Proposed Methods for 13th General Programme of Work (GPW13) Impact Measurement

DRAFT FOR CONSULTATION

VERSION 1.1.1

13 Sep 2019

Document intended for consultation and discussion only.
This is a working document and is not yet complete.
Warning

This is a working document intended for review, consultation and discussion. The documentation is not yet complete, and the methods are not yet finalised. All contents and examples are draft and may be expected to change. The document has not yet been formally edited or laid out.

The document will be downloadable (in due course) from https://www.who.int/about/what-we-do/thirteenth-general-programme-of-work-2019-2023]. It is planned to provide regular updates to this document as it evolves. The document will be versioned and dated. Please check the above web page for updates.

Once methods are completed and agreed, a final report will be produced (May 2020).

Version History

v0.x 28 Aug 2019  Used for internal consultation and comment
v1.0 03 Sep 2019  Draft for wider consultation
v1.1 12 Sep 2019  Updates to UHC chapter
# Table of Contents

Executive Summary .................................................................................................................. 8

1 Introduction ............................................................................................................................. 12
   1.1 The WHO Impact Framework .......................................................................................... 12
   1.2 Scope of this Report ........................................................................................................ 13
   1.3 Status of Methods ........................................................................................................... 13

2 Programmatic Indicators and Milestones ............................................................................ 15
   2.1 46 Programmatic indicators and 40 milestones .............................................................. 15
   2.2 Use of indicators in the triple billions ............................................................................ 18
   2.3 Indicator availability and methods ................................................................................ 18
   2.4 Equity for programmatic indicators .............................................................................. 19
   2.5 Supporting and strengthening country measurement capacity .................................... 20

3 Universal Health Coverage billion .................................................................................... 22
   3.1 Introduction ..................................................................................................................... 22
   3.2 Status of UHC Billion methods ..................................................................................... 23
   3.3 Selecting a UHC index for the UHC billion ................................................................. 23
   3.4 Using SDG 3.8.1 ............................................................................................................ 24
      3.4.1 The SDG 3.8.1 index ............................................................................................. 24
      3.4.2 Selecting Component Indicators ............................................................................ 24
      3.4.3 Data Availability for SDG 3.8.1 component indicators ........................................ 25
      3.4.4 Limitations of using SDG 3.8.1 indicators to calculate the Billion ...................... 26
   3.5 Calculating the UHC Billion .......................................................................................... 26
      3.5.1 Estimating the UHC Billion from Average Service Coverage ............................... 26
      3.5.2 How does Average Service Coverage compare? .................................................... 27
      3.5.3 Country example of calculating contribution to UHC billion ............................... 28
   3.6 UHC Index for the future ............................................................................................... 29
   3.7 UHC Financial Risk Protection ...................................................................................... 29
   3.8 UHC Combined Index .................................................................................................. 30
   3.9 Example country calculation ........................................................................................ 31
   3.10 Equity for UHC ............................................................................................................ 31

4 Health Emergencies billion .................................................................................................. 32
   4.1 Status of Emergency Billion Methods ........................................................................... 32
   4.2 The Emergency Prepare indicator ............................................................................... 32
      4.2.1 Example of country calculation .............................................................................. 35
   4.3 The Emergency Prevent indicator .............................................................................. 35
      4.3.1 Calculation Method ................................................................................................. 36
      4.3.2 Data sources and availability ................................................................................. 36
4.3.3 Example country calculation.................................................................................. 37
4.3.4 Initial Global Results ............................................................................................ 37

4.4 The Emergency Detect and Respond Indicator .................................................... 38
4.4.1 Approach .............................................................................................................. 39
4.4.2 Example Country calculation ................................................................................ 40
4.4.3 Data Sources and Availability .............................................................................. 40
4.4.4 Measuring Timelines of Detection (and notification?) ........................................ 41
4.4.5 Measuring Timeliness of Response ..................................................................... 43
4.4.6 Limitations ............................................................................................................ 43

4.5 Combined Emergency index ................................................................................... 44
4.5.1 Calculating the Country Contributions to the billion .......................................... 45

4.6 Equity for Emergencies ........................................................................................... 45

5 The Healthier Population Billion .............................................................................. 46
5.1.1 A new index as a first step for monitoring Healthier Populations ....................... 46
5.2 A concept framework for Healthier Populations .................................................... 47
5.3 Indicators for measuring Healthier Populations ...................................................... 48
5.3.1 Type of indicators ............................................................................................... 48
5.3.2 Criteria for selection of indicators ....................................................................... 48
5.3.3 Choice of indicators ............................................................................................ 48
5.3.4 Impact of indicators ............................................................................................ 50
5.3.5 Reframing indicators for Healthiness .................................................................. 51
5.3.6 Converting non-prevalence indicators ................................................................ 52

5.4 The Healthier Lives Approach ............................................................................... 53
5.4.1 Criteria for choice of method .............................................................................. 53
5.4.2 Concept ............................................................................................................... 53
5.4.3 Healthier Lives Index - an index of change ......................................................... 54
5.4.4 Calculating the Healthier Lives Index ................................................................. 54

5.5 Limitations of the Healthier Lives Approach ......................................................... 57

5.6 Other aspects ......................................................................................................... 57
5.6.1 Equity for Healthier Populations ......................................................................... 57
5.6.2 Dealing with lags in data ..................................................................................... 58
5.6.3 Dealing with uncertainty ..................................................................................... 58
5.6.4 Missing data ....................................................................................................... 58
5.6.5 Negative contributions ....................................................................................... 58

5.8 Achieving the Healthier Population Billion ............................................................. 59
5.9 Examples ............................................................................................................... 60
5.9.1 By country ........................................................................................................ 60
5.9.2 By indicator ....................................................................................................... 60

5.10 ................................................................................................................................. 60

6 Healthy Life Expectancy (HALE) ............................................................................ 61
6.1 Calculation of HALE........................................................................................................61
6.2 Contribution of the billions to HALE..................................................................................62
6.3 Equity for HALE................................................................................................................62
7 Equity ........................................................................................................................................63
8 Country Examples....................................................................................................................64

Appendices..................................................................................................................................65

Appendix A Programmatic Indicators .......................................................................................65
Appendix A.1 Example of metadata for one of the programmatic indicators (SDG 1.5.1) ..........65
Appendix A.2 Availability of indicator data values for Programmatic indicators.........................66
Appendix A.3 Country selection of GPW13 priorities.................................................................67

Appendix B Universal Health Coverage Index............................................................................68
Appendix B.1 SDG 3.8.1 component indicators..........................................................................68
Appendix B.2 A new UHC index...............................................................................................68
Appendix B.3 UHC effective service coverage............................................................................69
Appendix B.4 UHC and full service coverage.............................................................................70
Appendix B.5 Illustrating that the UHC index is only modestly sensitive to adjustments in the component indicators..............................................................71

Appendix C Emergencies Preparedness Billion Appendices........................................................72
Appendix C.1 Data Sources for the Emergency Prevent Index..................................................72
Appendix C.2 Emergencies Detection decision instrument.......................................................75

Appendix D Healthier Populations............................................................................................76
Appendix D.1 Country selection of GPW13 priorities relating to Healthier Populations ............76
Appendix D.2 Alternative methods for measuring Healthier Population Billion........................76
Appendix D.3 Correlations between changes in indicators........................................................77
Appendix D.4 Alternative approaches for handling population growth......................................77
Appendix D.5 Known issues and limitations with the Healthier lives approach........................78
Appendix D.6 Gaps in the Healthier Lives Index indicators.......................................................79
Appendix D.7 Consultation Process ...........................................................................................80
Appendix D.8 Indicator Appendices (work packages).................................................................81

Appendix E HALE calculation template...................................................................................81

List of Figures

Fig. 0.1. WHO Impact Measurement .........................................................................................8
Fig. 1.1. The WHO Impact Framework .....................................................................................12
Fig. 1.2. The overlapping triple billion goals .............................................................................13
Fig. 2.1. Indicators in the Triple Billion Indices. The 7 UHC service coverage indicators are selected from the SDG 3.8.1 tracer indicators and are all direct measures of service coverage. 18
Fig. 2.2. Availability of primary or underlying data for SDG indicators: For about one third of countries, there is no recent primary or underlying data for over half of the SDG indicators. ...............................

Fig. 2.3. Example of dimensions of inequality for country monitoring: One (or two) of these dimensions will be selected for each indicator and country-level..............................................

Fig. 2.4. Strengthening country capacity in data and innovation: Outcome 4.1 of the proposed programme budget 2020-21. ..............................................................................................................

Fig. 3.1. Universal Health Coverage within the Sustainable Development Goals ......................................

Fig. 3.2. Data availability for indicators used in SDG 3.8.1. To be updated.................................

Fig. 3.3 The three cases below both result in a UHC of 50% (average service coverage). In the first case everyone has 50% coverage; in the second case half the population has full coverage and the remainder has no coverage, in the third case there is a mix of levels that averages out to 50%......................

Fig. 3.4 Relationship between SDG 3.8.1 UHC Index and average of 7 component indicators for service coverage for 183 countries for years 2000 to 2017 (with values for 2015 in red). .........................

Fig. 3.5 UHC Combined Index: The population receiving UHC without catastrophic spending is a subset of the population with UHC. ..................................................................................

Fig. 4.1. The three tracer indicators that constitute the Health Emergencies Index...........................

Fig. 4.2. Comparison of SPAR and JEE IHR scores..........................................................................

Fig. 4.3. Routine and campaign vaccinations included in the ‘prevent’ indicator............................

Fig. 4.4. Mean coverage of Emergency Prevent Indicator..................................................................

Fig. 4.5. Outline of stages for the detect and respond indicator........................................................

Fig. 4.6. Outline of stages for the detect indicator.............................................................................

Fig. 4.7 Sources of information for events........................................................................................

Fig. 4.8. Calculation of the combined emergency index .....................................................................

Fig. 4.9. Countries moving from one level to the next contribute to the Emergencies billion.............

Fig. 5.1. The healthier billion concept – improving people’s health and well-being by addressing social (& commercial), economic, environmental and behaviour risks to health..................................................}

Fig. 5.2. Health impact pyramid (Frieden) .......................................................................................

Fig. 5.3. 14 Indicators selected for inclusion in the Healthier Populations Index .................................

Fig. 5.4. Relationship between mean alcohol consumption and prevalence of (a) heavy episodic drinking in the last month and (b) abstainers last 12 months. Approximate linear relationships can be seen. ..... 

Fig. 5.5. The healthier lives approach..............................................................................................

Fig. 5.6. Contributions to the HL index calculation for 2010-15 by indicator and region..................

Fig. 5.7. Expected number of Healthier Lives if GPW13 milestones are met together with expected corresponding DALYs averted (update needed).................................................................
List of Tables

Table 2.1. Programmatic indicators and milestones ................................................................. 16
Table 3.1. Indicators in the UHC SDG Index (see Appendix B.1 for details of indicators) .............. 24
Table 3.2 Calculation of contribution to UHC Billion for Ethiopia based on historical data for the 5-year period 2012 to 2017 .................................................................................................................. 28
Table 4.1. IHR Capacity score categories, and example values for Bangladesh based on the SPAR... 33
Table 4.2. Emergency Prevent Indicator Categories ................................................................... 34
Table 4.3. At-risk member states (n) ....................................................................................... 36
Table 4.4. Example calculation of the Emergency Prevent indicator for Nigeria ....................... 37
Table 4.5. Emergency Prevent Indicator levels for all Member States and at-risk Member States (n = 66) ......................................................................................................................................................... 38
Table 4.6. Ending Pandemics (Nov 2018 Salzburg statement unpublished). Table to be updated to use WHO terminology and to be combined with Table 4.9 below .................................................. 39
Table 4.7 Potential outcome 2.3.1 indicator metrics .................................................................. 42
Table 4.8: Potential indicator metrics ......................................................................................... 42
Table 5.1. Indicators considered for Healthier Population Billion. 14 have been selected for inclusion. Data sources are GHO and UN SDG databases ............................................................................................................. 49
Table 5.2. Global burden of disease and current data availability for indicators in the Healthier Population Billion .................................................................................................................................................. 50
Table 5.3. Indicators for measuring change in Healthiness ......................................................... 51
Table 5.4. Current mapping of indicators to distinct population subgroups ................................. 55
Table 5.5. Estimated number of Millions of people with Healthier Lives by indicator and region for 2010 to 2015 .............................................................................................................................................. 58
Table 0.1 Average Vaccine Coverage by Country Category ..................................................... 73
Executive Summary

The purpose of this document is to describe and propose details of the methods to be used to measure the impact of the World Health Organisation’s Thirteenth General Programme of Work, 2019–2023 (GPW13). At present the document provides a basis for consultation and discussion prior to the finalisation of the methods. It is planned that the document will evolve into the definitive write up of the GPW13 measurement methods.

WHO Impact Measurement is part of GPW13. It measures progress at three levels:

1. 46 programmatic indicators and milestones covering a range of health issues

2. The triple billion goals to be achieved by 2023
   - 1 billion more people benefiting from universal health coverage,
   - 1 billion more people better protected from health emergencies, and
   - 1 billion more people enjoying better health and well-being

3. Healthy life expectancy (HALE) quantifying expected years of life in good health as a measure of the overall health of populations.

The Impact Framework commits to improving equity in health at all levels of the framework.

Programmatic Indicators

The 46 programmatic indicators cover a range of key health issues and underpin the GPW13 programme. The 46 programmatic indicators were approved at WHA May 2020 after extensive internal and external consultation. They include 38 SDG indicators together with 8 non-SDG indicators that address priorities identified by member states: antimicrobial resistance; polio; risk factors for noncommunicable diseases; and emergencies. The 46 programmatic indicators are associated with 40 2023 global milestones.

The programmatic indicator approach is flexible – countries select which indicators are a priority and set their own 2023 milestones. Not every country will track every indicator. Indicators will be disaggregated by key inequality measures (such as sex, age and location).

WHO will work with countries to address gaps in data collection: for around 1/3 of countries there is no recent data for over half of the SDG health-related indicators (WHS report 2019).
The Universal Health Coverage Billion

The Universal Health Coverage (UHC) billion aims to ensure that an additional one billion people receive the health services they need without financial hardship. Universal Health Coverage (UHC) is a part of the Sustainable Development Goals (Task 3.8). The UHC billion will be based on the 2 UHC SDG indicators: - an index of coverage of essential health services (indicator 3.8.1); and a measure of the proportion of population with large household expenditure on health as a share of total household expenditures or income (indicator 3.8.2).

SDG 3.8.1, the UHC service coverage index is currently measured using 14 sub indicators of which 8 are measures of coverage and the rest are proxy measures. Calculation of the UHC billion from the SDG indicators is not entirely straightforward because SDG 3.8.1 provides a directional index of UHC levels but is not a direct measure of service coverage. It is proposed to estimate the UHC billion using 7 of the SDG 3.8.1 tracer indicators to calculate average service coverage and then convert this into a count (section 3.5).

The UHC billion must account for financial protection as well as access to service coverage. Work is required to evaluate approaches to including financial protection (section 3.8).

If current progress towards UHC is maintained at a steady rate, this would result in a contribution of 500 – 600 million (with no account taken of financial protection). Considerable acceleration will be needed if the target of 1 billion is to be achieved.

The Health Emergencies Billion

The Emergencies billion goal is for 1 billion more people to be better protected from health emergencies. It will be measured using an index that is built from three simple indicators

- Emergency Prepare indicator (measuring IHR capacities)
- Emergency Prevent indicator (measuring routine and emergency vaccination coverage)
- Emergency Detect and Respond indicator (measuring timeliness)

The Emergency “prepare” indicator measures country preparedness for emergencies. It encapsulates the level to which a country is ready to identify and respond to a range of emergency situations. It is based on the average attainment of 13 International Health regulations (IHR) capacities for surveillance and response as reported using the IHR State Parties Self-Assessment Annual Reporting (SPAR).

The Emergency “prevent” indicator measures efforts to prevent health emergencies via vaccination coverage. Reaching high vaccination coverage in at-risk groups for vaccine-preventable infectious pathogens is a key element to tackling preventable epidemic diseases and pandemics and to the control and elimination of high-threat infectious hazards. The indicator is a weighted average of routine and campaign vaccinations for epidemic and pandemic prone diseases. The indicator can be adapted to include other mass vaccination campaigns that are needed (e.g. pandemic influenza, Ebola virus disease).

Current vaccinations used in the prevent indicator are

- priority infectious hazards: yellow fever, meningococcal meningitis A. and cholera.
- measles – measured everywhere and emphasizing the importance of routine coverage

Vaccination data will be compiled from a variety of sources, particularly for campaign coverage for which data tends to be patchy.

The Emergency “detect and respond” indicator measures the proportion of IHR notifiable public health events that are detected and responded to in a timely fashion. The indicator will probably focus on

- Time to detection (definition and target under debate)
• Time to respond (i.e., how many days from detection to the first public health intervention) with a target to be defined.

This is a new indicator of key importance for improving emergency response. Data will be gathered prospectively and retrospectively from events reported to WHO under IHR regulations. The indicator is not fully defined and will be adapted to make data collection viable.

The Health Protection index (HPI) is calculated as the average of the prepare, prevent and detect & respond sub-indicators. Countries will be categorized into 5 levels of HPI (0-30, 30-50, 50-70, 70-90 and >90 %). The “1 billion better protected” will be measured at the end of the 5-year period by the total population in countries that have stepped up by at least one level. The approach encourages incremental progress in all countries. No countries are at the top level, so there is scope for improvement everywhere.

The Healthier Population Billion

The Healthier Population (HP) Billion goal aims to support the world’s population to live healthier lives. The key to achieving this will be via government policies and actions that promote healthier environments and encourage healthier life choices.

The proposed Heathier Lives index will be constructed using indicators that are healthier populations enablers. The index is built on the assumption that the target will primarily be met through multisectoral interventions, driven by the health sector, and influenced by policy, advocacy and regulation. These will be measured based on data on social, environmental, economic and behavioural risks. The index is not intended to include factors primarily handled within the health care system.

The proposals made in this document include

• Use of 14 indicators selected from the GPW13 programmatic indicators (Section 5.3). These are health indicators covering environmental, behavioural and social/health risk factors. They include clean air, safe water, sanitation and roads, tobacco and alcohol use, obesity, domestic violence (intimate partner; child), child nutrition and child development. Most of them are SDG indicators.
• Use of a simple unweighted counting scheme, the Healthier Lives approach, to create the Healthier Lives index which will measure progress of populations towards the billion (Section 5.4).
• Making simple adjustments for mitigating double counting and population growth as outlined in Section 5.4.4.
• Reporting data on policy implementation and legislation alongside the Healthier Lives index – such interventions will be key to progressing the HP billion. Policy measures will not be directly included in the index.

The proposed approach takes into account the potential buy-in power achieved by using a method which is straight-forward and transparent whilst being able to capture progress on key factors. In response to requests for greater country autonomy, the method is designed to be accessible to countries so that countries are able to calculate their own contributions to the index. It is hoped this will encourage further changes that promote healthier lives around the globe (Section 5.4.1).

The proposed method is tested using historical data for 2010 to 2015 (a 5-year period equivalent to the GPW13 period). Over this period, the number of healthier lives counted is around 570 million (provisional). Thus, if progress continues at the same rate, the Healthier Population Billion would not be achieved. Acceleration will be required particularly for indicators where decreases in healthiness are anticipated e.g. obesity.

As a separate study of the method, the potential progress towards the Healthier Population billion is estimated using future scenarios. This examines how the Healthier Lives index would look if all indicators were to meet the GPW13 milestones and demonstrates the potential individual contributions of indicators.
The Healthier Lives approach is considered as a first step in measuring changes in healthiness linked to the GPW13 programme. Both indicators and the method may evolve over time as experience is gained. For example, the GPW13 indicators are non-optimal set of indicators - they are not comprehensive of all key environmental, economic, behavioural and social risks affecting healthiness and they do not cover all aspects of the life course equally. More comprehensive methods may be considered in the future (Section 5.5, Appendix D).

The billion measures the impact linked to GPW13 indicators due to the joint efforts of WHO, member states and other interested parties. It is not possible to separate out the impact specifically attributable to WHO’s GPW13 impact framework. The time frame of GPW13 programme, in combination with lags in the timeliness of indicator estimates, and the time delay between an intervention and a result, will make calculation of change by 2023 a challenge.

Healthy life expectancy

Healthy life expectancy (HALE) is an indicator that provides a summary measure of average levels of population health. It quantifies the expected years of life spent in good health. HALE will be used for GPW13 baseline reporting and for monitoring progress for each Member State. HALE will facilitate cross-country comparisons, and comparisons within countries over time.

Equity

Equity in health is a cross cutting theme of the GPW13 methods: advances in global and member state health care must not leave behind those in the greatest need. Measures of inequality will be made at all three levels of the GPW13 framework: the component indicators, the triple billion goals and HALE. Specific milestones for disadvantaged groups will be used to ensure that disadvantaged groups benefit proportionally more from the triple billion goals. The key to tracking equity will be disaggregation of the 46 programmatic indicators, whenever applicable, to measure within-country inequality so that it can be addressed on a country level.
1 Introduction

1.1 The WHO Impact Framework

In May 2018, the World Health Assembly approved WHO’s 13th General Programme of Work (GPW 13). This programme focuses on measurable health impact for people at the country level. To support this WHO has created the WHO Impact Framework, a measurement system which allows health impact to be measured accountably.

The Impact Framework aims are to

- make a measurable impact on people’s health at country level
- increase the likelihood that the triple billion goals will be met
- accelerate progress towards the Sustainable Development Goals (SDGs)
- transform how WHO works by anchoring commitments in measurable results
- provide a means of tracking the joint efforts of the Secretariat, Member States and partners
- strengthen country data and information systems for health.

Fig. 1.1. The WHO Impact Framework

The Impact Framework measures progress at three levels:

1. **46 programmatic indicators and milestones** cover a range of health issues and provide a set of measurement indicators that will be used to measure the outcomes in the programme budget (38 of which are identical to SDGs).

2. **The triple billion goals**:
   - 1 billion more people benefiting from universal health coverage,
   - 1 billion more people better protected from health emergencies, and
   - 1 billion more people enjoying better health and well-being

The goal will be to achieve the triple billion goals by 2023. Each of the triple billions will be measured using composite indices. The billions may overlap, that is some people may benefit from more than one of the billions (Fig. 1.2).
Healthy life expectancy (HALE) quantifies expected years of life in good health at a particular age and can be considered a summary measure of the overall health of populations. It is proposed to use HALE within GPW 13 as an overarching and comparable measure of the impact of the triple billion goals.

The Impact Framework includes a cross-cutting commitment to improving equity in health at all levels of the framework (Chapter 7).

1.2 Scope of this Report

The document describes the current state of the (proposed) methods for use in the GPW13 Impact Framework. It includes method details and examples where known.

It discusses each of the three levels of the Impact framework, focussing particularly on the methodology for each of the billions and how indices and component indices will be calculated. It provides (or will provide) example calculations and considers both the global and country level.

In cases where the method is still under debate, or examples are not yet constructed, it suggests options under consideration. Sections on Status (as below) provide a summary of work in progress and will not form part of the final report.

This report is intended to evolve into a publication that documents the methods of the GPW13 programme.

1.3 Status of Methods

The GPW13 programme formally commenced at the beginning of 2019. At the time of writing this report (September 2019) methods are currently work in progress and undergoing a process of consultation.

Current key areas needing to be resolved

**UHC.** A method to estimate UHC from SDG 3.8.1 indicators is proposed but requires further testing. Work is needed as to how to combine service coverage with financial protection (see Section 3.8).

**Emergencies** The method is largely ready. However, the detect and respond indicator continues to evolve and data is not ready for this indicator. The method for combining the sub indicators into an overall index needs to be tested and examples produced.
Healthier Populations A method for estimating the Healthier Populations is proposed in Section 5. The approach awaits consultation, review and refinement. Three indicators require transformation into prevalence and this is not yet complete. Country examples are being prepared.

Country examples An important next step for the report (and methods) is to include examples of each of the methods applied at a country level so countries can understand how it looks at their level, what their expected targets are for the three billions. The aim is to make the document more relevant for Member states.

Steps planned for the finalisation of the methods and report include

September 2019: Informal review by key experts (partly complete, some changes still to be incorporated).

September 2019: WHO technical programs

October 2019: Expert review (regions, technical experts, country experts, ERG)

November 2019: Informal country consultation

January 2020: Executive Board

May 2020: WHA. Final submission

This report and methods will continue to evolve over this period.

This report is presented in the light of being the best that can be offered now and with the hope of facilitating progress and rapid completion of the methods. Updates will be issued as methods become finalised.
2 Programmatic Indicators and Milestones

2.1 46 Programmatic indicators and 40 milestones

The programmatic milestones cover a range of health issues and provide a set of measurement indicators that will be used to measure the outcomes of the programme budget. The programmatic milestones and the corresponding indicators are designed to be flexible. Countries will select their priorities and track progress on selected targets using the associated indicators. Not all milestones will be selected in every country, thereby focusing Member States on reporting the most important country-identified issues.

The milestones have been developed by WHO technical programmes and have undergone consultation with Member States and review by partners. They were approved by WHA 2019 after extensive consultation. Progress on the underlying issues will provide the basis for improving global health and achieving the billions.

There are 46 programmatic indicators and 40 milestones associated with these indicators (table 2.1). The 46 selected indicators (Table 1) serve as a flexible toolkit to measure GPW13 performance and to track and accelerate progress toward the SDGs. The indicators have largely been selected from existing SDG indicators with the addition of a few addition emerging health topics:

- 38 of the 46 indicators are taken from the Sustainable Development Goals (SDGs)
- 25 derive from SDG 3; 13 from other SDG categories
- 8 non-SDG indicators addressing priorities identified by member states: antimicrobial resistance; polio; risk factors for noncommunicable diseases; and emergencies

Indicators will be disaggregated by key inequality measures (such as sex, age and location). Disaggregation dimensions will be identified globally and by member states.
Table 2.1. Programmatic indicators and milestones
Todo update and add column for which billion. See also
http://apps.who.int/gb/ebwha/pdf_files/WHA72/A72_5-en.pdf

<table>
<thead>
<tr>
<th>Indicator #</th>
<th>Indicator</th>
<th>2023 Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDG 1.5.1</td>
<td>Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population</td>
<td>Reduce the number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population</td>
</tr>
<tr>
<td>SDG 1a.2</td>
<td>Proportion of total government spending on essential services (education, health and social protection)</td>
<td>Increase the share of public spending on health by 10%</td>
</tr>
<tr>
<td>SDG 2.2.1</td>
<td>Prevalence of stunting (height for age &lt;-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age</td>
<td>Reduce the number of stunted children under 5 years of age by 30%</td>
</tr>
<tr>
<td>SDG 2.2.2</td>
<td>Prevalence of malnutrition (weight for height &gt;=2 or &lt;=-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age (wasting)</td>
<td>Reduce the prevalence of wasting among children under 5 years of age to less than 5%</td>
</tr>
<tr>
<td>SDG 2.2.2</td>
<td>Prevalence of malnutrition (weight for height &gt;=2 or &lt;=-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age (overweight)</td>
<td>Halt and begin to reverse the rise in childhood overweight (0-4 years)</td>
</tr>
<tr>
<td>SDG 3.1.2</td>
<td>Maternal mortality ratio</td>
<td>Reduce the global maternal mortality ratio by 30%</td>
</tr>
<tr>
<td>SDG 3.1.2</td>
<td>Proportion of births attended by skilled health personnel</td>
<td>Reduce the preventable deaths of newborns and children under 5 years of age by 17% and 30%, respectively</td>
</tr>
<tr>
<td>SDG 3.2.1</td>
<td>Under-5 mortality rate</td>
<td>Reduce number of new HIV infections per 1,000 uninfected population, by sex, age, and key populations by 78%</td>
</tr>
<tr>
<td>SDG 3.3.1</td>
<td>Tuberculosis incidence per 100,000 population</td>
<td>Reduce by 21% the number of new TB cases per 100,000 population</td>
</tr>
<tr>
<td>SDG 3.3.3</td>
<td>Malaria incidence per 1,000 population</td>
<td>Reduce malaria case incidence by 50%</td>
</tr>
<tr>
<td>SDG 3.3.4</td>
<td>Hepatitis B incidence per 100,000 population</td>
<td>Reduce Hepatitis B incidence to 0.5% for children under 5 years</td>
</tr>
<tr>
<td>SDG 3.3.5</td>
<td>Number of people requiring interventions against neglected tropical diseases</td>
<td>Reduction of people requiring interventions by 400 million</td>
</tr>
<tr>
<td>SDG 3.4.1</td>
<td>Mortality rate attributable to cardiovascular disease, cancer, diabetes or chronic respiratory disease</td>
<td>20% relative reduction in the premature mortality (age 30-70 years) from NCDs (cardiovascular, cancer, diabetes, or chronic respiratory diseases) through prevention and treatment</td>
</tr>
<tr>
<td>SDG 3.4.2</td>
<td>Suicide mortality rate</td>
<td>Reduce suicide mortality rate by 15%</td>
</tr>
<tr>
<td>SDG 3.5.1</td>
<td>Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and aftercare services) for substance use disorders</td>
<td>Increase service coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and aftercare services) for substance use disorders to 11%</td>
</tr>
<tr>
<td>SDG 3.5.2</td>
<td>Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol</td>
<td>7% relative reduction in the harmful use of alcohol as appropriate, within the national context</td>
</tr>
<tr>
<td>SDG 3.6.1</td>
<td>Death rate due to road traffic injuries</td>
<td>Reduce the number of global deaths and injuries from road traffic accidents by 20%</td>
</tr>
<tr>
<td>SDG 3.7.1</td>
<td>Proportion of women of reproductive age (15-49 years) who have their need for family planning satisfied with modern methods</td>
<td>Increase the proportion of women of reproductive age (15-49 years) who have their need for family planning satisfied with modern methods to 66%</td>
</tr>
<tr>
<td>SDG 3.8.1</td>
<td>Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)</td>
<td>Increase coverage of essential health services</td>
</tr>
<tr>
<td>SDG 3.8.2</td>
<td>Proportion of population with large household expenditures on health as a share of total household expenditures or income</td>
<td>Stop the rise in percent of people suffering financial hardship (defined as out-of-pocket spending exceeding ability to pay) in accessing health services</td>
</tr>
</tbody>
</table>
Other public health priorities, such as service coverage for severe mental disorders, care dependency in older adults, cervical cancer screening and palliative care, are areas for which additional milestones and indicators will be considered once better data become available.
2.2 Use of indicators in the triple billions

The programmatic indicators contribute either indirectly or directly to the triple billions (Figure 2.2; Table 2.1).

The UHC billion is based on the programmatic indicators SDG 3.8.1 UHC service coverage index and 3.8.2 UHC financial hardship. SDG 3.8.1 has 14 component indicators – and several of these are either programmatic indicators or are closely associated with programmatic indicators (for example tuberculosis treatment is used as a SDG 3.8.1 sub-indicator, and tuberculosis incidence rate is one of the programmatic indicators). Seven of the SDG sub-indicators are used to calculate the UHC billion (section 3.4.2).

For the emergencies better protected billion, IHR and vaccine coverage are used in the estimation of the billion. Two further indicators monitor equity for emergency protection.

For the healthier populations billion, all component indicators are selected from the programmatic indicators.

![Fig. 2.1. Indicators in the Triple Billion Indices. The 7 UHC service coverage indicators are selected from the SDG 3.8.1 tracer indicators and are all direct measures of service coverage.](image)

2.3 Indicator availability and methods

The availability of data values/estimates for the 46 programmatic indicators can be found in Appendix A.2 (extend this to include underlying data availability as previously). The data is compiled from two key sources of data.

- Data was primarily extracted from [https://unstats.un.org/sdgs/indicators/database/](https://unstats.un.org/sdgs/indicators/database/). This database contains country-reported data or official estimates agreed with countries.
- In case data was not available from this source, data from WHO’s Global Health Observatory was used.
- Data is available on the indicators from 2000-2018.

Three aspects of indicator availability are presented in Appendix A.2:
1. Number of countries which had no data for each of the indicators, 2000-2018.
2. Number of countries which have at least one data point available from 2015 or later.
3. Number of countries which have trend data available: at least two data points with the latest data from 2015 or later.

A key issue is that while indicators are available they are not always derived from primary data. For countries with no data, indicators such as under-five mortality and neo-natal mortality are estimated. The World Health Statistics 2019 reported that 63 of 194 WHO Member States lack recent primary data for more than half of the health-related SDGs indicators (Fig. 2.2), and for 40 per cent of indicators, less than half of countries have recent primary data. For many indicators, no recent sex-disaggregated data are available. Even though 10 per cent of health-related SDG indicators depend directly on reliable cause of death data, only half of all deaths around the world are reported with a cause of death and 30 million deaths are unreported each year, mainly in low- and middle-income countries.

Fig. 2.2. Availability of primary or underlying data for SDG indicators: For about one third of countries, there is no recent primary or underlying data for over half of the SDG indicators.

Many of the SDG indicators, GPW13 specific indicators and the methods for each of the billions depend on the availability of accurate cause of death data, household surveys, and diseases registries. The methods, data sources, frequency of data collection and other relevant information on each of the 46 programmatic indicators are provided in the metadata file (http://bit.ly/gpw13-metadata). An example of the information provided for each of the indicators can be seen in Appendix A.1

It is possible that one or more additional indicators will be proposed to Member States on vital topics where data or measurement are not yet available or agreed (e.g. ageing, palliative care, cervical cancer and mental health).

### 2.4 Equity for programmatic indicators

A key objective of the 46 programmatic indicators and milestones is to proportionally benefit the most disadvantaged populations and reduce within-country inequalities, i.e. differences in health that exist between population subgroups within a country.
Each country will identify, for each of its selected programmatic indicators and milestones

- at least one key dimension of inequality, and,
- for each key inequality dimension, at least one priority subgroup.

The situation in the priority subgroup(s) will be monitored alongside national average to show how the most-disadvantaged subgroups are performing compared to the population overall.

The key dimension(s) of inequality and priority subgroup(s) will differ between indicators (Fig. 2.3). Even for a given indicator, the key dimension(s) and priority subgroup(s) may differ from country to country and need not be the same as that used for global monitoring. Furthermore, the choice of key dimension(s) and priority subgroup(s) may be influenced by local data availability.

Fig. 2.3. Example of dimensions of inequality for country monitoring: One (or two) of these dimensions will be selected for each indicator and country-level

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Income</th>
<th>Location (rural/urban)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Countries should consider the following:

- At least one key dimension of inequality should be selected for each indicator, and for each inequality dimension, at least one priority subgroup should be identified. The priority subgroup is typically the most-disadvantaged or most-vulnerable subgroup.
- Geographical inequalities may be captured using administrative/district-level data. Where possible this should be included in addition to the other key dimension(s).
- Double-disaggregation should be considered wherever relevant. For instance, in a study of the smoking prevalence in Eastern European countries, data disaggregated simultaneously by sex and income showed opposite patterns in men (higher prevalence among the poor) and women (higher prevalence among the rich).

Not all the 46 programmatic indicators and milestones can be disaggregated. Some indicators and milestones are only applicable at the national level, such as SDG 3.d.1 International Health Regulations.

### 2.5 Supporting and strengthening country measurement capacity

The GPW13 WHO Impact Framework measurement requires reliable, timely, affordable, country-owned and accessible data, including disaggregation to enable analysis by equity and gender. Measurement of the triple billion goals depends on country measurement systems.
This report focusses on the GPW13 methods. Nevertheless, WHO is investing effort and working with a diverse set of partners, in supporting countries to strengthen their data collection, analysis, interpretation, and use functions without which robust measurement of the GPW13 will not be possible. A long-lasting benefit of this measurement approach will be to identify and fill gaps in measurement systems at the country level and support countries to address these to monitoring and improvement of public health impact.

Fig. 2.4. Strengthening country capacity in data and innovation: Outcome 4.1 of the proposed programme budget 2020-21.
3 Universal Health Coverage billion

3.1 Introduction

The Universal Health Coverage (UHC) billion aims to ensure that an additional one billion people receive the health services they need without financial hardship.

Universal Health Coverage is a part of the Sustainable Development Goals (Task 3.8) and is monitored by two indicators. These are an index of coverage of essential health services (indicator 3.8.1); and a measure of the proportion of population with large household expenditure on health as a share of total household expenditures or income (indicator 3.8.2).

Fig. 3.1. Universal Health Coverage within the Sustainable Development Goals

The UHC billion will incorporate both coverage and financial protection and will combine them into a single composite index of UHC that can be used to estimate contributions to the billion.

Access: the ability to use services including:
- Physical accessibility
- Financial affordability
- Social and cultural acceptability

Coverage: the proportion of people who need an intervention that receive it

Effective coverage of a service or intervention: the fraction of potential health gain that is delivered to the people in need of health intervention

Effective coverage of the entire health system: is the fraction of the total health gain that the health system could deliver to a population that is delivered.

Quality: whether the people who need the interventions obtain them in a timely manner and at a desired level of quality
3.2 Status of UHC Billion methods

The Universal Health Coverage billion will be based on SDG 3.8.1 (UHC report 2017, 2019; Lancet paper).

Calculation of the UHC billion from SDG 3.8.1 is not entirely straightforward because SDG 3.8.1 provides a directional index of UHC levels but not a direct measure of service coverage. For example, it includes several proxy measures that have been rescaled. This means that SDG 3.8.1 cannot be directly converted into contributions towards the UHC billion.

Work is underway to finalise the method for estimation of the UHC billion. The proposed approach is to use a subset of the SDG 3.8.1 tracer indicators to create a measure of average service coverage that can be directly converted into the billion.

An alternative approach is under development with the aim of providing a more comprehensive approach to UHC based on effective coverage and avoiding some of the known limitations of the SDG UHC index (Section 3.4.4).

Method development and testing to combine service coverage with financial protection is required as the UHC billion must account for financial protection as well as access to service coverage. Work is needed to evaluate possible approaches to including financial protection (section 3.7.)

3.3 Selecting a UHC index for the UHC billion

Measuring UHC via an index is non-trivial and remains a relatively recent development in global health metrics. Methods for measuring UHC are still evolving and in the future UHC measurement is expected to benefit from improved indicators and methods. For the UHC billion, the aim is to make the best use of existing methods and data whilst looking forward to the future.

Use of the SDG 3.8.1 UHC index is currently the preferred option of member states for measurement of the billion. However, this index is not ideal because SDG 3.8.1 is a directional index rather than a measure of coverage, and so it cannot (statistically) be directly converted into contributions to the billion. There is no simple perfect solution for estimation of the UHC billion based on SDG 3.8.1 alone.

This chapter describes how the billion will be calculated by taking selected SDG 3.8.1 component indicators and using them to estimate average service coverage which can then be converted into contributions to the UHC billion. This avoids any additional data burden on countries and means the billion is closely linked to SDG 3.8.1.

The average service coverage proposed here has the advantage of simplicity and transparency and could, for example, be easily adapted if other measures of service coverage become available. The disadvantage is that at present the index measures only seven key treatments (Table 3.1) and thus overestimation of UHC is anticipated. Further discussion of the limitations of using SDG 3.8.1 as the basis for estimation of UHC coverage is provided in Section 3.4.4.

Parallel work is on-going to try to develop a more comprehensive and general UHC index that will measure effective service coverage. Challenges are to minimise the additional data burden, to use country data and allow countries to carry out their own calculations (Section 3.6, Appendix B.2, Appendix B.3).

In the WHO UHC reports (2017, 2019), an alternative approach was used to estimate the global number of people receiving $\geq 85\%$ of services. This method is not suited to application at a country level and requires additional data beyond the SDG 3.8.1 indicators. It is not proposed to use this approach for the UHC billion. More details are given in Appendix B.4.
3.4 Using SDG 3.8.1

3.4.1 The SDG 3.8.1 index

SDG 3.8.1 is calculated using 14 component indicators that are grouped into Reproductive, maternal, newborn and child health; Infectious disease control; Non-communicable diseases and Service capacity and access (Table 3.1). Component indicators were selected to meet several criteria including data availability, equity disaggregation and lessening of the reporting burden. The indicators include eight direct measures of service coverage and six indicators that are proxy measures.

For the SDG 3.8.1 index, the 14 indicators are combined using a nested geometric averaging approach. Measures of service coverage (e.g., antiretroviral therapy coverage for people living with HIV) are used directly, whilst proxy measures are rescaled to a 0 to 100 scale (e.g. mean fasting plasma glucose). The rescaled indicators are combined through a series of geometric means to obtain the index. The resulting index is a performance metric (scaled from 0 to 100). Full details of the method and calculations for 2015 are available in the Tracking Universal Health Coverage Report (WHO, 2017) and the 2019 UHC report.

The use of transformed proxy indicators, together with use of geometric averaging, means that the SDG 3.8.1 is directional but is not a directly scalable measure of service coverage (e.g. if SDG 3.8.1 increases by 20% this does not mean service coverage has increased by 20%).

3.4.2 Selecting Component Indicators

The UHC billion will be based on a subset of 7 out of the 14 SDG 3.8.1 component indicators (Table 3.1). These indicators are selected because they measure service coverage. Note that the safe sanitation coverage indicator is not included for the UHC billion because it forms part of the healthier population billion. Two of the excluded proxy indicators will be counted in other billions: prevalence of tobacco use for the Healthier Populations billion; and IHR regulations for the Emergencies billion.

For Hypertension and Diabetes, the current indicators measure outcome rather than service coverage; in the future they could usefully be included if some adjustment to the indicator definition was made.

Health Work Force and Hospital bed density are not measures of coverage and are difficult to translate into levels of service and to include in the billion.

Table 3.1. Indicators in the UHC SDG Index (see Appendix B.1 for details of indicators).

<table>
<thead>
<tr>
<th>Tracer topic</th>
<th>Current indicator</th>
<th>Used in UHC Billion</th>
<th>Used in other billion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. RMNCH</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family planning</td>
<td>Family planning (SDG)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Pregnancy care</td>
<td>Antenatal care (4+ visits)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Immunization</td>
<td>3 of diphtheria-tetanus-pertussis</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Child treatment</td>
<td>Child pneumonia care-seeking</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>2. Infectious disease</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>TB treatment</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>HIV</td>
<td>HIV treatment</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>Bed nets</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Water and sanitation</td>
<td>Improved sanitation</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>3. Noncommunicable disease</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>Prevalence of high blood pressure</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
3.4.3 Data Availability for SDG 3.8.1 component indicators

To do: include only those subindicators used in this billion.

There are many gaps in primary data availability for the UHC SCI tracer indicators (Fig. 3.2), particularly for recent years (2015-2017). Across UHC SCI tracer indicators, over a quarter of the latest country data points pre-date 2010.

Fig. 3.2. Data availability for indicators used in SDG 3.8.1. To be updated.

Where primary data is missing, imputation methods have been applied. These include

- Using a validated model to provide estimates. This is used for:- met need for family planning (FP);9 diphtheria-tetanus-pertussis, three doses (DTP3);10 ART coverage;11 tuberculosis case detection and treatment (TB);12 ITN use;13 access to at least basic sanitation (WASH);14 prevalence of non-elevated blood pressure (BP);15 mean fasting plasma glucose (FPG);16 and prevalence of tobacco non-use (TOB).
- Linearly interpolating between available data points and/or extending latest reported value to subsequent years when no newer data are available. This is used for antenatal care, at least four visits (ANC4); care-seeking for suspected pneumonia (PNEU); hospital beds per 10,000 (HOSP); health worker density (HWD); and IHR scores.
- Imputing from countries with similar characteristics (WHO region or World Bank income group). This is used when no data points exist for an indicator for a country.
3.4.4 Limitations of using SDG 3.8.1 indicators to calculate the Billion

(to be expanded)

With only 7 service coverage indicators used to calculate the UHC billion, it is not possible to be representative of the extremely wide remit of UHC. For example, there are no indicators that reflect service coverage of NCDs (e.g., cancer treatments, treatments for diabetes and hypertension) and there are no measures of several key health services such as access to surgical care or to essential medicines.

The limited number of indicators means that UHC estimates are likely to give an overestimate of UHC coverage because it focuses heavily on RMNCH and does not include NCDs (ref 2016 Mexico paper). The index is heavily geared towards key issues in the developing world and is less relevant to more developed countries.

Several of the service coverage indicators are non-optimal and could be improved without necessarily increasing burden (e.g., ANC, bed nets).

The indicators measure service coverage but do not measure the quality or effectiveness of treatments.

The indicators are equally weighted and do not account for differences in health gain.

3.5 Calculating the UHC Billion

3.5.1 Estimating the UHC Billion from Average Service Coverage

The goal of UHC is that everyone should have access to all the services they require. This would equate to a global average service coverage of 100%. The UHC billion will be calculated by estimating average service coverage and converting this into a contribution to the billion.

**Average service coverage (ASC)** measures the percentage of needed services that are provided at a population level. It can track change that makes a difference in people lives and encourages progress towards universal coverage. If average UHC service coverage is 50%, this means that 50% of UHC services are available at the population level. The approach does not distinguish between (Fig. 3.3)

- All people have half (50%) of the services they need;
- 50% of people have all services they need; the rest have no coverage; and
- A mix of service coverage that averages to 50% at the population level.

If average service coverage increases from, say, 50% to 72%, then the contribution to the UHC billion would be 22% of the population. This can be thought of as the increase in service coverage is equivalent to 22% of the population moving from 0% to 100% coverage. In reality, the change would be distributed across more than 22% of the population.
Fig. 3.3 The three cases below both result in a UHC of 50% (average service coverage). In the first case everyone has 50% coverage; in the second case half the population has full coverage and the remainder has no coverage, in the third case there is a mix of levels that averages out to 50%.

For the UHC billion, the Average Service Coverage (ASC) is estimated for each country

\[ ASC = \text{Av service coverage} = \text{Average of 7 SDG 3.8.1 indicators} \]

Equation 3.1

This can then be used to calculate the equivalent number of people with additional UHC as

\[ \text{Additional people UHC} = ASC_{2023} \times \text{pop}_{2023} - ASC_{2019} \times \text{pop}_{2019} \]

Equation 3.2

The UHC contribution therefore counts the equivalent of the number of people moving from zero to full coverage.

3.5.2 How does Average Service Coverage compare?

Average service coverage for member states has been calculated using the 7 selected SDG 3.8.1 component indicators. The estimates are plotted against the SDG 3.8.1 UHC index value in Fig. 3.4. The two measures are closely aligned but with some non-linearity apparent.
Fig. 3.4 Relationship between SDG 3.8.1 UHC Index and average of 7 component indicators for service coverage for 183 countries for years 2000 to 2017 (with values for 2015 in red).

3.5.3 Country example of calculating contribution to UHC billion

A sample calculation of how change in UHC would contribute to the UHC billion using average coverage is shown for Ethiopia in Table 3.2 below. The calculation is based on an historical 5-year period (2017 to 2012). For GPW13, data would be for the 5-year period 2019 to 2023 (not yet available). The estimation of the contribution to the billion proceeds by calculating average service coverage from 7 selected SDG 3.8.1 tracer indicators, and then finding the increase in the population covered (Section 3.5.1).

Table 3.2 Calculation of contribution to UHC Billion for Ethiopia based on historical data for the 5-year period 2012 to 2017

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Indicator value</th>
<th></th>
<th>2012</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Planning</td>
<td></td>
<td></td>
<td>0.535</td>
<td>0.606</td>
</tr>
<tr>
<td>Antenatal Care</td>
<td></td>
<td></td>
<td>0.3195</td>
<td>0.318</td>
</tr>
<tr>
<td>Vaccines</td>
<td></td>
<td></td>
<td>0.62</td>
<td>0.73</td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
<td></td>
<td>0.2786</td>
<td>0.313</td>
</tr>
<tr>
<td>HIV treatment</td>
<td></td>
<td></td>
<td>0.45</td>
<td>0.64</td>
</tr>
<tr>
<td>TB treatment</td>
<td></td>
<td></td>
<td>0.601</td>
<td>0.612</td>
</tr>
<tr>
<td>ITN bednets</td>
<td></td>
<td></td>
<td>0.385</td>
<td>0.452</td>
</tr>
<tr>
<td><strong>Average Service coverage</strong></td>
<td></td>
<td></td>
<td>0.46</td>
<td>0.524</td>
</tr>
<tr>
<td>Population (Millions)</td>
<td></td>
<td></td>
<td>92.7</td>
<td>106.4</td>
</tr>
<tr>
<td>Population with UHC</td>
<td></td>
<td></td>
<td>42.2</td>
<td>55.8</td>
</tr>
<tr>
<td>Contribution to UHC billion (Millions)</td>
<td></td>
<td></td>
<td></td>
<td>13.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contribution needed in proportion to gap</th>
<th>To add</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.6 UHC Index for the future

Not finished.

Approaches to obtaining globally comparable UHC indices are likely to change as methods and data measurements and health treatments change.

In the original selection of SDG 3.8.1 indicators it was intended to replace proxy indicators with measurements of treatment coverage as data became available e.g. for diabetes and hypertension. It was also planned to add coverage for cervical cancer vaccines and essential medicines in the future. Of the current 14 UHC indicators, several could merit revision in the methods or replacement with alternatives. The aim should be to include the highest impact, most measurable indicators that will drive the most important change.

The effective coverage approach is a new approach proposed by the GPW13 Expert Review Group that focuses on quality of treatment coverage in keeping with the definition of UHC (ref). The aim of the method is to provide a more comprehensive and consistent approach that avoids several of the known limitations of the current the SDG 3.8.1 index. It will use tracer indicators categorized by type of care (promotion, prevention, treatment, rehabilitation and palliation) and by life course. The approach will use proxies to measure the effectiveness of health services. Tracers are combined into a UHC index by weighting by potential health gain (see Appendix B.2, Appendix B.3). It is planned to continue to develop and test this method in countries.

3.7 UHC Financial Risk Protection

Health related financial hardship occurs in two settings: when households pay a very large share of their disposable income on health services (catastrophic payments) or when payment for health services pushes the household below the poverty line (impoverishing payments). An important WHO goal is to stop the rise in percent of people suffering financial hardship in accessing health services.

<table>
<thead>
<tr>
<th>Catastrophic</th>
<th>payment for health services is very large share of household disposable income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impoverishing</td>
<td>payment for health services pushes the household below the poverty line</td>
</tr>
</tbody>
</table>

The definition of catastrophic payment requires the selection of a threshold of total household expenditure or a threshold of non-basic needs expenditure in a given year. The current WHO measure of catastrophic payment is the fraction of households with more than 10% or more than 25% of total household expenditure on healthcare in a given year. Using the 10% threshold, some countries have very high percentages of households with catastrophic payment. The 25% threshold, however, represents a very high bar. Alternative thresholds such as 15% or 20% may be more appropriate for the future.

A future goal is to use capacity to pay, e.g. non-food-expenditure, or total expenditure minus expenditure on basic needs in the place of the total-expenditure. This should reduce the anomalies seen whereby catastrophic payments can be more common amongst the rich than the poor.
3.8 UHC Combined Index

The combined measure is defined as the population with UHC service coverage and financial health protection. It will measure the fraction of households receiving care and not facing large health spending in a year. It can be determined if we can obtain an estimate of the population with service coverage that incur financial hardship.

Estimation of a combined index based on SDG 3.8.1 and 3.8.2 is currently constrained by the lack of a common data source from which this can be directly extracted. For an accurate combined index we require financial protection monitoring data from the same data/cohort as the data identifying the bundle of services they have access to. For the future, we should aim at collecting data so that this is feasible.

For the time being, the fraction of people included in SDG 3.8.1 but incurring financial hardship will need to be estimated from the available financial data, making some simplifying assumptions. Options under consideration for estimating the combined index are:

1. Assume that health related financial hardship can occur at any level of UHC service coverage and is spread evenly:
   \[
   \text{Average financially protected UHC coverage} = \text{Average service coverage} \times (1 - \text{proportion with catastrophic spending}).
   \]

2. Assume that anyone incurring health-related financial hardship also had full UHC service coverage:
   \[
   \text{Average financially protected UHC coverage} = \text{Average service coverage} - \text{proportion with catastrophic spending}.
   \]

3. Develop models describing co-distribution of level of service coverage and proportion of catastrophic spending. Data is lacking for this. [Too complex for now?]

Neither of the first two approaches is perfect. The first case may overestimate UHC because it assumes independence of service coverage and financial hardship. The second will underestimate UHC because it is possible to incur financial hardship and not have full UHC service coverage. The first case is more robust and better justified statistically.

**Test calculations needed**

**Fig. 3.5. UHC Combined Index:** The population receiving UHC without catastrophic spending is a subset of the population with UHC.

The UHC combined index can (hopefully) be converted to a count of people for a country as

\[
\text{Number of people with UHC coverage} = \text{UHC combined index} \times \text{population}
\]
The contribution to the billion will then be

\[
\text{Contribution to UHC Billion} = \text{Population in 2023 with UHC} - \text{population in 2018 with UHC}
\]

3.9 Example country calculation

Add examples illustrating calculation of contribution to the billion.

3.10 Equity for UHC

Equity is inherent to the concept of Universal Health Coverage, which aims to ensure that all people have access to the health services they need without suffering financial hardship. Equity in UHC coverage will be assessed by examining between-country inequalities, for example by measuring the absolute and relative difference in UHC index between low resource settings and the global average or high resource settings.

Ideally, within-country inequalities will also be examined. If data availability permits, the UHC index can be determined separately for the national population and priority population subgroups of a country so as to highlight differences between them. For many countries, disaggregation by geographic location is likely to be the most feasible dimension for within-country inequality monitoring as these data are often available from existing data sources. Where further data are available, the UHC index can be broken down by age, sex, socio-economic status and place of residence (urban/rural). Where it is not feasible to disaggregate the UHC index, disaggregation of the tracer indicators can be undertaken.
4 Health Emergencies billion

The Health emergencies billion goal is for 1 billion more people to be better protected from health emergencies. It will be measured using an index that is built from three simple indicators that capture the scope of WHO’s health emergency activities (Fig. 4.1).

- Emergency Prepare indicator (measuring IHR capacities)
- Emergency Prevent indicator (measuring routine and emergency vaccination coverage)
- Emergency Detect and Respond indicator (measuring timeliness)

Fig. 4.1. The three tracer indicators that constitute the Health Emergencies Index.

The Emergency Billion goal is consistent with Sustainable Development Goals 3.d and 3.d.1, and with the 2016 Review Committee report on the Role of the International Health Regulations (IHR), 2005 in the Ebola Outbreak and Response.

4.1 Status of Emergency Billion Methods

An outline method for the Emergency Billion has been completed. The index is based on three sub indicators

- Prepare: Method largely complete and initial calculation made.
- Prevent: Method largely complete and initial calculation made. Data sets for emergency vaccination coverage exist but may not be complete.
- Detect and Respond: Data will be collected from Member States retrospectively to calculate a baseline. The exact definition of the elements of this indicator and the targets for timeliness are not fully defined and some evolution is expected.

Combined index still to be calculated and tested.

4.2 The Emergency Prepare indicator

The Emergency “prepare” indicator measures country preparedness for emergencies. It encapsulates the level to which a country is ready to identify and respond to a range of emergency situations.

The Emergency Prepare indicator is based on attainment of International Health regulations (IHR) capacities for surveillance and response. States that are party to the International Health Regulations (IHR) (2005) are
required to develop and maintain minimum core public health capacities for surveillance and response, and to report on the implementation of 13 core capacities. Each of the 13 IHR (2005) capacities is calculated as the average of its indicator scores (1-3 indicators per capacity, 24 indicators in total), with each indicator scored from 0 - 5 (5 steps). The assessment of these capacities provides the most comprehensive, internationally agreed and consistently measured dataset for determining the country capacity for preparedness for health emergencies.

The 13 IHR capacities are reported using the IHR State Parties Self-assessment Annual Reporting (SPAR) which became available in June 2018 (https://www.who.int/ihr/publications/WHO-WHE-CPI-2018.16/en/).

The Preparedness indicator is the average of the scores for the 13 International Health Regulations (IHR) (2005) capacities (Table 4.1) as measured using SPAR.

Table 4.1. IHR Capacity score categories, and example values for Bangladesh based on the SPAR

<table>
<thead>
<tr>
<th>IHR Reporting capacities</th>
<th>Example of Capacity Score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1. Legislation and Financing</td>
<td>60</td>
</tr>
<tr>
<td>C2. IHR Coordination and National IHR Focal Point Functions</td>
<td>80</td>
</tr>
<tr>
<td>C3. Zoonotic events and the human–animal interface</td>
<td>80</td>
</tr>
<tr>
<td>C4. Food safety</td>
<td>40</td>
</tr>
<tr>
<td>C5. Laboratory</td>
<td>73</td>
</tr>
<tr>
<td>C6. Surveillance</td>
<td>80</td>
</tr>
<tr>
<td>C7. Human resources</td>
<td>40</td>
</tr>
<tr>
<td>C8. National Health Emergency Framework</td>
<td>47</td>
</tr>
<tr>
<td>C9. Health Service Provision</td>
<td>60</td>
</tr>
<tr>
<td>C10. Risk Communication</td>
<td>60</td>
</tr>
<tr>
<td>C11. Points of entry</td>
<td>60</td>
</tr>
<tr>
<td>C12. Chemical events</td>
<td>40</td>
</tr>
<tr>
<td>C13. Radiation emergencies</td>
<td>40</td>
</tr>
<tr>
<td><strong>Preparedness Index (average of 13 core capacities)</strong></td>
<td><strong>58</strong></td>
</tr>
</tbody>
</table>

Preparedness indicator = Average of 13 IHR capacities (SPAR)

Over the past 8 years, all 196 WHO State Parties for IHR have reported on the implementation of these 13 core capacities at least once. Of these, as of August 7, 2019, data from 182 State Parties was available for the most recent reporting year (SPAR 2018).

The Emergency Prepare indicator allows countries to be stratified into 5 preparedness levels (Table 4.2), enabling prioritization of where preparedness efforts are most needed. Progress will be measured by the cumulative population moving from one level of preparedness to a higher level – thus encouraging improvements to be made for all Member States.
Table 4.2. Emergency Prevent Indicator Categories

<table>
<thead>
<tr>
<th>Level</th>
<th>Number of Member States</th>
<th>Cumulative Population (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 (&lt;30)</td>
<td>10</td>
<td>114</td>
</tr>
<tr>
<td>Level 2 (30–&lt;50)</td>
<td>56</td>
<td>627</td>
</tr>
<tr>
<td>Level 3 (50–&lt;70)</td>
<td>51</td>
<td>1,715</td>
</tr>
<tr>
<td>Level 4 (70–&lt;90)</td>
<td>46</td>
<td>2,549</td>
</tr>
<tr>
<td>Level 5 (≥90)</td>
<td>19</td>
<td>2,231</td>
</tr>
<tr>
<td>Data Pending</td>
<td>14</td>
<td>316</td>
</tr>
<tr>
<td>Total</td>
<td>196*</td>
<td>7,552</td>
</tr>
</tbody>
</table>

*A total number of State Parties for the IHR is 196*

Self-reported measures can often suffer from bias. In the case of IHR, voluntary external evaluations such as joint external evaluation (JEE) are used to assess this bias. Initial results from the new SPAR tool show a much closer alignment with the joint external evaluation (JEE) tool than the previous annual reporting tool (Fig. 4.2) with a correlation coefficient of 0.87 (Jan 2019, 63 countries) and no significant differences between the average scores for each of the technical areas. For the Emergencies Preparedness indicator, unadjusted SPAR values will be used. Bias will however continue to be assessed.

Fig. 4.2. Comparison of SPAR and JEE IHR scores
4.2.1 Example of country calculation

Bangladesh has scored an average of 58% of their 13 IHR core capacities based on their IHR annual reporting (Table 4.1). Based on their average score they fall on the “Level 3” of the preparedness index (50 to 70%).

4.3 The Emergency Prevent indicator

The Emergency “prevent” indicator measures efforts to prevent health emergencies via vaccination coverage. Reaching high vaccination coverage in at risk groups for vaccine-preventable infectious pathogens is a key element to tackling preventable epidemic diseases and pandemics and leads to the control and elimination of high-threat infectious hazards.

The Emergency prevent indicator incorporates both routine and campaign vaccination for epidemic and pandemic prone diseases (Fig. 4.3). It focuses on three priority infectious hazards: yellow fever, meningococcal meningitis A and cholera, all three being priority diseases calling for elimination or reduction through the implementation of global strategies in the Health Emergencies Programme. Because not all Member States are at-risk for these diseases, routine vaccination of measles is also included to develop estimates for all Member States and to highlight the importance of a functioning immunization programme for disease prevention.

The index will be the average coverage of relevant vaccines i.e. measles and any of the listed three diseases for which a Member State is at risk.

Fig. 4.3. Routine and campaign vaccinations included in the ‘prevent’ indicator

The index is designed to be able to include any new vaccines for epidemic-prone or for public health emergencies requiring mass vaccination campaigns (e.g., pandemic influenza, Ebola virus disease). In these contingency scenarios, Member States that are either considered affected or at-risk for the event, or for whom WHO recommends a mass vaccination occur, will have the relevant antigen added to the immunization coverage sub-index for that year.
4.3.1 Calculation Method

The prevent indicator is calculated as the population weighted average of routine and campaign vaccine coverages for the applicable diseases: i.e. measles for all Member States, and yellow fever and/or cholera and/or meningitis where there is a risk.

\[
\text{Emergency Prevent indicator} = \frac{\sum_v \text{Coverage}_v \times \text{Relevant population}_v}{\sum_v \text{relevant population}_v}
\]

Where \( v \) are the relevant vaccines for the country and year of estimation (see Table 4.3). The coverage estimates are each weighted by the relevant population size. For routine vaccination, this is the total population of surviving infants. For campaigns this is the target population. The rolling/cumulative vaccinated population will be used during emergencies or any supplementary campaigns.

The indicator is an absolute estimate, meaning that countries can demonstrate progress by incremental improvement independently of other countries' performance. Ultimately, all countries should have coverage estimates of >90%. The weighting scheme places a high weight on routine vaccination, emphasizing the value of routine coverage for many diseases. A potential limitation of this approach is that small targeted campaigns will have only a small impact on the indicator. Other weighting schemes were also considered (e.g. equal weighting for all antigens – in which small campaigns (e.g. for cholera) had an oversized effect on the mean).

4.3.2 Data sources and availability

The main sources of vaccination coverage data are

- Coverage estimates for routine vaccination (yellow fever, measles) from WHO/UNICEF estimates of national immunization coverage (WUENIC); MCV1 data available for all Member States
- Routine immunization administrative coverage (meningitis A) from the WHO/UNICEF Joint Reporting Form (JRF)
- Coverage estimates for emergency requests made to the International Coordinating Group (ICG) on Vaccine Provision where available (yellow fever, cholera, and meningococcal meningitis)
- Additional meningitis and yellow fever immunization campaign coverage estimates from the WHO/UNICEF JRF
- Mass preventive oral cholera vaccination campaign coverages from the Global Task Force on Cholera Control (GTFCC)

There are 66 Member States that are currently considered at-risk by the WHO Health Emergencies Programme for at least one of yellow fever, cholera, and meningitis (Table 4.3)

<table>
<thead>
<tr>
<th>At-Risk for yellow fever, cholera, or meningitis</th>
<th>66</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningitis (countries at high epidemic risk)</td>
<td>26</td>
</tr>
<tr>
<td>Cholera (affected countries)</td>
<td>47</td>
</tr>
<tr>
<td>Yellow Fever (high risk countries)</td>
<td>39</td>
</tr>
<tr>
<td>Number of countries</td>
<td></td>
</tr>
</tbody>
</table>

Because not all Member States at high risk or affected by yellow fever, cholera, or meningitis made or had requests approved by the ICG in 2017 or conducted other vaccination campaigns, the mean campaign coverage estimate was calculated using the antigen data available (i.e., non-missing). The estimate for cholera was the average of campaign coverage (when available) weighted by the relative sizes of the
target population for the specific campaign(s). There is no cholera vaccination currently recommended as part of the routine vaccination schedule.

Where target population data are not available for a specific campaign, the number of doses shipped by the ICG or GTFCC will be used as a proxy for target population size.

### 4.3.3 Example country calculation

A sample calculation of the prevent indicator is provided for Nigeria which is at-risk for Yellow Fever and Meningitis A. Routine coverage is therefore evaluated for Measles, Yellow Fever and Meningitis A with the relevant population being the population of surviving infants. Emergency campaigns were also undertaken for Yellow Fever, Meningitis A and Cholera. The numerator for the emergency prevent is the sum of vaccinated populations in each category. The denominator is the total of the relevant populations. The ratio of these is 0.44.

#### Table 4.4. Example calculation of the Emergency Prevent indicator for Nigeria

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Type</th>
<th>Coverage (%)</th>
<th>Relevant Population</th>
<th>Vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measles</td>
<td>Routine</td>
<td>42</td>
<td>6,862,604</td>
<td>2,882,294</td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>Routine</td>
<td>39</td>
<td>6,862,604</td>
<td>2,676,416</td>
</tr>
<tr>
<td>Meningitis A</td>
<td>Routine</td>
<td>0*</td>
<td>6,862,604</td>
<td>0</td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>Campaign</td>
<td>87</td>
<td>3,290,920</td>
<td>2,863,100</td>
</tr>
<tr>
<td>Meningitis A</td>
<td>Campaign</td>
<td>86</td>
<td>2,335,349</td>
<td>2,008,400</td>
</tr>
<tr>
<td>Cholera</td>
<td>Campaign</td>
<td>104*</td>
<td>1,780,520</td>
<td>1,851,741</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>Index</strong></td>
<td><strong>27,994,601</strong></td>
<td><strong>12,281,951</strong></td>
</tr>
</tbody>
</table>

*Introduction of Meningitis A vaccination scheduled in 2019

*Campaign estimates >100% using administrative data will be assigned a value of 100%

### 4.3.4 Initial Global Results

The emergency prevent indicator has been estimated in March 2019 for 194 Member States and was based on incomplete data (Fig 4.5, Table 4.4). (Check status: Computations need to be done incorporating the rolling/cumulative vaccination data?).

The results show an average global coverage of 83%, with 3.7 billion persons in 105 Member States having the highest level of prevention (>90%). This means 3.8 billion people reside in 89 Member States where routine and emergency vaccination could be strengthened. The 66 at-risk Member States account for most Member States that have mean coverage <90%, with 3.3 billion of people living in Member States with a level of prevention <90% and 15 Member States falling into the lowest two categories of vaccination coverage (Fig. 4.4, Table 4.5).

Fig. 4.4. Mean coverage of Emergency Prevent Indicator
Table 4.5. Emergency Prevent Indicator levels for all Member States and at-risk Member States (n = 66)

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Member States</th>
<th>Total Population (millions)</th>
<th>Number of at-risk Member States</th>
<th>Total at-risk Population (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: &lt;30</td>
<td>5</td>
<td>177</td>
<td>5</td>
<td>177</td>
</tr>
<tr>
<td>Level 2: 30–&lt;50</td>
<td>11</td>
<td>422</td>
<td>11</td>
<td>422</td>
</tr>
<tr>
<td>Level 3: 50–&lt;70</td>
<td>25</td>
<td>401</td>
<td>19</td>
<td>296</td>
</tr>
<tr>
<td>Level 4: 70–&lt;90</td>
<td>49</td>
<td>2715</td>
<td>21</td>
<td>2236</td>
</tr>
<tr>
<td>Level 5: ≥90</td>
<td>104</td>
<td>3791</td>
<td>10</td>
<td>451</td>
</tr>
<tr>
<td>Total</td>
<td>194</td>
<td>7505</td>
<td>66</td>
<td>3,581</td>
</tr>
</tbody>
</table>

4.4 The Emergency Detect and Respond Indicator

For the “detect and respond” indicator, countries will be assessed on timeliness of detection and response to public health events, including outbreaks and emergencies.

Timeliness is an easily understood view of the functional capacities of country detection and response and can be used to measure progress over time. It is measured by the delays in detecting, reporting, and responding to a public health event. The indicator measures the proportion of public health events detected and responded to in a timely fashion.

The following text is provisional and details are expected to change. A redefinition of the time to detection and its target is anticipated e.g. to move away from use of incubation periods (See Section 4.4.4 for details). The general philosophy is expected to be similar.
4.4.1 Approach

The “detect and respond” indicator will monitor the proportion of IHR notifiable events that were detected and responded to in a timely fashion. IHR notifiable events are events that have already been determined by Member States to be serious, unusual or unexpected, or pose a risk of international spread or risk of international travel or trade restrictions. Because these events have already been reported to WHO, they establish a clear denominator (~100 events per year), for which details of the detection, verification, assessment, and response (where applicable) might be realistic to obtain. These data can be collected retrospectively (annually) where routine systems are not in place.

The timelines can extend to several measures (Table 4.6, Fig. 4.5. Outline of stages for the detect and respond indicator.).

Table 4.6. Ending Pandemics (Nov 2018 Salzburg statement unpublished). Table to be updated to use WHO terminology and to be combined with Table 4.9 below

<table>
<thead>
<tr>
<th>Event Milestone</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Start ($t_0$)</td>
<td>Date of symptom onset in the primary case or earliest epidemiologically-linked case; date of event-start of a chemical event or radiation emergency</td>
</tr>
<tr>
<td>Event Detection ($t_D$)</td>
<td>Date that the event if first recorded by any source or in any system, including indicator-or event-based surveillance systems, social media, or traditional media</td>
</tr>
<tr>
<td>Event Notification</td>
<td>Date the event is first reported to a public health authority</td>
</tr>
<tr>
<td>Event Verification</td>
<td>Earliest date of event verification through a reliable verification mechanism</td>
</tr>
<tr>
<td>Event Intervention ($t_R$)</td>
<td>Earliest date of any public health intervention, including communications, decontamination, source control, or medical countermeasures</td>
</tr>
</tbody>
</table>

The indicator will focus on

- Time to detection (definition under debate) and
- Time to respond (i.e., how many days from detection to the first public health intervention).

This choice aims to reduce the burden of data collection and processing, and to capture the key timeliness indicators (Fig. 4.5).
4.4.2 Example Country calculation

This example is provisional and illustrative of the general approach only. The event detection component and target are expected to change. The overall principle is likely to be similar.

In the example calculation of the detect and respond indicator (Table 4.7), there have been 3 IHR-notifiable events in a country during 2015. Only one of three events was detected and responded to in a timely fashion, giving an indicator value of 33%.

Table 4.7 Approximate Example country calculation for ‘detect and respond’ indicator. This calculation will be replaced but for now illustrates the general approach.

<table>
<thead>
<tr>
<th>Event</th>
<th>Incubation Period (days)</th>
<th>Target time to detection (days) (2 x incubation)</th>
<th>Event Start (to)</th>
<th>Event Detection (to)</th>
<th>Event Intervention (te)</th>
<th>Time to Detection D=to–to</th>
<th>Time to Response R=te–to</th>
<th>Timely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebola</td>
<td>21</td>
<td>42</td>
<td>26 Feb, 2015</td>
<td>9 May, 2015</td>
<td>16 May, 2015</td>
<td>52 days</td>
<td>7 days</td>
<td>No</td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>6</td>
<td>12</td>
<td>4 April, 2015</td>
<td>9 April, 2015</td>
<td>10 April, 2015</td>
<td>4 days</td>
<td>1 day</td>
<td>Yes</td>
</tr>
<tr>
<td>SARS</td>
<td>7</td>
<td>14</td>
<td>10 June, 2015</td>
<td>26 June, 2015</td>
<td>27 June, 2015</td>
<td>16 days</td>
<td>1 day</td>
<td>No</td>
</tr>
</tbody>
</table>

4.4.3 Data Sources and Availability

The key sources for (the detect component of?) the relatively small number of IHR-notifiable events that occur in a given year at the country level are

- **Event Information System (EIS).** A Web-based site that allows secure communication between WHO and the IHR National Focal Points (NFPs) as defined in Article 11.1 of the IHR (2005). EIS is only accessible to NFPs and UN partners.
- **Event Management System (EMS).** WHO’s central electronic system for entering, accessing and managing information for all potential and substantiated events. All event details, relevant communications, WHO assessments and decisions must be recorded in EMS. EMS required adaptation for GPW13.
The collection of timeliness metric will likely need to be arrived at in a phased manner. Initially, existing methods for timeliness to event detection, and data from after action reviews can be used to set 2019 baseline data for the GPW13. The data strengthening needs for effective implementation of indicator are described in greater detail in Brief Methods Note for 1 Billion Better Protected from Health Emergencies: “Detect and Respond” Annex 2 (See Appendix)

Countries will be encouraged to make incremental progress on timeliness of detection and response to events, regardless of baseline values.

4.4.4 Measuring Timelines of Detection (and notification?)

Interim. The following information is in the context of the programmatic budget outcome 2.3.1, Potential health emergencies rapidly detected, and risks assessed and communicated. It affects the possible components of the detect and respond indicator including definitions and targets.

A review is underway to establish baselines and to examine potential health emergencies notified under IHR and communicated through the Event Information System (EIS) in the 5 past years. This is focused on key milestones (Fig. 4.6)

1. Start of an event/outbreak (a)
2. Detection of an event/outbreak (b)
3. Confirmation of an event/outbreak (c)
4. Notification of the event to WHO (d)
5. Assessment of the event (e)

The review will determine the level of completeness of the information and aim to select the most appropriate proxy. Table 4.7 presents some possible proxies.

Fig. 4.6. Outline of stages for the detect indicator.
There are two cases that occur (Table 4.8):

- Type 1 Events reported under IHR to WHO, can be used for GPW13 indicator monitoring to measure the country performance.
- Type 2 Events detected by WHO, where no official communication was received, prior to detection, which can be used for measuring the countries capacity to communicate with WHO.

For type 1 events, the time to detection is not directly reported by the MS (check). For type 2 events, the time to detection is the time to detect as measured by WHO rather than the MS. This poses a problem for measurement of time to detect.

**Table 4.7 Potential outcome 2.3.1 indicator metrics**

<table>
<thead>
<tr>
<th>Event Milestone</th>
<th>Ideal proxy</th>
<th>Alternative proxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event start (a)</td>
<td>Date of index case symptom onset</td>
<td>First case reported; Number of cases exceeding threshold; Incident date chemical/radiological/nuclear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Start date of an environmental hazard/natural disaster</td>
</tr>
<tr>
<td>Event detection (b)</td>
<td>Date the local health authorities detect the outbreak</td>
<td>WHO detects the event (any source)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laboratory tests taken</td>
</tr>
<tr>
<td>Event confirmation (c)</td>
<td>Date event verified/confirmed by NFP</td>
<td>Health authorities officially communicate the event through other means;</td>
</tr>
<tr>
<td>Event notified to WHO (d)</td>
<td>Date of notification under IHR</td>
<td>WHO receives an official report from other sources than IHR NFP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WHO receives a reply for verification request</td>
</tr>
<tr>
<td>Event assessment (e)</td>
<td>Date EMS updated (occurring events) or created (new events)</td>
<td>First EIS drafted if prior to EMS entry</td>
</tr>
<tr>
<td>Event communication (f)</td>
<td>Date EIS posted</td>
<td></td>
</tr>
</tbody>
</table>

Fig 4.7 shows an analysis of events in EMS. IHR was the first source of information for only 18% of the 4,600 public health events documented by WHO in EMS between January 2000 to April 2018. Event-based Surveillance by WHO remains the primary source of information for the detection of global and
national health risks. The proportion of IHR notifications has increased since IHR’s implementation with key progress made in PAHO, EURO regions.

Fig. 4.7 Sources of information for events

A useful additional indicator that could be used by WHO to track progress would be the proportion of potential acute public health events detected and for which the 1st source of information was IHR. This would clearly inform on the timeliness of notification and compliance with IHR. This is an important part of ensuring MS are reporting events as required. Regions should be encouraged to follow the lead of PAHO and EURO in reporting events.

4.4.5 Measuring Timeliness of Response

Work needed.

4.4.6 Limitations

Detect and Respond timeliness data has not previously been gathered. Gathering of retrospective and ongoing events poses challenges despite the relative small number of events. The definitions need to be clarified.

The desirable key milestones are relatively straight forward, but it is difficult to obtain data that is suitable. In general, data are not collected in routine nor in a standardized way and reporting of notifiable events is very variable.

The number and nature of potential acute health events varies enormously according MS states context (e.g. their burden of diseases, access to health care, safe water and sanitation, etc.). It is planned to calculate this indicator using a rolling time period (3-years). Nevertheless, not all countries will have had a notifiable event in a three-year period. A plan is needed for how to handle the case of no notifiable events.
Although, IHR promotes an all hazard approach, in most MS the available data remains focused on outbreaks of infectious diseases. Only 18% of events detected by WHO are currently reported under IHR.

For detection, the occurrence of laboratory confirmed cases is not necessarily a good indicator of an acute public health events especially for endemic diseases.

Data collection of timeliness data will require the enhancement and systematic use of EMS and EIS (requires investment).

Support from regions will be required, eg to provide data similar to PAHO and EURO.

4.5 Combined Emergency index

The health emergency protection index (HPI) is the calculated as the mean value of the 3 indicators, i.e. the prepare, prevent, detect and respond indicators. It summarises a country’s overall level of protection from health emergencies.

HPI is calculated as the arithmetic mean of the sub indicators:

\[
\text{Country Health Protection Index} = \frac{(\text{Prepare} + \text{Prevent} + \text{Detect and Respond})}{3}
\]

Fig. 4.8. Calculation of the combined emergency index

Countries will be categorized into 5 levels of HPI (0-30, 30-50, 50-70, 70-90 and >90 %) (Fig. 4.8). The “1 billion better protected” will be measured at the end of the 5-year period by the total population in countries that have stepped up by at least from one level, which encourages incremental progress in all countries (Fig. 4.9).

Fig. 4.9. Countries moving from one level to the next contribute to the Emergencies billion.
4.5.1 Calculating the Country Contributions to the billion

Add in a country example calculation involving calculation of the Better protected index and the conversion to a contribution to billion.

4.6 Equity for Emergencies

Equity for Emergencies will be assessed by examining between-country inequalities, for example by measuring the absolute and relative difference in the better prepared for Emergencies index between low resource settings and the global average or high resource settings.

In addition, within-country equity will be monitored by two of the 46 programmatic indicators which consider at-risk/vulnerable populations in emergency settings. These are vaccine coverage of at-risk groups for epidemic or pandemic prone diseases; proportion of vulnerable people in fragile settings provided with essential health services.
5 The Healthier Population Billion

The Healthier Population billion is 1 billion more people enjoying better health and well-being.

The Healthier Population (HP) billion is a goal that aims to enable and encourage people to lead healthier lives. The key to achieving this will be via government policies and actions that promote healthier environments (e.g. clean air, water and urban infrastructure) and encourage healthier life choices such as reduced use of alcohol and tobacco, better nutrition and healthier body weight. The billion includes aspects central to health that are determined by social and commercial factors which are largely outside of the health sector. It is not intended to include factors primarily handled within the health care system. It will be mainly met through multisectoral interventions driven by the health sector and influenced by policy, advocacy and regulation. It will measure change using data on social, environmental and behavioural risks (Fig. 5.1).

The Healthier Population billion attempts to measure the impact of WHO's impact framework on the health and well-being of the world's populations. It limits itself to examining changes in relevant indicators included in the GPW13 programme. It will measure the overall global impact on these indicators of all interventions from WHO, member states and other interested parties (and not just the particular contribution from WHO).

Fig. 5.1. The healthier billion concept – improving people’s health and well-being by addressing social (& commercial), economic, environmental and behaviour risks to health.

5.1.1 A new index as a first step for monitoring Healthier Populations

The Healthier Lives index described below is the first time that WHO has attempted to create a combined measure of change in the domain of the behavioural, environmental and socially determined healthiness of global populations. The method is purposefully kept straightforward and is constrained to use indicators that are a part of the GPW13 monitoring.

It is anticipated that lessons will be learnt during GPW13, and that our understanding of the best way to measure changes in world healthiness will develop further. It is hoped that this may in the future inspire a more general and comprehensive index of healthiness. In addition, whilst the current approach captures change in several key risk factors linked to healthiness, it does not provide a comprehensive coverage of factors and sectors. We are likely to wish to revisit the selection of indicators beyond GPW13.
It is recognised that the measurement approach taken here is an initial one and that improved approaches are possible. The method is a practical way forward given the constraints of the GPW13 programme and the requirement that the method can be assimilated by member states. Further discussion of these matters may be found in the Appendices E and G (Known issues and consultation steps).

5.2 A concept framework for Healthier Populations

A useful conceptual framework to illustrate the areas targeted for the healthier populations billion is the health impact pyramid (Frieden 2010). As shown in Fig. 5.2, this pyramid illustrates the impact and focus of interventions ranging from individual level interventions at the top to those addressing socioeconomic factors at the bottom. Interventions at the top of the pyramid require more effort to generate benefit for individuals; those at the bottom are more complex but have the potential to generate greater impact at the population level. Much of the focus of the work carried out to achieve this billion is centred around ensuring that the environment, social and commercial context in which individuals live is conducive to healthy choices. While individuals have responsibility for their decisions (to be physically active or not) and choices (of what to eat, drink and whether or not to smoke), there are numerous social and commercial influences over what choices are made available to individuals.

In addition to the choices of food products, factors such as the design of urban infrastructure can play an important role in influencing the choice to walk or cycle. Individuals are less likely to choose modes of transport that are more physically active if the environments are unsafe. As such, ensuring healthier behaviours on the part of individuals requires changes to the context to make the default or easiest choices (what to eat, what to drink what mode of transport to use, etc), the healthiest choices.

Creating a context that enables healthy choices requires interventions that address the bottom layer of this pyramid, socioeconomic factors. Such interventions are complex and often involve actions and the leadership of sectors outside of health. The price of oil for example, influences the choice in transport modes/systems which directly contributes to the quality of air and subsequently the risk of health outcomes such as asthma. Where oil prices are low, transport systems favour the use of private vehicles which in turn is a disincentive for walking and cycling. The cost of transport is also factor in determining what the types and origins of food products that are made available to the public. Similar analyses can be made for other behavioural risk such as the use of tobacco and alcohol.

Fig. 5.2. Health impact pyramid (Frieden)
5.3 Indicators for measuring Healthier Populations

5.3.1 Type of indicators

An important choice is to determine what type of indicators will be used in measuring Healthier Populations. Key contenders are

1. *indicators measuring risk to health* (e.g. prevalence of tobacco use, (lack of) access to clean water). Such indicators are typically the outcome of policy and regulation and can be considered as a measure of the effectiveness of policy, legislation, education and regulation.

2. *indicators measuring policy, regulation etc.* Policy, laws, taxation, advocacy, regulation, education and investments are key drivers for change in social, environmental and behavioural risks. There may however be a gap between whether a policy is in place and whether it is effective. Such indicators are not directly translatable into a number of healthier lives.

Both above types of indicators are valid - each has its merits. However, for GPW13, most of the indicators in the measurement framework fall in the first category and it makes sense to base the Healthier Lives index on these measures of risks to health. Using a mix of risks and policies is not advised because of the likely differences in effective impact on healthiness. For example, where a new government policy is implemented this could be taken as applying to a whole population. This is not readily comparable with the impact on health for people who have, say, stopped using tobacco.

Given the importance of policy and regulation for addressing risks to health and achieving healthier populations, complementary information on policy implementation and legislation will be reported and tracked alongside the Healthier Lives index. Many of the indicators run alongside programs that support and measure interventions (e.g. MPOWER for tobacco, INSPIRE for violence against children, NCD progress monitoring, etc. (*add references*)). Understanding what interventions have already taken place will assist with progressing the HP billion. Policy measures will not be directly included in the index.

5.3.2 Criteria for selection of indicators

The Healthier Populations Billion concept is part of the GPW13 programme and will use and measure change linked to relevant GPW13 programmatic indicators. The index described here is consequently constructed using a subset of the 46 GPW13 programmatic indicators (Table 2.1).

Key criteria for selecting from the GPW13 indicators are

- Focus is largely outside health sector
- Significant impact on population healthiness
- Motivates change
- Emphasis towards healthiness
- Indicator is a measure of risk or can be used as a proxy for risk.
- Ideally indicator is as population prevalence

5.3.3 Choice of indicators

Fourteen GPW13 indicators have currently been identified for inclusion in the measurement of the HP billion. Table 5.1 lists the potential candidates that were considered – these are all the GPW13 indicators that have some focus beyond the health sector.

The indicators in Table 5.1 that were not selected were excluded for the following reasons
• More relevant to the health sector (suicide mortality, sexually informed choice). Both indicators are impacted by health and non-health sector policies (e.g. laws on access to firearms, or access to contraception) but (arguably) the main focus is inside the health sector.
• Mortality data where there is an alternative exposure indicator (WASH, air pollution mortality), or where global burden is lesser (mortality due to poisoning)
• Policy indicator (trans fats) which is not comparable to the remaining risk indicators (is it possible to transform trans fats policy into a measure of prevalence e.g. diet high in trans fats?). The DALYS per person for this indicator are an order of magnitude smaller than the other indicators.

Whilst stunting and wasting conditions should be handled by the health sector once they exist, they are caused by factors outside the health sector (e.g. social determinants, lack of safe water and sanitation, poor feeding practices, lack of education, etc). On these grounds they are considered to belong in the HP Index.

Three of the selected 14 indicators do not fully meet the criteria stated above. They are included because each is a top contributor to the global burden. The three indicators are

• Alcohol, for which the SDG indicator is mean intake of alcohol in litres (i.e. not expressed as a prevalence).
• Air pollution, for which the SDG indicator is mean PM2.5 (also not expressed as a prevalence)
• Road mortality, which is a measure of mortality and included as a proxy for road safety. Although all other measures of mortality have been excluded, an exception is made for this indicator because of the very high burden with which it is associated and the lack of an alternative measure of road safety.

The above three indicators require a transformation to convert to a prevalence that is suitable for measurement of healthier lives. Details of the conversions are under development (see Section 5.3.6 below and a planned Appendix) for details.

Table 5.1. Indicators considered for Healthier Population Billion. 14 have been selected for inclusion. Data sources are GHO and UN SDG databases.

<table>
<thead>
<tr>
<th>Indicator short name</th>
<th>Data coverage</th>
<th>Not health sector</th>
<th>Health sector</th>
<th>Determinant of / Risk to health</th>
<th>Outcome</th>
<th>Prevalence</th>
<th>Policy measure</th>
<th>Important Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>Median</td>
<td>Limited</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPW13 indicators selected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 3.6.1 Tobacco use</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 3.5.1 Alcohol (litres)</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 3.6.1 Road deaths</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 2.2.1 Childhood stunting &lt;5</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 2.2.2 Childhood wasting &lt;5</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>WHA66.10 Obesity</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 11.6.2 Mean particulates (PM2.5)</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 7.1.2 Clean fuels</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 6.1.1 Safely managed water</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 6.2.1 Safely managed sanitation</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 4.2.1 Developmentally on track u5</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 5.2.1 Partner violence for women</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 16.2.1 Violence against children</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>GPW13 indicators considered but not used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHA66.10 Protected from trans fats</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 3.9.1 Mortality ambient air pollution</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 3.9.2 Mortality unsafe WASH</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 3.9.3 Mortality poisoning.</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 5.6.1 Informed sexual choice (F)</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SDG 3.4.2 Mortality due to suicide</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
5.3.4 Impact of indicators

*Text to be added.* This section shows the burden of disease associated with the indicators in the index and the current availability of data estimates.

Table 5.2. Global burden of disease and current data availability for indicators in the Healthier Population Billion.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco use</td>
<td>177</td>
<td>0.20</td>
<td>145</td>
<td>149</td>
</tr>
<tr>
<td>Obesity</td>
<td>135</td>
<td>0.18</td>
<td>190</td>
<td>190</td>
</tr>
<tr>
<td>Ambient air pollution</td>
<td>105</td>
<td>0.03</td>
<td>189</td>
<td>189</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>99</td>
<td>0.19</td>
<td>191</td>
<td>191</td>
</tr>
<tr>
<td>Childhood wasting &lt;5</td>
<td>86</td>
<td>0.79</td>
<td>80</td>
<td>47</td>
</tr>
<tr>
<td>Clean household fuels</td>
<td>77</td>
<td>0.05</td>
<td>191</td>
<td>191</td>
</tr>
<tr>
<td>Road injuries/deaths</td>
<td>71</td>
<td>0.37</td>
<td>194</td>
<td>174</td>
</tr>
<tr>
<td>Safe water</td>
<td>53</td>
<td>0.04</td>
<td>78</td>
<td>84</td>
</tr>
<tr>
<td>Safe sanitation</td>
<td>40</td>
<td>0.02</td>
<td>84</td>
<td>78</td>
</tr>
<tr>
<td>Childhood stunting &lt;5</td>
<td>14</td>
<td>0.10</td>
<td>86</td>
<td>47</td>
</tr>
<tr>
<td>Intimate Partner Violence</td>
<td>5</td>
<td>0.02</td>
<td>88</td>
<td>28</td>
</tr>
<tr>
<td>Childhood overweight &lt;5</td>
<td>0.6</td>
<td>0.01</td>
<td>83</td>
<td>47</td>
</tr>
<tr>
<td>Developmentally on track &lt;5</td>
<td>1</td>
<td></td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Violence against children</td>
<td></td>
<td></td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>
Notes: DALYs are from IHME GBD 2016 (WHO does not produce DALYS for most of these risk factors). Indicators are ordered by Global Burden of disease. Data availability columns show (a) those indicators for which it was possible to calculate a change over a 5-year period (approximately 2010-2015 - see also Section 5.7) and (b) which indicators have recent estimates available. Data from GHO and UN SDG databases.

5.3.5 Reframing indicators for Healthiness

The GPW13 indicators are heterogenous being expressed in a mixture of ways. For some, higher values are better (% access to safe water), for other low values are the best (% children experiencing violence). For the HP, the proportion of population that are additionally healthy for the relevant indicator over a period is calculated. The higher the value, the greater the improvement. A value of 0% would mean no change in proportion of people that are healthy at a population level. Negative changes will indicate decrease in population healthiness. The maximum/minimum possible change would be +/−100%.

Indicators will (perhaps) be reframed as a healthier concept (Table 5.3). For example, prevalence of tobacco use, would be converted to

%newly free from direct tobacco use.

For all reframed indicators, higher values represent greater reduction in risks and thus healthier populations.

The reframed indicators are provisional and under discussion with programs. Comments welcomed on (a) whether this is workable and (b) on the naming of the Healthier Change Concept names in Table 5.3.

Childhood wasting <5 and overweight <5 are both forms of unhealthy weight as measured by ratio of height to weight and will be combined to create a healthy child weight indicator.

Table 5.3. Indicators for measuring change in Healthiness

<table>
<thead>
<tr>
<th>SDG/WHA</th>
<th>SDG/WHA short name</th>
<th>Value</th>
<th>Healthier Change Concept</th>
<th>Age range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDG 3.a.1</td>
<td>Tobacco use</td>
<td>100-SDG</td>
<td>% newly free from direct tobacco use</td>
<td>15+</td>
</tr>
<tr>
<td>SDG 3.5.1</td>
<td>Alcohol (litres)</td>
<td>convert</td>
<td>% using alcohol with less risk</td>
<td>15+</td>
</tr>
<tr>
<td>SDG 3.6.1</td>
<td>Road injuries/Deaths</td>
<td>convert</td>
<td>% experiencing safer roads</td>
<td>all</td>
</tr>
<tr>
<td>SDG 2.2.1</td>
<td>Stunting u5</td>
<td>100-SDG</td>
<td>% better child height</td>
<td>&lt;5</td>
</tr>
<tr>
<td>SDG 2.2.2</td>
<td>Wasting/Overweight u5</td>
<td>100-SDG</td>
<td>% healthier child weight</td>
<td>&lt;5</td>
</tr>
<tr>
<td>WHA66.10</td>
<td>Obesity</td>
<td>100-WHA</td>
<td>% healthier weight</td>
<td>5+</td>
</tr>
<tr>
<td>SDG 11.6.2</td>
<td>Mean particulates (PM2.5)</td>
<td>convert</td>
<td>% with improved air quality</td>
<td>all</td>
</tr>
<tr>
<td>SDG 7.1.2</td>
<td>Clean fuels</td>
<td>SDG</td>
<td>% newly using clean fuels</td>
<td>all</td>
</tr>
<tr>
<td>SDG 6.1.1</td>
<td>Safely managed water</td>
<td>SDG</td>
<td>% newly accessing to safe water</td>
<td>all</td>
</tr>
<tr>
<td>SDG 6.2.1</td>
<td>Safely managed sanitation</td>
<td>SDG</td>
<td>% newly accessing safe sanitation</td>
<td>all</td>
</tr>
<tr>
<td>SDG 4.2.1</td>
<td>Developmentally on track u5</td>
<td>SDG</td>
<td>% additionally on track</td>
<td>&lt;5</td>
</tr>
<tr>
<td>SDG 5.2.1</td>
<td>Partner violence for women</td>
<td>100-SDG</td>
<td>% newly free from partner violence</td>
<td>partnered women 15+</td>
</tr>
<tr>
<td>SDG 16.2.1</td>
<td>Violence against children</td>
<td>100-SDG</td>
<td>% newly free from home violence</td>
<td>&lt;18</td>
</tr>
</tbody>
</table>
5.3.6 Converting non-prevalence indicators

Transformation of non-prevalence indicators to prevalence is still under discussion with programs. Full details will eventually be added to Appendices. The following is provisional.

**Safer Alcohol use**

Under discussion with the Alcohol programme. This is likely to involve a transformation linking mean intake of alcohol (litres) with prevalence of (say) abstainers. For the initial analysis, a regression line was fitted between mean alcohol intake and proportion of abstainers, to give

\[
\text{Change in healthier population (\%) = -4.8 x change in mean intake(litres)}
\]

This relationship will be replaced when discussions are completed with the Alcohol programme.

*Fig. 5.4. Relationship between mean alcohol consumption and prevalence of (a) heavy episodic drinking in the last month and (b) abstainers last 12 months. Approximate linear relationships can be seen.*

**Road safety**

Under discussion with road safety programme. Current provisional plan is to use a global estimate of the average number of injuries per road fatality (or estimate for each world bank income group). Road mortality can then be converted into the proportion of the population that are injured or killed per year. Current calculations are based on an interim conversion of 35 injuries per road fatality.

**Clean Air**

The approach will use gridded air quality information to calculate the proportion of population who experience safe air quality, ie mean PM2.5 of less than the 10 \(\mu\)g/m\(^3\) WHO guideline level. The data used will be the same as that which is used to calculate PM2.5 for SDG 11.6.
5.4 The Healthier Lives Approach

5.4.1 Criteria for choice of method

The following criteria have been used in selecting the method for counting the HP billion:

- The method should estimate the number of lives that are healthier.
- The method should be simple to understand, straightforward to apply and suitable for calculation by all countries.
- The method must be based on indicators from the GPW13 programmatic indicators (largely SDG indicators) and avoid imposing any further data collation burden on member states.
- The method should count change that is meaningful for healthiness (e.g. new access to water is likely to result in a healthier life, whereas implementing a policy at population level may not mean all the population is healthier)
- The method should be ready to use by autumn 2019 and not require a long development schedule.
- Simplicity and broad applicability is preferred over sophisticated complexity. The method will be a first attempt that can be further developed and refined over time.

Based on the above, the recommended method for measurement of Healthier Populations is the Healthier Lives Approach (Fig. 5.5) (NB this was formerly termed the lives touched approach in earlier documents).

Alternative methods have been considered, notably a GPW13 Expert Review Group (ERG) recommendation to weight indicators by DALYs averted so as to estimate a relative health gain for each indicator. Further details of alternative approaches can be found in Appendix C.

Fig. 5.5. The healthier lives approach

5.4.2 Concept

The healthier lives approach counts the number of people whose lives are newly healthier as measured by the net change in one or more of the component indicators. Conceptually, if a person becomes newly healthier in more than one way (e.g. clean water and safer roads) then this will be counted as just one extra healthier life. If a person become healthier in one way but less healthy in another (stops use of tobacco but starts to drink alcohol) then they would not count as a newly healthier life (the effects cancel out). In practice, the healthier lives approach cannot count at the level of an individual – it measures change at an aggregated population level using change in population prevalence.
The healthier lives approach uses a simple unweighted counting scheme. This approach has the advantage of simplicity and yet provides a direct measurement of lives: it is comparatively easy to understand, and it is hoped that it will be accessible to all countries. A disadvantage of the approach is that disparate impacts on individuals are given equal weight, e.g. access to clean air vs access to safe sanitation vs avoiding partner violence.

5.4.3 Healthier Lives Index - an index of change

The Healthier Lives approach will be used to calculate a Healthier Lives (HL) index. The index measures the net number of people, at a population level, whose lives are newly healthier in some way. This could be due to parts of the population having new access to clean water, or due to a reduction in the prevalence of smoking, or due to more people accessing safer roads.

The Healthier Lives index presented here is an index of change over time, e.g. using the period 2018 – 2023 for GPW13. This contrasts with the Universal Health Coverage (UHC) index for which the index is a measure of coverage for a specific point in time (Appendix C).

Note that the HL index does not count the number of people who are fully healthy, and it does not assess the average healthiness of a population. In some instances, a population may experience better conditions (better air quality, reduced alcohol consumption, reduced body weight from obese to overweight) but there may remain scope for further future improvements (excellent air quality, zero alcohol consumption, healthy weight). Counting as a healthier life does not mean a life is 100% healthy with no room for improvement.

5.4.4 Calculating the Healthier Lives Index

For simplicity we start by considering the case of no population growth, and no double counting (adjustments for population growth and double counting are covered in subsequent sections). The contribution to the billion from indicator $i$, is then:

$$ Contribution_i = pop_i \times \Delta p_i $$

where $pop_i$ is the population relevant to indicator $i$ (e.g. population of children under 5) and, $\Delta p_i$ is the change in indicator prevalence (expressed as a proportion) over a period of time.

For example, if the adult population is 1 million and the prevalence of clean water is 60% at the start of the period and 62% at the end of the period, then

$$ Contribution_{clean\ water} = 1 000 000 \times 0.02 = 20 000 $$

The contribution over all indicators is then summed over all indicators

$$ Total\ Contribution = \sum_i pop_i \times \Delta p_i $$

Reducing double counting

[shorten and convert to an appendix?]

The above formula is only correct if there are no overlaps in who receives heath gains. In practise, it is likely that there will be some overlap and so double counting could occur. For example, some people may both stop smoking and gain access to clean water.
A first-level correction for double accounting can be made based on the assumption that the observed change in each of the indicators occurs randomly (independently). Note that for this index, independence is assumed between changes in indicators; this is not the same as assuming independence between the indicators. The assumption appears to be reasonable at a within-country level, based on examination of historical data (maximum observed correlations for changes in indicators are < 0.4, see also Appendix D). However, the approach remains a simplification and cannot account for correlations within sub-populations. For example, many of the indicators are highly correlated with socioeconomic/income levels (e.g. access to safe water and sanitation, clean fuels, childhood stunting) so improvements may be expected to centre on addressing needs of lower income populations — this would cause double counting but is not captured in the double counting correction. Use of other methods such as joint distribution estimation are also possible but will also require further data.

The total contribution to the billion, correcting for double counting, is the difference between the proportion of the population who are healthier, as measured by one or more indicators, and the proportion who are less healthy. This can be written as follows

$$\text{Contribution} = \sum_j \text{pop}_j \left\{ \left( 1 - \prod_{\Delta p_i < 0} (1 - |\Delta p_i|) \right) - \left( 1 - \prod_{\Delta p_i > 0} (1 - |\Delta p_i|) \right) \right\}$$

(Eqn 1)

which simplifies to

$$\text{Contribution} = \sum_j \text{pop}_j \left\{ \prod_{\Delta p_i < 0} (1 - |\Delta p_i|) - \prod_{\Delta p_i > 0} (1 - |\Delta p_i|) \right\}$$

where $|\Delta p_i|$ is the absolute value of the change in prevalence for indicator $i$, $j$ are distinct population tranches (e.g. <5s, 5-9s, over 18s) and $i$ are the indicators relevant to each population tranche. Note that different tranches of the population are affected by different sets of indicators (e.g. compare indicators relevant to under 5s versus indicators relevant to adults, Table 5.4), and overlaps are calculated for each population tranche separately.

Table 5.4. Current mapping of indicators to distinct population subgroups.

<table>
<thead>
<tr>
<th>SDG/WHA</th>
<th>SDG/ WHA short name</th>
<th>Age range</th>
<th>u5</th>
<th>5-14</th>
<th>15-17</th>
<th>15-17 other</th>
<th>18-19</th>
<th>18-19 other</th>
<th>20-65</th>
<th>20-65 other</th>
<th>65+</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDG 3.4.1</td>
<td>Tobacco use</td>
<td>15+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 3.5.1</td>
<td>Alcohol (litres)</td>
<td>15+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 3.6.1</td>
<td>Road injuries/Deaths</td>
<td>all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 2.2.1</td>
<td>Stunting u5</td>
<td>&lt;5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 2.2.2</td>
<td>Wasting/ Overweight u5</td>
<td>&lt;5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHA66.10</td>
<td>Obesity</td>
<td>5+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 11.6.2</td>
<td>Mean particulates (PM2.5)</td>
<td>all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 7.1.2</td>
<td>Clean fuels</td>
<td>all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 6.1.1</td>
<td>Safely managed water</td>
<td>all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 6.2.1</td>
<td>Safely managed sanitation</td>
<td>all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 4.2.1</td>
<td>Developmentally on track u5</td>
<td>&lt;5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 5.2.1</td>
<td>Partner violence for women</td>
<td>partnered women 15+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDG 16.2.1</td>
<td>Violence against children</td>
<td>&lt;18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# indicators | 9 | 7 | 10 | 9 | 9 | 8 | 9 | 8 | 8 |
Notes: The violence against women indicator applies to ever partnered women over the age of 15, which is approximated by the number of married women aged 15-65. Populations in the age range 15-65 are therefore separated into the population of partnered women (pw) and the remaining population (other). Ages 15-17 and 18-19 are separated out because of differences in indicator ages ranges.

The above formula derives from simple probabilistic arguments. First note that \((1 - |\Delta p_i|)\) is the proportion of the population seeing no change in indicator \(i\). Then \((1 - |\Delta p_1|) \times (1 - |\Delta p_2|)\) is the proportion of the population with no change in either indicator 1 or 2, and \(\prod_i (1 - |\Delta p_i|)\) is the proportion of the population with no change in any of the \(i\) indicators. This means that the remaining proportion, \(1 - \prod_i (1 - |\Delta p_i|)\), is the proportion of the population where one or several indicators have changed over the period, i.e., the proportion living newly healthier lives.

The correction also needs to take account of the fact that not all indicators are improving. Where \(\Delta p > 0\) it means that the population has reduced exposure to risks to healthiness, and where \(\Delta p < 0\) it indicates the population is experiencing increased exposure to health risks. If 10% of a population become healthier due to improved air quality and 10% become less healthy due to increased body weight, then, in the Healthier Lives approach, the net number of healthier lives is zero – the two changes offset each other.

In Eqn 1 above, the first term, \(1 - \prod_{\Delta p > 0} (1 - |\Delta p_i|)\), is the proportion of population who became healthier, and the second term, \(1 - \prod_{\Delta p < 0} (1 - |\Delta p_i|)\), is the proportion who became less healthy. The net contribution is the difference between these two.

**Handling population growth**

The HP must count lives that are newly healthier as a result of intervention, and not lives that are newly healthier simply due to population growth.

Handling change in population requires making some simplifying assumptions. The baseline assumption made here is that, in the absence of any intervention, the new population defaults to the same prevalence rate as the existing population for each indicator. With this assumption, we can calculate the index using the population at the end of the period, and the observed changes in prevalence for each indicator, i.e.

\[
\text{Contribution} = \sum_j p_{\text{pop end } j} \left\{ \prod_{\Delta p_i < 0} (1 - |\Delta p_i|) - \prod_{\Delta p_i > 0} (1 - |\Delta p_i|) \right\}
\]

Where \(p_{\text{pop end } j}\) is the final population for tranche \(j\).

This provides a robust first-level approximation that can be used alongside the double counting correction. Alternative and more general forms of handling population growth are also possible and are considered in Appendix D.4.

To do. Add an extension to deal with indicators that are age-stratified.

**Choosing a scenario for measuring change**

For the purposes of the Healthier Population Billion, the additional healthier lives will be measured as the change in healthier lives since the baseline year (expected to be 2018).

For many of the indicators, there is already an underlying trend in the data which could be expected to continue. Such trends, if continued, will be added into the billion - even though they may not be attributable to interventions within 2019-2023. Improving trends are expected for several indicators. Worsening trends...
are likely for obesity and unsafe use of alcohol unless interventions are accelerated. As mentioned above, indicators which change for the worse will make negative contributions to the billion.

An alternative scenario for measuring the billion would be look at the changes over and above existing trends and only count into the billion any change that is additional to the background change. Consider for example, if tobacco use is currently in decline and the current trend in a region/country is equivalent to a 5% reduction over 5 years. A country with a 7% decrease over the GPW13 period would then contribute 7 - 5% = 2% to the billion, and a country with a change of 3% reduction in tobacco use during GPW13 (less than current regional trend) would end up with a negative, 3 - 5% = -2%, contribution.

This approach is not selected for the following reasons

- It is more complex and makes the billion harder to interpret
- It means that countries which continue to progress at a steady rate could get no recognition in terms of a contribution to the billion. Only change over and above the background trend would be counted as healthier lives.
- Indicators which are getting worse but at a steady rate (e.g. obesity) would have a lesser impact on the billion if measured in this way – however, the world needs to pay particular attention to topics where healthiness is in decline.
- Further historical data is needed to estimate the baseline trend and there is already a shortage of historical data. Baseline trends would in many cases need to be estimated (regional, global, …) and in many cases there would be insufficient data for reliable estimates to be made.

5.5 Limitations of the Healthier Lives Approach

The Healthier Lives approach is proposed as a first step in measuring changes in healthiness linked to the GPW13 programme. The method however has several limitations. A detailed list of known issues is provided in Appendix F. Here a brief summary is made.

The GPW13 indicators are non-optimal set of indicators for measuring change in overall population non-health-sector healthiness - they are not comprehensive of all environmental, behavioural and social risks affecting healthiness and they do not cover all aspects of the life course equally. The indicators are unweighted despite differences in relative health impacts. In the future a more general index and framework for healthiness could be envisaged, with a broader coverage of sectors and factors, and with more balancing across the life course. It is possible that future approaches could build in more comprehensive adjustments for population growth and double counting.

The billion measures the impact linked to GPW13 indicators due to the joint efforts of WHO, member states and other interested parties. It is not possible to separate out the impact specifically attributable to WHOs GPW13 impact framework. The time frame of GPW13 programme, in combination with lags in the timeliness of indicator estimates, and the time delay between an intervention and a result, will make calculation of change by 2023 a challenge. Decreases in healthiness are expected for some indicators, e.g. obesity, but effective interventions that can halt or reverse change are not yet known.

The billion appears unlikely to be achieved (see section 7).

5.6 Other aspects

5.6.1 Equity for Healthier Populations

Equity for Healthier Populations will be assessed by examining between-country inequalities, for example by measuring the absolute and relative difference in Healthier Populations index between low resource settings and the global average or high resource settings.
5.6.2 Dealing with lags in data

Delays in receiving data are likely to cause problems for estimation of the billion in 2023. This is the case for all the billions. Todo Move to data availability section.

5.6.3 Dealing with uncertainty

Suggestions welcome!

5.6.4 Missing data

The index can be calculated without estimation or infilling of missing data. Healthier lives are currently calculated only where estimates are available. Of course, missing data may mean that some newly healthier lives are not counted. Attention will be needed to ensure that most indicators cover most countries and all regions.

5.6.5 Negative contributions

Negative contributions to the HL index can occur if an indicator prevalence has worsened over time. Negative contributions point to where there is an ongoing problem and where particular attention is needed. This is likely to be the especially important for overweight and obesity and for alcohol. Results will be reported that provide a breakdown of healthier lives into where there are improvements and worsening situations (see Section 5.7).

5.7 Testing the Healthier Population Billion using Historical data 2010-15

The Healthier Lives index is an index that measures change over a period. To test the performance of the HL index, the index has been calculated at country level for indicators for which change could be measured over (approximately) the period 2010 to 2015. If data was available for a similar period (e.g. 2009 to 2013), this also was used – with a simple linear rescaling used to make it equivalent to a 5-year period. Even so, not all indicators have enough data for this historical period to measure change. In some cases, there are important regional data gaps, e.g. very few countries are included in the Africa region for water and sanitation. The summary contributions by region and by indicator are shown in Table 5.5. No infilling has been performed and the values only sum change where it was measured.

Important things to note from this exercise:

1. For the period 2010 to 2015, the Healthier Lives index is estimated to be 400 Million (to do add data for PM2/5 which is expected to increase this to 570 Million), far short of the 1 Billion that is hoped for in GPW13. Although this value is likely to be an underestimate, since data is not available for all countries and indicators, even with additional data, current trends would not be enough to make up the Billion.

2. Without the hefty contribution from China for sanitation, the total would be much reduced.

3. There are typically a mix of negative and positive contributions within a region (see also Fig. 5.6). Alcohol has the most mixed picture with some regions making progress (EUR) and others losing ground (WPR, SEAR). Increases in Obesity are globally the largest contributor to less healthy lives.

Table 5.5. Estimated number of Millions of people with Healthier Lives by indicator and region for 2010 to 2015

58
Notes: Negative values indicate that overall lives have become less healthy. No infilling has been undertaken, values are summed over countries where there is sufficient data to estimate change for 2010 to 2015 (approximately). The high values for WPR and safe sanitation are due to significant sanitation improvements in China. The row showing totals includes the correction for double counting (thus is less than the sum of the values in the column above). Data from GHO and UN SDG databases. (New data on air pollution likely to increase total by around 170 Million)

Fig. 5.6. Contributions to the HL index calculation for 2010-15 by indicator and region.

Notes: Positive and negative contributions are shown separately. Increases in Obesity are the largest contributor to less healthy lives. Alcohol has the most mixed picture with some regions making progress (EUR) and others losing ground (WPR, SEAR). Data from GHO and UN SDG databases.

5.8 Achieving the Healthier Population Billion

The purpose of this Section is to demonstrate what would happen if GPW13 met the proposed indicator milestones, and how these would contribute to the billion. Historical data suggests this is unlikely to be the case.
For each indicator, we estimate how many lives would be impacted if the GPW13 programmatic indicator global milestones are achieved (Figure 6). These are global estimates only and, for this exercise, we do not account for overlaps in indicators.

Differences in contributions from the indicators reflect both variations in the ambitiousness of the milestone and the size of the affected population. Some milestones are more realistic and others largely aspirational. For example, the milestones for water and sanitation stem from the SDG 2030 objective of universal access to safe water and sanitation. If these ambitious milestones were to be met, they alone would mean that the HP billion goal would be exceeded. However, the GPW13 outcomes over the next 5 years may be very different from the milestones set because many indicators are not currently on track for the stated milestones.

The 2023 milestones for ambient air pollution and for clean household fuels are not finalised and have been set to a nominal illustrative 5% in Figure 6. For obesity, the milestone is to halt rise which would give zero lives changes and zero DALYS averted. For this exercise, to better understand the relative impact of obesity change on the billion, an artificial value of 5% has been used below.

The impact of meeting proposed milestones is assessed in Fig. 5.7 as (a) number of healthier lives and (b) DALYS averted (assuming that lives improved are evenly distributed across the population). Water and sanitation impact global DALYS through sheer numbers of people affected. Tobacco and childhood wasting are the next two greatest impacts on DALYS.

Fig. 5.7. Expected number of Healthier Lives if GPW13 milestones are met together with expected corresponding DALYS averted (update needed)

<table>
<thead>
<tr>
<th>Healthier Lives indicators</th>
<th>No of Lives improved if GPW target met (millions)</th>
<th>DALYs averted if GPW target met (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe water</td>
<td>1,000</td>
<td>36</td>
</tr>
<tr>
<td>Safe sanitation</td>
<td>800</td>
<td>13</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>224</td>
<td>44</td>
</tr>
<tr>
<td>Ambient air pollution*</td>
<td>180</td>
<td>5</td>
</tr>
<tr>
<td>Clean Household fuels*</td>
<td>73</td>
<td>4</td>
</tr>
<tr>
<td>Road injuries/deaths</td>
<td>39</td>
<td>14</td>
</tr>
<tr>
<td>Obesity*</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>36</td>
<td>7</td>
</tr>
<tr>
<td>Childhood wasting &lt;5</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>Childhood stunting &lt;5</td>
<td>19</td>
<td>2</td>
</tr>
</tbody>
</table>

5.9 Examples

5.9.1 By country

5.9.2 By indicator

5.10
6 Healthy Life Expectancy (HALE)

Healthy life expectancy (HALE) is an indicator that provides a summary measure of average levels of population health. HALE quantifies the expected years of life in good health at a particular age.

HALE has been selected because it can be used across the triple billions and because it is aligned with SDG 3. It will be used for GPW13 baseline reporting and monitoring in future years for each Member State. HALE will facilitate cross-country comparisons, and comparisons within countries over time.

HALE is currently reported annually as part of the Global Burden of Disease (GBD) and also as part of the WHO’s Global Health Estimates (GHE).

WHO is tasked with developing standard guidance and providing tools and technical assistance to Member States to apply standardized methods to measure and report on HALE themselves, based on the input data sources that are available.

6.1 Calculation of HALE

HALE is estimated using Sullivan’s method (ref: Sullivan DF. HSMHA Health Rep, 1971). Two main variants of this method exist - the conventional approach and the GBD approach. Both approaches share the same conceptualization but differ in the levels of detail of the measurement for disability, depending on the availability of corresponding information in the data inputs. The GBD approach is the most widely used method for the estimation of HALE, being used by institutions such as IHME and WHO, although with some differences in which data are used as inputs (ref: GBD 2016 DALYs and HALE Collaborators. Lancet. 2017; WHO GHE2015. 2015).

In the simpler Conventional approach, prevalence of disability from population-based, nationally-representative surveys are used. The input data are: 1) sex-specific period life tables by country, and 2) age-sex-specific prevalence of overall morbidity, preferably adjusted for severity, by country. For each age interval, the total person-years lived in the period life table is partitioned into those lived in healthy and unhealthy states, using the prevalence of overall morbidity as the fraction.

In the GBD approach the input data are: 1) sex-specific period life tables by country, and 2) age-sex-specific estimates of years of healthy life lost due to disability (YLD) by cause across a comprehensive set of disease and injuries, adjusted for severity. By summing YLD over all causes and adjusting for independent morbidity by country, age, and sex, the fractions of years of healthy life lost in total years lived by each age-sex-country group are derived. For each age interval, the corresponding fraction is then used to partition the years lived in the period life table into years lived in healthy and unhealthy states.

In both methods, to estimate HALE at age x, the total person-years lived in a healthy state in all age intervals above age x are summed and divided by the survivor at age x in the period life table.
6.2 Contribution of the billions to HALE

Ideally the contribution of each “billion” to changes in HALE will be quantified. It requires that underlying data are available to quantify the impact of improvement in indicators of the billions on overall mortality and cause-specific morbidity. A particular issue will be to deal with some of the health-related overlaps between the indicators used in the billions (e.g. vaccines (second and third billion) and smoking (COPD in first billion and smoking prevalence in third billion)). The methodology is currently under development. However, given the extensive additional data that will be needed for the calculations and the complex analysis, this is unlikely to be feasible within the GPW13 period.

6.3 Equity for HALE

HALE estimates will initially be calculated at the country level and disaggregated by sex.

The equity target for HALE is to reduce absolute inequality between countries, and to reduce the absolute and relative differences between HALE in low resource settings compared to global and/or high resource settings.

In the future it is hoped that in some settings sub-national estimates of HALE will also be possible. This will require disaggregation of disease burden sub-nationally. HALE may additionally be subdivided by life course stage.
7 Equity

Equity is the absence of unfair and avoidable differences in health. Monitoring health inequalities, i.e. observable differences in health, is essential for achieving health equity. Health inequalities may exist between countries and between population subgroups within a country. The GPW 13 aims to reduce both between- and within-country inequalities.

Inequalities will be monitored at all three levels of the GPW 13 impact framework: the 46 programmatic indicators and milestones, the triple billion targets and HALE. Importantly, within-country inequality monitoring depends on the availability of real data. If real data are not available, within-country inequalities are hard to measure and monitor based on estimates.

For HALE and the triple billion targets, which are measured using composite indices, data availability is generally insufficient to allow for data disaggregation and within-country inequality monitoring. The focus will therefore be on monitoring between-country inequalities. Comparisons can be made based on country income, for example by comparing the situation in low income countries with the global average. In addition, for countries where disaggregated data are available, case studies can be undertaken to monitor within-country inequalities.

For the 46 programmatic indicators, the main aim will be to monitor within-country inequalities. Within-country inequality measurement is of particular importance as it is the most actionable on a country level. Disaggregation will be tailored to the indicator of interest for global monitoring and will ideally focus on the inequality dimension (axis of disaggregation) most relevant to each member state when it comes to national monitoring. Sex disaggregation should be undertaken, wherever relevant.

For reductions in inequality to be achieved, specific targets for priority subgroups will be used. These targets, when rolled up across countries, will result in priority subgroups benefiting proportionally more from the triple billion goals. They will mean that the pace of improvement for an indicator is faster for a priority subgroup than at the national level and/or for a defined advantaged group.
8 Country Examples

Not yet written.

This chapter to contain case studies of countries, including selection of targets, calculation of the billions, target contributions to each billion and examples of capacity building.
Appendices

Appendix A  Programmatic Indicators

Appendix A.1  Example of metadata for one of the programmatic indicators (SDG 1.5.1)

<table>
<thead>
<tr>
<th>Milestone #1</th>
<th>Reduce the number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
<td>Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000</td>
</tr>
<tr>
<td>SDG/ Core 100</td>
<td>SDG 1.5.1</td>
</tr>
<tr>
<td>Definition</td>
<td>This indicator measures the number of people who died or went missing from disasters per 100,000 population.</td>
</tr>
<tr>
<td>Method of estimation/calculation</td>
<td>Number of deaths attributed to disasters / 100,000</td>
</tr>
<tr>
<td>Numerator</td>
<td>Number of deaths attributed to disasters: The number of people who died during the disaster, or directly after, as a direct result of the hazardous event.</td>
</tr>
<tr>
<td>Denominator</td>
<td>Global population</td>
</tr>
<tr>
<td>Preferred data sources</td>
<td>Data are available from the Sendai Framework monitoring platform, overseen by UNISDR (<a href="https://sendaimonitor.unisdr.org/">https://sendaimonitor.unisdr.org/</a>). Data provider at national level is appointed Sendai Framework Focal Points. In most countries disaster data are collected by line ministries and national disaster loss databases are established and managed by special purpose agencies including national disaster management agencies, civil protection agencies, and meteorological agencies. The Sendai Framework Focal Points in each country are responsible of data reporting through the Sendai Framework Monitoring System.</td>
</tr>
<tr>
<td>WHO GPW13 Framework</td>
<td>Country (country population as denominator); Hazard type</td>
</tr>
<tr>
<td>Disaggregation</td>
<td></td>
</tr>
<tr>
<td>Expected frequency of data collection</td>
<td>Annual</td>
</tr>
<tr>
<td>Limitations</td>
<td>Currently data from UNISDR and UNSD are available for only 73 countries in 2017. Data availability are expected to increase during the period. Data disaggregated by hazard type (e.g., biological, climatological, hydrological) will be available in future years allowing for</td>
</tr>
<tr>
<td>Data type</td>
<td>Rate</td>
</tr>
</tbody>
</table>
Table to be reformatted and updated to also include whether there is underlying data availability.
Appendix A.3

Country selection of GPW13 priorities (this list of indicators has since been changed). The figure below shows the number of countries by region selecting each of the available Impact Framework indicators.

### Impact Framework targets

<table>
<thead>
<tr>
<th>Indicator</th>
<th>AS</th>
<th>EM</th>
<th>EU</th>
<th>NL</th>
<th>WP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased IMR capacity and health emergency preparedness</td>
<td>21</td>
<td>18</td>
<td>21</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Reduce the percentage of children who die due to vaccine preventable diseases</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Reduce the percentage of children who die due to diarrhea</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Reduce the percentage of children who die due to malaria</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Reduce the percentage of children who die due to malnutrition</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Reduce the percentage of children who die due to maternal mortality</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Reduce the percentage of children who die due to cardiovasular</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20% relative reduction in the premature mortality of adults (&gt;70 yrs) from ACVD (cardiovascular, cancer, diabetes, or chronic...)</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Increase access to essential health services (including promotion, prevention, curative, rehabilitative and palliative care) with a focus on the elderly</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>

In 2018, member states were asked to select their priorities amongst the then current GPW13 programmatic indicators.
Appendix B  Universal Health Coverage Index

Appendix B.1  SDG 3.8.1 component indicators

Extract from SDG 3.8.1 metadata. List of component indicators. The first seven indicators will be used for the UHC billion.

I. Reproductive, maternal, newborn and child health
1. Family planning: Percentage of women of reproductive age (15–49 years) who are married or in-union who have their need for family planning satisfied with modern methods (SDG indicator 3.7.1, metadata available here)
2. Pregnancy and delivery care: Percentage of women aged 15–49 years with a live birth in a given time period who received antenatal care four or more times
3. Child immunization: Percentage of infants receiving three doses of diphtheria-tetanus-pertussis containing vaccine
4. Child treatment: Percentage of children under 5 years of age with suspected pneumonia (cough and difficult breathing NOT due to a problem in the chest and a blocked nose) in the two weeks preceding the survey taken to an appropriate health facility or provider

II. Infectious diseases
5. Tuberculosis: Percentage of incident TB cases that are detected and successfully treated
6. HIV/AIDS: Percentage of people living with HIV currently receiving antiretroviral therapy
7. Malaria: Percentage of population in malaria-endemic areas who slept under an insecticide-treated net the previous night [only for countries with high malaria burden]
8. Water and sanitation: Percentage of households using improved sanitation facilities

III. Noncommunicable diseases
9. Hypertension: Age-standardized prevalence of non-raised blood pressure (systolic blood pressure <140 mm Hg or diastolic blood pressure <90 mm Hg) among adults aged 18 years and older
10. Diabetes: Age-standardized mean fasting plasma glucose (mmol/L) for adults aged 25 years and older
11. Tobacco: Age-standardized prevalence of adults >=15 years not smoking tobacco in last 30 days (SDG indicator 3.a.1, metadata available here)

IV. Service capacity and access
12. Hospital access: Hospital beds per capita, relative to a maximum threshold of 18 per 10,000 population
13. Health workforce: Health professionals (physicians, psychiatrists, and surgeons) per capita, relative to maximum thresholds for each cadre (part of SDG indicator 3.c.1).
14. Health security: International Health Regulations (IHR) core capacity index, which is the average percentage of attributes of 13 core capacities that have been attained (SDG indicator 3.d.1, see metadata here)

Appendix B.2  A new UHC index

UHC is meant to ensure that people receive the essential health services they need, at sufficient quality to be effective, and do so without incurring financial hardship. The inclusionary nature of true UHC requires quality care to be provided across a wide set of services (including promotive, preventive, curative, rehabilitative, and palliative health services) and across the life course. This wide remit is a challenge because no measure of UHC service coverage will cover everything, especially when data is sparse. UHC monitoring efforts need to look forwards and aim providing the data and evidence base needed for achieving UHC worldwide.
Work is underway to explore use of new index of UHC which would have the aims of

- Measuring effective coverage of treatment – taking care of service quality (via proxies if need be).
- Covering the major health interventions that people need at different stages of the life course in different settings
- Weighting contributions to the index by potential health gain (DALYs)
- Suitable for estimation of contributions to the billion
- Limits reporting burden but encourages forward look at data needs

<table>
<thead>
<tr>
<th>Type of care:</th>
<th>The life course:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion</td>
<td>reproductive and newborn,</td>
</tr>
<tr>
<td>Prevention</td>
<td>under 5,</td>
</tr>
<tr>
<td>Treatment Communicable, Maternal,</td>
<td>5-19.</td>
</tr>
<tr>
<td>Perinatal, Nutritional</td>
<td>20-64</td>
</tr>
<tr>
<td>Treatment Non-Communicable Disease</td>
<td>65+.</td>
</tr>
<tr>
<td>and Injuries</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation</td>
<td></td>
</tr>
<tr>
<td>Palliative</td>
<td></td>
</tr>
</tbody>
</table>

The new index of UHC will be tested on pilot countries.

Appendix B.3  UHC effective service coverage

Extract from UHC 2019 report

UHC is meant to ensure that people receive the essential health services they need, at sufficient quality to be effective, and do so without incurring financial hardship. The inclusionary nature of UHC and its emphasis on providing quality care across a wide set of services – promotive, preventive, curative, rehabilitative, and palliative health services across the life course – poses unique challenges for monitoring UHC progress in policy-relevant, actionable ways. Ultimately no measure of UHC service coverage will be perfect, particularly in the absence of routine and representative data systems that simultaneously capture intervention need, receipt, and effectiveness across health service domains and for all populations. As a result, UHC monitoring efforts must recognize their current limitations and identify approaches for continuous improvement in the future – all with the overarching goal of providing the best possible data and evidence base for achieving UHC worldwide.

The UHC Service Coverage Index (SCI) offers several improvements since its introduction in the 2017 Global monitoring report, such as increasing country-year coverage of primary data and producing a time series for tracking trends over time. Many of its current limitations, particularly country-indicator coverage in the most recent years, stem from longstanding gaps in broader data systems and/or lags in primary data publication. Household surveys are vital components to a country’s overarching health data ecosystem, alongside well-functioning civil registration and vital statistics (CRVS) systems and routine, representative administrative data platforms; further, household surveys are often the only available data sources to monitor trends in equity and provide more disaggregated data. However, especially due to the inherent periodicity of household surveys, they provide valuable complementary information to CRVS and other data sources within national health information systems (e.g., disease registries, vaccination records, health facility surveys). The SDGs explicitly call for investing in and strengthening national data systems, which directly support UHC monitoring and thus can foster greater accountability and action on improving service coverage. Other limitations, such as the use of health system inputs (e.g., density of hospital beds) and prevalence-based measures like non-tobacco use to approximate service availability, also stem from a global paucity of data on more direct measures of different types of service coverage. Although the use of proxy measures is often necessary, it is important to continuously revisit how well various proxy indicators
can actually capture progress on health service coverage across settings — and whether they may be inadvertently reflecting factors outside of health services.

Achieving UHC not only involves ensuring access and receipt of essential health services needed by people — it also requires that those services are of sufficient quality to be effective and thus provide the health gains associated with them. Understanding if and how much people are actually benefiting from the interventions they receive is critical for addressing any gaps in service provision, and more broadly, overall accountability of health systems to the populations they serve. From vaccination and HIV treatment to hypertension, numerous studies show that focusing on coverage alone risks painting an overly positive picture of intervention impact and program success; for instance, while about 30% of people in 44 low- and middle-income countries received treatment for hypertension, only 10% achieved control. To truly deliver on the promise of UHC — to improve health outcomes throughout the life course — tracking health service effectiveness alongside the receipt of needed services must be prioritized.

The UHC SCI does not currently capture the effectiveness of coverage across its 14 tracer indicators, though work is underway to estimate effective coverage of hypertension and diabetes treatment across the 183 Member States. Data availability are among the main constraints to measuring population-level effective coverage, or the fraction of the potential health gain that is actually delivered by the health system to populations with the needed health services. For some health services, the move from tracking intervention receipt to effective coverage is fairly straightforward, and the data, at least in some areas, on intervention effectiveness or health improvement exist today; examples include hypertension and diabetes treatment and control. For other services, such as cancer care as well as post-labor/maternal care, assessing effectiveness is less clear-cut and proxy measures are thus frequently required. Mortality-based statistics associated with a subset of cancers that are particularly amenable to healthcare could serve as indicators of population-level quality effective cancer treatment. The overarching premise for using outcome-based measures to approximate effective coverage is that for some conditions, if currently available health interventions or technologies are received in a timely manner and of sufficient quality, particular health outcomes like death should not occur. As a result, in the absence of more granular data, using population-level rates of outcomes amenable to healthcare could offer strong proxy indicators of effective coverage for broader intervention packages or services across levels of care (i.e., primary, tertiary, specialized care) that target high-priority causes or health domains. Nonetheless, such outcome-based measures also can have drawbacks, as they may not fully capture the effectiveness of broader prevention services, and detectable differences in outcomes over time or place may be affected by factors outside the health sector.

Evaluating how well different indicators of effective service coverage, both direct and proxy measures, represent health needs across the life course is an important next step for monitoring UHC service coverage at both national and global levels. This is a priority endorsed by Member States and WHO aims to support country-led efforts to strengthen data systems and improve methods for monitoring effective coverage. Globally, technical groups and collaborations such as the Countdown to 2030 for Women’s Children’s and Adolescent’s Health are among those considering ways to address longstanding challenges in measuring effective coverage and applications for measuring UHC. Building on this information, by tracking the full cascade of care, health systems could then be able to track where changes are needed, identify bottlenecks, implement solutions, and measure progress on an ongoing basis.

Appendix B.4 UHC and full service coverage

The WHO has estimated the number of people globally who are considered to have full UHC coverage (UHC report 2019). This method uses estimates of average service coverage in combination with estimates of co-coverage of services to evaluate approximately how many people have access to >85% of essential services. Details of the UHC report method are provided in a technical note (https://www.who.int/healthinfo/universal_health_coverage/report/uhc_report_2017_technical_note.pdf?ua=1). The approach uses 8 of the SDG 3.8.1 indicators but adds 3 additional tracer indicators to calculate the average service coverage. Household survey data is then used to determine co-coverage (i.e. who has
85% of services needed) by performed a series of regressions relating co-coverage to average UHC service coverage. At present, there is very limited data on co-coverage and it covers only some services. This adds considerable uncertainty to the calculation. The method can only sensibly be used to estimate contributions to the UHC billion at a regional or income-group level and does not allow country contributions to be measured.

The above approach is not recommended for counting the UHC billion. It is a more complex approach, with greater uncertainty and requiring more data and analysis. The results are sensitive to the choice of threshold, and also to any extensions to the service coverage indicators (add lancet ref). It is not suitable for calculation by countries because insufficient data is available for estimation at a country level (uncertainties are thus very high) and it is a relatively complex calculation.

**How different are average coverage and the 85% coverage approach?**

(All numbers provisional and to be updated).

Both average and 85% coverage approaches are both valid approaches for counting how many people have UHC - although the concept and interpretation is a little different. Average coverage provides a simpler, more robust, more transparent approach which is better suited for use by member states.

The UHC 2019 report estimates that at current rates the increase in population with UHC coverage over 2018 to 2023 would be somewhere between 400 and 600 million people. Using the average service coverage approach proposed for the UHC billion, the likely increase in coverage would be around 600 million i.e. similar but probably a little greater than the UHC report method.

With either approach, considerable acceleration will be required if the UHC billion is to be achieved.

**Appendix B.5 Illustrating that the UHC index is only modestly sensitive to adjustments in the component indicators.**

(To be updated and expanded)

**Figure 1. There is a strong correlation between values of the existing SDG 3.8.1 and an index using alternative indicators.** Each point represents the value of UHC service coverage for a country for a year. Values were calculated for 183 member states for the years 2000-2017.
Figure 2. Similar trends are observed using values of the existing SDG 3.8.1 and an index using alternative indicators. Solid points show values of the existing 3.8.1, and hollow points show the value of the index calculated using alternative indicators.

Appendix C Emergencies Preparedness Billion Appendices

Appendix C.1 Data Sources for the Emergency Prevent Index

[Is this appendix needed?] The sub-index includes data for routine and emergency immunizations. For baseline values, a mean vaccine coverage estimate will be computed (n= yellow fever, meningitis and cholera specific at-risk/affected countries) using 2017 coverage data. 2017 data are used because WUENIC estimates are generated annually, for the preceding year, and available at approximately the annual midpoint.

Routine immunizations data are available from all Member States, using the WHO-UNICEF coverage estimates (WUENIC), which are generated annually after submission of Joint Reporting Forms (JRF) from all Member States, after review by a panel of experts that triangulate coverage estimates, survey results, historical trends, and country context. Currently, WUENIC coverage estimates for meningitis vaccination are unavailable.

Emergency stockpiles of yellow fever, cholera, and meningitis vaccines are managed by the International Coordinating Group (ICG) on Vaccine Provision; a global multi-organization mechanism to manage and coordinate the provision of emergency vaccine supplies and antibiotics to countries during major outbreaks. The ICG works to improve cooperation and coordination of epidemic preparedness and response. It also works on forecasting vaccine stocks, negotiating vaccine prices through its networks or partners, evaluating interventions and standard protocols for managing diseases. Countries make emergency vaccination requests to the ICG, typically during emergencies. The ICG makes requests and their approval publicly available, as well as the number of doses requested and shipped. Currently, only a subset of coverage estimates are currently available from 2017 for yellow fever (50%) and cholera (78%). Coverage estimates for all approved requests for meningitis vaccination were available for 2017.
- MenA routine immunization administrative coverage data from the WHO/UNICEF Joint Reporting Form (JRF) (https://www.who.int/immunization/monitoring_surveillance/routine/reporting/en/)
- Emergency immunization coverage for cholera, meningitis and yellow fever using the International Coordinating Group (ICG) on Vaccine Provision data (http://www.who.int/csr/disease/icg/en/);
- Additional meningitis and yellow fever immunization campaign coverage estimates from the WHO/UNICEF JRF (https://www.who.int/immunization/monitoring_surveillance/routine/reporting/en/)
- Mass preventive oral cholera vaccination campaign coverage data from the Global Task Force on Cholera Control (GTFCC) (https://www.who.int/cholera/task_force/en/)

Table 3: Data Availability, Routine and Emergency Vaccinations (2017)

<table>
<thead>
<tr>
<th>Antigen</th>
<th>Denominator (number of Member States)</th>
<th>Routine Coverage Data Source (Member States with data available)</th>
<th>Preventive Vaccination Campaign Data Availability</th>
<th>Emergency Vaccination Campaign Data Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCV1</td>
<td>194</td>
<td>WUENIC (194)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>YF</td>
<td>39</td>
<td>WUENIC (35)</td>
<td>JRF</td>
<td>ICG (1)</td>
</tr>
<tr>
<td>MenA</td>
<td>26</td>
<td>JRF (6)</td>
<td>JRF</td>
<td>ICG (4)</td>
</tr>
<tr>
<td>OCV</td>
<td>47</td>
<td>N/A</td>
<td>GTFCC</td>
<td>ICG (9); GTFCC</td>
</tr>
</tbody>
</table>

1 35 of yellow fever high risk Member States have WUENIC data on routine yellow fever vaccination

2 An additional 4 Member States have WUENIC data on routine yellow fever vaccination, but are not at high risk for yellow fever

3 6 countries at high epidemic risk for meningitis have routine immunization data available (administrative coverage); WUENIC estimates are not available for meningitis but will be used when available

4 An additional 9 countries have routine immunization data available (administrative coverage), but are not considered to be at high epidemic risk for meningitis

5 2 Member States with ICG approved or partially approved requests (Brazil, Nigeria); 1 with coverage data available

6 4 Member States with ICG approved or partially approved requests (Togo, Cameroon, Nigeria, Niger [Benin request not approved])

7 9 Member States with ICG approved or partially approved requests (South Sudan, Somalia, Mozambique, Malawi, Yemen, Sierra Leone, Nigeria, Bangladesh, Chad [Philippines request not approved]); of which 7 have coverage data available

Table 0.1 Average Vaccine Coverage by Country Category

<table>
<thead>
<tr>
<th>Number States</th>
<th>Mean Coverage (%)</th>
<th>Range of coverage</th>
</tr>
</thead>
</table>

73
<table>
<thead>
<tr>
<th>Disease Combination</th>
<th>Count</th>
<th>Estimate</th>
<th>5-Year IDUM Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Fever Only</td>
<td>14</td>
<td>75</td>
<td>16-99</td>
</tr>
<tr>
<td>Cholera Only</td>
<td>22</td>
<td>81</td>
<td>53-99</td>
</tr>
<tr>
<td>Meningitis Only</td>
<td>2</td>
<td>43</td>
<td>39-48</td>
</tr>
<tr>
<td>Yellow Fever and Cholera</td>
<td>4</td>
<td>66</td>
<td>35-86</td>
</tr>
<tr>
<td>Yellow Fever and Meningitis</td>
<td>3</td>
<td>54</td>
<td>45-60</td>
</tr>
<tr>
<td>Cholera and Meningitis</td>
<td>3</td>
<td>48</td>
<td>45-50</td>
</tr>
<tr>
<td>Yellow Fever, Cholera, and Meningitis</td>
<td>18</td>
<td>60</td>
<td>21-88</td>
</tr>
<tr>
<td>All at-risk states</td>
<td>66</td>
<td>67</td>
<td>58-99</td>
</tr>
<tr>
<td>Routine Only</td>
<td>128</td>
<td>92</td>
<td>16-99</td>
</tr>
<tr>
<td>All</td>
<td>194</td>
<td>83</td>
<td>16-99</td>
</tr>
</tbody>
</table>

9 Estimate for 18 of 22 Member States was generated using DPT3 and MCV1 coverage only

10 Estimate for 2 of 2 Member States was generated using DPT3 and MCV1 coverage only

11 Estimate for 1 of 4 Member States was generated using DPT3, MCV1, and YF coverage only

12 Estimate for 3 of 3 Member States was generated using DPT3, MCV1, and YF coverage only

13 Estimate for 3 of 3 Member States was generated using DPT3 and MCV1 coverage only

14 Estimate for 1 Member State was generated using DPT3, MCV1, YF, cholera, and meningitis (all antigens); estimate for 3 Member States was generated using DPT3, MCV1, YF, and meningitis; estimate for 10 Member States was generated using DPT3, MCV1, and YF; estimate for 1 Member State was generated using DPT3, MCV1, and cholera; estimate for 3 Member States was generated using DPT3 and MCV1 coverage only (total 18 Member States)
APPENDIX C.2

Emergencies Detection decision instrument

ANNEX 2

DECISION INSTRUMENT FOR THE ASSESSMENT AND NOTIFICATION OF EVENTS THAT MAY CONSTITUTE A PUBLIC HEALTH EMERGENCY OF INTERNATIONAL CONCERN

EVENTS DETECTED BY NATIONAL SURVEILLANCE SYSTEM (SEE ANNEX 1)

A CASE OF THE FOLLOWING DISEASES: UNUSUAL OR UNEXPECTED AND MAY HAVE SERIOUS PUBLIC HEALTH IMPACT, AND THEREFORE SHOULD BE NOTIFIED:
- SMALLPOX
- POLIOVIRUS DUE TO WILD-TYPE POLIOVIRUS
- HUMAN INFLUENZA CAUSED BY A NEW SUBTYPE
- SEVERE ACUTE RESPIRATORY SYNDROME (SARS)

ANY EVENT OF POTENTIAL INTERNATIONAL PUBLIC HEALTH CONCERN, INCLUDING THOSE OF UNKNOWN CAUSE OR SOURCE AND THOSE INVOLVING OTHER EVENTS OR DISEASES NOT LISTED IN THE BOX ON THE LEFT AND THE BOX ON THE RIGHT SHALL LEAD TO UTILIZATION OF THE ALGORITHM.

AN EVENT INVOLVING THE FOLLOWING DISEASES SHALL ALWAYS LEAD TO UTILIZATION OF THE ALGORITHM, BECAUSE THEY HAVE DEMONSTRATED THE ABILITY TO CAUSE SERIOUS PUBLIC HEALTH IMPACT AND TO SPREAD RAPIDLY INTERNATIONALLY:
- CHOLERA
- PLAGUE
- YELLOW FEVER
- MEASLES
- SMALLPOX
- OTHER DISEASES THAT ARE OF SPECIFIC NATIONAL OR REGIONAL CONCERN, E.G. DENGUE FEVER, KISSEYFIEK FEVER, AND Meningococcal Disease

IS THE PUBLIC HEALTH IMPACT OF THE EVENT SEVERE?

YES

NO

IS THE EVENT UNUSUAL OR UNEXPECTED?

YES

NO

IS THERE A SIGNIFICANT RISK OF INTERNATIONAL SPREAD?

YES

NO

IS THERE A SIGNIFICANT RISK OF INTERNATIONAL TRAVEL OR TRADE RESTRICTIONS?

YES

NO

EVENT SHALL BE NOTIFIED TO WHO UNDER THE INTERNATIONAL HEALTH REGULATIONS

NOTIFIED AT THIS STAGE. READINESS WHEN MORE INFORMATION BECOMES AVAILABLE.

1. As per WHO case definitions.
2. The disease list shall be used only for the purposes of these Regulations.
Appendix D  Healthier Populations

Appendix D.1  Country selection of GPW13 priorities relating to Healthier Populations

In 2018, member states were asked to select their priorities amongst the then current GPW13 programmatic indicators (this list of indicators has since been modified – so not all indicators used in the current HP billion were present at the time of this exercise). The figure below shows the number of countries by region selecting each of the available Healthier Population related Impact Framework programmatic indicators.

Appendix D.2  Alternative methods for measuring Healthier Population Billion

The main criteria used in selection of the method for counting the HP billion are listed in Section 5.4.1.

This appendix provides further detail on alternative methods that have been considered. The alternatives are typically more complex, require more development, and are considered less likely to be easily assimilated by all member states. Nevertheless, further exploration of these methods is merited, and it is possible that these (or variants) may be used in the future to create an improved Healthier Lives index (or perhaps Healthiness Index).

An important alternative approach, recommended by the Expert Review Group (ERG) of the GPW13 programme, would be to weight the contributions of the different indicators. This addresses an obvious shortcoming of the unweighted Healthier Lives approach in which all indicators are treated as having equal impact on healthiness. The ERG recommended development of an approach in which each of the indicators are converted into the equivalent health gain. The use of DALYS averted was proposed as a possible measure of health gain.

Using a weighting scheme aims to quantify the relative health gain due to different indicators, e.g. for safer use of alcohol versus a violence free childhood. It requires determining both a weighting scheme and then a means of converting the health gains back into a number of lives. The use of DALYS averted as weights is conceptually appealing in that it provides a principled basis for aggregation across disparate efforts. A disadvantage is that it requires considerably more effort to communicate how the calculations are implemented and does not map as directly to the ‘billion-persons’ heuristic. Furthermore, DALYS averted may not provide the ideal weighting scheme for measuring change in healthiness. Firstly, care would be needed in how DALYS are applied to age groups (we would probably need to use the total DALYS averted across the full age spectrum). For example, changes in overweight u5s and teenage smokers could be considered key ages with the potential to most impact long term population healthiness. A young smoker is more likely to end up as a life/long smoker, an overweight u5 may be more likely to end up as an obese adult. Yet the DALYS for these age groups are low because health impacts are not felt until later in life. Secondly, it is not clear that DALYS fully capture all aspects that constitute healthiness, for example the
associated well-being and impacts on relationships. The impact of “on track” child development, or violence issues may affect healthiness in a way that extends beyond lives lost or disability.

A further option that may be worth considering for the future is whether it would be possible to create an index of non-health-sector related healthiness. This would be an index that would rank the healthiness of a population from 0 (worst possible) to 100% (best possible). This would be akin to the Universal Health Coverage index and would apply to a point in time (and thus not be limited to measurement of change). It would require a more complex approach and would require significant methodological developments.

Appendix D.3 Correlations between changes in indicators

The correction for double counting relies on independence between changes in different indicators. We evaluate the level of correlation using the 2010-2015 dataset of observed changes in indicators. The observed correlations in the changes are modest (Figure D.1) with most being non-significant (at the 0.05 level) and the maximum correlation being 0.39 between the child nutrition indicators.

![Figure D.1 Correlations in changes in observed indicators for 2010-2015 (approx.). Correlations are shown as coloured ellipses (top right) and as numbers (bottom left). A grey X indicates that the correlation is not significant (0.05 level). Data from GHO and UN SDG.](image)

Appendix D.4 Alternative approaches for handling population growth

In the context of the Healthier Population Billion, it is important to carefully consider how to handle population growth. In particular, how the additional people in a population will impact the billion. Change in population healthiness that is due solely to population change should not be counted into the final number. If population growth were to be included (e.g. adding in all new non-smokers) then much of the healthier billion could be achieved due to population growth alone. Conversely, it would mean that declines in population could be interpreted as losses of healthy lives.

It is not practical to deal with population growth in full detail for GPW13 – for example by tracking changes in population age structure. This is in part because for most SDG/GPW13 indicators we do not know the breakdown by age. In part, because the level of complexity would be disproportionate to the rest of the approach.

The simplest robust approach to population growth is to calculate the change in prevalence multiplied by the final population (as described in Section 0 above).

\[
\text{Contribution}_i = \text{pop}_{\text{end}} \times (\text{prev}_{i-\text{end}} - \text{prev}_{i-\text{start}})
\]  

(Eqn A.0)
This approach assumes a counterfactual scenario where the additional population inherits the same prevalence as the existing population (the default, non-intervention case). For example, without intervention, the additional population would have the same proportion of smokers or of obesity. This is a reasonable first approximation for many behavioural indicators but may be less desirable for some of the environmental risk indicators.

More generally, it could be argued that population growth should be treated differently for different indicators (and countries). For example, indicators such as water and sanitation require additional resource to maintain the same prevalence of access to safe water for a larger population. This is because, without intervention, the larger population would have proportionally less access to safe water than the current population (the additional population would “dilute” access to safe water).

A generalisation of Eqn A.0 allows the additional population to be modelled as having a different prevalence to the initial population:

\[
\text{Contribution}_i = \text{pop}_{\text{end}} \times (\text{prev}_{i,\text{end}} - \text{cf}_{\text{prev}}_{i,\text{start}})
\]

(Eqn A.1)

Where \(\text{cf}_{\text{prev}}\) is the counterfactual prevalence for the case that the original population is augmented by new population but without additional intervention, and is given by:

\[
\text{cf}_{\text{prev}}_{i,\text{start}} = \frac{\text{prev}_{i,\text{start}} + \theta \cdot \text{prev}_{i-g}}{1+g}
\]

with

\(g = \) the population growth over the period

\(\text{prev}_{i-g} = \) the prevalence of healthy people for indicator \(i\) in the new population without intervention.

In the case where \(\text{prev}_{i-g} = \text{prev}_{i,\text{start}}\), Eqn A.1 simplifies to Eqn A.0 above.

This generalised approach is more flexible but also requires estimation of \(\text{prev}_{i-g}\), the expected prevalence in the new population without intervention. Care is also needed because \(\text{prev}_{i-g}\) may be different for cases where there is growth or decline in the population. Where \(g\) is negative, it is proposed to set \(\text{prev}_{i-g} = \text{prev}_{i,\text{start}}\).

The more generalized method it is more complex to understand and requires estimation of further parameters. At present, the use of the simpler but robust approach of Eqn A.0 and Section 0 is proposed.

Appendix D.5 Known issues and limitations with the Healthier lives approach

The objective of the GPW13 billion is to measure and encourage improvements in the healthiness of the world’s populations. The proposed method offers a reasonable first attempt at this - able to monitor important changes in population healthiness linked to GPW13 whilst being a method that can be applied at country level. It does however have its limitations. Known issues (and some response to these) include:

4. The framework for the Healthier Population Billion is built on indicators that were selected for the GPW13 programme. This a non-optimal set of indicators for measuring change in overall population healthiness - the indicators are not comprehensive of all environmental, behavioural and social risks affecting healthiness. The Healthier Lives index proposed here will be specific to the GPW13 programme. In the future a more general index and framework for healthiness could be envisaged, with a broader coverage of sectors and factors. See Table G for candidate additional indicators (Appendix G)
5. The GPW13 healthier population framework does not allow fully for the life course. There are important differences in the number and type of indicators that apply to different population groups. Young children are perhaps both under and over represented – there are several indicators specific to under 5s, but at the same time, the counting scheme, which counts all indicators equally, is likely to under-play the importance of a healthy start in life. Other ages groups may also not be well represented, for example adolescents and the elderly.

6. The billion measures the joint efforts of WHO, member states and other interested parties, probably with a noticeable time lag. It is not possible to separate out the impact attributable to WHO’s GPW13 impact framework.

7. The index is an index of change not absolute level. The method will not provide a ranking of (non-health-sector) healthiness. It is not designed for this purpose.

8. The method weights all indicators equally. Although a change in each indicator marks an important step in likely healthiness, this is not ideal.

9. The method simplifies many underlying relevant factors, such as population growth, and could be outperformed by more comprehensive approaches. Nevertheless, a simple method is preferred for practical reasons. Uptake of the methods at country level and by the WHA executive board is required. Countries are more likely to accept a straightforward method.

10. There has been noticeable concern during consultations about the impact of double counting on the billion. This has been partially addressed using a correction based on assumptions of independence of change. The correction reduces the impact of double counting but does not account for within-population correlations. More comprehensive corrections may also be possible.

11. Handling population growth. A robust first approximation is used. It assumes that the additional population, without intervention, “inherits” the same prevalence as the current population. It neglects differences between indicators in the interplay between population growth and the impact on indicator values.

12. Not all indicators are expressed as a prevalence and not all indicators are measures of risk (for example, road deaths are an outcome, used as a proxy for risk). Conversion into a measure of prevalence is needed for inclusion of an indicator into the method. A discussion and rationale as to the choices made is provided in Section 5.3.6 & (eventually) Appendix X.

13. Noise in the data due to sample size and measurement errors, especially those spread over time, could cause noise in the index. Smoothing and use of consistent estimates will be used when available.

14. Some GPW13 datasets are not yet available for all regions, for example water and sanitation data is very lacking in Africa. It is hoped that this will improve during GPW13.

15. The trans fats indicator is not included at present (it measures policy not risk). Country effort to act to remove trans fats from foods will not be recognized in the billion.

16. The time frame of GPW13 programme, in combination with lags in the timeliness of indicator estimates will make calculation of change by 2023 a challenge. Unless the timeliness of data improves, projection and forecasting may be required. This will reduce the level of “measurement” of this billion.

17. Interventions put in place during GPW13 may not produce effects quickly enough to be measured by 2023.

18. Based on current data and trends the Healthier Population Billion is unlikely to be achieved. It may however, encourage action in several important areas.

Appendix D.6 Gaps in the Healthier Lives Index indicators

There are several important exclusions from the healthier billion for which it is hoped that further indicators could be included in future approaches (Table G)
Table G. Showing sectors and indicators that could be considered missing from the HL index. These may be relevant for future versions of an index to measure healthier populations. Physical inactivity and long working hours indicators are shown in blue as suitable data is known to be available for these indicators. (List to be added to, data may also be available for other indicators)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Health related climate support</td>
</tr>
<tr>
<td>Healthy life style</td>
<td>Physical activity</td>
</tr>
<tr>
<td>Labour</td>
<td>Long working hours</td>
</tr>
<tr>
<td>Food Safety</td>
<td>Access to safe foods</td>
</tr>
<tr>
<td>Dietary</td>
<td>Salt intake</td>
</tr>
<tr>
<td>Dietary</td>
<td>Sugar intake</td>
</tr>
<tr>
<td>Poverty</td>
<td>Urban housing (SDG 11.1.1)</td>
</tr>
<tr>
<td>Human Capital index</td>
<td></td>
</tr>
<tr>
<td>Well being</td>
<td></td>
</tr>
<tr>
<td>Chemicals?</td>
<td>Poisoning?</td>
</tr>
<tr>
<td>Older people</td>
<td>accessibility/Safety</td>
</tr>
<tr>
<td>Gender equality</td>
<td></td>
</tr>
</tbody>
</table>

Appendix D.7 Consultation Process

The Healthier Population Billion has been developed by the WHO secretariat with extensive input and consultation within and external to WHO (which continues). The following has already taken place.

- Recommendations made by GPW13 Expert Review Group (for both a lives-touched approach and DALYs averted weighting scheme)
- Outline calculations made for lives touched approach (now renamed to healthier lives approach)
- Presentation of outline for method made to WHO programs, to informal country consultation and to PAHO region (Spring 2019).
- Discussions of approach with Tom Frieden and Rafael Lozano.
- Creation of secretariat working group May 2019
- Creation of technical/ method working sub group and of framework sub group.
- Discussions held with each WHO programme with relevant indicators.

Comments have been received from programs and countries and many of these have led to alterations to the methods (dealing with double counting, handling population growth, selection of indicators, requirement for countries to be able to calculate)

Next steps planned

- Presentation of status to GPW13 WIF ERG
- Examination by technical expert group for GWP13 (Sept)
- Consultation with regional focal points
- Member state consultation
- Continuation of working group
- Report/ Journal write up
For each indicator there will be 1 to 2 pages detailing brief description of indicator, recommended interventions, policies, best buys etc and where to get further information.

Alcohol

Tobacco

Etc

HALE calculation template

An Excel spreadsheet (or online tool will be made available to countries who wish to calculate HALE. An example of this is shown in Table E.1
Table E.1 Illustration of calculation of HALE for a country using an excel spreadsheet template

<table>
<thead>
<tr>
<th>Age Interval</th>
<th>Survivors</th>
<th>Total years lived in age interval</th>
<th>Total years lived from age x</th>
<th>Life expectancy</th>
<th>Years lost due to disability per capita</th>
<th>Total Years lived without disability in age interval</th>
<th>Total Years lived without disability from age x</th>
<th>HALE = (1 - YLD) * L</th>
<th>YLD = (1 - YLD) * L</th>
<th>HALE = (1 - YLD) * L</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>L_x</td>
<td>L_x</td>
<td>LE_x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>100,000</td>
<td>99,469</td>
<td>7,962,789</td>
<td>79.6</td>
<td>0.032</td>
<td>96,286</td>
<td>7,062,248</td>
<td>70.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td>99,429</td>
<td>397,297</td>
<td>7,863,320</td>
<td>79.1</td>
<td>0.019</td>
<td>389,748</td>
<td>6,965,962</td>
<td>70.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-9</td>
<td>99,251</td>
<td>495,934</td>
<td>7,466,023</td>
<td>75.2</td>
<td>0.035</td>
<td>478,576</td>
<td>6,576,214</td>
<td>66.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-14</td>
<td>99,132</td>
<td>495,382</td>
<td>6,970,089</td>
<td>70.3</td>
<td>0.039</td>
<td>476,062</td>
<td>6,097,638</td>
<td>61.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td>99,019</td>
<td>494,680</td>
<td>6,474,707</td>
<td>65.4</td>
<td>0.058</td>
<td>465,989</td>
<td>5,621,575</td>
<td>56.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td>98,842</td>
<td>493,631</td>
<td>5,980,027</td>
<td>60.5</td>
<td>0.066</td>
<td>461,051</td>
<td>5,155,587</td>
<td>52.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-29</td>
<td>98,602</td>
<td>492,327</td>
<td>5,486,396</td>
<td>55.6</td>
<td>0.078</td>
<td>453,925</td>
<td>4,694,536</td>
<td>47.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-34</td>
<td>98,323</td>
<td>490,695</td>
<td>4,994,069</td>
<td>50.8</td>
<td>0.088</td>
<td>447,514</td>
<td>4,240,610</td>
<td>43.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-39</td>
<td>97,935</td>
<td>488,421</td>
<td>4,503,374</td>
<td>46.0</td>
<td>0.095</td>
<td>442,021</td>
<td>3,793,096</td>
<td>38.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-44</td>
<td>97,419</td>
<td>485,370</td>
<td>4,014,953</td>
<td>41.2</td>
<td>0.101</td>
<td>436,348</td>
<td>3,351,075</td>
<td>34.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-49</td>
<td>96,708</td>
<td>481,048</td>
<td>3,529,583</td>
<td>36.5</td>
<td>0.099</td>
<td>433,424</td>
<td>2,914,728</td>
<td>30.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-54</td>
<td>95,667</td>
<td>474,821</td>
<td>3,048,535</td>
<td>31.9</td>
<td>0.108</td>
<td>423,540</td>
<td>2,481,303</td>
<td>25.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55-59</td>
<td>94,182</td>
<td>466,048</td>
<td>2,573,714</td>
<td>27.3</td>
<td>0.115</td>
<td>412,452</td>
<td>2,057,763</td>
<td>21.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-64</td>
<td>92,101</td>
<td>453,021</td>
<td>2,107,666</td>
<td>22.9</td>
<td>0.15</td>
<td>385,068</td>
<td>1,645,310</td>
<td>17.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65-69</td>
<td>88,915</td>
<td>432,755</td>
<td>1,654,645</td>
<td>18.6</td>
<td>0.169</td>
<td>359,619</td>
<td>1,260,243</td>
<td>14.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70-74</td>
<td>83,769</td>
<td>398,542</td>
<td>1,221,890</td>
<td>14.6</td>
<td>0.201</td>
<td>318,435</td>
<td>900,623</td>
<td>10.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75-79</td>
<td>74,883</td>
<td>340,869</td>
<td>823,348</td>
<td>11.0</td>
<td>0.235</td>
<td>260,765</td>
<td>582,188</td>
<td>7.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80-84</td>
<td>60,423</td>
<td>254,919</td>
<td>482,479</td>
<td>8.0</td>
<td>0.288</td>
<td>181,502</td>
<td>321,423</td>
<td>5.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>85-89</td>
<td>40,815</td>
<td>150,691</td>
<td>227,560</td>
<td>5.6</td>
<td>0.355</td>
<td>97,196</td>
<td>139,921</td>
<td>3.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90-94</td>
<td>19,905</td>
<td>60,758</td>
<td>76,869</td>
<td>3.9</td>
<td>0.427</td>
<td>34,814</td>
<td>42,725</td>
<td>2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>95-99</td>
<td>5,995</td>
<td>14,368</td>
<td>16,111</td>
<td>2.7</td>
<td>0.516</td>
<td>6,954</td>
<td>7,911</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100+</td>
<td>893</td>
<td>1,743</td>
<td>1,743</td>
<td>2.0</td>
<td>0.451</td>
<td>957</td>
<td>957</td>
<td>1.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>