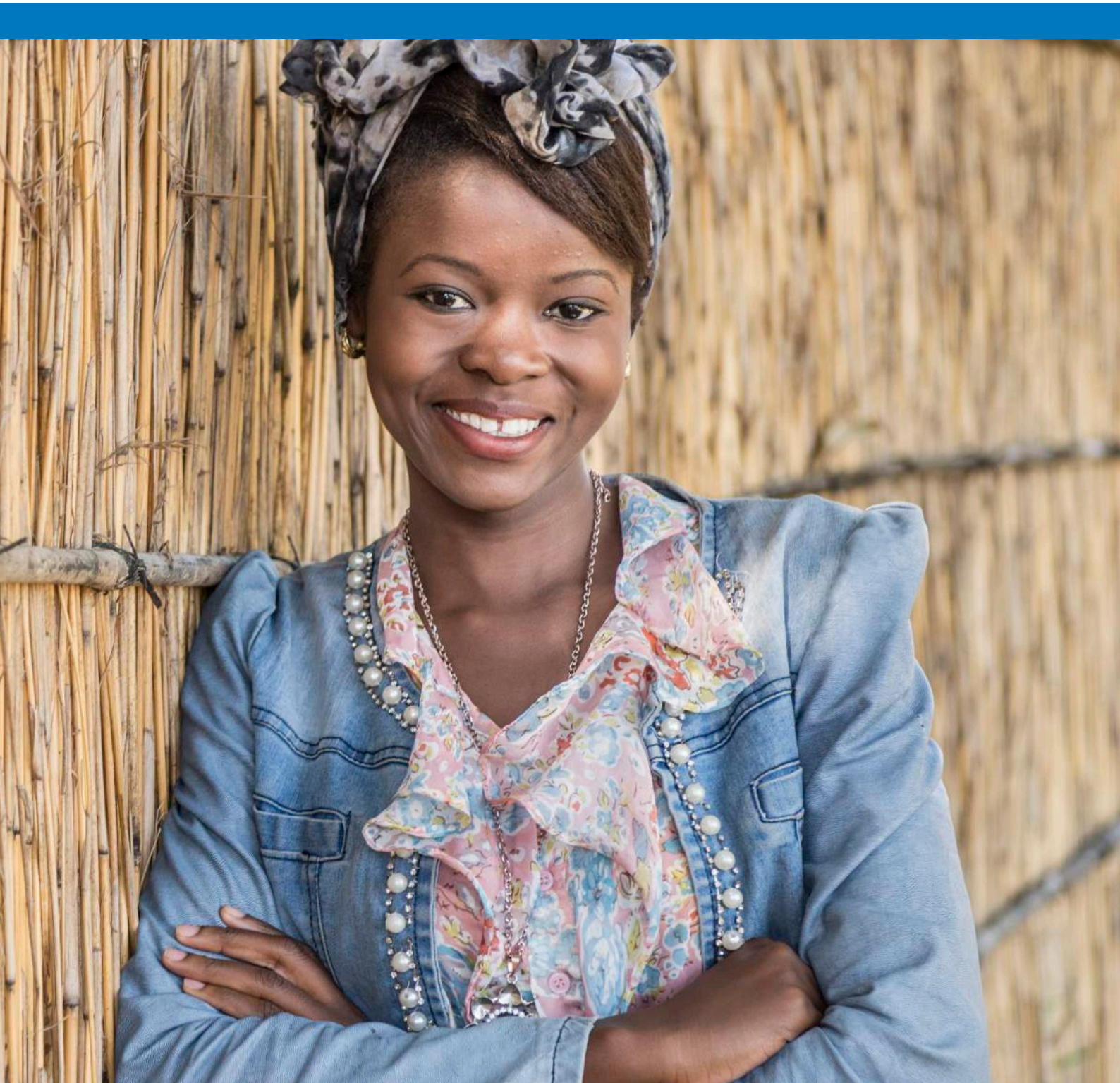


Noncommunicable Disease Prevention and Adolescents

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I. Introduction

The Sustainable Development Goals (SDGs), adopted in September 2015, include ambitious targets related to non-communicable diseases (NCDs), including by 2030 reducing by one-third premature mortality from NCDs, through prevention and treatment and promoting mental health and well-being (SDG Goal 3, Target 3.4). Yet the role of prevention among adolescents (10-19 years), who represent 1 in 6 of the world's population, has been largely ignored in global NCD declarations and action plans to date.¹

Although nearly 35% of the global burden of disease has its origins in adolescence, and more than 3000 adolescents die every day, mostly from NCDs, intentional and unintentional injuries² and other preventable causes, adolescents have largely been overlooked in global discussions on NCDs (WHO 2017a; Akseer et al., forthcoming). Premature mortality from NCD deaths as measured through the indicator for in SDG Target 3.4, for example, does not include NCD-related mortality among children, adolescents and young people under the age of 30.

Adolescence is a time of rapid physical, neurological, social, and sexual development marked by the

growing significance of peer networks, individual behavioral choices, and increased risk-taking behavior. It is also a pivotal period for the development of NCDs, the prevention of which may yield a triple dividend of benefits – for adolescents today, for their future adult lives, and for the next generation (Patton *et al.* 2016).

The upcoming United Nations Third High Level Meeting on the Prevention and Control of NCDs in 2018 presents a critical opportunity for national governments to commit to investment in adolescents. This paper outlines the evidence, opportunities and actions required to prioritise and accelerate NCD prevention among this critical age group.

¹ See the United Nations General Assembly (UNGA) Political Declaration on the Prevention and Control of NCDs (2011), the World Health Association-endorsed *Global Action Plan for the Prevention and Control of NCDs 2013-2020* and the UNGA Outcome Document of the High-level Meeting of the General Assembly on the *Comprehensive Review and Assessment of the Progress Achieved in the Prevention and Control of Non-communicable Diseases* (2014)

² Although beyond the scope of this paper, it is important to recognize the significant contribution of intentional and unintentional injuries to global adolescent disease burden. For example, in 2015, road injuries were the leading cause of death among adolescents (10-19 years) globally, and interpersonal violence was the second leading cause of death among older adolescent males (15-19 years). For additional information see WHO. *Global accelerated action for the health of adolescents (AA-HAI): Guidance to support country implementation*. Geneva: World Health Organization; 2017a, pgs 24-25.



II. Global context and risk factors among adolescents

NCDs, principally cardiovascular diseases, cancers, diabetes, and chronic lung diseases, account for 70% of all deaths globally, more than all other causes combined. WHO estimates that 40 million people die each year from NCDs, including 15 million who die prematurely (defined by WHO as those between the ages of 30 and 69) from preventable causes. Disproportionately affecting low socioeconomic groups, both within and across countries, the preponderance of those dying prematurely from preventable NCDs (86%) live in low-income and middle-income countries (WHO 2017g).

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NCDs impose a substantial burden on the global economy, with significant adverse impacts not only on human health and well-being, but also on economic growth, productivity, and development. Macro-economic analyses predict that under a 'business as usual' approach to NCDs, cumulative economic losses to low and middle-income countries will approximate USD \$7 trillion between 2011-2025 (Bloom *et al.* 2014). The NCD burden also strains national health systems and health budgets, undermining the capacity of countries to progressively realise and deliver universal health coverage, a clear priority on the global health agenda. Moreover, a recent report from the World Economic Forum emphasises that investing in health promotion and NCD prevention at particular "inflection points" across the life-course, several of which are associated with childhood and adolescence, provides superior health and economic returns (WEF 2015).

Premature NCD deaths due to cardiovascular diseases, diabetes, cancers and chronic respiratory diseases (as listed above) are prioritised in the *Global Action Plan for the Prevention and Control of NCDs 2013-2020*. Largely preventable, these NCDs are attributable in large part to four modifiable risk factors including tobacco, poor diet, the harmful use of alcohol, and insufficient physical activity (WHO 2013a). Beyond the four main NCDs, mental health disorders also represent a risk factor for premature mortality as well as for the development of cardiovascular diseases and cancer (Pryor, Da Silva, and Melchior 2017). A leading cause of disability worldwide and accounting for 4.3% of the global burden of disease, the WHO estimates that depression alone, a common mental health disorder, affects more than 300 million people of all ages globally, including adolescents (2013b).

Although most NCD-related morbidity and mortality occurs in adulthood, NCDs have considerable effect on children and adolescents. More specifically:

- Asthma, type 1 diabetes, leukemia, and rheumatic heart disease are the leading causes of death



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among children, yet all of them are treatable (NCD Child 2014).

- Children and adolescents in low and middle income countries who suffer from NCDs often die prematurely because of late diagnosis or lack of access to medications or to adequate treatment, or suffer long-term disabilities from chronic conditions that are not adequately managed (NCD Child 2014).
- Among adolescents (10-19 years), a substantial share of the global NCD burden is due to mental illnesses. Depression is the third leading cause of illness and disability among adolescents, and self-harm, which includes both suicide and accidental death resulting from self-harm without suicidal intent, is the third leading cause of death in older adolescents (15-19 years) (WHO 2017a; Akseer *et al.*, forthcoming).

Many risks for the development of NCDs have their origins in early life. Prenatal malnutrition and low birth weight create a predisposition to obesity, high blood pressure, heart disease and diabetes, and pregnancy conditions, such as maternal obesity and gestational diabetes, are associated with cardiovascular disease and diabetes for both mother and the child (Boney *et al.* 2005; Barouki *et al.* 2012; WHO 2016). In addition, risk factors are often intertwined. For example, tobacco use and secondhand smoke exposure contribute to obesity, diabetes and infectious diseases, as well as to asthma, cancers and cardiovascular disease in both smokers and nonsmokers (CDC 2006; Oberg *et al.* 2011; WHO 2017d).

While risk factor profiles for the development of NCDs among adolescents vary considerably by gender and across countries and regions (see for example UNICEF 2015b), many NCDs are associated with behaviors that are initiated and established in childhood or adolescence, including tobacco and alcohol use, unhealthy diets, and sedentary lifestyles. In addition, as many as half of all mental health disorders start by the age of 14, but most often are neither identified nor treated (WHO 2014b).

Tobacco use and exposure to second-hand smoke

A major cause of NCDs worldwide, tobacco use kills more than 7 million people annually. More than 6 million of those deaths are the result of direct tobacco use while approximately 890,000 are the result of non-smokers, including children’s exposure to second-hand smoke. More than 30% of women and 40% of all children and adolescents worldwide (0-14 years) have reported exposure to secondhand smoke (Oberg et al 2010). Without strong preventative action, the annual death toll from tobacco is expected to increase to 8 million deaths per year by 2030 (WHO 2014a).

Although the prevalence of current tobacco use varies by region and gender, the WHO estimates that at least 1 in 10 adolescents aged 13 to 15 years globally uses tobacco (WHO 2017e). In some low-income and middle-income countries, prevalence rates of current tobacco use are considerably higher. The mean prevalence of current tobacco use among adolescents (aged 12-15 years) across 68 low-income and middle-income countries was 13.6%, ranging from 2.8% in Tajikistan to 44.7% in Samoa. The overall prevalence of second-hand smoke exposure was also very high (55.9%), ranging from 16.4% in Tajikistan to 85.4% in Indonesia. Notably, parental tobacco use and second-hand smoke exposure were strongly associated with tobacco use among young adolescents (Xi *et al.* 2016). Unfortunately the SDGs currently only count tobacco use starting at 15 years, and make no mention of secondhand smoke.

Alcohol use

Alcohol use among adolescents is a significant public health issue in many countries as well as a risk factor for youth violence (WHO 2014c, 2015d). The prevalence of alcohol drinking among 15-19 year olds is highest in Latin America and the Caribbean (boys (55%) and girls

(38%)) and in Eastern Europe (boys (69%) and girls (49%)) (Brumana *et al.* 2017, Table 3).

Monthly heavy episodic drinking (HED) - defined as drinking at least 60 grams or more of alcohol on at least one occasion in the past 30 days – is more prevalent worldwide among adolescents aged 15–19 years (11.7%) than among the total population aged 15 years or older (7.5%). It is also three times more likely among adolescent males (16.8%) than females (6.2%)) (WHO 2014c).

Although trends vary by region and country, per capita alcohol consumption (15+ years) increased between 2006 and 2010 worldwide, driven primarily by increases in China and India.

Overweight and obesity

Between 1975 and 2016, the number of children and adolescents (aged 5-19 years) who are obese increased tenfold worldwide. The global prevalence of obesity increased from 0.7% to 5.6% in girls (aged 5-19 years), and from 0.9% to 7.8% in boys (aged 5-19 years) (NCD Risk Factor Collaboration 2017).

In 2016, an estimated 50 million girls and 74 million boys worldwide were obese, and an additional 213 million children and adolescents were overweight. Although rising trends in child and adolescent overweight and obesity have plateaued in many high-income countries since 2000, there continues to be an accelerating upward trend in many low-income and middle-income countries, particularly in East, South, and Southeast Asia. If current trends continue, global levels of child and adolescent obesity are expected to exceed those of moderate and severe underweight by 2022 (NCD Risk Factor Collaboration 2017).

As a result of the global increase in child and adolescent overweight and obesity over the past four decades, many countries are now facing a double burden of malnutrition simultaneously, which is characterised by the co-existence of undernutrition and overweight and obesity across the life course, all of which contribute to the NCDs burden.³

³ WHO recently released guidelines to assess and manage children at primary health care facilities to prevent childhood overweight and obesity (but not adolescent overweight and obesity) with the broader context of malnutrition (WHO 2017f).



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Physical inactivity

Insufficient physical activity among adolescents is a significant issue across all regions of the world. Globally, 81% of adolescents aged 11–17 years did not meet the WHO recommendation of 60 minutes of physical activity per day. Adolescent girls (84%) were less active than adolescent boys (78%) (WHO 2014).

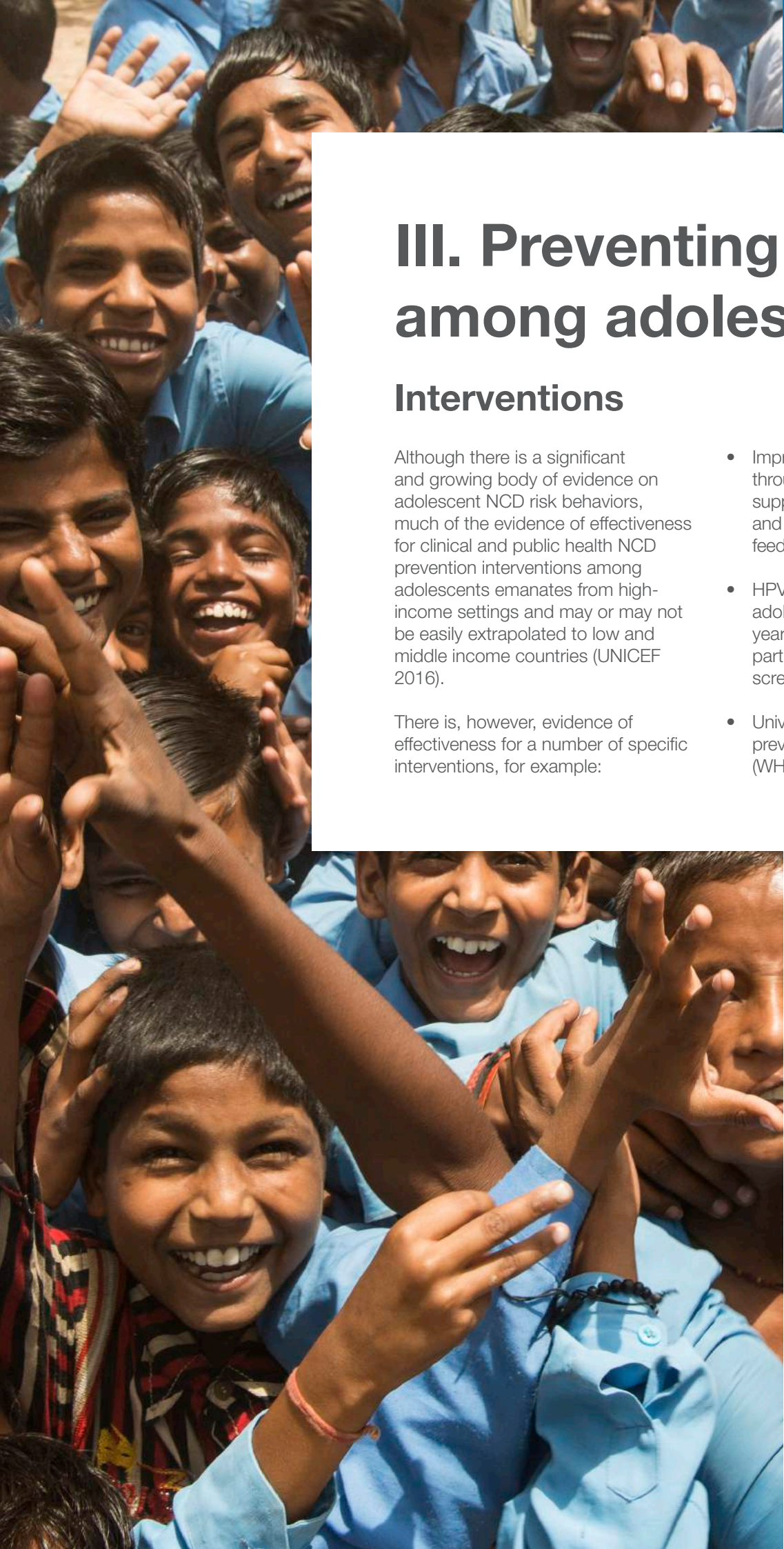
Social, environmental, and commercial determinants of risk

The evidence clearly demonstrates that social determinants of health and early childhood adversity (including high-stress family and community environments; poverty and low socio-economic status; social and political instability; violence, including child maltreatment; unsafe environments; and poor living conditions)

contribute to the adoption of unhealthy behaviors, impairments in physical and mental well-being, and the development of NCDs (Shonkoff *et al.* 2012; Blum 2014; Brumana *et al.* 2017; Stringhini *et al.* 2017).

Further, environmental determinants of health, such as indoor and outdoor pollution also directly contribute to NCD morbidity and mortality. According to 2016 WHO estimates, modifiable environmental risk factors cause about 1.7 million deaths in children younger than five years and 12.6 million total deaths every year (Neira *et al.* 2017). Household air pollution and ambient particulate matter are among the leading global risk factors associated with adolescent death and disability among 10-14 year olds (WHO 2017c).

Lastly, the commercial determinants of health, which include the marketing of unhealthy products to children and adolescents, (i.e., low nutrition foods and beverages, alcohol and tobacco) also have direct effects on children and adolescent’s preferences, behaviors, and consumption patterns (WHO 2010; Cairns 2013). This underscores the importance of policy-level interventions to constrain the marketing of unhealthy commodities, particularly to children and adolescents.



III. Preventing NCDs among adolescents

Interventions

Although there is a significant and growing body of evidence on adolescent NCD risk behaviors, much of the evidence of effectiveness for clinical and public health NCD prevention interventions among adolescents emanates from high-income settings and may or may not be easily extrapolated to low and middle income countries (UNICEF 2016).

There is, however, evidence of effectiveness for a number of specific interventions, for example:

- Improving nutrition, including through maternal micronutrient supplementation, breastfeeding and appropriate complementary feeding;
- HPV vaccination among adolescent girls (aged 9-13 years) to prevent cervical cancer, particularly in contexts where screening is limited
- Universal Hepatitis B vaccination to prevent cirrhosis and liver cancer (WHO 2017b; Brumana *et al.* 2017)

Platforms

Given the impact of early life influences on NCD risks and outcomes, reproductive, maternal, newborn and child health (RMNCH) programmes in particular are well positioned to play an important role in NCD prevention. Many of the interventions that impact child survival and reproductive health also impact NCD risk (Baird *et al.* 2017; Brumana *et al.* 2017). Given that 11% of all births worldwide are delivered by adolescent girls aged 15-19 years (WHO 2017e), preventing early and/or unintended adolescent pregnancies (and the associated high risk births including low birth weight, a predisposition for NCDs) and using the antenatal care (ANC) platform to reinforce NCD prevention may be important. Interventions promoted during ANC (e.g., nutrition, healthy life-style, screening and management of gestational diabetes) can improve maternal health and child survival, and also confer NCD risk reduction benefits as highlighted earlier. Expanding the scope of RMNCH programmes to include children older than five years of age as well as non-pregnant adolescents while simultaneously incorporating a broader NCD prevention focus (for example, tobacco and secondhand smoke, mental health and other screening or preventive counseling) could also have important risk reduction benefits (Brumana *et al.* 2017). Integrating NCD prevention into adolescent HIV prevention, treatment, and care is also another critical opportunity for NCD risk reduction, including among adolescents living with HIV and AIDS.

In addition to integrating an NCD prevention lens into services already provided through the RMNCH platform, strengthening the range and quality of NCD preventative and curative services for adolescents (including for mental health) at the primary health care level is essential, as is improving adolescent access to and uptake of primary health care services more generally (WHO 2014b, 2017a; Patton *et al.* 2016). In particular, as a population group, adolescents are often not well served by existing health systems. There is a general assumption that adolescents are relatively healthy, resulting in adolescent health services being uncoordinated, variable in quality, and not responsive to their unique needs or developmental stage. Stigma and discrimination also impede adolescents from accessing needed services in many settings. In addition, adolescents with disabilities and those in humanitarian and fragile settings are

particularly vulnerable and face additional challenges (WHO 2014b, 2017a; Patton *et al.* 2016).⁴

Alongside strengthening adolescent NCD prevention in the health sector, there is emerging evidence to support expanding service delivery platforms that provide NCD prevention services in schools and through community-based approaches. Although additional implementation research is needed (Singh *et al.* 2017), school-based interventions and programmes have demonstrated positive impacts on a range of adolescent health outcomes including those related to sexual and reproductive health, immunisation, substance use, mental health, and nutrition (WHO 2017a, c). Given that in many countries young people spend a large proportion of their time at school, pre-schools, primary schools and secondary schools are well positioned to promote healthy behaviors through school policies; school-based health education programmes and interventions to promote healthy eating and physical activity, including participation in sports; and through the modeling of healthy behaviors (WHO 2017a, c). Strong ownership and leadership on health promotion and NCD prevention from within the education sector is an important element for driving this agenda forward.

Given the broader social determinants of health as they pertain to NCD risk, there is increasing agreement that multi-level, multi-component interventions that combine home, school, health facilities, childcare settings, and community-based activities are more effective than standalone interventions (Patton *et al.* 2016, Akseer *et al.* forthcoming).

This further underscores the importance of broad multi-sectoral efforts and a development-oriented approach (McKee *et al.* 2014) that tackle the behavioral, social, environmental, and commercial determinants of NCD risk through various mechanisms, including public policy and regulations, poverty alleviation strategies, urban planning and built environment initiatives, and the implementation of evidence-based NCD prevention interventions across diverse platforms and contexts. Learning from countries that have implemented multi-sectoral actions to address the social determinants of NCDs will be an important component in developing integrated and context-specific interventions and programming (Arora *et al.* 2011).

⁴ WHO's Global Accelerated Action for the Health of Adolescents (AA-HAI): *Guidance to Support Implementation* provides a detailed discussion of evidence-based approaches to strengthen adolescent health, including through the integration of adolescent NCD prevention and treatment into primary health care services, and with attention to adolescent health inequities.

Strategies and Approaches

In addition to interventions and platforms, there is also growing consensus about *the strategies and approaches* needed to promote healthy behaviors during adolescence to prevent NCDs. These include:

- A life course approach, which recognises that opportunities to prevent NCDs and promote healthy behaviors occur at multiple stages throughout the life cycle, beginning in early life (including prenatally) and continuing throughout childhood and adolescence into adulthood.
- An integrated, comprehensive, and standards-driven approach to adolescent health and service delivery that moves beyond adolescent pregnancy and HIV to address the full range of adolescents' health and development needs, including mental health issues (WHO 2014; WHO and UNAIDS 2015).
- A multi-sectoral and multi-stakeholder approach that includes broad public sector engagement across health, education, youth development, trade and finance, and urban planning, as well as civil society and the private sector to address behavioral, social, and environmental determinants of risk. Many non-health sectors can and do impact adolescent NCDs risk, with broad consensus that effective NCDs prevention and improved adolescent health require broad multi-sectoral efforts. In addition to stronger coordination and collaboration across sectors, it is also critical that sector leaders, including in social development and poverty alleviation, prioritise adolescent NCDs prevention in their respective strategic and operational plans.
- An inclusive youth development and empowerment approach that enhances the literacy of adolescents, including health literacy, and creates meaningful and formal opportunities for adolescent participation in the planning and implementation of adolescent health, education, social service, and development programming (amongst others), including through mentorship and training activities. The inclusion of adolescents and young people as decision makers is broadly recognised as best practice and a key contributor to building effective programmes and policies for improved adolescent health outcomes (Baker et al 2016; Patton et al. 2016; WHO 2017a).

Policy and Regulatory Action

Policy actions that limit or prevent exposure to NCD risks in adolescence are perhaps most critical for promoting protective environments and supporting healthy behaviors in this age group. The WHO has developed a menu of policy options and 'best buys' (interventions considered the most cost-effective and feasible for implementation) to improve the prevention and control of NCDs (2017b). Policy and regulatory actions that are particularly significant for NCD prevention among children and adolescents include:

- Setting a minimum age for the purchase and consumption of alcohol and regulating how alcoholic drinks are targeted at the younger market, including through sponsorships and activities targeting young people;
- Prohibiting the sale of tobacco products to minors, banning tobacco advertising and ensuring smoke-free environments;
- Developing regulations on the marketing of foods and beverages, in line with WHO recommendations, to limit the consumption of foods and beverages high in fat, sugar and salt by children and adolescents, including nutritional labeling to reduce total energy intake from sugars, sodium, and fats;
- Taxing and increasing the price of unhealthy commodities such as tobacco products, alcohol, and sugar-sweetened drinks



IV. Recommendations and looking ahead

The global prevention and control of NCDs is critical both for achieving Target 3.4 of the SDGs and for achieving other SDG targets, including those related to poverty, hunger, economic development, and environment sustainability (NCD Alliance 2017). Both for SDG 3 and also for other SDGs, increased consideration of the needs of adolescents and groups that have been traditionally disadvantaged is critically needed (Klein and Alden, 2017).

The data and research evidence clearly indicate the urgent need to address NCD risk factors among adolescents, including social, environmental, and commercial determinants of health, and with specific attention to issues of equity. This is for the tremendous potential impact for the health and well-being of adolescents themselves, for the benefit of future generations

and for broader social and economic development.

They also demonstrate the need for strong policy action, a decisive shift in programming to include a focus on adolescents and NCDs, and clear accountability mechanisms.

Priority areas for action include:

Policies and regulations:

- Include adolescent NCD prevention, including mental health interventions, in existing national health and other sector policies, including education, social development and poverty alleviation, environment, and urban planning.
- Implement and enforce national policies and regulations prohibiting the sale of tobacco products and alcohol to children and adolescents and protecting both child and adult non-smokers from secondhand tobacco smoke.
- Restrict and/or ban (where relevant) the marketing of unhealthy products to children and adolescents (tobacco, alcohol, unhealthy foods and beverages).
- Use pro-health taxation and price measures to reduce the consumption of tobacco, alcohol, and unhealthy foods and beverages and increase the consumption of healthier products (through price subsidies and distribution programmes etc.).

Data, financing, and accountability:

- Collect and report age and sex-disaggregated data on the prevalence and incidence of NCDs and NCD risk behaviors among children and adolescents, including those pertaining to mental health.
- Implement a systematic needs assessment to identify and prioritise adolescent NCD-related health needs, with attention to issues of equity and inequality (e.g., gender, economic status, disability, geography, etc.) within the broader context of national adolescent health plans, programmes, and legislation.
- Develop country profiles on adolescents and NCDs to inform the development of country-specific policies and programmes and resource allocation for NCD prevention among adolescents and young people.
- Ensure that data on NCDs and adolescents is integrated into new and existing accountability mechanisms for NCDs and/or adolescent health, such as the WHO NCD Global Monitoring Framework as well as national and global monitoring tools to track progress on adolescent health.⁵

Programmes:

- Integrate adolescent NCD prevention and treatment into basic primary health care services and packages, in particular RMNCH platforms, to screen for those in need of NCD treatment. Promote healthy behaviors across the life cycle, beginning with maternal health and the pre-natal period and extending throughout childhood and adolescence and into adulthood.
- Expand the service delivery platforms that provide NCD prevention services to adolescents and young people including through schools and community-based platforms.

Adolescent participation:

- Ensure national policy frameworks recognise the importance of adolescent participation and leadership in national planning processes through the establishment of formal mechanisms for participation, including inclusion and outreach to adolescents from key vulnerable groups.
- Create forums, structures, and processes to institutionalise adolescent participation and leadership in national and sub-national dialogues and planning processes about young people's health and well-being, including NCD risk reduction.
- Strengthen adolescent competencies and leadership in NCD prevention through sustained training and mentorship opportunities.

⁵ The Every Woman Every Child's Independent Accountability Panel for example has recommended that member states and key stakeholders consider the development of a national multi-sectoral adolescent health and well-being index. Ensuring the inclusion of NCD-related data in the index would be an important step forward. See Independent Accountability Panel. Every Woman, Every Child, Every Adolescent. *Transformative accountability for adolescents. Accountability for the health and human rights of women, children, and adolescents in the 2030 Agenda. Summary of recommendations*, 2017 (http://iapreport.org/files/IAP_2017_Exec_Summary-EN-web.pdf)

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