

LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE



LSHTM Research Online

Patton, GC; Sawyer, SM; Santelli, JS; Ross, DA; Affi, R; Allen, NB; Arora, M; Azzopardi, P; Baldwin, W; Bonell, C; +20 more... Kakuma, R; Kennedy, E; Mahon, J; McGovern, T; Mokdad, AH; Patel, V; Petroni, S; Reavley, N; Taiwo, K; Waldfogel, J; Wickremarathne, D; Barroso, C; Bhutta, Z; Fatusi, AO; Mattoo, A; Diers, J; Fang, J; Ferguson, J; Ssewamala, F; Viner, RM; (2016) Our future: a Lancet commission on adolescent health and wellbeing. *Lancet*, 387 (10036). pp. 2423-78. ISSN 0140-6736 DOI: [https://doi.org/10.1016/S0140-6736\(16\)00579-1](https://doi.org/10.1016/S0140-6736(16)00579-1)

Downloaded from: <http://researchonline.lshtm.ac.uk/2549330/>

DOI: [https://doi.org/10.1016/S0140-6736\(16\)00579-1](https://doi.org/10.1016/S0140-6736(16)00579-1)

Usage Guidelines:

Please refer to usage guidelines at <https://researchonline.lshtm.ac.uk/policies.html> or alternatively contact researchonline@lshtm.ac.uk.

Available under license: <http://creativecommons.org/licenses/by-nc-nd/2.5/>

<https://researchonline.lshtm.ac.uk>

Our Future: A Lancet Commission on Adolescent Health and Wellbeing

Executive Summary

Unprecedented global forces are shaping the health and wellbeing of the largest generation of 10 to 24-year-olds in human history. Population mobility, global communications, economic development and the sustainability of ecosystems are setting the future course for this generation and in turn mankind.^{1,2} At the same time, we have come to new understandings of adolescence as a critical phase in life for achieving human potential (see text box 1 for definitions of adolescence). It is characterised by dynamic brain development where the interaction with the social environment shapes the capabilities an individual takes forward into adult life.¹ It is during adolescence that an individual acquires the physical, cognitive, emotional, social and economic resources that are the foundation for later life health and wellbeing. These same resources define trajectories into the next generation. From this life-course and intergenerational perspective, investments in adolescent health and wellbeing bring benefits today, for decades to come and for the next generation.

Better childhood health and nutrition, extensions to education, delays in family formation and new technologies offer a prospect of this being the healthiest generation of adolescents ever. Yet these are years in which new and different health problems related to the onset of sexual activity, emotional control and behaviour commonly first emerge. Current global trends including those around unhealthy lifestyles and commodities, the crisis of youth unemployment, less stable families, environmental degradation, armed conflict and mass migration have the potential to pose major threats to adolescent health and wellbeing.

Adolescents and young adults have until recently been overlooked in global health and social policy, one reason why they have had fewer health gains with economic development than other age groups. The UN Secretary-General's Global Strategy for Women's, Children's and Adolescents' Health in September 2015 presents an outstanding opportunity for investing in adolescent health and wellbeing.² Yet, because of low capacity and limited technical capabilities, both in countries and at the global level, responding effectively presents many challenges. The question of where to make the most effective investments is now pressing for the international development community. In that context, this Commission outlines the opportunities for investment at both country and global levels.

There are marked differences in adolescent health profiles between countries and within nation states. These commonly reflect progress through the epidemiological transition that follows economic development and the demographic transition. *Multi-Burden* countries, that have yet to pass through the epidemiological transition, are characterised by high levels of all adolescent health problems including diseases of poverty (HIV and other infectious diseases, under-nutrition and poor sexual and reproductive health), injury and violence, and non-communicable diseases (NCDs). These countries commonly continue to have high adolescent fertility and high unmet need for contraception, particularly for unmarried sexually active adolescents. *Injury Excess* countries are characterised by high persisting levels of unintentional injury and/or violence and high adolescent fertility, and have commonly made little progress in reducing these problems in recent decades. A growing number of countries are now *NCD Predominant*, where the major adolescent burden lies with mental and substance use disorders, and chronic physical illness.

Health services should be easily accessible and provide a package of care that is matched to local need and acceptable to adolescents and young adults. Health services play essential roles in identifying health needs, providing effective contraception, and in early intervention and management of conspicuous health problems. Yet adolescents and young adults currently have high unmet needs for healthcare. Their inexperience and lack of knowledge about accessing healthcare is one barrier, while heightened sensitivity to confidentiality breaches is another. Further barriers arise from restrictive legislative frameworks, out-of-pocket costs, stigma and community attitudes. Lastly, health care providers need attitudes, knowledge and skills that foster engagement with adolescents while maintaining a level of engagement with families. The most effective health service systems include high-quality health worker training, adolescent responsive facilities and broad community engagement.

The most effective actions for adolescent health and wellbeing are intersectoral and multicomponent. They may include structural, media, community, online and school-based elements. Laws, for example, have profound effects on adolescent health. Some are important in protecting adolescents from harms (e.g. preventing child marriage); others are potentially damaging in limiting access to essential services and goods (e.g. contraception). Although nearly all countries have signed and ratified The UN Convention on the Rights of the Child, there are profound differences in the legal frameworks underpinning adolescent health across countries. Even where national legal frameworks exist, customary or religious laws often take precedence leaving the rights of adolescents to health too often neglected and undermined.

New opportunities for adolescent health actions are emerging. The expansion of secondary education in many countries, particularly for girls, is particularly important. Participation in quality secondary education enhances cognitive abilities, improves mental health and sexual and reproductive health, and lowers risks for later-life NCDs. Schools also provide a platform for health promotion that extends from the provision of essential knowledge for health including comprehensive sexuality education, to maintaining lifestyles that minimise health risks. Equally, adolescent health, nutrition and well-being are essential for achieving the educational and economic benefits that extensions to secondary school offer.

Adolescents are biologically, emotionally and developmentally primed for engagement beyond their families. That engagement is essential for their health, wellbeing and development as well as being a force for change and accountability within communities. Digital media and social networking technologies have the potential to galvanise, connect and mobilise this generation as never before. However, extending youth engagement into the real world requires financial investment, strong partnerships with adults, training and mentorship and the creation of structures and processes that allow adolescent and young adult involvement in decision-making.

The neglect of adolescent health and wellbeing has resulted in minimal investments in programming, capacity building and technical support compared with other age-groups. There are therefore major gaps in our understandings of adolescent health needs, in the evidence base for action and in creating the civil society structures for advocacy in adolescent health. Within any country there are marked differences in health between different regions and within different adolescent groups, with poverty, gender and social marginalisation important determinants. Groups such as ethnic minorities, LGBT (lesbian, gay, bisexual or transsexual) youth, those with disabilities, or who are homeless or in juvenile detention have the greatest health needs. Yet because information systems around health and wellbeing are piecemeal, the needs of these groups are typically both invisible and unmet. A capacity to understand local health needs inclusive of all adolescents, regardless of age, sex, marital or socioeconomic status, is essential.

In the face of global change, continued inaction jeopardises health and wellbeing for this generation and for the next. Yet there are grounds for optimism. The Global Strategy for Women's, Children's and Adolescents' Health offers a framework to drive and coordinate investment, capacity building, research and evaluation.² Global strategies to extend education, to reduce gender inequalities and empower women, to improve food security and nutrition, to promote vocational skills and opportunities for employment are all likely to have benefits for the health and wellbeing of adolescents and young adults.³ So too digital technologies and global communications offer exceptional opportunities for catch-up in training and education, health care and prevention, creation of inclusive health information systems, meaningful youth engagement and cooperation across sectors. This generation of adolescents and young adults can transform all of our futures; there is no more pressing task in global health than ensuring they have the resources to do so.

Introduction

The Second Lancet Series on Adolescent Health concluded that a *“Failure to invest in the health of the largest generation of adolescents in the world’s history jeopardises earlier investments in maternal and child health, erodes future quality and length of life, and escalates suffering, inequality, and social instability.”*⁴ The response of the international development community to this and other calls has been striking. From September 2015, the Every Woman, Every Child agenda has become the Global Strategy for Women’s, Children’s and Adolescents’ Health, supported by a Global Financing Facility.² This Commission on Adolescent Health and Wellbeing outlines where those investments should be in the years to 2030.

This Commission was established as a network of academics, policy makers, practitioners and young health advocates with broad expertise in adolescent health. It has brought together leading academic institutions in global health (Columbia University, the London School of Hygiene and Tropical Medicine, University College London, the University of Melbourne and the University of Washington). The Commission’s 26 members bring experience from Africa, Asia, Australia, Europe, the Middle East, North America and South America. They represent diverse disciplines including public health and medicine, behavioural and neuroscience, education, law, economics as well as political and social science.

In Section 1 we consider the place of adolescent health within the life-course with particular reference to the health capital that accrues or is diminished across these years. We also consider the global forces shaping adolescent and young adult health and our new understandings of healthy development across these years. Section 2 considers the rapidly changing social and structural determinants of adolescent health and their implications for health promotion and prevention. Section 3 uses available data on adolescent and young adult health to provide a global profile that takes into consideration the differing health needs of adolescents as their countries pass through the epidemiological transition. Section 4 summarises a series of reviews of reviews of our current knowledge base for action in adolescent health, concluding with an example of matching country level actions to health needs. It also considers the different roles of health service systems for adolescents. In Section 5 we consider models for youth engagement and for accountability in adolescent health and wellbeing. The Commission’s recommendations are detailed in Section 6.

Adolescence has historically been considered to begin with puberty and to end with transitions into marriage and parenthood.⁵ In today’s context, the endpoints are often less clear-cut and more commonly around the adoption of other adult roles and responsibilities including the transition to employment, financial independence, as well as the formation of life partnerships. These events occur at different ages in different parts of the world and so local cultural concepts of adolescence vary greatly. Given this variability we have adopted an inclusive age definition of 10 to 24 years for this report. Text Box 1 summarises terms that are commonly used to describe this age group. In general we use the terminology of adolescent and young adults, though in some instances we abbreviate this to adolescents. Given that the field commonly uses the terms ‘youth engagement’ and ‘youth participation’, we have retained these terms in Section 6.

Definitions of wellbeing are diverse and range from the subjective to more objective. We have adopted a broad capabilities-based approach to wellbeing emphasising adolescents’ opportunities to achieve developmentally important goals (e.g. access to education, opportunities for civic engagement) in the context of their emerging physical, emotional and cognitive abilities.^{6,7}

Section 1. Why Adolescent Health and Wellbeing?

Adolescence has often been considered the healthiest time of life. In most places, it has been the point of lowest mortality across the life-course, sitting between the peaks of early life mortality and of chronic disease in later adulthood. It is an age where many attributes of good health are at their height,⁸ and from the perspective of health services, adolescents appear to have fewer needs than those in early childhood or in later years. This dominant view of adolescent health has been the reason why adolescents and young adults have attracted so little interest and investment in global health policy.

Yet even from a perspective of conspicuous health needs, there has been a shift in attitude towards adolescents and their health.⁹ Changes in the health of other age groups is one reason. Mortality has fallen sharply in younger children in high and middle income countries compared to older adolescents and young adults.¹⁰ By 2013, mortality in 1 to 4-year-olds had fallen to around a quarter of 1980 levels (Supplementary Figure 1). In contrast, deaths in 20 to 24-year-olds had only fallen to around 60% of 1980 levels. For this reason, male deaths in many high and middle income countries are now higher in older adolescents and young adults than in 1 to 4-year-olds.¹⁰

From three alternative perspectives, adolescence and young adulthood has an altogether different significance. Firstly, health and wellbeing underpin the crucial developmental tasks of adolescence including the acquisition of the emotional and cognitive abilities for independence, completion of education and transition to employment, civic engagement and formation of lifelong relationships. Secondly, adolescence and young adulthood can be seen as the years for laying down the foundations for health that determine health trajectories across the life course. Lastly, adolescents are the next generation to parent; these same health reserves do much to determine the healthy start to life they provide for their children.

The adolescent and young adult years are central in the development of capabilities related to health and wellbeing. These emergent capabilities are dependent on available opportunities (e.g. presence of a school), having the resources to use those opportunities (e.g. family finances that allow school attendance), and for those who have been socially marginalised, access to second chances (e.g. access to education for married girls who have left school).¹¹ Adolescents with longer participation in education, fewer health risks and slower transitions into marriage and parenthood generally accrue greater capabilities and resources for health. Conversely early marriage and parenthood, little education and early exposure to economic and social adversity are likely to diminish an individual's health and capabilities. So too premature autonomy with early disengagement from parents and school and high levels of health risk behaviours predict poorer health and well-being.¹² The extent to which an individual's health and wellbeing is fostered or compromised during these years has consequences across the life course as well as influencing the healthy start to life of the next generation.¹³

Health capital can be considered the set of resources that determine trajectories of health across the life-course.¹⁴ These resources typically peak during adolescence and young adulthood. Physical fitness peaks around the age of 20 and remains high until the early 30s when it declines steadily through to old age.¹⁵ Those with the highest fitness levels in their 20s are more likely to stay physically healthy throughout life, with less health service use as they age.¹⁵ Adolescent cardiorespiratory fitness, muscular strength and body composition are also predictive of lower rates of all-cause mortality and lower cardiovascular disease in later life than in those who are less fit.¹⁶ Adolescence is similarly central in skeletal health. Bone mineral density, a primary determinant of later life osteoporosis and its complications, peaks in the late teens to early 20s¹⁷. In the two years of peak skeletal growth, adolescents accumulate over 25% of adult bone, with patterns of physical activity and adolescent nutrition important modifiable influences.^{18,19}

A growing understanding that neurodevelopment extends across the second and into the third decade has implications for both adolescent health and the capacities that underpin wellbeing across the life-course (Text Box 3).²⁰ Many cognitive capacities increase markedly from late childhood to peak in the early 20s and

then undergo slow decline from the early 30s.²¹ Analogous to physical health, educational attainment between late childhood and the mid-20s is a strong and independent predictor of cognitive capacity in midlife.²² These cognitive reserves predict later life physical health and longevity²³ and are protective against cognitive decline.²² Equally, maturation of the neural systems underpinning emotional processes may be one reason for higher risks for mental and substance use disorders during these years.²⁴ The maturation of these systems similarly has profound implications for emotional development and the capacities that adolescents bring into their future roles as parents, citizens and workers.²⁵

Adolescence and young adulthood are also the years in which an individual establishes the social, cultural, emotional, educational and economic resources to maintain their health and wellbeing across the life-course.²⁶ The process of hormonal changes that lead to sexual maturation commences with adrenarche in mid-childhood and continues through puberty. This is a time of adaptation to social and cultural complexity and the point at which gender differences in social and emotional styles, including gender roles, typically crystallise. So too, the foundations for success in the transitions to an independent healthy lifestyle, to employment, and to supportive life partnerships, marriage and parenthood are laid in these years.¹¹

Conversely, adolescent health problems and health risks diminish peak fitness and life-time health. Sexual health risks that result in teenage pregnancy have profound effects on the health and wellbeing of young women across the life-course. Pregnancy (and early marriage) typically denote the end of formal education, restricts opportunities for employment, heightens poverty and may limit growth in undernourished girls.²⁷ In many low and middle income countries (LMICs), adolescents and young adults remain at high risk for infectious diseases, such as HIV that now commonly has a chronic course, while others such as meningitis, tuberculosis and neglected tropical diseases can similarly have major and persisting effects on health, social and economic adjustment and wellbeing, albeit for different reasons.²⁸ A range of health risks including tobacco and alcohol use, greater sedentary behaviour, diminished physical activity, increasing overweight and obesity emerge across adolescence and young adulthood, reducing fitness and ultimately posing major risks for cardiovascular disease and type II diabetes in later life.²⁹ Mental disorders commonly emerge during these years with many persisting into adulthood with consequences for mental health across the life-course, social adjustment and economic productivity.³⁰ Substance use during adolescence diminishes fitness, increases risks for many later life non-communicable diseases (NCDs) and heightens the risk for later substance use disorders.³¹ Some forms of substance use may also affect adolescent cognitive development and ultimately reduce peak cognitive abilities.³² Injuries, both intentional and unintentional, disproportionately affect adolescents and young adults. They are not only a common cause of adolescent and young adult death in many countries but a major cause of disability, including acquired brain injury, leading to diminished health capacity that persists across the life-course.

These same resources that underpin life-course health and wellbeing are primary determinants of the health and development of the next generation of children. Maternal preconception nutritional deficiencies, whether micronutrients (e.g. folate) or macronutrients (e.g. protein energy malnutrition), have profound consequences for fetal and infant development with the effects extending to neonatal and early childhood mortality, and stunting.³³ Chronic adolescent infectious diseases such as HIV, and chronic physical conditions such as Type 1 diabetes mellitus and congenital heart disease, require proactive management from adolescence into pregnancy. Adolescent obesity, tobacco and alcohol use, and mental health problems are similarly risks for poor pregnancy outcomes in infants as well as in mothers.^{34 35} A possibility of trans-generational epigenetic inheritance, whereby preconception influences alter patterns of gene expression that might pass to the next generation, has further heightened interest in preconception parent health, behaviours and nutrition.³⁶ From this perspective, investment in adolescent health and wellbeing including the lifestyles, knowledge, social and financial resources for health, can equally be seen as an investment in the next generation.³⁷

In many countries, the focus of health policy is shifting from infectious diseases in early life to NCDs in older adults.³⁸ The life-course trajectories of health capital and wellbeing are largely set by young adulthood. There is a growing recognition that early onset health risks, including those for sexual and reproductive

health and HIV, mental disorders, injuries and later life NCDs reduce physical fitness and wellbeing across the life-course. So too early marriage and parenthood and lack of education limit capabilities and wellbeing both during adolescence and across the life-course. The case for optimizing health, fitness and capabilities as well as minimizing risks to health and wellbeing are reasons to bring adolescents into sharper focus.³⁹ So too is the knowledge that inequalities in health and wellbeing established by young adulthood persist to account for many of the disparities in health (including cardiovascular disease, cancer, type II diabetes and other NCDs) and capabilities in later life.

Developing Adolescent Brains

Neuroscience is shedding new light on changing cognitive and emotional capacities across adolescence. Adolescence can now be understood as a dynamic period of brain development, second only to infancy in the extent and significance of the changes occurring within neural systems (Text Box 3).⁴⁰ Much of the research that has led to this understanding has only emerged in the last 20 years. Adolescent brain development differs from that in earlier life, both in its form and regions of greatest activity. It follows the childhood increase in dendritic outgrowth and synaptogenesis and is then characterised by synaptic pruning during the second decade that continues into young adulthood. Pubertal processes, including gonadal hormone changes, have been implicated in maturation of subcortical structures with dimorphic patterns that may be relevant to understanding sex differences in the pattern of mental and behavioural disorders that emerge during adolescence.⁴¹ Neurodevelopment is also considerably affected by social and nutritional environments, as well as by exposures, such as substance use.¹

Adolescent neurodevelopment has far-reaching implications for the influence of social environments on health.¹ The capacity for greater social and emotional engagement that emerges around puberty is likely to have had adaptive advantages in the social contexts in which modern humans evolved.⁴² Plasticity in neurodevelopment underpins the acquisition of culturally adapted interpersonal and emotional skills that are essential for the more complex social, sexual and parenting roles that until recently occurred soon after pubertal maturation.⁴³ These biological foundations of adaptive learning also underpin the acquisition of health and human capital from late childhood through to young adulthood. However, the social networks and roles of adolescents today differ markedly from those of earlier, historical environments. The quality, security and stability of social contexts in which younger adolescents are growing up is likely to be particularly important for the acquisition of skills in emotional processing and social cognition (e.g., the capacity to infer the thoughts, intentions and beliefs of others).⁴⁴ It is perhaps not surprising that late childhood and early adolescence are the time in which the first symptoms of most mental disorders commonly emerge.

The ways in which adolescents make decisions, including those affecting their health, differ from those of older adults. One notable difference is the effect of peer presence that affects the processing of social information, with a consequent greater sensitivity to reputational enhancement and damage.⁴⁵ This characteristic develops in the transition through puberty and is again likely to have had adaptive advantages in an evolutionary context. It is in part related to the way in which younger adolescents differ in terms of a heightened response to the emotional displays of others.⁴⁶ It is one reason why adolescents spend increased time with peers.⁴⁷

In a contemporary context, there are often marked differences between peer and family values. The great salience of peers means that for adolescents, peer influences on health and wellbeing are greater than at any other time in the life-course.^{1,48} This sensitivity to peers in decision-making is often targeted by teen-oriented entertainment and marketing. In this way the media, particularly social media, shape attitudes, values and behaviours in this age group more than any other.⁴⁹ The media's contribution to adolescent sexual health risks in East Asian cities, for example, is equivalent to the influence of peers, families or schools.⁵⁰ In health promotion and prevention, just as in marketing, interventions that affect the attitudes, values and behaviours of the peer group are likely to be more powerful than at any other point in the life-course.

Adolescents both seek out and are more influenced by exciting, arousing and stressful situations when making decisions when compared to adults.⁵¹ Put another way, adolescents differ from adults in their capacity to override 'hot emotions' that arise in emotionally charged situations. This is particularly relevant in the context of sexual activity and one of the reasons why 'cool-headed intentions' fail to predict adolescent behaviour. It is an important reason why relying on condoms for contraception tends to fail. It is also one reason why interventions that either avoid 'hot emotions' or are effective regardless of the emotional context are important. One example is long acting reversible contraception (LARCs), such as IUDs and implantable contraceptives. The effectiveness of LARCS (that have a 0.2% per annum failure rate in comparison to 18% for condoms) reflects their consistent presence regardless of the sexual and emotional context.

Adolescent predisposition to sensation seeking is relevant in considering the effects of the digital technology revolution. Adolescents are rapid adopters and high-end consumers of exciting digital and social media.⁵² Girls tend to use social media more than boys, whose focus is more likely to be on gaming.⁵² There are potentially great benefits from strong social digital connections during this time, but these same media can equally amplify vulnerabilities from intense emotions.⁵³ These vulnerabilities are already apparent in shifting risks for violence, mental health, suicide and self-harm across adolescence.⁵⁴ Extremist groups are increasingly utilising social media to offer prospects of adventure, belonging and fulfilment that many adolescents find missing in ordinary life.⁵⁵

Ultimately actions to support adolescent health, development and wellbeing should consider decision-making processes. An adolescent's perception of their power and agency affects the balance between short- and long-term goal setting.⁵⁶ Supporting an adolescent's capacity to make reflective decisions, considering risks and consequences, has been called 'autonomy-enhancing paternalism'.⁵⁷ Progressively empowering adolescents in decision-making as they mature also affects their perception of agency around health. These strategies are particularly important for socially marginalised adolescents such as adolescent girls in contexts of gender inequality. It is an important reason why there is value in creating opportunities for adolescents to exercise self-determination through meaningful participation, supported and facilitated by adults, in decision-making that affects their lives and their communities.

The demographic transition and changes in adolescence

The demographic transition describes a country's shift from high birth and death rates to low fertility, low mortality and longer life expectancy. The process comes about as a result of economic development. The demographic transition began in many of today's high income countries (HICs) after the Industrial Revolution and is now proceeding rapidly in most countries. It is typically accompanied by an epidemiological transition with reductions in maternal mortality, falling rates of infectious disease and greater child survival into adolescence. The combined consequences of the demographic and epidemiological transitions has been the survival into adolescence of the largest cohort of adolescents and young adults, relative to other ages, that the world has ever seen (Figure 1). The 1.8 billion people aged 10-24 now represent 24% of the world's population.⁵⁸

The demographic transition is, in turn, linked to a decline in the ratio of dependents (children and the elderly) to those in the active workforce. This lowered dependency ratio presents a potential demographic dividend for countries to expand their economies and reduce poverty. While the demographic dividend has now passed for many of today's HICs, it still lies ahead for many low income countries. The health and human capital of today's adolescents will be a determinant of future economic and social development in these countries.⁵⁹

Accompanying the demographic transition have been changes in adolescence that affect the significance of health and wellbeing during these years. One consequence of changing patterns of childhood infectious disease and nutrition has been a fall in the age of onset of puberty in many countries.⁶⁰ Conversely transitions to marriage and parenthood are taking place later than in previous generations. As a result, adolescence now takes up a larger proportion of the life-course than ever before. This expansion also

places adolescence more centrally in the creation of health and human capital than ever before. The greater duration of contemporary adolescence, particularly in the context of rapidly changing consumer and youth cultures, increases the possibility of health risks emerging during these years, with detrimental consequences well into later life.

Over the same period that the age of onset of puberty has fallen, there has been a striking upward extension in the ages at which adult social roles and responsibilities are adopted in many countries. In pre-industrial societies, the gap between physical maturation and parenthood was generally around two years for girls and four years for boys.⁴³ In these contexts adolescence was not especially recognised as the distinct phase of life that it is now in most high and middle income countries. In many HICs, first marriage and parenthood now commonly occur 10 to 15 years after the onset of puberty. Indeed a transition to marriage in many places is being replaced by other forms of stable union, including co-habitation and same-sex relationships. Inter-related drivers of this upward extension of adolescence include economic development, industrialisation, length of education and urbanisation.⁶¹ Commonly, there are differences in the timing of the transitions into marriage and parenthood between adolescents in wealthier urban settings compared to those in poorer rural settings, especially in LMICs. In a growing number of countries where marriage and parenthood are very delayed or where it is no longer rare for marriage or parenthood not to occur, these events no longer signal the end of adolescence.⁶² So too traditional linear sequences of social role transitions such as finishing school, getting a job, getting married and having children, are increasingly less well defined.⁶²

These changes in the timing and duration of adolescence have been accompanied by dramatic alterations in patterns of health risk. This is particularly notable around sexual and reproductive health. A delayed transition into marriage and parenthood in high and middle income countries has brought great benefits for young women. When accompanied with ready access to modern contraception, good antenatal care and, when necessary, legal and safe abortion the shift has brought extraordinary reductions in maternal mortality and morbidity. It has also opened opportunities to extend education and take advantage of social contexts well beyond the immediate family and village. This in turn brings greater maturity and experience to later parental roles, in addition to the huge contribution to economic development. Conversely earlier age of first sexual intercourse and later marriage have widely created new vulnerabilities. This is clearest around sexual health where a pattern of pre-marital serial sexual relationships creates a period of vulnerability to STIs and unplanned pregnancy.⁶³ These changing patterns of risk may be further heightened with the availability of new social media that promote casual sexual intercourse.⁶⁴

The demographic transition has also been accompanied by a shift in nutrition from under-nutrition and growth stunting to increasing rates of obesity. First in HICs and now in LMICs, there has been a dietary switch towards greater consumption of foods high in added sugars, salt and unhealthy fats, and low in important micronutrients. Combined with decreases in physical activity, these patterns have fuelled the global rise in obesity.

In the past, transitions into marriage and child-rearing were assumed to be a safe haven as they were accompanied by a “maturing out” of health risks, with benefits including reduced tobacco, alcohol and illicit substance use, particularly for young men.⁶⁵ Yet, for many young women, the transition to marriage is accompanied by increasing sexual and reproductive health risks including HIV and sexually transmitted infections, interpersonal violence and mental disorders.⁶⁶ With delayed and falling rates of marriage, as well as a growth in co-habitation and other partnerships, historic benefits of marriage on health risks are likely to diminish. Moreover, because adolescents in many countries initiate health risk behaviours at an earlier age, they are increasingly coming to marriage and parenthood with more established and heavier patterns of alcohol and other substance use. An additional change is the increasing participation of girls in these same behaviours, with continuity into the child-bearing years. In the absence of pregnancy planning, this creates distinct risks from the peri-conceptual phase (e.g. fetal alcohol syndrome) through to the post-natal period (e.g. SIDS).⁶⁷

Section 2. Enabling and protective systems

Adolescent development takes place within a complex web of family, peer, school, community, media and broader cultural influences.⁴² Puberty today triggers greater engagement beyond an individual's family, with a shift to peers, youth cultures and the social environments created and fostered by new media. This wider social engagement is an important aspect of healthy development in which young people test the values and ideas which have shaped their childhood lives.⁴⁴ Not only is the range of social influences greater and more complex but an extended adolescence increases their duration and significance.

Beyond local and national trends, powerful global 'megatrends' are increasingly shaping the evolution of society, health and individual development.⁶⁸ These include growth in educational participation, global patterns of economic development and employment, technological change, changing patterns of migration and conflict, growing urbanisation, political and religious extremism, and environmental degradation. The adolescent and young adult years will be increasingly shaped by these global shifts, for better and for worse. For example, growing up in urban settings may lessen family poverty and bring better access to education and health services. Conversely, it may heighten risks for mental health, substance use, obesity and physical inactivity. Urban migration may involve whole families, parents or young people alone, bringing different degrees of separation from the support of family and community. For adolescents living outside of families, urban settings can bring additional risks of sexual exploitation, unsafe employment and human trafficking.

The digital revolution has the potential to transform the social environment and social networks of today's adolescents. It has brought mobile phones to the great majority of young people, even in LMICs.⁶⁹ The potential benefits in terms of economic development, education, health care and promotion of democracy are great.⁶⁸ For adolescents and young adults, new media promote access to an extended social network, without geographic or cultural constraints. They bring the potential for engagement with new ideas and like-minded individuals. Yet the digital revolution also brings new risks for adolescent health. Digital media have extended the marketing of unhealthy commodities and promoted stronger consumer cultures which in turn affect lifestyles, health and wellbeing.⁷⁰ Access to global media may accentuate the experience of economic disadvantage as adolescents come to understand the extent of material advantage elsewhere. Online safety has emerged as a further concern, especially for younger adolescents. Experiences of cyberbullying, grooming for sex and radicalisation, sharing of sexual images and social contagion around self-harm, mass shootings, radicalisation and eating disorders have the potential to cause great harm.⁷¹ So too rising rates of adolescent sleep disturbance and addiction to gaming have been linked to the new media.⁷²

The social determinants of health are the conditions in which people are born, grow, develop, live, work and age.⁴² Within the life-course, adolescence is the time of greatest change and diversity in exposure to social determinants, particularly those most proximal to young people (Figure 2). The influence of families remains strong, although family relationships change markedly with adolescents' greater capacity for autonomy. Inequalities related to gender, ethnicity, and sexual orientation increase further from puberty.⁴²

Young people growing up in contemporary societies differ in fundamental ways from those of past generations.⁷³ Key amongst these globally are changes in the structure and function of families, greater engagement with education, and greater exposure to media influences. Each can function as an important enabling and protective system for health.

Family function, structure and adolescent health

Families provide the primary structure within which children are born, grow and develop and from which adolescents transition to adult lives.⁷⁴ Families are the main protective and enabling setting for children's health, growth and well-being. Economic development has generally brought changes in family structure, stability and patterns of transition to the next generation of families. Parents have fewer children, allowing greater investment of family resources for each child.⁷⁵ Smaller families mean parents can afford to invest more in education.⁶¹ This is important in the context where delayed transition into marriage and the

formation of the next generation of families necessitates a longer period of parental investment. In the next 10 years, spending on education is projected to grow fastest in countries with the most rapid economic development and declines in fertility.⁷⁶ Global changes in the transition into marriage are illustrated in supplementary Figure 2, with countries outside of sub-Saharan Africa and south Asia having largely moved away from early marriage. In the majority of remaining countries with high rates of child marriage there is also a trend to later marriage.

Families take an increasing variety of forms. In most countries, a majority of adolescents still live at home with two parents. Co-habitation of parents rather than marriage is increasingly common, especially in HICs where there is also less stigma about single unmarried parents. Parental relationships have become less stable with parental separation now common in many countries. Together with declines in marriage, parental deaths from HIV in some countries and parental migration for employment in others, there has been a global trend towards more single parent families.⁷⁴ Living with only one or neither parent is now common in much of sub-Saharan Africa and Latin America.^{77,78} In Asia, the Middle East, sub-Saharan Africa and Central and South America, large numbers of adolescents now live with extended family members rather than parents.⁷⁴

In HICs, many experience parental divorce, remarriage or change in cohabitation during adolescence. In North America and Europe, around one-fifth of adolescents now live in single parent households.⁷⁴ By 2030 single parent families will make up to 40% of families in many countries.⁷⁹ Increasing numbers of single parent families may increase adolescent exposure to poverty and lower uptake of education.⁷⁹ Family instability is linked with poorer outcomes for adolescents including teenage parenthood, early marriage and later life-course trajectories that are themselves characterised by family instability.^{73,80}

Puberty brings major shifts in parent-child relationships, with increases in both conflict and distance as adolescents seek greater independence and more autonomy.⁸¹ Such changes in parent-child interactional patterns are normal but parental difficulty in managing these changes predicts adolescent health risks.⁸² Parenting capacities, such as those around monitoring and supervision of activities, are important for reducing health risks.⁷³ Beyond this, families are likely to play a central role in how adolescents learn to respond to new emotional experiences that emerge in and around puberty.⁸³ Both parents and peers are important reference points for the adolescent in learning how to respond to more intense experiences of sadness, anxiety and anger. The extent to which parents are able to express and respond to emotions is likely to have a major effect on this capacity in their adolescent children.⁸³ Families also have the potential to harm. Family norms may promote gender inequity and attitudes towards violence with profound effects on identity development, reproductive health, mental health and risks for violence.⁸⁴ Female genital cutting or mutilation is common across Africa and the Arab World, often perpetuated by families from cultural beliefs that it is necessary to prepare girls for marriage.⁸⁵ Family violence and abuse have profound effects on adolescent mental health. Adolescents exposed to family violence are more likely to have educational failure and early school leaving, develop substance abuse and engage in abusive relationships themselves.⁸⁶

In the context of such secular changes in families and the greater complexity of adolescent social and emotional development, there are important questions about what strategies might best support families to nurture adolescents.⁷⁹ Surprisingly, there have been few systematic studies of the effects of family functioning on adolescent health. In response, we undertook a review of reviews to address the question of how family characteristics are associated with adolescent reproductive health, violence, and mental health (Supplementary Table 2). The vast majority of identified studies focussed on younger children with scant evidence around families of adolescents. Most of these focussed on the effects of parent-adolescent communication. There is limited but consistent evidence that parent-adolescent communication (particularly mother-daughter communication) about sex delayed initiation of sex and promoted contraception use.⁸⁷ Better parent-adolescent communication is also linked to adolescent self-esteem and self-worth,⁸⁸ better social functioning,⁸⁹ and fewer mental health problems.⁸⁸ For LGBT youth, supportive parent-adolescent relationships are protective against risky behaviours.⁹⁰ Limited but consistent evidence

indicates that lower family socioeconomic status and parental education are associated with higher rates of teenage pregnancy.⁹¹ Adolescents living in non-intact families or families with problems have higher odds of suicide, substance abuse, depression, and eating problems.⁸⁹

Given that families and parents remain the most important figures in the lives of most adolescents, the lack of rigorous research into family influences on adolescent health and wellbeing is a striking knowledge gap.

Education and adolescent health

Education is a powerful determinant of adolescent health and human capital.^{42,92} Those who are more educated live longer lives with less ill-health. This is true in both rich and poor countries and is likely to be causal.⁹² In HICs, the benefits are generally greater for women than men, particularly in terms of mortality, self-reported health, mental health and obesity.⁹³ Amongst adolescents in LMICs, higher education is associated with reduced teenage births and older age at marriage.⁹⁴ Education also has inter-generational effects; improved education for women may account for up to half of the global improvement in child mortality since 1970.⁹⁵

To date, research on the value of education for health in LMICs has largely focused on early childhood and primary education.⁹⁶ There has been little study of the benefits of secondary education for adolescents in LMICs, despite a dramatic global expansion in the length of education in the past 30 years. Figure 3 shows estimates of global educational attainment. Young women aged 15-24 years had a global average of 9.5 years of education in 2015 in comparison to 9.9 years in young men. Primary education only (≤ 7 average years of education) was the norm for young men in 22% of countries and for young women in 26% of countries. Lower secondary education (8-10 years of education) was the norm in 34% of countries for young men and in 18% for young women. Upper secondary or beyond (11+ years of education) was the norm in 44% of countries for young men and 56% for young women.⁹⁷

The health benefits of secondary education for adolescents have been poorly studied in LMICs. In HICs there may be a threshold effect at the upper secondary level for self-reported health, mental health and alcohol use, with little additional benefit from tertiary education.⁹³ With primary education now widespread in LMICs, expansion of participation in secondary education offers an achievable strategy for improving health across the life-course and into the next generation.⁹³ In countries that already have high secondary education participation, facilitating schools to more explicitly promote health has the potential for leverage above and beyond the health benefits of educational participation alone.

We used recent data on average years of education for young men and young women aged 15-24 years for 187 countries from 1970 to 2015 and data from UN sources on adolescent fertility and mortality to examine the links between participation in secondary education and health (Figure 4, Supplementary Figures 3, 4 & 5). Strong associations were found between the average years of education for 15-24 year olds and adolescent birth rates, all-cause and injury mortality amongst 15-19 year old males and females, and maternal mortality amongst 15-24 year olds. Each additional year of education for girls was associated with 9.2 fewer births per 1000 girls pa. Countries in which young women generally attended lower secondary education (i.e. received 8-10 years of education) had approximately 48 fewer births than those with primary education alone. Those where most young women obtained upper secondary education (11+ years) had an average of 68 fewer births/1000 pa (Figure 4). We then modelled the impact of trends in education on adolescent fertility from 1990 to 2012. Both economic development and increases in education were independently associated with total birth rate. Each additional year of education again decreased adolescent birth rates annually by 8.5 births/1000 pa across all countries when adjusted for growth in national wealth. Accelerating investments to 12 years of education for girls would bring very marked reductions in total adolescent birth rates (Supplementary Figure 5).

Higher average levels of education were associated with lower total adolescent mortality in both sexes, injury mortality (males only) and maternal mortality, after adjustment for national wealth. Each additional year of education was associated with 13 fewer deaths in 15-19 year old boys/100,000 pa after adjustment

for national wealth with a similar but smaller association for girls. For young women 15-24 years, pregnancy-related maternal mortality, while at relatively low levels in most countries providing data, was strongly associated with education. Each additional year of education for young women was associated with 0.4 fewer maternal deaths/100,000 pa in 15 to 24 year olds after accounting for national wealth.

We identified six cohorts from LMICs in which it was possible to examine the associations of secondary education participation with health (Figure 5 and Supplementary Figure 6). In each, we estimated the association between participation in lower or upper secondary school compared with attending primary school on a range of health outcomes, using structural marginal models and controlling for a range of potential confounders. In each cohort, higher secondary completion was associated with health independent of wealth, age, sex, parental education and cognitive ability. In one cohort in the Philippines, adolescents with later secondary education had a greater than 50% lower rate of various health problems (Figure 5). The benefits were most consistent for mental health, alcohol use and sexual health. Despite being based on observational data, the consistency across cohorts supports secondary education as a major resource for adolescent health and wellbeing extending across the life-course.

Characteristics of health promoting schools

We reviewed evidence from existing systematic reviews on the school characteristics predictive of health for young people across all country types (Supplementary Text Box 1). We addressed the effects schools' environments (i.e. physical and social environment, management/organisation, teaching, pastoral care, discipline, school health services, whole-school health promotion and extra-curricular activities) on violence, substance use and sexual health. We focused on these outcomes as each is common, almost entirely initiated during adolescence and has substantial consequences for health and wellbeing.

The traditional way in which schools address these behaviours is through health education delivered in classrooms, for which there is established evidence of small to moderate effects - although implementation is often patchy and effects not sustained.⁹⁸ The ways that schools operate more widely have great effects on health and wellbeing.⁹⁹ For this reason actions that address the school environment are more likely to be effective. A school's environment extends to the physical and social environment, management and organisation, teaching, discipline, pastoral care, school health services, whole-school health promotion and extra-curricular activities.

We found clear evidence that a positive school ethos is associated with health (Table 1). One medium-quality review¹⁰⁰ found that in schools where attainment and attendance are better than would be predicted based on student socio-demographic factors, rates of adolescent smoking, alcohol use and drug use and, in one study, violence were lower. Another medium quality review¹⁰¹ found that student connection to school and to teachers was associated with reduced drug use, alcohol use and smoking. A low quality review¹⁰² suggested there were lower rates of violence in schools with positive student-teacher relationships, with students who were aware of rules and accepted these were fair. A further low quality review¹⁰³ that specifically focussed on outcomes for LGBT students found that schools with more supportive policies had lower rates of victimization. The evidence around school characteristics affecting sexual health were insufficient to draw firm conclusions. Expansion of secondary education in countries with high adolescent fertility and sexual health risks suggests that this is an important question for research and evaluation.

The health and wellbeing benefits of expansion of secondary education accrue through multiple mechanisms, including healthier behaviours, greater cognitive capacity and longer productive adult lives for the current generation, better health and lower mortality amongst their children and overall greater productivity in the future workforce.⁶¹ However, many forces operate to exclude or divert adolescents from secondary education. Prominent among these are the costs of education and the opportunity costs to families of the loss of adolescent labour, especially in rural areas. In many LMICs, poor adolescents are less likely to attend secondary school.¹⁰⁴ Most interventions to increase access to and retention in education have been in younger adolescents, largely in primary schools. Scholarships, school fee reductions, cash transfers conditional on remaining in school, decrease in grade repetition, school proximity and mother

tongue education are cost effective actions.^{105,106} Free school uniforms and abolishing school fees are among the most cost-effective interventions, while school meals, financial support to parent-teacher associations and cash transfers are less cost-effective. Building schools close to students is cost-effective as one school can serve children for many years.¹⁰⁵ Addressing gender disparities in access and targeting more resources to the poorest regions as well as to disadvantaged students (notably children affected by armed conflict, children whose home language is not used at school, and children with disabilities) are critical to closing equity gaps.¹⁰⁷ There is also a need for greater non-formal or flexible learning strategies for children without access to mainstream education (e.g., child labourers and married adolescents who have left school).¹⁰⁸

Schools in higher income settings have come to be viewed mainly as a system for increasing academic attainment. International metrics of student attainment (e.g. the Programme for International Student Assessment or PISA)¹⁰⁹ are being used to manage the performance of schools and publish data to inform parents' choice of schools. In this context, there is a risk that schools will de-emphasise their essential role in social development, marginalise health actions and health-related education¹¹⁰ and potentially undermine mental health. Particularly for low achieving students, a narrow focus on academic achievement diminishes self-esteem¹¹¹ and increases student disengagement, a predisposing factor for academic failure, poor mental health, substance use, violence and sexual risks.¹¹² Potentially harmful directions in current educational policy that overly focus on academic performance could be mitigated by including health and wellbeing indices alongside educational attainment metrics in school performance management systems.¹¹³ Ultimately, promoting education and health are synergistic goals, both of which are essential for wellbeing and generating human capital; health and wellbeing interventions boost educational attainment while education boosts health and wellbeing.¹¹⁴

Transition into the workforce

The workplace has historically been a major social influence on health from mid-adolescence. A reduction in the number of 10-24 year olds working has followed increased retention in secondary and tertiary education.⁶¹ Yet in LMICs, many adolescents less than 15 years of age still work. Of these, a substantial minority work in hazardous occupations with poor life-long earning prospects.¹¹⁵ Over 47.5 million young people aged 15 to 17 years are estimated to work in jobs that expose them to environmental hazards, excessive hours or physical, psychological or sexual abuse.¹¹⁵ Young women are more likely than young men to have difficulty finding safe and stable work in non-hazardous occupations.¹¹⁵

Longer education and reduced exposure to occupational health hazards have both had positive health effects but new risks are emerging related to unemployment. Transitioning from education into the workforce has become more difficult in many countries.⁶¹ Transitions are now slower with a poorer selection of jobs. Many young adults are in unstable, informal employment or unable to get jobs.¹¹⁶ Global youth unemployment is estimated at 12.5%, with youth almost three times more likely than adults to be unemployed.¹¹⁶ Those who leave school to be unemployed or inactive (NEET: not in employment, education or training) make up around 13% of the youth population across the OECD but up to 30% in rapidly developing LMICs such as South Africa and India and close to 50% in some OECD countries such as Spain and Greece.¹¹⁷ Those who are NEET at the end of schooling are more likely to have lower earnings, greater unemployment and employment instability through adult life.¹¹⁸ Poor health and difficult transitions into the workplace go hand in hand; those who are NEET have high rates of mental health problems, suicide risk and substance abuse.^{119,120}

Peers, media, youth culture and marketing

The emergence of strong peer relationships is a central feature of early adolescence with significant implications for health and wellbeing.⁴² Modern adolescence differs markedly from a preindustrial context in both the number and diversity of peers.¹²¹ Later marriage and parenthood and prolongation of education have acted to expand the role of peers within the lives of adolescents. Social media are further expanding the role of peers and youth cultures in the lives of adolescents across all countries.¹²²

Peers may have strong positive or negative influences on adolescent health.¹²³ Peer connection, peer modelling and awareness of peer norms can be protective against violence, substance use and sexual risks.¹²⁴ Equally, peers may also increase risks, with peer participation in risk behaviours likely to increase smoking initiation and persistence, alcohol initiation and use, sexual risks and violence.^{125,126} Other peer characteristics, such as sexual partner communication and negotiation skills, influence sexual and HIV risks.^{124,127}

Social media further extend the influence of peers on health.¹²⁸ Online spaces have changed adolescent developmental tasks such as relationship and identity building which were previously mainly negotiated in face-to-face communications with peers.¹²¹ For many adolescents, identity formation incorporates local influences with new elements derived from global culture, particularly youth cultures.¹²⁹ There is continued debate over whether exposure to digital media, including a greatly expanded social network, may adversely affect adolescent social, emotional and cognitive development.¹³⁰ To date, the development of the new media has been so rapid that research efforts to understand their effects have failed to keep pace with their growing influence.

There is, however, little doubt that rapid changes in the media environment have changed patterns of marketing to adolescents and young adults. Again the speed of change has been such that research on the consequences has lagged far behind marketing practices. To assess current knowledge around the effects of marketing on adolescent health, we conducted a review of reviews of research around the effects of media on sexual and reproductive health, substance use and obesity, using diverse strategies (Table 2). Although most research is around traditional media, we extended to reviews on digital media where available (Supplementary Text Box 2).

The evidence around the influence of marketing through traditional media on adolescent tobacco use is compelling. *Point of sale advertising* and *smoking imagery in films* had the clearest evidence. There is moderate evidence around the importance of smoking imagery in other settings including television and magazines particularly among girls. A range of factors linked to marketing and media use were also predictors of tobacco initiation with the strongest evidence around *ownership of a promotional item*.

There was moderately strong evidence for marketing affecting alcohol initiation, consumption, maintenance and heavy drinking. Depiction of *drinking in movies, television, music and rap videos, advertisements in magazines, point of sale displays, and advertising on radio and concessional stands at promotional events* all had effects. In general, the effects of multiple media exposures on alcohol consumption were greater than for specific individual media.

Links between marketing and adolescent obesity are less well defined, in part due to the greater time lag between exposure and outcome. Yet links between marketing and intermediate outcomes that are strongly predictive of later obesity are clear. Food *imagery in television, imagery in films* and *point of sale advertising* had moderate evidence for outcomes including food choice and amount. *Overall media use* (TV, computer and video games) showed the strongest evidence of association with overweight and obesity although a major mediator is likely to be sedentary behaviour and diminished physical activity.

There have been fewer studies of media effects on sexual health risks. *Frequent viewing of sexual content on TV* has moderate evidence for an association with early sexual intercourse and increasing levels of non-coital sexual activity. There is weaker evidence around associations between *exposure to pornography* and early sexual debut, higher number of lifetime partners and higher risk sexual activity such as engaging in unprotected anal intercourse.

Most studies on the effects of marketing have been in HICs where there is solid evidence of their effects on adolescent health risks. Few studies have extended either to LMICs or to new media. Yet industries which have until recently largely used traditional marketing media are now utilizing digital media to promote unsolicited content and advertise their products. This marketing extends beyond national borders and is

more tailored to individuals. Given that marketing is likely to become even more powerful and increasingly cross national borders, policy responses at both national and global levels are necessary. The World Health Organization Framework Convention on Tobacco Control (FCTC), now ratified by 180 countries, provides perhaps the best indication of what may be needed. Yet even strategies such as these may be ineffective in the face of international trade pacts that protect the interests of global corporations ahead of a country's capacity to implement regulatory controls.¹³¹ There is need to both extend current global health frameworks to other unhealthy commodities and access to essential health goods and ensure that these are included in international trade and investment agreements.¹³²

Legal frameworks

Laws affect adolescent and future health by governing both access to resources for health and protection from hazards. Some specifically address health (e.g. access to healthcare including effective contraception); others address health risks (e.g. consumption of alcohol, access to tobacco); and others address social determinants of health (e.g. age of marriage, protection from hazardous work). These laws reflect ever-evolving, complex and often contradictory perspectives on young people that have been informed by historical, social, economic, religious, and other cultural forces. Inadequate and inconsistent legal frameworks can powerfully affect the health, rights and potential of adolescents and young adults.

The complex articulation of legal principles of adolescent capacity

Courts have long recognised varying levels of adolescent capacity in decision-making and the need to protect adolescents by taking age into account. However, it was not until the twentieth century that more consistent adolescent legal frameworks emerged at the international level. The 1989 United Nations Convention on the Rights of the Child (UNCRC) recognised children as bearers of human rights rather than parental property, with liberties and responsibilities appropriate to their age.¹³³ It states that when adolescent freedoms and liberties are restricted, such imposition should be consistent with human rights principles and the concept of evolving capacities. As adolescents acquire greater competency and maturity, there is a lesser need for adult guidance and an increased capacity for autonomy in decision-making.

The great majority (195) of countries have signed and ratified the UNCRC, with the United States and Somalia notable exceptions. Despite this, there remains great diversity in adolescent legal frameworks. We selected six countries with varying wealth, geographic locations, cultures and religions to illustrate the differences in legal frameworks and their implementation (see table 3 and supplementary table 1). Variation in the ages at which these protections or acquisition of rights apply are slowly becoming more uniform. Rights may be applied differently according to sex or sexuality. For example, where homosexuality is legal, there may be a higher age of consent for sex between same-sex partners.¹³⁴ Notwithstanding some changes in response to the UNCRC, major differences persist across and within countries that profoundly affect the health, rights and life chances of adolescents.

Prevailing legal frameworks fail adolescents both in their framing and implementation. They reflect neither the principles of the UNCRC or a thoughtful assessment of adolescents' actual and differing capacities. Rather, they mirror historical economic, social, cultural and sometimes religious priorities of the State, as well as traditional assumptions about what is necessary to protect adolescents.¹³⁵ In some areas where legislation has a proven role in protecting health (e.g. minimum age to smoke tobacco, working age), laws commonly do not exist. In others, such as legal frameworks around sexual and reproductive health, there is little consistency between countries in the age of marriage, access to contraception and availability of safe abortion. Indeed, there is often variability within the one country.

Countries with plural or multiple legal systems allow various sources of law to govern, including English common law, French civil or other law, statutory law, customary law, and religious law and/or practice.¹³⁶ Although international conventions have contributed to national consensus on norms and statutory laws, other laws commonly dominate practice. Customary and religious laws enjoy binding status in law or practice in most countries in the African region and a number in Asia and the Americas.¹³⁷ These laws permit the persistence of cultural and religious customs and practices, some of which are discriminatory and have profound health effects.

Child marriage violates many internationally recognised rights. The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) requires States to ensure that men and women have equal rights to enter into marriage and to freely choose a spouse with their free and full consent. Free and full consent is defined as a capacity to understand the meaning and responsibility of marriage, to have access to full information about her future spouse, knowledge about institution of marriage and her right to exercise a choice about whether to marry, who to marry, and when to marry.¹³⁸ Consent to marriage cannot be free and full when one of the parties involved is insufficiently mature and experienced to make an informed decision about a life partner.¹³⁹ Yet 15 million girls around the world marry each year before 18 years.¹⁴⁰ In developing countries, one-third of girls are married before 18, and one in nine before 15 years.¹⁴¹

Girls who marry young face diminished opportunities for education, greater sexual exploitation and violence that can sometimes extend to enslavement. Child brides are also exposed to health risks from early pregnancy, have greater maternal and infant mortality and heightened vulnerability to HIV/AIDS and other sexually transmitted diseases.¹⁴² Thirty-four countries permit girls to marry below 18 years. Some still permit marriage below 15 years, and a few specify no minimum age.¹⁴³ An even more important barrier to progress around child marriage lies in the discrepancy between legislation and actual marriage practices, largely the result of legal pluralism. At least 40 countries allow customary or religious law to override specific age of marriage legislation. Even in countries which have ratified international rights treaties applicable to age of marriage, loopholes exist for laws and practices in personal, family, religious or private matters. In many places an absence of marriage registration is a further barrier that limits monitoring of implementation of international treaties. The barriers to implementation are further illustrated in the case examples in Text Box 4 and Supplementary Text Box 3.

Developmentally informed legal frameworks

More rational legal frameworks governing adolescents would take greater account of evolving adolescent cognitive and emotional capacities. Developmental neuroscience is beginning to offer new insights into adolescents' capacities. With access to knowledge, they demonstrate similar or even greater cognitive capacity than adults to make good judgements in calm and emotionally-neutral contexts.⁴⁸ Yet in emotionally-charged situations of stress or excitement, particularly with peers, emotions are more likely to drive decision-making.^{48,144} Adolescents are also often more influenced by short-term than longer term outcomes. In other words short-term, emotionally-driven rewards have a greater influence on adolescent and young adult decision-making than in adults.⁴⁴

A capacity for consent (or competence) has a basis in evolving cognitive and emotional capacities, as well as knowledge and experience.¹⁴⁵ Legal frameworks should take both factors into account in framing legislation around age of consent. Restricting an adolescent's right to smoke is therefore justified from their greater vulnerability to poor decision-making in emotionally charged contexts with peers, as well as from their still evolving capacity to understand the extent of future health consequences of smoking.

Yet in addition to protecting adolescents from harm, legal frameworks should also support and promote adolescent autonomy. Developmental neuroscience provides some principles for how legal and social policy frameworks could operate more effectively for adolescents. Given knowledge, and with appropriate safeguards, adolescents are competent to make effective decisions about almost all important matters in their lives, including their health. Legal and policy frameworks should reflect these evolving cognitive and emotional abilities with age-appropriate autonomy, freedoms and rights. Most adolescents are capable of voting from 16 years and doing so both empowers adolescents and promotes civic engagement. Yet, adolescents need legal and policy safeguards and support for decisions made in contexts where heightened emotion affects the choices an adolescent might make. This includes many decisions around substance use and sexual behaviours. Permitting access to effective contraception (e.g. long acting reversible contraceptives) for those sexually active under 18 is one example of how the law can protect adolescents' health. Lastly, the capacity for adolescent learning should be exploited through graduated legal and policy

frameworks. This includes supporting skills and decision making around driving (Text Box 5), and preventing custodial sentences for young offenders (Text Box 6).

Section 3. The Global Health Profile of Adolescents and Young Adults

The epidemiological transition has changed health profiles across all age-groups. Adolescents and young adults have also benefited from the control of infectious diseases including diarrhoeal disease, lower respiratory tract infections, tuberculosis and malaria. So too adolescent girls and young women have benefited from gains in maternal health, though there is ongoing debate as to whether gains have been as great in this younger age group.¹⁴⁶ Yet the epidemiological transition has commonly brought an increase in other health problems of adolescents, including road traffic injuries and suicide.^{147,148} In some contexts, such as Latin America and Eastern Europe, these problems have extended to homicide, mostly in young males.¹⁴⁸ Although young men are the main perpetrators and victims of homicide in these settings, young women's lives are profoundly restricted by both violence and fear of violence.¹⁴⁹ The linkage with economic conditions is evident in the rise of mortality and alcohol-related disease burden in Eastern European countries following the fall of the Soviet Union in 1991.¹⁵⁰ A high proportion of young males competing for limited economic opportunities is also likely to be a factor underlying the recent civil unrest and armed conflict across the Middle East, North Africa and sub-Saharan Africa.¹⁵¹

Other adolescent health problems become more prominent during the epidemiological transition. Mental health problems, including self-harm and suicide, assume greater significance. In part this is likely to reflect their greater prominence after reductions in infectious, nutritional and sexual and reproductive health problems. It may also, in part, reflect a true increase in the prevalence of adolescent mental health problems that has been described in recent decades in developed economies.¹⁵² Mental disorders commonly have their onset in late childhood and adolescence. Because many persist into adulthood, adolescent mental disorders make a greater contribution to adult disease than ever before.³⁰

HIV is a further reason why adolescents and young adults, particularly in southern and eastern sub-Saharan Africa, have so far seen fewer benefits from the epidemiological transition. The burden of HIV has fallen to a large extent on the young. New infections are largely concentrated in young adults, and adolescents and young adults have not experienced equivalent mortality declines recently seen in other age groups.¹⁵³

With ageing populations and a convergence to a disease burden dominated by NCDs in later life, adolescent health risks assume greater significance.¹⁵⁴ NCD risks that commonly emerge during adolescence include tobacco use, physical inactivity, obesity, alcohol and illicit substance use and poor diet. Without specific policy interventions, the combination of increasing wealth and unrestrained marketing will see adolescent health risks continue to rise in prevalence.

Defining adolescent health needs across the epidemiological transition

We adapted the conceptual model of the 2012 series on adolescent health to define health needs at three levels (Figure 6): current health problems and causes of adolescent and young adult deaths; health risks for health problems in adolescence, adulthood or the next generation; and important proximal social determinants of health during the adolescent and young adult years.¹³ These include education and employment; marriage and parenthood; marketing and digital media; and quality of universal health coverage. The three categories of diseases outlined in Figure 7 reflect conditions that change in prominence with passage through the epidemiological transition. Thus diseases of poverty are conditions that are prominent prior to a country passing through the epidemiological transition and include undernutrition, major sexual and reproductive health problems (e.g. maternal deaths, high rates of sexually transmitted infections), and infectious diseases including HIV. Text Box 7 and Supplementary Text Boxes 4 and 5, and Supplementary Table 3 further describe both the categorisation of disease burden and the methods used to derive three categories of countries.

Multi-Burden countries: Sixty eight countries are in this category (Figure 8). Many are in southern and eastern sub-Saharan Africa where HIV has been a growing contributor to disease burden in adolescents and

young adults. Some are also in Southeast Asia and Oceania. Fifty one percent of the world's adolescents live in these countries but they account for almost two thirds of all Disability-Adjusted Life Years (DALYs) (62.5%). These countries have made some progress in the past fifteen years in reducing infectious diseases other than HIV and sexual and reproductive health and nutritional deficiencies. (Figure 9). Current contributors to disease burden from infectious disease in Multi-Burden countries are shown in Figure 10. Reductions in unintentional injuries have been less than for diseases of poverty, especially in males.

Injury Excess countries: Twenty eight countries are in this category. They make up 12% of the global population and 11% of DALYs. Most countries (22) have made little progress since 2000 in reducing the burden of disease affecting adolescents and young adults. These include Syria and Iraq, countries that have been affected by conflict. The remaining countries are to a large extent in Latin America and Central Asia. Six countries, including the Russian Federation, Thailand, Columbia and Bolivia, have made good progress in reducing DALYs from unintentional injuries and to a lesser extent violence.

NCD Predominant countries: Ninety two countries are in this category. Thirty seven percent of the world's adolescent live in these countries where they account for a little over a quarter of all DALYs (26.3%). These countries include North America, most of Western Europe, Latin America and Australasia.

Most countries (74) have been relatively static in their adolescent disease burden since 2000.

Eighteen countries, including China and a number of countries in Eastern Europe and the Middle East, stood out as having made substantial reductions in the adolescent disease burden since 2000. In general this group has made some progress in reducing unintentional injuries. In contrast, they have made little progress in reducing the disease burden from chronic physical disorders, mental disorders and substance use disorders. As a result the proportion of disease burden due to these conditions has continued to rise.

Eight countries have had an increase in their total DALY rate since 2000. Two are conflict affected (Georgia, Syria); three are violence-affected Latin American countries (Mexico, Venezuela, Paraguay); and two have been particularly affected by HIV (Lesotho, Swaziland). Overall since 2000 the most consistent gains have been in reducing infectious diseases, sexual and reproductive health problems and nutritional deficiencies in Multi-Burden countries. There have also been reductions in unintentional injuries across all three country groups. In contrast progress in reducing violence has been limited. Also HIV contributes a greater proportion of disease burden in adolescents in 2013 than 13 years earlier. Alcohol and other drug problems have also increased over that time, with increases most pronounced in NCD Predominant countries.

Figure 10 illustrates the changing burden of disease from early adolescence to young adulthood in males and females. Particularly striking changes occur in rates of injury with age in males, in both Injury Excess and Multi-Burden countries. In females the most striking changes with age in Multi-Burden countries are the increasing burden of sexual and reproductive health problems and injuries. In all country groups, there is a large increase in disease burden from chronic physical disorders, substance use disorders and mental disorders with increasing age across adolescence.

Figure 12 uses the example of China to illustrate the variation in disease burden with a country. Both total disease burden and its contributors vary substantially by province. Although China as a whole is classified as NCD Predominant, four provinces (Tibet, Xinjiang, Qinghia and Hebei) would fall into the Injury Excess classification due to unintentional injuries remaining at a high level.

Major adolescent health risks

Tobacco use is a major risk factor for NCDs later in life which overwhelmingly has its onset in adolescence. Maternal smoking during pregnancy is also a well-established risk factor for poor fetal growth as well as later life illness in offspring.¹⁵⁵ Overall tobacco use has declined since 1990, but progress has been mixed (Supplementary Figure 7). Rates of daily smoking remain above 15% in 10 to 24 year olds across most European countries. In the Russian Federation one in four smoke daily. Across all groups of countries, daily smoking is more common in males than in females. A number of countries in sub-Saharan Africa, Eastern Europe and the Middle East have seen rises. Many non-signatories to the Framework Convention on Tobacco Control have not seen any fall in adolescent and young adult tobacco use.

Alcohol use disorders typically begin during the young adult years. As with nicotine addiction, younger age of drinking is a particular risk factor.^{156,157} Alcohol consumption in adulthood is now linked to eight different cancers, hypertension, haemorrhagic stroke and atrial fibrillation, various forms of liver disease and pancreatitis.¹⁵⁸ Greater use of alcohol in pregnancy has prominent intergenerational harms in the form of fetal alcohol syndrome.¹⁵⁹ Binge drinking was considerably more prevalent in males than females in every country grouping (Supplementary figure 8). Binge drinking rates were highest in NCD Predominant and Injury Excess countries where around a quarter of 15 to 24 year old males report at least one occasion in the past 12 months. There has been little progress in reducing adolescent and young adult binge drinking since 1990. Indeed, a trend for increasing binge drinking is now clear for both males and females in Injury Excess and Multi-Burden countries; Injury Excess countries are likely to overtake the NCD Predominant countries in binge drinking in the coming years.

Overweight and obesity increase markedly across adolescence and young adulthood with very high persistence, particularly for obesity.¹⁶⁰ The risks in later life include premature mortality, chronic disability, type 2 diabetes, ischaemic heart disease, hypertension and cerebrovascular disease.¹⁶¹ Preconception maternal obesity increases risks for miscarriage, gestational diabetes, operative delivery, pre-eclampsia, infant perinatal mortality and macrosomia.¹⁶² Adolescent overweight and obesity have increased in prevalence across almost all countries since 1990, as shown in Figure 13. Notable exceptions are Iran, Turkey, Bulgaria, Argentina and a number of countries in central sub-Saharan Africa. The annual increase has been around 10% in China and Vietnam, but there have also been marked increases in other countries across Southeast Asia as well as in sub-Saharan Africa. The prevalence of overweight and obesity is around one in five young people in NCD Predominant and Injury Excess countries. Although lower, around one in 10 young people in Multi-Burden countries are also overweight or obese. If their recent increase in obesity continues, Injury Excess countries will soon outstrip NCD Predominant countries in rates of overweight and obesity.

Across sub-Saharan African and Latin American countries with available data, between 10-20% of 15 to 24-year-olds report having first sexual intercourse before the age of 15 years (Supplementary Figure 9). Condom use in the context of having had two or more partners in the past year shows great variability between countries, but remains under 50% for adolescents in Multi-Burden countries. Rates of women giving birth before 18 years remain high across Western, Central and Eastern sub-Saharan Africa, and for a number of countries in South Asia. Overall around one in five women in Multi-Burden countries report giving birth by the age of 18 years. Unmet need for contraception refers to young women aged 15-24 years currently married or in union and not wanting to become pregnant within the next two years who report not using any method of contraception. Rates of unmet need were high across sub-Saharan Africa, though there was substantial variation between countries. Although fewer data are available in other regions, high rates of unmet need for contraception remain in countries in Oceania, Latin America and South Asia. Where data exist, the profile of sexual and reproductive health risks is generally poorer in Multi-Burden countries. One exception is the high rate of intimate partner violence for young women in Injury Excess countries (Supplementary Figure 10).

Lower adolescent fertility benefits young women by making it more likely that they remain in education, delay marriage, enter the workforce and achieve economic independence. In many countries the age of onset of sexual activity has remained similar while the age of marriage and first pregnancy has substantially risen. This shift in the age of first sexual intercourse relative to the age of marriage has taken place very widely across many countries in all regions, with enormous implications for the provision of effective contraception for young women.¹⁶³

Figure 14 illustrates the very large variation in adolescent fertility by country. The highest rates remain in sub-Saharan Africa but rates are also high across Latin America and in many countries in South Asia and Oceania. Globally there have been strong trends towards reduced adolescent fertility but these are less prominent in sub-Saharan Africa and Latin America. Adolescent fertility is high in Multi-Burden and Injury

Excess country groupings. Injury Excess countries have made little progress in reducing adolescent fertility and are likely to overtake Multi-Burden countries in having the highest adolescent fertility.

Section 4. Actions for health

Investments in adolescent health extend from those directed toward conspicuous health problems to health risks that emerge during these years and to the broader social determinants of health (Figure 6). Yet there are challenges in responding to these health needs, whether through health services, community actions or structural actions. Adolescents and young adults are the age group with the poorest level of universal health coverage.¹⁶⁴ Social and environmental determinants of adolescent health lie largely outside the health service sector.⁴² There are shifts in these determinants as young people mature through adolescence, such that strategies suited to younger adolescents may be inappropriate or ineffective with young adults.⁴² So too strategies that are effective and appropriate for girls may be less effective in boys. The settings for health actions mirror those of determinants and extend from health services, schools and education settings, to families and communities, places of employment, road transport, media and structural, legal and policy environments.

Health services

Health services for adolescents and young adults play a number of essential roles. Firstly, adolescents have acute healthcare needs. Secondly, health services need to respond to emerging health needs. This includes health actions around normative conditions such as the provision of contraception for sexually active adolescents and maternal care for pregnant young women, as well as early and effective responses to the many health problems that emerge in adolescence such as nutritional deficiencies, HIV and other infectious diseases (e.g., STIs, tuberculosis) and mental and substance use disorders.^{165,166} Thirdly, health services play a central role in the management of chronic health conditions, including physical disorders and HIV/AIDS, mental disorders and injury-related disability, all problems that can have profound implication for social, educational and economic adjustment.

Despite having clear needs, adolescents and young adults commonly fail to access healthcare. Unmet sexual healthcare needs are high in many countries, including access to reliable contraception in both married and unmarried adolescent girls. In Tanzania for example, where 58% of 20-24 year old girls are sexually active before 18 (14% before 15), the unmet need for contraception is 16% in married 15-19 year olds and 64% in those who are sexually active but unmarried.¹⁶⁷ In most African countries, the proportion of married 15-19 year old girls with unmet contraception need is at least 25%, and as high as 64% in Ghana.¹⁶⁷ Unmarried 15-19 years olds have approximately double the rate of unmet need for contraception. Such striking figures are not restricted to Africa. In Asia, for example, the unmet need for contraception ranges from 25% in Kazakhstan to 94% in Laos. In most countries in Latin American and the Caribbean, between one third and one half of unmarried sexually active 15-19 year old girls have unmet needs.¹⁶⁷

Rates of contraceptive failure are higher in adolescents than in older women, with younger women more likely to abandon contraception despite ongoing need.¹⁶⁸ Barriers include poor understanding of pregnancy risks, concerns about the effect of contraceptives on health or fertility and opposition from partners. Lack of knowledge of services, cost, shyness and community stigma about sexual activity, and disapproving attitudes from providers are further barriers.¹⁶⁹ One study in the US found contraceptive failure was almost twice as high in under 21 year olds using oral contraceptive pills, transdermal patch, and the vaginal ring. In contrast the failure rate of long acting reversible contraceptives is extremely low in all age groups.¹⁷⁰ Yet despite increased use of LARCs in the US since 2007, 15-24 year olds are less likely to use LARCS than 25-39 year old women.¹⁷¹ Given their impressive effectiveness at reducing unplanned pregnancy, LARCs should be a critical component of universal healthcare for sexually active adolescent girls and young women, notwithstanding higher upfront costs.

An estimated 22 million unsafe abortions occur annually, of which about 15% (about 3.2 million) are among adolescent girls. Young women experience a higher risk of abortion-related deaths than in women over 25, are more likely to terminate pregnancy after the first trimester, and are more likely to use unregulated providers.¹⁶⁷ One nationally representative study in Ghana identified younger women as having the highest risks for unsafe abortion. In those who obtained an abortion, 44% of those under 20 years old did so with a safe provider, compared with 57% of 20-29 year-olds and 65% of women aged 30 and older.¹⁶⁷ Even after controlling for various socio-demographic factors, knowledge of the legal status of abortion and partner support, adolescents had 77% lower odds of obtaining a safe abortion compared with women aged 30 and older.

Notwithstanding the increased prevalence of mental disorders across adolescence, there is evidence that most adolescents and young adults with mental health problems do not receive treatment from health professionals.^{172,173} One European study of mental health care in adults showed that about 6% of the sample was in need of mental health care but nearly half reported no formal healthcare use. Those aged 18-24 reported least use of services.¹⁷⁴ Actions to reduce barriers include promoting mental health literacy and combatting stigma, particularly in LMIC where the scaling up of mental health services has not yet been a priority.^{175,176}

Chronic physical disorders also increase in prevalence across adolescence. For example, in the US, 12-17 year olds have nearly double the rate of special healthcare needs of 0-5 year olds¹⁷⁷ Beyond individual conditions, one in five US adolescents feel that they should but don't seek health care due to concerns around lack of confidentiality.¹⁷⁸ Furthermore, across 11 high income counties, 18-24 year olds reported significantly worse overall satisfaction with healthcare than older adults, with most patient experience indicators being less positive among young adults than older adults.¹⁷⁹

Barriers to healthcare

There are two sets of barriers to achieving universal health coverage for adolescents and young adults. The first set are external to health services and include legal frameworks governing health actions, out of pocket costs, and cultural and community attitudes. Though not unique to adolescents, they assume a greater magnitude in the young. The second set arise more from the developmental context of adolescence that brings sensitivities around health care that are unique to this age group.

Adolescents face greater legal and financial barriers to health service access than other age groups. Even when national legislation allows a particular health response, a provider's attitudes and beliefs about the appropriateness of an action in the context of age, marital status, or partner/parental consent may affect their response to an adolescent.¹⁸⁰ Financial barriers may arise from limited eligibility for tax and insurance based funding schemes.¹⁸¹ In comparison to older adults, 18-24 year olds report more frequent cost barriers (21.3% vs. 15.2%; $p < 0.001$) than older adults.¹⁷⁹ Socially marginalised adolescents and young adults are particularly vulnerable to catastrophic medical events.

The developmental context of adolescence is one of increasing desire for privacy and confidentiality, with embarrassment, shame, and fear of being judged functioning as barriers to accessing healthcare. A particular concern is that their parents will be informed about sensitive issues, such as substance use, mental health and sexual behaviours.^{182,183} In the US, for example, the leading concern of adolescents who had foregone health care was that they did not want their parents to find out.¹⁸⁴ Difficulties also arise when policies and procedures for claiming healthcare benefits inadvertently expose adolescents to confidentiality breaches through routine communication, such as when itemized bills are sent to policyholders (typically parents).¹⁸⁵

Adolescents are less experienced users of healthcare, with a consequence that time is required to engage them in consultations, especially around sensitive issues. Beyond engagement, inexperience also results in a majority of adolescents not appreciating that health risks such as substance use, bullying or overweight can be raised with health professionals.¹⁸⁶ Adolescents welcome such discussions as long as they are sensitively and confidentially addressed.¹⁸⁷

A young child's involvement with health care providers is typically mediated through parents or family. With age, support and experience, the maturing adolescent develops greater capacity to engage in decision-making around their own healthcare. A task for health professionals is to help set expectations with adolescents and parents about an adolescent taking greater responsibility for healthcare. With increasing age, providers need to explicitly engage the young person themselves, which ideally includes consulting with them alone. Engaging adolescents in a friendly, respectful and non-judgmental manner helps them to gain the confidence and skills to increasingly make decisions about their health and wellbeing.¹⁶⁴ Consulting with young people alone can be challenging to parents' perceptions of their role.¹⁸⁸ It requires careful explanation even in settings in which it is more culturally acceptable.¹⁸⁹

Adolescent responsive health care

What adolescents view as responsive or youth friendly health care is similar across high, middle and low income countries.¹⁹⁰ Adolescents value patient-centred care with an emphasis on respect, coordination of care, appropriate provision of information, high-quality communication, involvement in decisions about care, and the ability of health care providers to listen to their needs.¹⁹¹ These align with the principles of adolescent-friendly health care, a framework developed by the World Health Organization, that emphasises equity of access, effectiveness, accessibility, acceptability to young people, and appropriateness of care offered.¹⁹² These are applicable across all health services (e.g. clinic, school health service, hospital).

As clinicians generally find consulting with adolescents more challenging than other age groups, extending the competence of healthcare providers to ensure they have the attitudes, knowledge and skills to appropriately engage with and respond to adolescent's health needs is required.¹⁶⁴ The inexperience of adolescents places particular responsibility on health care providers to identify young people's conspicuous and emerging health care needs. Health care providers also need competence to maintain an appropriate level of engagement with family, and how to negotiate relationships with an adolescent and her family in the context of local laws. It often requires individualised assessments of the competence of adolescents to make autonomous decisions about their health.¹⁹³ Digital technology platforms such as Massive Open Online Courses (MOOCs) offer exceptional opportunities to build competency in health-care professionals but face-to-face training will still be required.¹⁹⁴

A recent review illustrates the steps needed to make SRH services more adolescent responsive in LMICs.¹⁹⁵ Training health workers without changes to facilities did not increase service or contraceptive use. So too creating standalone services for adolescent SRH was not effective.¹⁹² The most positive intervention used a combination of high quality health worker training, adolescent-friendly facility improvements, and broad information dissemination via the community, schools, and mass media to drive demand.¹⁹⁶ Further elements within a multifaceted approach might include promotion of adolescent health literacy, engagement of community leaders, having an appropriate package of services, ensuring provider competencies, improving facilities, promoting equity and non-discrimination, collecting data for quality improvement and engaging adolescents around practice policies.¹⁹⁷ In England, the 'You're Welcome' criteria provide guidelines to health services to more consistently provide quality care to adolescents.¹⁹⁸

Ultimately healthcare services depend on adolescent help-seeking. School-based promotion of services, mass media campaigns and social media all have potential roles in reducing developmental barriers to accessing healthcare by promoting health literacy and help-seeking.¹⁹⁹ So too, web-based or other technologies might improve help-seeking, although a recent systematic review found little evidence to date.²⁰⁰ In LMICs, school-based health services will have greater salience as participation in secondary education grows. Service models range from fully equipped and permanently staffed centres with medical, nursing and counselling staff to clinics offering nursing services only a few hours a week. The predominant focus to date has been on provision of sexual and reproductive health care where the evidence for the effectiveness of school-based health services without on-site provision of contraceptives is mixed.²⁰¹ Ensuring better matching of health actions to adolescent health needs is an opportunity for all health services, including school based health services.

Developmental continuity in health care

Continuity of care is essential in managing chronic physical illness and severe mental disorders and in sustaining preventive interventions such as contraception. Adolescents' evolving cognitive and emotional capabilities are again a consideration. In general treatment adherence diminishes as children with chronic physical health conditions enter adolescence. This has major consequences for the management and outcomes of a range of significant chronic illnesses such as type 1 diabetes, allergy and asthma, HIV and Inflammatory Bowel Disease.^{202,203} Providing information alone is ineffective in achieving greater adherence with adolescents.²⁰⁴ Additional strategies such as behavioural management, family engagement and understanding the young person's emotional responses to illness are important elements within the clinician's response.²⁰⁵ Peer strategies are effective at improving health outcomes of adolescents, especially when linked to wider school and community strategies.²⁰⁶ There is much interest in the role of apps and other technologies in promoting adherence in adolescents with chronic physical conditions but as yet few studies of benefit.

The importance of the transition to adult health care for adolescents with conditions such as type 1 diabetes, spina bifida and cystic fibrosis is well appreciated in HIC.²⁰⁷ Successful engagement with adult services requires repeated discussion with young people and families, planning and care coordination and enhanced follow-up within adult services to maximise engagement and retention.²⁰⁸ More recently, the extent that young people with HIV/AIDS are dropping out of adult health care in LMICs after transferring from specialist paediatric services has become apparent, leading to failure of adherence to antiretroviral therapy, and greater risks to self and others.²⁰⁹ Health system deficiencies commonly include inadequate pre-transfer communication and planning from child health services, and adult services that don't meet young people's needs – or both.²⁰⁸ Such experiences are consistent with the less positive experiences of 18-24 year olds than older adult users of health services in HIC,¹⁷⁹ which reinforces recent efforts to bring greater attention to the health experiences and outcomes of young adults as well as adolescents.²¹⁰

Preventive health actions

We conducted a series of systematic reviews of systematic reviews to assess current knowledge on the effectiveness for preventive interventions outside formal healthcare settings, across the nine areas of health need specified in Figure 7.²¹¹ We included both specific health outcomes and health risks. Some responses (e.g., policy measures such as taxation or some forms of legislation such as gun control) are not directly targeted at young people but may have particular benefits for young people compared to other age groups. Other actions (e.g. legislation around age of marriage or employment, or actions taken through schools) target adolescents directly. We searched the following databases between 15 and 30 March 2015: CINAHL, Education Research Complete, ERIC, MEDLINE with Full Text, PsycINFO and Cochrane Database of Systematic Reviews. Levels of evidence were classified according to the criteria given in supplementary text box 6. Highly recommended interventions are those with at least 50% of review studies reporting positive outcomes. These were often supported by some evidence on cost-effectiveness. Interventions with some positive evidence not reaching this threshold have a moderate recommendation with further research needed. Some other actions are unlikely to be effective in isolation but are recommended as part of multi-component interventions. Toledo et al. also reviewed the available literature on the economic case for health investments through the adolescent years.²¹² Due to the relative scarcity of cost-effectiveness studies of interventions that target adolescents, a review of reviews approach was infeasible and a review of primary studies was undertaken. These findings were incorporated into the evidence summaries.

Sexual and reproductive health including HIV

More than any other area of health, the sexual and reproductive health of adolescents and young adults is affected by a country's cultural, religious, legal, political and economic contexts. In many settings these underlying determinants overlap with the determinants of violence and substance abuse.¹⁴⁹ Actions for sexual and reproductive health must take these contexts, as well as age and gender, into account. In responding, health actions are needed at each level - from structural, through to community settings including schools, and health services (Table 4, Supplementary Table 4). The most effective programs are typically multicomponent and target one or more of these settings.²¹³

The provision of accessible and quality health care (e.g. STI screening including HIV testing, provision of contraception, treatment of STIs, provision of continuous care for HIV positive adolescents) and high quality, comprehensive sexuality education are likely to be effective, though much more so in conjunction with a broader suite of actions. While legislation is essential in protecting adolescents from sexual coercion, early marriage and early pregnancy, discrepancies between statutory legislation and actual practices are a barrier to implementation (see Section 2: Enabling and Protective Systems). Such laws will often be ineffective without actions to change community and professional attitudes. Together with quality healthcare, comprehensive sexuality education, amelioration of family poverty and access to quality education, legislation is one essential element within the suite of interventions for adolescent sexual and reproductive health.

Infectious and vaccine preventable diseases

Vaccination against infectious diseases has received far less attention in adolescents than in children. Yet adolescents are also important for ensuring completion of immunisation schedules (e.g. Measles-Rubella, Hepatitis B Vaccine [HBV]), administering booster doses (e.g. Diphtheria-Tetanus) and for primary immunisation (e.g. Human Papilloma Virus [HPV]). Rubella vaccination is important for adolescent girls in terms of intergeneration risks, while HBV is important for both sexes given the adult burden of disease from Hepatitis B. Others to consider according to local prevalence and cost are BCG, influenza, and meningitis vaccines.

Recent developments have brought fresh attention to adolescent vaccination as a strategy to prevent adult cancers as well as STIs (e.g. HBV, HPV). HPV immunisation for young girls is cost-effective across different regions.^{215,216} To date there are few cost-effectiveness studies in males.²¹⁴ Cost effectiveness has been calculated from preventing cancer but quadrivalent and multivalent vaccines have additional value in reducing anogenital warts. In HICs, school-based HPV vaccination programs have a higher uptake than other approaches.

Lack of basic knowledge has hindered responses to common infectious diseases in adolescents. For example, in contrast to diarrhoeal disease in children, the aetiological agents, proportion of vaccine preventable morbidity and mortality and comorbidities are largely unknown in adolescents. Similarly, very little attention has been given to adolescent TB, despite it being the leading contributor to the burden of infectious disease in young adults in Multi-Burden countries (Figure 11). It may, in part, reflect the predominance of adults presenting to clinical services. In African settings estimates of TB prevalence range from 160 to 462 per 100,000 in adolescents and young adults.²¹⁵ In Asian settings, the range is from 39 to 142. Because adolescents are prone to adult-type pulmonary manifestations, including cavitation and smear-positive disease, they are a potent source of infection to others.²¹⁶ Yet there is little age disaggregated data with studies typically refer to participants as 'children' or 'adults'.

Adolescents also carry a substantial burden from malaria in Africa. In high transmission areas rates are higher in young women who also encounter further risks in pregnancy.²¹⁷ In endemic regions, childhood immunity provides relative protection for adolescents but in areas of lower transmission, clinical disease is more common in adolescents and young adults. As infection in endemic areas is controlled so too the risk for adolescents will increase. In low transmission regions, the adolescent incidence of malaria reflects their use of individual preventive interventions such as insecticide treated bed-nets. A study from Nigeria, where 50% of the community is estimated to experience an episode of malaria each year, showed that only 8.5% of 13-18 year old students reported sleeping under insecticide treated bed-nets.²¹⁸ Over half had learnt about malaria prevention from traditional media (radio, TV).

Undernutrition

Adolescent nutrition is relevant for both current, future and intergenerational health.²¹⁹ The causes of adolescent nutritional deficiencies are complex with individual, household and population level factors contributors.²²⁰ There is currently no direct evidence of the benefit of interventions targeting adolescents specifically, or the effects of broader interventions on adolescents as a separate age-group. Even a question of the effect of iron deficiency anaemia on learning and educational attainment in adolescents is largely unknown. There is, however, good evidence around interventions targeting nutrition-related risks that commonly affect adolescents.

Iron requirements increase sharply during adolescence to support pubertal growth and for adolescent girls to meet additional needs relating to onset of menstruation.²²¹ Adolescents, particularly adolescent girls, are therefore vulnerable to iron deficiency anaemia. Iron fortification of staple foods, such as flour, can be implemented through government policy or market-based mechanisms. It is cost effective and can reduce iron deficiency anaemia at a population level by up to 63%.²²² For these reasons WHO recommends intermittent iron and folic acid supplementation for all menstruating adolescent girls and adult women in populations with $\geq 20\%$ prevalence of anaemia.²²³ Interventions addressing food insecurity, may also improve iron levels. For example, conditional cash transfer programs²²⁴ and home garden programs²²⁵ have been successful in improving iron levels in some but not in all participants.

The increased energy intake required for optimal growth during and following puberty means that adolescents are also vulnerable to protein-energy malnutrition.²²¹ Interventions that can reduce protein-energy malnutrition, including balanced protein-energy supplementation,²²⁴ cash transfers²²² and improved household food storage systems,²²⁶ may therefore have particular benefits for them.²⁰ Although school-based meal programs might increasingly extend into adolescence, recent reviews have found little or no effect on under-nutrition in younger children.²²⁷ Using school children as a distribution point for household food packages decreased adolescent anaemia, but had little effect on protein-energy malnutrition.²²⁸ Because few interventions have been evaluated for adolescent populations, we know little of the benefits or side-effect (e.g. obesity) of interventions targeting protein-energy malnutrition in adolescents.

Children born to adolescent girls are more likely to have low birth-weight, independent of socioeconomic or maternal preconception nutrition status.²²⁹ This may be due to greater maternal-fetal competition for energy and nutrients as pregnant adolescents' energy and nutrient reserves are still important for their own growth.²³⁰ Pregnant adolescent girls' growth may slow or stop during pregnancy,²³¹ and may experience weight loss, depleted fat and lean body mass.²³² Pregnant and lactating adolescent girls are also at increased risk of iron deficiency, which is in turn linked with low birth-weight.²²⁹ For these reasons, preconception interventions to increasing the availability of energy and micronutrients are likely to be of particular benefit. These include multiple micronutrient supplementation or iron and folic acid supplementation continuing into pregnancy, deworming to reduce nutrient loss, delaying first pregnancies and spacing of later births, and antenatal nutrition counselling and education.²²⁴ Because of maternal-fetal competition for calcium, pregnant adolescents are at increased risk for gestational hypertension and pre-eclampsia and are therefore likely to benefit from calcium supplementation.²³³

Stunted adolescent girls who become pregnant are at increased risk of complications such as vesico-ureteric fistulae and obstructed labour, and their children are at increased risk of low birth-weight and preterm birth.²²⁴ We know little about the scope for catch-up growth among stunted adolescents whether before or during the pubertal growth spurt.²³⁴ However, any opportunity for catch-up will be restricted by early pregnancy and for that reason, delaying first pregnancy is essential in stunted adolescent girls.²³⁰

Specific nutritional interventions should ideally be considered in a broader context of actions. Delayed childbearing is a related priority.²²⁴ Therefore interventions that improve girls' access to contraception, reduce early marriage, reduce coerced sex, and prevent early pregnancy through sexuality education are all

linked.²³⁵ So too nutritional interventions should ideally be integrated with strategies to empower young women through access to education and health care or to increase her control over household resources.²³⁶

Unintentional injury

Road traffic injuries dominate the picture of adolescent unintentional injury in most countries. Developmental immaturity, risky behaviour and poor decision-making in response to 'hot' emotions increase the risks, particularly among young males.²³⁷ Adolescents and young adults, particularly those in LMICs, are at high risk as they are more likely to be vulnerable road users, such as pedestrians, cyclists and motorcyclists. For these reasons, they will disproportionately benefit from actions to promote safer road infrastructure and regulate road safety risks.²³⁸

In HICs, improvements in road design, equipment and maintenance, traffic control (notably speed reducing devices), vehicle design and protective devices, driver training and regulation (e.g. drink driving), police enforcement and sanctions, public education and information and post-crash care (from training of first responders such as ambulance services through to trauma surgery), have brought substantial reductions in the burden of disease.²³⁹

Effective action to reduce road traffic injury in adolescents and young adults is necessarily multifaceted and ultimately benefits all road users. More targeted actions include:

- The introduction of graduated licensing systems (Text Box 5) in which the young driver has an extended learner period. These systems increase low-risk supervised driving experience prior to licensure. They may regulate exposure to high risk settings such as unsupervised late night driving, driving with other young passengers or alcohol use during an initial licensing period.²⁴⁰ Robust testing of competence before issuing of licenses is generally an essential element.
- Legislation and enforcement of helmet-wearing in countries where a high proportion of adolescents and young adults ride motorcycles are likely to be cost effective.²⁴¹
- Investment in pedestrian safety in regions where pedestrian injuries are common e.g. sub-Saharan Africa. Effective actions include lowering speed limits on lengths of road where pedestrians mix with other traffic (and enforcement of these limits),²⁴² regulation including police enforcement of the behaviour of drivers and riders at pedestrian crossings,²⁴³ improved pedestrian facilities (footpaths and crossings),²⁴⁴ separating pedestrians and vehicles²⁴⁵ and increasing the visibility of pedestrians.²⁴⁶

These interventions may be supplemented by education programs, with input from young drivers where possible.²⁴⁷ However, school-age driver education programs, that focus on selecting a driving instructor, theory and practical tests, should be avoided as they may encourage earlier driving leading to greater risk of accidents.²⁴⁸

Intersectoral coordination has been a feature in countries that have made progress in reducing road traffic injury. In addition to the specific interventions outlined above, underpinning factors have included strong information systems, clear governance, civil society advocacy and a capacity to implement effectively within the different sectors. Road traffic injury therefore provides a powerful illustration of the strategies needed for effective action in adolescent health.¹⁵⁴

Violence

Many individual, community, cultural and economic factors are linked to violence in adolescents and young adults.²⁴⁹ Individual factors include personality attributes such as impulsivity, substance use and abuse, low educational attainment and childhood aggression. Family conflict and poor family management, involvement of peers in problem behaviours, poor community social cohesion, high levels of residential mobility, drug trafficking and unemployment may all be interlinked contributors. Social and economic inequality, availability of weapons, and laws and cultural norms that support violence are further factors. All may be targets for intervention.²⁵⁰

There is some evidence that single interventions such as legislation and school-based interventions targeting at-risk students can reduce rates of violence. However, most effective interventions, including those targeting homicide, require a multifaceted approach tailored to the risk profile of the particular community.²⁵¹ Policy responses might include those directed to inequality, lack of access to education, unemployment, availability of weapons and laws and cultural norms that support violence.²⁵²

Evidence around the effectiveness of interventions for preventing intimate partner violence and sexual violence in adolescents and young adults is largely lacking. In many cases, particularly in LMIC, studies are of poor quality with small sample sizes, varied outcome measures and short follow-up periods.

Legislative and justice sector responses are again likely to be important elements. Indeed the number of countries with relevant legislation has grown considerably in recent decades. However legislation has not, of itself, been shown to reduce intimate partner and sexual violence, and there is a need for system-wide changes to overcome resistance from the police and judiciary.²⁵³

Educational and skills-based programmes implemented in school or tertiary institution settings (principally in the US) have been the most commonly used intervention targeting adolescents and young adults. They aim to prevent or reduce dating and relationship violence by promoting gender-equitable norms and healthy relationships. While the programs may change knowledge and attitudes they have not been shown to affect behaviours.²⁵⁴

Community-based programs that aim to promote gender-equitable norms have been the most commonly evaluated in LMICs. Evidence on their effectiveness is mixed.²⁵⁵ There is an absence of evidence on programs that more fully address risk factors for intimate partner violence and sexual violence (e.g. alcohol misuse, family-derived attitudes to violence, social norms that condone violence and gender inequality); are tailored to local contexts; include families where appropriate; and target adolescents at highest risk (including those in emergency and humanitarian situations).^{253,256} Studies of violence against those of sexual minority status are rare. Supplementary table 5 outlines the evidence on the effectiveness and cost-effectiveness of interventions for adolescent and young adult violence, including intimate partner and sexual violence.

Mental disorders

It is only in the past few decades that the significance of adolescent mental disorders across the life-course has become clear.²⁵⁷ Studies in adults suggest that most mental disorders begin before 25, most often between 11-18 years.²⁵⁸ Recent prospective studies have found that while mental health problems are very common during adolescence, not all persist into adulthood, particularly if the episodes are brief.^{30,259} These understandings have brought a growing emphasis on early clinical interventions through more accessible and better resourced primary healthcare or in some countries, through adolescent-focused mental health services.²⁶⁰ While there is evidence that access to health services is increasing in some places, there is as yet no evidence that these increases have led to detectable improvements in adolescent mental health.²⁶¹

To date, evaluation studies have focused on a narrow set of preventive interventions that are readily amenable to randomised controlled trials (RCTs). The dominant approach has been to take effective clinical treatments, such as cognitive-behavioural therapies (CBT), and apply these to the general population of adolescents or to at risk sub-groups to test if they prevent disorders developing. A recent systematic meta-review and meta-analysis of RCTs of prevention interventions for depression or anxiety in children and adolescents produced mixed findings on the effectiveness of this strategy. They concluded that these interventions produced minimal to moderate reduction in symptoms in the short-term but no effect beyond 12 months of follow-up. For a group of disorders that often persist for decades, there is clearly a need for innovation and more sustained effects of intervention. Approaches that focus on developmental mental health risks such as bullying, interpersonal violence and social media risks appear worth testing.

Although digital and social media have been implicated as risk factors, online and mobile-phone interventions may equally play a positive role in prevention and promoting access to clinical services.²⁶²

Suicide prevention

Risks for suicide increase across adolescence and young adulthood, particularly for the socially marginalised.²⁶³ These include depression, alcohol abuse, mental disorders, antisocial behaviour, sexual abuse, physical abuse, poor peer relationships, suicidal behaviour by friends, family discord, family suicidal behaviour, unsupportive parents and living apart from parents.²⁶⁴ Contagion is a further factor in up to 60% of adolescent and young adult suicides.²⁶⁵ Deliberate self-harm is also common in adolescents, particularly in females, and heightens risks for subsequent suicide.²⁶⁶

Adolescent-specific suicide prevention strategies have been implemented in three principal settings: schools, the community and the health system.²⁶⁷ Goals range from increasing help-seeking for suicidal thoughts and behaviours; identification and referral of at-risk young people (e.g. by health professionals, teachers, parents or peers); reduction of risk factors for suicide; and promotion of mental health. School-based interventions are the most evaluated, with some systematic reviews focused solely on these.²⁶⁸ Universal interventions have been shown to improve knowledge of and attitudes about suicide²⁶⁸ but the gains are not maintained at follow-up.²⁶⁸ Gatekeeper training also improves knowledge of and attitudes about suicide, and confidence in providing help.²⁶⁸ There is mixed evidence for universal school-based interventions, gatekeeper training, public education/mass media interventions, screening or post-vention (after suicide) programs on help-seeking behaviour,²⁶⁹ help-giving behaviour, suicidal ideation or suicide attempts. Health practitioner education to increase the recognition of depression and evaluate suicide risk shows some benefits in preventing suicide across all ages and is therefore likely to also benefit adolescents and young adults.²⁷⁰

Evidence for prevention of suicide in adolescents and young adults is largely lacking in LMICs. Where studies exist, they are often of poor quality. Reducing suicide in adolescents and young adults is likely to require a multifaceted approach that includes limiting access to means (e.g. gun control legislation, medication packaging, safe storage of pesticides), health practitioner training in risk assessment, and effective treatment of risk factors such as depression and substance use.²⁷¹ Help-seeking is likely to differ between males and females and future evaluations of preventive actions should address gender differences in effect.²⁷²

Physical Health and Health Risks

Prevention of overweight and obesity

The prevalence of overweight and obesity commonly rises in mid-adolescence with the trend continuing into early adulthood.²⁷³ Because adolescent obesity strongly predicts adult obesity and associated morbidity, adolescence is an essential life phase for action.²⁷⁴ The case is even stronger when considering the maternal and intergenerational health risks of obesity in young women.²⁷⁵

Modifiable risks for obesity also change rapidly across adolescence. Physical activity commonly decreases and sedentary behaviour increases.²⁷⁶ In addition, adolescents have greater autonomy around food choices and are more likely to eat out of the home, which often leads to less healthy food choices.²⁷⁷ Exposure to media influences and susceptibility to processed food marketing also increase.²⁷⁸ Treatment of obesity in adolescents and young adults is necessary for the prevention and treatment of type 2 diabetes and other co-morbidities, but is difficult. The rapidity of change in the prevalence and severity of obesity means that prevention in childhood and adolescence is of the highest importance.

Supplementary Table 6 outlines the evidence on the effectiveness and cost-effectiveness of interventions for the prevention of obesity and promotion of physical activity. Relatively few reviews focussed on adolescents, although a number report on studies of children that include younger adolescents.²⁷⁹ Multi-component interventions that incorporate policy measures, environmental changes that promote physical activity and education about a healthy diet and physical activity are more likely to be effective than single

interventions.²⁸⁰ More work is needed on interventions that capitalise on peer and social network influences. There is also a need for further research to explore the impact of gender on response to obesity prevention interventions.²⁸¹ Barriers to participation for girls may be greater than those for boys and may include cultural or body image sensitivities (especially in mixed-gender settings); a focus upon competitive sports (which may not appeal to some girls) and lack of facilities in schools (e.g. changing rooms, toilets and showers).²⁸⁰ There is also a need for further research into interventions that target adolescents and young adults who are not in educational settings, minority groups and socially disadvantaged adolescents.²⁸² In addition, there is a need for evaluation, including economic evaluation, of obesity-related interventions in LMICs. Consistent with the reductions in substance use that fiscal and marketing interventions have brought to substance use, so too the potential benefits from interventions to limit food marketing and increase the relative cost of unhealthy products (eg soda taxes) are likely to particularly benefit adolescents.

Alcohol, illicit drugs and tobacco

Consumption of alcohol and illicit drugs often begins and then increases during the adolescent years, with some evidence suggesting that adolescents are using substances at increasingly early ages.²⁸³ Early initiation of alcohol use is linked to later binge drinking, heavy drinking and alcohol-related problems in adolescence and adulthood.²⁸⁴ There is also evidence that early consumption may lead to impairment of neurological development.²⁸⁵ Supplementary Table 7 summarises the evidence on the effectiveness and cost-effectiveness of interventions for the prevention of harmful use of alcohol, illicit drugs and tobacco.

Regulatory or statutory enforcement interventions show the greatest benefit in the prevention of tobacco and harmful use of alcohol. Regulating the availability of alcoholic beverages through restricted times of sale and reducing the demand for alcohol through taxation and pricing are two of the most cost-effective strategies, while regulating access to alcohol through restrictions on purchasing age is particularly effective for preventing alcohol-related harms in adolescent and young adults. The great majority of this evidence is from HICs. Interventions should be tailored to the local context with consideration to levels of alcohol consumption, age- and gender-related drinking patterns and levels of harm.

Treatment and rehabilitation services and harm minimisation strategies have been the main focus in reducing the adverse consequences of illicit drug use. Harm minimisation strategies are essential in preventing transmission of blood-borne viruses, including HIV and hepatitis, and may include needle/syringe exchange programs, drug substitution programs that switch users from black market drugs to legal drugs dispensed by health professionals, HIV testing and counselling, prevention and services for the management of STIs, overdose prevention and education relating to wound and vein care.²⁸⁶ Strategies need to be tailored to the local context, including drug use patterns and related levels of harm.

Whether or not an adolescent initiates tobacco use depends on diverse factors, such as gender, concerns with body weight and attitudes to smoking, parental, peer and community smoking, socioeconomic status and level of education.²⁸⁷ School, family, community and media-based intervention can be beneficial but the effects are small, and should ideally form part of more comprehensive strategies, as outlined in the Framework Convention for Tobacco Control.

Limits in current knowledge

For most adolescent health problems and risks there is a scarcity of published literature on the effectiveness of interventions for adolescents and young adults. Furthermore, with the exception of sexual and reproductive health, available evidence at the systematic review level is from HICs, particularly the US. Different cultures, beliefs, knowledge, lifestyles and health systems affect implementation and effectiveness in different settings. The costs of interventions will also vary markedly between countries with different salary structures, health systems, other unit costs and methods of implementation. Costs are largely unavailable for many settings evidence on cost-effectiveness scarcer still. Comparison of cost-effectiveness is further complicated by differences in outcome measures, methods and thresholds for what is considered cost-effective. A move towards a common outcome measure such as the cost per disability adjusted life years averted would be valuable.²⁸⁸

Developing More Comprehensive Responses

The social and environmental determinants of adolescent health and wellbeing act at different levels and across different settings. Furthermore many social and structural determinants affect multiple and interconnected aspects of adolescent health and wellbeing. The most effective responses operate at different levels of relevant different settings.⁴² Table 5 outlines six platforms for action in adolescent health and recommendations for actions from each. These platforms offer scope for action in nearly all countries.

Structural interventions

Legislation, taxation and implementation of policies bringing investment in families, communities, schools and health services are essential elements of adolescent health action in all places. They lie at the core of actions for health risks such as tobacco and alcohol, prevention of road traffic injury, violence, obesity and sexual and reproductive health. Structural interventions are dependent on sound governance, a capacity to implement within the relevant sectors, and good information systems to monitor implementation and health outcomes. Thus legal reforms are unlikely to be successful without addressing the values, knowledge, attitudes and behaviour of the judiciary and police responsible for their implementation. In fragile states, structural actions are more difficult as the government systems for implementation are generally weak. In many other countries, information systems to support structural interventions are also weak.

Media and social marketing

Most social marketing and mass media approaches will not only target the attitudes and values of adolescents and young adults but also their families and broader communities. The South African multimedia “edutainment” program Soul City helped change social norms around HIV/AIDS and domestic violence, contributed to increased individual knowledge about condom use and domestic violence and more widely contributed to the empowerment of local communities.²⁸⁹ Partnerships with civil society and media professionals are powerful in exploiting the potential of these platforms. One such coalition, MTV Staying Alive Ignite, has aimed to prevent the spread of HIV by attempting to change attitudes, behaviours and national norms. Building on a confronting television drama, the accompanying multimedia campaign (<http://ignite.staying-alive.org/kenya/>) challenged young people in Kenya, Trinidad and Tobago, and Ukraine to ‘ignite’ a wider social movement to stop the spread of HIV.

Community interventions

The lives of young people are affected by the behaviour, norms and values of adults and other adolescents around them. Community interventions commonly involve local government, families, youth-focused and religious organisations and schools. Positive youth development programs are, for example, often community based and seek to promote life skills and positive attitudes including self-confidence and empowerment, social and emotional skills and good problem solving. The strategies employed range from sport and outdoor education to theatre, music and art, survival skills, leadership training and mentorship. An interventions such as the promotion of sport in girls has the potential to bring benefits in physical health and fitness, as well as empowering girls through challenging harmful traditional gender norms.²⁹⁰ The most effective have generally incorporated elements that build on available community structures, use good information on adolescent health and wellbeing, adopt a multicomponent strategy and monitor progress. One well established approach has been the Communities that Care (CTC) framework that has been trialled in a number of US sites with clear benefits and evidence for cost-effectiveness.²⁵⁰

Online interventions

Young people are the earliest adopters of information and communication technologies (ICT) such as mobile phones, instant messaging, the internet and social media, a phenomenon seen in LMICs as well as in HICs.²⁹¹ New social media have the potential to provide a powerful voice for adolescents and young adults to actively engage with each other and their communities. They also have the potential to transform health knowledge and delivery systems around the globe.²⁹²

Trends in using digital media are global, but the means of accessing information varies widely (e.g. mobile phones, personal or public computers). In sub-Saharan Africa growth in access to mobile phones has meant

that digital media are even available in many remote places.²⁹³ In Bangladesh, for example, over 70% of women of reproductive age have access to a mobile phone within the household.²⁹⁴ These new tools provide a platform for health education in their own right as well as the capacity to augment health care delivery and other preventive actions including those within schools.²⁹⁵ Social media offer a possibility of reaching diverse groups including geographically and socially marginalized adolescents. This is a platform of great promise but as yet there is little consensus about the most effective strategies for use with adolescents. Evidence on its effectiveness also remains very limited both in terms of longer term benefits and harder health endpoints.

School interventions

For children who go to them, schools are the site of the most important relationships outside of the family i.e. with teachers and peers. The global growth in secondary education has the potential to greatly increase actions for health among adolescents through schools. Yet despite the evidence that enhancing school environments brings major health benefits, most school based interventions have been limited to the provision of health education. The most effective actions from this platform are multi-component with curriculum elements, a focus on a school's social and physical environment, together with engagement of families and/or the community.²⁹⁶ These types of actions show consistently positive outcomes for adolescent sexual health, violence and tobacco smoking and may be beneficial for other health risks.^{296,297}

Health service interventions

Health care has distinct functions in responding to conspicuous health problems, emerging health issues, and chronic adolescent health problems. Healthcare providers need the knowledge and skills to respond to these complex health issues, but they also require non-judgemental attitudes, a willingness to maintain confidentiality and skills to engage with adolescents and young adults, while maintaining an appropriate engagement with families. Strengthening health systems, including health financing, institutions, human resources and leadership will also benefit adolescents. However, given the barriers they face, delivery of universal health care to adolescents also requires targeted investments.

Taking action at country level

Many interventions found to be effective in research settings are under-utilised.²⁵⁰ The reasons are many but one important element is failure to match actions to need. Where it is unclear what the health priorities are, it is difficult to make the case for investment. Scalability is a further consideration and determined by the costs of operating at scale and the acceptability of an intervention in the local context.²⁹⁸ For comprehensive sexuality education, intra-curricular programs in schools have great potential to be scaled up because of their compulsory nature. However, quality depends on teacher training, smaller class sizes, more lessons and working with the local community context which are elements that increase costs. Advocacy is a significant cost component of early implementation but is likely to decrease as programs become more accepted.²⁹⁹ As an intervention is successfully scaled up, so too its cost-effectiveness is likely to increase.³⁰⁰

Interventions need to be designed and implemented with an 'equity lens' to ensure that benefits also reach the most hard-to-reach adolescents and young adults.³⁰¹ Scaling up should give careful consideration to gender, race, ethnicity, sexuality, geography, socioeconomic status and disability.³⁰² Some actions may not reach vulnerable groups and may in fact worsen inequities. For example, in budget constrained contexts, financing tertiary education may be prioritized over universal quality primary and secondary education, which would further disadvantage the most marginalised adolescents.¹⁰⁵

Figure 15 illustrates the complex picture of adolescent health in Nigeria, a Multi-Burden country. Nigeria has a continuing high disease burden related to maternal health. Adolescent fertility is high, as are rates of early marriage, although with differences across States. Adolescent pregnancy rates in Nigeria's northern States are more than four-fold higher than in the south. There is an over four-year lower median age of marriage in rural settings (16.6 years) compared to urban regions (20.8 years). Nigeria has an emerging HIV epidemic, particularly in the north-central zone, although this is not as advanced as in southern sub-Saharan Africa. Rates of unsafe sexual activity are high. Infectious diseases other than HIV, though

diminishing, are still prominent contributors to burden of disease among adolescents with malaria and neglected tropical diseases notable among these.³⁰³ While these diseases of poverty are priorities, road traffic injury and sexual violence are also prominent. Haemoglobinopathies (e.g. sickle cell anaemia, iron deficiency anemia) figure prominently within chronic physical illnesses and rates of obesity are rising in both males and females.

Responses to Nigeria's adolescent health profile are also outlined in Figure 15. Because Nigeria has a low density of health workers, scaling up of health service coverage is essential for maternal health care, greater contraceptive coverage, treatment of HIV and infectious diseases and responding to adolescent chronic physical health problems. Retention in secondary education is increasing but fewer than 50% of adolescents and young adults are receiving a basic level of education (9 years). For both health services and schools, there is a need for scaling up the country's capacity. At the same time emerging health priorities of road traffic injury and obesity warrant specific policy and legislative responses.

Section 5. Adolescent and Young Adult Engagement

Two ideas around youth engagement have gained traction in international development. The first is that adolescents and young adults make an essential contribution to the design and implementation of programs and policies that affect them and their peers. A second is that with structures, support and processes to do so effectively, meaningful engagement leads to healthier, more just and egalitarian communities.³⁰⁴

The United Nations has defined youth participation as “the active and meaningful involvement of young people in all aspects of their own, and their communities’ development, including their empowerment to contribute to decisions about their personal, family, social, economic and political development.”³⁰⁵ The UN further affirms that societal progress is based in part on a capacity to incorporate the contributions of youth in “building and designing the future.”³⁰⁶ From a UN perspective, meaningful youth participation is both a fundamental right and captures the unique contributions and social mobilization skills of young people.³⁰⁷

Developmental perspectives further support meaningful engagement as an essential positive influence on social and emotional development. The transition through puberty brings a shift in a child's orientation from one focused on self and family towards one that takes on the perspectives of others.³⁰⁸ By adolescence, most individuals have gained the cognitive capacities to allow their greater engagement in social, community and political life. Adolescents are emotionally “primed” to engage. Ron Dahl has described early adolescence as a phase of ‘igniting passions’, where structures, processes and support for positive and meaningful engagement shape trajectories of development into adulthood.³⁰⁸ Equally, social contexts that value antisocial forms of engagement including violence, substance abuse or extremism (of any sort) will shape development to the detriment of the individual and the broader community. A lack of social and emotional engagement brings risks for mental disorders including depression.⁴⁴

History has seen many examples of how this growing positive engagement, along with the energy, enthusiasm and passion that young people bring, inspires social change movements. In recent years, adolescents and young adults have led movements for democracy in Asia and the Middle East, for LGBT rights, for gender equality, and for action on climate change. Conversely, where opportunities for positive engagement are absent, we have seen adolescents and young adults drawn into violent extremism and gang violence with catastrophic health and societal outcomes.¹⁴⁹

Meaningful Engagement of Young People in Health Advocacy

The idea that meaningful engagement of adolescents and young adults contributes to improvements in health policies and services, and in turn improved health and broader societal outcomes is well established. More than 20 years ago, the World Health Organisation cited the importance of youth in its call for community participation in health, noting that effective adolescent health programs require youth involvement at local, national and international levels. This extends from setting program objectives to

policy development and allocation of resources.³⁰⁴ UNICEF, UNFPA, UNAIDS and international non-governmental organizations such as the International Planned Parenthood Federation (IPPF) have followed suit, recommending, and sometimes mandating, youth participation in the governance of service systems, as well as in the oversight and implementation of health-related policies (Supplementary Text Box 7).

Youth health advocates themselves recognize the critical importance of meaningful youth participation in health policymaking and programming. The *Lancet Commission on Adolescent Health and Wellbeing* includes two young members, who were selected through a competitive online process. As the Commission sought to incorporate the views of a more globally representative sample of youth, we conducted an online survey to capture a broad range of inputs. The survey was promoted to youth health advocates through the networks of the Commissioners and their organisations. It sought the opinions of youth advocates about priority areas for investment and around which key messages are likely to be most effective with decision makers. More than 500 adolescents and young adults from 89 countries working across a range of health issues participated. The idea that “Adolescents and youth should be supported and empowered to contribute to designing, implementing and assessing policies, programs and systems that contribute to their health and wellbeing” was considered the single most important theme by them.

Even though the rationale for youth engagement around health is strong, there have been few syntheses of the evidence on its effectiveness. We reviewed available studies around models of youth engagement, leadership and participation, and their effectiveness.³⁰⁹ There was a dearth of studies examining the effects of adolescent and young adult engagement on health outcomes. In contrast to the scarcity of effectiveness studies, there is a growing literature around the essential elements for meaningful youth engagement.

An essential starting point is a rejection of presumptions that adults know best. Rather, successful engagement emphasises the capacities of adolescents and young adults to work in partnership with adults. This generally requires both processes to promote active youth participation (“training young people to speak”) and the responses of adults (“training adults to listen”). Ideally, partnerships with adults begin early. Typically, it begins with shared decision-making in the family. It should extend to growing engagement in school life and local community groups that provide enabling and protective environments for adolescents to learn the skills for effective engagement. With growing capacities, adolescents can further engage more meaningfully in policies, systems and programs that affect them and their peers.

Adolescents and young adults depend on systems and structures for engagement that are put in place and supported by adults. To engage most effectively, youth need resources (including financial), training, ongoing mentorship, sensitization to political and management processes (figure 16). They also need platforms and mechanisms for engagement. In different settings adolescents and young adults face very different opportunities and limits on their ability to engage and advocate meaningfully. Social, cultural, economic and political forces shape both the opportunities and form of youth engagement and the strategies needed to promote it.³¹⁰

Existing models range from tokenism to those that are completely youth-led.³¹¹ More egalitarian relations between young people and adults are essential for meaningful engagement but decisions are still often taken through an adult lens that overlooks youth perspectives.³¹² In general, the greater the level of youth control and responsibility, the greater is the effectiveness of engagement, whether around their own health or around policies and programs that affect others.³¹¹

Adolescent and young adult engagement around health can start with the individual and can move through the clinic and community levels, and on to national and international platforms. Below, we discuss some of the ways in which young people have engaged in health decision-making, policy-making and programming. We point to both promising strategies and recommendations for how these efforts might be leveraged to achieve greater impact.

Approaches to youth engagement and advocacy in health

Peer education, or the promotion of healthy behaviours *for* young people *by* young people, is the most evaluated strategy for youth engagement in the health sector. For the most part, such interventions have shown positive outcomes for the young people conducting the programming (i.e. the peer educators themselves), but evidence of their effectiveness in changing health outcomes for the broader population of youth they are meant to reach is thin.³¹³ Peer promoters themselves have greater self-confidence, improved communications, leadership and interpersonal skills, higher aspirations, and lower rates of health risk behaviours. Although better-evaluated than most strategies, there remains a lack of standardised evaluations. This reflects the tension between a wish to scale up promising approaches and the value of undertaking smaller scale interventions with rigorous methodologies, a particular challenge in resource-constrained settings.³¹³

Youth engagement in health-related advocacy has increased over the past two decades, fostered at a global level by the UN and other international organizations. Similar processes have occurred at country and community levels within organisations delivering services to young people. Text box 8 uses the example of *Education as a Vaccine* from Nigeria to illustrate one recent example of national youth advocacy.³¹⁴

Community-based participatory action research has become popular in work with marginalised adolescents. It has the potential to shift the power dynamic from one in which adolescents are *subjects* of research to one where they are *active partners*.³¹⁵ Engaging youth in this way gives insight into the lives and realities of young people. *Photovoice* is an example of this approach, as illustrated in text box 9.

There are reasons to be optimistic about the scope for extending meaningful youth engagement around their health and wellbeing. The growth of democratic processes in many countries brings new opportunities.³¹⁶ The greater involvement of adolescents and young adults in education, employment, and local community and youth organisations also offers new contexts for meaningful engagement. So too, social networking and digital media make it possible to access information, communicate and mobilise with other advocates as well as draw in resources in unprecedented ways. New media promote more active engagement as adolescents and young adults can independently generate their own content.³¹⁷ These possibilities allow broader collaboration which in turn can generate political leverage. Time, privacy and the need to convince adolescents that their voices will be heard remain barriers. For these reasons capitalising on these new possibilities is likely to require a shift in approaches to communication for both government and civil society organisations.³¹⁸

One unique challenge is that as young people grow, their places as “young leaders” must be taken by the next generation. More than any other field of health, youth engagement requires ongoing renewal.³¹⁹ Attitudes of adults towards young people and their capabilities, together with young people’s lack of confidence in engagement processes, are a common barrier.³²⁰ Attitudinal barriers commonly arise from cultural contexts where young people are perceived as subordinate to adults, that exclude young women and that further stigmatise socially marginalised groups.^{321,322} Inflexible bureaucratic arrangements, insufficient investment to support ongoing engagement, and restrictive policies, such as limiting the participation of adolescents in research, may be further limiting factors.³²³

For these reasons, most youth engagement in health falls short of sustainability, and top-down, adult-driven approaches remain the most common.³¹² In programs that do engage young people, those selected are often already “confident, articulate and naturally identified leaders”.³²³ In practice, few efforts meaningfully involve the most marginalised youth, who may include ethnic minorities, HIV-positive youth, married adolescents, youth with disabilities, LGBT youth, youth living in poverty, those with lower educational levels, and very young adolescents.³²⁴ In many circumstances, adolescent girls and young women face inequitable systems and structures which limit their participation. Yet meaningful engagement of vulnerable young people is feasible. One program with homeless youth in the “Skid Row” of L.A

California and their adult mentors used the sharing personal stories to inform community activism and policy advocacy, and successfully gained educational rights for homeless students.³²⁵

More effective and meaningful engagement will require systems and processes that exist in few programs and structures today. Mentorship between adults and youth; the building of young people's capacity, skills and knowledge; the establishment of new forums; and the growth of new methods of communication can create a sustainable environment for young people to engage around their health and that of their communities. The growth in mobile devices together with social networking and digital technologies provide unparalleled opportunities for engagement. Although the evidence of the effectiveness of new communication technologies in promoting engagement remains limited,³²⁶ many global organisations including WHO, UNFPA and the Lancet Commission itself are using online technologies, including social media and surveys, to gather information about health priorities directly from young people to inform strategies and policies.

Data and Accountability

Global health and development frameworks tended to include a cycle of three elements of monitoring, review, and appropriate responses but have been criticised for failing to adequately address governance and instead relying on voluntary and non-binding commitments to outcomes.^{327,328} The limits of this approach have led to calls for independent accountability and for ensuring that monitoring and evaluation processes are participatory and inclusive.⁵⁵ The newly-adopted *2030 Agenda for Sustainable Development* has recognised a need for a greater focus on accountability particularly at country level.³²⁹ The *Global Strategy for Women's, Children's and Adolescents' Health* notes the importance of transparent and freely accessible data, for the inclusion of sectors beyond health service delivery in advancing global health, and for the engagement of civil society.³³⁰ Various global health agendas have also begun to call for increased accountability, with participatory accountability frameworks proposed across a range of areas relevant to young people including HIV, NCD risks, obesity, women's health, mental health and nutrition.³³¹⁻³³³

Inclusive, participatory approaches to accountability could provide an ideal setting for meaningful youth engagement. Equally, young health advocates have the energy and potential to drive governance, advocacy and accountability in health for decades to come. To date, adolescents and young adults have generally been an afterthought in vertically siloed global and country health initiatives. With so many calls for accountability across so many health agendas, there is a risk that they will once again be overlooked. Beyond this, various barriers, ranging from the limitations of current data systems to the relative lack of an evidence base for action, pose challenges to effective accountability around an integrated agenda for adolescent health and wellbeing.

Kraak and colleagues reviewed 15 interdisciplinary frameworks for accountability, including trade and international development, human rights, business finance, public health policy and global health.³²⁸ On this basis they outlined a four-step process for accountability. We have adapted this four-step framework to consider the particular elements of effective accountability for adolescent and young adult health and wellbeing, as outlined in figure 17.³²⁸

The limits of current data systems

Planning responses to adolescent health requires data that is timely, developmentally relevant, age and sex-disaggregated, and defined to a local level. Ideally, these data would allow comparisons over time and tracking of inequalities within and between countries. In reality existing global data systems for adolescents are uncoordinated, inconsistent in coverage and timing, inadequately disaggregated, missing large groups of adolescents and fail to deal with the spectrum of health problems and their determinants (Text Box 10).³³⁴ This matters a great deal as LMICs are, to a very large extent, dependent on global surveys, such as Demographic and Health Surveys (DHS), for data to drive health policy and programming for adolescents.

Recent developments in health metrics seem unlikely to provide the impetus for change. The *Global Reference List of 100 Core Health Indicators* (2015), proposed by WHO to guide responses at global,

regional and national levels illustrates some of the difficulties. Younger adolescents are largely missing, both in specific indicators and age disaggregation with counting generally starting from the age of 15 years. Although some age disaggregation is proposed from the age of 15, adolescent fertility rate is the only adolescent-specific indicator included.³³⁵ The list does not include indicators around mental and substance use disorders or violence. The gaps in health risks are even more compelling with obesity, physical activity, and fruit and vegetable intake indicators proposed only from 18 years. Important social determinants of adolescent health and wellbeing, including child marriage and lack of participation in secondary education, are not included in either the core or supplementary lists. These indicator gaps are further illustrated in Supplementary Table 8.

The data gaps are compounded by the absence at a global level of any single agency with responsibility for processing available data to provide a more complete picture of adolescent health at either a global or country level. The patchwork approach to data collection is then mirrored in data analysis and reporting systems where responsibility for adolescent health and wellbeing data sits across a range of UN agencies (e.g. UNFPA, WHO, UNPD, World Bank, UNICEF), global NGOs (e.g. Population Council, Population Reference Bureau) and academic groups (e.g. IHME). The result is an incomplete and uneven picture. Similarly, for those wishing to understand the profile of adolescent health and wellbeing in any given country, there is typically no single 'go to' national department or agency.

These limits in global data system pose major difficulties for countries in taking an adequate account of adolescent health needs. Yet even with better coverage of health areas, global surveys are unlikely to provide adequate data for national planning; none provide the finer-grained geographic information needed for monitoring progress and capturing inequalities at subnational levels. There is therefore a need for country-level technical capacity to extend current data collection and data processing systems. It is essential that data reporting extends to sectors such as education, transport, justice and community environments. Ideally this would lead to country-level reports of health and wellbeing including inequalities and inequities across adolescent groups.

Digital media have the potential to transform the sharing and presentation of such data, to generate new data and assess its quality, and allow for communication to and with a much wider audience. It also has the potential to heighten the engagement of young people globally around adolescent health needs, as well as generating greater demand for data.

The process of communication around adolescent health and wellbeing requires engagement with different government ministries. In many countries, it extends to international agencies and global funders. However, it also needs the involvement of civil society groups outside of government.³³⁶ These constituents include adolescents and young adults themselves, youth organisations, professionals working with adolescents, academics and private industry. Young people and youth-focused organizations are essential stakeholders in this process. Their meaningful engagement can ensure a proper understanding of what the data means, assess and inform the feasibility and appropriateness of potential actions, and support broader buy-in for such actions.

Coordinating Responses

For the most part, the most effective actions for adolescent health and wellbeing are intersectoral and multi-component, tailored to local needs and capacities. This raises important questions around the structure and processes for governance. Creating processes whereby civil society can hold government ministers to account for the investments made (or not made) depends on the cultural and political context.³³⁷ For governments less open to influence from civil society, the involvement of international agencies and use of financial and economic incentives may be needed for advancing adolescent health and wellbeing.

Holding industry to account is yet more challenging. Kraak and Story examined the *Children's Food and Beverage Advertising Initiative*, which promoted the responsible use of cartoon brand mascots to promote food products to American children between 2000 and 2015.³³⁸ They found moderate progress in taking

and sharing the account. This included public hearings in the US Congress, as well as dialogues between investors, businesses, public health researchers, advocates and government officials. However, there was little actual progress in holding companies to account with the absence of clearly empowered body to hold industry to account a major shortcoming. Such a body could encourage governments to play active roles through taxation, legislation, economic incentives and social audits to influence the marketing and sales of products such as food, tobacco, alcohol, fashion or illicit drugs - activities that directly and indirectly influence health and health risks for young people.⁶⁸

Taking action also requires a sound evidence base around interventions that have been ideally adapted and trialled in similar contexts. Yet in areas such as mental disorders and sexual and intimate partner violence, there are not yet clearly effective and scalable interventions for adolescents. Some contexts that are of major importance in shaping the health and wellbeing of adolescents, including families and digital media, have received little attention in intervention studies. In many areas of health need, actions have been evaluated in HICs, and for the most part, have neither been adapted nor trialled in LMICs. So too, many innovative approaches have been piloted and sometimes rolled out on a larger scale but without evaluation. New platforms based on digital media offer great promise but in the absence of more systematic evaluation their broader utility is still uncertain. Lastly, the absence of good cost and cost-effectiveness data in different regions remains a barrier to implementing effective actions at scale.

These knowledge gaps arise in part from a lack of technical capacity globally. Unlike the fields of maternal and child health and HIV that have had considerable investments over decades, adolescent health has seen little technical investment. This is further compounded by the lack of any single agency with responsibility for pulling together the evidence base for action. Current policy and programming relevant to adolescent health and wellbeing sits within different UN agencies (e.g. WHO, UNICEF, UNAIDS, UNESCO, UNFPA, World Bank, UNODC) as well as with various global NGOs (e.g. Save the Children, Population Council). The absence of an overarching coordinating body around the evidence-base contributes has led to an inability to provide guidance to countries on either choice of 'best buys' or the 'how to' of intersectoral implementation.

Notwithstanding such limitations, there is sufficient knowledge for generating greater action at country level around adolescent health and wellbeing. A human and technical capacity to act is essential. Commonly this requires attention to the training of those across the relevant sectors (e.g. pre- and in-service training of teachers around adolescent development and youth engagement). There is a need for growing adequate country-level technical capacity in policy and program evaluation. This technical capacity is not only important in ensuring fidelity in program implementation but would also generate valuable data on both local effectiveness and resources required for implementation.

Key constituents

Adolescent health and wellbeing is increasingly shaped by diverse influences beyond the immediate family and community. These social and structural determinants are themselves changing rapidly. For these reasons adolescent health and wellbeing increasingly depends on the engagement of a broad range of actors and constituencies from local communities to the global level.

Adolescents and young adults are central actors around their health and wellbeing. Their meaningful participation and engagement is essential for effective action aiming to enhance their health and wellbeing. This same engagement is essential for their own emotional and social development. There is need for sustainable systems and processes where meaningful engagement become a normal part of their lives.

The organisations with and working for young people have a particularly important role to play in their support and mentorship. Given the influence of religious leaders on community and family values, as well as directly on the attitudes, beliefs and values of adolescents, they are also important constituents.

Families and local communities: Despite the rapidly changing social determinants of adolescent health and wellbeing, families provide the most important platform for the transition to adulthood. Families are also affected by rapid social and economic change. The knowledge, skills, financial resources and community support available to parents remain essential determinants of adolescent health and wellbeing.

Professional groups such as teachers, health care providers, community workers, sports trainers and employers have increasingly important roles in young lives. For disadvantaged and marginalised youth

these groups extend to the judiciary, police, youth justice workers, social and accommodation service workers. Their capacity to engage and understand the health, social and developmental needs of adolescents will determine their effectiveness in promoting health and wellbeing.

Government ministries: Because the major determinants of health lie outside the health service sector, other sectors within government play an essential role in adolescent health and wellbeing. Key portfolios for adolescent health include ministers for health, education, youth, finance, justice, transport and industry. Effective actions are often multicomponent and intersectoral. They require both a capacity for action within individual sectors and coordination of investment across different sectors. That coordination is dependent on understanding health needs, current investments and effective actions, together with the structures and processes to coordinate across ministerial portfolios.

Private industry including media and marketing organisations are increasingly shaping the health, lifestyles, attitudes and wellbeing of adolescents. Private industry also provides employment and many essential services for adolescents and their families. Establishing a dialogue with industry as essential partners in adolescent health and wellbeing is a pressing agenda.

The international development community has an essential role in resourcing and coordinating investments in adolescent health and wellbeing. This role will become greater with the Global Strategy for Women's, Children's and Adolescents' Health. To date, efforts to support adolescent health have been piecemeal and poorly coordinated. Future investments require greater consideration of coordination, capacity building and technical support at country level.

The academic community has the potential to partner with the international development community and governments in the development of health information systems, innovation and evaluation, and training service providers and youth health advocates. Many academic disciplines have a role in the promotion of adolescent health and wellbeing. However, the academic and research capacity in LMICs is at very low levels and in need of investment.

Independent oversight

Effective processes of accountability require independent review. A critical question relates to the structures that would most effectively ensure that oversight. Responsibility for adolescent health and wellbeing at a global level is currently dispersed across many UN agencies including WHO, UNICEF, UNFPA, UNAIDS, World Bank, UNESCO, UN Women and UNODC. All have different foci and age mandates. It is difficult to see progress around global adolescent health oversight without more effective coordination. An entity or global focal point for adolescent health and wellbeing could play an essential role in galvanising and reviewing action at country level. It could mobilise and grow global resources in terms of funding, technical and research capacity, youth advocacy and intersectoral action. Such an entity could also provide independent oversight and guidance to the UN agencies active in adolescent health and wellbeing.

At a country level, processes for independent oversight may provide a point for engagement with the different constituents. Such a forum becomes essential where the most effective actions have the potential to sit uncomfortably with local cultural and religious traditions. These processes for independent oversight might also provide a mechanism for external stakeholders to coordinate investments, including technical support and training.

Accountability processes are likely to take different forms and use different structures in different places. The NCD accountability process has, for example, proposed the establishment of national NCD commissions with an independent chair and membership drawing on the interests of different stakeholders. Recognising that national health commissions already exist in some areas around HIV or women and children's health, they have recommended the expansion of the mandate to cover NCDs.³³⁹ Inclusion of adolescent health and wellbeing into a pre-existing structure of this kind would require expansion of both the agenda and membership to include young people, youth-focused organisations and experts with knowledge of young people's health. Given the breadth of the adolescent health and wellbeing agenda, an alternative and preferable strategy might be the establishment of National Youth Commissions with oversight of all aspects of adolescent health and wellbeing. It would require clear roles with the relevant government departments and explicit linkage to other relevant processes (e.g. NCD commissions).

Establishing effective processes for accountability is central to the promotion of adolescent health and wellbeing. These processes will ultimately allow us to invest more, invest more efficiently and ensure that where evidence does not currently exist, we can innovate and evaluate. Country level accountability structures must be mirrored in new and different global mechanisms that coordinate and complete the current piecemeal approach to adolescent health and wellbeing. With the largest generation of adolescents in human history, the time to do so is now. The health and wellbeing of today's adolescents and young adults is the most significant resource we have for future global and planetary health.

Section 6: Responses and recommendations

Despite being up to a third of the population in many countries, adolescents and young adults have generally been overlooked in government investments. This is therefore a field with very low capacity and limited technical capabilities within countries and globally. Major new investments are needed to address this neglect and take advantage of the opportunities that come with the largest generation in human history. The UN Secretary-General's Global Strategy for Women's, Children's and Adolescents' Health presents one opportunity for increasing investment in adolescent health and wellbeing. For countries, investments in adolescent health and wellbeing should at least become proportionate to their numbers in the population. This Commission's recommendations for specific actions and investment are outlined below.

Reframe adolescent health and wellbeing within international development

All constituencies should reconsider the framing of adolescent health and wellbeing that has led to its neglect in policy. Moving forward requires:

- The adoption of a broader view of adolescent health, one that starts with a comprehensive view of sexual and reproductive health and extends to include HIV and other infectious diseases, nutritional deficiencies, injury and violence, chronic physical health problems and mental and substance use disorders. This extends to ensuring that adolescents are centrally placed in relevant, emerging agendas including strategies around NCDs, mental health, and maternal, new-born and child health.
- Appreciation of adolescence as crucial years for the development of human capabilities with the benefits of investment providing a triple dividend of health and wellbeing during adolescence, across the life-course and into the next generation.
- Consideration of the implications of age, gender and evolving capacities in the implementation of all policies, laws and programs affecting adolescents and young adults.
- Attention to huge inequalities in adolescent health and wellbeing that are linked to gender and poverty. Policies that reduce inequities in opportunity and provide 'second chances' for the most marginalised are needed.

Set clear objectives based on national and local needs

Moving forward requires different actions in different places. Specific recommendations include:

- No country should remain in the Multi-Burden category by 2030. For today's Multi-Burden countries infectious diseases including HIV, sexual and reproductive health and under-nutrition remain preventable causes of disease burden that should be a priority focus in health service delivery and in preventive efforts including those addressing the structural and social determinant of poverty.
- All of today's Injury Excess countries should have made the transition to NCD Predominant profiles by 2030. For these countries, preventive efforts targeting the social and structural determinants of injuries, violence and high rates of early pregnancy are priority actions.
- Both Multi-Burden and Injury Excess countries must take parallel preventive actions to reduce their accelerating adolescent risks for NCDs to ensure that diseases of poverty and injury are not replaced by an unaffordable burden of non-communicable disease.
- There is great variation in the pattern and level of adolescent NCD burden across all countries, including NCD Predominant, which indicates great scope for accelerating investments to reduce adolescent NCD risks. NCD Predominant countries should identify and adopt international best practice (e.g. taxation of unhealthy food, tobacco and alcohol) as well as invest in innovation and evaluation of promising interventions that target adolescent NCDs and NCD risks.
- Within all countries many adolescents are marginalised with few resources for health and well-being. Actions to address their health and wellbeing need to take into account their different profiles of disease, health risk and social determinants.

Reorientate health services to meet adolescent health needs

Adolescents and young adults have low levels of health-care coverage. Extending the responsiveness of health service to adolescents requires:

- Guarantees of universal health access and comprehensive responses for all major health problems, including infectious diseases, mental health and sexual and reproductive health needs, for all adolescents regardless of gender, age, sexual orientation, marital and socioeconomic status.
- Resourcing of early and effective treatment of health problems that commonly emerge or have a particular significance for adolescents including HIV and other infectious diseases, nutritional deficiencies and mental and substance use disorders.
- Guarantees of essential health care to all sexually active adolescents, including maternal health care and access to affordable modern contraception, particularly long acting reversible contraceptives; if unwanted pregnancy does occur provide access to legal, safe abortion.
- Ensure health care providers have the necessary competencies to provide confidential, non-judgemental and respectful health care to adolescents. This extends to a capacity to engage with adolescents and young adults around health service provision that meets their health needs.

Create enabling, protective and empowering social scaffolds through intersectoral investments and partnerships

The most effective actions for adolescent health and wellbeing lie in sectors beyond health service provision. Moreover, alignment of health service responses with preventive and promotional actions in other sectors is a key to health service effectiveness. Essential investments in other sectors include:

- Guaranteeing access to free, quality secondary education regardless of sex, marital and socio-economic status. This should extend to reducing family financial barriers to quality education.
- Ensuring that schools function to promote health. This includes resourcing schools to deliver life skills for health and comprehensive sexuality education, and supporting a positive school ethos.
- Providing pre-service and in-service training for teachers and other professionals working with adolescents around the knowledge and skills to empower adolescents to make the best possible decisions about their health and wellbeing.
- Ensuring that necessary investments are made to implement national and international legal frameworks designed to empower and protect adolescents. In many countries this includes guaranteeing 18 years as the minimum age for marriage which will require educating community leaders and professionals within the justice system around the implementation of this legislation.
- Ensuring that new legislation and policies affecting adolescents draw on contemporary understandings of evolving cognitive and emotional capacities to promote autonomy while concurrently protecting adolescents from harm.
- Convening a whole of government approach to the creation of an enabling, protective and empowering social scaffold for adolescent health and wellbeing including safe employment, supported families and parents, and taxation and regulation of the marketing of unhealthy commodities to adolescents. This whole of government approach should extend to essential health care provision such as contraception where the promotion of favourable community attitudes and enabling and protective legal frameworks are essential for effective coverage.

Enhance the engagement of young people

Adolescence is intrinsically a time of active engagement with the broader social environment beyond the family. Indeed, this is an essential facet of healthy adolescent social development. Given the opportunity, adolescents and young adults are powerful agents for social change, including the promotion of their own health and wellbeing. Given the complexity of adult systems and of adolescent social worlds, creation of new structures and processes is required to facilitate this engagement. This includes:

- Access to training, mentorship and resources to ensure that adolescents are empowered to play an effective role in governance and accountability processes around their health and wellbeing.

- National government leaders convening relevant constituents including adolescents and young adults, their families and community leaders, adolescent focused organisations, international development partners, professionals groups and academics in a National Youth Commission, or its equivalent, to consider, review and advise governments around their investments in adolescent health and wellbeing. This should extend to establishing and strengthening mechanisms for meaningful participation of adolescents in the design, communication, implementation and monitoring of policies and practices affecting their health and wellbeing. This is particularly important for socially and economically marginalised adolescents.

Invest in knowledge and grow capacity

Because adolescents and young adults have seen little systematic investment in their health and wellbeing from governments and their International development partners, the capacity of many relevant service systems is very limited, including technical support. Without investment in research, training, financing and technical underpinnings, progress in adolescent health and wellbeing will remain slow. Essential investments include the following:

- Build profiles of adolescent health and wellbeing at national and sub-national levels. National governments must work with international development partners, including funders and global data collection systems, to collect and report on a minimum set of priority indicators of adolescent health and wellbeing. National statistics agencies should report regularly on the health, development and wellbeing of adolescents, disaggregated by age and sex, and ensure that this information is easily accessible to constituents. International data collection systems should be resourced to collect and report on age and sex disaggregated data (10-14, 15-19, 20-24 years) on all relevant global indicators of health and wellbeing for all adolescents, including those who are out of school and socially and economically marginalised.
- Ensure that the international development community and national governments address gaps in the evidence base for action in practice and policy through innovation, evaluation, and economic analysis of promising actions. Innovation is particularly needed in prevention and early intervention of major emerging areas of need such as mental health and violence where the existing evidence base for action is thin. In general, there is a need to better understand what works for males and females, for different aged adolescents and for socially marginalised groups.
- Establish new processes for supporting actions around adolescent health and wellbeing. For Multi-Burden countries, these should align with the Global Strategy on Women's, Children's and Adolescents' Health, and extend to coordination of technical and research investments in adolescent health and wellbeing and increasing capacity in technical support personnel within countries.
- Investment in the education and training of all professionals working with and providing services to adolescents. These investments should extend to ensuring that adolescent and young adult advocates have access to training and mentorship to ensure that they have the required competencies to play an effective role in national and global processes around accountability for their health and wellbeing.

Acknowledgements

This report was made possible by grants from the Bill & Melinda Gates and MacArthur Foundations. The findings and conclusions are those of the authors and do not necessarily reflect recommendations or policies of the funders. The University of Melbourne, University College London, the London School of Hygiene and Tropical Medicine, and Columbia University provided financial and logistic support to the Commission.

Text Box 1. Some definitions of adolescence and young adulthood

Adolescence is defined by the World Health Organization as between 10-19 years, while **youth** refers to 15 to 24 years.³⁴⁰ **Young people** refers to the 10 to 24 year old age group, as does the composite term **adolescents and young adults**. This is the age group and term that is used through the Commission report.

Emerging adulthood has been used to describe the phase of life from the late teens to the late twenties when an individual acquires some of characteristics of adulthood without having reached the milestones that historically define fully-fledged adulthood.³⁴¹

The Convention on the Rights of the Child (1989) defines a **child** as below the age of 18 years, unless under the laws applicable to the child, majority is attained earlier.¹³³

Eighteen is the **legal age of majority**, the point at which an individual is considered an adult in many countries, although not universally. In law there is no single definition of adulthood but rather a collection of laws that at differing ages for different activities bestow the status of adulthood. These include laws related to the age of consent, the minimum age that young people can legally work, leave school, drive, buy alcohol, marry, be held accountable for criminal action and the age that young people are deemed capable to make medical decisions.

When reporting age disaggregated data, the 10-24 year old age range is increasingly divided into five year age categories. **Early adolescence** refers to 10 to 14 years, **late adolescence** to 15-19 years and **young adulthood** to 20 to 24 years.

Text Box 2: Key messages

1. Adolescents and young adults face unprecedented social, economic and cultural changes **that are shaping their health and wellbeing**: we must transform and strengthen health, education, family and legal systems to keep pace with these changes.
2. Investments in adolescent health and wellbeing bring a triple dividend of benefits now, into future adult life and for the next generation of children: we must invest more; invest more effectively; invest in proven interventions; and invest in innovation where evidence is limited or technological change is rapid.
3. Adolescents are biologically, emotionally and developmentally primed for engagement beyond their families: it is essential that we create the opportunities to meaningfully engage with them in all aspects of their lives.
4. Differences between and within countries in adolescents' health needs, risks and determinants necessitate different responses in different places: inclusive information systems addressing adolescents' health and wellbeing, including these inequalities, are needed.
5. Inequities, including those linked to poverty and gender, shape all aspects of adolescent health and wellbeing nationally and globally: strong multisectoral actions are needed to respond to current health needs, grow the resources for health and offer second chances to the most disadvantaged.

Text Box 3. Psychological and emotional development through adolescence

Early adolescence (10-14 years) is biologically dominated by puberty and the effects of the rapid rise in pubertal hormones on body morphology, and sexual and brain development.³⁴² It is a time of remodelling of the brain's reward system.³⁴³ Psychologically it is characterised by low resistance to peer influences, low levels of future orientation and low risk perception, often leading to increases in risk taking behaviour and poor self-regulation.⁵¹ It is a time of identity formation and development of new interests including emerging interest in sexual and romantic relationships.⁴⁴ School and family environments are critical social contexts during this period.

Late adolescence (15-19 years) is also characterised by pubertal maturation, especially in boys, but in ways that are less visually obvious. At this time the brain continues to be extremely developmentally active, particular in terms of the development of the prefrontal cortex and the increased connectivity between brain networks.^{344,345} This later phase in adolescent brain development brings continued development of executive and self-regulatory skills, leading to greater future orientation and an increased ability to weigh up the short and long term implications of decisions. Family influences become distinctly different during this phase of life, as many adolescents enjoy greater autonomy, even if they still live with their families. Likewise, education settings remain important, although not all adolescents are still engaged in school at this age, especially in low and middle income countries.

Young adulthood (typically 20-24 years) is accompanied by maturation of the prefrontal cortex and associated reasoning and self-regulatory functions. It marks the end of a period of high brain plasticity associated with adolescence whereby the final phase of the organisation of the adult brain occurs.^{346,347} This often corresponds to the adoption of adult roles and responsibilities, including entering the workforce or tertiary education, marriage, child bearing and economic independence. Secular trends in many developed nations point towards an increase in the age that many of these adult roles are attained - if they are attained at all.³⁴⁸

Text Box 4: Country case study on legal frameworks for child marriage

Strong national legislation is not enough to mitigate child marriage in India

Child marriage is common in India, declining very slowly.^{349,350} Forty-seven percent of women are married before 18 years.³⁵¹ The highest prevalence is in five states: Madhya Pradesh (73%), Andhra Pradesh (71%), Rajasthan (68%), Bihar (67%) and Uttar Pradesh (64%).³⁵¹ The urban-rural differential is substantial with rural girls marrying younger than 18 years at nearly twice the rate of urban girls.³⁵² Girls marrying before 18 years report physical violence twice and sexual violence three times as often as those marrying later.³⁵³ The Prohibition of Child Marriage Act set the legal age of marriage at 18 years for girls and 21 years for boys.³³⁰ The Compulsory Registration of Marriages Act requires registration of all marriages across India.³⁵⁴ Close examination of the law reveals many customary and religious loopholes. Each religious community has separate personal status laws which override national legislation in matters relating to the family, including marriage.³⁵⁵ Eighty percent of the Indian population, including Hindus, Sikhs, Buddhists, and Jains, are governed by the Hindu Marriage Act, which validates marriages, once solemnised, even for parties under 18 years.³³⁶ Under Muslim personal law, marriage can occur at the age of “puberty.”³⁵⁶ The Prohibition of Child Marriage Act does not prevent or criminalise these marriages—it only makes them voidable at the option of a contracting party. In addition, there is an explicit exception for Muslim marriage where the voidable provision only applies when a girl is under 15 years at the time of marriage.³⁵⁵ The Compulsory Registration of Marriages Act “does not affect any right recognised or acquired by any party to the marriage under law, custom or usage,” meaning religious marriages are also exempt from registration.¹⁵⁸ India has also filed a reservation to Article 16(2) of CEDAW, which mandates compulsory registration of marriages stating, “...the Republic of India declares that though in principle it fully supports the principle of compulsory registration of marriages, it is not practical in a vast country like India with its variety of customs, religions, and level of literacy.”¹⁴⁰

Text Box 5. Graduated driving licences balance protection and autonomy

Australia, New Zealand, and many U.S. states have introduced graduated driving licenses. Restrictions on adolescent drivers and those without requisite levels of driving experience are intended to address the disproportionately high numbers of teenage automobile accidents, injuries and fatalities.³⁵⁷ In California, for example, a three-step process to obtaining a full driving license recognises the increased risk associated with peer influence and alcohol consumption during this period.³⁵⁸ The first stage requires all teenage drivers to complete 50 hours of driving while supervised by an adult over the age of 25 years, including six hours of a driver training course. Completion of this stage must be certified in writing by the young person's parent or guardian. In the subsequent second stage, which lasts 12 months, those under 18 years old are prohibited from driving passengers under 20 years old or between 11pm and 5am, unless accompanied by a licensed driver aged 25 or over. This reflects concerns about peer influences while driving. A full driving license is only awarded as a third stage of graduation if the driver completes the second stage without any court-ordered driving restrictions, suspensions or probations on their record. In parallel, up until the age of 21 years, a 'zero tolerance law' prohibits any alcohol consumption prior to driving. An evaluation across 43 U.S. states suggests an 18-21% reduction in the involvement of 16 year olds in crashes in those states with the most extensive graduated driving license programs.³⁵⁹ The greatest reductions were seen in 16-year-olds, where a strict permit stage was associated with a 58% reduction in fatal crash risks with similar reductions for injury associated crashes.³⁶⁰ The success of graduated approaches for driving suggests consideration should now be given to applying graduated approaches to other aspects of adolescent policy, particularly where similar public health concerns are apparent.³⁵⁷

Text Box 6. 'Second chances' for young offenders

Adolescents and young adults are more commonly both victims and perpetrators of criminal offences than older age groups. Offending in the young may be increasing in many places, with urbanisation a contributing factor. Many offenses occur within the context of gangs, where peer influence is a major contributor. Young offenders have some of the worst health profiles of any group of adolescents and young adults. In HIC, deaths of young offenders are around 10 times higher than in other adolescents due largely to drug overdose, suicide, accidental injury and homicide.³⁶¹ A separation of youth from adult justice systems began in high income countries in the late 19th century with a rationale of acting in the best interest of the child. The UN Convention of the Rights of the Child has more recently stressed the importance of a consciousness of rights within the operation of youth justice systems.¹³³ In particular, it stressed the use of detention and imprisonment as measures of last resort. Yet in many settings, political pressures have re-emerged for adolescents to be held fully accountable for their actions.³⁶² In many places, custodial detention (incarceration), including pre-trial detention, is still used with first time adolescent and young adult offenders, even for minor offenses such as cannabis or other substance use, shop-lifting or minor theft - even though most first time offenders do not re-offend.

Alternative approaches that provide 'second chances', promote emotional learning and ultimately better life (including health) outcomes have been implemented in a range of jurisdictions. Diversion programs have been designed both to keep adolescents out of the criminal justice system, that when tied with family interventions, reduce recidivism.³⁶³ Restorative justice approaches address the needs of both victims and offenders. They commonly bring offenders victims, families and sometimes other community members together. They too reduce rates of recidivism.³⁶³ Other approaches to protect young offenders include the use of welfare-oriented hearings for younger offenders³⁶⁴, ensuring that convictions before 18 years can later lapse from an individual's criminal record, and extending youth justice approaches to the age of 21 years for those considered emotionally immature.³⁶⁵

Text Box 7. Categorization of country health profiles for adolescents

We aggregated the 236 causes of DALYs and deaths among 10-24 year olds from the 2013 Global Burden of Disease (GBD) study into nine categories reflecting changing disease burden with progression through the epidemiological transition. This resulted in three broad categories of health problems as summarised in Figure 8. Countries were then classified into one of three categories depending on their pattern of disease burden, using the definitions below, and shown in Figure 9:

1. **Multi-burden countries** were those with little evidence of having yet passed through an epidemiological transition. DALYs due to infectious diseases, nutritional deficiency and sexual and reproductive health, together with HIV, were grouped. Countries with a total DALY rate within this group of conditions of $\geq 2,500$ per 100,000 per annum were defined as higher burden multiple problem.
2. **Injury excess countries** were those where the burden of disease showed evidence of having passed through the first phase of the epidemiological transition but where rates of preventable injury remained high. We combined the DALY rates for unintentional injuries and violence and defined a group of countries with an injury burden of $\geq 2,500$ per 100,000 per annum and DALY rates for infectious diseases, nutritional deficiencies and sexual and reproductive health and HIV $< 2,500$ per 100,000 per annum.
3. **NCD predominant countries** were defined as those with DALY rates of $< 2,500$ per 100,000 for both groups, namely infectious diseases, nutritional deficiencies, sexual and reproductive health and HIV, as well as for unintentional injuries and violence.

Further details are provided in Supplementary text box 4 in the online appendix

Text Box 8. Youth Advocacy in Health: Education as a Vaccine (EVA)

EVA supported a **Youth Advocacy Group (YAG)** of ten young Nigerians, aged 18–24, to educate peers, adult gatekeepers and policy makers around sexual and reproductive health policies for young people. In 2010 a draft national HIV/AIDS anti-discrimination bill was tabled that failed to take into account the stigma and discrimination faced by young people. The YAG developed and presented a position paper to the House of Representatives, highlighting youth-specific recommendations. A specific goal was to ensure that the bill made reference to protecting the rights of young people. The YAG then actively engaged other youth across Nigeria in support of their recommendations. The YAG created a video screened at University campus education events in three states. At each, a YAG member led discussions on the policy. A petition calling for the inclusion of the youth recommendations collected 1500 signatures. Once the bill passed the House, with the YAG recommendations included, the group generated postcards from nearly 2,200 young people in advocating with the Senate. The bill was signed in 2015 and included language recommended by the YAG. The experience illustrated common challenges for young advocates. They faced a culture that discouraged young people from speaking out, based on a (mis)perception that they lacked the knowledge and expertise for a meaningful contribution. Youth groups across the country were poorly resourced making communication difficult. Lastly, lack of financial support limited the capacity to engage other youth. Despite the challenges YAG members gained leadership skills and a capacity to, in the words of one member, “be responsible not just for myself but for others.”³⁶⁶

Text Box 9. Photovoice: using images to communicate and advocate



Photovoice is a participatory action research strategy commonly used with disadvantaged and marginalised groups. Photos are used to document personal and community issues and provide a basis for story-telling. It is a powerful tool for youth engagement, raising awareness of important aspects of the lives of adolescents. It is a useful way of levelling power differentials between adults and young participants. It can be a means to catalyse community action, as the development of a story narrative facilitates the engagement of all participants in engaging in social change. It has been used across a wide variety of settings including health care (e.g. young survivors of childhood cancer in South Korea³⁶⁷), prevention and health promotion (e.g. obesity prevention in USA³⁶⁸, reproductive health and empowerment program targeting married adolescent girls in Ethiopia) and in youth engagement more broadly (adolescents identifying community strengths in Kenya³⁶⁹). The images powerfully engage public interest in the daily lives and health challenges faced by young people.³⁷⁰

Text Box 10. Global adolescent health data: a patchwork quilt with many holes

Adolescent health and wellbeing is currently assessed in a patchwork of surveys.

- The Health Behaviour of School Aged Children (HBSC), supported by an academic network, has over the past three decades collected data on younger adolescents in schools in many high and middle income countries, with intermittent, ad hoc support from some national governments.
- The Demographic and Health Surveys (DHS) operate in low and middle income countries and have provided some health information for 15-25 year olds, over a similar period, predominantly around sexual and reproductive health.
- The Multiple Indicator Cluster Surveys (MICS), run by UNICEF, use similar methodologies to DHS, with a predominant focus on the sexual and reproductive health of married women and girls.
- The Global Youth Tobacco Survey and the Global School Health Survey, run through the World Health Organization (with support from CDC), are more recent surveys of younger adolescents in schools in LMIC. The Global School Health Survey is broadly focused on risks for NCDs although does cover other aspects of adolescent health.

There are many gaps in current coverage:

- Younger adolescents are poorly covered, especially in LMIC, with no coverage for those out of school in any survey.
- Fewer data are available on males and unmarried young women.
- Beyond sexual and reproductive health, most aspects of adolescent health and health risks are not included in household surveys.
- Funding constraints for school-based surveys have limited the capacity to understand health trends due to lack of investment in repeat surveys in many countries.

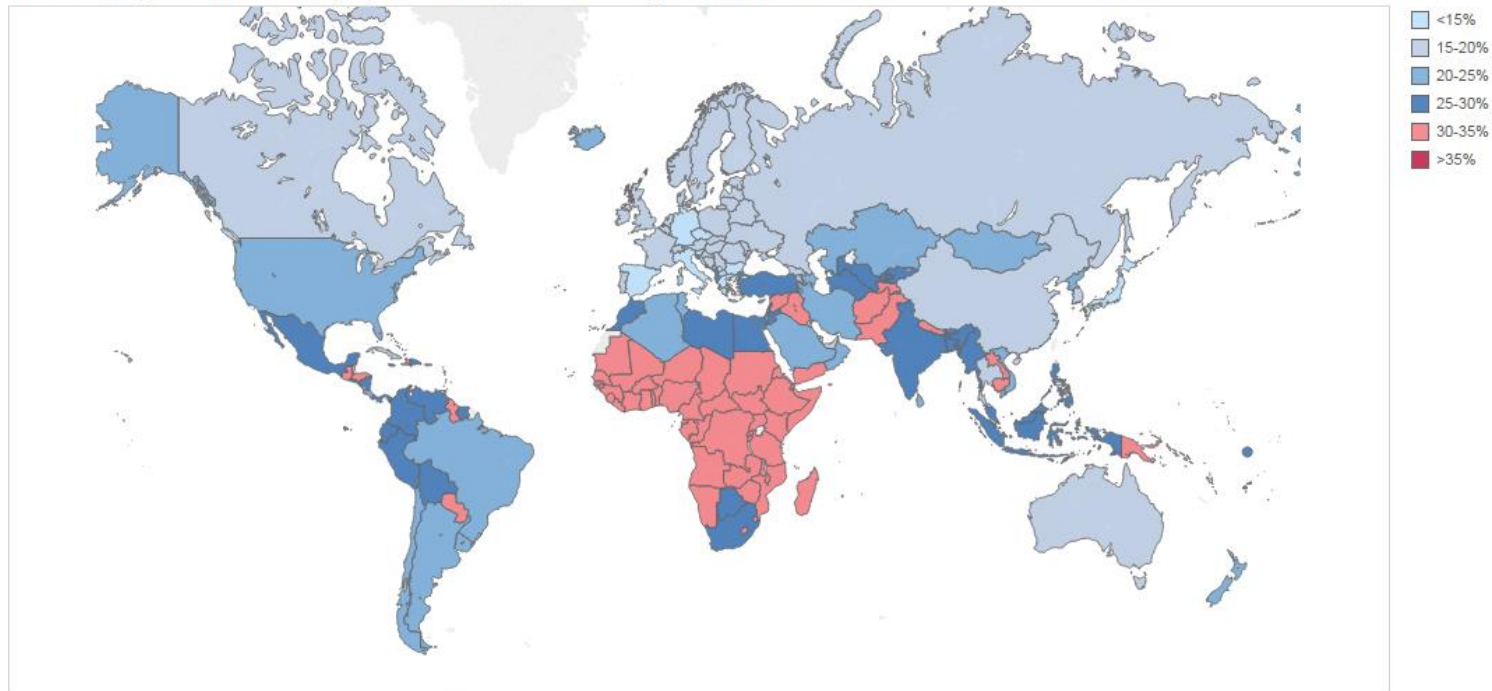
Necessary responses include:

- Harmonise assessments across surveys based on standardised indicators and measures. Where harmonisation is not possible, studies are needed to understand how different survey approaches might be complementary.
- Extend the coverage of current surveys to new and emerging problems and health risks, including mental disorders and emotional wellbeing, substance use and injury risks. This is likely to require the development of new indicators and measures.
- Extend existing surveys to provide adequate coverage of younger adolescents as well as develop systems for assessing structural and social determinants of health.

Digital technologies offer great opportunities for cheaper and more effective data collection systems, training and support of in-country expertise in data analysis.

Figure 1. Adolescents and young adults as a proportion of country population in 2013 (IHME estimates)*

Percentage of the total population aged 10-24 years in 2013



*data available from <http://ghdx.healthdata.org/global-burden-disease-study-2013-gbd-2013-data-downloads>

Figure 2. Changing proximal social determinants of health across the life course

Legend: Adolescence is a time when social determinants from outside the family become greater with major influences of peers, media and education and the beginning of workplace influences. Community and structural determinants are shown in blue. The shaded vertical box signals adolescence and young adulthood.

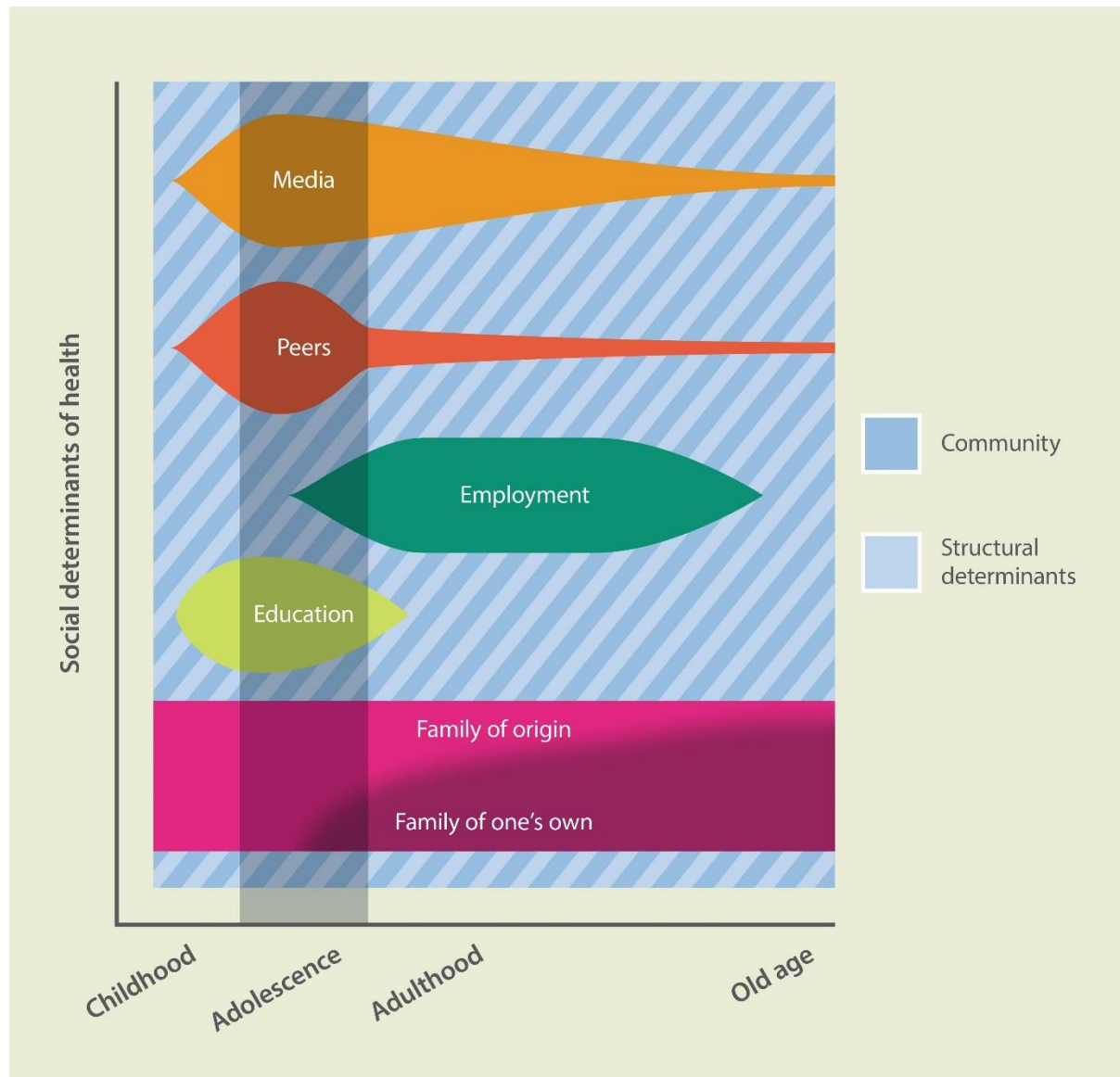
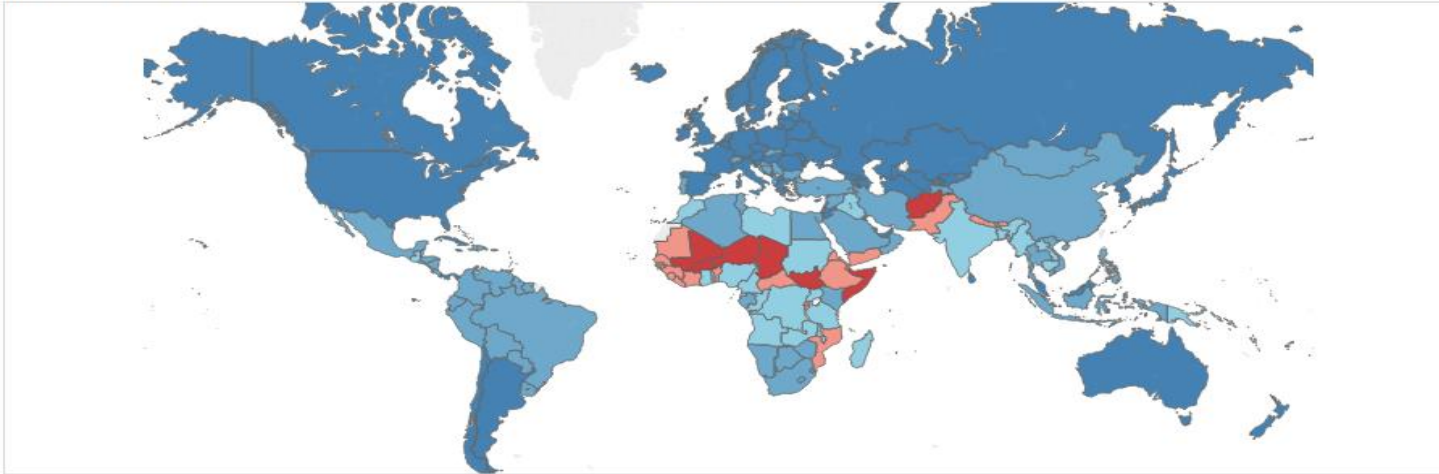
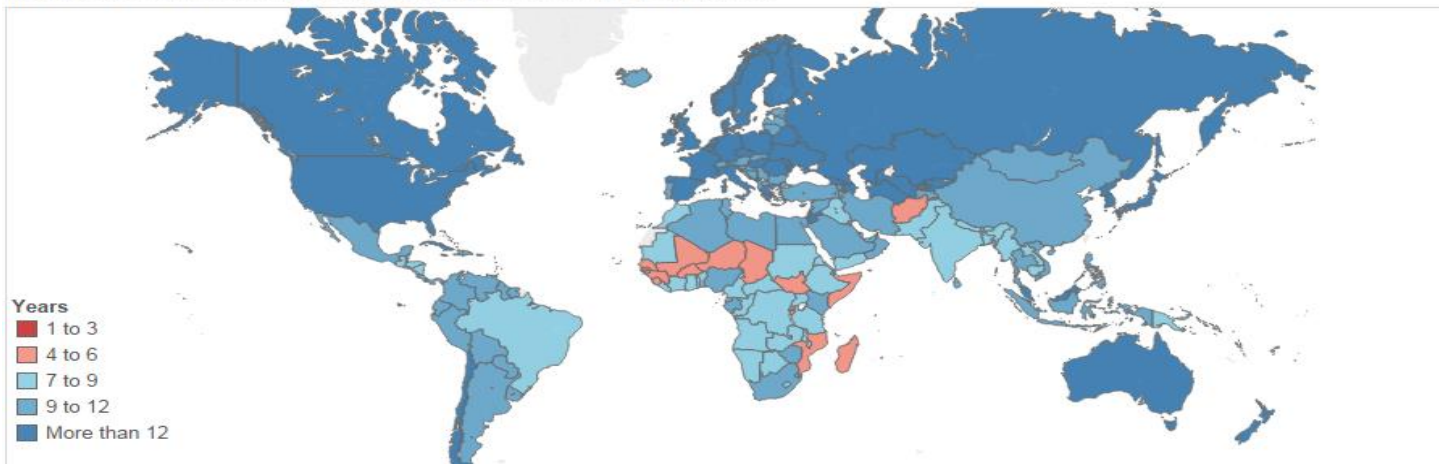


Figure 3. Educational participation of 15 to 24 year olds for 188 countries (IHME estimates for 188 countries)*

Mean years of educational attainment, females 15-24 years, 2013



Mean years of educational attainment, males 15-24 years, 2013



*data available from <http://ghdx.healthdata.org/global-burden-disease-study-2013-gbd-2013-data-downloads>

Figure 4. Scatter plot of the association between country level adolescent fertility rates and years of education in 2010-12

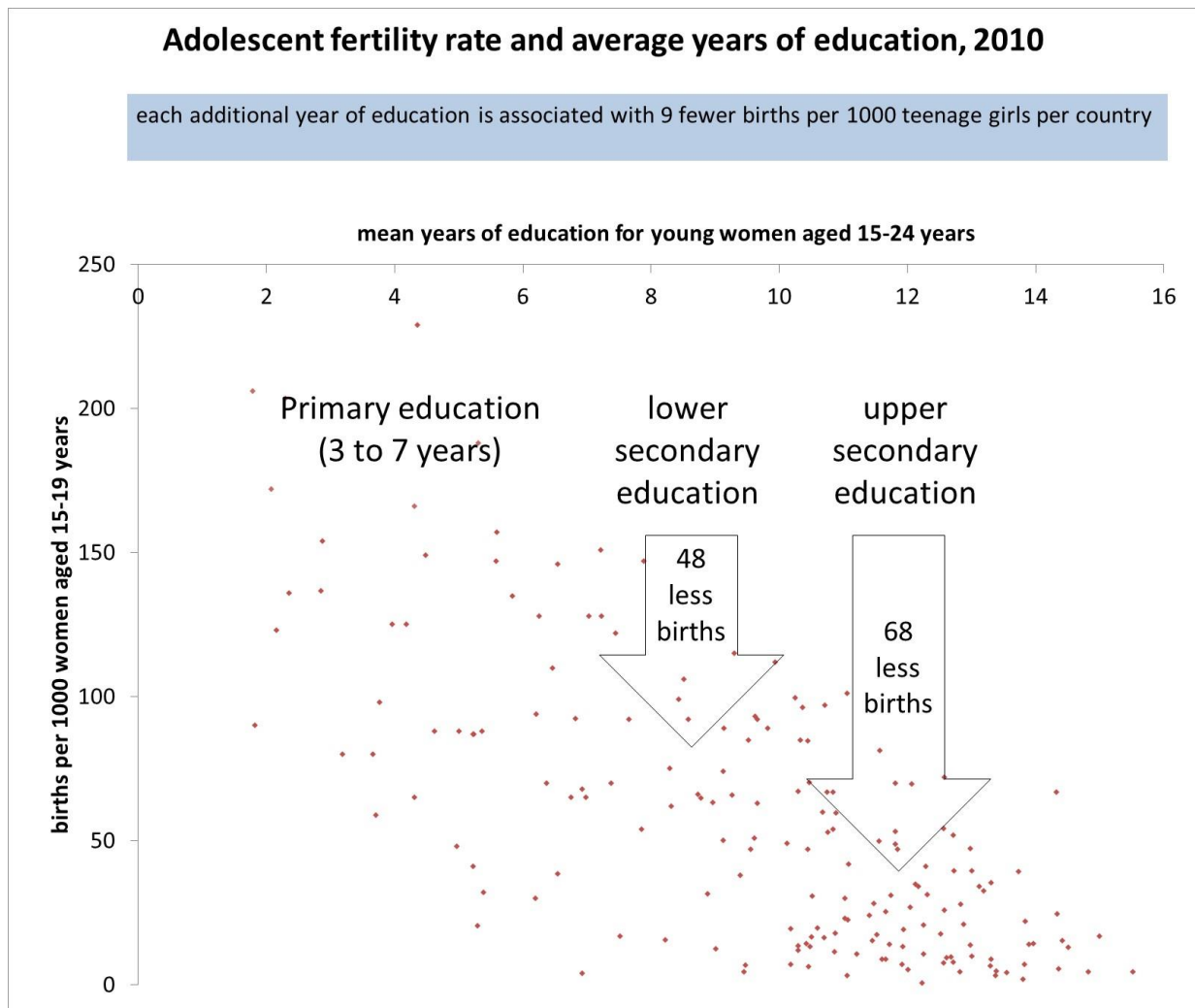


Figure 5. Associations between health at 18 years and level of education obtained in the Cebu cohort study, Philippines

- Non-significant relationships are shown in grey.
- M=males only, F=females only.

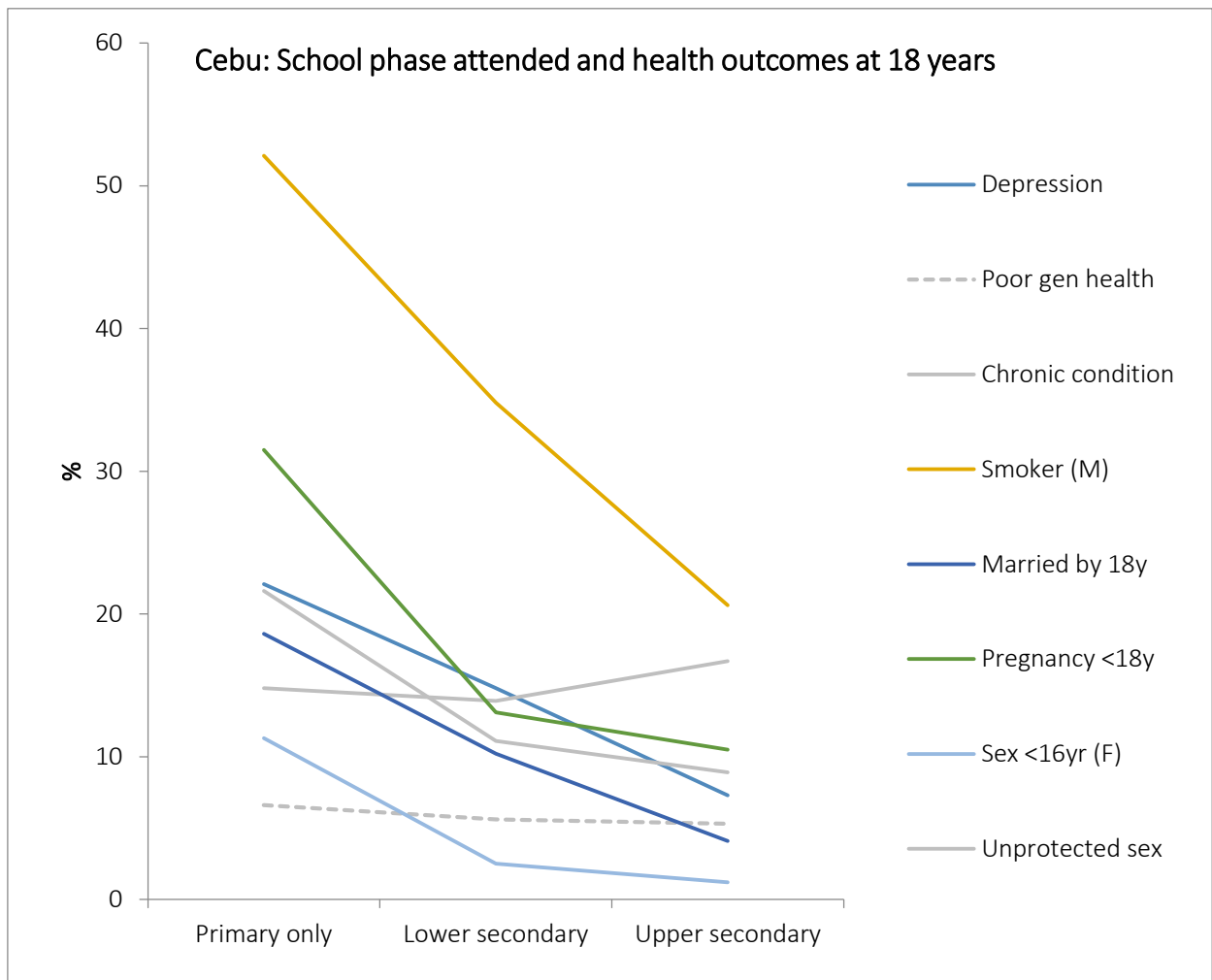


Figure 6. A conceptual framework for defining health needs and actions in adolescents and young adults

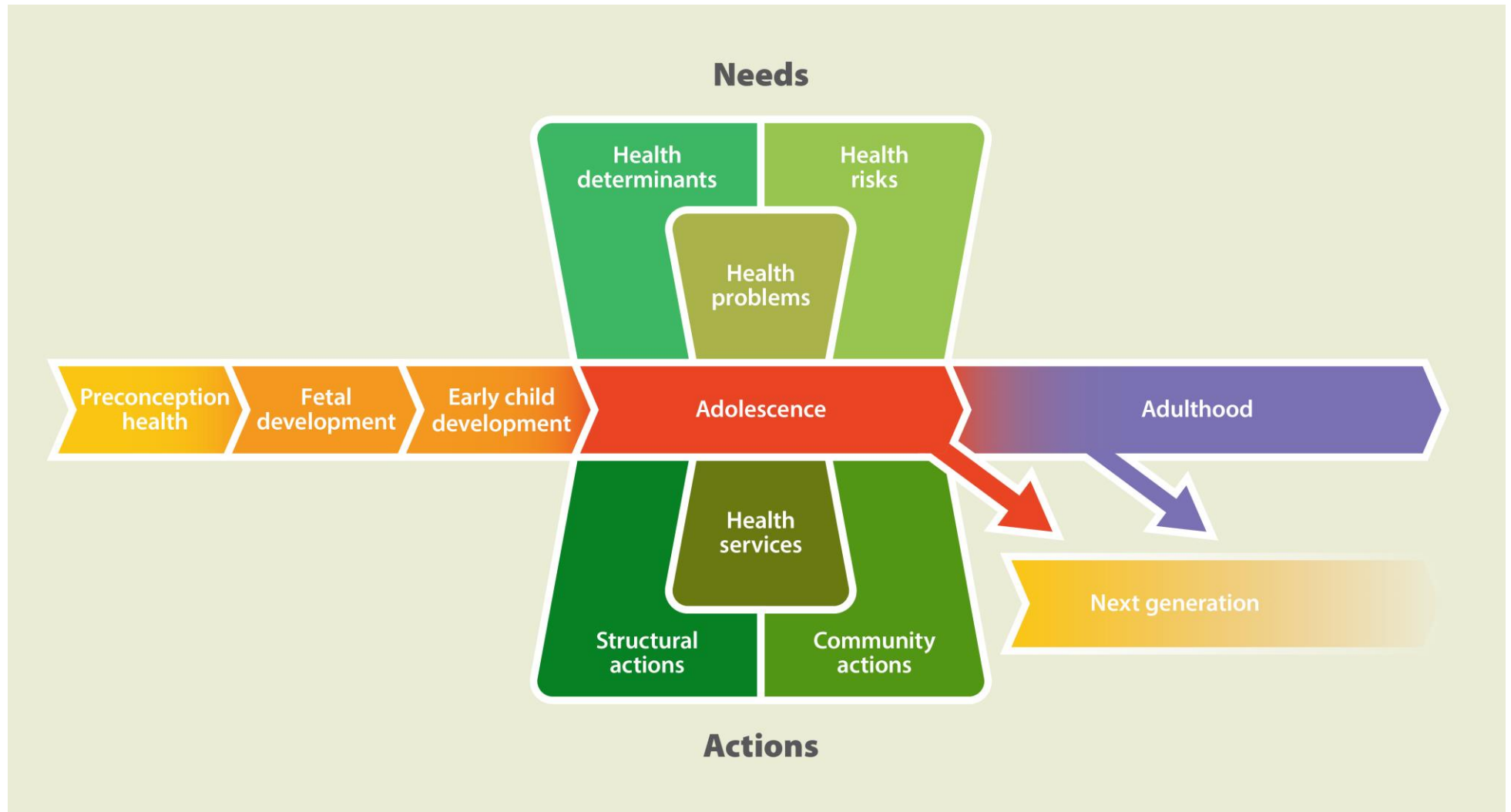


Figure 7. Categorisation of countries into 3 groups according to adolescent burden of disease and reflecting passage through the epidemiological transition

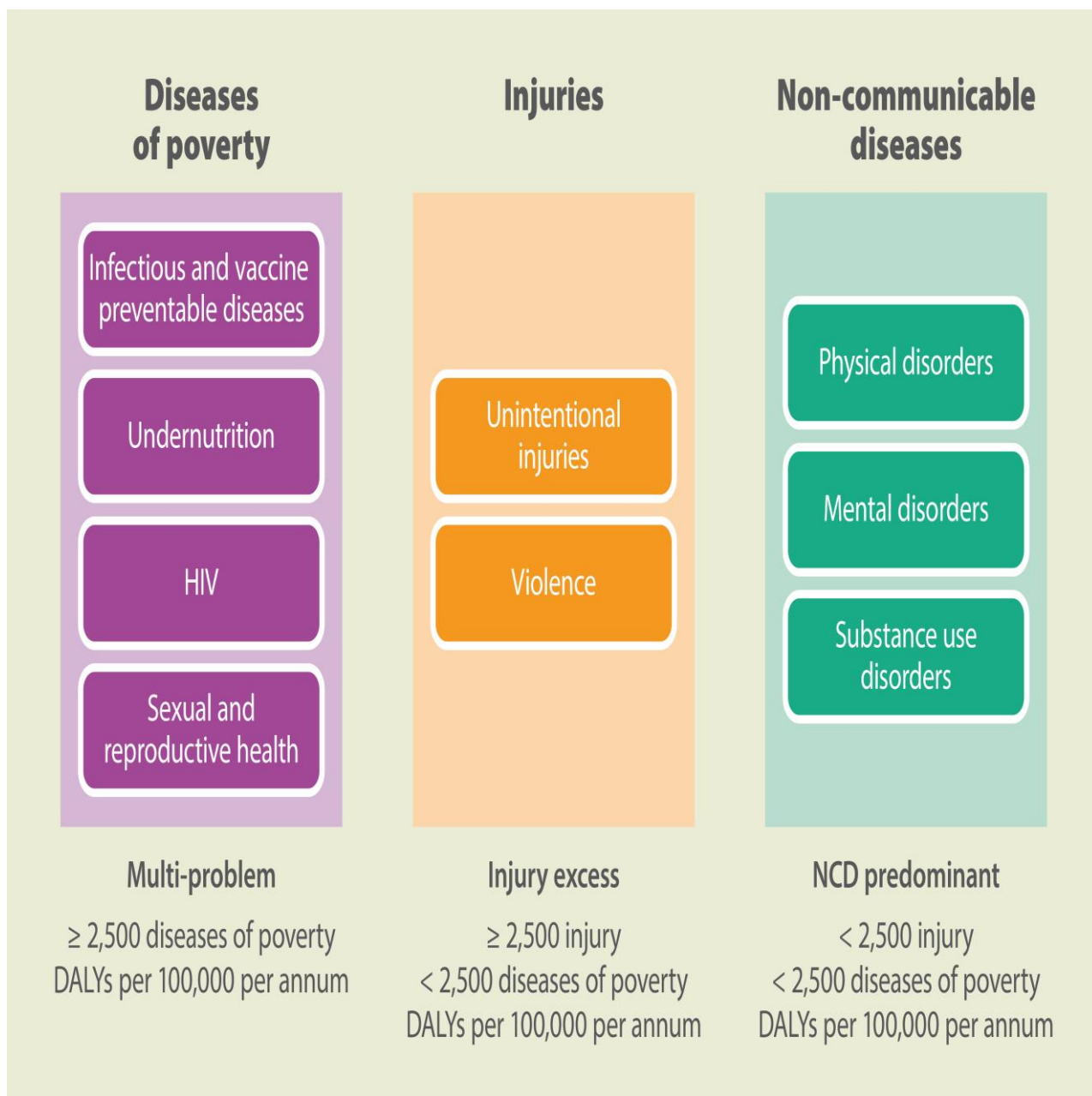
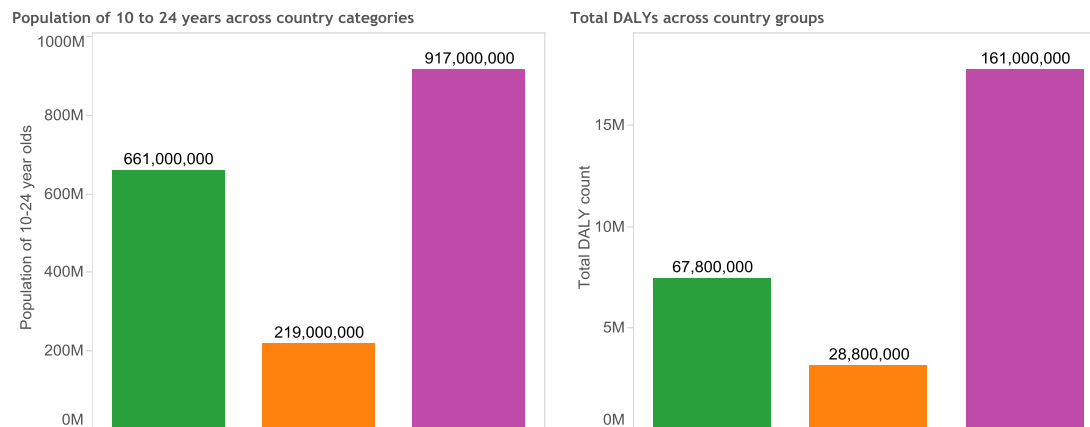
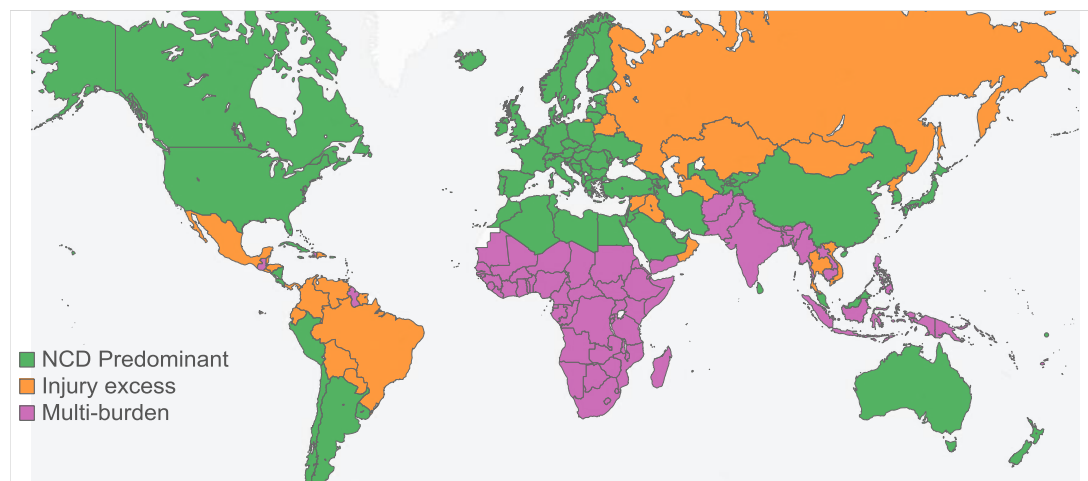
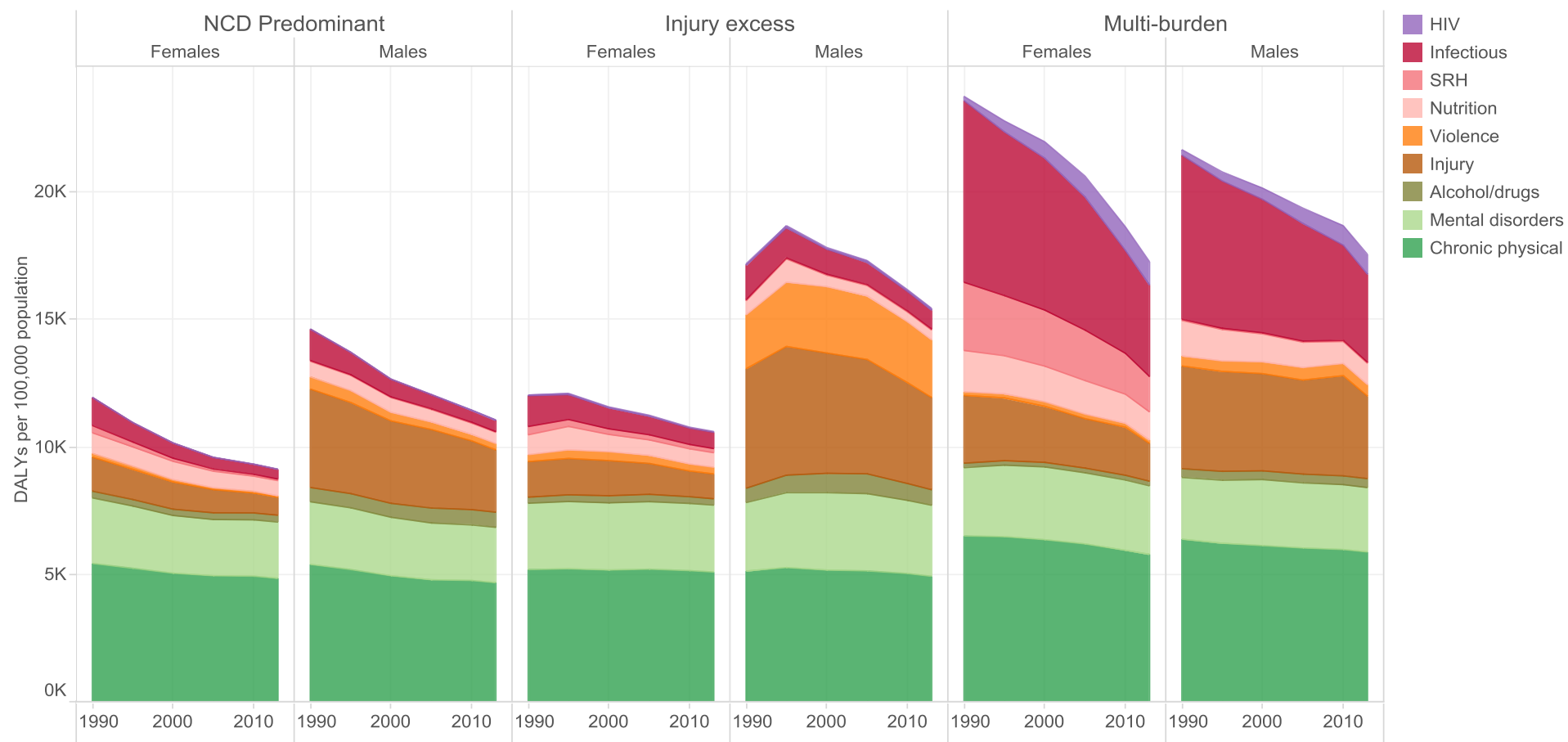


Figure 8. Categorisation of countries based on pattern of DALYs in 10 to 24 year olds.*



*data available from <http://ghdx.healthdata.org/global-burden-disease-study-2013-gbd-2013-data-downloads>

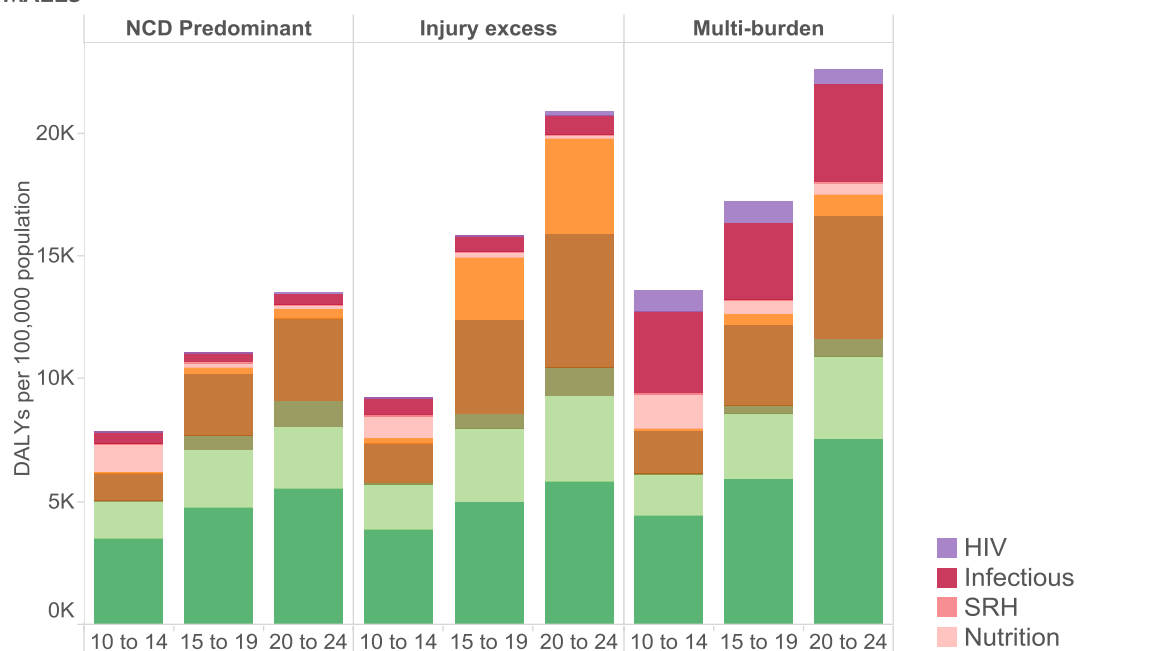
Figure 9. Changes in disease burden in 10 to 24-year-olds between 1990 and 2013 across the three country groups*



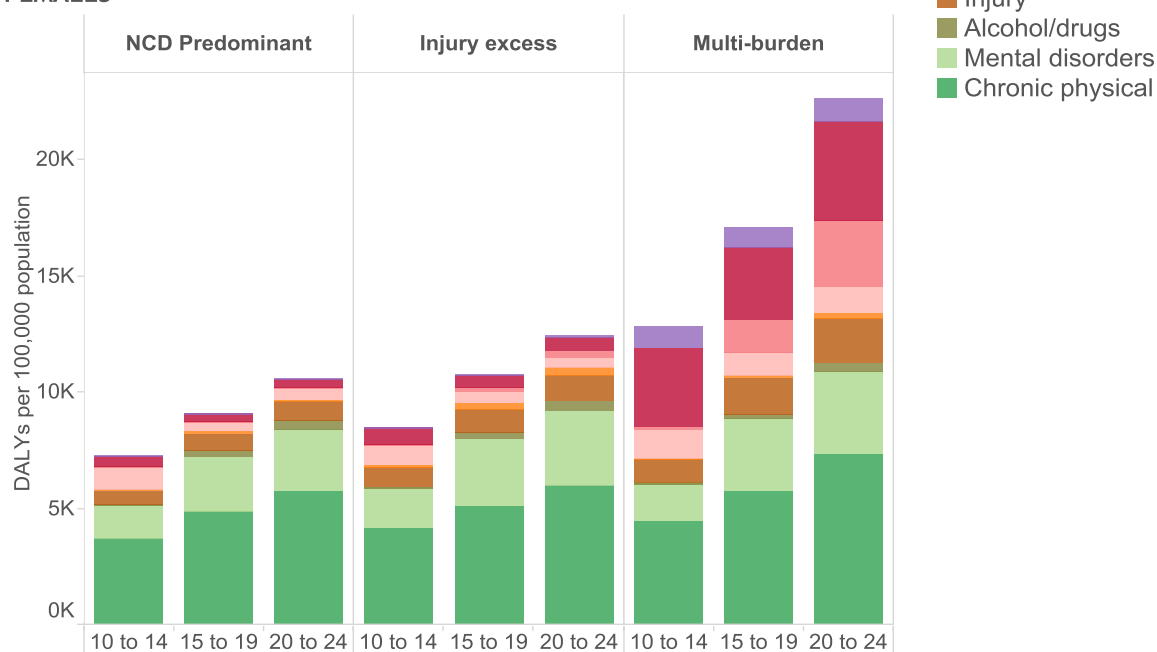
*data available from <http://ghdx.healthdata.org/global-burden-disease-study-2013-gbd-2013-data-downloads>

Figure 10. Patterns of disease burden by age and sex across 10 to 24 year olds*

MALES

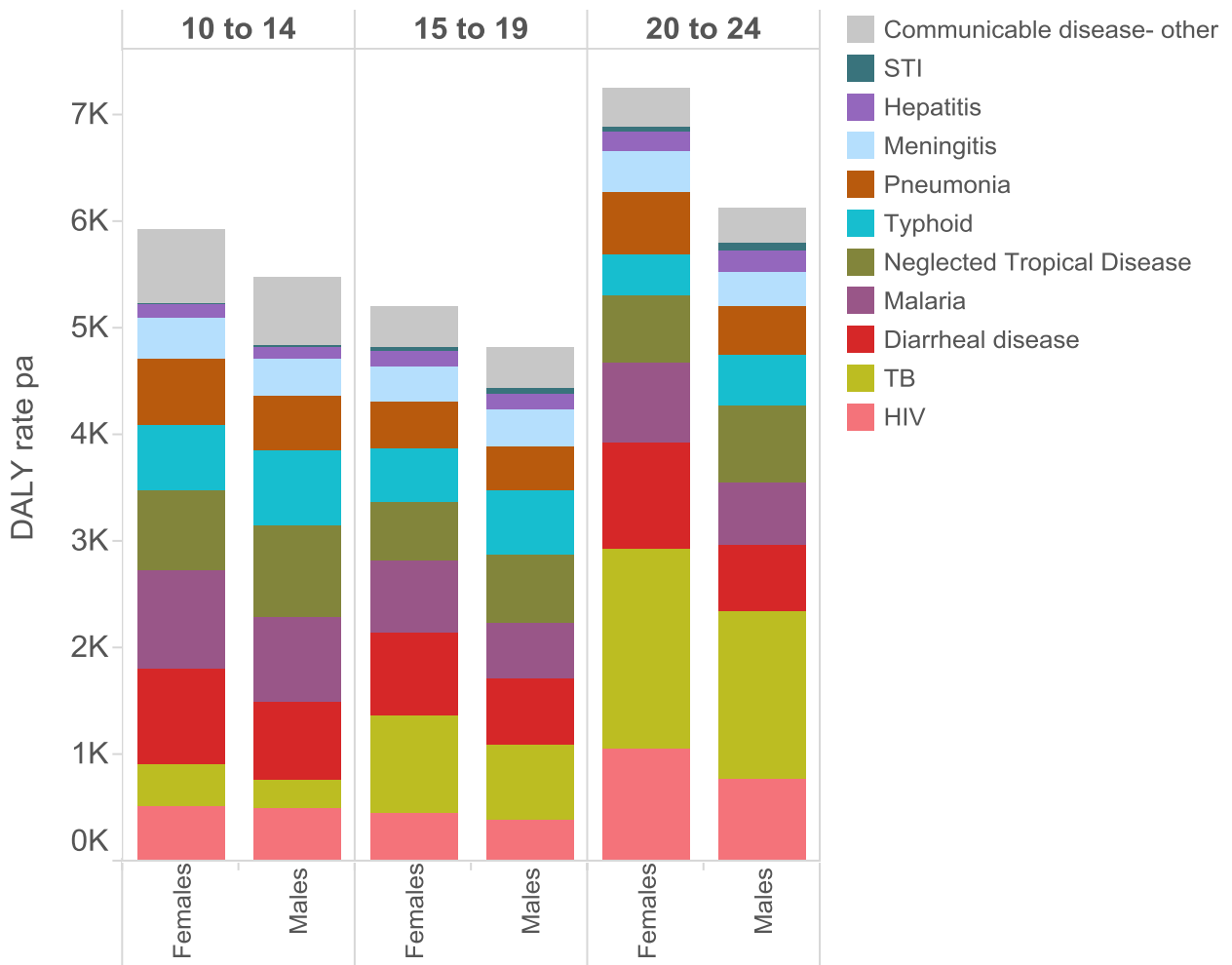


FEMALES



*data available from <http://ghdx.healthdata.org/global-burden-disease-study-2013-gbd-2013-data-downloads>

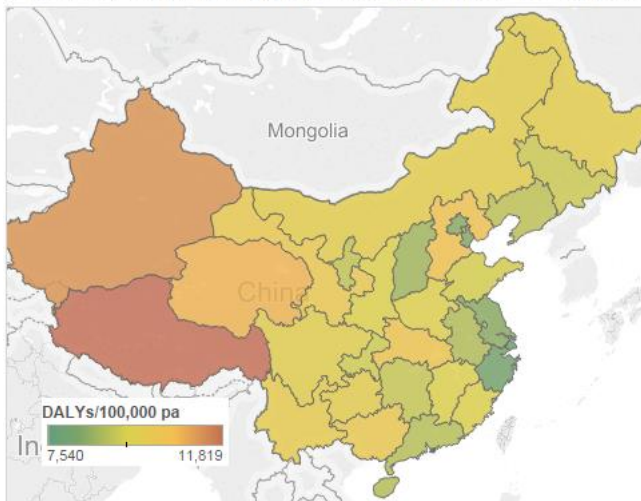
Figure 11. DALY rate per 100,000 from infectious diseases in multi-burden countries, by age group and gender*



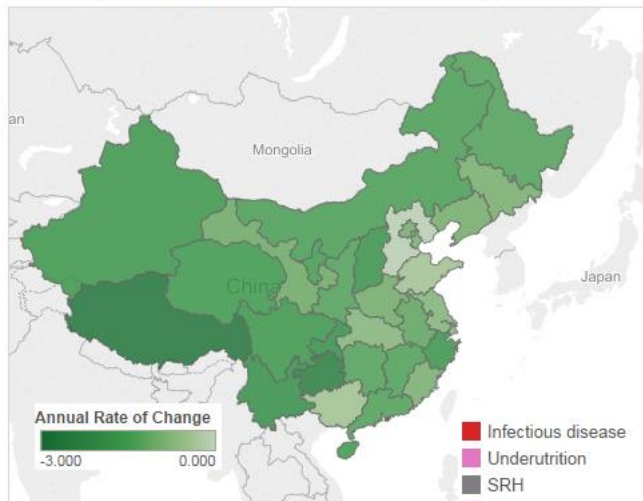
*data available from <http://ghdx.healthdata.org/global-burden-disease-study-2013-gbd-2013-data-downloads>

Figure 12. Profile of disease burden in 10 to 24 year olds across Chinese provinces

DALYs/100,000 pa across provinces for 10-24 year olds in 2013



Annual rate of change in total DALYs 2000 - 2013



Categorisation of provinces by major contributors to disease burden



Contributors to disease burden in 10-24 year olds across Chinese Provinces

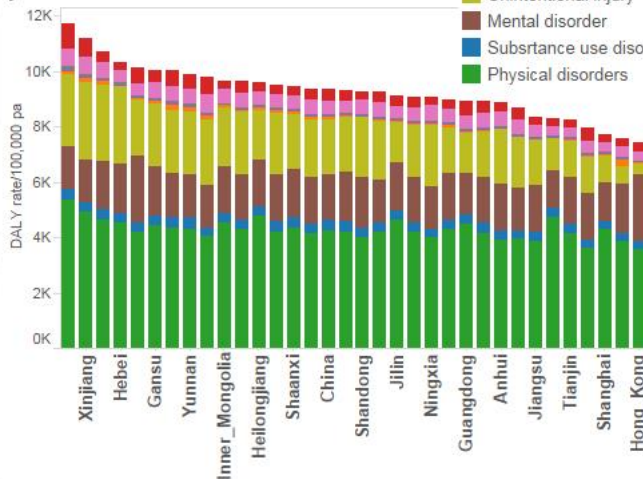
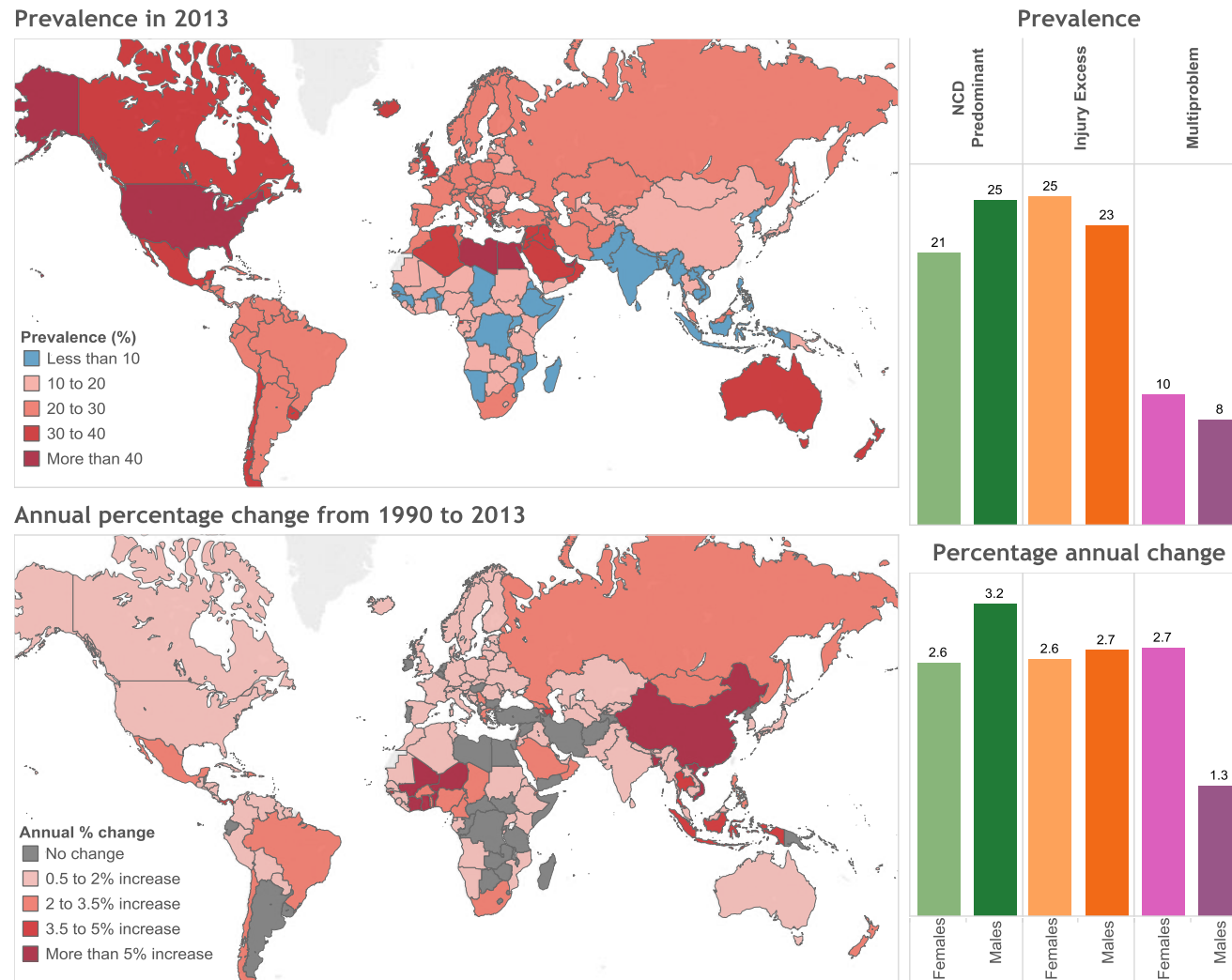
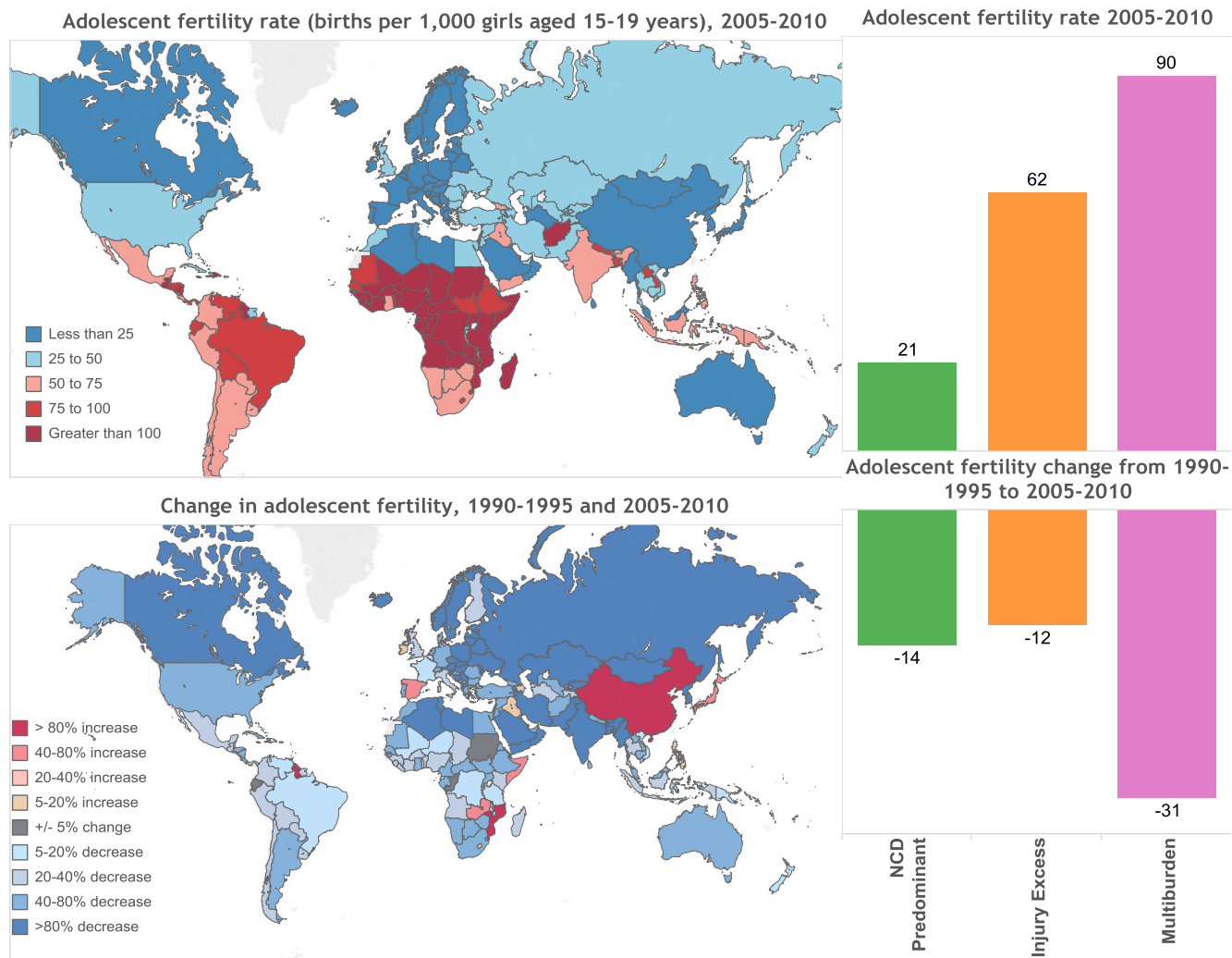


Figure 13. Overweight and obesity in 10 to 24-year-olds between 1990 and 2013*



*data available from <http://ghdx.healthdata.org/global-burden-disease-study-2013-gbd-2013-data-downloads>

Figure 14. Profile of adolescent fertility over the course of a decade across countries and country groups (UNDP)



*data available from <http://ghdx.healthdata.org/global-burden-disease-study-2013-gbd-2013-data-downloads>

Figure 15 appears separately

Figure 16. A conceptual framework of the essential elements in meaningful youth engagement

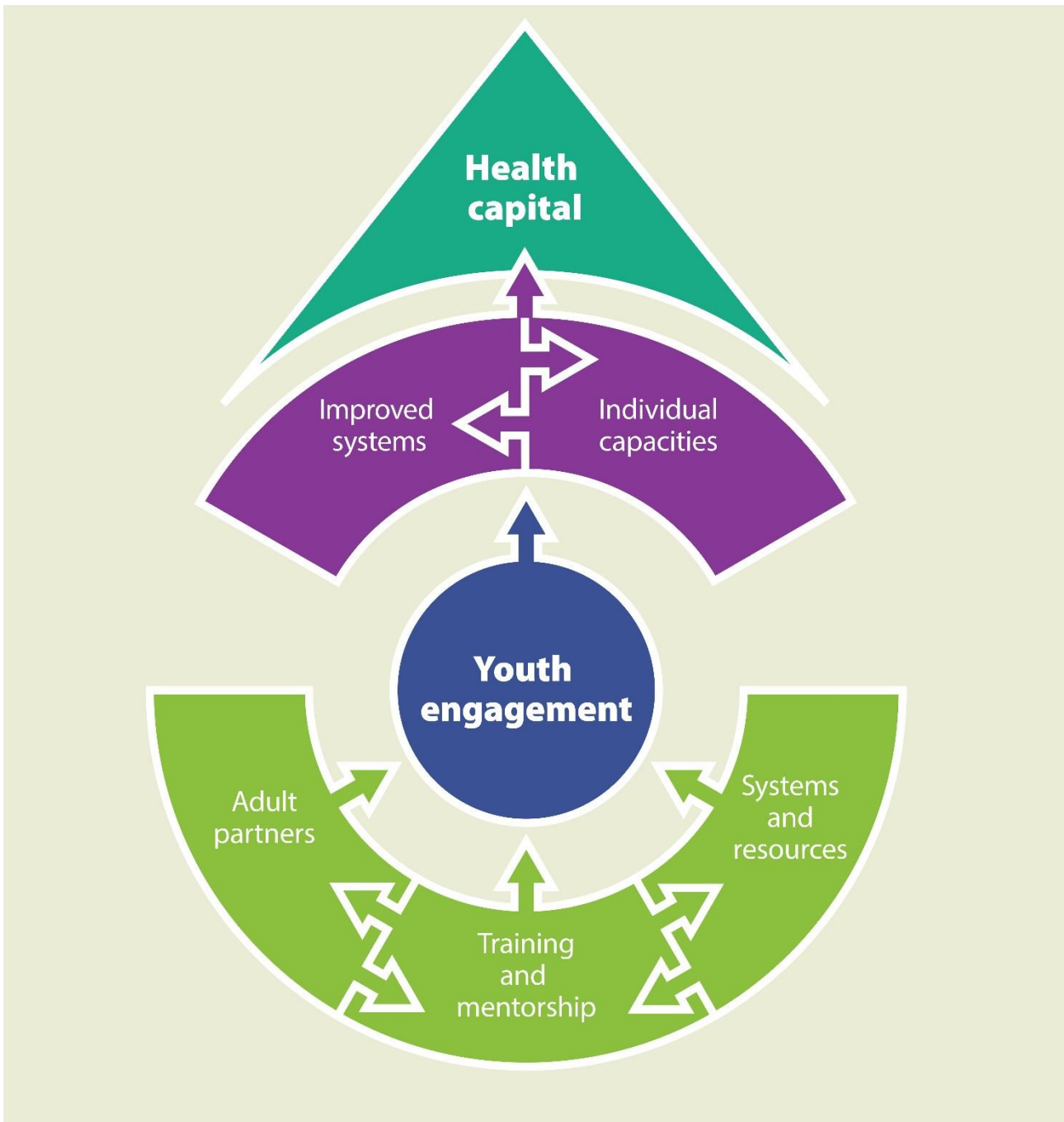


Figure 17. A four step accountability framework for adolescent health and wellbeing

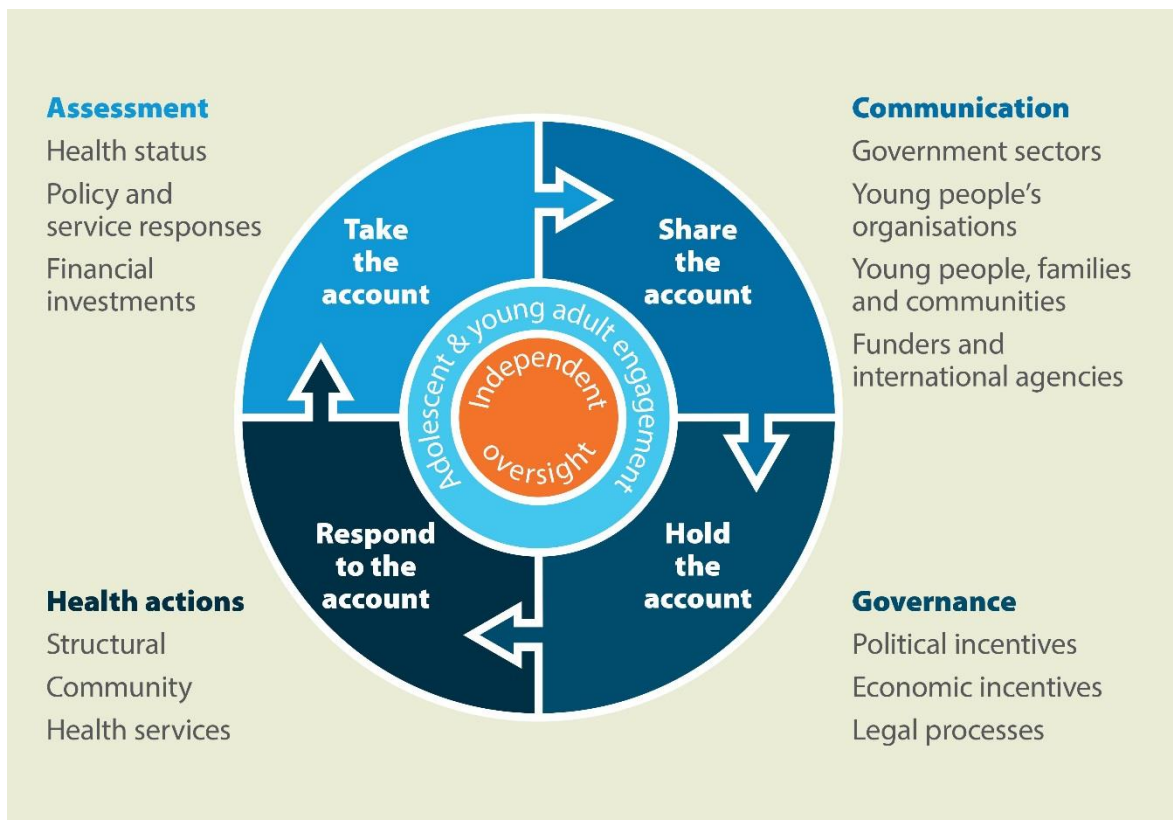


Table 1: Summary of school effects on adolescent health from a systematic review of reviews of observational studies

		Outcomes				
		<i>Sexual health</i>	<i>Violence</i>	<i>Tobacco</i>	<i>Alcohol</i>	<i>Drugs</i>
Exposures	<i>Value added education</i>	0	√	√√	√√	√√
	<i>Student connection to school/ teachers</i>	0	√	√	√	√
	<i>School rules / policies</i>	0	√	0	0	0
	<i>Physical environment</i>	0	√	0	√	√
	<i>Student norms</i>	0	√	√	√	0
	<i>Student socio- demographics</i>	0	√	0	0	0

√√ = rigorous evidence of benefits;
 √ = limited evidence of benefits;
 0 = no or inconsistent evidence;
 XX = rigorous evidence of ineffectiveness or harms;
 X = limited evidence of ineffectiveness or harms).

Table 2. Effects of media and marketing on adolescent health risks

		Tobacco use	Alcohol use	Obesity	Sexual risks
Distal Exposures	Point of sale advertising (POS)	XXX	XX	XXX (Food choice)	NA
	Imagery in films/movies	XXX	XXX	XX (Amount of food)	#
	Imagery in Television	XX	XX	XXX (Food choice/amount) XX Food purchase request	XX
	Music videos / MTV	0	XX	0	X
	Cartoon media characters	0	0	XX (Food choice & purchase request)	0
	Magazines	XX	XX	0	0
	Outdoor advertising	#	XX	0	0
	Imagery on Internet	X	#	0	X
	Online social networking sites	X	#	0	#
	Concessional stands at events	0	XX	0	0
	Radio advertising	0	X	0	0
	Composite (multiple media)	0	XX	0	0
	Advertising (media unspecified)	XX	0	XXX Food choice/amount)	
Intermediate exposures	Ownership of promotional items	XXX	XX	0	0
	Approval of advertising	XX	0	0	0
	Receptivity to marketing	XX	0	0	0
	Media use	0	#	XXX	0
	Favourite star smoking	XX	0	0	0
	Favourite Ad/ Brand recall	XX	0	0	0
	Attending a promotional event	X	0	0	0

XXX Strong evidence: consistency, temporality, dose-response in cohort studies or experimental study/meta-analysis

XX Moderate evidence level based on consistency and temporality from cohort studies

X Low evidence level based on cross-sectional surveys, # Limited/insufficient evidence

0 No studies

Table 3. Comparison by age (years) of adolescent legal frameworks across six countries, highlighting exceptions due to customary or religious law†. Range reflects variation within a country, such as by State.

	India	Lebanon	Nigeria	Peru	Sweden	United States
Age of majority¹	15–18	18	21	18	18	18–21
Customary/religious law exception Other exceptions	Yes Marriage	Yes Marriage	Yes Marriage	None	None Marriage	None State variance
Minimum working age	None	13	None	14	13–18	14
Customary/religious law exception Other exceptions	None Work nature	None	None	None	None Work nature	None
Minimum drinking age	18 or Illegal	16 or Illegal	18 or Illegal	18	None – 20	21
Customary/religious law exception Other exceptions	Yes State variance	Yes	Yes	None	None Alcohol strength	None
Minimum smoking age	18	None	None	18	18	None–20
Customary/religious law exception Other exceptions	None	None	None	None	None	None State variance
Age of criminal responsibility²	7	7	None	12–18	15	6–14
Customary/religious law exception Other exceptions	None	None	Yes	None	None	None State variance
Minimum age of marriage	Puberty–21	9–18	9–18	16	18	16–21
Customary/religious law exception Other exceptions	Yes Gender	Yes Gender	Yes Gender	None	None Special Reason	None State variance
Heterosexual age of sexual consent	None–18	None–15	Puberty–18	14	15	16–18
Customary/religious law exception Other exceptions	Yes Marriage, gender	Yes Maturity	Yes State variance	None	None	None State Variance, Gender
Same-sex age of sexual consent	No information	No information	No information	14	15	16-18
Customary/religious law exception Other exceptions	None Legally restricted	None Legally restricted	None Legally restricted	None	None	None State Variance
Age of consent to medical treatment	12 or 18	18	16	18	18	12–18
Customary/religious law exception Other exceptions	None	None	None	None	None Maturity	None State Variance
Age to access contraceptives³	None	18	Unknown	None	None	Varies

Customary/religious law exception Other exception	Yes Provider discretion	Yes Marriage	Yes	None	None	None State Variance
Age to access abortion⁴	18	Illegal	Illegal	Illegal	None	18
Customary/religious law exception Other exception	Yes Marriage	Yes Mother's life	Yes Mother's life	None Mother's health*	None	None State Variance
Age of consent to HIV test⁵	None	Unknown	18	18	None	12
Customary/ religious law exception Other exception	None	None	None	None	None	None State Variance

† Shading represents context where there is a conflict between statutory law and customary/religious law.

* Avoid grave and permanent harm to the woman

¹ **Age of majority:** The age at which a person, formerly a minor or infant, is recognized by law to be an adult.

² **Age of criminal responsibility:** The age at which an individual can be seen as capable of committing a criminal offence and stand trial and be convicted.

³ **Age to access contraceptives:** The age at which adolescents or minors can access contraceptives without parental consent.

⁴ **Age to access abortion:** The age at which adolescents or minors can consent to an abortion without parental consent.

⁵ **Age of consent to an HIV test:** The age at which adolescents or minors can consent to an HIV test without parental consent.

Table 4. Evidence of effectiveness and cost-effectiveness of sexual and reproductive health interventions, including those for HIV

Intervention description	Key findings	Limitations/ comments	Cost-effectiveness	Recommendation
School-based interventions				
<p>Comprehensive sex education: A curriculum-based approach that aims to provide young people with the knowledge, attitudes, skills and efficacy to make informed decisions about their sexuality and sexual and reproductive health. Some incorporate contraceptive services or encourage young people to use contraception.</p>	<p>Knowledge and attitudes: High quality evidence of moderate benefit from studies in HICs and LMICs. Both adult-led and peer-led interventions have shown benefit. Safe-sex behaviours: Moderate quality evidence of mixed impact on service use. Significant but minimal beneficial impact on safe-sex behaviours, including condom use, number of sexual partners, initiation of first sex and risky sexual behaviour. STI or HIV prevalence and incidence: No evidence of benefit. High-quality evidence of some benefit with added contraception provision. Pregnancy: High quality evidence of benefit of combining education and contraceptive promotion. Moderate quality evidence of the effectiveness of multi-component interventions, particularly with intensive case management by a culturally matched social worker.</p>	<ul style="list-style-type: none"> • Few studies of interventions involving provision of contraceptives in LMICs. • Few assess impact on biological outcomes. • Most studies of effects on pregnancy have been in HICs • No evidence of heightening premature sexual activity. 	Some evidence of cost-effectiveness in USA and Europe.	Ensure that all adolescents and young adults' rights to essential health information are met, including comprehensive sexuality education.
Abstinence-only education	High quality evidence that abstinence-only education is ineffective in preventing HIV, incidence of STIs and adolescent pregnancy.		NA	Abstinence-only education is not recommended.
<p>School-based health services: These range from fully equipped, with permanent medical, nursing & other health staff to nurse clinics a few hours per week.</p>	<p>Safe-sex behaviours: Moderate quality evidence of mixed impact on contraceptive behaviours, (more effective if on-site provision of contraceptives). Pregnancy: Some moderate quality evidence of benefit if contraception provision is on site.</p>	<ul style="list-style-type: none"> • Most studies in HICs. • In LMICs linkages with health services, may increase uptake of some SRH services. 	NA	Provision of essential resources for health in schools and easy access to adolescent health services including condoms and modern contraception.
Community-based interventions				
<p>Generating community support: for interventions in schools and health services through social marketing, public hearings, meetings, dialogues and fairs.</p>	<p>STI or HIV prevalence and incidence: South African Stepping Stones program showed reductions in HSV-2 incidence. Pregnancy: Some moderate quality evidence of benefit, particularly studies including access to SRH services. Early marriage: Some moderate quality evidence for the effectiveness of integrated programs that focus on empowerment and incentives.</p>	In LMICs, it is likely to play a key role in the effectiveness of interventions in other settings.	NA	It plays a key role in the success of interventions within other settings and should feature in multi-component interventions.
<p>Positive youth development (PYD) programs focus on school retention and academic success as well as social support and skill development e.g. family or parent engagement, life skills training or peer mentoring.</p>	<p>Knowledge and attitudes: Some moderate quality evidence for impact. Safe-sex behaviours: Some moderate quality evidence around use of contraception, delayed sexual initiation and number of sexual partners. Pregnancy: Moderate quality evidence of no benefit. Early marriage: Moderate quality evidence of mixed impact.</p>	PYD programs may also incorporate adolescent participation and leadership and are likely to have broad educational and social benefits.	NA	Promising intervention. Further research is needed.
<p>Youth-friendly venues in which young people access information and services that address SRH needs.</p>	Moderate quality evidence of mixed impact on uptake of services. Ineffective in changing safe sex behaviours, HIV or STI prevalence or incidence and adolescent pregnancy.	Main users are often older than the target age group.	High costs so cost-effectiveness likely to be low.	Not recommended in current form.

Interventions to shift social norms around early marriage & pregnancy.	Early marriage: Moderate quality evidence of mixed impact.		Some evidence of cost-effectiveness in the Middle East.	Should feature in multi-component interventions.
Cash transfers (in LMICS) may be unconditional, with payments going to individuals who are not required to do anything to receive these, or conditional, with payments tied to risks states (e.g. remaining STI or HIV-free), staying in school or not becoming pregnant.	Safe sex behaviours: Some moderate quality evidence for the impact of both unconditional and conditional cash transfers. STI and HIV prevalence and incidence: Mixed results of conditional cash transfers for remaining STI or HIV-free. A program providing cash transfers for young women (the Zomba program) to remain in school showed a reduction in HIV prevalence at 18-month follow-up. Pregnancy: Moderate quality evidence of some benefit. Early marriage: Moderate quality evidence for interventions that support school attendance e.g. provision of school uniforms & supplies.	<ul style="list-style-type: none"> • More research needed around payment amounts and frequency. • The Zomba CCT program decreased teenage pregnancy rates among girls who had previously dropped out of school, but not among schoolgirls. 	Some evidence of cost effectiveness in Sub-Saharan Africa.	Promising intervention. Further research is needed.
Peer education: Education delivered by young people to their peers.	Safe sex behaviours: Some moderate quality evidence for impact in LMICS of programs that include provision of contraception. Health service use: Moderate quality evidence of mixed impact in LMICS Moderate quality evidence that peer education in Europe was ineffective in changing knowledge and attitudes, STI or HIV prevalence and incidence or adolescent pregnancy.		NA	Promising intervention in LMICS. Further research is needed.
Family-based interventions				
Interventions to improve parent/child communication about sexual health and sexuality.	Some moderate quality evidence of impact on parent-child communication and safe-sex behaviours.		NA	Should feature in multi-component interventions
Online interventions				
Group and individually tailored Internet and computer based theory and behavioural skills based interventions	Knowledge and attitudes: High quality evidence of moderate benefit. Safe-sex behaviours: High quality evidence of significant but minimal benefits. STI or HIV prevalence or incidence: High quality evidence of significant but minimal benefits.	All studies conducted in HICs.	NA	Promising intervention. Further research is needed, particularly in LMICS.
Promoting universal health coverage				
Health service interventions involve the provision of information and counselling, contraception, prenatal and postnatal care and delivery, abortion services and post-abortion care, treatment and prevention of STIs, HIV testing and counselling, and care for sexual and gender-based violence.	Safe-sex behaviours: Moderate quality evidence of mixed impact on contraceptive behaviours. Some moderate quality evidence that making services more adolescent friendly increases service use. STI or HIV prevalence or incidence: Moderate quality evidence of ineffectiveness.	Quality of provider training likely to be an important factor in the success of interventions.	NA	Health services should provide all essential health care responses, including modern contraception and when necessary safe abortion regardless of age, marital and socioeconomic status. Providers should have the skills to provide confidential and non-judgemental care.

Overall Recommendations	
	Not recommended
	Implement as part of multi-component interventions
	Moderate recommendation/further research needed
	Highly recommended

Table 5. Recommended action bundles for adolescent and young adult health problems and risks*

	Structural	Social Marketing	Community interventions including family	e-health m-health	Schools	Health service sector
Sexual and reproductive health, including HIV	Legislation <i>18 years as the minimum age of marriage</i> <i>Allow provision of contraception to legal minors</i> <i>Legalising abortion</i>	<i>Promote community support for SRH & HIV health access for adolescents</i>	Cash transfer programs, with payments tied to staying in school <i>Positive youth development</i> <i>Peer education</i>	<i>Targeting knowledge, attitudes & risk behaviours</i>	Quality secondary education Comprehensive sexuality education Safe schools with clean toilets and facilities for menstrual care School-based health services with condoms and modern contraceptives	Condoms and affordable modern contraception including LARC. Early HIV and STI diagnosis and treatment Male circumcision Antenatal, delivery and postnatal care <i>Transition to adult care for HIV</i>
Under-nutrition	Fortification of foods e.g. iron and folate		Micronutrient supplements (particularly in pregnancy) Protein-energy supplementation Deworming <i>Cash transfer programs</i> <i>Nutrition education</i>		Micronutrient supplements Healthy school meals	Screening & micronutrient supplementation
Infectious diseases			<i>Deworming</i> <i>Bed net distribution</i>		HPV vaccination <i>Deworming</i>	Early identification & treatment Adolescent vaccinations (HPV, childhood catch up) <i>Deworming</i> <i>Bed net distribution</i> <i>Seasonal malaria chemoprevention</i>
Violence	Gun control <i>Legalising homosexuality & protecting women from violence & sexual coercion</i> <i>Youth justice reforms to promote 'second chances' & diversion from custody</i> <i>16 as the minimum age for criminal responsibility.</i>	<i>Promote knowledge of the effects of violence and available services</i>	<i>Promote parent skills and parent-child communication</i> <i>Positive youth development</i> <i>Promote gender equality</i> <i>Economic empowerment</i> <i>Group training for awareness, knowledge, and/or skills</i>		Multi-component interventions that target violent behaviour and substance use	Trauma Care

Unintentional injury	Graduated licensing Mandatory helmet wearing Multicomponent traffic injury control	<i>Promoting knowledge of risks</i>	<i>Police enforcement of traffic injury control</i>			Trauma care, including first responders (eg ambulances)
Alcohol and illicit drugs	Limit alcohol sales to underage adolescents Taxation on alcohol Drink-driving legislation Restrict illicit alcohol Interventions in licensed premises Diversion from youth justice and custody <i>Graduated drinking</i>	Advertising restrictions <i>Campaigns to build community awareness</i>	<i>Promoting parent-child communication and parenting skills</i> <i>Needle-syringe exchange access</i> <i>Mentoring</i>	<i>Target knowledge, attitudes & risk behaviours</i>	<i>Alcohol free policies</i>	<i>Risk screening and motivational interviewing</i>
Tobacco	Tobacco-control including taxation/pricing/ advertising control Youth access restrictions Legislation for smoke-free air	Anti-tobacco campaigns	<i>Interventions to promote parent skills and parent-child communication</i>	<i>Text messaging adjunct to quitting</i>	<i>Smoke free policies</i> <i>Multicomponent</i>	<i>Routine screening and motivation interviewing to promote cessation</i>
Mental disorders & Suicide	Restriction of access to means	<i>Promoting adolescent mental health literacy</i>	<i>Gatekeeper training</i>	<i>e-mental health interventions</i>	<i>Educational interventions</i> <i>Gatekeeper training</i> <i>School-based mental health services</i>	Practitioner training in depression recognition and treatment <i>Routine assessment of mental health, including self-harm and suicide risk</i>
Chronic physical disorders			<i>Peer support initiatives</i>		<i>School based health services</i>	<i>Promote self-management</i> <i>Promote transition to adult health care</i>
Overweight and obesity	Taxation of high sugar, salt & fat foods <i>Front-of-pack nutrition labels</i> <i>Restriction of fast food advertising</i>	<i>Promoting physical activity</i>	<i>Creating opportunities for maintaining physical activity in daily life</i>	<i>Interactive/ personalized feedback interventions</i>	<i>Multicomponent interventions, involving education about healthy diet and increasing opportunities for physical education</i>	Manage comorbidities of obesity

* Bold are actions where there is an evidence base and italics represent action that are promising but without yet a strong evidence base in adolescents and young adults.

References

1. Blakemore SJ, Mills KL. Is adolescence a sensitive period for sociocultural processing? *Annu Rev Psychol* 2014; **65**: 187-207.
2. Secretary-General EOotUN. The Global Strategy for Women's, Children's and Adolescents Health (2016-2030): Survive Thrive Transform. 2015, 2015.
3. UN. Transforming our world: the 2030 agenda for sustainable development. New York: United Nations, 2015.
4. Resnick MD, Catalano RF, Sawyer SM, Viner R, Patton GC. Seizing the opportunities of adolescent health. *The Lancet* 2012; **379**(9826): 1564-7.
5. Feldman SS, Elliot GR. At the threshold: the developing adolescent. Cambridge MA: Harvard University Press; 1990.
6. Sen A. Commodities and capabilities. *OUP Catalogue* 1999.
7. Nussbaum MC. Creating capabilities: Harvard University Press; 2011.
8. Graham P. The End of Adolescence. New York: Oxford University Press; 2004.
9. Dick B, Ferguson BJ. Health for the world's adolescents: a second chance in the second decade. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine* 2015; **56**(1): 3-6.
10. Viner R, Coffey C, Mather C, et al. 50-year mortality trends in children and young people: a study of 50 low-income, middle-income, and high-income countries. *Lancet* 2011; **377**: 1162-74.
11. World Bank. World Development Report 2007: Development and the Next Generation. Washington, DC: The World Bank, 2007.
12. Dishion TJ, Nelson SE, Bullock BM. Premature adolescent autonomy: Parent disengagement and deviant peer process in the amplification of problem behaviour. *J Adolesc* 2004; **27**(5): 515-30.
13. Sawyer SM, Afifi RA, Bearinger LH, et al. Adolescence: a foundation for future health. *Lancet* 2012; **379**(9826): 1630-40.
14. Grossman M. On the concept of health capital and the demand for health. *The journal of political economy* 1972: 223-55.
15. Rockwood K, Song X, Mitnitski A. Changes in relative fitness and frailty across the adult lifespan: evidence from the Canadian National Population Health Survey. *Can Med Assoc J* 2011; **183**(8): E487-E94.
16. Ruiz JR, Castro-Piñero J, Artero EG, et al. Predictive validity of health-related fitness in youth: a systematic review. *Br J Sports Med* 2009.
17. Baxter-Jones AD, Faulkner RA, Forwood MR, Mirwald RL, Bailey DA. Bone mineral accrual from 8 to 30 years of age: an estimation of peak bone mass. *J Bone Miner Res* 2011; **26**(8): 1729-39.
18. Whiting SJ, Vatanparast H, Baxter-Jones A, Faulkner RA, Mirwald R, Bailey DA. Factors that affect bone mineral accrual in the adolescent growth spurt. *The Journal of nutrition* 2004; **134**(3): 696S-700S.
19. Julián-Almárcegui C, Gómez-Cabello A, Huybrechts I, et al. Combined effects of interaction between physical activity and nutrition on bone health in children and adolescents: a systematic review. *Nutr Rev* 2015; **73**(3): 127-39.
20. Prentice AM, Ward KA, Goldberg GR, et al. Critical windows for nutritional interventions against stunting. *The American journal of clinical nutrition* 2013; **97**(5): 911-8.
21. Li S-C, Lindenberger U, Hommel B, Aschersleben G, Prinz W, Baltes PB. Transformations in the couplings among intellectual abilities and constituent cognitive processes across the life span. *Psychol Sci* 2004; **15**(3): 155-63.
22. Richards M, Deary IJ. A life course approach to cognitive reserve: a model for cognitive aging and development? *Ann Neurol* 2005; **58**(4): 617-22.
23. Gottfredson LS, Deary IJ. Intelligence predicts health and longevity, but why? *Curr Dir Psychol Sci* 2004; **13**(1): 1-4.
24. Chambers RA, Taylor JR, Potenza MN. Developmental neurocircuitry of motivation in adolescence: a critical period of addiction vulnerability. *Am J Psychiatry* 2014.
25. Martins A, Ramalho N, Morin E. A comprehensive meta-analysis of the relationship between emotional intelligence and health. *Pers Individ Dif* 2010; **49**(6): 554-64.
26. Engström L-M. Who is physically active? Cultural capital and sports participation from adolescence to middle age—a 38-year follow-up study. *Physical Education and Sport Pedagogy* 2008; **13**(4): 319-43.

27. Macleod CI, Tracey T. A decade later: follow-up review of South African research on the consequences of and contributory factors in teen-aged pregnancy. *South African Journal of Psychology* 2010; **40**(1): 18-31.
28. Rosema S, Crowe L, Anderson V. Social function in children and adolescents after traumatic brain injury: A systematic review 1989–2011. *J Neurotrauma* 2012; **29**(7): 1277-91.
29. Saydah S, Bullard KM, Imperatore G, Geiss L, Gregg EW. Cardiometabolic risk factors among US adolescents and young adults and risk of early mortality. *Pediatrics* 2013: peds. 2012-583.
30. Patton GC, Coffey C, Romaniuk H, et al. The prognosis of common mental disorders in adolescents: a 14-year prospective cohort study. *The Lancet* 2014.
31. Behrendt S, Wittchen H-U, Höfler M, Lieb R, Beesdo K. Transitions from first substance use to substance use disorders in adolescence: Is early onset associated with a rapid escalation? *Drug Alcohol Depend* 2009; **99**(1): 68-78.
32. Meier MH, Caspi A, Ambler A, et al. Persistent cannabis users show neuropsychological decline from childhood to midlife. *Proceedings of the National Academy of Sciences* 2012; **109**(40): E2657-E64.
33. Mason E, McDougall L, Lawn JE, et al. From evidence to action to deliver a healthy start for the next generation. *The Lancet* 2014; **384**(9941): 455-67.
34. Draper CE, Micklesfield LK, Kahn K, et al. Application of Intervention Mapping to develop a community-based health promotion pre-pregnancy intervention for adolescent girls in rural South Africa: Project Ntshembo (Hope). *BMC Public Health* 2014; **14**(Suppl 2): S5.
35. Patton GC, Romaniuk H, Spry E, et al. Prediction of perinatal depression from adolescence and before conception (VIHCS): 20-year prospective cohort study. *The Lancet* 2015.
36. Smith GD. Epigenesis for epidemiologists: does evo-devo have implications for population health research and practice? *Int J Epidemiol* 2012; **41**(1): 236-47.
37. Hanson M, Gluckman P. Developmental origins of health and disease—Global public health implications. *Best Practice & Research Clinical Obstetrics & Gynaecology* 2015; **29**(1): 24-31.
38. Murray CJ, Barber RM, Foreman KJ, et al. Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition. *Lancet* 2015.
39. Sawyer SM, Afifi RA, Bearinger LH, et al. Adolescent Health 1 Adolescence: a foundation for future health. *Lancet* 2012; **379**(9826): 1630-40.
40. Andersen SL, Teicher MH. Stress, sensitive periods and maturational events in adolescent depression. *Trends Neurosci* 2008; **31**(4): 183-91.
41. Goddings A. The impact of puberty on adolescent brain development: UCL (University College London); 2015.
42. Viner RM, Ozer EM, Denny S, et al. Adolescence and the social determinants of health. *Lancet* 2012; **379**(9826): 1641-52.
43. Schlegel A, Barry H. Adolescence: An anthropological enquiry. New York: Free Press 1991.
44. Crone EA, Dahl RE. Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nat Rev Neurosci* 2012; **13**(9): 636-50.
45. Somerville LH. The teenage brain sensitivity to social evaluation. *Curr Dir Psychol Sci* 2013; **22**(2): 121-7.
46. Pfeifer JH, Masten CL, Moore WE, et al. Entering adolescence: resistance to peer influence, risky behavior, and neural changes in emotion reactivity. *Neuron* 2011; **69**(5): 1029-36.
47. Brown B. Adolescents' relationships with peers. In: Lerner R, Steinberg L, eds. *Handbook of Adolescent Psychology*. New York: Wiley; 2004.
48. Steinberg L, Monahan KC. Age differences in resistance to peer influence. *Dev Psychol* 2007; **43**(6): 1531-43.
49. Brown JD, Halpern CT, L'Engle KL. Mass media as a sexual super peer for early maturing girls. *J Adolesc Health* 2006; **36** 420-7.
50. Lou C, Cheng Y, Gao E, Zuo X, Emerson MR, Zabin LS. Media's contribution to sexual knowledge, attitudes, and behaviors for adolescents and young adults in three Asian cities. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine* 2012; **50**(3 Suppl): S26-36.

51. Steinberg L. A Social Neuroscience Perspective on Adolescent Risk-Taking. *Dev Rev* 2008; **28**(1): 78-106.
52. Madden M, Lenhart A, Duggan M, Cortesi S, Gasser U. *Teens and Technology 2013* (Washington, DC: Pew Research Center, 2013). 2014.
53. Morin-Major JK, Marin M-F, Durand N, Wan N, Juster R-P, Lupien SJ. Facebook behaviors associated with diurnal cortisol in adolescents: Is befriending stressful? *Psychoneuroendocrinology* 2016; **63**: 238-46.
54. Starcevic V, Aboujaoude E. Cyberchondria, cyberbullying, cybersuicide, cybersex: "new" psychopathologies for the 21st century? *World Psychiatry* 2015; **14**(1): 97-100.
55. Saltman EM, Smith M. *Till Martyrdom do us part. Institute for Strategic Dialogue* 2015.
56. Joshi PD, Fast NJ. Power and reduced temporal discounting. *Psychol Sci* 2013; **24**(4): 432-8.
57. Binder M, Lades LK. Autonomy-Enhancing Paternalism. *Kyklos* 2015; **68**(1): 3-27.
58. UNFPA. State of the World's Population. The Power of 1.8 billion - adolescents, youth, and the transformation of the future. <http://www.unfpa.org/swop>, 2014.
59. Bloom DE. Youth in the Balance. *Finance & Development* 2012; **49**: 7-11.
60. Song Y, Ma J, Agardh A, Lau PW, Hu P, Zhang B. Secular trends in age at menarche among Chinese girls from 24 ethnic minorities, 1985 to 2010. *Global health action* 2015; **8**.
61. National Research Council and Institute of Medicine. Growing up global: The changing transitions to adulthood in developing countries. In: Lloyd CB, ed. Panel on Transitions to Adulthood in Developing Countries. Washington, DC: The National Academies Press; 2005.
62. Eisenberg ME, Spry E, Patton GC. From Emerging to Established Longitudinal Patterns in the Timing of Transition Events Among Australian Emerging Adults. *Emerging Adulthood* 2015: 2167696815574639.
63. Bajos N, Bozon M, Beltzer N, et al. Changes in sexual behaviours: from secular trends to public health policies. *AIDS* 2010; **24**(8): 1185.
64. Ybarra ML, Mitchell KJ. "Sexing" and Its Relation to Sexual Activity and Sexual Risk Behavior in a National Survey of Adolescents. *J Adolesc Health* 2014; **55**(6): 757-64.
65. Staff J, Schulenberg JE, Maslowsky J, et al. Substance use changes and social role transitions: proximal developmental effects on ongoing trajectories from late adolescence through early adulthood. *DevPsychopathol* 2010; **22**(4): 917-32.
66. Santhya K. Early marriage and sexual and reproductive health vulnerabilities of young women: a synthesis of recent evidence from developing countries. *Curr Opin Obstet Gynecol* 2011; **23**(5): 334-9.
67. Meng Y, Holmes J, Hill-McManus D, Brennan A, Meier PS. Trend analysis and modelling of gender-specific age, period and birth cohort effects on alcohol abstention and consumption level for drinkers in Great Britain using the General Lifestyle Survey 1984–2009. *Addiction* 2014; **109**(2): 206-15.
68. Lamy P, Bachelet M, Barber L, et al. *Now for the Long Term: The Report of the Oxford Martin Commission for Future Generations*. Oxford: Oxford Martin School, 2013.
69. World Bank. *World Development Report 2014: Risk and Opportunity: Managing Risk for Development*. Washington D.C: World Bank, 2013.
70. Furlong A, Cartmel F. *Young People and Social Change: Invidualisation and risk in late modernity*. Buckingham: Open University Press; 1997.
71. Bottino SMB, Bottino C, Regina CG, Correia AVL, Ribeiro WS. Cyberbullying and adolescent mental health: systematic review. *Cad Saude Publica* 2015; **31**(3): 463-75.
72. Shochat T, Cohen-Zion M, Tzischinsky O. Functional consequences of inadequate sleep in adolescents: A systematic review. *Sleep Med Rev* 2014; **18**(1): 75-87.
73. Institute of Medicine (IOM) and National Research Council (NRC) of the National Academies. *Toward and integrated science of research on families: Workshop report*. Washington, DC: National Academies Press; 2011.
74. Elzakkars IF, Danner UN, Hoek HW, Schmidt U, van Elburg AA. Compulsory treatment in anorexia nervosa: a review. *Int J Eat Disord* 2014; **47**(8): 845-52.
75. UN DESA. *World Marriage Patterns*. New York: United Nations Department of Economic and Social Affairs (UN DESA). Population Division, 2011.
76. Euromonitor International. *Special Report: The family structure of the future*. 2013. <http://blog.euromonitor.com/2013/07/special-report-the-family-structure-of-the-future.html> (accessed 12 August 2015).

77. Boamong M. Adolescents and Youth Migration: Harnessing the Development Potential while Mitigating Risk. 2011. <http://www.voicesofyouth.org/posts/adolescents-and-youth-migration-harnessing-the-development-potential-while-mitigating-risk--2> (accessed 21 August 2015).
78. Cortés R. Adolescents' Rights, Gender and Migration: Challenges for policy makers, 2011.
79. OECD. The future of families to 2030: A synthesis report. Paris: OECD, 2011.
80. Harris KM, Lee H, DeLeone FY. Marriage and health in the transition to adulthood: evidence for African Americans in the Add Health Study. *J Fam Issues* 2010; **31**(8): 1106-43.
81. Larson RW, Richards MH, Moneta G, Holmbeck G, Duckett E. Changes in adolescents' daily interactions with their families from ages 10 to 18: Disengagement and transformation. *Dev Psychol* 1996; **32**(4): 744.
82. Schwartz OS, Byrne ML, Simmons JG, et al. Parenting During Early Adolescence and Adolescent-Onset Major Depression A 6-Year Prospective Longitudinal Study. *Clinical Psychological Science* 2014; **2**(3): 272-86.
83. Morris AS, Silk JS, Steinberg L, Myers SS, Robinson LR. The role of the family context in the development of emotion regulation. *Soc Dev* 2007; **16**(2): 361-88.
84. Krug EG, Mercy JA, Dahlberg LL, Zwi AB. The world report on violence and health. *Lancet* 2002; **360**(9339): 1083-8.
85. Garcia-Moreno C, Guedes A, Knerr W. Female Genital Mutilation: Understanding and addressing violence against women. Geneva: WHO, 2012.
86. Volpe JS. Effects of Domestic Violence on Children and Adolescents: An Overview 1996 <http://www.aaets.org/article8.htm> (accessed 21 August 2015).
87. Commendador KA. Parental influences on adolescent decision making and contraceptive use. *Pediatr Nurs* 2010; **36**(3): 147-56, 70.
88. McPherson KE, Kerr S, McGee E, et al. The association between social capital and mental health and behavioural problems in children and adolescents: an integrative systematic review. *BMC Psychol* 2014; **2**(1): 7.
89. Pilgrim NA, Blum RW. Adolescent mental and physical health in the English-speaking Caribbean. *Rev Panam Salud Publica* 2012; **32**(1): 62-9.
90. Bouris A, Guilamo-Ramos V, Pickard A, et al. A systematic review of parental influences on the health and well-being of lesbian, gay, and bisexual youth: time for a new public health research and practice agenda. *J Prim Prev* 2010; **31**(5-6): 273-309.
91. Penman-Aguilar A, Carter M, Snead MC, Kourtis AP. Socioeconomic disadvantage as a social determinant of teen childbearing in the U.S. *Public Health Rep* 2013; **128 Suppl 1**: 5-22.
92. Cutler DM, Lleras-Muney A. Education and Health: Insights from international comparisons. Cambridge, MA, USA: National Bureau of Economic Research (NBER); 2012.
93. Miyamoto K, Chevalier A. Education and health. In: OECD, ed. Improving Health and Social Cohesion through Education: OECD Publishing; 2010.
94. McQueston K, Silverman R, Glassman A. The efficacy of interventions to reduce adolescent childbearing in low- and middle-income countries: a systematic review. *Stud Fam Plann* 2013; **44**(4): 369-88.
95. Gakidou E, Cowling K, Lozano R, Murray CJ. Increased educational attainment and its effect on child mortality in 175 countries between 1970 and 2009: a systematic analysis. *Lancet* 2010; **376**(9745): 959-74.
96. WHO. Closing the gap in a generation: health equity through action on the social determinants of health. Geneva: World Health Organization (WHO), 2008.
97. IHME. Global Educational Attainment 1970-2015. Seattle, USA: Institute for Health Metrics and Evaluation (IHME), 2015.
98. Foxcroft DR, Tsertsvadze A. Universal school-based prevention programs for alcohol misuse in young people. *Cochrane Database Syst Rev* 2011; (5): Cd009113.
99. Patton G, Bond L, Butler H, Glover S. Changing schools, changing health? Design and implementation of the Gatehouse Project. *Journal of Adolescent Health* 2003; **33**(4): 231-9.
100. Bonell C, Parry W, Wells H, et al. The effects of the school environment on student health: a systematic review of multi-level studies. *Health Place* 2013; **21**: 180-91.

101. Fletcher A, Bonell C, Hargreaves J. School effects on young people's drug use: a systematic review of intervention and observational studies. *J Adolesc Health* 2008; **42**(3): 209-20.
102. Johnson SL. Improving the school environment to reduce school violence: a review of the literature. *J Sch Health* 2009; **79**(10): 451-65.
103. Black WW, Fedewa AL, Gonzalez KA. Effects of "Safe School" programs and policies on the social climate for sexual-minority youth: A review of the literature. *Journal of LGBT youth* 2012; **9**(4): 321-39.
104. UNESCO. Educational for all 2000-2015: Achievements and Challenges. Paris: UNESCO, 2015.
105. UNICEF. Investment Case for Education and Equity. New York: UNICEF, 2015.
106. Glewwe P, Kremer M. Chapter 16 Schools, Teachers, and Education Outcomes in Developing Countries. *Handbook of the Economics of Education* 2006; **2**: 945-1017.
107. UNESCO Institute for Statistics (UIS), UNICEF. Fixing the broken promise of education for all: Finding for the Global Initiative on Out-of-School Children. Montreal: UIS, 2015.
108. Yasunaga M. Non-formal education as a means to meet learning needs of out-of-school children and adolescents. Montreal: UNESCO Institute for Statistics (UIS), 2014.
109. OECD. PISA 2012 Results in Focus: What 15-year-olds know and what they can do with what they know. Geneva: OECD Programme for International Student Assessment, 2012.
110. Demissie Z, Brener ND, McManus T, Shanklin SL, Hawkins J, Kann L. School Health Profiles 2012: Characteristics of Health Programs Among Secondary Schools. Atlanta GA: Centers for Disease Control and Prevention (CDC); 2013.
111. Harlen W, Deakin Crick R. Testing and motivation for learning. *Assessment in Education: Principles, Policy & Practice* 2003; **10**(2): 169-207.
112. Kneale D, Fletcher A, Wiggins R, Bonell C. Distribution and determinants of risk of teenage-motherhood in three British longitudinal studies: implications for targeted prevention interventions. *J Epidemiol Community Health* 2013; **67**(1): 48-55.
113. Bonell C, Fletcher A, Sorhaindo A, Wells H, McKee M. How market-oriented education policies might influence young people's health: development of a logic model from qualitative case studies in English secondary schools. *J Epidemiol Community Health* 2012; **66**(7): e24.
114. Bonell C, Humphrey N, Fletcher A, Moore L, Anderson R, Campbell R. Why schools should promote students' health and wellbeing Education policy shouldn't focus solely on academic attainment. *Br Med J* 2014; **348**: g3078.
115. International Labour Organization. World Report on Child Labour 2015: Paving the way to decent work for young people. Geneva: International Labour Organization; 2015.
116. International Labour Organization. Global employment trends for Youth 2013: A generation at risk. Geneva: International Labour Office; 2013.
117. OECD. Youth neither in employment, education nor training (NEETs). Society at a Glance 2014: OECD Social Indicators. Paris: OECD Publishing; 2014.
118. Hale DR, Bevilacqua L, Viner RM. Adolescent Health and Adult Education and Employment: A Systematic Review. *Pediatrics* 2015; **136**(1): 128-40.
119. Benjet C, Hernández-Montoya D, Borges G, Méndez E, Medina-Mora ME, Aguilar-Gaxiola S. Youth who neither study nor work: mental health, education and employment. *Salud Publica Mex* 2012; **54**(4): 410-7.
120. Baggio S, Iglesias K, Deline S, et al. Not in Education, Employment, or Training Status Among Young Swiss Men. Longitudinal Associations With Mental Health and Substance Use. *J Adolesc Health* 2015; **56**(2): 238-43.
121. Tomasik MJ, Pavlova MK, Lechner CM, Blumenthal A, Korner A. Changing contexts of youth development: An overview of recent social trends and a psychological model. *New Directorions for Youth Development* 2012; **135**: 27-38.
122. Larson RW, Willson S, Brown RB, Furstenberg FF, Verma S. Changes in adolescent's interpersonal experiences: Are they being prepared for adult relationships in the twenty-first century. *J Res Adolesc* 2002; **12**(1): 31-68.
123. Jaccard J, Blanton H, Dodge T. Peer influences on risk behavior: an analysis of the effects of a close friend. *Dev Psychol* 2005; **41**(1): 135-47.

124. Salazar LF, Santelli JS, Crosby RA, DiClemente RJ. Chapter 15: Sexually transmitted disease transmission and pregnancy among adolescents. In: DiClemente RJ, Santelli JS, Crosby RA, eds. *Adolescent Health: Understanding and Preventing risk Behaviors*. San Francisco, CA: Jossey-Bass; 2009: 274-302.
125. Fisher LB, Miles IW, Austin SB, Camargo CA, Jr., Colditz GA. Predictors of initiation of alcohol use among US adolescents: findings from a prospective cohort study. *Arch Pediatr Adolesc Med* 2007; **161**(10): 959-66.
126. Kretman SE, Zimmerman MA, Morrel-Samuels S, Hudson D. Chapter 12: Adolescent violence: Risk, resilience, and prevention. In: DiClemente RJ, Santelli JS, Crosby RA, eds. *Adolescent Health: Understanding and Preventing risk Behaviors*. San Francisco, CA: Jossey-Bass; 2009: 213-32.
127. Taffa N, Klepp KI, Sundby J, Bjune G. Psychosocial determinants of sexual activity and condom use intention among youth in Addis Ababa, Ethiopia. *Int J STD AIDS* 2002; **13**(10): 714-9.
128. Strasburger VC, Jordan AB, Donnerstein E. Health effects of media on children and adolescents. *Pediatrics* 2010; **125**(4): 756-67.
129. Jensen LA, Arnett JJ. Going global: New pathways for adolescents and emerging adults in a changing world. *J Soc Iss* 2012; **68**(3): 4730492.
130. Bell V, Bishop DV, Przybylski AK. The debate over digital technology and young people. *BMJ* 2015; **351**: h3064.
131. Stuckler D, McKee M, Ebrahim S, Basu S. Manufacturing epidemics: the role of global producers in increased consumption of unhealthy commodities including processed foods, alcohol, and tobacco. *PLoS Med* 2012; **9**(6): 695.
132. Thow AM, Snowdon W, Labonté R, et al. Will the next generation of preferential trade and investment agreements undermine prevention of noncommunicable diseases? A prospective policy analysis of the Trans Pacific Partnership Agreement. *Health Policy* 2015; **119**(1): 88-96.
133. United Nations General Assembly. Convention on the Rights of the Child. United Nations Treaty Series vol. 1577; 1989.
134. Ellis SJ, Kitzinger C. Denying equality: An analysis of arguments against lowering the age of consent for sex between men. *J Community Appl Soc Psychol* 2002; **12**(3): 167-80.
135. Lansdown G. Innocenti Insight: The Evolving Capacities of the Child. 2005. <http://www.unicef-irc.org/publications/pdf/evolving-eng.pdf>. (accessed 11 April 2015).
136. Plan International and Special Representative of the UN Secretary-General on Violence against Children. Protecting children from harmful practices in plural legal systems. 2012. <https://plan-international.org/files/global/publications/protection/protecting-children-from-harmful-practices-in-plural-legal-systems> (accessed 15 April 2015).
137. Ngwena C. Sexual Health and Human Rights in the African Region. 2011. http://www.ichrp.org/files/papers/185/140_Ngwena_Africa_2011.pdf (accessed 23 June 2014).
138. WHO. Keeping promises, measuring results: commission on information and accountability for women's and children's health. Geneva: World Health Organization (WHO), 2011.
139. U.S. Agency for International Development (USAID). The Roadmap for Health Measurement and Accountability. Washington, DC: USAID, World Bank, WHO, 2015.
140. UNICEF. Child Marriage and the Law. 2008. [http://www.unicef.org/policyanalysis/files/Child_Marriage_and_the_Law\(1\).pdf](http://www.unicef.org/policyanalysis/files/Child_Marriage_and_the_Law(1).pdf) (accessed 20 April 2015).
141. UNICEF. State of the World's Children. 2013. <http://www.unicef.org/sowc2013/> (accessed 20 April 2015).
142. Klugman J, Hanmer L, Twigg S, Hasan T, McCleary-Sills J, Santamaria J. Voice and Agency: Empowering Women and Girls for Shared Prosperity. Washington, DC: World Bank Group, 2014.
143. Forum on Marriage and the Rights of Women and Girls. Early Marriage: Whose Right to Choose? 2001. <https://www.crin.org/en/library/publications/early-marriage-whose-right-choose> (accessed 20 April 2015).
144. Van Duijvenvoorde A, Crone E. The teenage brain a neuroeconomic approach to adolescent decision making. *Curr Dir Psychol Sci* 2013; **22**(2): 108—13.
145. Biegler P. The ethical treatment of depression: autonomy through psychotherapy. Cambridge, MA: MIT Press; 2011.

146. Blanc AK, Winfrey W, Ross J. New findings for maternal mortality age patterns: Aggregated results for 38 countries. *PLoS One* 2013; **8**(4): e59864.
147. Patel V, Ramasundarahettige C, Vijayakumar L, et al. Suicide mortality in India: a nationally representative survey. *Lancet* 2012; **379**(9834): 2343-51.
148. Patton GC, Coffey C, Sawyer SM, et al. Global patterns of mortality in young people: a systematic analysis of population health data. *Lancet* 2009; **374**(9693): 881-92.
149. Moser CO, Van Bronkhorst B. Youth violence in Latin America and the Caribbean: Costs, causes, and interventions: World Bank, Latin America and the Caribbean Region, Environmentally and Socially Sustainable Development SMU; 1999.
150. Rehm J, Sulkowska U, Mańczuk M, et al. Alcohol accounts for a high proportion of premature mortality in central and eastern Europe. *Int J Epidemiol* 2007; **36**(2): 458-67.
151. Yair O, Miodownik D. Youth bulge and civil war: Why a country's share of young adults explains only non-ethnic wars. *Conflict Manage Peace Sci* 2014.
152. Collishaw S. Annual research review: secular trends in child and adolescent mental health. *Journal of Child Psychology and Psychiatry* 2015; **56**(3): 370-93.
153. Murray CJ, Ortblad KF, Guinovart C, et al. Global, regional, and national incidence and mortality for HIV, tuberculosis, and malaria during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014; **384**(9947): 1005-70.
154. Jamison DT, Summers LH, Alleyne G, et al. Global health 2035: a world converging within a generation. *Lancet* 2013; **382**(9908): 1898-955.
155. Bruin JE, Gerstein HC, Holloway AC. Long-term consequences of fetal and neonatal nicotine exposure: a critical review. *Toxicol Sci* 2010; **116**(2): 364-74.
156. Bonomo YA, Patton GC, Bowes G. What are the longer term outcomes of adolescent alcohol consumption in young adulthood? Results from a 10-year cohort study. *Alcoholism-Clinical and Experimental Research* 2006; **30**(9): 117A-A.
157. Viner RM, Taylor B. Adult outcomes of binge drinking in adolescence: findings from a UK national birth cohort. *J Epidemiol Community Health* 2007; **61**(10): 902-7.
158. Parry CD, Patra J, Rehm J. Alcohol consumption and non-communicable diseases: epidemiology and policy implications. *Addiction* 2011; **106**(10): 1718-24.
159. Riley EP, McGee CL. Fetal alcohol spectrum disorders: an overview with emphasis on changes in brain and behavior. *Exp Biol Med* 2005; **230**(6): 357-65.
160. Patton GC, Coffey C, Carlin JB, et al. Overweight and obesity between adolescence and young adulthood: a 10-year prospective cohort study. *J Adolesc Health* 2011; **48**(3): 275-80.
161. Reilly J, Kelly J. Long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood: systematic review. *Int J Obes* 2011; **35**(7): 891-8.
162. Yu C, Teoh T, Robinson S. Review article: obesity in pregnancy. *BJOG* 2006; **113**(10): 1117-25.
163. Lesthaeghe R. The second demographic transition: A concise overview of its development. *Proceedings of the National Academy of Sciences* 2014; **111**(51): 18112-5.
164. Tylee A, Haller DM, Graham T, Churchill R, Sanci LA. Youth-friendly primary-care services: how are we doing and what more needs to be done? *Lancet* 2007; **369**: 1565-73.
165. Granich RM, Gilks CF, Dye C, De Cock KM, Williams BG. Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model. *The Lancet* 2009; **373**(9657): 48-57.
166. Patel V, Flisher AJ, Hetrick S, McGorry P. Mental health of young people: a global public-health challenge. *The Lancet* 2007; **369**(9569): 1302-13.
167. Woog V, Singh S, Browne A, Philbin J. Adolescent Women's Need for and Use of Sexual and Reproductive Health Services in Developing Countries. 2015.
168. Blanc AK, Tsui AO, Croft TN, Trevitt JL. Patterns and trends in adolescents' contraceptive use and discontinuation in developing countries and comparisons with adult women. *International Perspectives on Sexual and Reproductive Health* 2009: 63-71.
169. Biddlecom AE, Munthali A, Singh S, Woog V. Adolescents' views of and preferences for sexual and reproductive health services in Burkina Faso, Ghana, Malawi and Uganda. *Afr J Reprod Health* 2007; **11**(3): 99.

170. Winner B, Peipert JF, Zhao Q, et al. Effectiveness of long-acting reversible contraception. *N Engl J Med* 2012; **366**(21): 1998-2007.
171. Finer LB, Jerman J, Kavanaugh ML. Changes in use of long-acting contraceptive methods in the United States, 2007–2009. *Fertil Steril* 2012; **98**(4): 893-7.
172. Vanheusden K, Van der Ende J, Mulder CL, van Lenthe FJ, Verhulst FC, Mackenbach JP. The use of mental health services among young adults with emotional and behavioural problems: equal use for equal needs? *Soc Psychiatry Psychiatr Epidemiol* 2008; **43**(10): 808-15.
173. Tick NT, van der Ende J, Verhulst FC. Ten-year trends in self-reported emotional and behavioral problems of Dutch adolescents. *Soc Psychiatry Psychiatr Epidemiol* 2008; **43**(5): 349-55.
174. Alonso J, Codony M, Kovess V, et al. Population level of unmet need for mental healthcare in Europe. *The British journal of psychiatry* 2007; **190**(4): 299-306.
175. Patel V, Araya R, Chatterjee S, et al. Treatment and prevention of mental disorders in low-income and middle-income countries. *Lancet* 2007; **370**(9591): 991-1005.
176. Reavley NJ, Jorm AF. Young people's recognition of mental disorders and beliefs about treatment and outcome: findings from an Australian national survey. *Aust N Z J Psychiatry* 2011; **45**(10): 890-8.
177. Health UDo, Services H. The national survey of children with special health care needs chartbook 2001. *Rockville, MD: Health Resources and Services Administration, Maternal and Child Health Bureau, US Department of Health and Human Services* 2004.
178. Ford CA, Bearman PS, Moody J. Foregone health care among adolescents. *JAMA* 1999; **282**(23): 2227-34.
179. Hargreaves DS, Greaves F, Levay C, et al. Comparison of Health Care Experience and Access Between Young and Older Adults in 11 High-Income Countries. *J Adolesc Health* 2015.
180. Calhoun LM, Speizer IS, Rimal R, et al. Provider imposed restrictions to clients' access to family planning in urban Uttar Pradesh, India: a mixed methods study. *BMC Health Serv Res* 2013; **13**(1): 532.
181. Waddington C, Sambo C. Financing health care for adolescents: a necessary part of universal health coverage. *Bull World Health Organ* 2015; **93**(1): 57-9.
182. Cheng TL, Savageau JA, Sattler AL, DeWitt TG. Confidentiality in health care: a survey of knowledge, perceptions, and attitudes among high school students. *JAMA* 1993; **269**(11): 1404-7.
183. Ford CA, Millstein SG, Halpern-Felsher BL, Irwin CE. Influence of physician confidentiality assurances on adolescents's willingness to disclose information and seek future health care. A randomised controlled trial. *J Am Med Assoc* 1997; **278**: 1029-34.
184. Schoen C, Davis K, DesRoches C, Shekhdar A. Health of Adolescent Boys: Commonwealth Fund Survey Findings: Commonwealth Fund New York, NY; 1998.
185. Sedlander E, Brindis CD, Bausch SH, Tebb KP. Options for assuring access to confidential care for adolescents and young adults in an explanation of benefits environment. *J Adolesc Health* 2015; **56**(1): 7-9.
186. Sancil L. Clinical Preventive Services for Adolescents: Facing the Challenge of Proving "An Ounce of Prevention Is Worth a Pound of Cure". *J Adolesc Health* 2011; **49**(5): 450-2.
187. Kadivar H, Thompson L, Wegman M, et al. Adolescent Views on Comprehensive Health Risk Assessment and Counseling: Assessing Gender Differences. *J Adolesc Health* 2014; **55**(1): 24-32.
188. Sasse RA, Aroni RA, Sawyer SM, Duncan RE. Confidential consultations with adolescents: An exploration of Australian parents' perspectives. *J Adolesc Health* 2013; **52**(6): 786-91.
189. Duncan RE, Jekel M, O'Connell MA, Sancil LA, Sawyer SM. Balancing parental involvement with adolescent friendly health care in teenagers with diabetes: are we getting it right? *J Adolesc Health* 2014; **55**(1): 59-64.
190. Ambresin AE, Bennett K, Patton GC, Sancil LA, Sawyer SM. Assessment of youth-friendly health care: a systematic review of indicators drawn from young people's perspectives. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine* 2013; **52**(6): 670-81.
191. Luxford K, Piper D, Dunbar N, Poole N. Patient-centred care: Improving quality and safety by focusing care on patients and consumers. *Editing by Biotext, Canberra[Internet]* 2010.
192. WHO. Adolescent Friendly Health Services: an agenda for change. Geneva: World Health Organization (WHO), 2002.
193. Michaud P-A, Blum RW, Benaroyo L, Zermatten J, Baltag V. Assessing an Adolescent's Capacity for Autonomous Decision-Making in Clinical Care? *J Adolesc Health* 2015.

194. Sawyer SM, Conn JJ, Reid KJ, et al. Working with young people: Evaluation of an education resource for medical trainees. *J Paediatr Child Health* 2013; **49**(11): 901-5.
195. Denno DM, Hoopes AJ, Chandra-Mouli V. Effective strategies to provide adolescent sexual and reproductive health services and to increase demand and community support. *The Journal Of Adolescent Health: Official Publication Of The Society For Adolescent Medicine* 2015; **56**(1 Suppl): S22-S41.
196. Chandra-Mouli V, Svanemyr J, Amin A, et al. Twenty years after International Conference on Population and Development: where are we with adolescent sexual and reproductive health and rights? *The Journal Of Adolescent Health: Official Publication Of The Society For Adolescent Medicine* 2015; **56**(1 Suppl): S1-S6.
197. Nair M, Baltag V, Bose K, Boschi-Pinto C, Lambrechts T, Mathai M. Improving the Quality of Health Care Services for Adolescents, Globally: A Standards-Driven Approach. *J Adolesc Health* 2015; **57**(3): 288-98.
198. Hargreaves DS. Revised You're Welcome criteria and future developments in adolescent healthcare. *J Clin Res Pediatr Endocrinol* 2011; **3**(2): 43.
199. Kesterton AJ, Cabral de Mello M. Generating demand and community support for sexual and reproductive health services for young people: A review of the Literature and Programs. *Reproductive health* 2010; **7**: 25-.
200. Kauer SD, Mangan C, Sancu L. Do online mental health services improve help-seeking for young people? A systematic review. *J Med Internet Res* 2014; **16**(3).
201. Mason-Jones AJ, Crisp C, Momberg M, Koech J, De Koker P, Mathews C. A systematic review of the role of school-based healthcare in adolescent sexual, reproductive, and mental health. *Systematic Reviews* 2012; **1**: 49-.
202. Rausch JR, Hood KK, Delamater A, et al. Changes in treatment adherence and glycemic control during the transition to adolescence in type 1 diabetes. *Diabetes Care* 2012; **35**(6): 1219-24.
203. Kahana SY, Rohan J, Allison S, Frazier TW, Drotar D. A meta-analysis of adherence to antiretroviral therapy and virologic responses in HIV-infected children, adolescents, and young adults. *AIDS Behav* 2013; **17**(1): 41-60.
204. Dean AJ, Walters J, Hall A. A systematic review of interventions to enhance medication adherence in children and adolescents with chronic illness. *Arch Dis Child* 2010; **95**(9): 717-23.
205. Salema N-EM, Elliott RA, Glazebrook C. A systematic review of adherence-enhancing interventions in adolescents taking long-term medicines. *J Adolesc Health* 2011; **49**(5): 455-66.
206. Al-sheyab N, Gallagher R, Crisp J, Shah S. Peer-led education for adolescents with asthma in Jordan: a cluster-randomized controlled trial. *Pediatrics* 2012; **129**(1): e106-e12.
207. Lotstein DS, Seid M, Klingensmith G, et al. Transition from pediatric to adult care for youth diagnosed with type 1 diabetes in adolescence. *Pediatrics* 2013; **131**(4): e1062-e70.
208. Suris J-C, Akre C. Key Elements for, and Indicators of, a Successful Transition: An International Delphi Study. *J Adolesc Health* 2015; **56**(6): 612-8.
209. Herman-Giddens ME, Steffes J, Harris D, et al. Secondary sexual characteristics in boys: data from the Pediatric Research in Office Settings Network. *Pediatrics* 2012; **130**(5): e1058-e68.
210. Committee on Improving the Health S, Bonnie R, Stroud C, Breiner H. Investing in the Health and Well-Being of Young Adults. 2015.
211. Reavley NJ, Lorenze D, Deery A, et al. The effectiveness for preventive interventions for adolescent health: an overview of reviews. Melbourne, Australia: University of Melbourne.
212. De la Cruz Toledo E, Mahon J, Santelli J, Waldfogel J. Economic perspectives on adolescent health: A review of research on the cost-effectiveness of interventions to improve adolescent health. 2015; **Working paper**.
213. Blank L, Baxter SK, Payne N, Guillaume LR, Pilgrim H. Systematic review and narrative synthesis of the effectiveness of contraceptive service interventions for young people, delivered in educational settings. *J Pediatr Adolesc Gynecol* 2010; **23**(6): 341-51.
214. Chesson HW, Ekwueme DU, Saraiya M, Dunne EF, Markowitz LE. The cost-effectiveness of male HPV vaccination in the United States. *Vaccine* 2011; **29**(46): 8443-50.
215. Snow K, Nelson L, Sismanidis C, Sawyer S, Graham S. Incidence and prevalence of active tuberculosis among adolescents and young adults: a systematic review. 2015; **submitted for publication**.

216. Marais BJ, Gie RP, Schaaf HS, et al. The clinical epidemiology of childhood pulmonary tuberculosis: a critical review of literature from the pre-chemotherapy era [State of the Art]. *The International Journal of Tuberculosis and Lung Disease* 2004; **8**(3): 278-85.
217. Desai M, ter Kuile FO, Nosten F, et al. Epidemiology and burden of malaria in pregnancy. *The Lancet infectious diseases* 2007; **7**(2): 93-104.
218. Udonwa NE, Gyuse AN, Etokidem AJ. Malaria: Knowledge and prevention practices among school adolescents in a coastal community in Calabar, Nigeria. *African Journal of Primary Health Care & Family Medicine* 2010; **2**(1): 4 pages.
219. Victora CG, Adair L, Fall C, et al. Maternal and child undernutrition: consequences for adult health and human capital. *Lancet* 2008; **371**(9609): 340-57.
220. United Nations Children's Fund. Improving child nutrition: The achievable imperative for global progress. New York: UNICEF, 2013.
221. Haider R. Adolescent nutrition: a review of the situation in selected South-East Asian countries. New Delhi: Regional Office for South-East Asia, World Health Organization (WHO), 2006.
222. DFID. The neglected crisis of undernutrition: evidence for action. London: Department for International Development (DFID), 2012.
223. WHO. Guideline: Intermittent iron and folic acid supplementation in menstruating women. Geneva: World Health Organization (WHO), 2011.
224. Bhutta ZA, Das JK, Rizvi A, et al. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *The Lancet* 2013; **382**(9890): 452-77.
225. World Bank. From agriculture to nutrition: pathways, synergies and outcomes. Washington, DC: World Bank, 2007.
226. Masset E, Haddad L, Cornelius A, Isanza-Castro J. A systematic review of agricultural interventions that aim to improve the nutritional status of children. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, 2011.
227. Bhutta ZA, Ahmed T, Black RE, et al. What works? Interventions for maternal and child undernutrition and survival. *Lancet* 2008; **371**: 417-40.
228. Adelman S, Gilligan D, Konde-Lule J, Alderman H. School feeding reduces anemia prevalence in adolescent girls and other vulnerable household members in a cluster randomized controlled trial in Uganda. Washington, DC: International Food Policy Research Institute, 2012.
229. Gibbs CM, Wendt A, Peters S, Hogue CJ. The impact of early age at first childbirth on maternal and infant health. *Paediatr Perinat Epidemiol* 2012; **26**(S1): 259-84.
230. King JC. The Risk of Maternal Nutritional Depletion and Poor Outcomes Increases in Early or Closely Spaced Pregnancies. *J Nutr* 2003; **133**(5): 1732S-6S.
231. Casanueva E, Roselló-Soberón ME, De-Regil LM, Argüelles MdC, Céspedes MI. Adolescents with Adequate Birth Weight Newborns Diminish Energy Expenditure and Cease Growth. *J Nutr* 2006; **136**(10): 2498-501.
232. Rah JH, Christian P, Shamim AA, Arju UT, Labrique AB, Rashid M. Pregnancy and lactation hinder growth and nutritional status of adolescent girls in rural Bangladesh. *J Nutr* 2008; **138**(8): 1505-11.
233. WHO. Guideline: Calcium supplementation in pregnant women. Geneva: World Health Organization (WHO), 2013.
234. Reinhardt K, Fanzo J. Addressing Chronic Malnutrition through Multi-Sectoral, Sustainable Approaches: A Review of the Causes and Consequences. *Frontiers in Nutrition* 2014; **1**: 13.
235. Chandra-Mouli V, Camacho AV, Michaud P-A. WHO Guidelines on Preventing Early Pregnancy and Poor Reproductive Outcomes Among Adolescents in Developing Countries. *J Adolesc Health* 2013; **52**(5): 517-22.
236. Bushamuka V, de Pee S, Talukder A, et al. Impact of a homestead gardening program on household food security and empowerment of women in Bangladesh. *Food Nutr Bull* 2005; **26**(1): 17-25.
237. Toroyan T, Peden M. Youth and Road Safety. Geneva, Switzerland: World Health Organization (WHO), 2007.
238. Peden M, Scurfield R, Sleet D, et al. World report on road traffic injury prevention. Geneva, Switzerland: WHO, 2004.

239. WHO. Global Status Report on Road Safety 2013: Supporting A Decade of Action. Geneva, Switzerland: World Health Organization (WHO), 2013.
240. Simpson HM. The evolution and effectiveness of graduated licensing. *J Safety Res* 2003; **34**(1): 25-34.
241. Norton R, Hyder AA, Bishai D, Peden M. Unintentional Injuries. In: Jamison DT, Breman JG, Measham AR, et al., eds. *Disease Control Priorities in Developing Countries*. 2nd ed. Washington (DC): World Bank; 2006: 737-55.
242. Afukaar FK. Speed control in developing countries: issues, challenges and opportunities in reducing road traffic injuries. *Inj Control Saf Promot* 2003; **10**(1-2): 77-81.
243. Elvik R, Høy A, Vaa T, Sørensen M. *The Handbook of Road Safety Measures* (2nd Edition). Bingley, UK: Emerald Group Publishing Limited; 2009.
244. Forjuoh SN. Traffic-related injury prevention interventions for low-income countries. *Inj Control Saf Promot* 2003; **10**(1-2): 109-18.
245. Retting RA, Ferguson SA, McCartt AT. A review of evidence-based traffic engineering measures designed to reduce pedestrian-motor vehicle crashes. *Am J Public Health* 2003; **93**(9): 1456-63.
246. Porchia BR, Baldasseroni A, Dellisanti C, Lorini C, Bonaccorsi G. Effectiveness of two interventions in preventing traffic accidents: a systematic review. *Annali Di Igiene: Medicina Preventiva E Di Comunità* 2014; **26**(1): 63-75.
247. Williams AF. Young driver risk factors: successful and unsuccessful approaches for dealing with them and an agenda for the future. *Inj Prev* 2006; **12 Suppl 1**: i4-8.
248. Roberts IG, Kwan I. School-based driver education for the prevention of traffic crashes. *Cochrane Database of Systematic Reviews* 2001; (3).
249. Krug EG, Dahlberg LL, Mercy JA, B. ZA, Lozano R. *World Report on Violence and Health*. Geneva: WHO, 2002.
250. Catalano RF, Fagan AA, Gavin LE, et al. Worldwide application of prevention science in adolescent health. *The Lancet* 2012.
251. Fagan AA, Catalano RF. What Works in Youth Violence Prevention: A Review of the Literature. *Research on Social Work Practice* 2013; **23**(2): 141-56.
252. WHO. *Violence prevention: the evidence*. Geneva: World Health Organization (WHO), 2010.
253. Ellsberg M, Arango DJ, Morton M, et al. Prevention of violence against women and girls: what does the evidence say? *Lancet* 2015; **385**(9977): 1555-66.
254. Fellmeth GLT, Heffernan C, Nurse J, Habibula S, Sethi D. Educational and skills-based interventions for preventing relationship and dating violence in adolescents and young adults. *Cochrane Database of Systematic Reviews* 2013; **6**: CD004534.
255. Lundgren R, Amin A. Addressing intimate partner violence and sexual violence among adolescents: emerging evidence of effectiveness. *The Journal Of Adolescent Health: Official Publication Of The Society For Adolescent Medicine* 2015; **56**(1 Suppl): S42-S50.
256. Whitaker DJ, Morrison S, Lindquist C, et al. A critical review of interventions for the primary prevention of perpetration of partner violence. *Aggr Violent Behav* 2006; **11**(2): 151-66.
257. Patton GC, Romaniuk H, Spry E, et al. Preconception prediction maternal perinatal depression: a 20-year prospective cohort from adolescence. *Lancet* 2015; **Accepted for publication Nov 2014**.
258. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey replication. *Arch Gen Psychiatry* 2005; **62**: 593-602.
259. Copeland W, Shanahan L, Costello EJ, Angold A. Cumulative prevalence of psychiatric disorders by young adulthood: a prospective cohort analysis from the Great Smoky Mountains Study. *J Am Acad Child Adolesc Psychiatry* 2011; **50**(3): 252-61.
260. McGorry P, Bates T, Birchwood M. Designing youth mental health services for the 21st century: examples from Australia, Ireland and the UK. *Br J Psychiatry Suppl* 2013; **54**(s54): s30-5.
261. Jorm AF. How effective are 'headspace' youth mental health services? *Aust N Z J Psychiatry* 2015; **49**(10): 861-2.
262. Nesi J, Prinstein MJ. Using Social Media for Social Comparison and Feedback-Seeking: Gender and Popularity Moderate Associations with Depressive Symptoms. *J Abnorm Child Psychol* 2015: 1-12.

263. Hunter E, Harvey D. Indigenous suicide in Australia, New Zealand, Canada and the United States. *Emerg Med* 2002; **14**(1): 14-23.
264. Evans E, Hawton K, Rodham K. Factors associated with suicidal phenomena in adolescents: a systematic review of population-based studies. *Clin Psychol Rev* 2004; **24**(8): 957-79.
265. Hazell P. Adolescent suicide clusters: evidence, mechanisms and prevention. *Aust N Z J Psychiatry* 1993; **27**(4): 653-65.
266. Hawton K, Zahl D, Weatherall R. Suicide following deliberate self-harm: long-term follow-up of patients who presented to a general hospital. *Br J Psychiatry* 2003; **182**: 537-42.
267. Gould MS, Greenberg T, Velting DM, Shaffer D. Youth Suicide Risk and Preventive Interventions: A Review of the Past 10 Years. *J Am Acad Child Adolesc Psychiatry* 2003; **42**(4): 386.
268. Robinson J, Cox G, Malone A, et al. A systematic review of school-based interventions aimed at preventing, treating, and responding to suicide-related behavior in young people. *Crisis* 2013; **34**(3): 164-82.
269. Andriessen K. Suicide bereavement and postvention in major suicidology journals: lessons learned for the future of postvention. *Crisis* 2014; **35**(5): 338-48.
270. Mann JJ, Apter A, Bertolote J, et al. Suicide prevention strategies: a systematic review. *JAMA* 2005; **294**(16): 2064-74.
271. Robinson J, Hetrick SE, Martin C. Preventing suicide in young people: systematic review. *Aust N Z J Psychiatry* 2011; **45**(1): 3-26.
272. Klimes-Dougan B, Klingbeil DA, Meller SJ. The impact of universal suicide-prevention programs on the help-seeking attitudes and behaviors of youths. *Crisis* 2013; **34**(2): 82-97.
273. Ng M, Fleming T, Robinson M, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014; **384**(9945): 766-81.
274. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. *N Engl J Med* 1997; **337**(13): 869-73.
275. Ruager-Martin R, Hyde MJ, Modi N. Maternal obesity and infant outcomes. *Early Hum Dev* 2010; **86**(11): 715-22.
276. Dumith SC, Gigante DP, Domingues MR, Kohl HW, 3rd. Physical activity change during adolescence: a systematic review and a pooled analysis. *Int J Epidemiol* 2011; **40**(3): 685-98.
277. Niemeier HM, Raynor HA, Lloyd-Richardson EE, Rogers ML, Wing RR. Fast food consumption and breakfast skipping: predictors of weight gain from adolescence to adulthood in a nationally representative sample. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine* 2006; **39**(6): 842-9.
278. Jordan AB, Kramer-Golinkoff EK, Strasburger VC. Does adolescent media use cause obesity and eating disorders? *Adolesc Med State Art Rev* 2008; **19**(3): 431-49, viii-ix.
279. Laska MN, Pelletier JE, Larson NI, Story M. Interventions for weight gain prevention during the transition to young adulthood: a review of the literature. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine* 2012; **50**(4): 324-33.
280. Pearson N, Braithwaite R, Biddle SJ. The effectiveness of interventions to increase physical activity among adolescent girls: a meta-analysis. *Acad Pediatr* 2015; **15**(1): 9-18.
281. Rees R, Kavanagh J, Harden A, et al. Young people and physical activity: a systematic review matching their views to effective interventions. *Health Educ Res* 2006; **21**(6): 806-25.
282. Stice E, Shaw H, Marti CN. A meta-analytic review of obesity prevention programs for children and adolescents: The skinny on interventions that work. *Psychol Bull* 2006; **132**(5): 667-91.
283. Francis JM, Grosskurth H, Changalucha J, Kapiga SH, Weiss HA. Systematic review and meta-analysis: prevalence of alcohol use among young people in eastern Africa. *Trop Med Int Health* 2014; **19**(4): 476-88.
284. Bonomo YA, Bowes G, Coffey C, Carlin JB, Patton GC. Teenage drinking and the onset of alcohol dependence: a cohort study over seven years. *Addiction* 2004; **99**: 1520-8.
285. Feldstein Ewing SW, Sakhardande A, Blakemore S-J. The effect of alcohol consumption on the adolescent brain: A systematic review of MRI and fMRI studies of alcohol-using youth. *NeuroImage: Clinical* 2014; **5**: 420-37.

286. WHO. Global health sector strategy on HIV/AIDS 2011-2015. Geneva: World Health Organization (WHO), 2011.
287. Warren CW, Lea V, Lee J, Jones NR, Asma S, McKenna M. Change in tobacco use among 13-15 year olds between 1999 and 2008: findings from the Global Youth Tobacco Survey. *Glob Health Promot* 2009; **16**(2 Suppl): 38-90.
288. Batura N, Hill Z, Haghparast-Bidgoli H, et al. Highlighting the evidence gap: how cost-effective are interventions to improve early childhood nutrition and development? *Health Policy Plan* 2015; **30**: 813-21.
289. Moyer-Gusé E. Toward a theory of entertainment persuasion: Explaining the persuasive effects of entertainment-education messages. *Communication Theory* 2008; **18**(3): 407-25.
290. Saavedra M. Dilemmas and opportunities in gender and sport-in-development. *Sport and international development* 2009: 124-55.
291. UNICEF. The State of the World's Children 2011: Adolescence: An Age of Opportunity. 2011. <http://www.unicef.org/sowc2011/> (accessed 12 April 2015).
292. Kawamoto K, Houlihan CA, Balas EA, Lobach DF. Improving clinical practice using clinical decision support systems: a systematic review of trials to identify features critical to success. *BMJ* 2005; **330**(7494): 765.
293. Lester R, Karanja S. Mobile phones: exceptional tools for HIV/AIDS, health, and crisis management. *Lancet Infect Dis* 2008; **8**(12): 738-9.
294. B Labrique A, S Sikder S, Mehara S, et al. Mobile phone ownership and widespread mHealth use in 168,231 women of reproductive age in rural Bangladesh. *Journal of Mobile Technology in Medicine* 2012; **1**(4S): 26-.
295. Puccio JA, Belzer M, Olson J, et al. The use of cell phone reminder calls for assisting HIV-infected adolescents and young adults to adhere to highly active antiretroviral therapy: a pilot study. *AIDS Patient Care STDS* 2006; **20**(6): 438-44.
296. Harden A, Brunton G, Fletcher A, Oakley A. Teenage pregnancy and social disadvantage: systematic review integrating controlled trials and qualitative studies. *BMJ (Clinical research ed)* 2009; **339**(8900488, bmj, 101090866): b4254.
297. Blank L, Baxter S, Goyder E, et al. Promoting well-being by changing behaviour: a systematic review and narrative synthesis of the effectiveness of whole secondary school behavioural interventions. *Mental Health Review Journal* 2010; **15**(2): 43-53.
298. Milat AJ, King L, Newson R, et al. Increasing the scale and adoption of population health interventions: experiences and perspectives of policy makers, practitioners, and researchers. *Health Res Policy Syst* 2014; **12**: 18.
299. Kivela J, Ketting E, Baltussen R. Cost analysis of school-based sexuality education programs in six countries. *Cost Eff Resour Alloc* 2013; **11**(1): 17.
300. Terris-Prestholt F, Kumaranayake L, Obasi AI, et al. From trial intervention to scale-up: costs of an adolescent sexual health program in Mwanza, Tanzania. *Sex Transm Dis* 2006; **33**(10 Suppl): S133-9.
301. O'Neill J, Tabish H, Welch V, et al. Applying an equity lens to interventions: using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health. *J Clin Epidemiol* 2014; **67**(1): 56-64.
302. Chandra-Mouli V, Lane C, Wong S. What Does Not Work in Adolescent Sexual and Reproductive Health: A Review of Evidence on Interventions Commonly Accepted as Best Practices. *Glob Health Sci Pract* 2015; **Early online Aug 31 2015**.
303. Hotez PJ, Asojo OA, Adesina AM. Nigeria: "Ground Zero" for the high prevalence neglected tropical diseases. *PLoS Negl Trop Dis* 2012; **6**(7): e1600.
304. Suleiman AB, Soleimanpour S, London J. Youth action for health through youth-led research. *J Community Pract* 2006; **14**(1-2): 125-45.
305. United Nations (DESA). World Youth Report 2007: Young People's Transition to Adulthood. New York: United Nations, 2007.
306. United Nations. World Programme of Action on Youth. New York, NY: United Nations, 2010.
307. UNICEF. The State of the World's Children Report 2003: Child Participation. 2002. http://www.unicef.org/adolescence/files/pub_sowc03_en.pdf (accessed 12 April 2015).

308. Dahl RE. Adolescent brain development: a period of vulnerabilities and opportunities. Keynote address. [Review] [10 refs]. *Ann N Y Acad Sci* 2004; **1021**: 1-22.
309. Petroni S, L. M. Engaging Young People in Health Policymaking and Programming. *Forthcoming* 2015.
310. Lansdown G. Rights Based Approach to Programming: Implications for children. 2005. http://www.savethechildren.org.uk.proxy.library.vcu.edu/sites/default/files/docs/Whats_the_Difference_1.pdf (accessed 9 April 2015).
311. Wong NT, Zimmerman MA, Parker EA. A typology of youth participation and empowerment for child and adolescent health promotion. *Am J Community Psychol* 2010; **46**(1-2): 100-14.
312. Gibbs A, Campbell C, Maimane S, Nair Y. Mismatches between youth aspirations and participatory HIV/AIDS programmes in South Africa. *Afr J AIDS Res* 2010; **9**(2): 153-63.
313. Maticka-Tyndale E, Barnett JP. Peer-led interventions to reduce HIV risk of youth: A review. *Eval Program Plann* 2010; **33**(2): 98-112.
314. Akinfaderin-Agurau F, Fashola T. What business do youth have making HIV and AIDS laws in Nigeria? 2011. <http://pubs.iied.org/pdfs/G03196.pdf> (accessed 2 April 2015).
315. Jacquez F, Vaughn LM, Wagner E. Youth as partners, participants or passive recipients: A review of children and adolescents in community-based participatory research (CBPR). *Am J Community Psychol* 2013; **51**(1-2): 176-89.
316. Shaw A, Brady B, McGrath B, Brennan MA, Dolan P. Understanding youth civic engagement: debates, discourses, and lessons from practice. *Community Dev J* 2014; **45**(4): 300-16.
317. Kaplan AM, Haenlein M. Users of the world, unite! The challenges and opportunities of Social Media. *Bus Horiz* 2010; **53**(1): 59-68.
318. Brandtzæg PB, Haugstveit IM, Lüders M, Følstad A. Participation Barriers to Youth Civic Engagement in Social Media. Ninth International AAAI Conference on Web and Social Media; 2015; 2015.
319. Campbell C, Gibbs A, Maimane S, Nair Y, Sibiyi Z. Youth participation in the fight against AIDS in South Africa: from policy to practice. *J Youth Stud* 2009; **12**(1): 93-109.
320. Coates D, Howe D. The importance and benefits of youth participation in mental health settings from the perspective of the headspace Gosford Youth Alliance in Australia. *Child Youth Serv Rev* 2014; **46**: 294-9.
321. Harden A, Oakley A, Oliver S. Peer-delivered health promotion for young people: a systematic review of different study designs. *Health Educ J* 2001; **60**(4): 339-53.
322. Iwasaki Y. Reflection on Learnings from Engaging and Working with High-risk, Marginalized Youth. *Relational Child & Youth Care Practice* 2014; **27**(4): 24-35.
323. Villa-Torres L, Svanemyr J. Ensuring youth's right to participation and promotion of youth leadership in the development of sexual and reproductive health policies and programs. *J Adolesc Health* 2015; **56**(1): S51-S7.
324. Paterson BL, Panessa C. Engagement as an ethical imperative in harm reduction involving at-risk youth. *Int J Drug Policy* 2008; **19**(1): 24-32.
325. Garcia AP, Minkler M, Cardenas Z, Grills C, Porter C. Engaging homeless youth in community-based participatory research: a case study from Skid Row, Los Angeles. *Health Promot Pract* 2014; **15**(1): 18-27.
326. Bell J, Vromen A, Collin P. Rewriting the rules for youth participation: Inclusion and diversity in government and community decision making. 2008. http://www.uws.edu.au/data/assets/pdf_file/0009/476343/rewriting_the_rules_for_youth_participation.pdf (accessed 9 April 2015).
327. Bonita R, Magnusson R, Bovet P, et al. Country actions to meet UN commitments on non-communicable diseases: a stepwise approach. *Lancet* 2013; **381**(9866): 575-84.
328. Kraak VI, Swinburn B, Lawrence M, Harrison P. An accountability framework to promote healthy food environments. *Public Health Nutr* 2014; **17**(11): 2467-83.
329. United Nations. The road to dignity by 2030: ending poverty, transforming all lives and protecting the planet. Synthesis report of the Secretary-General on the post-2015 sustainable development agenda. New York, NY: United Nations, 2014.

330. iERG. Every Woman, Every Child: Strengthening Equity and Dignity through Health: the second report of the independent Expert Review Group (iERG) on Information and Accountability for Women's and Children's health. Geneva: World Health Organization, 2013.
331. Collins C, Coates TJ, Szekeres G. Accountability in the global response to HIV: measuring progress, driving change. *AIDS* 2008; **22 Suppl 2**: S105-11.
332. Beaglehole R, Bonita R, Ezzati M, et al. NCD Countdown 2025: accountability for the 25 x 25 NCD mortality reduction target. *Lancet* 2014; **384**(9938): 105-7.
333. Haddad L, Achadi E, Bendeck MA, et al. The Global Nutrition Report 2014: actions and accountability to accelerate the world's progress on nutrition. *J Nutr* 2015; **145**(4): 663-71.
334. Patton GC, Coffey C, Cappa C, et al. Health of the world's adolescents: a synthesis of internationally comparable data. *Lancet* 2012; **379**: 1665-75.
335. WHO. Global Reference List of 100 Core Health Indicators. Geneva: World Health Organization (WHO), 2015.
336. Bhamra AS, Nagrath K, Z N. Role of Non-State Actors in Monitoring and Review for Effective Implementation of the Post-2015 Agenda: IRF2015, 2015.
337. de Andrade LOM, Pellegrini Filho A, Solar O, et al. Social determinants of health, universal health coverage, and sustainable development: case studies from Latin American countries. *The Lancet* 2015; **385**(9975): 1343-51.
338. Kraak VI, Story M. An accountability evaluation for the industry's responsible use of brand mascots and licensed media characters to market a healthy diet to American children. *Obes Rev* 2015; **16**(6): 433-53.
339. Beaglehole R, Bonita R, Horton R. Independent global accountability for NCDs. *Lancet* 2013; **381**(9867): 602-5.
340. WHO. The Second Decade: Improving Adolescent Health and Development. Geneva: World Health Organization (WHO), 2001.
341. Arnett JJ. Emerging adulthood. A theory of development from the late teens through the twenties. *AmPsychol* 2000; **55**(5): 469-80.
342. Sisk CL, Foster DL. The neural basis of puberty and adolescence. *Nat Neurosci* 2004; **7**(10): 1040-7.
343. Spear LP. The adolescent brain and age-related behavioral manifestations. *Neurosci Biobehav Rev* 2000; **24**(4): 417-63.
344. Baker ST, Lubman DI, Yucel M, et al. Developmental Changes in Brain Network Hub Connectivity in Late Adolescence. *J Neurosci* 2015; **35**(24): 9078-87.
345. Giedd JN, Lalonde FM, Celano MJ, et al. Anatomical brain magnetic resonance imaging of typically developing children and adolescents. *J Am Acad Child Adolesc Psychiatry* 2009; **48**(5): 465-70.
346. Giedd JN, Blumenthal J, Jeffries NO, et al. Brain development during childhood and adolescence: a longitudinal MRI study. *Nat Neurosci* 1999; **2**(10): 861-3.
347. Tanner JL, Arnett JJ. Presenting "emerging adulthood": What makes it developmentally distinctive. *Debating emerging adulthood: Stage or process* 2011: 13-30.
348. Sawhill IV. Generation Unbound: Brookings Institution Press; 2014.
349. International Institute for Population Sciences (IIPS). National Family Health Survey (NFHS-1), India 1992-93. Mumbai, India: IIPS, 1995.
350. International Institute for Population Sciences (IIPS), Macro International. National Family Health Survey (NFHS-3), 2005-06: India: Volume I. Mumbai, India: IIPS, 2007.
351. Jain S, Kurz K. New Insights on Preventing Child Marriage: A Global Analysis of Factors and Programs. Washington, DC: ICRW, 2007.
352. International Institute for Population Sciences (IIPS). District Level Household and Facility Survey 2007-08 (DLHS-3). Mumbai, India: IIPS, 2010.
353. ICRW. Development Initiative on Supporting Healthy Adolescents (DISHA) project: Analysis of quantitative baseline survey data conducted in 2004. Washington, DC: International Center for Research on Women (ICRW), 2005.
354. DNA India. Cabinet approves bill on compulsory marriage registration. 2012. <http://www.dnaindia.com/india/report-cabinet-approves-bill-on-compulsory-marriage-registration-1674966> (accessed 22 July 2014).

355. Tandon U. Family Planning in India: A Study of Law and Policy. 2010. <http://paa2010.princeton.edu/papers/101217> (accessed 2 April 2015).
356. ICRW. Delaying Marriage for Girls in India: A Formative Research to Design Interventions for Changing Norms. New Delhi, India: UNICEF, 2011.
357. Johnson SB, Jones VC. Adolescent development and risk of injury: using developmental science to improve interventions. *Inj Prev* 2011; **17**(1): 50-4.
358. DriversEd.com. Graduated Drivers License (GDL). n.d. <https://www.driversed.com/dmv/california/gdl.aspx> (accessed 20 April 2015).
359. Chen L-H, Baker SP, Li G. Graduated driver licensing programs and fatal crashes of 16-year-old drivers: a national evaluation. *Pediatrics* 2006; **118**(1): 56-62.
360. Lyon JD, Pan R, Li J. National evaluation of the effect of graduated driver licensing laws on teenager fatality and injury crashes. *J Saf Res* 2012; **43**(1): 29-37.
361. Coffey C, Veit F, Wolfe R, Cini E, Patton GC. Mortality in young offenders: retrospective cohort study. *British Medical Journal* 2003; **326**(7398): 1064-6.
362. Muncie J. International juvenile (in) justice: penal severity and rights compliance. *International Journal for Crime, Justice and Social Democracy* 2013; **2**(2): 43-62.
363. Schwalbe CS, Gearing RE, MacKenzie MJ, Brewer KB, Ibrahim R. A meta-analysis of experimental studies of diversion programs for juvenile offenders. *Clin Psychol Rev* 2012; **32**(1): 26-33.
364. Asquith S. The Kilbrandon report. Children and Young Persons Scotland. Edinburgh: HMSO, 1995.
365. Dünkel F, Pruin I. Young adult offenders in juvenile and criminal justice systems in Europe. *Young Adult Offenders: Lost in Transition* 2012: 11-38.
366. Hochberg Z, Belsky J. Evo-devo of human adolescence: beyond disease models of early puberty. *BMC Med* 2013; **11**: 113.
367. Yi J, Kim MA, An S. The Experiences of Korean Young Adult Survivors of Childhood Cancer A Photovoice Study. *Qualitative health research* 2015: 1049732315599374.
368. Findholt NE, Michael YL, Jerofke LJ, Brogoitti VW. Environmental influences on children's physical activity and eating habits in a rural Oregon County. *Am J Health Promot* 2011; **26**(2): e74-e85.
369. Dakin EK, Parker SN, Amell JW, Rogers BS. Seeing with our own eyes: Youth in Mathare, Kenya use photovoice to examine individual and community strengths. *Qualitative Social Work* 2015; **14**(2): 170-92.
370. Findholt NE, Michael YL, Davis MM. Photovoice engages rural youth in childhood obesity prevention. *Public Health Nurs* 2011; **28**(2): 186-92.