Technical consultation on indicators of adolescent health
WHO, Geneva, Switzerland
30 September – 1 October 2014

World Health Organization
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Acknowledgements

The meeting was organized by the WHO Department of Maternal, Newborn, Child and Adolescent Health. The core team comprised Cynthia Boschi-Pinto, Jane Ferguson, Sapna Manglani, Matthews Mathai and Dilip Thandassery. Gersende Moyse and Susan Helary provided administrative support.

We gratefully acknowledge the contributions of the participants during and after the meeting and, in particular, those of the co-chairs, Monika Arora and George Patton.

Jane Ferguson and Sarah Jensen (King’s College London) prepared this report.

Abbreviations

ART antiretroviral therapy
BMI body mass index
DHS Demographic and Health Surveys programme
GSHS Global School-based Student Health Survey
HBSC Health Behaviour In School-aged Children
MICS Multiple Indicator Cluster Survey
PHQ patient health questionnaire
SD standard deviation
UNAIDS Joint United Nations Programme on HIV/AIDS
UNFPA United Nations Population Fund
UNESCO United Nations Educational, Scientific and Cultural Organization
UNICEF United Nations Children’s Fund
WMH-CIDI World Mental Health Composite International Diagnostic Interview
1. Introduction

Aim of the consultation
The aim of the consultation was to reach consensus on a core list of indicators for measuring and reporting on adolescent health.

Objectives of the consultation
The two objectives of the global consultation were:
- to reach consensus on a core list of health indicators of adolescent health in order to monitor progress;
- to explore the mechanisms for validating and/or testing new indicators for the core list

The expected outcomes of the consultation were
- consensus on a minimum list of health indicators to measure adolescent health and
- agreement on steps for validation and/or testing of new indicators.

The list of health indicators for adolescents will be submitted to the data repository of the WHO Global Health Observatory.

The consultation comprised plenary presentations, discussions and some group work. See Annex 1 for the agenda. It was attended by 37 participants, including regional and country experts and representatives of technical organizations, United Nations partners and WHO staff. The list of participants is given in Annex 2.

Declarations of interest
All external participants were required to declare any potential conflict of interests. None reported a conflict of interest.
2. Setting the scene

The need for indicators of adolescent health

Strengthening programming for adolescent health in countries is one of WHO’s key concerns, and measurement and monitoring are integral parts of this process. A core set of indicators to monitor the health status of adolescents nationally and globally could assist countries in optimal data collection to inform policy and programmes.

In 1995, a WHO/UNFPA/UNICEF study group on “Programming for adolescent health” concluded that strengthening monitoring and evaluation would require the identification and use of indicators (WHO, 1997; McNeely et al., 2001). To follow-up on this and with funding from the Rockefeller Foundation, the then Department of Child and Adolescent Health at WHO headquarters supported identification of key domains that describe adolescent health. These provided the background to some areas of the Global School-based Student Health Survey (GSHS).

WHO prepared an online report “Health for the world’s adolescents—a second chance in the second decade” (WHO, 2014a), which described the specific contexts of adolescents and the need for programming specifically for this age group. Indicators of adolescent health are a fulcrum for the health sector in collecting and using strategic information, as described in one section of the report. Such information can flag priority health issues, subpopulations and opportunities for early interventions to improve adolescents’ health and well-being and reduce disability and mortality. Ministries of health have asked WHO to support the development of consensus on a core list of indicators. More information about the selection of indicators is given in section 3.

The global reference list of core health indicators

With global partners, WHO has prepared a global reference list of core indicators (WHO, 2015a) for obtaining concise information on health situations and trends, including responses at national and global levels. The aims of the list are to reduce reporting requirements and ensure better alignment to country monitoring and evaluation systems. This list (in draft form at the time of the consultation) was an important basis for selecting indicators for adolescent health.

Surveys that constitute important sources of data for the indicators

Demographic and Health Surveys (DHS)

The Demographic and Health Surveys are household surveys that provide nationally representative data on indicators of demographics, health and nutrition. The surveys are funded by the United States Agency for International Development and are conducted primarily in countries that receive assistance from that Agency. DHS have been conducted in more than 70 developing countries in Africa, Asia, Australasia, Europe and Latin America and the Caribbean. Two types of surveys are conducted: standard DHS surveys and interim surveys (conducted between the standard surveys). The standard surveys comprise sampling of 5000–30 000 households and are usually conducted every 5 years. The interim surveys are shorter, cover smaller samples and usually focus on performance and monitoring indicators, with fewer data on impact indicators such as
mortality rates. The DHS surveys usually cover married women and men aged 15–49 years, although they are tailored to the needs of each country.

The DHS cover a broad range of demographic and health topics, including anaemia, domestic violence, family planning, fertility, HIV (knowledge, behaviour and prevalence), maternal health and mortality, and tobacco use. Limitations of these surveys for data on adolescent health are that the numbers of adolescents included may be small, and they do not include adolescents aged 10–14 years.

Global School-based Student Health Survey

The GSHS is a cross-national school-based survey developed by WHO in collaboration with UNICEF, UNESCO and UNAIDS, with technical assistance from United States Centers for Disease Control and Prevention. Data are collected on students aged 13–17 years. The surveys are not conducted in Europe or North America, but data are currently available for 79 other countries. The survey is administered in classrooms and based on self-reporting. The mandatory survey includes 10 core questionnaire modules, with an option to add “core-expanded” questions and country-specific questions. The 10 mandatory core questionnaire modules address factors that contribute to the leading causes of morbidity and mortality: alcohol use, dietary behaviour, substance use, hygiene, mental health, physical activity, risky sexual behaviour, tobacco use and violence and unintentional injury; protective factors are also included. The GSHS covers many of the indicators on the list; however, because the survey is based on self-reporting, the biological data have certain limitations. It also does not measure mortality.

Health Behaviour in School-aged Children (HBSC)

The HBSC is another a cross-national school-based survey. Data are collected every 4 years from 11-, 13- and 15-year-olds in 44 countries in Europe and North America. The format is self-completed questionnaires administered in the classroom. The surveys include a mandatory questionnaire, a number of optional packages and country-specific questions. The mandatory survey includes assessment of eating habits, weight control and body image, physical activity, sedentary behaviour, risk behaviour (including alcohol consumption, tobacco use and cannabis use), sexual health, violence and injuries, family and peer culture, health and well-being, school setting, social inequality and puberty.

Multiple indicator cluster survey (MICS)

MICS was prepared by UNICEF in collaboration with organizations such as WHO and the Washington Group on Disability Statistics. These surveys, begun in 1995, are one of the largest sources of internationally comparable data on women and children and for the indicators of the Millennium Development Goals. The last MICS was conducted in 2012–2015 (round 5); it included a household questionnaire, a questionnaire for males and females aged 14–49 years and a questionnaire for children under the age of 5 (based on maternal or caretaker reports). A new version will be released in 2015 that includes updated questionnaires to be administered to the mothers of children and adolescents aged 2–17 years. This choice was guided by concern about the feasibility of international data collection on children; the comparability of maternal responses and those self-reported by children and adolescents is being tested, and the results are expected to become available in late 2015.
3. Development of the proposed list of indicators

Selection of indicators before the consultation

WHO convened a consultation among WHO departments and external partners (UNICEF, UNFPA, Johns Hopkins University and the University of Melbourne) to prepare a short list of indicators of adolescent health (WHO, 2011). The discussions also contributed to the selection of (health) indicators for the World Programme of Action for Youth (United Nations, 2012). Concurrently, the availability of internationally comparable data on a limited number of indicators of adolescent health was being reviewed (Coffey & Patton, 2008). That review resulted in a list of 32 indicators of adolescent health, chosen on the basis of four criteria: public health relevance, validity of constructs, feasibility of measurement and possibility of detecting change over time (Patton et al., 2012).

The indicators were transposed into the WHO monitoring and evaluation framework, which comprises four indicator domains: system inputs and processes, outputs, outcomes and impact. This framework illustrates how inputs to the system (e.g. financing, health workforce) and processes (e.g. supply chain) contribute to outputs (e.g. availability of high-quality services and interventions) and eventual outcomes (e.g. intervention coverage and the prevalence of health-related behaviour), which finally result in impact (e.g. improved health outcomes). This results-chain framework can be used to indicate the performance of both disease-specific and health systems interventions. The framework also facilitates the identification of core indicators for each domain of the results chain. The identification of adolescent health indicators for these domains will facilitate global and national tracking of the epidemiology of adolescent health (from the outcomes and impact domains) as well as the response of the health system in improving access to high-quality health services, (outputs) and ensuring a workforce trained in adolescent health and relevant policy and strategy guidelines (inputs).

Selection of the 28 indicators discussed at the technical consultation

To refine the initial list of 32 indicators of adolescent health, it was shared with health professionals involved in research and in adolescent health programming during an e-consultation. The aim was preliminary scoring and ranking of the proposed 32 indicators. Responses were received from 37 people (46% response rate), and the indicators were ranked by their average score on each of the following four criteria: public health relevance, validity of the construct, feasibility of the measure and possibility of detecting change over time and among (sub)populations. The preliminary scores were presented before the plenary discussion of the indicators. The rankings from the e-consultation are shown in Table 1.

Revisions made to the list of indicators after the e-consultation

The e-consultation led to a reduction of the list from 32 to 28 indicators. The following indicators were excluded because they address policy or programmes rather than conditions, events or behaviours of individuals: existence of national standards for health service delivery, existence of policies requiring consent
<table>
<thead>
<tr>
<th>Adolescent-specific health indicator</th>
<th>Public health relevance</th>
<th>Valid construct</th>
<th>Feasibility measure</th>
<th>Trend and sub-population disaggregation</th>
<th>Average of ranks</th>
<th>Overall rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mortality rate</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1.25</td>
<td>1</td>
</tr>
<tr>
<td>2. Maternal mortality ratio</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1.75</td>
<td>2</td>
</tr>
<tr>
<td>3. HIV mortality rate</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4. Road traffic injuries mortality rate</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>8</td>
<td>4.75</td>
<td>4</td>
</tr>
<tr>
<td>5. Use of tobacco (%)</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>5.25</td>
<td>5</td>
</tr>
<tr>
<td>6. Fertility or pregnancy rate</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7. HIV prevalence</td>
<td>6</td>
<td>5</td>
<td>13</td>
<td>4</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>8. Underweight (%)</td>
<td>13</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>8.5</td>
<td>8</td>
</tr>
<tr>
<td>9. Obese (%)</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>9.25</td>
<td>9</td>
</tr>
<tr>
<td>10. Overweight (%)</td>
<td>12</td>
<td>11</td>
<td>8</td>
<td>10</td>
<td>10.25</td>
<td>10</td>
</tr>
<tr>
<td>11. Age disaggregation in HMIS</td>
<td>14</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>12.5</td>
<td>11</td>
</tr>
<tr>
<td>12. Undergone HIV testing (%)</td>
<td>10</td>
<td>12</td>
<td>18</td>
<td>12</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>13. Health service use (%)</td>
<td>16</td>
<td>13</td>
<td>14</td>
<td>13</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>14. Knowledge on HIV transmission by sex (%)</td>
<td>19</td>
<td>17</td>
<td>11</td>
<td>11</td>
<td>14.5</td>
<td>14</td>
</tr>
<tr>
<td>15. Suicide mortality rate</td>
<td>23</td>
<td>14</td>
<td>9</td>
<td>16</td>
<td>15.5</td>
<td>15</td>
</tr>
<tr>
<td>16. Use of alcohol (%)</td>
<td>11</td>
<td>19</td>
<td>15</td>
<td>19</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>17. Physically active (%)</td>
<td>15</td>
<td>16</td>
<td>19</td>
<td>15</td>
<td>16.25</td>
<td>17</td>
</tr>
<tr>
<td>18. National standards for health service delivery</td>
<td>17</td>
<td>23</td>
<td>17</td>
<td>17</td>
<td>18.5</td>
<td>18</td>
</tr>
<tr>
<td>19. Intimate partner violence mortality rate (%)</td>
<td>26</td>
<td>15</td>
<td>16</td>
<td>18</td>
<td>18.75</td>
<td>19</td>
</tr>
<tr>
<td>20. Use of condom</td>
<td>8</td>
<td>22</td>
<td>26</td>
<td>21</td>
<td>19.25</td>
<td>20</td>
</tr>
<tr>
<td>21. Trained health service provider</td>
<td>18</td>
<td>21</td>
<td>21</td>
<td>20</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>22. Use of illicit drugs (%)</td>
<td>20</td>
<td>24</td>
<td>23</td>
<td>24</td>
<td>22.75</td>
<td>22</td>
</tr>
<tr>
<td>23. Had sex before age 15 (%)</td>
<td>25</td>
<td>20</td>
<td>25</td>
<td>22</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>24. Syphilis prevalence</td>
<td>27</td>
<td>18</td>
<td>24</td>
<td>25</td>
<td>23.5</td>
<td>24</td>
</tr>
<tr>
<td>25. Legal minors consent</td>
<td>28</td>
<td>25</td>
<td>20</td>
<td>23</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>26. Sedentary life (%)</td>
<td>24</td>
<td>27</td>
<td>22</td>
<td>26</td>
<td>24.75</td>
<td>26</td>
</tr>
<tr>
<td>27. Depression (%)a</td>
<td>21</td>
<td>26</td>
<td>27</td>
<td>27</td>
<td>25.25</td>
<td>27</td>
</tr>
<tr>
<td>28. Depression (%)a</td>
<td>22</td>
<td>28</td>
<td>30</td>
<td>29</td>
<td>27.25</td>
<td>28</td>
</tr>
<tr>
<td>29. Parental connection (%)</td>
<td>30</td>
<td>29</td>
<td>28</td>
<td>28</td>
<td>28.75</td>
<td>29</td>
</tr>
<tr>
<td>30. Sexual readiness</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>31</td>
<td>30.25</td>
<td>30</td>
</tr>
<tr>
<td>31. Parental regulation (%)</td>
<td>31</td>
<td>31</td>
<td>29</td>
<td>30</td>
<td>30.25</td>
<td>30</td>
</tr>
</tbody>
</table>

**HMIS, health management information system**  
*a Two alternative indicators were initially proposed for depression*
of parents or spouses for use of selected health care services, existence of functional national adult health programmes and availability of age-disaggregated data in the national health information system.

**Plenary discussion of the entire list**

During the consultation, each of the 28 indicators was discussed one by one. The discussion followed the structure of a worksheet provided at the beginning of the meeting, covering:

- Whether the indicator was on the global reference list of core indicators
  - If so, were there any differences?

- Whether an indicator was included on lists of indicators proposed by other organizations
  - If so, what was the rationale behind inclusion of the indicator on that list? (Representatives of the organizations were asked to comment, if present.)

- How the indicator ranked in the e-consultation

- Whether other comments from the e-consultation should be considered (These were compiled in a document.)

- Comments on:
  - the definition of the indicator
  - the choice of numerator and denominator
  - the age range
  - availability of data (Representatives of the different surveys and programmes were asked to comment when relevant.)
  - the relevance of disaggregating data to monitor specific trends
  - the perceived relevance of the indicator (i.e. whether it should be on the core or additional list or removed from the list).

Participants also shared experience with existing indicators, commented on how indicators could supplement current monitoring frameworks and discussed the relevance of the indicators globally, regionally and at country level. Each discussion was closed with an informal vote on whether the indicator should be on the core list, the additional list or removed. Please see section 5 for summaries of the main points of the discussion on each of the indicators.
4. Discussions on selection of indicators

Use and ideal number of indicators

Before the plenary discussion on the indicators, participants were asked to discuss two general questions concerning the function and scope of the list of adolescent health indicators:

Question 1: How would you use the core indicators in your country to contribute to your work?

Question 2: How many indicators should be on the core list?

Question 1: How would you use the core indicators in your country to contribute to your work?

A number of uses of a core list of indicators were mentioned during the discussion. The discussion is summarized according to those uses.

Indicators guide data collection and monitoring of health trends.

A list of indicators can guide ministries of health in deciding which health trends they should measure and monitor. Such a list can also guide decisions on which data countries should collect. Concern was raised about use of the list of indicators by countries, because indicators designed at regional level might be difficult to measure in countries with weak health systems. More capacity-building might be required to support the use and measurement of indicators in some countries. It was suggested that guidelines be provided for the collection of data, including which data to collect, and on the importance of each indicator.

Indicators allow collection of data to guide policy-making and health programming.

Indicators allow collection of information for evidence-based policy recommendations. Data for measuring indicators can be used in policy briefs and help guide decisions on health policies and programming. Furthermore, health measurements help to identify issues that require a policy response. A list of indicators can help put important health challenges on the agenda, which might be overlooked or ignored if no data are collected. This function of indicators may be particularly important with regard to those associated with cultural sensitivity or stigma; mental health problems were mentioned as an example. As for the list of indicators, it was noted that it is important to ensure that policy-makers understand the meaning and appropriate use of data, which may require more capacity-building, perhaps involving tutoring and technical support. For example, the DHS arrange workshops with journalists and academics to teach them to disseminate and read data. Capacity-building and training are important for supporting countries in making use of indicators.

Global indicators facilitate comparisons.

A list of global indicators of adolescent health provides a common base for monitoring, so that the health of the adolescent population can be monitored and compared within and among countries. Governments can
use such comparisons to prioritize work and resources to improve adolescent health. It was also mentioned that cross-national comparisons can help to put pressure on governments to do more about health challenges that are less urgent in other countries.

**Indicators promote harmonization of health measurements.**

A global list of indicators promotes coordination and harmonization of health measurement among sectors, countries, global organizations and national and global surveys. It might also help to harmonize health programming across sectors and countries.

**Indicators can guide research.**

Better data collection will directly support epidemiological research. Such data also help shape research questions, by indicating health trends on which research is needed to better understand causes and effects. Data can therefore be important for prioritizing research and applying for funding. Researchers who wish to address a particular outcome are in a stronger position to obtain funding if the issue is on a list of indicators issued by WHO.

**Question 2: How many indicators should be on the core list?**

*The context is more important than numbers.*

It was agreed that there is no ideal number of indicators; instead, the number of indicators should be determined according to their relevance. The ideal number of indicators also depends on the objective of using the list, which may differ for national ministries of health, political organizations and specialist organizations. As a general guide, it might be better to have a shorter list with greater data coverage than a long list of indicators for which data are rarely collected or used. A focused rather than an exhaustive list of indicators might also facilitate advocacy. Policy-makers must be able to envisage the utility of the indicators.

**Should context-specific indicators be included on the global list?**

It was emphasized that all core indicators should be globally relevant and universally applicable. The question of whether indicators that are relevant to only some countries or regions should be on the global list was raised. HIV infection was discussed as an example of a context-dependent indicator that is relevant in some regions but not in others. Similarly, indicators of sexual activity, such as “Condom use at most recent sex among adolescents with multiple sexual partnerships in past 12 months” or “Knowledge about HIV transmission among adolescents”, might be perceived as inappropriate in some cultural settings and are therefore unlikely to be measured in some countries.
5. Final lists of indicators

This section gives the final lists of indicators after revision based on feedback during and after the consultation. The final list consists of 20 core indicators and 7 additional indicators; 3 indicators are suggested for inclusion but require further development. The next section presents more information on the proposed indicators, including definitions, measurement, data sources and key points from the discussion.

**TABLE 2**
Final core indicators for adolescent health

<table>
<thead>
<tr>
<th>No.</th>
<th>Core indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adolescent mortality rate</td>
</tr>
<tr>
<td>2</td>
<td>Adolescent mortality rate from road traffic injuries</td>
</tr>
<tr>
<td>3</td>
<td>Adolescent mortality rate from HIV/AIDS</td>
</tr>
<tr>
<td>4</td>
<td>Adolescent mortality rate from suicide</td>
</tr>
<tr>
<td>5</td>
<td>Adolescent mortality rate from homicide</td>
</tr>
<tr>
<td>6</td>
<td>Adolescent maternal mortality ratio</td>
</tr>
<tr>
<td>7</td>
<td>Adolescent fertility rate</td>
</tr>
<tr>
<td>8</td>
<td>Prevalence of underweight among adolescents</td>
</tr>
<tr>
<td>9</td>
<td>Prevalence of anaemia among adolescents</td>
</tr>
<tr>
<td>10</td>
<td>Prevalence of overweight and obesity among adolescents</td>
</tr>
<tr>
<td>11</td>
<td>Early initiation of sexual activity</td>
</tr>
<tr>
<td>12</td>
<td>Condom use at most recent sex among adolescents with multiple sexual partnerships in past 12 months</td>
</tr>
<tr>
<td>13</td>
<td>Prevalence of intimate partner violence among adolescents</td>
</tr>
<tr>
<td>14</td>
<td>Demand for family planning satisfied with modern methods</td>
</tr>
<tr>
<td>15</td>
<td>Current tobacco use among adolescents</td>
</tr>
<tr>
<td>16</td>
<td>Current alcohol use among adolescents</td>
</tr>
<tr>
<td>17</td>
<td>Prevalence of insufficient physical activity among adolescents</td>
</tr>
<tr>
<td>18</td>
<td>Knowledge about HIV transmission among adolescents</td>
</tr>
<tr>
<td>19</td>
<td>Parental connection with adolescents</td>
</tr>
<tr>
<td>20</td>
<td>Parental regulation of adolescents</td>
</tr>
</tbody>
</table>

*On the global reference list of core indicators (WHO, 2015a)*
<table>
<thead>
<tr>
<th>No.</th>
<th>Additional indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prevalence of HIV infection among adolescents</td>
</tr>
<tr>
<td>2</td>
<td>HIV testing among adolescents</td>
</tr>
<tr>
<td>3</td>
<td>Adolescents living with diagnosed HIV infection</td>
</tr>
<tr>
<td>4</td>
<td>Antiretroviral therapy coverage of adolescents</td>
</tr>
<tr>
<td>5</td>
<td>New patients on antiretroviral therapy</td>
</tr>
<tr>
<td>6</td>
<td>HIV viral load suppression among adolescents</td>
</tr>
<tr>
<td>7</td>
<td>Current cannabis use among adolescents</td>
</tr>
</tbody>
</table>

*a* On the global reference list of core indicators (WHO, 2015a)

*b* As per the *Consolidated strategic information guidelines for HIV in the health sector* (WHO, 2015b)

The three indicators suggested for inclusion but which require further development are:

- Prevalence of depression among adolescents (validation of indicator required)
- Health service use by adolescents (further development required)
- Trained health service providers (further development required)
The 20 core indicators

Core Indicator 1: Adolescent Mortality Rate

Definition:
Number of adolescent deaths per 100,000 adolescent population

This indicator is calculated as:

\[
\frac{\text{Number of deaths among adolescents aged 10–14 and 15–19 in a specified year}}{\text{Mid-year adolescent population (10–14 and 15–19 years) in a specified year}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
National mortality rates for the adolescent population that can be disaggregated by age (10–19 years)

Data sources:
- WHO Global Mortality Database
- United Nations Population Division

Data availability:
- Mortality data are not available in all countries.

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa

Included on the Global reference list of 100 health indicators?
- No

Notes
- The WHO Regional Office for Africa highlighted the importance of this indicator because of a general lack of tools and poor tracking of mortality data.
- The data might be disaggregated by cause in order to promote action; however, other indicators on the list already include mortality: road traffic accidents, HIV/AIDS, suicide, homicide and maternal mortality.
- Concern was raised about the validity of data globally: rates may be underestimated.
CORE INDICATOR 2. ADOLESCENT MORTALITY RATE FROM ROAD TRAFFIC INJURIES

Definition:
Number of adolescent deaths due to road traffic injuries per 100,000 adolescent population

This indicator is calculated as:
Number of deaths due to road traffic injuries among adolescents aged 10–14 and 15–19 years
Mid-year adolescent population (10–14 and 15–19 years) in a specified year
x 100%

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
National mortality rates due to road traffic accidents that can be disaggregated by age (10–14 and 15–19 years).

Data sources:
- WHO Global Mortality Database
- United Nations Population Division (denominator)

Data availability:
- General concerns about mortality data

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa
- UNICEF
- United Nations (2012)

Included on the Global reference list of 100 health indicators?
- Yes

Notes
- Represent a major cause of death in every region and the most common cause of deaths among adolescents globally
- Concern about data coverage similar to that about other types of mortality data
- Concern about the validity of data: deaths may be wrongly reported and under-reported; in the WHO African Region, many road traffic injuries and fatal and non-fatal accidents are not reported.
- This indicator reflects only the “tip of the iceberg”. Road traffic injuries should be monitored, as they are a major cause of disability.
- If this indicator is to inform policies for action, factors such as the age for acquiring a licence, minimum drinking age and alcohol consumption should be considered.
**CORE INDICATOR 3: ADOLESCENT MORTALITY RATE FROM HIV/AIDS**

**Definition:**
Number of adolescent deaths due to HIV/AIDS per 100 000 adolescent population

**This indicator is calculated as:**
\[
\frac{\text{Number of deaths due to HIV/AIDS among adolescents aged 10–14 and 15–19 years}}{\text{Mid-year adolescent population (10–14 and 15–19 years) in a specified year}} \times 100\%
\]

**Stratification:**
This indicator can be further disaggregated by sex and age.

**Data requirements:**
National mortality rates due to HIV infection or AIDS that can be disaggregated by age (10–14 years and 15–19 years)

**Data sources:**
- UNAIDS
- WHO Global Mortality Database
- United Nations Population Division (denominator)

**Data availability:**
Data availability may be an issue.

**Included on other lists of adolescent health indicators?**
- WHO Regional Office for Africa
- UNICEF

**Included on the Global reference list of 100 health indicators?**
- Yes

**Notes**
- This indicator depends on the context and may represent a major cause of deaths in only some parts of the world.
**CORE INDICATOR 4: ADOLESCENT MORTALITY RATE FROM SUICIDE**

**Definition:**
Number of adolescent deaths due to suicide per 100,000 adolescent population

**This indicator is calculated as:**
\[
\text{Number of suicide deaths among adolescents aged 10–14 and 15–19 years} \times 100% \\
\text{Mid-year adolescent population (10–14 and 15–19 years) in a specified year}
\]

**Stratification:**
This indicator can be further disaggregated by sex and age.

**Data requirements:**
National mortality rates due to suicide that can be disaggregated by age (10–14 and 15–19 years)

**Data sources:**
- WHO Global Mortality Database
- United Nations Population Division (denominator)

**Issues:**
- Measurement: data availability and quality (validity of reported rates)
- Legal concerns: in some countries suicide is illegal, which contributes to under-reporting

**Data availability:**
- General concern about the availability of data on mortality from suicide due to stigma

**Included on other lists of adolescent health indicators?**
- UNICEF
- United Nations (2012)

**Included on the Global reference list of 100 health indicators?**
- Yes (Note that there is no age disaggregation for this indicator in the global reference list.)

**Notes**
- Suicide represents a major cause of mortality among adolescents globally.
- It was suggested that this indicator should be a measure of suicide attempts rather than mortality; suicide attempts may also reflect mental illness.
- Data on mortality by suicide can be difficult to obtain, and their validity may be problematic. Suicide is a sensitive topic; therefore, suicide deaths may sometimes be classified as accidents, leading to underestimation of the actual numbers.
- Suicide attempts rather than mortality may be better covered, because school-based surveys measure suicide ideation; however, the validity of the data should be examined.
- Inclusion of self-harm was considered, as deliberate self-harm is more prevalent among adolescents than suicide attempts. Tools to measure self-harm require validation, however.
- Examination of the available data after the meeting brought to light two challenges: poor availability (few countries systematically collect data on suicide attempts) and limited data on the validity of self-reported suicide attempts and ideation. Further examination of the validity of relevant items in the GSHS should be considered.
- See separate report on adolescent mental health indicators (WHO, 2015c) for more information.
CORE INDICATOR 5: ADOLESCENT MORTALITY RATE FROM HOMICIDE

Definition:
Number of adolescent deaths due to homicide per 100 000 adolescent population

This indicator is calculated as:

\[
\frac{\text{Number of deaths due to homicide among adolescents aged 10–14 and 15–19 years}}{\text{Mid-year adolescent population (10–14 and 15–19 years) in a specified year}} \times 100\% 
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
National mortality rates due to homicide that can be disaggregated by age (10–14 and 15–19 years).

Data sources:
- WHO Global Mortality Database
- United Nations Population Division (denominator)

Issues:
- Measurement: Definition, measurement and collection of data at country level
- Legal issues

Data availability:
- Data are available, despite general concern about the availability of mortality data. It was noted that these data are collected by the police rather than in health surveys, which might lead to difficulties in obtaining data.

Included on other global lists of adolescent health indicators?
- UNICEF
- United Nations (2012)

Included on the Global reference list of 100 health indicators?
- No

Notes
- The definition was changed from “Interpersonal violence” to “Homicide” after the consultation.
- Homicide is an important cause of death, especially among boys.
- Data coded according to the International Classification of Diseases and Causes of Death are available from approximately 90 countries; estimates have been modelled for other countries.
- A related indicator is the “prevalence of interpersonal partner violence”.
- The prevalence of violence rather than mortality might be important.
CORE INDICATOR 6: ADOLESCENT MATERNAL MORTALITY RATIO

Definition:
Number of maternal deaths among adolescents per 100,000 live births to adolescents

This indicator is calculated as:
\[
\frac{\text{Number of maternal deaths from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, among adolescents aged 15–19 years in a specified period}}{\text{Number of live births to adolescents in the specified period}} \times 100\%
\]

Stratification:
This indicator should be disaggregated by age 15–19 years.

Data requirements:
National data on births and deaths during pregnancy, childbirth or within 42 days of termination of pregnancy. Data must be disaggregated by age (15–19 years).

Data sources:
- Civil registration and vital statistics systems
- DHS
- United Nations Maternal Mortality Estimation Inter-agency Group

Issues:
- Data availability is a problem: these data are not commonly obtained for adolescents.

Data availability:
- General concern about the availability of mortality data for adolescents, especially in low-income countries

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa
- WHO Regional Office for the Eastern Mediterranean
- UNICEF
- United Nations (2012)

Included on the Global reference list of 100 health indicators?
- Yes

Notes
- This indicator is also reflected in the Millennium Development Goals.
- Important indicator for improving the quality of services; estimates can be used to advocate for change and draw the attention of the health sector to its responsibilities. Many such deaths could be prevented by better services.
- Data can be used to advocate for a minimum age for marriage in regions where early marriage and early pregnancy are common.
- Concern about the validity of data was expressed. In India, where the legal age of marriage is 18 years, a family might report that a girl who attends a health facility for pregnancy-related care is 18 years old, when she is actually 15 or 16 years old. This distorts the data. Similarly, some girls die during an abortion, but the family may say that she died of fever or malaria or some other cause.
**CORE INDICATOR 7: ADOLESCENT FERTILITY RATE**

**Definition:**
Annual number of births to adolescents aged 15–19 years per 1000 girls in that age group

**This indicator is calculated as:**

\[
\frac{\text{Number of live births to adolescents aged 15–19 years}}{\text{Total number of girls aged 15–19 years}} \times 100\%
\]

**Stratification:**
This indicator should, when possible, also capture data on girls < 15 years.

**Data requirements:**
National information on the number of girls aged 10–19 years (age range depends on the availability of data) who have given birth to a living child

**Data sources:**
- Civil registration and vital statistics system
- DHS
- MICS
- United Nations Population Division (denominator)

**Issues:**
- Measurement: In some countries, it may be difficult to obtain data on live births outside health facilities.

**Data availability:**
- Good coverage. Data on birth rates among 15–19-year-olds are widely available in civil registration and vital statistics, DHS and MICS. Data on younger girls may be more difficult to obtain.

**Included on other global lists of adolescent health indicators?**
- WHO Regional Office for Africa
- WHO Regional Office for the Eastern Mediterranean
- UNICEF
- United Nations (2012)

**Included on the Global reference list of 100 health indicators?**
- Yes

**Notes**
- Adolescent pregnancy and AIDS are the two main causes of death in the WHO African Region and are included in Millennium Development Goal 5.
- The inclusion of 10–14-year-olds was suggested, as pregnancy at this age is more dangerous.
- An indicator of “adolescent pregnancy rates” would be important, but it may difficult to collect data, especially for 10–14-year-olds, because data on abortions are not generally available.
- This indicator may depend on the cultural context and is linked to child marriage.
**CORE INDICATOR 8: PREVALENCE OF UNDERWEIGHT AMONG ADOLESCENTS**

**Definition:**
Proportion of adolescents who are underweight

**This indicator is calculated as:**

\[
\frac{\text{Number of adolescents whose BMI was 2 SDs below the median BMI according to WHO growth reference standards for the respective age and sex in the survey}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

BMI, body mass index; SD, standard deviation

**Stratification:**
This indicator can be further disaggregated by age and sex.

**Data requirements:**
Weight and height, measured with standard equipment; data must be disaggregated by age (10–19 years; the age range depends on the coverage of the survey)

**Data sources:**
- DHS (measured by staff, 15–19-year-old girls)
- GSHS (Survey staff weigh and measure the height of each student before the survey and write the result on a slip of paper that is given to each student.)
- HBSC (self-reported weight and height)

**Issues:**
- Measurement: Concern about self-reported measures in HBSC

**Data availability:**
- Data coverage should be good, as data on BMI are collected widely. Also measured in school-based surveys (GSHS and HBSC)

**Included on other lists of adolescent health indicators?**
- WHO Regional Office for Africa
- WHO Regional Office for the Eastern Mediterranean
- UNICEF
- United Nations (2012) (2 SDs below) [supplementary indicator]

**Included on the Global reference list of 100 health indicators?**
- Yes (in the WHO global reference list, this indicator is for the population aged ≥ 18 years, with age disaggregation)

**Notes**
- The ages measured may vary by survey population, and survey measures are not comparable.
- Underweight may sometimes be related to an eating disorder (mental health); measurement of mental health would require information on self-image (available as an optional package in HBSC).
- Identified as important in some countries
CORE INDICATOR 9: PREVALENCE OF ANAEMIA AMONG ADOLESCENTS

Definition:
Proportion of adolescents aged 15–19 years screened for haemoglobin levels who have a level < 12 g/dL (pregnant adolescents, < 11 g/dL)

This indicator is calculated as:
\[
\frac{\text{Number of adolescents aged 15–19 years with inadequate haemoglobin levels}}{\text{Total number of adolescents aged 15–19 years screened for haemoglobin levels during a specified period}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex.

Data requirements:
Information on the number of adolescents with inadequate haemoglobin levels (defined as < 12 g/dL for non-pregnant and < 11 g/1 dL for pregnant adolescents) in a surveyed sample

Data sources:
- Population-based health surveys
- DHS

Issues:
- Measurement: Collection of these data is complicated, as biological measurements are required.

Data availability:
- Data coverage is reasonable. Data are available in DHS (for 36 countries) and in MICS. Data may also be available from national population-based health management information surveys.

Included on other lists of adolescent health indicators?
- WHO Regional Office for the Eastern Mediterranean
- UNICEF list (“Adolescent girls who are anaemic”)

Included on the Global reference list of 100 health indicators?
- The indicator appears in the appendix to the Global reference list, as an “additional core indicator”; disaggregation by age is recommended.

Notes
- Added to the list of indicators after the consultation on the basis of agreement that anaemia is important in some countries, especially in young women.
- Note that the cut-off for haemoglobin level in DHS varies for pregnant and non-pregnant adolescents (see definition).
CORE INDICATOR 10: PREVALENCE OF OVERWEIGHT AND OBESITY AMONG ADOLESCENTS

Definition:
Proportion of adolescents who are overweight or obese

This indicator is calculated as:
Number of adolescents aged 10–19 years whose BMI was ≥1 SD (overweight) and ≥2 SDs from BMI (obese) according to WHO growth reference standards for respective age and sex in the survey

\[
\frac{\text{Number of adolescents aged 10–19 years whose BMI was ≥1 SD (overweight) and ≥2 SDs from BMI (obese) according to WHO growth reference standards for respective age and sex in the survey}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
Weight and height, measured with standard equipment, and data must be disaggregated for adolescents (10–19 years; age range depends on the coverage of the survey)

Data sources:
- GSHS (Survey staff weigh and measure the height of each student before the survey, write the result on a slip of paper and give it to the student; 15–19 years)
- DHS (BMI ≥ 30.0 kg/m² is defined as obese)
- HBSC (self-reported weight and height; 15–19 years)

Issues:
- Measurement: There was some concern about the self-reported measures used in HBSC.

Data availability:
- Data coverage for BMI should be good, as BMI is one of the most widely collected measures. Also, data are available from school-based surveys.

Included on other lists of adolescent health indicators?
- WHO Regional Office for the Eastern Mediterranean
- UNICEF
- United Nations (2012)

Included on the Global reference list of 100 health indicators?
- No, not in this format.

Notes
- This indicator combines two indicators discussed at the meeting (obesity and overweight) to align it with indicator 13 in the global monitoring framework on noncommunicable diseases (WHO, 2014b).
- As the ages may vary by survey population, the measures (overweight versus obesity) are not comparable.
- Height and weight should be measured rather than self-reported.
CORE INDICATOR 11: EARLY INITIATION OF SEXUAL ACTIVITY

Definition:
Proportion of adolescents who had sexual intercourse before the age of 15 years

This indicator is calculated as:
Number of adolescents who report having had sexual intercourse before age 15 years in the survey
--------------------------------------
Total number of adolescent respondents in the survey
× 100%

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
Information on the number of adolescents (> 15 years) in the survey who reported having had sexual intercourse before the age of 15 years

Data sources:
- DHS
- MICS
- HBSC
- GSHS

Issues:
- None

Data availability:
- Good coverage in many countries

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa
- UNICEF

Included on the Global reference list of 100 health indicators?
- No

Notes
- Early initiation of sexual activity can have health and social consequences.
- This indicator was discussed in depth in the working groups (see section 6).
- The group advised that this indicator should be sensitive to heterosexual and homosexual experiences.
CORE INDICATOR 12: CONDOM USE AT MOST RECENT SEX AMONG ADOLESCENTS WITH MULTIPLE SEXUAL PARTNERSHIPS IN PAST 12 MONTHS

Definition:
Proportion of adolescent males and females aged 15–19 years who have had more than one sexual partner in the past 12 months who report use of a condom during their most recent sexual intercourse.

This indicator is calculated as:
Number of adolescents aged 15–19 years who have had more than one sexual partner in the past 12 months who report use of a condom during their most recent sexual intercourse

\[
\text{Proportion} = \frac{\text{Number of adolescents aged 15–19 years who have had more than one sexual partner in the past 12 months who report use of a condom during their most recent sexual intercourse}}{\text{Total number of adolescent respondents aged 15–19 years who have had more than one sexual partner in the past 12 months}} \times 100\%.
\]

Stratification:
By sex and age (also adolescents aged 10–14 years, when included in a survey).

Data requirements:
Information on the number of adolescents in the survey who reported having had more than one sexual partner in the past 12 months and having used a condom during their most recent sexual intercourse.

Data sources:
- DHS
- Health facilities and especially specialized clinics, e.g. for adolescents, HIV, sexually transmitted infections, male health, could collect this information routinely.

Issues:
- Data availability: Few data available. Data would be more widely available from GSHS, HBSC and DHS if the definition was changed to adolescents who have “ever had sex” (rather than more than one partner).
- Cultural sensitivity: this indicator may be culturally inappropriate in some countries.

Data availability:
- Expected to be good, but more data would be available if the definition referred to adolescents who have “ever had sex”, the definition used in HBSC and GSHS.

Included on other lists of adolescent health indicators?
- UNICEF (15–24 years)
- Included on the Global reference list of 100 health indicators?
  - Yes, but refers to “higher-risk partner”

Notes:
- The numerator discussed at the consultation referred to sexual intercourse with a “higher-risk partner”, as in the Global reference list. This definition was changed to “more than one sexual partner” to clarify the definition. This language is aligned with that of Prevention indicator 1d of the WHO Consolidated strategic information guidelines for HIV in the health sector (WHO, 2015b).
- The numbers may be affected by married adolescents who are sexually active but do not use condoms. Married couples may use condoms only for contraceptive purposes.
- This is a culturally sensitive indicator in the WHO Eastern Mediterranean Region, where it would probably be used only for high-risk groups; asking this question of all adolescents would be seen as inappropriate.
- Trends should be interpreted with changes in percentages of adolescents who have had more than one sexual partner within the past 12 months.
CORE INDICATOR 13: PREVALENCE OF INTIMATE PARTNER VIOLENCE AMONG ADOLESCENTS

Definition:
Percentage of girls aged 15–19 years who have ever had an intimate partner, who reported experiencing physical and/or sexual violence by an intimate partner in the past 12 months.

This indicator is calculated as:

\[
\frac{\text{Number of girls aged 15–19 years who have ever had an intimate partner, who report experiencing physical and/or sexual violence by an intimate partner in the past 12 months}}{\text{Total number of girls aged 15–19 years surveyed who have ever had an intimate partner}} \times 100\%
\]

Data requirements:
Number of girls (aged 15–19 years) surveyed who have ever had an intimate partner and who report having experienced physical or sexual violence by a partner in the past 12 months.

Data sources:
- DHS
- Household surveys with a module on violence

Issues:
- Measurement: potential under-reporting of interpersonal violence because of stigma, legal complications or potential misclassification in police or hospital reports

Data availability:
- Good coverage by DHS. Data availability could be a challenge in countries not covered by DHS.

Included on other lists of adolescent health indicators?
- No

Included on the Global reference list of 100 health indicators?
- Yes

Notes
- Identified as a gap during the consultation and a concern in many countries; added to the list subsequently
CORE INDICATOR 14: DEMAND FOR FAMILY PLANNING SATISFIED WITH MODERN METHODS

Definition:
Percentage of girls aged 15–19 years who are sexually active, whose need for family planning is satisfied with modern methods

This indicator is calculated as:
\[
\frac{\text{Number of girls aged 15–19 years whose family planning demand is satisfied by modern methods}}{\text{Total number of girls aged 15–19 years who demand family planning}} \times 100\%
\]

Data requirements:
Information on the number of girls (aged 15–19 years) in the survey who reported a demand for family planning and who reported using modern methods.

Data sources:
- DHS
- MICS
- Population-based surveys

Data availability:
- Good data coverage

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa (“Unmet need for family planning”)
- UNICEF list (“Unmet need for family planning”)
- United Nations (2012) (“Percentage of women aged 15–24 who are married or in a union and who have met their need for family planning”)
- UNFPA (“Proportion of family planning demand met with modern contraceptives”)

Included on the Global reference list of 100 health indicators?
- Yes

Notes
- Identified as a gap during the consultation and added subsequently
CORE INDICATOR 15: CURRENT TOBACCO USE AMONG ADOLESCENTS

Definition:
Proportion of adolescents who have used any tobacco product in the past 30 days

This indicator is calculated as:

\[
\frac{\text{Number of adolescents who have used any tobacco product in the past 30 days}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
Information on the number of adolescents (aged 10–19 years, depending on coverage of the survey) in the survey who report having used any tobacco in the past 30 days

Data sources:
- GSHS
- Global Youth Tobacco Survey
- DHS

Issues:
- Specific ages vary by survey population

Data availability:
- Good data availability for adolescents of all ages. Younger adolescents covered by GSHS, Global Youth Tobacco Survey, HBSC, from 11-year-olds (in HBSC) to 16–17-year-olds. Older adolescents are covered in the Global Adult Tobacco surveys, the STEPwise Approach to Chronic Disease Factor Surveillance and DHS (although these should be harmonized).

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa
- WHO Regional Office for the Eastern Mediterranean
- UNICEF
- United Nations (2012)

Included on the Global reference list of 100 health indicators?
- Yes (the indicator is for current tobacco use by people aged ≥ 18 years)

Notes
- Aligned with the global monitoring framework (WHO, 2014b)
- “Smoked tobacco products” include cigarettes, bidis, cigars, cheroots, pipes, shisha (waterpipes), fine-cut smoking articles (roll-your-own), kreket and any other form of smoked tobacco. “Smokeless tobacco” includes moist snuff, plug, creamy snuff, dissolvable tobacco, dry snuff, gul, loose-leaf tobacco, red tooth powder, snus, chimo, gutkha, khaini, gudakhu, zarda, quiwam, dohra, tuibur, naas or naswar, shammah, betel quid (pan), toombak, iq’mik, mishri, tapkeer, tombol and any other tobacco product that is sniffed, held in the mouth or chewed.
CORE INDICATOR 16: CURRENT ALCOHOL USE AMONG ADOLESCENTS

Definition:
Proportion of adolescents who had at least one alcoholic drink on one or more days during the past 30 days

This indicator is calculated as:
\[
\frac{\text{Number of adolescents who had at least one alcoholic drink on one or more days during the past 30 days (in the survey)}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
Information on the number of adolescents (aged 10–19 years, depending on the coverage of the survey) who reported having had at least one alcoholic drink on ≥ 1 days during the past 30 days

Data sources:
- HBSC
- GSHS

Issues:
- Measurement: An alcoholic drink should be defined more clearly; currently, surveys consider a sip as an alcoholic drink. The indicator should be aligned with standard references such as “at least one unit of alcohol in the past 30 days”.
- Measurement: In many countries, alcohol is not legally sold to people ≤ 18 years. National variation in the legal minimum age for purchase of alcohol will affect the numbers.

Data availability:
- Good coverage. Data on “any alcohol use” is available in school-based surveys (GSHS, HBSC).
- Data available for 15–19-year-olds as per capita consumption based on sales

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa
- UNICEF
- United Nations (2012) (indicator refers to “ever use”)

Included on the Global reference list of 100 health indicators?
- Yes (from age 15 years. The indicator appears in the appendix to the Global list, as an “additional core indicator”. Disaggregation by age is recommended. The indicator is “prevalence of heavy episode of drinking”)

Notes:
- As appropriate in the national context; may not be appropriate in countries in which alcohol consumption is illegal
- An alcoholic drink is a glass of wine, a bottle of beer, a small glass of liquor or a mixed drink.
- This indicator is important for setting age restrictions on alcohol purchase.
- This indicator is related to other indicators, such as road traffic accidents.
CORE INDICATOR 17: PREVALENCE OF INSUFFICIENT PHYSICAL ACTIVITY AMONG ADOLESCENTS

**Definition:**
Proportion of adolescents who report not meeting recommended levels of physical activity

**This indicator is calculated as:**
\[
\frac{\text{Number of adolescents who report not having engaged in 60 min of moderate-to-vigorous physical activity per day in the past 7 days (in the survey)}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

**Stratification:**
This indicator can be further disaggregated by sex and age.

**Data requirements:**
Information on the number of minutes spend doing moderate-to-vigorous physical activity in the past 7 days or the number of adolescents who report not having (or having) done 60 minutes of moderate-to-vigorous physical activity in the past 7 days.

**Data sources:**
- HBSC
- GSHS
- DHS (in some countries, DHS measures "MET-minutes per week", where METs are multiples of the resting metabolic rate)

**Issues:**
- Measurement: valid measurement of physical activity from a questionnaire
- Specific ages may vary by survey population

**Data availability:**
- Good coverage. Measures of physical activity appear to be well harmonized between GSHS and HBSC. May also be compatible with DHS.

**Included on other lists of adolescent health indicators?**
- WHO Regional Office for the Eastern Mediterranean
- UNICEF
- United Nations (2012)

**Included on the Global reference list of 100 health indicators?**
- Yes, the indicator appears in the appendix to the Global reference list, referred to as an “additional core indicator”; disaggregation by age is recommended. Only from age ≥ 18 years.

**Notes**
- Aligned with the noncommunicable disease global monitoring framework (WHO, 2014b)
- Integrates two indicators discussed during the consultation: “Physical activity” and “Sedentary activity”
- It was suggested that an indicator of “Insufficient physical activity” would comply with the deficit approach to measurement of the other indicators and better match the WHO guidelines of < 60 min of moderate activity per day.
- Potential difficulties in measuring physical activity were mentioned; however, tools are being tested to improve harmonization across surveys (e.g. GSHS, HBSC)
- The indicator is predictive of health problems later in life.
- Specific ages may vary by survey population.
CORE INDICATOR 18: KNOWLEDGE ABOUT HIV TRANSMISSION AMONG ADOLESCENTS

Definition:
Proportion of adolescents who correctly identify the two major ways of preventing sexual transmission of HIV

This indicator is calculated as:

\[
\frac{\text{Number of surveyed adolescents who, in response to prompting, correctly identify using condoms and having sex with only one, faithful, uninfected partner as means of protection against HIV infection}}{\text{Total number of adolescent respondents in the survey}} \times 100%\]

Stratification:
This indicator can be further disaggregated by sex.

Data requirements:
Information on the number of adolescents (aged 10–19 years) in the survey who can correctly identify using condoms and having sex with one faithful, uninfected partner as a means of protection against HIV infection.

Data sources:
- DHS
- MICS
- AIDS Indicator Survey within the DHS programme

Issues:
- Specific ages may vary by survey population.
- Culturally sensitive; will not be included in surveys in some countries

Data availability:
- Data available mainly for females in DHS and MICS.

Included on other global lists of adolescent health indicators?
- UNICEF (15–49 years)

Included on the Global reference list of 100 health indicators?
- Yes, as an “additional core indicator”; disaggregation by age is recommended (15–19 and 20–24 years). In the Global reference list, it is “Knowledge of HIV transmission among young women and men” and not restricted to sexual transmission.

Notes:
- Culturally sensitive. In the WHO Eastern Mediterranean Region, this indicator will be seen as encouraging condom use, which is equated to encouraging sex; it could be used among married adolescents.
- Research should be conducted on whether condom use increases sexual activity.
- Data on this indicator are often used as a proxy for the coverage of sexuality education.
CORE INDICATOR 19: PARENTAL CONNECTION WITH ADOLESCENTS

Definition:
Proportion of adolescents who report that their parents or guardians understand their problems or worries most of the time.

This indicator is calculated as:
\[
\frac{\text{Number of adolescents who report that, in the past 30 days, their parents or guardians understood their problems or worries most of the time}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
Information on the number of adolescents (aged 10–19 years) in the survey who report that their parents or guardian understood their problems or worries most of the time in the past 30 days.

Data sources:
- HBSC
- GSHS

Issues:
- Specific ages may vary by survey population.

Data availability:
- Good data coverage in school-based surveys.

Included on other lists of adolescent health indicators?
- No

Included on the Global reference list of 100 health indicators?
- No

Notes:
- Specific ages may vary by survey population.
- During the consultation, there was some concern about the degree of subjectivity of the data. The common love–hate relation between parents and adolescents is likely to affect ratings.
- This indicator provides indirect evidence of the lack of a supporting adult for an adolescent.
- Data from GSHS show that adolescents perceive that parents' warmth is a protective factor against health-compromising behaviour (WHO, 2014a).
CORE INDICATOR 20: PARENTAL REGULATION OF ADOLESCENTS

Definition:
Proportion of adolescents who report that their parents or guardians really know what they are doing in their free time

This indicator is calculated as:
\[
\frac{\text{Number of adolescents who report that, in the past 30 days, their parents or guardians really knew what they were doing in their free time (in the survey)}}{\text{Total number of respondent adolescents aged 13–17 years in the survey}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
Information on the number of adolescents (aged 10–19 years) in the survey who reported that their parents or guardian knew what they were doing in their free time.

Data sources:
- HBSC
- GSHS

Issues:
- Specific ages may vary by survey population.
- Measurement: Validity of subjective experiences may be a challenge

Data availability:
- Good data availability from school-based surveys.

Included on other lists of adolescent health indicators?
- None

Included on the Global reference list of 100 health indicators?
- No

Notes
- Specific ages may vary by survey population.
- During the consultation, there was some concern about the definition. Is a high level of regulation good or bad? The meaning of this indicator depends on culture.
- It was suggested that this indicator should reflect protection rather than regulation, but such a measure would require validation.
- It was suggested that parental connection and regulation could be combined, as both refer to communication.
- Some participants expressed concern about the validity and meaning of such data, but data from GSHS show that adolescents perceive that parents’ warmth and their parents knowing of their daily activities predict less health-compromising behaviour (WHO, 2014a).
- Participants discussed whether this indicator could refer to having any understanding person more generally, i.e. a grandparent, a schoolteacher or a friend.
- A scale would be preferable to a dichotomous outcome for correlational analyses.
ADDITIONAL INDICATOR 1: PREVALENCE OF HIV INFECTION AMONG ADOLESCENTS

The indicator was “HIV incidence” on the list discussed at the consultation.

Definition:
Percentage of adolescents living with HIV in the general population

This indicator is calculated as:

\[
\frac{\text{Number of adolescents aged 10–14 and 15–19 years living with HIV}}{\text{Number of adolescents aged 10–14 and 15–19 years in the population}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
HIV prevalence rates that can be disaggregated by age (10–14 and 15–19 years)

Data sources:
- HIV surveillance systems
- HIV prevalence surveys

Issues:
- Relevant in only some countries

Data availability:
- Good; DHS provides data for more than 30 countries. Some countries also have data from national health management information systems.

Included on other lists of adolescent health indicators?
- UNICEF

Included on the Global reference list of 100 health indicators?
- Yes

Notes
- The consensus at the consultation was that this indicator should be included as an additional indicator.
- The definition of this indicator was changed from “incidence” to “prevalence” after the consultation.
- Data on HIV prevalence have wider coverage than those on HIV incidence; none of the current measures, surveys or DHS capture incidence, and only prevalence is available (except perhaps in high-prevalence countries).
- Incidence does not necessarily reflect vertical transmission or survival beyond childhood.
- Harmonization with the global reference Indicators will be challenging.
ADDITIONAL INDICATOR 2: HIV TESTING AMONG ADOLESCENTS

Definition:
Proportion of adolescents who had an HIV test in the past 12 months and received the results of the latest test.

This indicator is calculated as:

\[
\frac{\text{Number of adolescents who had an HIV test in the past 12 months and received the results of the latest test}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

Stratification:
This indicator should be disaggregated by age (10–14, 15–19 years) and sex.

Data requirements:
Information on the number of adolescents who have had an HIV test in the past 12 months and received the results from the latest test.

Data sources:
- DHS (15–49-year-olds, disaggregation by 15–19-year-olds)
- AIDS Indicator Survey in DHS

Issues:
- Relevant only in countries with generalized HIV epidemics
- Measurement: Stigma around HIV testing and content requirements in some countries

Data availability:
- Reasonable data coverage for the numerator in DHS (about 49 countries), but the denominator could be difficult to define.

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa

Included on the Global reference list of 100 health indicators?
- No

Notes
- The previous version of this indicator specified “sexually active” adolescents in the numerator and the denominator. Given the difficulty of obtaining data on sexually active adolescents and as this indicator is most relevant in countries with generalized HIV epidemics, where transmission may have been perinatal, the definition was revised.
- Inclusion of adolescents aged 10–14 years is recommended when possible.
- Testing is sometimes done in family planning programmes and during programmes for young people, where parental consent is unnecessary.
ADDITIONAL INDICATOR 3: ADOLESCENTS LIVING WITH DIAGNOSED HIV INFECTION

Definition:
Percentage of adolescents living with HIV who have had a positive test for HIV

This indicator is calculated as:
\[
\text{Number of adolescents living with diagnosed HIV infection who have received their results} \times 100\% \\
\text{Number of adolescents living with HIV}
\]

Stratification:
This indicator can be further disaggregated by sex and by age (5–14, 15–19 years)

Data requirements and data sources:
Estimates should be made from the best available data in the setting.
1. Population-based survey numerator and denominator:
   - Surveys with HIV testing and questions on awareness of HIV status
   - DHS/AIDS: Proportion of people living with HIV who report having had a test in the past 12 months, as a conservative proxy
2. Programme data and estimated number living with HIV:
   Numerators: Number of newly identified HIV-positive cases minus estimated deaths; if not available, estimates based on triangulated data from programme records and death estimates, as well as population-based surveys with HIV testing
   Denominators: (1) modelling, e.g. Spectrum AIDS impact model; (2) estimated number of people living with HIV extrapolated from national surveys

Issues:
- Data may be difficult to obtain.

Data availability:
- Data are currently relevant in only some countries.

Included on other lists of adolescent health indicators?
- No

Included on the Global reference list of 100 health indicators?
- No

Notes
- The proportion of people living with HIV who know their HIV status must be determined, as this is the entry point to the continuum of care. It is a key indicator of eligibility for HIV prevention and treatment (see WHO, 2015b)
- Disaggregated estimates can reveal gaps in the diagnosis of HIV infection.
- The proportion of adolescents living with HIV who know their HIV status should also be globally reported for target populations when these data are collected as national indicators, including the percentage of key populations and of pregnant women who have been tested in the past 12 months and know their HIV status.
ADDITIONAL INDICATOR 4: ANTIRETROVIRAL THERAPY COVERAGE OF ADOLESCENTS

Definition:
Percentage of adolescents living with HIV who are receiving antiretroviral therapy (ART)

This indicator is calculated as:
\[
\frac{\text{Number of adolescents living with HIV who are currently receiving ART}}{\text{Number of adolescents living with HIV}} \times 100\%
\]

Stratification:
This indicator must be disaggregated by age (10–19 years) and can be further disaggregated by sex.

Data requirements:
Information on the number of adolescents living with HIV and currently receiving ART; must be disaggregated by age (10–14; 15–19 years).

Data sources:
- Programme records, e.g. ART register
- Model-based estimates, e.g. Spectrum AIDS impact model

Issues:
- Relevant in only some countries
- Data quality is important.

Data availability:
- Good coverage by the service provision assessment survey in DHS, for selected countries

Included on other global lists of adolescent health indicators?
- No

Included on the Global reference list of 100 health indicators?
- No, as per the Consolidated strategic information guidelines for HIV in the health sector (WHO, 2015b)

Note
- Recommended by WHO for use in countries with generalized HIV epidemics
ADDITIONAL INDICATOR 5: NEW PATIENTS ON ANTIRETROVIRAL THERAPY

Definition:
Number of adolescents living with HIV who initiated ART within the past 12 months

This indicator is calculated as:
\[
\text{Number of adolescents living with HIV who initiated ART within the past 12 months} / \text{Not applicable} \times 100\%
\]

Stratification:
This indicator must be disaggregated by age (<1, 1-4, 5-9, 10-14, 15-19 years) and can be further disaggregated by sex.

Data requirements:
Information on the number of adolescents living with HIV who started ART within the past 12 months; must be disaggregated by age

Data sources:
- Programme records, e.g. ART register
- Model-based estimates e.g. Spectrum AIDS impact model

Issues:
- Relevant in only some countries
- Data quality is important

Data availability:
- Good coverage by the service provision assessment survey in DHS, for selected countries

Included on other lists of adolescent health indicators?
- No

Included on the Global reference list of 100 health indicators?
- No, as per the Consolidated Strategic Information Guidelines for HIV in the Health Sector (WHO, 2015b)

Notes
- Recommended by WHO for use in particular country contexts
ADDITIONAL Indicator 6: HIV Load Suppression in Adolescents

Definition:
Proportion of adolescents living with HIV and on ART who have virological suppression 12 months after initiating treatment

This indicator is calculated as:
\[
\frac{\text{Number of adolescents living with HIV who initiated ART up to 12 months before the start of the reporting period and who have a suppressed viral load (i.e.} \leq 100 \text{ copies/mL) at 12 months after initiating ART}}{\text{Number of adolescents aged 10–14 and 15–19 years living with HIV who initiated ART} \leq 12 \text{ months before the start of the reporting year and have had a CD4 test}} \times 100\%
\]

Stratification:
This indicator must be disaggregated by age (< 10, 10–14, 15–19 years) and can be further disaggregated by sex.

Data requirements:
Information on the number of adolescents living with HIV who initiated ART within the past 12 months and who have had a CD4 test. Data must be disaggregated by age (10–19 years)

Data sources:
- Facility reporting system

Issues:
- Relevant in only some countries

Data availability:
- Good coverage by the service provision assessment survey in DHS, for selected countries

Included on other lists of adolescent health indicators?
- No

Included on the Global reference list of 100 health indicators?
- No, as per the Consolidated Strategic Information Guidelines for HIV in the Health Sector (WHO, 2015b)

Notes:
- Still under discussion with WHO for use in particular country contexts
ADDITIONAL INDICATOR 7: CURRENT CANNABIS USE AMONG ADOLESCENTS

Definition:
Proportion of adolescents who report use of cannabis in the past 30 days

This indicator is calculated as:

\[
\frac{\text{Number of adolescents who report use of cannabis one or more times in the past 30 days (in the survey)}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex and age.

Data requirements:
Information on the number of adolescents in the survey who reported having used cannabis in the past 30 days

Data sources:
- HBSC
- GSHS

Issues:
- Specific ages may vary by survey population.

Data availability:
- Better data availability for cannabis than for other illicit drugs

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa
- WHO Regional Office for the Eastern Mediterranean
- UNICEF
- United Nations (2012)

Included on the Global reference list of 100 health indicators?
- No

Notes
- Early use of cannabis is likely to lead to persistent use, possibly with cognitive and health consequences.
- Specific ages may vary by survey population.
- On the basis of recommendations at the consultation, this indicator was redefined to focus on cannabis rather than the initially suggestion of “illicit drug use”.
- Friends reporting on friends may constitute a more valid source of information. HBSC asks whether friends of the respondent are using drugs.
Indicators that require further development

INDICATOR TO BE DEVELOPED 1: HEALTH SERVICE USE BY ADOLESCENTS

Definition:
Proportion of adolescents who used a specified package of health services in the past 12 months

This indicator is calculated as:

\[
\frac{\text{Number of adolescents who used the specified package of health services in the past 12 months (in the survey)}}{\text{Total number of adolescent respondents in the survey}} \times 100\%
\]

Stratification:
This indicator can be further disaggregated by sex.

Data requirements:
Information on the number of adolescents in the survey who used a package of health services [to be specified] within the past 12 months

Data sources:
- Population-based surveys

Issues:
- Measurement: Data availability
- Indicator requires further development

Data availability:
- Data collection could be difficult without a clearer definition of packages and services.

Included on other lists of adolescent health indicators?
- WHO Regional Office for Africa
- UNICEF
- United Nations (2012)

Included on the Global reference list of 100 health indicators?
- No

Notes
- Consider defining the package, e.g. marker conditions and interventions such as vaccination, HIV testing, treatment and care, contraceptive provision and management of mental health conditions
- During the consultation, concern was raised about what this indicator really measures. It provides information only on contacts with health services and not on the quality of services.
- It was suggested that the packages of health services referred to in the definition and numerator be specified.
- The group suggested that “Health service use” should include preventive services, such as vaccination and screening, to complement other use indicators (e.g. HIV testing).
INDICATOR TO BE DEVELOPED 2: TRAINED HEALTH SERVICE PROVIDERS

**Definition:**
Proportion of facilities (by country) with health service providers trained in the provision of adolescent health services in the past 2 years

**This indicator is calculated as:**

\[
\text{Proportion} = \frac{\text{Number of facilities in the country with at least one health service provider trained in the provision of adolescent health services in the past 2 years (in the survey)}}{\text{Total number of facilities surveyed in the country}} \times 100\%
\]

**Stratification:**
None

**Data requirements:**
Information on the number of health facilities surveyed with at least one health service provider who has been trained in providing adolescent health services in the past 2 years

**Data sources:**
- WHO Service Availability and Readiness Assessment survey

**Issues:**
- Data availability (see below)

**Data availability:**
- Poor. The WHO Service Availability and Readiness Assessment survey is currently available in only 10 countries.

**Included on other lists of adolescent health indicators?**
- WHO Regional Office for Africa

**Included on the Global reference list of 100 health indicators?**
- No

**Notes**
- Considered a poor proxy for good-quality health service provision, although it is measured and used for this purpose. Other attributes of good-quality services could be considered.
- This is an important indicator of whether health services meet adolescents’ needs and requirements (e.g. opening hours outside of school time).
INDICATOR TO BE DEVELOPED 3: PREVALENCE OF DEPRESSION AMONG ADOLESCENTS

Definition:
Proportion of adolescents who report experiencing symptoms of depression in a specified period

This indicator is calculated as:

Alternative 1
Number of adolescents (> 15 years) who screen positive on the six depression questions in the WMH-CIDI screening tool
Total number of respondents aged 15–19 years in the survey

Alternative 2
Number of adolescents aged 13–17 years in the GSHS who report having felt lonely and/or having felt so worried about something that they could not sleep (two separate items) during the past 12 months
Total number of respondents aged 13–17 years in the survey

Stratification:
This indicator can be further disaggregated by sex.

Data requirements:
Alternative 1: Information on the number of adolescents (aged 10–19 years, depending on coverage in the sample) in the World Mental Health Composite International Diagnostic Interview (WMH-CIDI) survey who screened positive with the tool
Alternative 2: Information on the number of adolescents in the GSHS who reported “having felt lonely” or “having felt so worried they could not sleep” in the past 12 months

Data sources:
- WMH-CIDI survey; data on adolescents are currently available only for subsamples in six countries and were collected for research purposes
- GSHS (“How often have you felt ‘lonely’ and/or ‘worried’ during the past 12 months?”)
- HBSC (“How often have you felt ‘low’ and/or ‘irritable and in a bad temper’?”)

Issues:
- Measure: Poor data availability, and the GSHS and HBSC measures do not comply with commonly used clinical measures of depression.
- Data availability: The WMH-CIDI survey does not usually cover adolescents (only adults > 18 years)

Data availability:
- Poor availability of data. No global monitoring in place. National health surveys or data from hospital records are not widely available, especially in low-income countries.
- School-based surveys cover relatively mild forms of depression and are likely to result in higher prevalence rates than more clinical screening tools.
**Included on other lists of adolescent health indicators?**
WHO Regional Office for the Eastern Mediterranean

No

**Notes**
- Consensus was achieved that this indicator should be included as a core indicator once a suitable measure has been identified.
- The indicator was discussed by the working group (see section 6), and a separate report was written after the consultation on the availability of data and the validity of the available tools (WHO, 2015c). The conclusion was that existing tools for measuring depression should be validated in a global study.
- The WMH-CIDI survey collected data on the prevalence of depression and other mental health problems in adults (> 18 years). Data on adolescents are currently available for only six countries, some of which used only a subsection of the survey. Training in administering the survey is recommended, which might compromise its usefulness as a global screening tool (see http://www.hcp.med.harvard.edu/wmhcidi/trc_main.php).
- Data that can be disaggregated by age would useful for examining developmental patterns throughout adolescence.
6. Indicators that require in-depth discussion

After the plenary discussion of individual indicators, participants separated into three groups to discuss indicators that required more discussion, namely those for mental health, sexual readiness and health services.

Each group was asked to address the following five questions:

1. What important information on the subject can the indicator provide?
2. What are the strengths and weaknesses of the indicators on the list? (Also consider sources of information.)
3. Are there alternative indicators?
4. How could the indicator and its measurement be improved, and/or could alternatives be developed and/or tested?
5. Should it/they be on the list of adolescent indicators?

Group 1. Mental health

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of depression</td>
<td>Proportion of adolescents who reported experiencing symptoms of depression in a specified period</td>
</tr>
<tr>
<td>Suicide mortality rate</td>
<td>Number of adolescent deaths due to suicide per 100 000 adolescent population</td>
</tr>
</tbody>
</table>

1. What important information on the subject can the indicator provide?

Indicators of adolescent mental health can increase awareness of the importance and scale of mental health problems among adolescents, which can guide countries in prioritizing initiatives to improve the situation. The group stressed that the mental health of adolescents should be a key concern of governments. Studies show that mental health problems are common in adolescence and that the onset of many such problems peaks during this period; thus, monitoring in this age group is particularly important. Self-reported data from surveys show that mental health problems are a major concern for adolescents themselves. The group noted that depression in particular is an important cause of lost disability-associated life years in the adolescent population globally.

2. What are the strengths and weaknesses of the indicators on the list?

The group stressed the importance of having an indicator of the prevalence of depression. The indicator discussed is a measure of symptoms of depression (such as “feeling sad”) over time. The group discussed whether the indicator should be a measure of the prevalence of depressive syndromes (equivalent to a clinical diagnosis of depression) or of current symptoms (as measured in most surveys such as HBSC and GSHS). One weakness of measuring the “prevalence of depression” is that it covers only depression and not other mental health issues that might be important causes of disability and poor health in adolescents, including anxiety.
The availability of data on this indicator is an important challenge, especially if they include symptoms over time. Many countries do not routinely collect data on depression in this age group, and the WHO mental health survey collects data only from adults (≥ 18 years).

The HBSC and GSHS have items that are related to depression, but the group expressed concern about the usefulness of the information obtained in these surveys for measuring the prevalence of depression for the current purpose, as both surveys measure relatively mild forms of self-reported symptoms of depression.

The GSHS has two items related to depression in the mandatory survey:
— “During the past 12 months, how often have you felt lonely?”
— “During the past 12 months, how often have you been so worried about something that you could not sleep at night?”

The HBSC asks adolescents:
— “In the last 6 months, how often have you had the following...”: “Feeling low”, “Irritability and bad temper”, “Feeling nervous” and/or “Difficulties in getting to sleep”.

The group expressed concern about the predictive validity of measuring current symptoms; diagnostic manuals recommend assessment of the persistence of symptoms over 2 weeks. It was suggested that the validity of various measures of depression be evaluated and recommendations made on a suitable tool for measuring depression in adolescents globally.

The group noted that the indicator “Mortality rate from suicide among adolescents” is an important indicator of mental health among adolescents. A weakness of the suggested definition, however, is that it captures only fatal attempts, which represent only the “tip of the iceberg” in terms of mental health problems.

3. Are there alternative indicators?

The group suggested use of both a diagnostic indicator of “Prevalence of depression among adolescents”, to assess symptoms including hopelessness, loss of interest (anhedonia) and change of mood, and a non-diagnostic indicator, to measure mental states or risks associated with depression, such as stress and perceived well-being.

The group concluded that not only “Mortality rate from suicide among adolescents” but also non-fatal suicide attempts, suicide ideation and self-harm should be considered for inclusion on the list, as they are important indicators of mental health.

Novel alternative indicators might include risk factors such as parental psychiatric problems, protective factors such as coping skills, and behaviour known to be correlated with mental health problems such as school drop-out or lack of attendance. The broader indicator, “Prevalence of disability”, could include aspects of both physical and mental health and was suggested as relevant to adolescents, since disability has a substantial impact on well-being and participation. The group noted the relevance of indicators of the availability of mental health care for adolescents.

4. How could the indicator and its measurement be improved, and/or could alternatives be developed and/or tested?

The group recommended that the validity of indicators of the “Prevalence of depression among adolescents” be tested. The group noted, however, that mental health problems such as depression may be too complex to measure with common surveillance instruments, and tools might be required to measure multiple symptoms over time.
5. Should it/they be on the list of adolescent indicators?

Prevalence of depression among adolescents: The group concluded that, although an indicator of mental health should be on the list, it might be premature to include one with a diagnostic definition of depression, as the validity of existing data must be confirmed, and new tools are required for data collection.

Mortality rate from suicide among adolescents: The group concluded that this indicator should be on the core list. Work should be undertaken to test the validity of behaviour related to suicide, so that suicide ideation, planning, attempts and even self-harm without suicidal intent could be included later (WHO, 2015c).

**Group 2. Sexual readiness**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early initiation of sexual activity</td>
<td>Proportion of adolescents who had sexual intercourse before the age of 15 years</td>
</tr>
<tr>
<td>Sexual readiness</td>
<td>Scored on a four-question scale of sexual well-being addressing individuals’ perceptions and beliefs about their sexual life and experience</td>
</tr>
</tbody>
</table>

1. What important information on the subject can the indicator provide?

The group noted that “Early initiation of sexual activity” can provide an estimate of the proportion of adolescents who are sexually active and therefore at risk for certain health outcomes. Studies of “sexual readiness” suggest that the measure captures both the psychological and social context of sexual activity in the adolescent population (Mercer et al., 2006; Symons et al., 2014).

2. What are the strengths and weaknesses of the indicators on the list?

An important strength of the “Early initiation of sexual activity” indicator is that data are available in a number of surveys, including DHS, HBSC and GSHS. A weakness of the indicator is that it might not be culturally appropriate in some settings. The group commented on the importance of the concept of sexual readiness but expressed concern about the availability and validity of data on this indicator; currently, data are not available in any country.

3. Are there alternative indicators?

An alternative measure of sexual readiness is available, which includes willingness, autonomy, timing and use of contraception at first intercourse, as used in Natsal surveys (Wellings et al., 2001). Other novel, potentially relevant indicators are “Sexual violence”, “Forced first sex” or “Experience of sexual abuse”. Legal and ethical considerations are, however, involved in asking questions about violence and forced sex. In many countries, these are reportable offences, and data will be difficult to access.

4. How could the indicator and its measurement be improved, and/or could alternatives be developed and/or tested?

The group noted that definitions of indicators of sexual activity must take into account their applicability to different sexual practices and cultural contexts. An indicator of “Early initiation of sexual activity” should take into consideration the framework of marriage, to make the question more culturally appropriate in situations in which it might otherwise be dismissed as inappropriate due to moral or religious disapproval of sexual activity outside marriage. The group suggested that age at marriage (in single years) could be used as a proxy for sexual activity and initiation in settings where an indicator of sexual activity is inappropriate.

The group noted that the indicator of sexual readiness has been validation in only one country and that further validation is needed.
5. Should it/they be on the list of adolescent indicators?

The group suggested that “Early initiation of sexual activity” should be included as a core indicator in view of the possible important health and social consequences. Sexual readiness reflects an important concept but should be modified and validated before it is included on the list. The indicator “Forced first sex” should be considered as an additional indicator.

**Group 3. Health services**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled birth attendant</td>
<td>Proportion of live births to adolescents that were attended by skilled health personnel</td>
</tr>
<tr>
<td>Health service use by adolescents</td>
<td>Proportion of adolescents who used a specified package of health services in the past 12 months</td>
</tr>
<tr>
<td>Trained health service providers</td>
<td>Proportion of facilities (by country) in which health service providers were trained in the provision of adolescent health services in the past 2 years</td>
</tr>
</tbody>
</table>

1. What important information on the subject can the indicator provide?

The indicator “Skilled birth attendant” provides a measure of the provision of skilled care during childbirth, which gives insight into the level of health care; however, it is related to only one health area (maternal care). The indicator “Health service use by adolescents” is a measure of whether adolescents actually use health services. “Trained health service providers” measures one aspect of the quality of care, i.e. whether health care services are welcoming, friendly and responsive to adolescents. For example, the opening hours of health clinics might prevent adolescents who attend school from receiving health care.

2. What are the strengths and weaknesses of the indicators on the list?

The definition of the “Skilled birth attendant” indicator is clear, and data are collected, for instance in DHS. A weakness of the indicator is that it is a measure of contact with a skilled birth attendant but not of the content or quality of the service. Some adolescents might not know whether the person with her at the time of childbirth satisfies WHO’s definition of a skilled birth attendant.

The indicator “Health service use by adolescents” is an interesting approach to assessing health care in a variety of settings; however, the current formulation of the indicator is very broad. Moreover, it does not include the reason for which the adolescent is seeking care.

A strength of the indicator “Trained health service providers” is that it is relatively easy to measure and is being measured in some places. A weakness of the indicator is that it is a poor proxy for the quality of health services.

3. Are there alternative indicators?

The group mentioned that “Institutional delivery” could be used as a proxy for “Skilled birth attendant”. A weakness of that measure, however, is that institutional delivery can be done in the absence of a skilled birth attendant. The group did not suggest alternative indicators of “Health service use by adolescents”.

The group noted that methods are available for measuring the quality of “adolescent-friendly health services”, but the assessments are not subsumed into a single indicator or index that could replace “Trained health service providers”. This may be an area for future development.
4. How could the indicator and its measurement be improved, and/or could alternatives be developed and/or tested?

The group did not suggest how the indicator “Skilled birth attendant” could be improved for adolescents. “Health service use by adolescents” should be clarified by defining packages of specific interventions; this could be done by identifying selected marker or tracer conditions. The indicator should also include preventive services such as vaccination and screening to complement other use indicators (e.g. HIV testing). The “Trained health service providers” indicator should cover a short list of indicators of some attributes of quality and friendliness.

5. Should it/they be on the list of adolescent indicators?

The group suggested that, despite its limitations, the indicator “Skilled birth attendant” should be on the core list and that the indicators “Health service use by adolescents” and “Trained health service providers” should be included on the list in modified forms. The group later agreed to remove “Skilled birth attendant” from the list because of its weaknesses and its limited relevance to overall adolescent health.
7. Summary of themes in the discussion on data availability and validity

Data availability

The participants described a range of experience in monitoring, evaluating and collecting data for the suggested indicators and age groups of adolescents. (Comments about the availability of data for each of the indicators can be found in section 5.)

Concern about population groups and gaps in data collection

A number of indicators were considered important but had limited data coverage because they are measured in only a few countries or in a subsample of adolescents. DHS, for instance, collect data only on adolescents aged ≥ 15 years. Indicators based on DHS data, such as “Prevalence of anaemia among adolescents”, “Knowledge about HIV transmission among adolescents”, “HIV testing among adolescents” and “Condom use at most recent sex among adolescents with multiple partners in past 12 months” may therefore exclude young adolescents. Moreover, some data collected in DHS, including on the prevalence of anaemia, are only for women.

GSHS and HBSC also cover only a limited age range (13–17 years in GSHS and 11–15 years in HBSC). Indicators that rely strongly on GSHS and HBSC surveys include “Parental connection with adolescents”, “Parental regulation of adolescents” and “Prevalence of depression among adolescents”.

Poor coverage of mortality data and measurement of conditions rather than mortality rates

Concern was raised about the availability of mortality data. Six of the proposed indicators are based on mortality rates, namely “Adolescent mortality rate”, “Adolescent mortality rate from road traffic injuries”, “Adolescent mortality rate from HIV/AIDS”, “Adolescent mortality rate from suicide”, “Adolescent mortality rate from homicide” (previously “Interpersonal violence mortality rate”) and “Adolescent maternal mortality ratio”. Concern was also raised about the coverage and tracking of mortality data in general and in many of the discussions on individual indicators. Specific concern was expressed with regard to the WHO African Region and low-resource countries. The main concern is potential under-reporting, due to ineffective police and hospital registers and the stigma associated with indicators such as “Adolescent mortality rate from HIV/AIDS” and “Adolescent mortality rate from suicide”, which may result in under-reporting or incorrect classification in registers in order to protect families. Some mortality indicators may have legal connotations that can affect reporting, including deaths due to road traffic accidents, homicide and suicide.

It was argued that data on the prevalence rates of behaviour, risk or conditions rather than mortality rates are more widely available, because prevalence data can be collected in health surveys whereas mortality data are obtained from register data. Furthermore, the prevalence rates of certain conditions or behaviours might be more informative than mortality rates, which capture only the “tip of the iceberg”. This might for instance be true for “Adolescent mortality rate from suicide”: the prevalence of non-fatal suicide attempts might be an important measure of mental health problems.
Caution: concern about reliance on existing data

Concern was raised with regard to reliance on existing surveys for data. Although data coverage is important, factors such as the age ranges for indicators should not be driven by the availability of data but should reflect the age range for which the indicator is considered the most important. For example, data on alcohol consumption by 13–15-year-olds is available from the GSHS, whereas alcohol consumption by adolescents aged 15–17 years might be even more important.
8. Revision of the list after the meeting and ways forward

List presented in the current report

After the consultation, the list of indicators was revised and adapted on the basis of the comments and suggestions made. Experts were asked for advice in the revision, leading to the final list of 20 core and 7 additional indicators. This list will be disseminated to stakeholders and recommended for use at country level.

The existence of global core indicators of adolescent health does not suggest that other indicators have been ignored or that these global indicators are in themselves sufficient for subnational quality improvement. The indicators should be perceived as complementary to those at national levels.

Indicators suggested for further development

An important conclusion of the consultation was that there are still critical gaps in data for some important indicators. Parallel to use of the list, work should be done to develop and test tools to measure the indicators that require more development. This will require partnerships with relevant researchers and organizations. Funding for development and testing will be critical.

Action plan for further development of the indicator “Prevalence of depression among adolescents”

Although the prevalence of depression among adolescents has been the subject of numerous studies in various countries, there are few globally comparable data. In a review of the available data and of the validity of current tools for measuring depression in adolescents (WHO, 2015c), the authors recommended that the validity of existing tools should be tested with the patient health questionnaire (PHQ)-2, PHQ-9, WHO-5 and a new three-item abbreviated version of WMH-CIDI developed for this purpose. The aim of validation will be to identify one instrument as suitable for collecting data on the prevalence of depression in adolescents at population level globally.

A validation study could be based on five large, school-based or community surveys to test the four identified measures against a commonly accepted self-reported assessment tool of depression, such as the Beck Depression Inventory. Each sample should include about 1000 adolescent boys and girls, and studies should be conducted in the major languages (Arabic, English, Hindi, Mandarin and Spanish) in Africa; Asia; Australia, Europe and North America; and South America.

The next step is to secure funding and identify partners for the validation study. WHO is in touch with a research group that is testing the PHQ-2 against the PHQ-7 (no gold standard) in a school-based study of adolescents in India. Contacts are being established with researchers in Australia, Europe and South America.
Action plan for validating measures of depression among adolescents

- Establish a group of interested researchers with relevant samples.
- Apply for funding for the study.
- Develop the package to be tested, and translate the questionnaires into the study languages.
- Collect data.
- Analyse data.
- Publish the results and make recommendations.

Estimated budget: US$ 300 000
Estimated time: 2 years

Other measures that should be considered for inclusion in the validation study are: self-harm, suicide ideation, anxiety, disability and sexual readiness. Relevant covariates, i.e. variables that may be associated with depression, should be included in the study design.
9.
References


Annex 1.

Agenda

Tuesday 30 September 2014

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00–09:15</td>
<td>Welcome and introduction</td>
<td>Director ad interim, Maternal, Newborn, Child and Adolescent Health</td>
</tr>
<tr>
<td>09:15–09:30</td>
<td>Declarations of interests, agenda and appointment of chairpersons</td>
<td>Matthews Mathai</td>
</tr>
<tr>
<td>09:30–09:45</td>
<td>Background and meeting objectives</td>
<td>Matthews Mathai</td>
</tr>
<tr>
<td>09:45–10:30</td>
<td>Setting the scene:</td>
<td>Jane Ferguson, Cynthia Boschi Pinto</td>
</tr>
<tr>
<td></td>
<td>- Health situation of adolescents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Need for indicators related to adolescent health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Global Reference List of Core Health Indicators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Discussion</td>
<td></td>
</tr>
<tr>
<td>10:30–11:00</td>
<td>Refreshment break</td>
<td></td>
</tr>
<tr>
<td>11:00–11:45</td>
<td>Proposed indicators</td>
<td>Matthews Mathai, Cynthia Boschi Pinto</td>
</tr>
<tr>
<td></td>
<td>- WHO Measurement Framework</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Initial criteria for selection of adolescent indicators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Revision of the list of 32 – now 28!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Discussion</td>
<td></td>
</tr>
<tr>
<td>11:45–12:30</td>
<td>Review of indicators</td>
<td>Matthews Mathai</td>
</tr>
<tr>
<td></td>
<td>- Purpose, process and overview of findings of e-consultation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Comparison with indicators proposed by WHO regional offices and United Nations organizations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Discussion – observations, coherence and gaps</td>
<td></td>
</tr>
<tr>
<td>12:30–13:30</td>
<td>Lunch</td>
<td></td>
</tr>
<tr>
<td>13:30–15:15</td>
<td>Indicators: functions and number</td>
<td>Jane Ferguson</td>
</tr>
<tr>
<td></td>
<td>- How would a list of core indicators contribute to your work in adolescent health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- What is an ideal core number of indicators?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Would a supplementary global list be useful?</td>
<td></td>
</tr>
<tr>
<td>15:15–15:45</td>
<td>Refreshment break</td>
<td></td>
</tr>
<tr>
<td>15:45–17:30</td>
<td>Review of core indicators I</td>
<td>Jane Ferguson</td>
</tr>
<tr>
<td></td>
<td>- Mortality – HIV, maternal mortality, suicide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Outcome – obesity, alcohol, tobacco</td>
<td></td>
</tr>
</tbody>
</table>
**Wednesday 1 October 2014**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Chair</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30–09:00</td>
<td><strong>Summary of Day 1</strong></td>
<td>Chair</td>
</tr>
<tr>
<td>09:00–10:30</td>
<td>Review of core indicators II</td>
<td>Jane Ferguson</td>
</tr>
<tr>
<td></td>
<td>Impact and outcome – Sexual and reproductive health – HIV incidence; use;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>adolescent fertility (including HIV additional indicators)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outcome (determinants) – parental connection and regulation</td>
<td></td>
</tr>
<tr>
<td>10:30–11:00</td>
<td><strong>Refreshment break</strong></td>
<td></td>
</tr>
<tr>
<td>11:00–12:30</td>
<td>Review of remaining adolescent health indicators (group work)</td>
<td>Jane Ferguson</td>
</tr>
<tr>
<td></td>
<td>Mental health (including impact – depression)</td>
<td></td>
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<td></td>
<td>Sexual readiness</td>
<td></td>
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<tr>
<td></td>
<td>Health services (including related coverage &amp; input indicators)</td>
<td></td>
</tr>
<tr>
<td>12:30–13:30</td>
<td><strong>Lunch</strong></td>
<td></td>
</tr>
<tr>
<td>13:30–15:15</td>
<td>Report back of group work</td>
<td>Chair</td>
</tr>
<tr>
<td>15:00–15:30</td>
<td><strong>Refreshment break</strong></td>
<td></td>
</tr>
<tr>
<td>15:30–16:30</td>
<td>Discussion</td>
<td>Chair</td>
</tr>
<tr>
<td></td>
<td>Other indicators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data availability</td>
<td></td>
</tr>
<tr>
<td>16:30–17:00</td>
<td>Next steps, summary of outcomes, and close meeting</td>
<td>Matthews Mathai and Co-chairs</td>
</tr>
</tbody>
</table>
Annex 2.

List of participants

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Dr Luis Codina, Regional Office for the Americas
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Headquarters
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Venkatraman Chandra-Mouli, Reproductive Health and Research
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Chika Hayashi, HIV/AIDS
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Sapna Manglani, Consultant, Maternal, Newborn, Child and Adolescent Health
Matthews Mathai, Maternal, Newborn, Child and Adolescent Health
Leanne Riley, Prevention of Noncommunicable Diseases
Chiara Servili, Mental Health and Substance Abuse
Dilip Thanassery, Maternal, Newborn, Child and Adolescent Health
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Annex 3.
Concordance of the 28 indicators with other lists of indicators

Before the plenary discussion, participants were given a table summarizing the presence of the proposed indicators on other lists of indicators proposed by WHO regional offices (for Africa and the Eastern Mediterranean), other United Nations organizations (UNICEF, United Nations and UNFPA) and the global reference list of core indicators (WHO, 2014b).

**TABLE A3.1**
Comparison of the list of the initially proposed 28 indicators and other lists of indicators

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator of adolescent health*</th>
<th>WHO Regional Office for Africa</th>
<th>WHO Regional Office for the Eastern Mediterranean</th>
<th>UNICEF</th>
<th>United Nations</th>
<th>UNFPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adolescent mortality rate</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Mortality rate from road traffic injuriesb</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>HIV/AIDS mortality ratea</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Suicide mortality rateb</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Interpersonal violence mortality rate</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>Maternal mortality ratioa</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (15–49 years)</td>
<td>No</td>
</tr>
<tr>
<td>7</td>
<td>Prevalence of depression</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>HIV Incidencea</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>Prevalence of maternal syphilis among adolescentsb</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>Adolescent fertility ratea</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>11</td>
<td>Prevalence of underweight</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (2 SD below)</td>
<td>No</td>
</tr>
<tr>
<td>12</td>
<td>Prevalence of overweighta</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>13</td>
<td>Prevalence of obesitya</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>14</td>
<td>Early initiation of sexual activity</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>15</td>
<td>Sexual readiness (draft index)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>16</td>
<td>Condom use at most recent higher-risk sexa</td>
<td>No</td>
<td>No</td>
<td>Yes (15–24 years)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>17</td>
<td>HIV testing</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>18</td>
<td>Current tobacco usea</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>No.</td>
<td>Indicator of adolescent health</td>
<td>WHO Regional Office for Africa</td>
<td>WHO Regional Office for the Eastern Mediterranean</td>
<td>UNICEF</td>
<td>United Nations</td>
<td>UNFPA</td>
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<td>-------------------------------------------------</td>
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<td>----------------</td>
<td>-------</td>
</tr>
<tr>
<td>19</td>
<td>Current alcohol use(^b)</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes (ever use)</td>
<td>No</td>
</tr>
<tr>
<td>20</td>
<td>Current illicit drug use</td>
<td>No</td>
<td>No</td>
<td>Yes (cannabis)</td>
<td>Yes (cannabis)</td>
<td>No</td>
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<tr>
<td>21</td>
<td>Sedentary activity</td>
<td>No</td>
<td>Yes (cannabis)</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<td>22</td>
<td>Physical activity(^b)</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>23</td>
<td>Knowledge of sexual transmission of HIV(^b)</td>
<td>No</td>
<td>No</td>
<td>Yes (15–24 years)</td>
<td>No</td>
<td>No</td>
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<tr>
<td>24</td>
<td>Parental connection</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>25</td>
<td>Parental regulation</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>26</td>
<td>Skilled birth attendant(^a)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>27</td>
<td>Health service use</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<td>28</td>
<td>Trained health service provider</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Total in current list</td>
<td>14</td>
<td>9</td>
<td>18 (3)(^c)</td>
<td>13 (4)(^c)</td>
<td>2</td>
</tr>
</tbody>
</table>

**SD, standard deviation**

\(^a\) On the global reference list of core indicators (WHO, 2015a)

\(^b\) The indicator appears in the appendix to the Global Reference List of Core Indicators (2014), referred to as “additional core indicators”, and disaggregation by age is recommended.

\(^c\) The figures in brackets are the numbers of indicators on the list for which the definitions are slightly different, e.g. different age groups