Why Social Determinants?

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Abstract

There is overwhelming evidence that social factors have profound influences on health. Children are particularly sensitive to social determinants, especially in the early years. Life course models view health as a developmental process, the product of multiple gene and environment interactions. Adverse early social exposures become programmed into biological systems, setting off chains of risk that can result in chronic illness in mid-life and beyond. Positive health-promoting influences can set in motion a more virtuous and health-affirming cycle, leading to more optimal health trajectories.

Mounting an effective response to social determinants will involve both direct social policy initiatives designed to eliminate poverty and inequality, and indirect approaches focused on disrupting pathways between social risks and poor health outcomes. To be effective, these indirect strategies will require nothing short of a transformation of existing child health systems. Parents and professionals must work together from the ground up, raising public awareness about social determinants of health and implementing cross-sector place-based initiatives designed to promote positive health in childhood.

◂ One of the many photos from the archive of Toronto's Board of Education. Circa 1911.

The social determinants of health are composed of the conditions in which people are born, grow up, live, work and age, together with the systems that are put in place to deal with illness (World Health Organization [WHO] 2008). The distribution of money, power and resources within society, influenced at least in part by policy choices, economics and politics, shape these conditions at local, regional and national levels. Social determinants operate at individual as well as population levels, influencing the extent to which each person possesses the physical, social and personal resources to identify and achieve personal goals, satisfy needs of daily living and cope with the environment (Raphael 2008).

Our current state of science suggests that there is no simple biological reason why the risk of pregnancy-related death in Sweden is one in 17,400 while it is one in eight in Afghanistan; why the life expectancy at birth of men in the Calton region of Glasgow is 54 years, 28 years lower than that of men in Lenzie, just a few kilometres away; and why the infant mortality rate among babies born to women in Bolivia with no education is more than 100 per 1,000 compared with less than 40 per 1,000 for babies born to mothers with at least secondary education (WHO 2008). These disparities reflect avoidable and unnecessary suffering, and the evidence suggests that they could be reduced by improving the social environments in which people live and work (Marmot et al. 2008). Yet, despite a global interest in equity and social justice, existing knowledge of the social determinants of health has not resulted in the types of policy change that would logically be expected. In fact, debate about the nature and role of social determinants has been conspicuously absent from the recent heated discussions surrounding healthcare reform in the United States.

There are indications, however, that this situation is starting to change. The days when social factors were dismissed as "confounders" in studies of the biological basis of disease have passed, giving way to a clearer understanding of the profound influence of social context on health in its own right (Woolf 2009). Applying Rogers' classic Diffusion of Innovation theory, the importance of social determinants of health has been recognized by innovators such as Black, Acheson, Marmot, Adler, Schroeder, McGuinness and other early adopters and is now becoming accepted by the "early majority" (Rogers 2003). Even "laggards," generally skeptical of new ideas, largely accept that the recent dramatic and well-chronicled increase in the prevalence of obesity across developed countries is being driven not primarily by genetic or biological changes but by changes in the way we live. In epidemiological terms, we might be reaching a tipping point (Gladwell 2000) at which the fundamental importance of social determinants for health is starting to be recognized both by providers of healthcare and policy makers. The arrival at this tipping point is aided by several converging trends, including the pace of global social change, which is dramatically demonstrating how rapidly changing social contexts can result in major epidemiological shifts (e.g., the obesity epidemic); research documenting how socially induced stresses are transformed into changes in neurodevelopment and immune and metabolic function; and new tools to measure population health and to assess the impact of policies on health, as well as place-based approaches that are improving health outcomes by addressing the social causes of poor health. With better cross-national data on the relationship of health outcomes to social investments, more countries are recognizing that improvement in population health requires attention to the social conditions that characterize their citizens' lives (Marmot et al. 2008).

In this article, we review what we know about the nature of social determinants and the strength of the evidence for their impact on health. We consider why they are particularly important for children, and the mechanisms that translate early social inputs into short- and long-run health consequences. Finally, we consider how society should respond, including implications both for broad social policy and for healthcare policy. In doing so, we set forth a vision for transforming children's health and healthcare through greater attention to social determinants, and the policy developments that are needed for this to happen.

What Are Social Determinants?

Early studies were largely confined to family income and social class, yet more recent treatments have broadened the boundaries of what constitutes social determinants. Social class codes for a number of different social influences on health, and it extends beyond simple measures of income or occupation to include family wealth and assets, education and health literacy, employment, the degree of autonomy in one's job and use of time, and the quality and nature of housing (apartment versus house, rented versus owned). Race/ethnicity is also classed as a social determinant, although some researchers regard the discrimination that results from membership of a social group – whether defined by race, gender, family structure or culture – as the true driver of health status (Baker et al. 2005). Social relationships also impact health and are included in social determinants frameworks through constructs such as social cohesion, social support networks and social exclusion. Over the past decade, there has been an explosion of interest in the concept of social capital – valued resources that lie within and are by-products of social relationships. Social capital can operate at individual and community levels, impacting personal and population health (Kawachi et al. 2008; Starfield and Macinko 2001). Because early life events are now understood to exert particularly strong influences on immediate health status and health in later life, most scholars now include a broad range of early life exposures as potential social determinants (e.g., the quality of parenting and caregiving, exposure to domestic violence, maternal depression, home organization and neighbourhood safety).

As the wider boundaries of social determinants become blurred, scholars differ on which factors to include. Some list aspects of the natural environment, such as clean air, water and soil and climate change, while others include the built environment (e.g., land use patterns, zoning and community design) and living conditions such as availability of transportation and healthy foods. This expanded view is supported by an increasing body of evidence demonstrating the impact of human activity on the natural environment and the potential role of socially constructed policy in altering environmental determinants of health. There is debate, too, about whether healthcare services should be classed as a social determinant of health; however, these and other services that deal with illness have been included in the WHO definition.

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As yet, there is no generally agreed-upon taxonomy or categorization of social determinants; however, there is general agreement that these non-biological influences are often interconnected, operating in dynamic nested systems of mutually reinforcing interactions at individual, family and community levels. From the standpoint of the medical clinician, any influence on health outside of the patient could be considered social instead of biological in nature. Even factors not traditionally thought of in this way, such as media use and health behaviours, are shaped by societal trends and norms and could be classified as part of the broader social ecology that impacts on individual well-being.

How Strong Is the Evidence for the Importance of Social Determinants?

Much of the evidence for the importance of social determinants of health has come from the study of adults, including several classic studies of British longitudinal cohorts. In the studies of Whitehall civil servants, Marmot and colleagues (1984) demonstrated a steep inverse gradient between employment grade and mortality such that men in the lowest grade had three times the mortality rate from coronary heart disease and other causes compared with men in the highest grade. Although smoking and other coronary risk factors were more common in the lowest grades, these differences only partially accounted for the mortality difference. Subsequent studies of later cohorts showed strong social gradients in morbidity across a range of indicators such as angina, hypertension, diabetes, chronic bronchitis, lung cancer and self-perceived health status. While social gradients vary in magnitude across different societies, these gradients have great explanatory power for the differences in health status in all the developed countries studied, including Canada, Finland, Australia, France, Sweden and the United States (Marmot 2005). An intriguing aspect of social determinants is that they appear important for almost every disease studied, suggesting that they operate through general mechanisms that contribute to a range of biological processes affecting multiple organs. For example, a range of adverse social circumstances may result in chronic stress that affects the ability of an individual's regulatory systems to achieve stability through change, a process known as allostasis (McEwan 1998). This increased allostatic load may cause "wear and tear" on different parts of the body, increasing the risk of a variety of adverse health outcomes including coronary artery disease and hypertension (Halfon and Hochstein 2002; Repetti et al. 2002). A growing number of studies are now connecting the experience of higher allostatic load in children with poorer health and functional outcomes, the development of a variety of health conditions and differential health trajectories across the lifespan (Gruenewald et al. 2009; Lehman et al. 2009).

Children's health outcomes show similar social gradients across a range of conditions (Currie and Lin 2007; Larson and Halfon 2009). There is good evidence that obesity is increasing at a faster rate among more disadvantaged children, implying that social determinants probably play a role in etiology (Singh et al. 2010; Stamatakis et al. 2005). Children experiencing multiple social risks are particularly vulnerable, exhibiting strong risk gradients across social-emotional, dental and physical health including obesity (Keating and Hertzman 1999; Larson et al. 2008). Social determinants have an impact in the prenatal period, with greater likelihood of reduced birth weight and preterm births among the more socially disadvantaged (Zeka et al. 2008). Lower birth weight has in turn been associated with poorer cognitive function in mid-childhood, but differences in social class explain much more of the variation (Jefferis et al. 2002). Social determinants can have positive as well as negative effects. For example, mothers reading to children and mothers' and fathers' interest in children's academic progress reduced the chances of leaving school with no qualifications among subjects in the 1958 British Birth Cohort study, with the greatest protective effects in children from the two lowest social classes (Power et al. 2006).

An expanding body of life course research is demonstrating that social influences early in life continue to exert effects on health into mid-life and beyond (Conroy et al. 2010; Hertzman and Power 2003). Felitti et al. (1998) found a strong graded relationship between exposure to abuse or household dysfunction during childhood and adult health risk behaviours and diseases. Adults with four or more adverse childhood exposures

had a four- to 12-fold increased risk for alcoholism, drug abuse, depression and suicide attempt, and a two- to fourfold increase in smoking, poor self-rated health and sexually transmitted disease, with similar risk gradients for the presence of ischemic heart disease, cancer, chronic lung disease and liver disease. Some experiences such as placement in foster care or other child welfare intervention are associated with particularly high risks of poor outcomes, including suicide and other avoidable mortalities in adolescence and early adulthood (Hjern et al. 2004). In short, the magnitude of the associations between common adverse social exposures and multiple child health outcomes meets or exceeds that of commonly accepted biological risks. Failure to address these social determinants affects adult health as much as, if not more than, health in childhood.

Why Are Social Determinants Particularly Important for Children?

In the context of health and health services, children are differentiated from adults by the "4Ds" – developmental vulnerability, dependency, differential morbidity and difference in demographics. Evolution has programmed humans to possess a great deal of plasticity early in life in order to respond rapidly to changing environmental conditions. The first three years of life are a critical period during which children are particularly susceptible both to positive and negative exposures. The advantage of this arrangement is that young children can adapt to a wide range of circumstances. The disadvantage is that, when exposed to adversity, some of these changes are maladaptive, setting the stage for even bigger problems later in life (Gluckman et al. 2008). For example, mothers who are depressed are less attentive and engaged with their infants, failing to respond adaptively to their emotional signals (Dawson et al. 1994). These infants develop shorter attention spans, elevated heart rates and cortisol levels and reduced activity in the frontal cortex as detected by electroencephalograms (Dawson et al. 1994). Longitudinal studies suggest that elevated heart rates and cortisol levels persist, reprogramming the child's internal "set point" to stress and increasing the risk of later hypertension and coronary artery disease (Boyce et al. 1995; Schonkoff et al. 2009; Seeman et al. 1997). In this way, a single, potentially avoidable risk (maternal depression) acts at a vulnerable period of development (infancy) with deleterious effects on lifelong health (Halfon et al. 2005).

Infants are almost completely dependent on adults for their interactions with the environment and remain essentially unable to "buffer" or protect themselves from adverse social circumstances throughout the preschool years and beyond. The physical and mental health of parents and other caregivers exert particularly strong effects on children's early development. Yet children are not merely passive recipients of care. Interactions are transactional in nature, with child and parent adapting to one another as developmental change proceeds (Sameroff and Fiese 2000). These transactions may be more or less adaptive depending on the "goodness of fit" of caregiver and child. For example, an "easy" temperament child with a mentally and physically healthy parent who establishes sensitive reciprocal interactions will fare better than an infant with a "difficult" temperament who is paired with an anxious mother with little confidence in her parenting skills. Children experiencing physical or emotional abuse during this critical period of development appear particularly sensitive to long-term effects.

Young children are relatively healthy compared with adults in terms of not yet having as many chronic diseases, but they are vulnerable to a wide range of disturbances in their developmental health, which provides the foundation of well-being for years to come. In childhood, steep gradients emerge not only in specific diseases and disorders but also in measures of socio-emotional functioning, cognitive functioning and general indicators of health (e.g., global health status, obesity) that set the stage for later health and well-being (Keating and Hertzman 1999). There has been increased recognition of the new morbidities of childhood; for example, greater psychosocial disturbances are highly susceptible to social determinants and can carry long-term health implications through disrupted life pathways and a greater likelihood of later adverse exposures. Social determinants may also have "subclinical" effects on aspects of children's health that are difficult to quantify such as "health reserves" and "future health potential." This suggests that current explanatory models may in fact underestimate the impact of these determinants on health, and that existing health measures that primarily focus on diagnosing disease and measuring disability have the radar set too high, detecting deviations in health trajectories only once they enter the pathological range.

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The social environments of children in the 21st century are changing rapidly. Child poverty rates are increasing, 40% of births are to single mothers, more mothers are working outside the home and more children are spending long hours in daycare. In the United States, births to minority mothers are set to surpass those to non-Hispanic white mothers by 2012 (Johnson and Lichter 2010). At the same time, there has been a "media explosion," with young children and adolescents engaged with some form of electronic entertainment for hours each day and yet expected to meet high academic expectations. These changes are probably more rapid and wide-reaching than at any previous point in history. Traditionally, cultural mores and support

networks have played a role in protecting children from potentially negative impacts of environmental change, yet the pace of change is so rapid and its nature so unpredictable that protective and health-promoting components of culture cannot "keep up." Scholars have suggested that the resultant "unfiltered" impact of social change on children may, at least in part, explain changing morbidities including high rates of teen pregnancy, drug and alcohol use, smoking, obesity and mental health problems (Gluckman et al. 2009). Finding solutions to these problems involves tackling the social determinants of health.

How Do Social Determinants Act?

An understanding of how social determinants act requires consideration of the social ecology of childhood and the life course mechanisms that translate early social exposures into long-term health consequences. Developmentalists including Bronfenbrenner and Sameroff have long posited various dynamic ecological models of child development (Bronfenbrenner 1979; Sameroff and Fiese 2000). Although different theories vary in their emphasis of the primary determinants of individual development, most contain a basic structure with parent, family, peer, school and community influences nested within the broader geopolitical environment (Sameroff 2010). Each layer of the system is interdependent, and different environments may play more salient roles at various developmental stages. For example, young children depend heavily on the support of their caregivers in the home, whereas peer relationships and school and neighbourhood environments are more important to older children.

These basic concepts have been incorporated into frameworks for understanding children's health. The US Institute of Medicine report *Children's Health, The Nation's Wealth* (2004) describes the multitude of social environmental and health system factors that act in combination to influence health. The Life Course Health Development model (Halfon and Hochstein 2002) extends these ideas to show how multiple risk and protective factors combine across time to influence developmental health trajectories in childhood and long-term disease outcomes. This model asserts that health is a developmental process, best understood as a product of gene and environmental transactions. As a transactional process, gene expression is influenced by environmental triggers, and the resulting phenotypic expression of behaviours and physical traits can in turn influence how the environment (family, social, physical and healthcare) responds to the developing individual. Like most developmental processes, there are sensitive and critical periods, where outside influences can have even greater effect in programming future functionality. During culturally defined transitions (e.g., the transition from home to preschool) and turning points (e.g., the experience of parental divorce), the individual is more likely to be stressed and vulnerable to other developmental health influences.

Although chronic disease or other physical, mental and cognitive impairments may not show clinical manifestation for decades, cumulative risk and protective exposures exert their influence on the latent health trajectory (subclinical functioning of physiological systems) beginning before birth and extending throughout life. Risk factors tend to cluster together (e.g., a child born into a poor family might also be exposed to family conflict, neighbourhood violence, a lack of preventive health intervention and truncated educational achievement), which can lead to large disparities in health across time.

Life course models posit three main mechanisms whereby the early social environment may influence long-term health outcomes: biological embedding, cumulative mechanisms and pathway models (Hertzman and Power 2003). Biological embedding is the process by which social exposures become programmed into the functioning of biological systems relevant to disease risk. Although this can happen at any developmental stage, childhood is thought to be particularly important due to the existence of several critical and sensitive periods of heightened vulnerability (Hertzman 1999). Biological changes can act alone or in concert with later risk factors. For example, fetal malnutrition can result in alterations in glucose metabolism that predispose to the development of impaired glucose tolerance, obesity and diabetes, particularly when the infant is later exposed to a calorie-dense food environment (Barker 2002; Hales and Barker 1992; Worthman 1999). Biological programming can operate through direct changes to the structure and function of organs and systems or through alterations in the expression of genes shaped by interactions with the social environment (Gluckman et al. 2008). For example, childhood abuse has been shown to influence stress reactivity through methylation of the gene encoding for the expression of the glucocorticoid receptor (McGowan et al. 2009). Social environmental influences are complex, and new evidence even points toward reversal effects. For example, the orchid hypothesis suggests that the genes that underlie some of the most difficult human problems such as violence, depression and anxiety can, when combined with the right social environment, also be responsible for our best talents and behaviours (Dobbs 2009).

Cumulative mechanisms describe the role of multiple and varied exposures across several decades in pushing biological systems toward health or disease. Cardiovascular disease, for example, has a long incubation period and a cumulative and lifelong impact from socially patterned risk factors such as maternal health, development and diet before and during pregnancy; poor growth in childhood; stress in childhood and onward; obesity; smoking; inactivity; and job insecurity and unemployment in adulthood. General risk accumulation models do not prioritize any particular life stage as most influential, but a special variant of these models posits chains of risk mechanisms whereby childhood factors directly cause future health shocks or

protective exposures. For example, poverty in early childhood could trigger a biological chain of risk whereby elevated stress exposures program the hypothalamic-pituitary-adrenal axis to have a greater cortisol response to stress – which contributes to overweight and, in turn, produces insulin resistance – along with a social chain of risk that directs children toward subsequent lower–social class exposures and the attendant risk of worse health behaviours throughout life. Pathway models are similar to chains of risk models, with a greater emphasis on the role that childhood factors play in directing adult social attainment and behaviours that then influence health outcomes. These three different mechanisms are not mutually exclusive and probably act in concert in bringing about persistent and pervasive adult social disparities in health.

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Policy Implications

If clinical, health system and social interventions are to be successful in addressing the impacts of social determinants, then health and social policies must be designed to respond strategically to what we know about social risks, their mechanisms of action and susceptibility to change. An effective approach must recognize that single social determinants rarely act in isolation but are usually clustered into multiple interacting factors. This suggests that effective interventions are likely to be comprehensive and integrated, crossing traditional service sector boundaries. Because marginal differences in risk exposure early in life compound to produce large health differences over the lifespan, policies that effectively reduce risks and promote health must target the early years and be sustained across developmental transitions if they are to have greatest impact in the long term. Similarly, population-based interventions, focused on shifting the risk curve for an entire population, have the potential to save more lives and improve health to a greater extent than individually focused biomedical interventions.

Unfortunately, existing health, economic and social policies in most developed nations have resulted in a confusing landscape of fragmented programs that are loosely aggregated into uncoordinated service delivery systems that do little to ameliorate the negative health impacts of social determinants. For example, weak employment security, coupled with limited social safety nets and reduced income support for families create high levels of social disadvantage for many families with young children. The resulting levels of social adversity can have damaging effects on children in the vulnerable early years, with a lifetime of health consequences. At the same time, children are often relatively invisible on the policy horizon. Their programs are comparatively "cheap," so they can appear less significant than those for adults; and because the impact of interventions is measured over long time frames, it is easy for short-term benefits to be discounted over longer time frames. Because the investments of one sector (e.g., health during the early years) result in benefits to another sector (e.g., lower rates of special education services), it is often difficult to account for and incentivize necessary investments, when little or no financial benefit accrues to the sector making that investment. The discounting of children's needs and their relative invisibility in the realm of public policy is further exacerbated by existing data systems, which are not equipped to produce a picture of the "whole child" nested in the context of the families and communities in which they reside, or to give valid estimates of the longitudinal costs of shortchanging investments in children and their families (Hertzman and Williams 2009). Consequently, the creation of child and family policies remains a low-status occupation, with service sectors competing with each other for marginal resources. An added challenge in individualist-oriented societies such as the United States and Canada is that child health, development and well-being are regarded as the responsibility of families, resulting in an approach that emphasizes second-chance programs for children that fail, rather than a community-wide strategy focused on investing in all children for success.

Different nations have devised different strategies to address social determinants and their impact on health. Social determinants can be attacked either directly through policies focused on eliminating poverty, inequality and discrimination or indirectly through strategies designed to disrupt the pathways between social risks and poor health outcomes. The direct approach speaks to fundamental values of equity and fairness and appeals to those countries with a strong social democratic tradition. In countries that adopt more direct approaches, social determinants are seen as the root causes of "health inequities," that is, differences in health status that have a moral or ethical consequence that confront a nation's basic notions of fairness. However, this approach has gained less traction in the United States and Canada, where, as we have noted, deep ideological schisms separate those who believe that individual solutions and free market mechanisms are the means to achieving all social benefits, as opposed to greater state intervention in the management and optimal allocation of common assets. In nations where efficiency often trumps equity, differences in health outcomes attributable to social determinants are usually classified using the ethically value-free term "health disparities."

In this context, irrespective of any underlying inequities, the existence and persistence of social disparities in health outcomes are explained in terms of a health system that is not performing effectively and efficiently. Rather than addressing social determinants directly, indirect approaches are framed as performance-enhancing quality improvements that encourage cost-effective, evidence-based interventions to improve the performance of health and social care systems. These service system interventions can target individuals through clinical prevention and health promotion services, or shift trajectories for whole populations through targeted place-based initiatives. In reality, most nations use a combination of direct and indirect approaches, with different degrees of emphasis and framing to fit the policy context du jour.

Whether direct or indirect approaches, or some combination of both, are favoured it is clear that mounting an effective response to the health threats posed by social determinants will take nothing short of a transformation of our existing child health systems (Halfon et al. 2007). The current system is confronting a growing number of children with chronic medical problems and special healthcare needs (Wise 2004). In addition to 14–16% of children classified as having special healthcare needs in the United States, there are between 20 and 40% of children that experience behavioural, developmental and mental health issues that compromise their long-term function and health trajectories (Bethell et al. 2008). Although the distribution of behavioural, developmental and mental health risks cut across all social classes, they tend to concentrate in communities of lower socio-economic status, where multiple social risks are at work and fewer protective and health-promoting factors are at play. At present, many of these children are flying under the radar of a child health system that is designed to diagnose and treat children with more severe medical problems, and is currently struggling to respond to the shifting epidemiology of children's health needs. The poor performance of the child health system was recently captured in a study documenting that US children receive less than 50% of recommended ambulatory healthcare (Mangione-Smith et al. 2007), and others documenting the inability of the system to provide services such as routine developmental screening (Bethell et al. 2010; Halfon et al. 2004).

Incremental change strategies that rely on the addition of "special programs" to an essentially dysfunctional infrastructure with its misaligned financial incentives, inadequate (or non-existent) communication and coordination tools and administrative inefficiencies will not result in the health gains that we seek, and could even result in greater fragmentation and management challenges. More fundamental changes are necessary in how the child health system is organized, structured and financed to address increasing rates of obesity, mental health and developmental problems as well as the growing impact of social determinants on inequities in child health outcomes (Perrin and Homer 2007). New and innovative approaches to the organization and delivery of child health and healthcare services will require adopting a transformative approach that can support more significant innovation and fundamental health system improvements (Halfon et al. 2007). Such a framework would attempt to move the child health system beyond the constraints of its current operating logic by (1) adopting a developmental definition of children's health similar to the one proposed in the Institute of *Medicine's Children's Health, The Nation's Wealth* report (2004); (2) utilizing a life course health development approach to focus the system on optimizing child health trajectories by minimizing socially mediated risk factors and enhancing protective and promoting factors; and (3) integrating health services and health producing sectors horizontally and longitudinally so that children benefit from more comprehensive and sustained approaches to optimizing their health outcomes.

Here, we propose seven strategies that could be acted on immediately to start the transformation of children's health and health systems.

FACTS FOR LIFE

The early years, especially the first three years of life, are very important for building the baby's brain. Everything she or he sees, touches, tastes, smells or hears helps to shape the brain for thinking, feeling, moving and learning.

Source: Facts for Life Global www.factsforlifeglobal.org/03/messages.html

Raise Public Awareness about Social Determinants of Health

In order to reach a tipping point at which knowledge translates to action, we need to spread awareness of the social determinants of health beyond social scientists and health researchers. Policy makers, healthcare providers and families need access to comprehensive information about social risks that are prevalent in their communities and their relationships with health. Stakeholders can use geographic information system (GIS) mapping tools to chart patterns of social risk and disease epidemiology across local populations. The broad use of the Early Development Instrument (EDI) to measure and map school readiness across communities Canada and Australia is an excellent prototype of such an approach (Centre for Community Child Health n.d.; Hertzman and Williams 2009). These data can demonstrate the impact of gradients in social risk, and motivate communities to tackle social issues and prioritize prevention and intervention strategies. Building upon the success and utility of this approach, it will be important to add other comprehensive measures of child health at different ages and stages of development so that the impact of social determinants on long-term health trajectories can be measured and better appreciated.

Government alone cannot transform the healthcare system. It is the actions of individual clinicians and families that will bring about true change.

Promote Children's Developmental Health as the Foundation for Lifelong Well-Being

Child development specialists emphasize the importance of treating the whole child, ensuring cognitive, mental and developmental health in addition to physical well-being. Life course models demonstrate how children's developmental health across each of these domains positions them on trajectories leading to an increasingly disparate range of adult health outcomes. Consequently, adult health policy discussions that omit the consideration of health in childhood and the powerful social determinants that shape child health status are at best incomplete and at worst ineffective. At the population level, measures of children's developmental health can serve as key predictors of future national health. The epidemic of childhood obesity, with its predictably serious adult health consequences, along with the growing rates of mental health problems in children and adolescents that result in a low-performing and increasingly disabled workforce are forcing policy makers to connect the dots between childhood adversity and national well-being.

Promote Place-Based Initiatives That Link Services and Sectors to Shift the Risk Curves for Populations of Children and Families

Most existing child health programs are institution, discipline or service-sector specific and focus on the needs of individual children. Yet many socially disadvantaged children have needs that cross health, education and welfare sectors and share risks with many other children in the neighbourhoods in which they reside. Families with the most challenging social circumstances are least well equipped to navigate fragmented service systems with confusing eligibility requirements, and the places where they live have limited resources to meet their needs. In place-based models, clinicians, social workers, educators, community development advocates and local service program administrators work together to design local interventions that link up services across traditional sector-imposed boundaries in an attempt to provide more integrated approaches to promoting positive health development. England's Sure Start Local Programs are a good example of such an approach (Melhuish et al. 2008). In the United States, place-based child development "zones" are being trialled in several locales, with the Harlem Children's Zone receiving a great deal of attention due to the interest of the Obama administration in this type of an approach (Tough 2008). Ideally, these initiatives increase the availability of local health development assets and provide a readily accessible "one stop shop" that can address children's physical, mental and developmental health needs in ways that are "user friendly" for families. England's Sure Start and America's Head Start Programs illustrate this type of approach, but with a greater emphasis on education than health. Enhancing the role and function of primary healthcare through the use of community health teams or primary health service support organizations is an approach that other nations are exploring as a means to improve health and reduce inequalities (Cumming et al. 2008).

Align Incentives

Healthcare providers who attempt to embrace new community partnerships to tackle social determinants of health frequently encounter unanticipated barriers to success. Clinicians at Children's Hospital, in Boston, Massachusetts, decided to adopt a systematic approach to the management of inner-city children with asthma. In addition to the provision of inhalers covered by insurance, the hospital paid for nurses to make home visits after discharge, ensuring that children knew how to use their medications and had appropriate follow-up. They also provided home inspections for mould and pests, and vacuum cleaners for families that needed them. The program was a success. Hospital readmission rates fell more than 80% and costs plummeted; but as hospital revenue depends on bed occupancy, the loss of income threatened the hospital's fiscal integrity (Gawande 2010). This example teaches us that unless fiscal policy can be

adjusted to support innovations such as the Boston Asthma project by aligning incentives within the health sector for clinicians, hospitals and communities, successful programs cannot be sustained or spread. Aligning incentives across sectors is also a major challenge, especially when investments by one sector result in the greatest benefits to the bottom line of another sector. New financial models and the use of population-focused prevention and wellness trusts that can pool resources and allocate them over longer time frames is one strategy that is being used to overcome this set of challenges (Chernichovsky and Leibowitz 2010; Lambrew 2007).

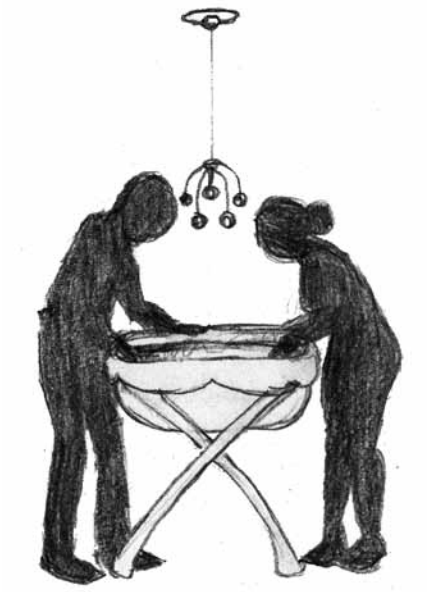
Create a Common Accountability Framework

Efforts to align incentives are facilitated by the existence of a common accountability framework. Existing accountability is sector specific: educators are responsible for test scores, clinicians for the delivery of proficient healthcare and social services for establishing eligibility for programs and benefits. No sector or discipline is responsible for the developmental health of the whole child, creating a situation where sectors may compete for resources to fulfill their own missions. A systems-level approach to the measurement of outcomes could align disparate programs behind a set of common goals and encourage cross-sector collaboration. The United Kingdom has made significant progress toward common accountability with the development of its Every Child Matters Framework (Chief Secretary to the Treasury 2003). The framework lists five outcomes – be healthy, stay safe, achieve and enjoy, make a contribution and achieve economic well-being – with accompanying sets of quality-of-life indicators (e.g., prevalence of breastfeeding, obesity) and quality-of-care measures (e.g., parents' satisfaction with services for children with disabilities). Similar frameworks have recently been proposed in the United States (Jean-Louis et al. 2010; Nemours Health and Prevention Services 2009). Multidimensional health measures such as the EDI can also provide communities with a tool to promote shared accountability across sectors. Shared accountability at the local level can help catalyze cross-sector innovation and improvement efforts that are necessary if service providers are going to combine forces to address more fundamental causes of adversity and provide more systemic kinds of supports.

Promote Positive Social Determinants of Health

One important aspect of our proposed new operating logic for child health systems is that it promotes positive health in childhood as well as preventing and treating illness. Not all social determinants are negative, and a greater understanding of positive determinants could inform the design of effective health promotion interventions. Regular parental reading to young children, interest in academic progress and parental warmth in the context of the parent-child relationship are all associated with improved developmental health outcomes. The promotion of healthy parenting styles and early childhood routines could be a very inexpensive approach to improving children's health development trajectories, leading to less chronic illness in mid-life and potentially vast cost savings. The realization of this potential will only be possible if trials of community-based pediatric interventions move from their current status as a "research backwater" to a high priority for significant and long-term funding. The recently passed health reform legislation in the United States provides new funding for community-wide prevention initiatives largely focused on addressing local social determinants associated with the rising tide of obesity. Using these obesity-focused prevention initiatives as the entry point, other community-focused health-promoting initiatives can follow.

FACTS FOR LIFE



Babies learn rapidly from the moment of birth. They grow and learn best when responsive and caring parents and other caregivers give them affection, attention and stimulation in addition to good nutrition, proper health care and protection.

Source: Facts for Life Global
www.factsforlifeglobal.org/03/messages.html

Create New Parent-Professional Partnerships

Transformation of the existing healthcare system requires both "top-down" and "bottom-up" support. Families have first-hand experience of the impact of social determinants on their lives and valuable insights on improvements that would most benefit their local communities. This knowledge can be harnessed through community-based participatory research and parent-professional collaboratives to design and implement population-based interventions. New web-based social networking technology and local measurement of child health outcomes and social risk also provide a way of empowering parents to take action on behalf of their children as individuals and within their communities. Government alone cannot transform the healthcare system. It is the actions of individual clinicians and families that will bring about true change (Gawande 2010). Redefining the nature of the provider-patient relationship as a reciprocal partnership with common health goals could contribute to a reformed system of care that is high quality and contains costs. Partnerships between professionals and parents are particularly important in child health, where both parties share the common goal of optimizing children's health.

Conclusions

Just as the social determinants of health operate in a complex and dynamic manner at various nested levels of influence, so also must our strategies to address them occur through a wide variety of channels. Many countries are now developing national policy initiatives to address the social determinants of health. Promoting a national childhood policy agenda that supports families through both direct and indirect approaches (e.g., the provision of adequate family income, labour market policies that support time for parenting, and early intervention and prevention services) is vital for promoting child health and addressing the upstream determinants of health inequalities. However, for countries such as the United States and Canada where prevailing ideologies and beliefs can slow broad social policy change, we also need to work from the ground up with state and local health officials who are interested in utilizing placed-based initiatives and other service system performance-enhancing strategies as the means to addressing inequities in exposures and outcomes. The recent passage of health system reform legislation in the United States will provide new opportunities to test innovative approaches to improving child health services and transforming the capacity of the child health system to address the growing impact of social determinants on inequities in child health outcomes. HQ

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