciplinary genre of 21st-century public health practice.

In moving forward, new metrics will be needed for assessing wellness policy, as will policies accounting for cultural relativities such as promoting increased vegetable and fruit consumption and reduced refined carbohydrate and red meat intake in South Asia. School-based curriculum around wellness in everyday life and the science behind this will be necessary for generational transformation to occur. Consumer demand will lead to a shift in industry practice. Still, it will need to be accompanied by a government-led emphasis on the production and supply of healthy foods and beverages as the required standards for these products. Comparative policy research will help determine successful strategies for creating wellness within and across sectors of society while accounting for cost savings in health systems, loss of productivity, academic attainment ,and healthy aging.

The Global Wellness Institute reports that as a global society, people are coming together to achieve everyday purposes and do essential work. The idea of work moving from *me* to *we* have resulted in teams, global networks, partnerships, and ad hoc project groups that have strategies for well-being. Organizations are exploring and implementing ways to foster high-trust environments of mutual respect and psychological safety and improve the shared outcomes they achieve. The movement is toward individual flourishing through collective action (Global Wellness Institute, 2019).

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Notes:

(1.) The influential American zoologist Edward Wilson coined the concept of *biophilia*: “The connection that human being subconsciously seek and need with the rest of life” (Wilson, 1984).

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