

Estimates of Vitamin A Supplementation Coverage in Preschool-age Children



Methods and processes for the UNICEF global database



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1

INTRODUCTION

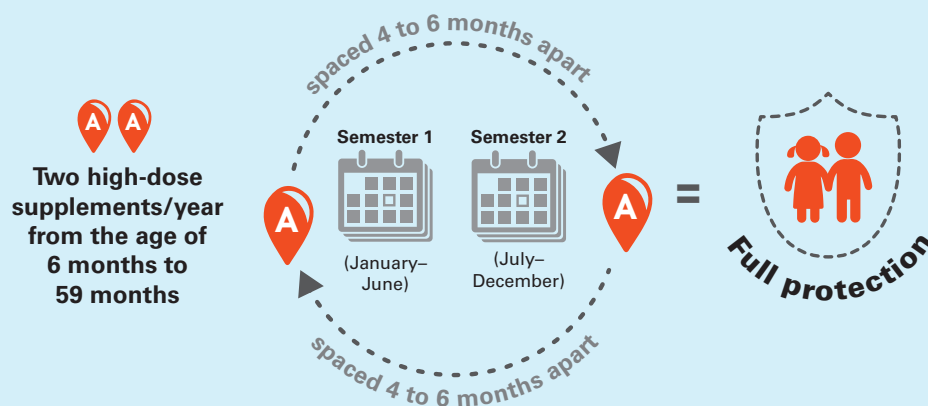
Vitamin A deficiency (VAD), for which the health implications are well described [1,2], remains a public health problem in many low- and middle-income countries [3,4]. Though the global prevalence of VAD in children under the age of 5 years has declined from approximately 39 per cent to 30 per cent over the past two decades, little progress has been achieved in South Asia and sub-Saharan Africa, where the deficiency still affects 44 per cent and 48 per cent of children under 5 years, respectively [2].

First targeted by global initiatives such as the World Summit for Children (1990), VAD control continues to be an important part of an intervention package to reduce preventable deaths, a key Sustainable Development Goal. To thwart the public health consequences of deficiency, the World Health Organization (WHO) currently recommends that periodic, high-dose vitamin A supplements of 100,000 international units (IU) be given to infants

aged 6–11 months and 200,000 IU to children aged 12–59 months in high risk areas. Ideally, children receive their first dose soon after they turn 6 months and get subsequent doses every four to six months until the last dose [6] is administered between 54 and 59 months of age.

As vitamin A supplementation (VAS) does not address the underlying causes of VAD and its effect is temporary, some countries are scaling up efforts to address dietary intake [5] and other underlying causes of poor vitamin A status, such as repeated infections due to poor hygiene. However, these efforts have been insufficient to entirely eliminate the need for supplementation [6,7]. Through collaborative efforts with partners, the United Nations Children’s Fund (UNICEF) plays a lead role in supporting countries to reach children aged 6–59 months with two appropriately spaced high-dose vitamin A supplements each year.

Supplementation with high-dose vitamin A boosts immunity and provides life-saving protection, but only when provided every four to six months.



Estimating coverage for two semesters (semester 1 [January to June] and semester 2 [July to September]) in a calendar year is required to generate an estimate of full protection.

Figure 1: Vitamin A supplementation: two appropriately-spaced doses required each year



A rural community health volunteer writes a patient report on a 4-year-old during an outreach visit to the family's home, Myanmar. © UNICEF/UNI136052/Dean

Since 2000, UNICEF has estimated VAS coverage in priority countriesⁱ at national, regional and global levels as part of organization-wide efforts to monitor the situation of children worldwide. This includes reporting on the estimated percentage of children aged 6–59 months receiving the recommended two doses, adequately spaced within each year (referred to throughout the rest of this report as “annual two-dose VAS coverage”). These data are published in *The State of the World's Children* report and released annually on the UNICEF data website.ⁱⁱ The regular collection and analysis of these data are a key component of efforts to achieve universal VAS coverage. Tracking country-level progress towards universal coverage facilitates programme monitoring and planning through the identification

of countries with low coverage, identifying where focused attention and investment from UNICEF and partners may be required.

This report describes the indicators, data, methods, assumptions and processes used to produce the national semester-wise and annual two-dose VAS coverage estimates that UNICEF maintains in the global database. Section 2 describes VAS indicators and their data sources, section 3 outlines the type of data requested from countries and the review process for generating estimates for the database, and section 4 outlines limitations and conclusions. Additional details related to the review process for generating yearly estimates described in section 3 are presented in Annex 2.

i The UNICEF Global VAS Coverage Database 2000–2017 includes 82 countries identified as “priority” for national VAS programming as of the year 2000. The list was based on a data-driven exercise undertaken in 2014, utilizing estimates of health and nutrition indicators around 2000, when VAS programmes were typically initiated. The two main indicators considered in the exercise were (i) under-five mortality rate and (ii) VAD prevalence. Informed by this analysis, the set of countries for which semester-wise and annual two-dose VAS coverage estimates are reported on in the UNICEF global database has been restricted to these countries. This list was reduced to 64 priority countries as of the 2018 reporting year. Countries requiring only sub-national programmes are not included in the database. The lists of countries can be found at <<https://data.unicef.org/nutrition/vitamin-a>>. The UNICEF Global VAS Coverage Database 2000–2017 includes 82 countries identified as “priority” for national VAS programming as of the year 2000. The list was based on a data-driven exercise undertaken in 2014, utilizing estimates of health and nutrition indicators around 2000, when VAS programmes were typically initiated. The two main indicators considered in the exercise were (i) under-five mortality rate and (ii) VAD prevalence. Informed by this analysis, the set of countries for which semester-wise and annual two-dose VAS coverage estimates are reported on in the UNICEF global database has been restricted to these countries. This list was reduced to 64 priority countries as of the 2018 reporting year. Countries requiring only sub-national programmes are not included in the database. The lists of countries can be found at <<https://data.unicef.org/nutrition/vitamin-a>>.

ii The latest country-specific annual two-dose VAS coverage estimates are available at: <<https://data.unicef.org/nutrition/vitamin-a>>.

2

INDICATORS AND DATA SOURCES

VAS coverage indicators and sources of data are discussed in this section. To determine whether appropriately spaced vitamin A supplements were delivered to children, VAS coverage data are ideally reported in six-month intervals. Typically, VAS coverage data are reported for two periods within a given calendar year, known as semesters: semester 1 is January to June, and semester 2 is July to December.ⁱⁱⁱ

A. Indicators of vitamin A supplementation coverage

There are two main types of VAS coverage indicators: 1) those that can be reported annually for each semester using data from administrative sources and 2) those that require a sample survey and are generally only sporadically available (and not necessarily aligned with any semester). The UNICEF Global VAS Coverage Database relies on the first type of indicator. While it could be possible to report on the semester-wise indicators using sample surveys, resource constraints have prevented countries from employing surveys to estimate national VAS coverage for each individual semester since 2000. In addition, surveys undertaken at this frequency would not be an advisable use of resources to report on semester-wise VAS coverage.

Indicators from administrative data

The semester-specific numerator is the total number of children that received an age-appropriate dose^{iv} of vitamin A through the main^v distribution mechanism in a given semester. Tally sheets and/or routine health system information reports of the number of children reached with vitamin A supplements are aggregated from lower levels (e.g., health posts and districts) to the national level, where they are summed to determine the total number of children aged 6–59 months reached between January and June, as well as those reached between July and December.

These numerators are then divided by the estimated target population of children in this age group in the

country (for that specific year/semester/distribution mechanism) to estimate the percentage of eligible children that received a vitamin A supplement in each semester.

In countries where multiple delivery mechanisms are utilized in a given semester, data on the number of children reached (and their related target populations/denominators) are ideally reported separately for each distribution mechanism. In such instances, efforts are made at the global level to account for potential overlap of VAS numerators in any semester by using a defined methodology to combine and/or separate numerators and denominators for distinct delivery mechanisms. Only data from the main distribution mechanism are accepted for inclusion in the global database. Further details on how the main distribution mechanism is determined are provided in section 3 and Annex 2.

Using coverage estimates from semesters 1 and 2, the annual two-dose VAS coverage is estimated as the lower coverage of the two semesters. However, while annual two-dose coverage is the main indicator for monitoring VAS programmes at the global level, it is not routinely used at the country level; for programme management, individual semester data for each distribution mechanism are recommended [8].

The coverage indicators derived from administrative data included in the global VAS database are: (i) VAS coverage of children aged 6–59 months through the main distribution mechanism in semester 1, (ii) VAS coverage of children aged 6–59 months through the main distribution mechanism in semester 2, and (iii) annual two-dose VAS coverage of children aged 6–59 months for a calendar year (see Table 1 for details) [8].

Indicators from survey data

Two VAS coverage indicators are typically derived from survey-based data: VAS coverage in the last six months and VAS coverage at a specific event.

ⁱⁱⁱ Semesters are based on six-month intervals to align with the WHO recommendation that children should receive one high-dose supplement every four to six months.

^{iv} Defined as infants aged 6–11 months receiving a 100,000 IU dose of vitamin A and children aged 12–59 months receiving a 200,000 IU dose of vitamin A.

^v Defined as the mechanism that achieved the highest coverage in the semester.

Table 1: Coverage indicators derived from administrative data included in the UNICEF Global VAS Coverage Database

Indicator	Indicator definition	Numerator	Denominator
Semester 1 VAS coverage (January to June ^{vi})	Percentage of children aged 6–59 months estimated to have received an age-appropriate dose of vitamin A through the main distribution mechanism in semester 1	Number of children aged 6–59 months estimated to have received an age-appropriate dose of vitamin A through the main distribution mechanism in semester 1	Total population of children aged 6–59 months
Semester 2 VAS coverage (July to December ^{vii})	Percentage of children aged 6–59 months estimated to have received an age-appropriate dose of vitamin A through the main distribution mechanism in semester 2	Number of children aged 6–59 months estimated to have received an age-appropriate dose of vitamin A through the main distribution mechanism in semester 2	Total population of children aged 6–59 months
Annual two-dose VAS coverage	Percentage of children aged 6–59 months estimated to have received two ^{viii} age-appropriate doses of vitamin A in each semester approximately six months apart over the calendar year	Number of children aged 6–59 months estimated to have received an age-appropriate dose of vitamin A through the main distribution mechanism in the semester with the lower coverage value for the calendar year	Total population of children aged 6–59 months used to estimate coverage for the semester with the lower coverage value for the calendar year

VAS coverage in “the last six months” (survey)

VAS coverage in “the last six months” was developed in the late 1990s as VAS programmes were being implemented on a larger scale. The numerator for this indicator is the number of children aged 6–59 months reported (by their caregiver) to have received a dose of vitamin A at some point in the six months preceding the survey interview, and the denominator is the total number of children aged 6–59 months surveyed. Large household surveys such as Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) also began reporting on this indicator around that time. Data collection in DHS and MICS focused on interviewee recall of receiving a vitamin A supplement within “the last six months” and did not attempt to reference a specific semester time period within a calendar year. However, as this indicator is not aligned with the semester-wise indicator definitions, it has not been included in the UNICEF global database since the early 2000s. For that reason, all estimates derived from sources using the indicator for “the last six months”, which were periodically used in the global VAS database between 2000 and 2004, were removed from the database. This indicator

is not among those currently recommended in the GAVA monitoring guidance [8]. In addition, most large household surveys like DHS and MICS are only conducted every three to five years, while the database strives to have annual estimates for each of two semesters.

VAS coverage during a specific event (survey)

The second VAS indicator from surveys refers to coverage at a specific event, which is aligned with semester-wise estimates. This indicator is typically used in household surveys implemented very soon after an event (e.g., within four to six weeks of a polio supplementary immunization activity [SIA] or a Child Health Event) in order to assess VAS coverage and collect other information related to the specific event. These estimates can be compared with the semester-wise data from administrative estimates. This survey method and indicator are recommended within the latest GAVA monitoring guidance to validate administrative coverage data from an event in certain situations [8], however, undertaking surveys every six months to report on national semester-wise VAS coverage would not be an advisable use of resources.

vi The majority of estimates for semester 1 in the database fall in the January to June period, but there have been limited exceptions when a semester 1 distribution occurred in July (e.g., for 2015: S1 = July 2015, S2 = December 2015).

vii The majority of estimates for semester 2 in the database fall in the July to December period, but there have been limited exceptions when a semester 2 distribution occurred in January of the subsequent year (e.g., for 2015: S1 = June 2015, S2 = January 2016).

viii As the numerator and denominator columns indicate, a numerator about the number of individual children that received two appropriately spaced doses is not used to calculate this indicator due to lack of availability; to estimate annual two-dose VAS coverage, it is assumed that those children who received a dose in the semester with the lower coverage also received one in the semester with the higher coverage.

The numerator for this indicator is the number of children aged 6–59 months reported to have received a vitamin A supplement at the specific event in question, either by verification of a health

card or by recall, and the denominator is the total number of children aged 6–59 months surveyed (see Table 2).

Table 2: Indicator definitions for surveys assessing VAS coverage at a specific event

Survey-specific indicator	Indicator definition	Numerator	Denominator
VAS coverage in the last six months	Percentage of children aged 6–59 months who received a dose of vitamin A in the six months preceding the survey interview	Number of children aged 6–59 months whose caregiver reported they received a dose of vitamin A in the previous six months	Total number of children aged 6–59 months surveyed
VAS coverage during a specific event	Percentage of children aged 6–59 months who received a dose of vitamin A during the specific event asked about in the survey	Number of children aged 6–59 months whose caregiver reported they received a dose of vitamin A during the specific event	Total number of children aged 6–59 months surveyed

B. Administrative vitamin A supplementation coverage data: Sources and challenges

Sources of administrative data

As the UNICEF Global VAS Coverage Database only includes the semester-wise and annual two-dose indicators based on administrative data, the remainder of this section focuses on administrative data sources related to indicators described in Table 1. Administrative data are collected by tracking the provision of commodities or services to end-users. These data are typically recorded into paper-based registers and/or electronic systems by the service provider (e.g., health worker) at the point of distribution. Administrative reporting systems intend to capture each person that received the health and nutrition service of interest over a specified time period.

For VAS coverage, administrative data on the number of children aged 6–59 months given a vitamin A supplement in each semester in the country (numerator) are generally derived from the following two data sources:

1. Event-based tally sheets: These forms capture the total number of children in the target age group given a vitamin A supplement during outreach or events. Event-based outreach includes child health events and SIAs for polio, measles or other vaccine-preventable diseases. Tallies from each distribution site are summed to generate the total number of children reached with a vitamin A supplement

across the country during a specific event. This process is repeated for each event that takes place during the year.

2. Health information system reports: These documents report on the total number of children in the target age group given a vitamin A supplement through routine health system contacts – that is, the vitamin A doses delivered to children when they visit a fixed site health facility or during outreach services from such a facility. For health information system reports, the data are also aggregated up from local to central level together with information on other routine health services, such as vaccines, essential drugs and/or other services delivered during a given time period.

For both of these data sources, most countries use separate sheets to report on different age groups, with one tally counting the number of children aged 6–11 months who received a 100,000 IU dose and another sheet for the number of children aged 12–59 months reached with a 200,000 IU dose. In such cases, it is possible to generate coverage estimates by age group.

Challenges of administrative data

There are two main challenges associated with use of administrative data for VAS coverage reporting: 1) double counting when multiple delivery mechanisms are used in the same semester targeting the same children, and 2) denominator issues.



Children with their mothers queue up during the UNICEF-supported National Vitamin A Plus Campaign in Bangladesh. © UNICEF/UNI112506/Kiron

1. Double counting: In many countries, multiple mechanisms are used to deliver VAS concurrently. For example, vitamin A supplements may be delivered during routine health visits and as part of polio SIAs in the same semester. While this approach enables higher levels of vitamin A supplement uptake, the use of multiple delivery platforms can result in multiple data sources and reporting pathways in the same semester. Efforts are in place to minimize the risk of overdosing any individual child in most countries (e.g., halting routine distribution one month prior to an outreach event), but multiple data sources and reporting systems could increase the risk of double counting a child in any given semester. This explains why the definition for semester-wise VAS coverage refers to the main distribution mechanism only (Table 1) and all attempts are made to separate out reporting for different distribution mechanisms occurring in the same geographical area in the same semester when calculating national coverage.

2. Denominator issues: VAS coverage estimates derived using a numerator from administrative data sources require an accurate estimate of the target population for the denominator. However, these estimates of the target population are often inaccurate. Estimated target populations, particularly projections of future population size, are complex computations and carry uncertainty [9]. Furthermore, in many countries the reference used to estimate the target population (denominator) varies depending on the distribution mechanism. For example, when distribution occurs via routine health system

contacts, common administrative denominator sources include projected population estimates from the most recent census. When distribution occurs via polio SIAs, the target population is generally estimated using the number of children reached during the SIA in the previous round plus some inflation factor (where the polio program assumes the population has increased). Meanwhile, the data source for the target population for other SIAs (e.g., measles or other antigens) is often the same as the one used for routine health system contacts (e.g., projected based on latest census), while in some countries it is similar to that used for polio SIAs. The WHO has published a practical guide to assist in the assessment of target population data [10] that may also prove useful for national VAS programme managers when they prepare for discussions with their national statistical office counterparts.

While administrative data are not without challenges, they are nonetheless well suited for programme management and monitoring purposes. They allow for semester-wise coverage estimates to be obtained using existing resources in a timely manner, as opposed to estimates only every three to five years when using major household surveys. In addition, such surveys are generally not available for the same time periods year on year. For these reasons, UNICEF requests administrative data from country teams for inclusion in the global VAS coverage database.

3

GLOBAL-LEVEL DATA COLLECTION, PROCESSING AND DISSEMINATION

The production of country-specific VAS coverage estimates is a multiphase process that begins with the annual collection of national VAS coverage data from countries using a standardized reporting form. Once submitted by country teams, forms are reviewed and checked for completeness and consistency at UNICEF Headquarters. UNICEF then produces a semester-wise and an annual two-dose national-level VAS coverage estimate for each country in a given year. Each phase in this process is described in detail in this section.

A. Requesting data from countries

The annual standardized VAS coverage reporting form is required to be filled in using official government data^{ix} and completed in country, ideally in a collaboration between partners involved in VAS distribution, including government, UNICEF and other stakeholders. The form has evolved over time, from a one-page Microsoft Word document that collected minimal information to a Microsoft Excel-based form with multiple modules. Since 2016, this form has been hosted on an electronic data collection platform, NutriDash.^x As discussed in section 2, administrative VAS coverage data are the only type of data accepted for use in the UNICEF global database.

Until 2006, the minimum information requirement included a numerator, denominator and estimated coverage as well as distribution mechanisms and timing of distribution (if distribution was through an event). Many countries also provided additional information and responded to any queries from UNICEF Headquarters about country-reported data.

In 2007, the reporting form was updated using a standardized Microsoft Excel template and required many new details to be reported for each semester. Since 2016, the questions have been asked via the UNICEF Nutrition Section online reporting platform NutriDash and are provided in Annex 1. The data required for review and clearance of VAS coverage estimates were further updated in 2012 to request data for all delivery mechanisms employed in a given semester, rather than only for the main delivery mechanism, as was requested between 2007 and 2011. The data required, and thus the essential parts of the reporting form for review and clearance of VAS coverage estimates since 2007, are listed below (noting that reporting on all types of distribution mechanisms has only been required since 2012):

- Confirmation that VAS did or did not occur in each semester within the calendar year;
- Endorsement of data reported by the government, and confirmation that the data reported are final;
- Target age group for prophylactic VAS;^{xi}
- Types of delivery mechanisms used for each semester (e.g., routine and/or event);
- Estimated number of children that received a vitamin A capsule (i.e., numerator data) for each aforementioned target group, in each semester. This information is requested by age disaggregation (i.e., children aged 6–11 months, children aged 12–59 months and the total number of children aged 6–59 months), as well as separately for each delivery mechanism used.

ix In some cases, partners such as NGOs implement VAS distribution and undertake reporting activities, but such information is reported up government channels and used in the official reporting.

x NutriDash <<https://www.unicefnutridash.org>>, the electronic data collection platform, is used for annual collection of a wide range of nutrition data from UNICEF programme countries. VAS coverage was included in NutriDash beginning in 2014. Prior to this, all data collection was completed via standardized Microsoft Excel forms or Word documents.

xi Some countries target a narrower age range than the full WHO-recommended 6–59-month age group. Narrower age ranges (e.g., 6–23 months) may be the target in some countries with lower mortality rates in the older age group. Other countries target VAS programmes only to specific subnational areas or special populations (such as refugees). While data from smaller age groups can be accepted in the global database (with a footnote), as long as the programme is national in scale, estimates from countries targeting only subnational populations are not included.

That is, UNICEF requests information on the number of children that received VAS through routine health contacts (e.g., well-child visit to a fixed site health facility) and through events, separately;

- VAS target population (i.e., denominator data) for each aforementioned target group (disaggregated by age), according to national-level government estimates. This information is requested for each semester and separately for each delivery mechanism used;
- Source of the target population (denominator) data (i.e., EPI estimates, census data with projected population growth rate of x per cent, United Nations Population Division (UNPD)-World Population Prospects (WPP) estimates, etc);
- For semesters when events were implemented, type of event (e.g., child health event, micronutrient event, polio SIA, measles SIA) and timing of the event (month(s) of implementation); and
- Information about the completeness of reporting. The number of administrative units (e.g., districts) that reported final VAS data, as well as the total number of administrative reporting units from which final reports were expected (e.g., total number of districts in the country) are requested for each semester and for each delivery platform used.

The data requirements listed above are utilized and checked in the VAS coverage review process (detailed in section 3-B). If the above data are not provided, then the country team is engaged to determine if the gaps can be filled. If any of the required data are unavailable, VAS coverage data are considered incomplete and the review remains pending until such information becomes available.

In addition to the data required to verify and generate the coverage estimates described above, the reporting form includes questions that provide supplementary information regarding VAS and VAS coverage, including: interventions co-delivered alongside vitamin A during events, coverage achieved at lower administrative levels (to assess equity of coverage within country), and national policy and programme details. This information is not required for the VAS coverage review; however, it does support verification of coverage estimates when available.

B. Reviewing data for completeness, quality and consistency

Following UNICEF HQ's receipt of reported data from countries, a series of data completeness and consistency checks is conducted across several domains of information collected in the reporting form.

Until 2006, consistency checks consisted primarily of comparing the numerator, denominator, coverage and distribution date data with neighbouring years for similar distribution mechanisms and verifying that the reported distributions took place against alternate sources (e.g., polio SIA calendar).

When the required information and reporting forms were updated in 2007, the review steps applied were also updated. These steps have stayed relatively consistent since then, the key difference being the determination of the main delivery mechanism numerator during the review process. All data are first reviewed at the semester level (i.e., one semester at a time for each country), meaning that consistency checks are repeated for each semester.

The steps undertaken during a VAS coverage data review are broken down into domains, and for each domain, there are related review questions. The domain categories and related review questions are listed below and summarized in Figure 1. Detailed notes, instructions and considerations for each domain and review question can be found in Annex 2.

Vitamin A supplementation

Coverage review flow chart

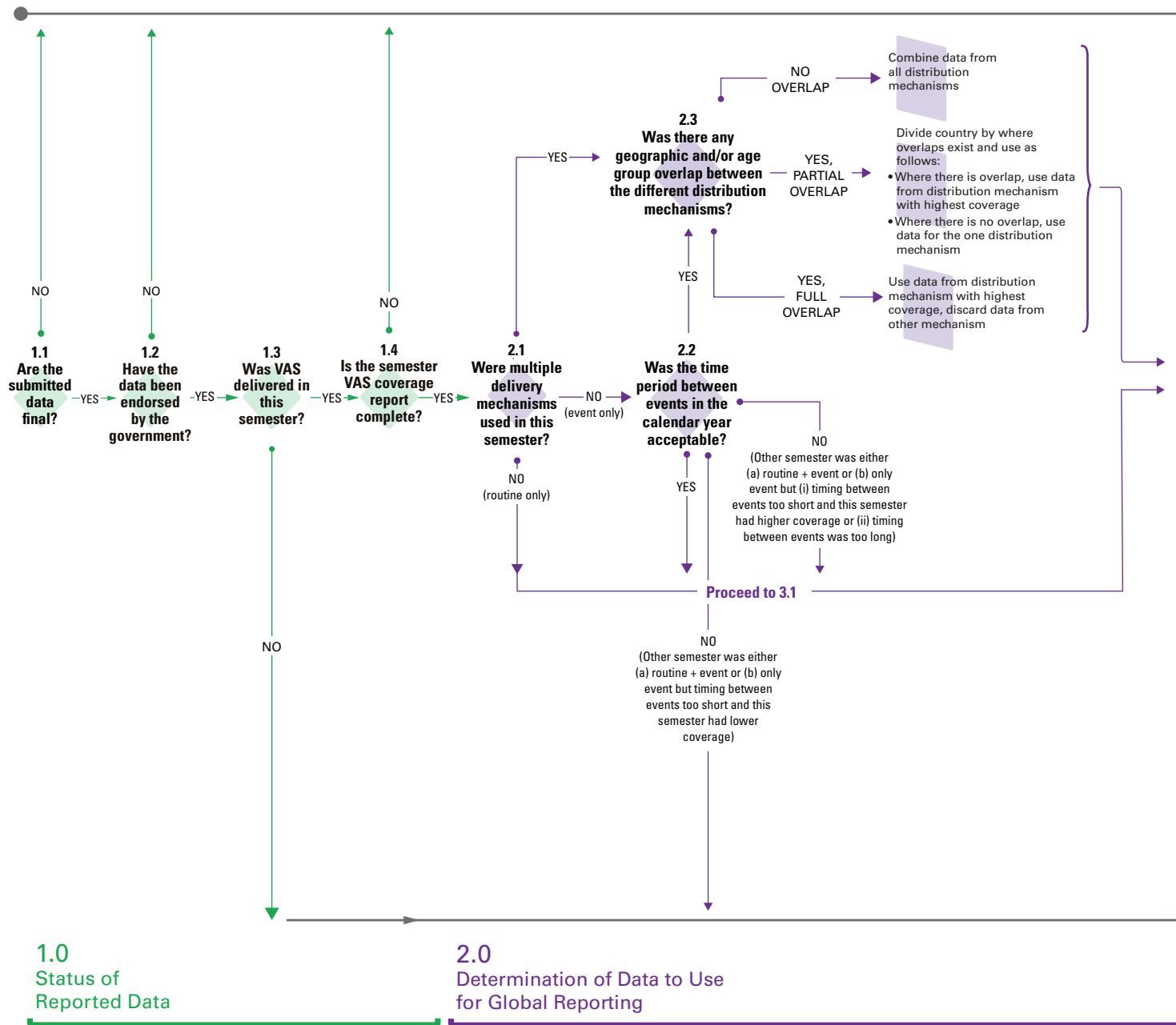
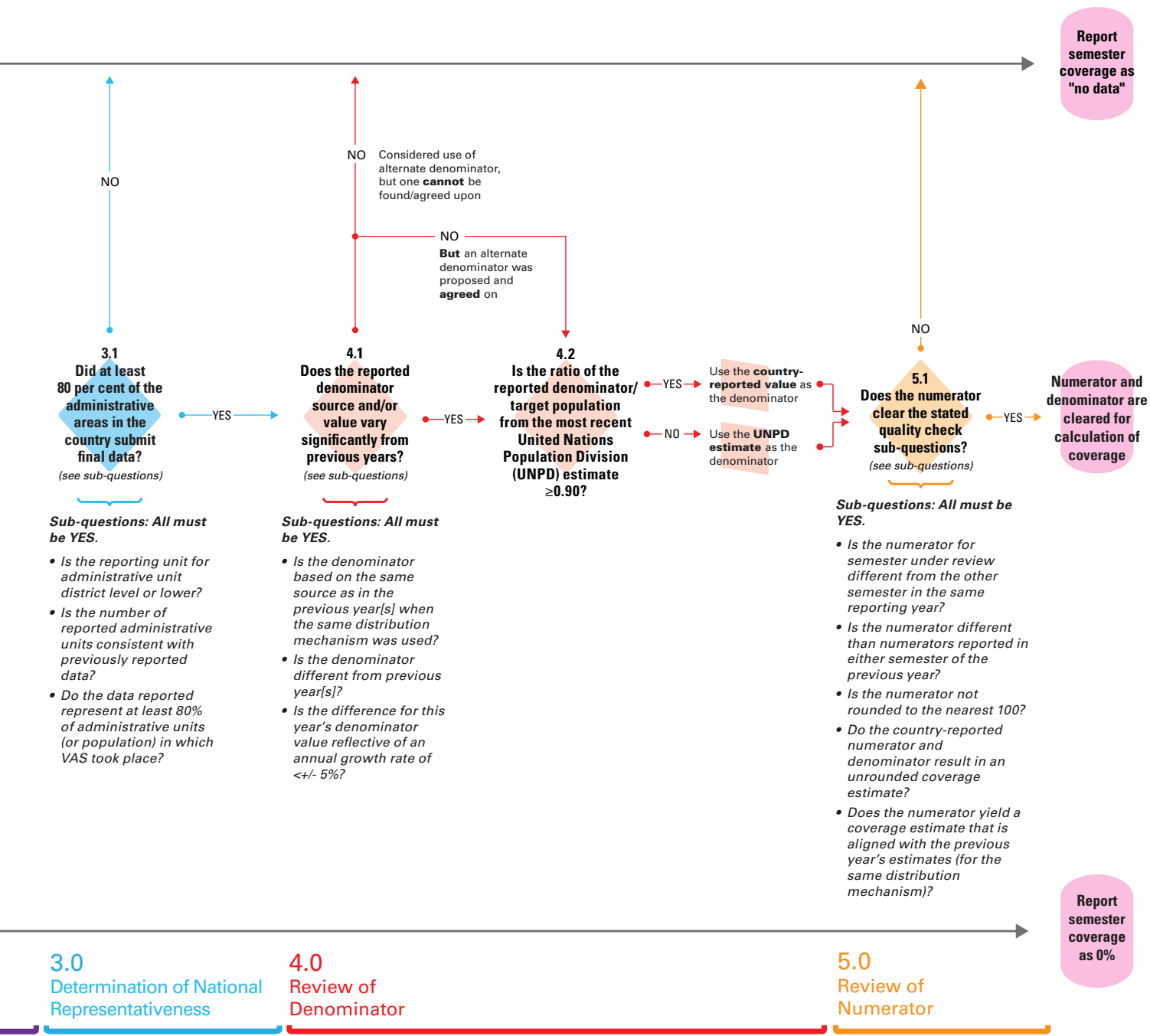


Figure 2: Flow chart of review domains and questions for VAS coverage



DOMAIN 1.0 STATUS OF REPORTED DATA

This review domain is used to verify the status (i.e., final or preliminary, endorsed by government, etc.) and completeness of the submitted data report.

- 1.1 Are the submitted data final?
- 1.2 Have the data been endorsed by the government?
- 1.3 Was VAS delivered in this semester?
- 1.4 Is the semester VAS coverage report complete?

DOMAIN 2.0 DETERMINATION OF DATA TO USE FOR GLOBAL REPORTING

This review domain is intended to help identify the most appropriate data to use in global reporting. This is particularly relevant for semesters in which more than one delivery mechanism was used in the same area and/or where distinct parts of the country used different delivery mechanisms. The following steps help determine the validity of the numerator data reported, and if data from only one mechanism or a combination of mechanisms should be used to estimate the number of children reached with prophylactic vitamin A supplements in the semester.

- 2.1 Were multiple delivery mechanisms used in this semester?
- 2.2 Was the time period between events that provided prophylactic vitamin A supplements in the calendar year acceptable?
- 2.3 Was there any geographic and/or age group overlap between the different distribution mechanisms employed?

DOMAIN 3.0 DETERMINATION OF NATIONAL REPRESENTATIVENESS

In order for coverage estimates to be accepted into the global VAS database, there must be some evidence that they are nationally representative. This is assessed through reporting coverage.

- 3.1 Did at least 80 per cent of the administrative areas in the country submit final data?

DOMAIN 4.0 REVIEW OF DENOMINATOR

This review domain includes questions to validate the reported denominator/target population estimate. The denominator(s) reviewed in this domain are derived from the decisions made in **Domain 2.0**.

The steps below are not required to be implemented in the order presented and can be undertaken in parallel or in an alternate order. At the end of this review domain, the denominator to be used for the calculation of coverage is determined.

- 4.1 Does the country-reported denominator source and/or value vary significantly from previous years (for the same delivery mechanism)?
- 4.2 Is the ratio derived by dividing the country-reported denominator by the target population from the corresponding year of the United Nations Population Division (UNPD)-World Population Prospects (WPP) ≥ 0.90 ?

DOMAIN 5.0 REVIEW OF NUMERATOR

There are several quality checks conducted on the reported numerator.

- 5.1 Does the numerator clear the stated quality checks?

After completing **Domains 1.0 through 5.0**, either the semester has been classified as having “no data”, as having 0 per cent coverage, or a numerator and denominator have been identified as valid and appropriate for use in the semester coverage calculation. If a numerator and denominator have been identified, these figures are then used in calculating semester-wise coverage (see section 3-C).

C. Calculating semester-wise coverage

The final step in generating a semester estimate is to calculate the VAS coverage. To do this for a given semester, the numerator and denominator identified as most appropriate during the review steps detailed in section 3-B and Annex 2 are used to calculate the percentage of children aged 6–59 months that received an age-appropriate dose of vitamin A in a given semester. As noted in section 2 of this report, this indicator is defined as the “Percentage of children aged 6–59 months who received an age-appropriate dose of vitamin A in a semester through the main distribution mechanism.” The added detail on the main distribution mechanism helps clarify if coverage figures differ from those reported at the country level. This is because the UNICEF estimates utilize data from only one of two or more delivery mechanisms potentially employed in a given semester.^{xii} Any semester-wise VAS coverage

xii As stated previously, this is done in an effort to reduce the possibility of double counting children in areas where multiple delivery mechanisms were implemented during the same semester in the same areas.

estimates calculated at ≥ 100 per cent are capped at 99 per cent.

Once coverage estimates are available for both semesters in the reporting year, these estimates are used to generate the annual two-dose VAS coverage database. Directions on this are detailed in section 3-D.

D. Calculating annual two-dose VAS coverage

Once an estimate is available for each semester in a calendar year, annual two-dose VAS coverage is estimated. Section 2 details the definition of this indicator. The method assumes that in countries providing VAS in more than one semester, the same children are missed in both semesters. Therefore, the lower of the two semester-wise coverage estimates for a given year is assumed to be a rough approximation of the percentage of children receiving two appropriately spaced doses of vitamin A in the calendar year. For example, if coverage achieved in semester 1 of 2016 was 98 per cent and coverage achieved in semester 2 was 50 per cent, the annual two-dose VAS coverage for 2016 is reported as 50 per cent. Similarly, if coverage achieved in semester 1 of 2016 was 70 per cent and coverage achieved in semester 2 was 0 per cent (either due to no VAS taking place or a determination of 0 per cent coverage during the data review steps listed in section 3-B and Annex 2), the annual two-dose VAS coverage for 2016 is reported as 0 per cent.

If VAS coverage estimates for semesters 1 and 2 are equal, for example, 45 per cent in semester 1 and 45 per cent in semester 2 – which is common when both semesters used routine health system contacts as the main distribution mechanism – annual two-dose VAS coverage is reported as 45 per cent. In cases where at least one of the two annual semesters is reported as “no data” (i.e., at least one semester did not have any data or did not have an approved coverage estimate), the annual two-dose VAS coverage is reported as “no data”.

Finally, in cases where only events were used in the reporting year and the time between events in semester 1 and 2 is (i) more than eight months, or (ii) less than four months, the two-dose coverage is reported as 0 per cent. The approved semester-wise coverage estimates are maintained in the UNICEF Global VAS Coverage Database, however the annual two-dose VAS coverage estimates are recorded as 0 per cent for the same year.

E. Final review

Following the initial review (according to **Domains 1.0 through 5.0**, described above), and the estimation of semester-wise and two-dose coverage, a panel comprising staff from UNICEF’s Programme Division Nutrition and Division of Data, Analytics, Planning and Monitoring review and confirm decisions taken (e.g., on numerators and denominators, coverage estimates). The panel determines whether the proposed coverage estimates can be finalized or require further investigation and revisions.

F. Dissemination

Following completion of VAS coverage estimates for a calendar year for the priority countries, the UNICEF Global VAS Coverage Database is updated and published on the UNICEF data website, <<https://data.unicef.org>>. The database is updated and republished online on an annual basis. The data of approximately 60 priority countries are available for review and clear the review criteria in any given year.

4

CONCLUSION

The role of VAS as an important, cost-effective intervention for preventing the public health consequences of VAD among children aged 6–59 months is clear, particularly for mortality and preventable childhood blindness [11]. This report describes the process, rules and assumptions applied for generation of the UNICEF Global VAS Coverage Database. However, there are a number of challenges to overcome in order for administrative data on VAS coverage to contribute to a robust evidence base for programme and policymaking. While the estimates in the UNICEF

global database are informed and constrained by a set of rules and assumptions and include a process of consultation and collaboration with national authorities and in-country programme partners, they are in many cases identical to nationally reported estimates. However, in other cases the estimates in the database are very different than those reported by national authorities. These differences tend to be largest when denominators require standardization to the set of rules applied to all countries, and generally occur when denominators are significantly adjusted as is often

The use of routine health system contacts as a delivery platform for vitamin A supplementation has increased significantly since 2000

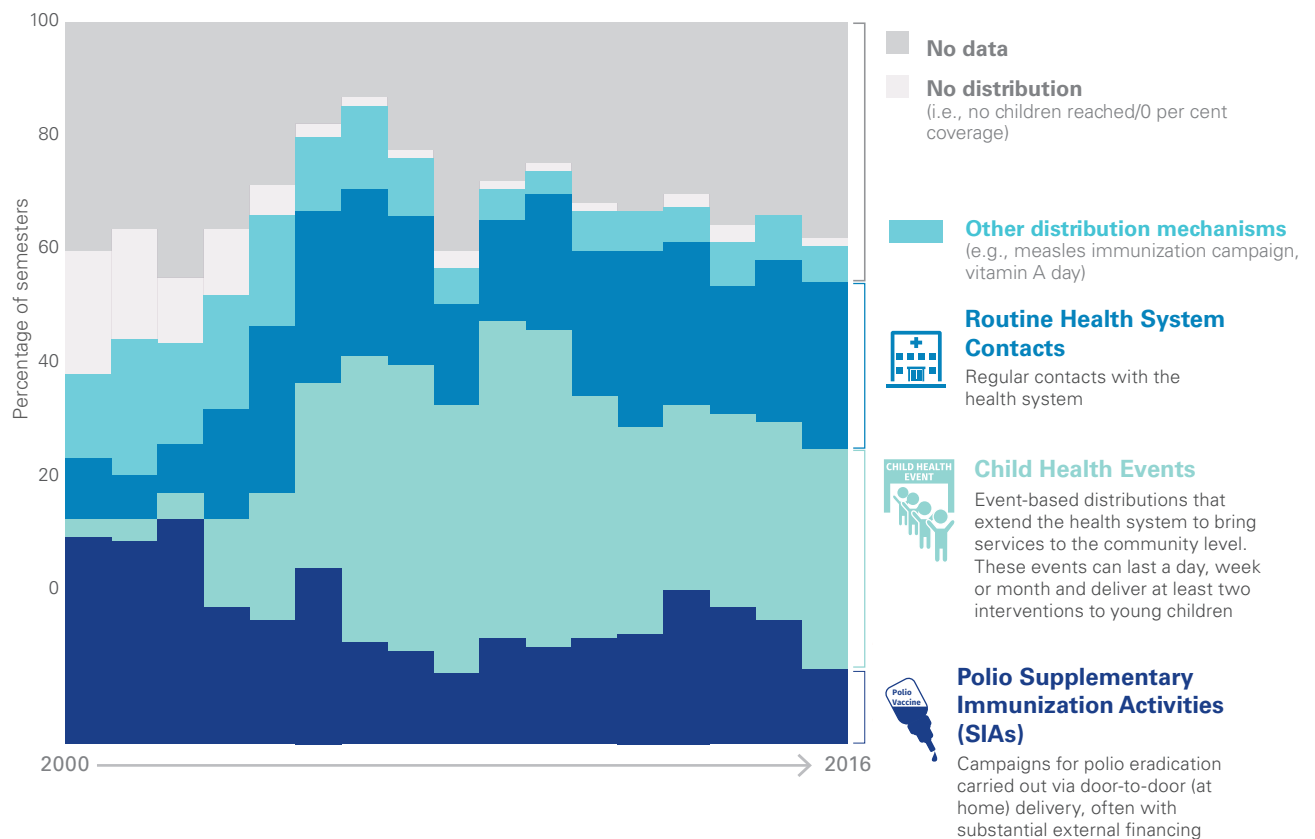


Figure 3: Trends in the percentage of main distribution mechanisms used to deliver vitamin A supplements in each semester, among 82 priority countries, 2000–2016
Source: UNICEF, *Coverage at a Crossroads* [12].

the case in countries with outdated (<10 years old) censuses.

The production of estimates of semester-wise and annual two-dose VAS coverage often requires judgement to evaluate and reconcile data of unknown and varying quality from multiple, and potentially conflicting, sources. Furthermore, delivery platforms have shifted over time, for instance, from almost no delivery via routine health system contacts and sole reliance on polio SIAs in many countries in 2000 to mixed approaches by subnational area in many countries in 2014 (Figure 3) [12]. This has resulted in a change to data collection forms, monitoring approaches and review rules over time. The current processes and rules, which have largely been applied since 2007, aim to generate reproducible estimates based on data and information submitted by country teams.

Estimates within UNICEF's Global VAS Coverage Database are subject to errors related to the availability of administrative data from routine service delivery and events submitted through the annual reporting forms. As discussed in section 2, errors in aggregated counts of the number of doses delivered as well as incomplete or missing reports from subnational areas are among the many challenges related to these data [13]. In addition, target population (i.e., denominator) estimates are also a concern, which requires improved collaboration between programmes within ministries of health and national statistical offices.

These challenges are not confined to vitamin A and reflect a broader and more urgent need to enhance country capacities for collection, analysis and use of health data and statistics. Not only must VAS programmes be well structured in order to effectively deliver the recommended doses of vitamin A, but these programmes must also require robust monitoring and surveillance activities as a core function. UNICEF is committed to working with national counterparts and partners to improve these activities moving forward.

Another limitation is that the global database cannot utilize data from population-based surveys due to their having a different indicator definition. At present, semester-wise coverage estimates are derived prior to producing annual two-dose VAS coverage estimates and it remains unclear how current data from DHS, which are based on the indicator assessing the last six months, could be incorporated. Ideally, such surveys would need to

complete field work within a window aligned with a distinct event in order to capture national coverage for just one semester. Utilizing these data would also require due consideration of the potential problems and biases, including the reliability of caregiver recall in the absence of documented evidence from home-based records. In both events and routine health contacts, the administration of a vitamin A capsule should be recorded on a home-based health record, similar to processes for vaccination services [14, 15].

Unfortunately, current recording practices for the delivery of vitamin A in home-based records, among other services [16], is suboptimal. Additional efforts are needed to improve ownership and retention of this type of record. Given the challenges of differentiating VAS from other interventions, namely orally administered vaccinations such as polio vaccine and rotavirus vaccine, caregiver recall of VAS could be problematic. In summary, further operational research is needed before utilizing survey data for the database can be considered.

With global changes in diets, disease epidemiology and the scale for fortification programmes, the need for VAS will be assessed on a regular basis to determine the priority countries for VAS programmes and coverage estimation. As delivery platforms and mechanisms shift and as the set of priority countries changes moving forward, revisions to the methods applied for the database will be communicated through similar publications and the UNICEF data website, <<https://data.unicef.org>>.

References

1. Sommer, Alfred, *Vitamin A Deficiency and Its Consequences: A field guide to detection and control*, third edition, World Health Organization, Geneva, 1995.
2. West, Keith P., 'Epidemiology and Prevention of Vitamin A Deficiency Disorders', ch. 23 in *The Retinoids: Biology, biochemistry, and disease*, edited by Pascal Dollé and Karen Neiderreither, John Wiley & Sons, Inc., New York, 2015.
3. Akhtar, Saeed, et al., 'Prevalence of Vitamin A Deficiency in South Asia: Causes, outcomes, and possible remedies', *Journal of Health, Population and Nutrition*, vol. 31, no. 4, 2013, pp. 413–423.
4. Stevens, Gretchen A., et al., 'Trends and Mortality Effects of Vitamin A Deficiency in Children in 138 Low-Income and Middle-Income Countries Between 1991 and 2013: A pooled analysis of population-based surveys', *The Lancet Global Health*, vol. 3, no. 9, 2015, pp. e528–e536.
5. Palmer, Amanda C., et al., 'The Use and Interpretation of Serum Retinol Distributions in Evaluating the Public Health Impact of Vitamin A Programmes', *Public Health Nutrition*, vol. 15, no. 7, 2012, pp. 1201–1215.
6. World Health Organization, *Guideline: Vitamin A supplementation in infants and children 6–59 months of age*, WHO, Geneva, 2011.
7. Wirth, James P., et al., 'Vitamin A Supplementation Programs and Country-Level Evidence of Vitamin A Deficiency', *Nutrients*, vol. 9, no. 3, 2017, p. e190.
8. Global Alliance on Vitamin A, *Monitoring of Vitamin A Supplementation: A guide for national programme managers*, Micronutrient Initiative, 2017.
9. Brown, David W., et al., 'Avoiding the Will O' the Wisp: Challenges in measuring high levels of immunization coverage with precision', *World Journal of Vaccines*, vol. 4, no. 3, 2014, pp. 97–99.
10. World Health Organization, 'Assessing and Improving the Accuracy of Target Population Estimates for Immunization Coverage', WHO, Geneva, 2015.
11. Imdad, Aamer, et al., 'Vitamin A Supplementation for Preventing Morbidity and Mortality in Children from Six Months to Five Years Of Age', *Cochrane Database of Systematic Reviews*, no. 3, 2017, p. CD008524.
12. United Nations Children's Fund, *Coverage at a Crossroads: New directions for vitamin A supplementation programmes*, UNICEF, New York, 2018.
13. Nyhus Dhillon, Christina, et al., 'Overestimation of Vitamin A Supplementation Coverage from District Tally Sheets Demonstrates Importance of Population-Based Surveys for Program Improvement: Lessons from Tanzania', *PLoS One*, vol. 8, no. 3, 2013, p. e58629.
14. World Health Organization, *Practical Guide for the Design, Use and Promotion of Home-Based Records in Immunization Programmes*, WHO, Geneva, 2015.
15. Cutts, Felicity T., Hector S. Izurieta and Dale A. Rhoda, 'Measuring Coverage in MNCH: Design, implementation, and interpretation challenges associated with tracking vaccination coverage using household surveys', *PLoS Med*, vol. 10, no. 5, 2013, p. e1001404.
16. Brown, David W., and Marta Gacic-Dobo, 'Home-Based Record Prevalence Among Children Aged 12–23 Months from 180 Demographic and Health Surveys', *Vaccine*, vol. 33, no. 22, 2015, pp. 2584–2593.
17. United Nations Children's Fund, *Priority Country Analysis Report*, UNICEF, New York, unpublished.
18. Blencowe, Hannah, et al., 'National, Regional, and Worldwide Estimates of Low Birthweight in 2015, with Trends from 2000: A systematic analysis', *The Lancet Global Health*, vol. 7, no. 7, 2019, pp. e849–e860.

Annex 1

UNICEF Vitamin A Supplementation Coverage Reporting Form Main Questions

Overview questions

-
- 1.1** Were vitamin A supplements delivered to children < 5 years through ROUTINE CONTACTS in semester 1 (*January to June*) ?
-
- 1.2** Were vitamin A supplements delivered to children < 5 years through ROUTINE CONTACTS in semester 2 (*July to December*) ?
-
- 1.3** Were vitamin A supplements delivered to children < 5 years through a CAMPAIGN-STYLE EVENT in semester 1 (*January to June*) ?
-
- 1.4** Were vitamin A supplements delivered to children < 5 years through a CAMPAIGN-STYLE EVENT in semester 2 (*July to December*) ?
-

Semester 1 coverage through ROUTINE CONTACTS

(these same questions are repeated for semester 2 ROUTINE CONTACTS and not shown here)

-
- 2.1** Are the data for semester 1 ROUTINE CONTACTS final?
-
- 2.1.1** If no, when will finalized data for semester 1 ROUTINE CONTACTS be available to report?
-
- 2.2** Have these data been approved by the government?
-
- 2.3** If semester 1 ROUTINE CONTACT data are final, for which age group do they apply?
-
- 2.4** How many children in each age group received vitamin A capsule (VAC) through ROUTINE CONTACTS in semester 1? (**Numerator**)
-
- 2.5** How many target children were in each age group in Semester 1, using government estimates? (**Denominator**)
-
- 2.6** What is the source of the government-estimated denominator target population (**Denominator**) specified in Question 2.5 (*provide title and year*)?
-
- 2.7** Coverage estimate for vitamin A supplementation (VAS) administered through ROUTINE contacts in semester 1 (*[auto calculated] Coverage = Numerator ÷ Government Denominator*)
-
- 2.8** Specify the type of ROUTINE CONTACT used to deliver supplements in semester 1?
-
- 2.9** What is the lowest "administrative level" from which data are available at the central level? (*i.e., by national authorities in the capital*)
-
- 2.10** How many of these administrative units have reported final data for routine contacts for semester 1?
-
- 2.11** How many of these administrative units were there in total in the country?
-
- 2.12** Percentage of administrative units reporting, by age group, for semester 1 (*auto calculated*)
-

Semester 1 coverage through CAMPAIGN STYLE EVENT

(these same questions are repeated for semester 2 CAMPAIGN-STYLE EVENT and not shown here)

-
- 3.1** Are the data for Semester 1 CAMPAIGN-STYLE EVENTS final?
-
- 3.1.1** When will finalized data for semester 1 CAMPAIGN-STYLE EVENTS be available to report?
-
- 3.2** Have these data been approved by the government?
-
- 3.3** If semester 1 CAMPAIGN-STYLE EVENT DATA are final, for which age group do they apply?
-

3.4	How many children in each age group received vitamin A capsules (VAC) through CAMPAIGN-STYLE EVENTS in semester 1? (<i>Numerator</i>)
3.5	How many target children were in each age group in semester 1, using government estimates? (<i>Denominator</i>)
3.6	What is the source of the government-estimated denominator target population (<i>denominator</i>) specified in Question 3.5 (<i>provide title and year</i>)?
3.7	Coverage estimate for vitamin A supplementation (VAS) administered through CAMPAIGN-STYLE EVENTS in semester 1 (<i>auto calculated</i>) $Coverage = Numerator \div Government\ Denominator$
3.8	Specify the type of CAMPAIGN-STYLE EVENT used to deliver supplements in semester 1.
3.9	In which months were VACs distributed through CAMPAIGN-STYLE EVENTS in semester 1?
3.10	What is the lowest “administrative level” from which data are available at the central level (<i>i.e., by national authorities in the capital</i>)?
3.11	How many of these administrative units have reported final data on CAMPAIGN STYLE EVENTS for semester 1?
3.12	How many of these administrative units were there in total in the country?
3.13	Percentage of administrative units reporting by age group for semester 1 (<i>auto calculated</i>).
3.14	Were other interventions delivered through this distribution mechanism along with VACs in CAMPAIGN-STYLE EVENTS in semester 1? Immunization <ul style="list-style-type: none"> • Polio (<i>administered to all children in campaign-style event, regardless of routine immunization status</i>) • Measles (<i>administered to all children in campaign-style event, regardless of routine immunization status</i>) • Tetanus (<i>for women of childbearing age</i>) • Catch-up routine vaccination for children <5 years • Deworming • Insecticide-treated mosquito nets • Growth monitoring and promotion • Screening/referral for acute malnutrition • Water, sanitation and hygiene (<i>e.g., hand-washing</i>) • Soap • Aquatabs • Behaviour change communication messages (<i>please specify</i>) • Iron-folic acid supplementation for pregnant women • Birth registration • Other interventions included?
3.15	Was a specific post-event coverage assessment administered (<i>such as a post-event coverage survey [PECS], a lot quality assurance sampling [LQAS] survey, SMART survey, or others</i>) <ul style="list-style-type: none"> • Which assessment method or tool was used? • Was the coverage assessment national or subnational? • When was it carried out (<i>i.e., mm/yyyy</i>)?

Annex 2

Detailed review steps for completeness, quality and consistency



VAS coverage review domains, review questions and sub-questions are detailed below. For each question, scenarios are presented that align with navigating the coverage review as illustrated in the methods flow chart (see Figure 2, section 3).

DOMAIN 1.0: STATUS OF REPORTED DATA

This review domain is used to verify the status (i.e., final or preliminary, endorsed by government, etc.) and completeness of the submitted data report.

1.1 Are the submitted data final? Countries are asked to indicate whether the data reported are the final data for the semester in question.

- **Scenario 1 (Yes):** If the semester data are reported as final, *the review continues to 1.2.*
- **Scenario 2 (No):** If the data are not final (i.e., still preliminary), *the semester coverage is reported as “no data”.* If the country team can provide final data at a later date, the review can recommence.

1.2 Have the data been endorsed by the government? Countries are asked to confirm whether the data reported have been endorsed by the government.

- **Scenario 1 (Yes):** If the data are reported as being endorsed by the government, *the review continues to 1.3.*
- **Scenario 2 (No):** If the data have not been endorsed by the government, they cannot be used in global reporting and *the semester coverage is reported as “no data”.*

1.3 Was VAS delivered in this semester? Countries are asked to report whether any VAS took place in each semester.

- **Scenario 1 (Yes):** If VAS activities took place in the semester, *the review continues to 1.4.*
- **Scenario 2 (No):** If VAS did not take place in the semester and thus the rest of the form is not filled in, *the semester coverage is reported as 0 per cent.* This is because the government has confirmed that no children were reached with prophylactic vitamin A supplements within the six-month semester window. Common reasons for this include security issues preventing implementation, lack of vitamin A supplements (e.g., stocks not arriving on time), delays/challenges in planning and funding issues.

1.4 Is the semester VAS coverage report complete? This step confirms whether all required data points^{xiii} were provided for the semester.

- **Scenario 1 (Yes):** If the coverage report is complete with all required information, *the review proceeds to Domain 2.0.*
- **Scenario 2 (No):** If the coverage report is not complete for the semester, *the VAS coverage review cannot proceed.* Further engagement with the country team is required to gather the missing data. If the team is unable to provide data to fill in the gaps, *the semester coverage is reported as “no data”.*

xiii Required data are listed in section 3 of this report.

DOMAIN 2.0: DETERMINATION OF DATA TO USE FOR GLOBAL REPORTING

This review domain helps identify the most appropriate data to use in global reporting. This is particularly relevant for semesters in which more than one delivery mechanism was used in the same area and/or where distinct parts of the country used different delivery mechanisms. The following steps help determine the validity of the numerator data reported, and if data from only one mechanism or a combination of mechanisms should be used to estimate the number of children reached with prophylactic vitamin A supplements in the semester.

2.1 Were multiple delivery mechanisms used in this semester?

- **Scenario 1 (Yes):** Multiple delivery mechanisms were used in this semester. Further discernment is required to determine which data will be most appropriate for use. *These cases move on to 2.3.* Depending on the outcome of 2.3, the review may loop back to 2.2 before proceeding to the next domain.
- **Scenario 2 (No – VAS distributed through routine health system contacts only):** VAS occurred only via routine health system contacts in this semester. In this scenario, *the data reported on routine implementation move forward to Domain 3.0.*
- **Scenario 3 (No – VAS distributed through events only):** Only events were implemented in this semester. In this scenario, *the data reported on events move forward to 2.2.*

2.2 Was the time period between events that provided prophylactic vitamin A supplements in the calendar year acceptable? Additional review is required to determine whether or not the timing of VAS events between semesters violates the WHO-recommended minimum or maximum spacing requirement of vitamin A doses. In other words, to remain consistent with WHO recommendations on spacing of prophylactic high-dose vitamin A supplements, delivery should ideally be spaced four to six months apart. Evidence suggests that this spacing helps maintain the protective effects of high-dose vitamin A supplements between events. If the spacing is too long, the protective effects wane and children are left unprotected from the benefits of VAS before their next dose. In this review, too short is classified as <4 months and too long as >8 months (allowing for the same two-month buffer above six months that WHO allows below six months). When reviewing semester data for a particular calendar year, the process generally does not look across calendar years; this is systematically done during periodic time series reviews. Therefore, this question largely requires that the time period between VAS events in semester 1 and 2 was between four and eight months. If only routine distribution took place in either or both semesters of a calendar year, this question is not applied. This is because routine distribution of vitamin A supplements is assumed to take place continuously throughout a given semester, rather than during isolated, distinct time frames within a semester. Thus, it is always assumed that spacing between semesters in a calendar year is adequate when at least one uses routine as its primary or only delivery mechanism. The assessments for this review question are described via potential contexts here:

Context 1: Only events were employed in both semesters

- **Scenario 1 (Yes – timing between events was acceptable [i.e., 4–8 months]):** Timing is acceptable if the time between events is within the four- to eight-month limit. For example, an event took place in October 2016 (semester 2, 2016), reaching 81 per cent of target children. An event also took place in April 2016 (semester 1, 2016), reaching 90 per cent of target children. In this scenario, the distribution in question (semester 2, 2016) was determined to have taken place six months after the semester 1 event and is thus within the acceptable time frame. *The review proceeds to Domain 3.0.*
- **Scenario 2 (No – timing between semester events was too short [i.e., <4 months]):** The length of time between the event in semester 2 and semester 1 is too short (i.e., <4 months). For example, an event delivering vitamin A supplements took place in August 2016 (semester 2, 2016), reaching 81 per cent of target children. An event also took place in June 2016 (semester 1, 2016), reaching 90 per cent of target children. In this scenario, because the two events are only two months apart, the timing violates the minimum spacing requirement and the short time span does not confer optimal protection to the children reached for the calendar year in question. *The data from only one of these two events*

can be accepted for consideration. The semester that achieved higher coverage is retained and its semester-specific VAS coverage reported. Data for the semester with the lowest coverage are recorded as 0 per cent.

- **Scenario 3 (No – the timing between semester events is too long [>8 months]):** The length of time between the event in semester 2 and semester 1 is too long. For example, an event delivering vitamin A supplements took place from 20 to 24 October 2016 (semester 2, 2016), reaching 91 per cent of target children. An event also took place from 3 to 5 February 2016 (semester 1, 2016), reaching 90 per cent of target children. In this scenario, >8 months separate these two events. This timing violates the maximum spacing requirement and potentially leaves children unprotected. *In this scenario, each semester's data are maintained, and the impact of the protracted spacing is seen in the calculation of the annual two-dose VAS coverage estimate (i.e., while semester estimates are maintained, annual two-dose coverage for that calendar year would be 0 per cent because children were left unprotected between semesters).* Methods for calculating annual two-dose coverage are covered in section 3-D.

Context 2: Multiple delivery mechanisms were used (i.e., routine and event) in either or both semesters

- **Scenario 1 (Yes – timing between events was acceptable [i.e., 4–8 months]):** Timing is acceptable if the time between events is within the four- to eight-month limit. For example, an event took place in October 2016 (semester 2, 2016), reaching 81 per cent of target children. It is noted during the review that an event took place in April 2016 (semester 1, 2016), reaching 90 per cent of target children. In this scenario, the data in question (semester 2, 2016) are determined to have taken place six months after the semester 1 event and are thus within the stated acceptable time frame. *The review proceeds to 2.3.*
- **Scenario 2 (No – timing between semester events is too short [i.e., <4 months]):** The length of time between events in semester 2 and semester 1 is too short (i.e., <4 months). For example, an event delivering vitamin A supplements took place on 28 August 2016 (semester 2, 2016), reaching 81 per cent of target children. Another event took place on 2 June 2016 (semester 1, 2016), reaching 90 per cent of target children. In this scenario, because the two events are <3 months apart, the timing violates the minimum spacing requirement and the short time span between the events would not confer optimal protection to the children reached for the calendar year in question. *The data from only one of these two events can be accepted for consideration. The event with the higher coverage is retained and its semester-specific VAS coverage reported. However, if routine distribution also took place in the semester with the lower event coverage, then the routine data are used to represent that semester. Data from the event are rejected and the data from routine distribution are defaulted to the semester. The review proceeds to 2.3.*
- **Scenario 3 (No – timing between semester events is too long [>8 months]):** The length of time between the event in semester 2 and semester 1 is too long. For example, an event delivering vitamin A supplements took place from 20 to 24 October 2016 (semester 2, 2016), reaching 91 per cent of target children. An event also took place from 3 to 5 February 2016 (semester 1, 2016), reaching 90 per cent of target children. In this scenario, > 8 months separate these two events. This timing violates the maximum spacing requirement and potentially leaves children unprotected. In this scenario, if routine distribution also took place in the semester with the lower coverage, *the event data are rejected and the data from routine distribution are used to represent that semester. The review proceeds to 2.3.*

2.3 Was there any geographic and/or age group overlap between the different distribution mechanisms employed? While vitamin A may be delivered through both routine health contacts and events in a country, for the purpose of determining semester-specific VAS coverage, further assessment is required to determine whether only data from the main distribution mechanism move forward, or if a combination of data from both mechanisms is required to best estimate national coverage. In order to facilitate this decision-making process, it needs to be determined whether or not there is any overlap between the two mechanisms either in terms of geography (for example, distribution through both routine health system contacts and events took place in the same administrative units) and/or target age groups (for example, distribution through both routine health system contacts and event targeted the same age groups).

- Scenario 1 (No overlap):** There is no geographic or age group overlap between the two mechanisms. In other words, 1) the routine distribution and event both took place in geographically distinct subnational areas (there were no administrative areas where both mechanisms overlapped), and/or 2) the routine distribution and event targeted completely different age groups (i.e., routine distribution targeted only children aged 6–11 months, and the event targeted only those aged 12–59 months). In either of these scenarios, because each mechanism was used to reach different groups within the target population, data from both mechanisms need to be combined to get a complete picture of programme coverage. *As such, the data from both distribution mechanisms are added together (the new numerator and denominator for national coverage would respectively be the sum of the numerators for each delivery mechanism in a semester/country and the sum of the denominator for each delivery mechanism in a semester/country). The review with these new numerators and denominators proceeds to Domain 3.0.*
- Scenario 2 (Full overlap):** There is full geographic and/or age group overlap between the two mechanisms. In other words, either 1) distribution via routine health system contacts and event both took place in the same areas (there was complete overlap, i.e., no geographic locations where only one mechanism was used), and/or 2) distribution via routine health system contacts and event targeted the exact same age groups. In either of these scenarios, only one delivery mechanism can move forward in the review (as there is no way to ensure the same children were not reached by both event and routine distribution in the same semester where mechanisms overlapped, data from only one mechanism are used to avoid inadvertently double counting children). The mechanism selected to move forward is that which reached the highest number of children with VAS in each respective age group. For example, if via routine delivery targeting children aged 6–59 months, a total of 50,000 children were reached in semester 1, 2016, and via a polio SIA event targeting children of the same age group, a total of 200,000 children were reached in semester 1, 2016, only the data on the 200,000 children reached via the SIA continue to the next review step. The 50,000 numerator from the routine data is not taken into consideration. Therefore, *the data from the delivery mechanism that reached the fewest number of children are disregarded, and the review, using data from the delivery mechanism that reached the most children, proceeds to Domain 4.0.* However, if the data selected to move forward are from an event, *then the review should first circle back to 2.2 to verify appropriate spacing of events.*
- Scenario 3 (Partial overlap):** There is partial geographic and/or age group overlap between the two mechanisms. In either scenario, it might be possible to request subnational-level data from a country to help determine where there is overlap and where there is not. For example, if a country has 100 districts and implemented VAS via polio SIAs in 75 of them and routine activities in 50 of them, there is overlap between the two distributions in at least some districts. In this situation, if the country team can provide district-level data on the number of children that received VAS in that semester for each mechanism, it is possible to determine which data are most appropriate to use for each area/district. If these more-disaggregated data are made available, in areas where there was overlap, only the data from the distribution mechanism that reached a higher number of children are used for those areas. In the non-overlap districts, data from the sole distribution mechanism would then be added to these data to create a new/modified numerator. In addition, in a case where the target population/denominator in the overlap districts was different (e.g., the source of target population is different for event and routine), then the country-reported denominator corresponding to the selected numerator data for that area is utilized. As this scenario would include at least some data from an event, *the review circles back to 2.2 to verify appropriate spacing of events, where applicable. The review, with these new numerators and denominators, proceeds to Domain 3.0.*

DOMAIN 3.0: DETERMINATION OF NATIONAL REPRESENTATIVENESS

This review domain helps determine if the data reported can be considered to be nationally representative. In order for coverage estimates to be accepted into the UNICEF Global VAS Coverage Database, there must be some evidence that they are nationally representative. A proxy for this assessment is based on a report of the total number of administrative areas in the country (e.g., districts, sub-districts, health posts, etc.) as well as the number of those administrative areas that submitted a final VAS report. The following questions help determine how representative the reported data are.

3.1 Did at least 80 per cent of the administrative areas in the country submit final data? A cut-off of 80 per cent has been set as being nationally representative; if this is not reached, then the coverage data cannot be assumed to be nationally representative. This cut-off has been used by other databases that rely on administrative data [18]. It is important to note that the 80 per cent cut-off counts an administrative area that did not submit a report – but for which the government confirms no activity took place – as having reported (a numerator of 0). For example, if in a particular semester, funding and security issues limited implementation of an event to only 45 of 100 districts in the country and it was confirmed that no VAS took place in the remaining 55 districts, then the 55 districts are counted as having reported a numerator of 0, even if they submitted no formal report. This means that reports from at least 25 of the districts that did implement VAS events are required to reach the 80 per cent country-level minimum. Assessment of this review question is broken down into the following sub-questions:

Sub-question 3.1.1: Is the reporting unit for administrative unit district level or lower?

- **Scenario 1 (Yes):** If the administrative reporting unit provided by the country team is district level or lower (e.g., sub-district, health post), *the review proceeds to sub-question 3.1.2.*
- **Scenario 2 (No):** If the administrative reporting unit provided by the country team is higher than the district level (i.e., region), the team is requested to provide data at lower administrative levels. If upon request the team can provide data at district or lower level, *the review proceeds to sub-question 3.1.2.* If data are not available for a lower unit, *the semester coverage is reported as “no data”.* There are limited scenarios in which data from administrative levels higher than district may be accepted, such as in conflict areas where data collection and reporting is dependent on the security situation. These scenarios are assessed on a case-by-case basis.

Sub-question 3.1.2: Is the number of total administrative units reported to exist in the country in line with previous reports and/or other official estimates? This question helps determine if the number of administrative units reported to exist in the country (and which is used as the denominator in the calculation in sub-question 3.1.3) is accurate.

- **Scenario 1 (Yes):** If the number of administrative units (e.g., districts, subdistricts, health posts) matches what was reported in the previous year’s vitamin A coverage report to UNICEF, *the review proceeds to sub-question 3.1.3.*
- **Scenario 2 (No):** If the number of administrative units (e.g., districts, subdistricts, health posts) reported is lower or higher than indicated in the previous year’s report, the information is checked against the number indicated in the most recent official document available online (e.g., ministry of health annual health bulletin for number of districts and/or health posts). If the number of administrative units reported to exist on the coverage form matches that of the latest official report, *the review proceeds to sub-question 3.1.3.* If the number of administrative units reported does not match the latest official report, *the country team is contacted and asked to provide an explanation and/or revise as necessary.* If the explanation is acceptable (e.g., additional districts were created prior to an election that were not reflected in the latest public documents of the ministry of health, planning or other), *the reported value is used as is and the review proceeds to sub-question 3.1.3.* If the explanation is not acceptable, and the team cannot revise the report, *the semester is reported as “no data”.*

Sub-question 3.1.3: Do the data reported represent at least 80 per cent of the geographic areas in which VAS took place? This question assesses whether the percentage of districts^{xiv} that reported data used in the numerator represents at least 80 per cent of all districts in the country; the 80 per cent cut-off is used as a proxy for national-level representativeness.

- **Scenario 1 (Yes):** If final data used in the report were available for at least 80 per cent of the geographic areas in the country, *the review continues to Domain 4.0.*
- **Scenario 2 (No):** If final data used in the report were not available from at least 80 per cent of the geographic areas in the country, the country team *is asked whether they can obtain reports from additional administrative units to reach at least 80 per cent and, if so, to revise the reporting form*

xiv The reporting form allows the user to select the lowest administrative level they are able to report on, district, subdistrict, health post or other (specify).

accordingly. If the country team indicates that they will never be able to submit reports for more administrative areas (e.g., flooding destroyed reports from some districts), *the semester coverage is reported as “no data”*. If the country team cannot provide data for additional administrative units, they are requested to provide under-five population estimates for all administrative units in the country; if the reporting administrative areas are home to ≥ 80 per cent of the total number of children under 5 years of age in the country, *the review proceeds to Domain 4.0*. If the country team provides population data for each administrative unit but the administrative units that reported are home to < 80 per cent of the total number of children under 5 years of age in the country, *the semester coverage is reported as “no data”*.

DOMAIN 4.0: REVIEW OF DENOMINATOR

This domain includes questions to validate the country-reported denominator/target population estimate. The denominator(s) reviewed in this domain are derived from the decisions made in Domain 2.0 (i.e., whether the denominator reported for events or routine health system contacts or another will be used for a given semester). The steps below are not required to be implemented in the order presented and can be undertaken in parallel or in an alternate order. At the end of this domain, a denominator to calculate coverage is selected.

4.1 Does the country-reported denominator source and/or value vary significantly from previous years (for the same delivery mechanism)? A number of sub-questions help determine if the reported denominators can be used as reported or require modification, or if alternates are needed.

Sub-question 4.1.1: Is the denominator based on the same source as in the previous year(s) when the same distribution mechanism was used?

- **Scenario 1 (Yes):** If the denominator is derived from the same source used in previous year(s) for the same delivery mechanism, *the review proceeds to sub-question 4.1.2*.
- **Scenario 2 (No):** If the denominator is derived from a different source than used in previous year(s) when the same delivery mechanism was used, *country teams are requested to provide justification for this change along with supporting documentation*. If the justification is acceptable (i.e., the national VAS team (including government) have decided to change the denominator source for this distribution mechanism for all years moving forward), *the review proceeds to sub-question 4.1.2*. If the justification is not acceptable, *the country team is requested to revise the form and use the same denominator source for that distribution mechanism as in the past or to get agreement with justification from the national VAS team (including government) to change the denominator source moving forward for all years to come; the review proceeds to sub-question 4.1.2 when the revisions have been made*.

Sub-question 4.1.2: Is the denominator different from previous year(s)?:

- **Scenario 1 (Yes):** If the denominator is different than what was reported in the previous year, or a previous year for the same distribution mechanism, *the review proceeds to sub-question 4.1.3*.
- **Scenario 2 (No):** If the denominator is exactly the same as what was reported in the previous year (e.g., 5,439,782), or any previous year, *the country team is requested to revise the denominator in the case it was incorrectly reported or to justify the lack of any change*. If a correction is made and the value is no longer exactly the same as a previous year, or if acceptable justification is provided (e.g., previous year was wrong, and this year is correct), *the review proceeds to sub-question 4.1.3*. If the country team is unable to provide an alternative estimate or acceptable justification, *the review proceeds to 4.2 to determine whether utilization of a different official estimate for a denominator is feasible*.

Sub-question 4.1.3: Is the difference for this year’s denominator value reflective of an annual growth rate of <+/-5 per cent?

- **Scenario 1 (Yes):** If the growth rate is less than +/-5 per cent per year, *the review proceeds to 4.2.*
- **Scenario 2 (No):** If the increase or decrease in the target population represents an annual growth rate of more than +/-5 per cent, *the country team is requested to make a correction in case a mistake has been made or for justification and to provide evidence/documentation about the change. If the revision leads to a difference representing an annual growth rate of <5 per cent or if the justification is acceptable (e.g., there is a new population and housing census yet to be reflected in the latest UNPD-WPP estimates and the reported value is in line with the census report), the review proceeds to 4.2.*

4.2 Is the ratio derived when dividing the country-reported denominator by the target population from the corresponding year of the UNPD-WPP estimate ≥ 0.90 ? Given the challenges with target population/denominator estimates from administrative data, the reported target population from government estimates are further checked by comparing them with the population estimate for the corresponding year from the UNPD-WPP. However, one adjustment is made as UNPD-WPP has population estimates for children younger than 5 (or children aged 0–59 months) and the target group for VAS is 6–59 months. As such, a population estimate for 6–59-month-olds is first generated based on UNPD-WPP estimates by subtracting 10 per cent of the total under-five population (e.g., if UNPD-WPP under-five population is 1,000,000, $1,000,000 - 10 \text{ per cent} = 900,000$ is used as the comparison against the country-reported denominator). The UNPD-WPP figures provide a set of systemically generated estimates for all countries. This review question helps identify situations in which the reported denominator is less than 90 per cent of the reported UNPD-WPP denominator for the same year to avoid use of underestimated denominator values.

- **Scenario 1 (Yes):** If the ratio is ≥ 0.90 of the UNPD-WPP estimate, *the country-reported denominator is used and the review proceeds to Domain 5.0.*
- **Scenario 2 (No):** If the ratio generated by dividing the reported target population from the coverage form for the semester by the estimated UNPD-WPP value for the same year is < 0.90 , *the country team is requested to provide a justification for the low value and supporting documentation. If the justification is acceptable (e.g., a census was released very recently that was not included in the latest UNPD-WPP estimate and for which source documentation confirm alignment with the denominator reported on the coverage reporting form), the reported target population is retained and the review proceeds to Domain 5.0. If the justification is not acceptable or lacks appropriate source documentation, the UNPD-WPP estimate is used as the denominator and the review proceeds to Domain 5.0.*

DOMAIN 5.0: REVIEW OF NUMERATOR

This domain includes one main question and a number of sub-questions to validate the country-reported numerator. The numerator(s) reviewed in this domain are derived from the decisions made in Domain 2.0 (i.e., whether the numerator reported for events or routine health system contacts or another will be used for a given semester). The sub-questions below are not required to be implemented in the order presented and can be undertaken in parallel or in an alternate order. At the end of this review domain, a numerator to calculate coverage is selected.

5.1 Does the numerator clear the stated quality checks? There are a number of quality checks conducted on the reported numerator, detailed below. If the answer to any of the questions below is no, then *the review ends and the semester is reported as “no data”.*

Sub-question 5.1.1: Is the numerator for the semester under review different from the other semester in the same the reporting year?

- **Scenario 1 (Yes):** If the numerators in semester 1 and 2 for the reporting year are different, *the review proceeds to sub-question 5.1.2.*
- **Scenario 2 (No):** If the numerators in semester 1 and 2 for the reporting year are exactly the same, the country team is requested to revise the report and/or provide justification. *If the report is revised and the numerators are no longer exactly the same or if an acceptable justification is provided for their being the*

same,^{xv} *the review proceeds to sub-question 5.1.2*. If the team is unable to make a revision or provide a justification, *the semester coverage is reported as “no data”*.

Sub-question 5.1.2: Is the numerator different than numerators reported in either semester of the previous year?

- **Scenario 1 (Yes):** If the numerator in the semester under review for the current reporting year is different than the numerator in both semesters of the previous year, *the review proceeds to sub-question 5.1.3*.
- **Scenario 2 (No):** If the numerator for the semester under review for the current reporting year is exactly the same as the numerator in either semester of the previous year, *the country team is requested to revise the report and/or to provide justification*. If the report is revised and the numerator is no longer exactly the same as the previous year’s semester or if an acceptable justification is provided for their being the same (i.e., the semester 2 value in the previous year was actually the semester 1 value of the current year, then the previous year’s data requires revision, not current year), *the review proceeds to sub-question 5.1.3*. If the country team is unable to make a revision or provide a justification, *the semester coverage is reported as “no data”*.

Sub-question 5.1.3: Is the numerator not rounded to the nearest 100?

- **Scenario 1 (Yes):** If the numerator for the semester under review is not rounded (e.g., 2,127,391 children dosed), *the review proceeds to sub-question 5.1.4*.
- **Scenario 2 (No):** If the numerator for the semester under review is rounded (e.g., 2,176,000 children dosed), *the country team is requested to explain how that numerator was obtained and to revise, if possible, with a value from an official reporting source, such as the Health Management Information System or tally sheets*. If the report is revised, the numerator is no longer rounded, and an explanation was provided for how the revised value was obtained, *the review proceeds to sub-question 5.1.4*. If the team cannot provide an unrounded estimate, *the semester coverage is reported as “no data”*.

Sub-question 5.1.4: Do the country-reported numerator and denominator result in an unrounded coverage estimate?

- **Scenario 1 (Yes):** If the semester under review does have an unrounded estimate (e.g., 72.4 per cent), *the review proceeds to sub-question 5.1.5*.
- **Scenario 2 (No):** If the semester under review does not have an unrounded estimate (e.g., 75.0 per cent) when using the country office-reported numerator and denominator, *the country team is requested to explain how the numerator was obtained*. If the numerator was reported to have been truly derived by tallying up the number of children reached as recorded (e.g., from reporting forms of all areas rolled up to national level), *the review proceeds to sub-question 5.1.5*. However, if the numerator was derived by back-calculating a coverage that was not based on a numerator or denominator for the entire country (e.g., the country team estimated about 75 per cent of children were reached and generated the numerator using that coverage value * denominator) and the team has no means of producing a numerator based on tallies of children dosed (e.g., from Health Management Information System reports, tally sheets), *the semester coverage is reported as “no data”*.

Sub-question 5.1.5: Does the numerator yield a coverage estimate aligned with the previous year’s estimates (for the same distribution mechanism)?

- **Scenario 1 (Yes):** If the coverage estimate is aligned with previous years (i.e., <10 percentage points different than previous years with the same distribution mechanism), *the review proceeds to the final step of calculating semester-wise coverage (see section 3-C)*.
- **Scenario 2 (No):** If the coverage estimate is not aligned with coverage in the previous year (i.e., >10 percentage points from the previous year with the same distribution mechanism, e.g., routine coverage

xv For example, only routine distribution took place in a given year and the only figure available on the number of children reached is a single annual value on the total children that received vitamin A between January and December. In these scenarios, this value is often divided by 2 given an assumption that half were reached in January to June and half were reached from July to December.

was 12 per cent in 2014 and is reported as 56 per cent in 2015), *the country team is requested to provide justification as such an increase could indicate an error in numerator reporting*. If the team provides acceptable justification for the change in coverage (e.g., routine systems were strengthened by enhanced community mobilization during outreach clinics), *the review proceeds to the final step of calculating semester-wise coverage (see section 3-C)*. If the country team indicates that the difference is due to a factor that has affected quality of reporting in the most recent year, making it incomparable to previous years (e.g., the team switched reporting platform and not all areas were trained on its use in time to use it properly), *the semester coverage is reported as “no data”*.

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