



Data and indicators to measure adolescent health, social development and well-being

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Produced by the UNICEF Office of Research, this series of briefs on research methods is intended to share contemporary research practice, methods, designs, and recommendations from renowned researchers and evaluators. The primary audience are professionals, including UNICEF staff, who conduct, commission or interpret research and evaluation findings in development contexts to make decisions about programming, policy and advocacy.

This brief is one of seven on research methodologies designed to expand and improve the conduct and interpretation of research on adolescent health and well-being in low- and middle-income countries (LMICs). Building on the recent [Lancet Commission on Adolescent Health and Wellbeing](#), these briefs provide an overview of the methodological quality of research on adolescents. They cover topics including: indicators and data sources; research ethics; research with disadvantaged, vulnerable and/or marginalized populations; participatory research; measuring enabling and protective systems for adolescent health; and economic strengthening interventions for improving adolescent well-being.

The briefs are written by leading experts in adolescent health and well-being. To read other briefs in this series, visit <https://www.unicef-irc.org/adolescent-research-methods/>

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INTRODUCTION

Adolescence, defined as the span between ages 10-19, is a critical juncture when rapid changes in health, social development and well-being have long-lasting and important implications for the life chances and trajectories of individuals, communities and the next generation. For these reasons, the international development community has identified the health, social development and well-being of adolescents as a priority. This is particularly salient in the current generation of adolescents and young adults – the largest the world has ever seen.

This brief focuses on quantitative data and indicators to measure adolescent health, social development and well-being. It discusses:

- the principles of good indicator definition
- common use of indicators
- examples of indicators for adolescent health and social development
- existing global data to describe (and populate indicators of) adolescent health and social development
- how data collection efforts can be improved.

The main learning points from this brief are presented in Box 1.

Box 1. Summary of key points

Indicators are summary measures that describe aspects of well-being, their determinants or service response:

- Good quality indicators measure relevant aspects of well-being, and are well defined, measurable, achievable and replicable.
- Indicators should be relevant to identifying priority areas for policy action and programme design, as well as to monitoring progress.

Reporting frameworks bring together individual indicators to provide a picture or profile of adolescent development and well-being:

- Reporting frameworks have been proposed by UNICEF, the World Health Organization (WHO), and academic groups.
- Physical and mental health, education and employment are commonly measured.
- Participation, civic engagement, and protection and safety are important domains of adolescent well-being, but data and indicators for these domains are not widely available.

Data are pieces of information that are needed to populate indicators:

- The best quality data for adolescents are sourced from surveys specifically designed for adolescents. School-based surveys provide a particularly efficient means of measuring adolescent development and well-being. However they are limited as they capture a sub-sample of adolescents who participate in the educational system.
- Significant data gaps exist for young adolescents (aged 10–14), adolescents out of school, and those who are marginalized and fall outside traditional data collection sampling frameworks. Data gaps also exist around the sexual and reproductive health of unmarried sexually active adolescents.
- Improved understanding of adolescence as a critical developmental stage coupled with improved measures and emerging technologies (including rapid uptake of smart phones and access to the internet) provide opportunities for improved adolescent well-being data.

Patterns of adolescent health, social development and well-being vary widely across different settings.

Indicators and data (the focus of this brief) play an essential role in determining priorities for investments in adolescent health, education and social development. Indicators help describe trends over time and identify inequalities across groups. They are also essential for monitoring the effectiveness of health action and investment. Indicators typically measure specific developmental or health outcomes, their determinants, or information about specific interventions, such as coverage or utilization.

Indicators are commonly reported as counts (total number of people with a given condition), prevalence (the number of people with a particular outcome [numerator], divided by the total population who are eligible to have that outcome [denominator], usually expressed as percent) or incidence (rate of *new* outcomes or events divided by the specified population over a given time period, typically a year). Indicators therefore typically have a clearly defined and standardized numerator and denominator, which facilitates comparison across data collection efforts. Indicators serve as a guide to decision-making, are used to set goals and targets, and are useful for monitoring the effects of programmes and policies. Sound primary data are the cornerstone of indicators. Data are pieces of information that may be specifically collected in surveys or captured through routinely collected data in registries (Box 2).

PRINCIPLES OF GOOD INDICATOR DEFINITION

Major policy initiatives are generally accompanied by a set of indicators for monitoring progress. For example, the Sustainable Development Goals are linked to a set of indicators and targets. This is generally also true for national and local policy initiatives.

Although many indicators exist for the different aspects of adolescent health, social development and well-being, few are well defined and measured. Box 3 describes criteria for defining indicators. Given the limited resources available for evaluation and measurement, it is generally necessary to define a minimal set of indicators that capture the essence of the policy or programme of interest.

Box 2. Definitions of key concepts

Data: Data are pieces of information collected for a purpose. Data may be either qualitative or quantitative. *Qualitative* data typically use words or other media (for example photographs or images) to understand a problem or context in depth. Qualitative data are particularly powerful in understanding underlying reasons, motivations and opinions. *Quantitative* data in contrast are typically numeric based, and measure or count specific outcomes. Quantitative data are reproducible, and can be manipulated using statistical techniques to adjust for measurement error or modelled for missing data. Data can be *cross-sectional*, measuring the status of the population at a point in time, or *longitudinal*, involving repeated measuring of the same group of people over time, to understand the various trajectories and changes.

Indicator: An indicator is a summary measure of an outcome of interest.* Indicators usually relate to outcomes (social, economic, educational and/or health status), determinants, or service and policy implementation. Indicators of adolescent health and social development should be clearly defined, valid, reliable and relevant. (They should relate to significant aspects of adolescent health and social development). Indicators are useful in assessing the status of a particular population group and how this status changes.

Metric: A **metric** is a system or method of measurement. For example, *prevalence* measures how common an outcome of interest is (the number of people in a population with the outcome of interest divided by the population count), while *incidence* measures the rate of new outcomes (new outcomes in the population divided by the population count over a specified time period).

Quality: Data quality relates to both the reliability and validity of the measure. *Validity* relates to how well the data measure captures what they intended to capture. *Reliability* relates to the stability and consistency of data measurement.

Reporting frameworks: Groups of indicators are often brought together to form 'reporting frameworks' to describe the status of a given population. Reporting frameworks typically align with policies and conceptual models of adolescent social development and well-being.

Stratification or disaggregation: The presentation of indicators by subgroups of interest (e.g. by sex, urban/rural status or by socioeconomic and ethnic group). Such comparisons allow the identification of inequalities, and targeting of action to marginalized groups.

Target: A goal, usually numeric, for policy or programming, typically defined for a future date. Tracking indicators over time allows monitoring of progress towards a target, whether or not that target is achieved.

* Murray, C. J., Salomon, J. A. and Mathers, C., 'A Critical Examination of Summary Measures of Population Health', *Bulletin of the World Health Organization*, vol. 78, no. 8, 2000, pp. 981-994.

Box 3. Criteria for quality indicator definition

Indicators should be:

- Timely and address a topic of public policy importance or a priority question for a programme of interest. In essence, they should be compelling in catalysing further action.
- Valid, reliable, easily interpretable in relation to the topic of interest, and comparable across settings and over time.
- Measurable and have an accompanying measurement strategy either through a feasible new data collection or through pre-existing data collections.
- Link to policy and programming priorities at a national (or global) level.

COMMON USE OF INDICATORS

Indicators serve three main purposes with respect to adolescent health and social development. They:

- identify problems for action
- measure determinants of development and well-being
- monitor the implementation and effectiveness of specific programmes and policies.

Identify problems for action

Indicators capture important information for programme design, for example, the rates of particular health problems (e.g. HIV seroprevalence among adolescents), the rates of school enrolment (e.g. the percentage of adolescents enrolled in school) or the rates of a particular risk (e.g. homelessness). Compelling indicators of need, inequity or inequality are an essential tool in advocacy for policy and service system responses.

Measure determinants of development and well-being

Many aspects of adolescent well-being and social development are shaped by the economic, social, cultural, legislative and policy context. Indicators of this kind may therefore measure structural determinants (e.g. wealth and equity) or determinants relating to policies and their coverage (e.g. the minimum legal age for marriage, and rates of child

marriage). Indicators may measure determinants at the community and household levels (e.g. community functioning or family connectedness). Indicators may also measure determinants at the individual level (e.g. civic engagement). While risk determinants are more commonly measured and reported, there is a growing interest in measuring strengths and capacities.

Monitor the implementation and effectiveness of specific programmes and policies

Indicators are essential for tracking change over time and in this context may be used to monitor the effects of policy and programming initiatives. This is essential in tracking implementation and operational success of programmes and ensuring inclusivity of all groups (e.g. socially and economically marginalized adolescents).

EXAMPLES OF INDICATORS FOR ADOLESCENT HEALTH AND SOCIAL DEVELOPMENT

UNICEF, WHO and academics have defined reporting frameworks for adolescent health, social development and well-being. These bring together multiple individual indicators, which measure discrete aspects of development and well-being, so as to provide a profile of adolescent health and social development for a population. Appendix 1 details some established reporting frameworks and their related indicators. Key domains included are discussed below.

Physical and mental health

Physical and mental health is a common domain for many reporting frameworks since it represents opportunity for health gain through the health system. Physical and mental health are also underlying determinants of well-being. Indicators of physical and mental health typically measure overall health status, health outcomes (diseases and injuries), health risks (behaviours and states that increase the risk for current or future poor health) and health system response.

- Health outcomes typically include mental health, sexual and reproductive health and injury outcomes. Health outcome indicators have often been measured using mortality data as these are routinely collected in many countries and represent the most complete data for adolescents globally. However, mortality data typically provide an

incomplete and biased picture of health outcomes, particularly for those that rarely result in death (such as sexually transmitted infections). An approach used by the recent [Lancet commission](#) on adolescent health and well-being was to use modelled data from the global burden of disease (including mortality and years of healthy life lost to disease and injury) so as to provide a more comprehensive picture of health.¹ Improved coverage of health surveys (discussed herein) provides increased opportunities to describe health outcomes for adolescents.

- Indicators related to health risk typically include nutritional risk (the proportion of overweight individuals and obesity), substance use (the prevalence of binge drinking) and sexual health risk (e.g., the proportion of adolescents who have sex under the influence of substances). The definitions of these indicators is largely inconsistent given the wide variability in data available.
- Indicators of health service response typically focus on coverage of interventions relating to sexual and reproductive health. For example, the proportion of adolescents with correct knowledge of HIV or the proportion of adolescents who used a condom at last sex.

Education and learning

Education and learning are central to adolescent development. Indicators largely measure school enrolment, attendance, attainment or learning outcomes. Data are most widely available for indicators on education enrolment (the proportion of adolescents who are enrolled at school) or attainment (e.g. the proportion of adolescents who have completed secondary high school), and are therefore most commonly reported data. For example, school enrolment is measurable using administrative data routinely collected by the education system. School attendance is rarely measured. There are a number of cross-country surveys measuring learning and cognitive outcomes. For example, the Programme of International Student Assessment (PISA) measures learning outcomes for adolescents aged 15 in 70 countries. Other cross-country global surveys measuring learning and cognitive outcomes include:

1 Patton et al., 'Our Future', <[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(16\)00579-1/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)00579-1/fulltext)>, accessed 16 January 2017.

Trends in International Mathematics and Science Study (TIMSS); Progress in International Reading Literacy Study (PIRLS); the International Civic and Citizenship Study (ICCS); the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ); and the Latin American Laboratory for Assessment of the Quality of Education (LLECE).

Economic opportunity and employment

Economic opportunity and employment indicators often focus on (formal and informal) labour force participation, and on child or hazardous labour. Indicators defining unemployment rates, unemployment ratios (in relation to older adults) and those not in employment, education or training (NEET) are the most commonly used for older adolescents and youth aged 15–24. Indicators on time use pertaining to domestic tasks, such as household chores (fetching water, cleaning or cooking) or caregiving to other household members, are less common.

Protection and safety

Protection and safety affect many aspects of adolescent health, social development and well-being. These indicators often measure experiences of physical, sexual or emotional abuse, or protection of sexual and reproductive health and rights. Common indicators in this domain relate to homicide-related mortality and marriage before 18 years of age (child marriage). Indicators may also measure safety within the peer network (bullying and violence) and in the community (neighbourhood safety).

Participation and civic engagement

Participation and civic engagement are important aspects of adolescent social development. Indicators in this domain may capture relevant attitudes and norms, and participation in voting and other community group-based activities (including sports or religious groups). A particular challenge is the limited availability of population data, and no agreement on what represents participation and engagement for adolescents.

KEY GAPS IN EXISTING INDICATORS AND INDEXES

There are some important areas where indicators remain poorly defined and/or infrequently reported. Examples with particular relevance to adolescents include: parental connectedness; housing and homelessness; justice; discrimination and racism; and cultural determinants of well-being.

Related to reporting frameworks are 'indexes' of adolescent development and well-being, which combine multiple individual indicators to derive a single summary score of adolescent development and well-being.² For example, the Commonwealth Youth Development Index combines indicators from the domains of education, health and well-being, employment, political participation and civic participation to derive a score from 0 to 1. Indexes are useful for comparing *across* populations, however these summary measures do not readily identify priority areas *within* development and well-being.

EXISTING GLOBAL DATA TO DESCRIBE ADOLESCENT DEVELOPMENT AND WELL-BEING

Adolescents tend to be at the margins of global data collection systems. As a result, many aspects of adolescent health, social development and well-being remain poorly measured in LMICs. Nationally representative household surveys such as the Demographic and Health Survey (DHS) and Multiple Indicator Cluster Survey (MICS) focus primarily on areas such as sexual and reproductive health, nutrition and education and typically only include older adolescents (aged 15+ years) and/or married adolescents. School-based surveys often sample younger adolescents and examine some broader aspects of adolescent health and well-being. However, these surveys do not capture out-of-school adolescents who account for a significant proportion of adolescents in some countries and/or are those who are most marginalized.

2 Goldin, N., Patel, P. and Perry, K., *The Global Youth Wellbeing Index*, Centre for Strategic & International Studies, 2014; Institute for Economics and Peace, *Commonwealth Youth Development Index: Methodology Report*, 2013.

Challenges in sampling and measurement of adolescent data

Ideally, data should be representative of all adolescents within a given population aged 10–19. Collecting data from all individuals is impractical, so a randomly selected representative sample from the population or group of interest is often used as an estimation. In practice, however, samples are often not completely representative. For example, adolescent data are often measured from young people sampled from schools. While schools provide an opportunity to sample a large number of adolescents efficiently, the representativeness of the data depends on school enrolment and attendance. Because schooling is linked to many factors, including gender, disability and socioeconomic status, these data often provide a biased picture, for example, in settings where girls and the poor have less access to education.

Household surveys may also fail to capture particularly marginalized adolescents, such as migrants, the institutionalized or the homeless, or adolescents in conflict settings. A further consideration on data quality is how the data are measured. Measurement may either be directly assessed through objective measurement (e.g. measurement of weight) or self-reported by the respondent (e.g. sexual behaviour, future aspirations). Some surveys measuring reported data for very young adolescents (10–14) rely on parent or guardian report. The reliability of this method varies according to the outcome being measured. For example, caregiver report of adolescent mental health is likely to be unreliable as it is subject to the interpretation and biases of the guardian or parent.

Sources of data for adolescent health and social development

There are two main sources of data for adolescent health, social development and well-being: routine data collection for administrative purposes and surveys measuring adolescent development and well-being.

Routine data collection for administrative purposes

These may include sources such as marriage, birth and death registries and service system statistics, such as those collected by health facilities (e.g. hospital separations) and education systems (e.g. enrolment). Administrative data have advantages in

often being easily accessible and low cost. However, these data are not always available for topics of relevance to adolescents, such as sexual behaviour, tobacco smoking and bullying. Data on health issues that may not always result in hospitalization or presentation to a health facility, such as mental illness, may also be under-reported by administrative sources. Moreover, in the absence of a high performing administrative infrastructure, data are likely to be incomplete, difficult to access in a timely manner, and biased towards adolescents with good access to services. In addition, administrative data are often poor quality because of under-reporting, misclassification or as a result of changing definitions of measures. This makes interpretation of trends over time, difficult.

Surveys that measure adolescent development and well-being

These include surveys with adolescents within the sampling frame – for example, household surveys such as the UNICEF MICS and DHS, which are both collected at regular intervals in developing countries – or surveys specifically designed for adolescents (such as the Global School Health Survey). Surveys generally provide a specific and wide range of adolescent development and well-being measures and are therefore useful in defining and populating indicators. The data quality is generally higher than for administrative data, but these surveys are often expensive to implement and require significant time investments. Survey data are often not available in many settings, and where available, may only capture a single point in time. Therefore, if not routinely administered, surveys are often not able to show changes over time. As previously mentioned, the representativeness of survey data may also be limited.

Table A2 in Appendix 2 lists some data sources available for adolescent development and well-being globally. UNICEF provides a summary of important data sources (see <<http://data.unicef.org/adolescents/overview.html>>). It should be noted that:

- Some data for adolescents (e.g., mortality, adolescent fertility and school enrolment rates) can be drawn from administrative datasets, however most data on development and well-being derive from household-based or micro-level surveys.
- Data on young adolescents, particularly those aged 10–14, are limited.

- Data for some key aspects of development and well-being (such as adolescent empowerment, including decision-making, agency or self-efficacy, participation and civic engagement) are limited.
- The DHS includes comprehensive measures of sexual and reproductive health, though for some countries data are only collected for adolescent females who are married or in a civil union. The sexual and reproductive health of unmarried sexually active adolescents is therefore often not captured (see <<https://dhsprogram.com/What-We-Do/Survey-Types/DHS.cfm>>).
- The MICS is sponsored by UNICEF and focuses on child and maternal health. The MICS provides data on indicators related to adolescents, including some data for younger adolescents. Data on adolescents include enrolment in primary and secondary school, child marriage, child labour, child discipline, maternal mortality, health risk behaviour, sexual behaviour, HIV/AIDS, male medical circumcision and, in some countries, female genital mutilation and cutting. Similarly to the DHS, data for adolescent males can be limited compared to those for adolescent females (see <<http://mics.unicef.org/publications/reports-and-methodological-papers>>).
- Health Behaviour in School-aged Children (HBSC) is a school-based survey of 11-, 13- and 15-year-olds. HBSC provides data on health risk behaviours (physical activity; cigarette, alcohol and cannabis use; sexual behaviour; violence and bullying; and injuries) and on some health states such as life satisfaction, self-reported health and body mass index (see <www.hbsc.org/methods/index.html>).
- The Global School Health Survey (GSHS) samples students aged 13–17 and addresses ten key topics: alcohol; substance use; diet; hygiene; mental health; physical activity; protective factors; sexual behaviour; tobacco use; and violence and injury (see <www.who.int/chp/gshs/methodology/en/>).

IMPROVING DATA FOR ADOLESCENT HEALTH AND SOCIAL DEVELOPMENT

Data are lacking for many core aspects of adolescent health and social development. This creates significant barriers to effective policy and programming. There are, however, opportunities to improve quality and quantity of data on adolescents.

Opportunities to improve data on adolescents

Emerging technologies hold great promise. Following rapid improvement in the number of people gaining access to the internet (particularly through mobile devices) new ways of capturing data more efficiently have emerged. Data for many large-scale health surveys are now collected using tablet computers. Many of these electronic collections include automated upload of data to a 'cloud', thus eliminating the need to code and enter data manually and reducing the delay in data availability. In addition to improvements in efficiency and accuracy, electronic data capture may reduce the respondent burden (e.g. skip patterns to exclude questions or topics of limited relevance). Automated surveys known as computer assisted self-interviewing, are a specific type of electronic data capture whereby individuals complete a survey without the assistance of an interviewer. Computer assisted self-interviewing may allow for more confidential assessment of sensitive issues (which may be omitted by an interviewer or not reported by respondents because of factors such as stigma or shame). Electronic surveys may also provide the opportunity for real-time feedback (e.g. a summary of key aspects of health and well-being measured in the survey). These emerging technologies introduce new challenges regarding privacy and confidentiality of data; see Brief 3 in this series, '[Inclusion with Protection: Obtaining informed consent when conducting research with adolescents](#)'.

Greater availability of computers and improved information technology has also led to their increased application in administrative data collection. For example, there has been a rapid transition to the digital recording of vital registration information in many countries. The increasing number of administrative and other datasets available electronically also provides opportunities for data linkage around educational enrolment, social service access and marriage registration. Newer statistical methods for analysing 'big data' increasingly allow different datasets to be

brought together, harmonized and gaps to be estimated, using models such as those adopted in the global burden of disease study.

There have been improvements in the accuracy and validity of tools that measure or assess adolescent health and social development in different settings. For example, the Strengths and Difficulties Questionnaire (see <<http://www.sdqinfo.com/a0.htm>> and Kessler-10 provide validated measures of adolescent mental health (see <www.hcp.med.harvard.edu/ncs/k6_scales.php>). Objective assessment of health status (e.g. vision and hearing screening; or collection of biomarkers for sexually transmitted infections including HIV; nutritional status; psychological stress) is also becoming more widely available and feasible to include in population surveys. There is also an increasing appreciation of research methods that are developmentally appropriate, particularly when working with younger adolescents.

There have also been improvements in methods of sampling adolescents. Newer ones such as respondent-driven sampling (where individuals recruit new participants who, in turn, recruit new participants) provide opportunities to sample difficult-to-reach populations not typically reached through household or school-based surveys, such as homeless or out-of-school adolescents. Unlike snowball recruitment, which is a non-probability (non-random) sampling method, respondent-driven sampling uses mathematical modelling to compensate for the non-random sampling, and therefore also enables population estimates to be derived. Increasing expertise with longitudinal studies is also helping to better understand adolescent health and development. These studies follow participants over a specific period of time; often many years; with repeated measurement of health outcomes and risk factors. One particular strength of longitudinal studies is that they can be used to identify risk and protective factors and their causal relationships to adolescent outcomes, thereby providing information on how outcomes and risks change over the life course.

Specific considerations in improving data on adolescents

There are three important considerations when defining data needs specific to indicators of adolescent health and social development. The first relates to data to help populate currently defined indicators of adolescent health and well-being. This includes making better use of available data from existing household, school and administrative datasets through disaggregation by age as well as marital, education, geographical and socioeconomic status. Modelled data may also help populate some current indicators in the absence of other data sources. Additionally, improved sampling is needed to ensure relevant data are collected for all adolescents (including young adolescents, males, out-of-school and marginalized) either through inclusion of these groups in existing surveys or by developing additional surveys.

The second relates to strengthening less well-defined indicators by developing new, validated measures of adolescent health and well-being. Third, data are also needed to aid the development of new indicators of adolescent health and well-being. For example, exploratory research, consultation with stakeholders, and use of modelled data can help identify gaps in current indicator frameworks.

The ten main principles for conducting good quality, relevant and useful research with adolescents are outlined in Box 4. It is essential to carefully consider confidentiality and consent; how to use measures validated for an adolescent population; which methods are developmentally appropriate; and how to engage young people. These principles help to inform an approach to research that will address important but challenging questions. For example, self-harm is a key adolescent health issue, but is a difficult area to research. With community engagement and support, and the use of methods that ensure the privacy of young people and their safety, it is nevertheless possible to collect data ethically, which can be used to inform policy and programming around this and other sensitive topics.

Box 4. Ten principles in conducting high quality research with adolescents

- 1 Engage, consult and build capacity of young people and local partners:
 - The principle ‘nothing about us without us’ applies to research with adolescents. In addition to engaging young people, it is important to build their capacity and support their professional development, wherever possible.
- 2 Define the research question clearly:
 - A well-defined research question helps define a good quality study. Consultation with young people and other core stakeholders, coupled with a review of appropriate literature and appropriate research methodologies, will help formulate a relevant question.
- 3 Ensure the privacy, confidentiality and safety of young people involved in the research:
 - Emerging technologies can help ensure privacy and confidentiality, but they can also introduce new concerns (e.g., the security of electronically stored information).
 - Surveys that measure risk to safety (e.g. intent to self-harm, abuse) must have clear protocols in place to ensure the safety of participants (e.g., timely referral to an appropriate service).
- 4 Obtain appropriate consent for participation in research:
 - Appropriate informed consent should be obtained from all adolescents or their guardians. While young adolescents may not be able to provide consent, their assent (agreement) to participate should be sought.
- 5 Use well-defined, validated measures and scales:
 - Adolescent health and social development measures are poorly defined in many areas. Defining and validating measures is therefore an essential component of the research agenda. Validating and pre-testing measures is particularly important when collecting data in a new cultural and linguistic environment.
- 6 Ensure the study design is suited to the research question:
 - Cross-sectional household or micro-survey data are useful in measuring the *prevalence* of particular outcomes, determinants or service access. Administrative data may also be suitable.
 - Longitudinal data are useful to better understand *incidence*, the emergence and interaction of risk and protective factors, and trajectories of development and well-being over time. Longitudinal data on adolescents are particularly challenging to collect as mobility is high due to changes in marital status, and moves to pursue higher education or labour force opportunities.
- 7 Sample a representative selection of adolescents:
 - School-based sampling is a pragmatic approach to conducting research with adolescents. However, (depending on education policies) school pupils are often under-representative of older adolescents, socioeconomically disadvantaged adolescents, or those with poor physical and mental health. Females and pregnant adolescents are also often under-represented.
 - Methods involving community-based sampling, peer researchers and respondent-driven sampling may help to reach marginalized, otherwise hard-to-reach adolescents.*
- 8 Use methods that are developmentally appropriate, engaging and efficient:
 - Adolescents should be the primary focus of data collection. However, their guardians, schools and communities may also provide some broader contextual information to reduce respondent burden.
 - Electronic surveys may help to improve privacy. Skip patterns, which exclude irrelevant questions, may improve efficiency. Reporting back of select findings (e.g., a respondent’s body mass index) may assist engagement.
 - Emerging technologies may allow for real-time data collection (eliminating delays associated with data entry and analysis).
- 9 Use appropriate feedback and dissemination of the findings to study participants.
- 10 Translate research into policy and practice.

* Heckathorn, D. D., ‘Snowball versus Respondent-driven Sampling’, *Sociological Methodology*, vol. 41, no. 1, 2011, pp. 355–366.

SUMMARY

Policies and programming for adolescent health, social development and well-being require data that are timely, accurate, developmentally relevant, age and sex disaggregated, and defined to a local level. Ideally, indicators should be available to track changes over time and inequalities between groups.

Despite the importance of data in understanding, addressing and monitoring adolescent social development and well-being, availability and quality of data on adolescents, are limited. There is particularly poor availability of data on young adolescents, adolescents disengaged from school and socially marginalized adolescents. Similarly, many current indicators for adolescent health and well-being are not well defined or measured. Therefore, further work is needed to define a minimal set of measurable indicators to track progress and support policy implementation, programming and evaluation of new interventions. Traditional surveys and data registries offer some opportunities for defining and populating indicators. However, methods based on new technologies and statistical techniques will be increasingly important in capturing an adequate picture of adolescent health, social development and well-being.

READINGS FOR FURTHER EXPLORATION

Institute for Health Metrics and Evaluation, 'Data Visualizations', <www.healthdata.org/results/data-visualizations> (accessed 1 February 2017).

Institute for Health Metrics and Evaluation, 'Global Health Data Exchange', <<http://ghdx.healthdata.org/gbd-results-tool>> (accessed 1 February 2017).

UNICEF, 'Adolescents', <<http://data.unicef.org/adolescents/overview.html>> (accessed 1 February 2017).

World Health Organization, *Health for the World's Adolescents: A second chance in the second decade*, 2014, <<http://apps.who.int/adolescent/second-decade/>> (accessed 1 February 2017).

GLOSSARY

<u>Adolescence</u>	A developmental stage of physical, social and neurocognitive change. The beginning of adolescence is usually considered to be puberty. The end is more difficult to define and usually considered to be the transition in social role to one of independence, which may include completion of education, employment, a relationship or starting a family.
<u>Adolescents</u>	The World Health Organization and UNICEF have traditionally defined adolescents as being young people aged between 10 and 19 years. However, adolescents are increasingly being grouped collectively with young adults, with 'adolescents and young adults' being the age band of 10 to 24 years, as this age band more reliably captures the physical, social and neurocognitive developments that define adolescence.
<u>Data</u>	Qualitative and quantitative information, such as words and numbers, collected to be analysed to provide information about a particular outcome of interest.
<u>Disaggregation</u>	The process of breaking down aggregate (or whole) data into component parts or smaller units of data. Typical disaggregation includes age or gender.
<u>Indicators</u>	Summary measures of an outcome of interest, usually related to outcomes (social, economic, educational and/or health status), determinants, or service and policy implementation.
<u>Metric</u>	A system or method of measurement.
<u>Reporting framework</u>	Groups of indicators brought together to describe the status of a given population. Reporting frameworks typically align with policies and conceptual models of adolescent social development and well-being.
<u>Seroprevalence</u>	The frequency of individuals in a population that test positive to a specific disease based on serology (e.g., antibodies to HIV in blood serum).
<u>Target</u>	A goal, usually numeric, for policy or programming, typically defined for some future date.

APPENDIX 1. SOME EXAMPLES OF INDICATORS OF ADOLESCENT DEVELOPMENT AND WELL-BEING

Table A1 lists four indicator sets defined for adolescent health, development and well-being. Four key observations can be made. First, the indicator sets are diverse in scope, reflecting the broad domains relevant to adolescent development and well-being. The differences between them reflect the differing purposes of these indicators. For example, UNICEF Adolescent Country Tracker (in progress) measures broad adolescent development and well-being, while the proposed WHO indicators are more aligned with health outcome and health system response. This diversity poses a significant challenge when defining a core set of indicators for adolescents. Second, there is some inconsistency in the definitions used across the indicator sets (e.g. for alcohol use), which most likely reflect differences in the availability of data, and preclude comparability across indicator sets. Of note, there is also inconsistency in the age range focus (e.g. adolescent pregnancy and fertility). However, most indicator sets recommend disaggregation by five-year age band, and sex. Third, some indicators are not universally relevant to adolescents. For example, female genital mutilation and cutting tends to be a problem in a relatively small number of countries. Fourth, indicators relating to core aspects of adolescent development (particularly participation and engagement) are difficult to define as data are particularly limited. As a result, indicators for these domains are poorly defined and therefore difficult to measure, representing an important area for further development. In contrast, there is better coverage of mortality data, and therefore indicators relating to mortality for adolescents are measured more consistently.³

The four indicator sets summarized in Table A1 are framed against five broad domains of adolescent development and well-being defined by UNICEF's Adolescent Country Tracker (in progress).

Table A1. Examples of indicators for adolescent health, well-being and development

Domain	Sub-domain	Indicator set			
		UNICEF 5 x 5 plus 5 (ages 10–19) (under development)	Lancet series 2012 (ages 10–24)	WHO proposed (ages 10–19)	Lancet commission
Health and well-being	Outcome	All-cause mortality rate (ages 10–19)	All-cause mortality rate (ages 10–24)	All-cause mortality rate	
		Suicide mortality rate (ages 10–19)	Suicide mortality rate (ages 10–24)	Suicide mortality rate	
			Road-traffic mortality rate (ages 10–24)	Road-traffic mortality rate	
			Maternal mortality rate (ages 10–24)	Maternal mortality rate	
				HIV mortality rate	
		Adolescent birth rate (ages 10–19)	Adolescent fertility rate (< 18 years)	Proportion of 15–19-year-olds who are pregnant	Birth rate per 1,000 10–19-year-old girls per year
				Syphilis seroprevalence among pregnant adolescents	
			HIV prevalence (ages 15–24)	HIV prevalence	
			Prevalence axis-I mental disorder	Prevalence of axis-I mental disorder	

3 Patton, G. C. et al., 'Our Future'.

Domain	Sub-domain	Indicator set			
		UNICEF 5 x 5 plus 5 (ages 10–19) (under development)	Lancet series 2012 (ages 10–24)	WHO proposed (ages 10–19)	Lancet commission
Health and well-being	Outcome			Prevalence of feeling sad or hopeless for every day for 2 weeks and stopped normal activities	
					Disability adjusted life year (DALY) rates of diseases of poverty in 10–24-year-olds
					DALY rates of injury and violence
					DALY rates of non-com- municable disease, including mental disorder
	Health risk	Prevalence of under- or over-nutrition (prev body mass index [BMI] of 15–19-year-olds < 18.5; prev BMI of 15–19-year- olds > 25)	Prevalence of 10–14-year- olds underweight (> 2 SD [standard deviation] below weight and height for age)	Prevalence of 10–14-year- olds underweight (> 1 SD below weight and height for age)	
					Prevalence of iron deficiency anaemia in 10–24-year-olds
			Prevalence of 10–24-year- olds overweight (> 1 SD)	Overweight prevalence (> 1 SD above weight and height for age)	Percentage of 10–24-year-olds exceed- ing WHO guidelines for overweight
				Obesity prevalence (> 2 SD above weight and height for age)	
		Alcohol: prevalence of 13–15-year-olds who have had at least one alcoholic drink in the last 30 days	Prevalence of binge drinking by 10–24-year- olds (> 5 units of alcohol drunk on one day in the past month)	Prevalence of 13–15-year- olds who had at least one alcoholic drink in the last 30 days	Binge drinking prevalence (> 60 grams) on a single occasion in the last 30 days (15–19-year-olds)
			Measures of physical activity (at least 60 minutes daily)	Measures of physical activity (at least 60 minutes daily)	
				Measures of sedentary behaviour: sitting for at least 5 hours per day	
			Prevalence of tobacco use by 10–24-year-olds	Prevalence of tobacco use by 13–15-year-olds	Prevalence of daily smoking in 10–24-year- olds
			Prevalence of illicit drug use in 10–24-year-olds	Prevalence of marijuana use in last 30 days	
				Sexual readiness (4 item scale) (proposed)	
		Health status		Self-reported health status	

Domain	Sub-domain	Indicator set			
		UNICEF 5 x 5 plus 5 (ages 10–19) (under development)	Lancet series 2012 (ages 10–24)	WHO proposed (ages 10–19)	Lancet commission
Health and well-being	Health service response		Condom use at last higher risk sex	Condom use at last higher risk sex	
					Percentage of 15–24-year-olds whose need for modern contraception was met
			Comprehensive HIV knowledge	Correct knowledge of HIV prevention	
			Prevalence of human papilloma virus (HPV) vaccination		
			Unmet need for treatment of mental disorder		
			Rate of use of health services	Rate of use of health services	
				HIV testing: proportion of sexually active adolescents who had an HIV test in the last 12 months	
				Percentage of births with skilled birth attendant present	
				Number of policies that allow legal minors to consent to health interventions	
				Proportion of countries that report having national standards for health service delivery for adolescents	
				Number of trained health service providers in adolescent health	
				Existence of functional national adolescent health programme (funding, coordination, reporting of activities)	
				Whether national health data are age disaggregated for adolescents	
		Education and learning	Learning	Proficiency in reading and mathematics	
Youth literacy rate					
Attainment	Completion rate of primary education				
	Completion rate of lower and upper secondary education		Enrolment rate in lower secondary education		Percentage of 20–24-year-olds who complete 12 or more years of education
	Out-of-school rate				

Domain	Sub-domain	Indicator set			
		UNICEF 5 x 5 plus 5 (ages 10–19) (under development)	Lancet series 2012 (ages 10–24)	WHO proposed (ages 10–19)	Lancet commission
Protection	Sexual and reproductive health and rights; gender rights	Child marriage rate (by ages 15 and 18)	Percentage of 20–24-year-olds married or in union before age 18		Percentage of 20–24-year-olds who married before age 18
		Percentage ever-partnered adolescents experiencing intimate partner violence in last 12 months			
	Safety	Homicide (mortality) rate by mechanism and type of perpetrator	Violence mortality rate (ages 10–24)	Violence mortality rate	
		Percentage of 10–17-year-olds who experienced psychological or physical punishment or discipline in past month			
		Percentage of adolescents aged 13–15 who reported being bullied at least once in the last couple of months			
	Economic opportunities	Child labour	Percentage of 10–17-year-olds engaged in child labour		
Average weekly time spent on unpaid household services by 10–17-year-olds, by sex					
Labour force		Information and communication technology skills			
		Percentage of 15–19-year-old NEETs*			Rate of 20–24-year-old NEETs*
		Unemployment rate for 15–19-year-olds, by age, sex and disability	Unemployment rate among 15–24-year-olds		
Participation and engagement	Attitudes and norms	Percentage of 13–15-year-olds endorsing values and attitudes promoting equality, trust and participation in governance (proposed)			

Domain	Sub-domain	Indicator set			
		UNICEF 5 x 5 plus 5 (ages 10–19) (under development)	Lancet series 2012 (ages 10–24)	WHO proposed (ages 10–19)	Lancet commission
Participation and engagement	Participation	Percentage of adolescents who have the right to vote in national elections (proposed)			
		Participation rate of 15–19-year-olds in labour unions or associations (proposed)			
		Percentage of adolescents who participate in recreational, social or leisure activities for a specified time during the day or week (proposed)			
	Engagement	Percentage of adolescents who indicate that their views are taken seriously in decisions at school, home and community (proposed)			
			Parental connection: percentage of parents who understood worries and concerns all or most of the time	Parental connection: percentage of parents who understood worries and concerns all or most of the time	
				Parental regulation: percentage of 13–15-year-olds whose parents knew what they were doing with their free time	
	'Plus 5' indicators	Socio-cultural context and demography	Adolescent population		
Adolescents living below international poverty line					
Use of improved water source and sanitation facility					
Position on Gini (inequality) index					
Position on social institutions and gender index					

* Not in education, employment or training NEET

APPENDIX 2. SUMMARY OF INTERNATIONAL DATA SOURCES TO POPULATE ADOLESCENT HEALTH INDICATORS

Table A2. Datasets that populate adolescent health indicators

Dataset	Coverage (population)	Availability	Methodology	Methodological considerations
WHO Mortality Database, < www.who.int/healthinfo/mortality_data/en/ >	Data from 1950; 2005, 72 countries; 2006, 51 countries; some sub-national, e.g. Hong Kong	80 countries classified with at least some recent years and with > 70% ascertainment of deaths	Underlying cause of death in accordance with International Classification of Diseases (ICD) classification obtained from national death registers	Accuracy of cause of death classification may vary between countries; both ICD9 and ICD10 systems are still in use, which limits scope for combining data; African countries seriously under-represented; poorer ascertainment is common in rural regions and mis-specification arises from high endorsement of unspecified causes of death
Health Behaviour in School-aged Children (HBSC), WHO, < www.hbsc.org/ >	Commenced in 1982; the survey has taken place in the following number of European countries: 2001 and 2005, 35 countries; 2010 (available in 2012), 38 countries; since 2010, all 39 countries	Data restricted to member country use for 3 years, but then available for external use, subject to agreement of investigator team	Nationally representative samples; sample size approximately 1,500 from each age group – 4,500 per survey; mainly two-stage sampling by school and classroom unless single stage sampling of classes is possible	Standardized questionnaire with a core set of questions on: background factors; individual and social resources; health risk behaviours (physical activity, cigarette, alcohol, cannabis use, sexual behaviour, violence and bullying, injuries) and health risk states; life satisfaction; self-reported health; BMI); optional thematic modules available in addition to core questionnaire
Global School-based Student Health Survey (GSHS), WHO, < www.who.int/chp/gshs/en/ >	Initiated in 2003 and currently has data on 97 mostly low- and middle-income countries	Unrestricted public access to core modules after 2 years; extended modules available subject to country's permission	Representative 2-stage sampling by school and classroom; usually national but sometimes restricted to urban centres or specific districts; classroom data collection supervised by trained personnel who, where possible, are unknown to participants; generally passive consent; minimum acceptable sample no. of 1,500; surveys. Rejected if ascertainment < 60%	Good ascertainment and quality control; modules are designed to measure risks for adolescent causes of death and disability as well as non-communicable diseases. Limitations: a school-based survey in countries where absenteeism and non-enrolment rates may be high; unavoidable between-country variation in choice of modules, e.g., alcohol use, sexual behaviour; limited surveys in European countries due to coverage by HBSC

Dataset	Coverage (population)	Availability	Methodology	Methodological considerations
Global Youth Tobacco Survey (GYTS), WHO, < www.who.int/tobacco/surveillance/gyts/en/ >	120 countries	Data available only as weighted percentages by sex of binary recodes	Same sampling procedure as GSHS, often conducted in tandem but different schools sampled	Same comments apply to this project as for GSHS on sound methodology and with same limitation for out-of-school population
Demographic and Health Surveys (DHS) Program, including the Key Indicators Survey (KIS), USAID, < www.dhsprogram.com/ >	Since 1984 there have been 240 surveys in 87 low- and middle-income countries, with HIV seroprevalence in >30 countries	Data available at < www.measuredhs.com/ >	Two types of DHS surveys: standard and interim; standard have large sample sizes (usually 5,000–30,000 households) and typically are conducted every 5 years, to allow comparisons over time	Provide data for a wide range of indicators on population, sexual and reproductive health, and nutrition; KIS surveys are designed to help meet the monitoring and evaluation needs of programmes involved in population and health activities in developing countries, especially to produce data for small areas – regions, districts, catchment areas – that may be targeted by an individual project; these can also be used in nationally representative surveys

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