

WHO Regional Office for Africa | ESPEN

ESPEN data-processing protocol

Standard operating procedures for the processing of Joint Application Package and related data into the analytical tables of the ESPEN NTD Portal

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Draft v0.1, for internal review | October 2026

Contents

This protocol brings together the standard operating procedures that describe how ESPEN processes the data reported by countries into the analytical tables used by the ESPEN NTD Portal. SOP-00 sets out the general framework and the conventions common to all diseases; each of the other procedures can be read on its own and keeps its own page numbering.

Code	Procedure	Page
SOP-00	General framework	3
SOP-01	Implementation units, population and endemicity	12
SOP-02	Lymphatic filariasis	19
SOP-03	Onchocerciasis	27
SOP-04	Soil-transmitted helminthiasis	33
SOP-05	Schistosomiasis	39
SOP-06	Trachoma	45
SOP-07	Co-endemicity, water and sanitation, and country summaries	51
SOP-08	Cartography and portal specifications	58

The procedures describe the R scripts of the ESPEN data team in their October 2026 versions. They are revised when a rule, threshold, category or data source changes.

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-00

General framework for processing Joint Application Package data into the ESPEN analytical tables

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-00
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	All data processed by ESPEN to produce the analytical tables of the ESPEN NTD Portal for lymphatic filariasis, onchocerciasis, loiasis, soil-transmitted helminthiases, schistosomiasis and trachoma
Data sources	Joint Reporting Form (JRF) and Joint Request for Selected PC Medicines (JRSM); GET2020 trachoma database; ESPEN IU boundaries; population, WASH and reference datasets
Outputs	Analytical tables at implementation unit (IU), country and regional level; cartography tables; map and chart specifications
Processing scripts	R scripts of the ESPEN data team, October 2026 versions (Annex A)
Related documents	SOP-01 to SOP-08 (disease-specific and cross-cutting procedures)

Abbreviations

AT	Analytical table (processed IU, country or region dataset)	LF	Lymphatic filariasis
EU	Evaluation unit	MDA	Mass drug administration
GET2020	WHO Alliance for the Global Elimination of Trachoma by 2020 (database held by ITI)	NTD	Neglected tropical disease
IHME	Institute for Health Metrics and Evaluation	PC	Preventive chemotherapy
ITI	International Trachoma Initiative	PC-NTD	NTD amenable to preventive chemotherapy
IU	Implementation unit	SAC	School-age children
JAP	Joint Application Package	SCH	Schistosomiasis
JMP	WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene	STH	Soil-transmitted helminthiases
JRF	Joint Reporting Form	WASH	Water, sanitation and hygiene
JRSM	Joint Request for Selected PC Medicines	WPP	World Population Prospects (United Nations)

1. Purpose and scope

The Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN) of the WHO Regional Office for Africa compiles the data reported by national programmes on the neglected tropical diseases amenable to preventive chemotherapy (PC-NTDs): lymphatic filariasis (LF), onchocerciasis, schistosomiasis (SCH), soil-transmitted helminthiasis (STH) and trachoma, together with loiasis, which conditions the choice of treatment for filarial diseases. These data are processed into analytical tables (ATs) that feed the dashboards, maps and country pages of the ESPEN NTD Portal [1] and support the monitoring of the road map for neglected tropical diseases 2021–2030 [2].

This document describes the general framework of the processing: data sources, geographic framework, processing cycle, conventions common to all diseases, quality assurance, publication and interpretation. The disease-specific rules and the cross-cutting components are described in the procedures listed in Table 1. The procedures describe the processing as implemented in the R scripts of the ESPEN data team in October 2026; rules are stated as they are applied by the code.

Table 1. ESPEN data-processing procedures

Code	Title	Content
SOP-00	General framework	Sources, geographic framework, processing cycle, common conventions, quality assurance, publication
SOP-01	Implementation units, population and endemicity	IU list by year, IU population estimates, harmonisation of JRF and JRSM data, endemicity tables by disease, loiasis
SOP-02	Lymphatic filariasis	Endemicity, MDA rounds, coverage and summary indicators
SOP-03	Onchocerciasis	Endemicity, MDA rounds, coverage, elimination-mapping flag and summary indicators
SOP-04	Soil-transmitted helminthiasis	Endemicity, population requiring PC and PC by age group, coverage and summary indicators
SOP-05	Schistosomiasis	Endemicity, population requiring PC by reporting scheme, PC by age group, coverage and summary indicators
SOP-06	Trachoma	Survey results, MDA with azithromycin, coverage and summary indicators from the global trachoma database
SOP-07	Co-endemicity, WASH and country summaries	Access to water and sanitation by IU, co-endemicity and recommended MDA strategies, country and regional summaries across PC-NTDs
SOP-08	Cartography and portal specifications	Cartography tables, IU map layers, maps available in the Map Generator Tool, dashboard charts

2. Overview of the data flow

The processing is organised in successive stages that run in a fixed order, each stage using the outputs of the previous one (Figure 1):

1. **Reference framework.** List of IUs for each year from the official IU boundaries, and IU population estimates used to complete the populations not reported (SOP-01).

2. **Harmonisation of the JAP data.** Population, endemicity and population requiring PC reported in the JRF and the JRSM are standardised and linked to the IU list of each year (SOP-01).
3. **Disease-specific processing.** Endemicity categories, treatment rounds, coverage and summary indicators are produced for each disease at IU, country and regional level (SOP-02 to SOP-06).
4. **Integration.** The disease tables are finalised and combined into co-endemicity tables with recommended MDA strategies, country summaries across PC-NTDs and yearly IU map layers (SOP-07, SOP-08).
5. **Publication.** The ATs are stored in the ESPEN analytical database, from which the portal products are generated (Section 8).

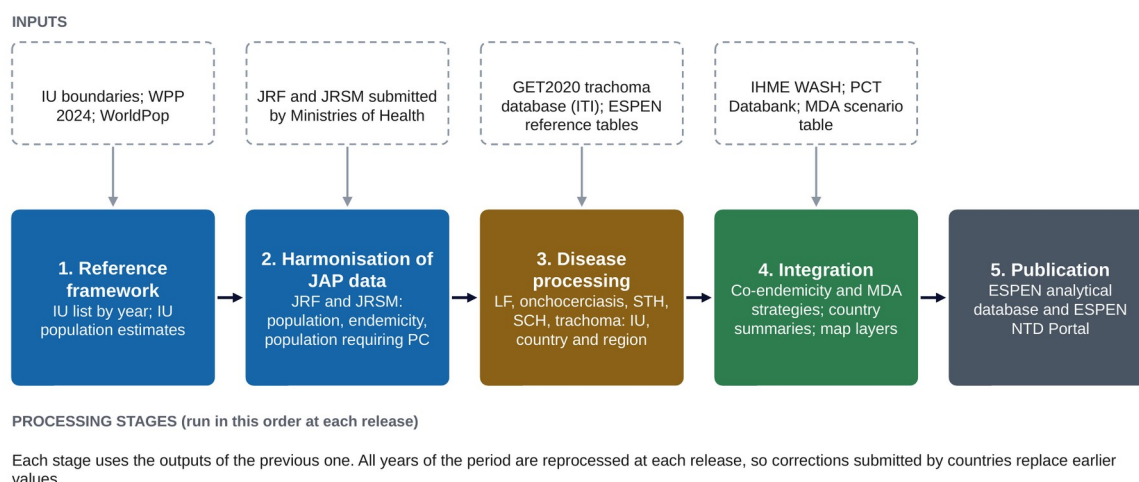


Figure 1. Stages of the processing of JAP and related data into the ESPEN analytical tables.

3. Data sources

Table 2 lists the data sources. The JAP forms are the main source: they are completed by national programmes and submitted by Ministries of Health to WHO [3]. Trachoma data are not reported through the JRF; they are obtained from the global trachoma database maintained by the International Trachoma Initiative (ITI) on behalf of national programmes [4].

Table 2. Data sources

Source	Content used	Provider	Used in
Joint Reporting Form (JRF)	IU population by age group, endemicity status, population requiring PC, PC delivered by regimen and age group (population targeted, population treated, coverage), version of the form	Ministries of Health [3]	SOP-01 to SOP-05, SOP-07
Joint Request for Selected PC Medicines (JRSM)	IU population, endemicity status, population requiring PC, planned rounds	Ministries of Health [3]	SOP-01, SOP-07
Global trachoma database (GET2020)	Trachoma surveys (TF and TT categories and prevalence), azithromycin distribution and coverage, surgery, IU population	ITI [4]	SOP-06
ESPEN IU boundaries	IU, first administrative level and country boundaries for each year since 2013	ESPEN, from boundaries submitted by countries	All

Source	Content used	Provider	Used in
Population data	Annual growth rates and age structure; gridded population counts at 1 km	UN WPP 2024 [5]; WorldPop R2024B [6]	SOP-01
WASH estimates	Household access to water and sanitation, 2000–2017; country indicators	IHME [7]; JMP [8]	SOP-07
PCT Databank	Country-level status of LF, onchocerciasis, STH and SCH	WHO [9]	SOP-07
ESPEN reference tables	Endemicity codebook; contemporary IU endemicity (2020), updated at a regional workshop with national programme and data managers at the end of 2019; historical MDA records (APOC) for LF and onchocerciasis; list of redistricted IUs; IU-level loiasis endemicity; scenarios of recommended MDA strategies; map and chart specifications	ESPEN	As stated in each SOP

4. Geographic framework

The implementation unit (IU) is the unit of analysis of the JAP data. An IU is the administrative unit, usually a district, in which MDA is planned and implemented. Each year the IU boundaries reported by countries are incorporated in the ESPEN cartography, and each IU carries a unique IU code for that year. The JRF and JRSM records are linked to the IU list of the corresponding year through the IU code and the year. Administrative names are also used in two cases: to complete the IU code of JRF records that have none (from the JRSM, when the administrative unit holds a single IU), and to give the treatment records the IU code of the JRF country information sheet with the same country, first- and second-level administrative units and year (SOP-01, SOP-02).

IU boundaries change when units are split or merged (redistricting). ESPEN keeps a list of IUs created by redistricting, with their parent IU and the year of creation. An IU created by a split from 2014 onwards inherits the cumulative counts of its first parent IU as of the year before its creation, on the assumption that treatment was delivered uniformly across the parent IU: the parent's rounds since 2013 are added to its own and, for LF and onchocerciasis, the cumulative total including historical rounds starts from the larger of its own and its parent's value (SOP-02 to SOP-05).

Trachoma data are processed on the IU geography of the global trachoma database, which may differ from the ESPEN IUs; trachoma tables are linked to the trachoma boundaries through the identifier of that database (SOP-06).

Results are aggregated by country and by United Nations subregion within each WHO region (Western, Middle, Eastern, Southern and Northern Africa, and Western Asia for the countries of the WHO Eastern Mediterranean Region covered by the ESPEN cartography). The disease tables do not include a total for the whole region; totals for the WHO African Region and for all countries covered are produced in the country summaries across PC-NTDs (SOP-07).

5. Processing cycle and versioning

The processing is run when new or corrected submissions are to be reflected in the portal. At each run all years of the period covered (currently 2013–2025 for the IU tables) are processed again from the source data. A correction submitted by a country for an earlier year therefore replaces the previous value at the next release, and published figures can change between releases.

Each release is identified by the year and month of the run (YYYYMM), which is used in the names of the exported copies of the analytical tables. The steps pass their results to each other through working files and database tables that are replaced at each run. The processing scripts are versioned; this series of procedures refers to the versions listed in Annex A. Data are organised by IU and year; JRSM records are linked to the JRF records of the same IU and year.

6. Conventions common to all diseases

The conventions in Table 3 apply to all diseases unless the disease-specific procedure states otherwise. Definitions of coverage follow WHO guidance on PC data [10,11]; the thresholds for an effective round correspond to the coverage targets of the WHO programmes [12–14].

Table 3. Conventions applied in the processing

Topic	Rule applied
Hierarchy of sources	For each IU and year the JRF record is used when there is one. Its endemicity category is used even when the code was left blank (it is then read as code 0 of the codebook), so the JRSM category is used only for IU-years without a JRF record. Population fields missing or zero in one form are completed from the other form, and a population requiring PC missing in the JRF is taken from the JRSM. Populations still missing, or below 100, are replaced by IU population estimates (SOP-01).
Linkage	Records are linked to the IU list by IU code and year. Names are used to resolve records that share an IU code, to complete missing JRF IU codes from the JRSM (only for administrative units with a single IU), and to give treatment records the IU code of the country information sheet with the same country, first- and second-level administrative names and year.
Country codes	Reported country codes are checked against the cartography using the ISO3 code, the ISO2 code, the IU codes and the country name. A valid reported ISO3 code is kept, and logged when other evidence contradicts it; an invalid code is replaced when all available evidence agrees. Country names follow the ESPEN cartography, with four names harmonised (Democratic Republic of the Congo, Sao Tome and Principe, Gambia, Cabo Verde).
Endemicity categories	Reported codes are converted into standard categories with the ESPEN endemicity codebook. Blank codes are read as code 0 of the codebook, and codes not found in the codebook are classified as non-endemic. IU-years without any report are classified as "Not reported" for LF, onchocerciasis, STH and SCH, and as non-endemic for loiasis.
Duplicated records	Records of the same form with the same IU code, year, administrative units and IU name (ignoring case, accents, spaces and punctuation) are treated as repeats whatever their other values: the record that reports a total population is kept, otherwise the first listed. Treatment data keep one record per IU, year and regimen (the record with the largest population treated) and one record per IU and year after the regimens are combined; populations are not added across regimens or rounds, and the largest value reported is kept (for onchocerciasis, the ALB+IVM record when reported, otherwise ivermectin alone).
Programme coverage	Population treated divided by population targeted, $\times 100$.
Epidemiological coverage	Population treated divided by population requiring PC, $\times 100$.

Topic	Rule applied
Denominators	When people were treated but the population targeted is missing or very small, the population requiring PC is used as the denominator, and coverage is set to zero when its denominator is below a minimum. For STH and SCH, the population treated is first limited to the population requiring PC of each age group. The thresholds are given in each disease procedure.
Treatment round	An IU-year counts as one round when coverage is above zero. The tables hold one round per IU and year, whatever the number of rounds delivered (for the exceptions in trachoma, see SOP-06).
Effective round	Coverage at or above the programme threshold: 65% for LF, 80% for onchocerciasis, 75% (total programme coverage) for STH and SCH. No threshold is applied for trachoma.
Cumulative rounds	Number of years with a round (or an effective round) for each IU since 2013. For LF and onchocerciasis, a separate cumulative total is the number of rounds in the historical (APOC) records, minus the round of 2014 (which these records are assumed to include), plus the rounds counted since 2013. New IUs inherit the counts of their parent IU (Section 4).
Aggregation	Country and subregional values are sums over the IUs in the relevant categories. Coverage above IU level is calculated from the summed populations, not averaged across IUs.
Rounding	Coverage and RAPLOA values are stored with two decimals, age-group fractions with three and growth multipliers with five. In the disease tables, other values are rounded to whole numbers (to the nearest even number when a value ends in exactly 0.5); in the IU list and the demographic tables, the decimal part is dropped.
Missing values	Missing populations and treatment values are set to zero at several steps. A zero in the tables therefore does not always distinguish a value not reported from a value reported as zero.

7. Quality assurance

Quality assurance is built into the processing and completed by a review of the decision logs after each run:

- **Automatic stops.** The processing stops when a join between the forms, with the codebook or with the country table would duplicate records, when an expected table or field is missing and, for the disease tables and the portal specifications, when an empty table would replace a published one. Joins with the cartography and with the population estimates keep the first record of each IU and year instead of stopping.
- **Decision logs.** Inconsistent country codes, records that share an IU code with the decision taken, and records whose IU name differs from the cartography are written to log files. The ESPEN data team reviews them and, when needed, asks for the correction at source.
- **Record counts.** For the disease tables and the portal specifications, the number of records stored in the analytical database is compared with the number prepared.
- **Consistency checks.** Reported and processed endemicity categories are cross-tabulated, the number of records edited is reported, and categories without a standard code, scenarios without a recommended MDA strategy and records left without an IU code are listed. Records whose IU code is not found in the cartography of the year are not yet listed (SOP-01).

- **Reference tables.** The parameters and reference tables listed in each procedure are reviewed before each reporting cycle.

8. Publication on the ESPEN NTD Portal

The ATs are stored in the ESPEN analytical database: IU, country and regional tables for each disease, co-endemicity tables, country summaries across PC-NTDs, cartography tables and the lookup tables that define the maps and charts. The ESPEN NTD Portal [1] reads these tables to produce the dashboards, the Map Generator Tool, the country pages and the data downloads. The maps available for each country and period are defined as described in SOP-08.

9. Interpretation and limitations

- The tables reflect the data reported by national programmes. The processing harmonises, links and completes the data but does not verify the accuracy of field data.
- Validated country data take precedence over estimates. Where a country does not report a value, estimates are used as described in SOP-01; these are identified as estimates in the procedures but not flagged record by record in the tables.
- Some rules reclassify reported values (for example, countries considered non-endemic for a disease, or the reconciliation of 2013–2019 endemicity with the contemporary classification agreed with national programme and data managers at the end of 2019). The category reported by the country, after conversion with the codebook, is kept in the IU demographic table; the category before reconciliation is kept in the intermediate processing files but not in the published disease tables.
- Programme coverage can exceed 100% when the population treated exceeds the population targeted.
- Figures for the most recent year may be incomplete, because reports are received during the following year.
- ESPEN figures can differ from those published by WHO headquarters, such as the PCT Databank [9], because of differences in timing, in the level of processing (IU rather than country) and in the completion of missing values.

10. Responsibilities and revision

The ESPEN data team runs the processing, reviews the decision logs, maintains the reference tables and keeps this series of procedures up to date. National programmes are contacted when data need to be corrected at source.

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-00, prepared from the code of the processing scripts.

References

1. World Health Organization Regional Office for Africa. ESPEN NTD Portal [Internet]. Brazzaville: WHO Regional Office for Africa; [cited 2026 Oct 19]. Available from: <https://espen.afro.who.int>

2. World Health Organization. Ending the neglect to attain the Sustainable Development Goals: a road map for neglected tropical diseases 2021–2030. Geneva: World Health Organization; 2020. Available from: <https://www.who.int/publications/i/item/9789240010352>
3. World Health Organization. Joint application package for preventive chemotherapy [Internet]. Geneva: World Health Organization; [cited 2026 Oct 19]. Available from: <https://www.who.int/teams/control-of-neglected-tropical-diseases/interventions/strategies/preventive-chemotherapy/joint-application-package>
4. International Trachoma Initiative. Trachoma data and the global trachoma database [Internet]. Decatur (GA): Task Force for Global Health; [cited 2026 Oct 19]. Available from: <https://www.trachoma.org>
5. United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects 2024 [Internet]. New York: United Nations; 2024 [cited 2026 Oct 19]. Available from: <https://population.un.org/wpp/>
6. WorldPop. Global population estimates 2015–2030, release R2024B, 1 km resolution, UN-adjusted [Internet]. Southampton: University of Southampton; [cited 2026 Oct 19]. Available from: <https://www.worldpop.org>
7. Local Burden of Disease WaSH Collaborators. Mapping geographical inequalities in access to drinking water and sanitation facilities in low-income and middle-income countries, 2000–17. *Lancet Glob Health*. 2020;8(9):e1162–85. doi:10.1016/S2214-109X(20)30278-3
8. WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. JMP WASH data [Internet]. [cited 2026 Oct 19]. Available from: <https://washdata.org>
9. World Health Organization. PCT databank [Internet]. Geneva: World Health Organization; [cited 2026 Oct 19]. Available from: <https://www.who.int/teams/control-of-neglected-tropical-diseases/data-platforms/pct-databank>
10. World Health Organization. Preventive chemotherapy: tools for improving the quality of reported data and information. A field manual for implementation. Geneva: World Health Organization; 2019. Available from: <https://www.who.int/publications/i/item/9789241516464>
11. World Health Organization. Preventive chemotherapy in human helminthiasis: coordinated use of anthelmintic drugs in control interventions. A manual for health professionals and programme managers. Geneva: World Health Organization; 2006. Available from: <https://www.who.int/publications/i/item/9241547103>
12. World Health Organization. Monitoring and epidemiological assessment of mass drug administration in the global programme to eliminate lymphatic filariasis: a manual for national elimination programmes. Geneva: World Health Organization; 2011. Available from: <https://www.who.int/publications/i/item/9789241501484>
13. World Health Organization. Guidelines for stopping mass drug administration and verifying elimination of human onchocerciasis: criteria and procedures. Geneva: World Health Organization; 2016. Available from: <https://www.who.int/publications/i/item/9789241510011>
14. World Health Organization. Guideline: preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups. Geneva: World Health Organization; 2017. Available from: <https://www.who.int/publications/i/item/9789241550116>

Annex A. Processing scripts documented

The procedures document the following R scripts (October 2026 versions). Scripts are listed in order of execution; the step numbers are those of the ESPEN workflow.

Step	Script	Folder	SOP	Stage
1.1	Processing_IU_list_v02.R	Processing_IU_list	SOP-01	Reference framework
3.1	Population_estimates_v03.R	Processing_Population	SOP-01	Reference framework
1.2	ESPEN_Indicators_Demographics_v04.R	Processing_Population	SOP-01	Harmonisation
1.3	ESPEN_Indicators_Endemicity_v02.R	Processing_Endemicity	SOP-01	Harmonisation
1.4	LF_AT_v05.R	Processing_LF	SOP-02	Disease processing
1.5	Oncho_AT_v05.R	Processing_Oncho	SOP-03	Disease processing
1.6	STH_AT_v05.R	Processing_STH	SOP-04	Disease processing
1.7	SCH_AT_v05.R	Processing_SCH	SOP-05	Disease processing
1.8	Trachoma_AT_v05.R	Processing_Trachoma	SOP-06	Disease processing
1.9	ESPEN_AT_Transpose_v02.R	Processing_AT	SOP-02 to SOP-06	Integration
2.1	Processing_WASH.R	Processing_WaSH	SOP-07	Integration
1.10	Coendemicity_AT_v02.R	Processing_Coendemicity	SOP-07	Integration
1.11	Country_Coendemicity_AT_v03.R	Processing_Coendemicity	SOP-07	Integration
1.12	IU_AT_shp_v02.R	Processing_IU_SHP	SOP-08	Integration
5.1	IU_AT_GeoJSON.R	Processing_IU_SHP	SOP-08	Publication
6.1	Maps_Specs_Categories_v02.R	Processing_Map_Chart_specs	SOP-08	Publication
6.2	Maps_Specs_v04.R	Processing_Map_Chart_specs	SOP-08	Publication
6.3	Chart_Specs_v02.R	Processing_Map_Chart_specs	SOP-08	Publication
–	Functions/JAP_functions.R	Functions	All	Shared functions

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-01

Implementation units, population and endemicity: harmonisation of the JRF and JRSM data

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-01
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	List of implementation units (IUs) by year; IU population estimates; harmonisation of the population, endemicity and population requiring PC reported in the JRF and JRSM; endemicity tables by disease, including loiasis
Data sources	ESPEN annual IU boundaries; JRF and JRSM (country information and introduction sheets); UN WPP 2024; WorldPop R2024B; ESPEN endemicity codebook; IU-level loiasis endemicity
Outputs	IU list by year; IU population estimates 2013–2030; IU, country and regional demographic tables 2013–2025; JRF and JRSM submission status by country and year; IU endemicity tables by disease
Processing scripts	Steps 1.1, 3.1, 1.2 and 1.3 (Annex A)
Related documents	SOP-00 (general framework); SOP-02 to SOP-05 (use the outputs of this procedure)

Abbreviations

IU	Implementation unit	RAPLOA	Rapid assessment procedure for loiasis
JAP	Joint Application Package	SAC	School-age children
JRF	Joint Reporting Form	SCH	Schistosomiasis
JRSM	Joint Request for Selected PC Medicines	STH	Soil-transmitted helminthiasis
LF	Lymphatic filariasis	WPP	World Population Prospects (United Nations)
PC	Preventive chemotherapy	WRA	Women of reproductive age
Pre-SAC	Pre-school-age children		

1. Purpose and scope

This procedure describes how ESPEN builds the reference framework of the processing: the list of implementation units (IUs) of each year, the IU population estimates used to complete the populations not reported, and the harmonised IU dataset of population, endemicity and population requiring preventive chemotherapy (PC) reported by countries in the Joint Reporting Form (JRF) and the Joint Request for Selected PC Medicines (JRSM) of the Joint Application Package [1]. It also describes the

split of this dataset into one endemicity table per disease. The outputs are used by all disease-specific procedures.

2. Data sources

Table 1. Data sources

Source	Content used	Years
ESPEN annual IU boundaries	Attributes of each IU (country, administrative levels, IU name, IU code)	2013–2025
JRF and JRSM, country information sheet	IU identifiers, total population and population by age group, endemicity code by disease, population requiring PC by disease and age group, rounds	JRF 2013–2025; JRSM 2015–2025
JRF introduction sheet	National percentages of the population by age group; version of the form	As submitted
UN World Population Prospects 2024 [2]	Annual population growth multiplier and age structure by country	2013–2030
WorldPop gridded population [3]	Population counts at 1 km resolution adjusted to UN totals (release R2024B for 2015–2030; counts prepared for 2013 and 2014)	2013–2030
ESPEN endemicity codebook	Correspondence between the endemicity codes of the forms and standard categories, by disease	Current
IU-level loiasis endemicity	Loiasis endemicity by IU and year, including rapid assessment (RAPLOA) results	As compiled by ESPEN

3. Definitions

Table 2. Terms used in this procedure

Term	Definition
IU-year	One IU in one year of the ESPEN cartography. The IU code and the year form the key of the tables of this procedure.
Population groups	Total population; pre-school-age children (pre-SAC); school-age children (SAC); adults; women of reproductive age (WRA, 15–49 years); children aged 2–4 years. Age groups are those of the JAP forms and of WPP 2024.
Population requiring PC	Population reported by the country as requiring PC for a disease, by age group where the form requests it.
Endemicity category	Standard category of the ESPEN codebook corresponding to the code reported for a disease.
Not reported	IU-year for which neither the JRF nor the JRSM holds a record.
Growth multiplier	Ratio of the national population of a year to that of the previous year (WPP 2024).
Age-group fraction	Share of the national population in an age group, from the JRF introduction sheet or, when not reported, from WPP 2024.

4. Processing steps

4.1 List of implementation units by year

The attribute tables of the annual IU boundary layers are combined into one list, with one record per IU feature and year; the uniqueness of the IU-years is not checked at this step and depends on the boundary files. Leading and trailing spaces are removed, accented characters are converted to plain characters, the names of the administrative levels are written in proper case and numeric fields are stored as whole numbers. No IU is added or removed at this step; the list is the reference to which all reported data are linked.

4.2 IU population estimates

IU population estimates are prepared for each year from 2013 to 2030 and are used only to complete the populations that countries do not report (Section 4.3). They are built as follows:

1. **National parameters.** For each country and year, the growth multiplier is taken from WPP 2024. Pre-SAC, SAC and adult fractions are taken from the JRF introduction sheet; when they are missing in a submitted sheet, they are taken from the previous submitted sheet of the country or, failing that, from the next one. The WRA fraction is not carried over. For any country and year without an introduction sheet (including 2026–2030), and for missing WRA fractions, WPP 2024 fractions are used. The fraction of children aged 2–4 years always comes from WPP 2024.
2. **Reported populations.** The total population reported in the JRF as submitted (before the harmonisation of Section 4.3) is used for an IU and year when it is at least 100; otherwise the total and the age-group values of that record are treated as missing.
3. **Years without a report.** A missing total is estimated from the nearest later reported total divided by the growth multiplier of the year being estimated or, when there is no later value, from the nearest earlier reported total multiplied by that multiplier. The multiplier of a single year is applied, whatever the number of years between the reported and the estimated value.
4. **Age groups.** Reported age-group populations are kept, including values of zero or below 100 when the reported total is valid; missing ones, and the WRA and 2–4-year groups, are obtained by applying the national age-group fraction to the IU total.
5. **Gridded population.** For IUs with no reported population in any year, and for all IUs from 2026 to 2030, the total is the sum of the WorldPop 1 km counts within the IU boundary (each cell weighted by the share of its area inside the IU); the boundaries of 2025 are used for 2026–2030. Age groups are derived with the national fractions. IU-years still without a total after this step are listed for review and left missing.

4.3 Harmonisation of the JRF and JRSM data

The country information sheets of the JRSM and of the JRF are processed in the same way:

1. **Standardisation.** Fields are given standard names, values stored as text are converted to numbers, and names are converted to proper case and plain characters.
2. **Country codes.** The ISO3 code reported for each country is checked against the cartography using four pieces of evidence: the ISO3 code itself, the ISO2 code, the country of the IU codes reported and the country name; a piece of evidence that is missing does not count against the code. A valid reported code is kept, and logged for review when another piece of evidence points to a different country. An invalid code is replaced when all available evidence points to the same country, and left unresolved otherwise; the country name is then left empty, but the records are still linked by IU code. The country name is then replaced by the name used in the cartography.
3. **Endemicity codes.** Known invalid codes are corrected first (for schistosomiasis, code 32 is read as 31 and "ND" as 4, unknown). A missing code is treated as code 0 of the codebook. Codes are

then converted into standard categories with the codebook; codes not found in the codebook are classified as non-endemic.

4. **Missing identifiers.** A JRF record without IU code or IU name takes them from the JRSM of the same country, year and first- and second-level administrative units, only when that unit holds a single IU. This step is applied before the next one, so the completed records take part in it.
5. **Records sharing an IU code.** When several records of the same form have the same IU code and year, records that also have the same administrative units and IU name (ignoring case, accents, spaces and punctuation) are treated as repeats whatever their other values: the record reporting a total population above zero is kept, otherwise the first listed. The remaining records are compared with the cartography entry of that IU code: each is scored from 0 to 1 by the similarity of its administrative units and of its IU name, and its advantage is that score minus its best score with any other IU of the country and year. The record with the largest advantage keeps the IU code if its score is at least 0.5 and its advantage exceeds that of the next record by at least 0.1; otherwise the first record listed (for the JRF, in alphabetical order of administrative units and IU name) keeps it. The other records are kept without IU code, so they are not linked to any IU; the closest other IU is suggested in the log when its score is at least 0.6.
6. **Combination of forms.** Each IU-year of the cartography is linked to the JRF and to the JRSM by IU code and year. Population, endemicity and population requiring PC are taken from the JRF record of the IU-year. Because a blank JRF endemicity code is read as code 0 of the codebook, the JRSM category is used only when the IU-year has no JRF record; a population requiring PC missing in the JRF is taken from the JRSM. Population fields missing or equal to zero in one form are first completed from the other form. IU-years without any record are classified as "Not reported" for LF, onchocerciasis, STH and SCH. Records whose IU code is not in the cartography of the year are not linked.
7. **Completion of populations.** Each population field (total, pre-SAC, SAC, adults) still missing or below 100 is replaced by the IU population estimate of Section 4.2; only the first estimate of each IU and year is used. Because the estimates keep the age-group values reported with a valid total, an age-group value below 100 can remain after this step. National age-group fractions and growth multipliers are attached to each IU-year.
8. **Aggregation.** Populations and populations requiring PC are summed by country and year and by subregion and year; national age-group fractions are carried at country level.
9. **Submission status.** For each country and year, the JRF (or JRSM) is recorded as submitted when the form holds at least one record for the country and year, whether or not it is linked to an IU. Countries that never submitted the form do not appear in the table.

4.4 Endemicity tables by disease

The harmonised dataset is divided into one table per disease (LF, onchocerciasis, loiasis, STH and SCH), each with the IU population, the endemicity category and the population requiring PC of that disease (none for loiasis). All IUs of the countries listed in Table 3 are classified as non-endemic for the disease in every year, irrespective of the category reported.

Table 3. Countries whose IUs are classified as non-endemic in the processing

Disease	Countries
LF	Algeria, Botswana, Burundi, Cabo Verde, Djibouti, Eswatini, Gambia, Lesotho, Mauritania, Mauritius, Namibia, Rwanda, Seychelles, Somalia, South Africa
Onchocerciasis	Algeria, Botswana, Cabo Verde, Comoros, Djibouti, Egypt, Eritrea, Eswatini, Gambia, Lesotho, Madagascar, Mauritania, Mauritius, Namibia, Rwanda, Sao Tome and Principe, Seychelles, Somalia, South Africa, Tanzania (Zanzibar), Zimbabwe

Disease	Countries
STH	Eritrea
SCH	Algeria, Cabo Verde, Comoros, Djibouti, Lesotho, Mauritius, Seychelles

For loiasis, the endemicity of each IU and year is taken from the IU-level loiasis dataset compiled by ESPEN for the same IU and year, which includes RAPLOA results ("RAPLOA 0" is read as non-endemic and "No data" as unknown). When the IU-year is not in that dataset, the category reported by the country is used; IU-years without any information are classified as non-endemic. The highest values of the lower and of the upper RAPLOA bounds recorded for each IU are attached to all its years, and set to zero in the years in which the IU is classified as non-endemic.

5. Outputs

Table 4. Outputs of this procedure

Output	Level	Content
IU list by year	IU, 2013–2025	Identifiers and administrative units of each IU and year
IU population estimates	IU, 2013–2030	Total and age-group populations, growth multipliers and age-group fractions
Demographic tables	IU, country, subregion; 2013–2025	IU: population by age group, age-group fractions and growth multiplier, endemicity category as reported (before the disease-specific rules), population requiring PC by disease and age group, rounds reported in the JRF. Country and subregion: number of IUs, population by age group and population requiring PC by disease and age group (and mean age-group fractions at country level).
Submission status	Country and year	Whether the JRF and the JRSM were submitted
Endemicity tables	IU, 2013–2025	One table per disease, used by SOP-02 to SOP-05 and SOP-07
Decision logs	Record	Country-code inconsistencies; records sharing an IU code and decision taken; IU names that differ from the cartography

6. Quality assurance

- The processing stops if a join between the forms, with the codebook or with the country table would duplicate records, or if records sharing an IU code and year remain after resolution. In the joins with the cartography, the population estimates and the loiasis dataset, only the first record of each IU and year is kept.
- Country-code inconsistencies, records sharing an IU code (with the score and the action taken) and IU names whose similarity with the cartography is below 0.5 are written to log files, which are reviewed after each run; corrections are requested at source when needed.
- Endemicity codes corrected and codes not found in the codebook are reported at each run.

- IU-years without population after completion are cross-tabulated with the endemicity category of each disease.
- The tables of this procedure are written to the analytical database without the empty-table and record-count checks applied to the disease tables (SOP-00, Section 7).
- The list of non-endemic countries (Table 3) and the table of code corrections are reviewed before each reporting cycle.

7. Limitations

- Population estimates are used where countries do not report; they rely on national growth rates and age structures and on gridded population data, and may differ from local census figures.
- Each population field is completed separately, so the age groups of an IU-year may not add up to its total population.
- Codes not found in the codebook are classified as non-endemic; such cases are reported at each run so that the codebook can be completed.
- The country rules of Table 3 override the categories reported by those countries for all years.
- For loiasis, the absence of information is treated as non-endemic.
- Records that cannot be attributed to an IU are not included in the tables until the IU code is corrected at source. Records whose IU code does not exist in the cartography of the year are not linked and are not currently listed in the decision logs.
- The IU tables do not show which populations were estimated: the field marking IU-years without population is calculated after completion.
- The population estimates use the JRF records as submitted, before the resolution of records sharing an IU code; an IU-year can therefore have more than one estimate, of which the first is used.

8. Revision

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-01, prepared from the code of the processing scripts.

References

1. World Health Organization. Joint application package for preventive chemotherapy [Internet]. Geneva: World Health Organization; [cited 2026 Oct 19]. Available from: <https://www.who.int/teams/control-of-neglected-tropical-diseases/interventions/strategies/preventive-chemotherapy/joint-application-package>
2. United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects 2024 [Internet]. New York: United Nations; 2024 [cited 2026 Oct 19]. Available from: <https://population.un.org/wpp/>
3. WorldPop. Global population estimates 2015–2030, release R2024B, 1 km resolution, UN-adjusted [Internet]. Southampton: University of Southampton; [cited 2026 Oct 19]. Available from: <https://www.worldpop.org>

Annex A. Processing scripts

Step	Script	Role in this procedure
1.1	Processing_IU_list_v02.R	List of IUs by year (Section 4.1)
3.1	Population_estimates_v03.R	IU population estimates (Section 4.2); run before step 1.2 whenever the JRF data, the boundaries or the gridded population change
1.2	ESPEN_Indicators_Demographics_v04.R	Harmonisation of the JRF and JRSM data (Section 4.3)
1.3	ESPEN_Indicators_Endemicity_v02.R	Endemicity tables by disease (Section 4.4)
–	Functions/JAP_functions.R	Shared functions: country-code validation, endemicity recoding, population completion, resolution of records sharing an IU code

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-02

Lymphatic filariasis: processing of endemicity and mass drug administration data

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-02
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	Endemicity, population requiring PC, MDA delivered, coverage and cumulative rounds of lymphatic filariasis (LF) at implementation unit (IU), country and regional level, 2013–2025
Data sources	Harmonised IU endemicity and population (SOP-01); JRF MDA data for four regimens; ESPEN contemporary IU endemicity (2020); historical record of MDA rounds (APOC); list of redistricted IUs; list of countries not implementing MDA by year
Outputs	LF analytical tables at IU, country and regional level; LF MDA history
Processing scripts	Steps 1.4 and 1.9 (Annex A)
Related documents	SOP-00; SOP-01; SOP-07 (use of LF results in co-endemicity and country summaries)

Abbreviations

ALB	Albendazole	JRF	Joint Reporting Form
APOC	African Programme for Onchocerciasis Control	LF	Lymphatic filariasis
DEC	Diethylcarbamazine	MDA	Mass drug administration
IDA	Ivermectin, diethylcarbamazine and albendazole	PC	Preventive chemotherapy
IU	Implementation unit	PTS	Post-treatment (post-intervention) surveillance
IVM	Ivermectin	TAS	Transmission assessment survey

1. Purpose and scope

This procedure describes how the LF data reported by countries are processed into the ESPEN LF analytical tables: the classification of each IU, the population requiring, targeted and treated, the MDA rounds and their effectiveness, and the summary indicators by country and region. The definitions follow the WHO guidance on the monitoring of MDA in the Global Programme to Eliminate Lymphatic Filariasis [1,2] and on alternative MDA regimens [3].

2. Data sources

Table 1. Data sources

Source	Content used
Harmonised IU dataset (SOP-01)	LF endemicity category, total population and population requiring PC by IU and year
JRF, MDA sheets	Population targeted, population treated and coverage for four regimens: albendazole with ivermectin (ALB+IVM), albendazole with diethylcarbamazine (ALB+DEC), albendazole twice a year (ALBx2) and ivermectin, diethylcarbamazine and albendazole (IDA)
JRF, country information sheet	Correspondence between administrative units and IU codes, used to link the MDA records to IUs
Contemporary IU endemicity (2020)	Reference classification of the LF status of each IU, updated at a regional workshop with national programme and data managers (end of 2019) on the basis of the survey data available
Historical MDA record	Number of MDA rounds of each IU in the historical record compiled from the records of the African Programme for Onchocerciasis Control (APOC); the processing assumes that the record includes the 2014 round
List of redistricted IUs	New IUs, their parent IU and year of creation
Countries not implementing MDA	Countries and years without MDA planned, for which no treatment report is expected

3. Definitions

Table 2. Terms and indicators

Term	Definition
Population requiring PC	Population of an endemic IU that requires MDA, as reported by the country (Section 4.2).
Population targeted	Population targeted by the MDA, as reported in the JRF (Section 4.4).
Population treated	Population that received the medicines, as reported in the JRF.
Programme coverage	Population treated / population targeted × 100; zero when the population targeted is below 100.
Epidemiological coverage	Population treated / population requiring PC × 100; zero when the population requiring PC is below 100.
MDA round	IU-year with programme coverage above zero (epidemiological MDA round: epidemiological coverage above zero).
Effective MDA round	IU-year with programme coverage of at least 65% (epidemiological: epidemiological coverage of at least 65%).
Cumulative rounds	Number of MDA rounds and of effective rounds since 2013; cumulative MDA also includes the rounds of the historical record (Section 4.6).

Term	Definition
Targeted treatment	Endemicity category 15, "Stopped MDA (targeted treatments)": IU that has stopped MDA and delivers treatment in clusters with persistent transmission or hotspots instead of IU-wide MDA.
Population no longer requiring treatment	Population of IUs under post-intervention surveillance, or the part of the population of IUs under targeted treatment that does not require treatment (Section 4.9).

4. Processing steps

4.1 Reconciliation of reported endemicity (2013–2019)

The contemporary IU classification (2020) results from a regional workshop held at the end of 2019, to which national programme managers and data managers were invited. At the workshop, the endemicity status of each IU was reviewed and updated on the basis of the survey data available. ESPEN uses the resulting classification as a benchmark and applies it retrospectively to the years before the workshop.

For 2013 to 2019, the category reported for each IU is compared with the contemporary IU classification and adjusted according to Table 3. A reported category "Unknown" takes the contemporary category when one exists. In the contemporary classification, an IU listed without a recognised category is treated as non-endemic; IUs not listed in it keep the category reported. From 2020 onwards the reported category is kept. The category originally reported is kept in the internal processing tables for traceability; it is not included in the published IU tables.

Table 3. Reconciliation of reported LF endemicity, 2013–2019

Reported	Contemporary (2020)	Category retained
Endemic	Non-endemic	Non-endemic
Endemic	Unknown	Unknown
Non-endemic	Endemic	Endemic
Non-endemic	Under surveillance	Under surveillance
Non-endemic	Unknown	Unknown
Under surveillance	Non-endemic	Non-endemic
Under surveillance	Endemic	Endemic
Any other combination	–	Reported category

4.2 Population requiring PC

- Endemic IUs: the population requiring PC reported; when it is below 100, the total population of the IU (a missing value is set to zero).
- IUs under targeted treatment (category 15): the population requiring PC reported is kept.
- All other categories: zero.

4.3 Linkage of the MDA records

Each MDA record is assigned the IU code that corresponds to its country, first and second administrative units and year in the country information sheet of the JRF; correspondences that point to more than one IU are not used. When no single correspondence is found, the IU code reported in the MDA sheet is kept. The decisions taken on records sharing an IU code (SOP-01) are applied, records without IU code are removed, and one record is kept per IU, year and regimen: the one with the largest population treated.

4.4 Combination of the regimens

- The population targeted and the population treated of an IU-year are the largest values reported across the four regimens; values below 100 are set to zero.
- The regimen of the IU-year is the one with the largest population treated: ALB+IVM, ALB+DEC, ALBx2 or IDA; "Not delivered" when no treatment is reported.
- When people were treated but the population targeted is missing or below 100, the population targeted is set to the population requiring PC.
- The population targeted is set to zero for IUs that are neither endemic nor under targeted treatment.

4.5 MDA rounds and coverage

Programme and epidemiological coverage, MDA rounds and effective rounds are calculated as defined in Table 2. Treatment delivered in IUs under targeted treatment (category 15) is kept in the population treated and coverage, but is not counted as an MDA round or an effective round. Because the population targeted is zero outside endemic IUs, MDA rounds are counted only in endemic IUs. At most one round is counted per IU and year.

4.6 Cumulative rounds

For each IU, the numbers of MDA rounds, effective rounds and their epidemiological equivalents are accumulated year by year from 2013. The cumulative number of MDA rounds (cumulative MDA) is the number of rounds in the historical MDA record, minus the round of 2014 (which the historical record is assumed to include), plus the rounds counted since 2013. The 2014 round is subtracted for every IU, including IUs without a historical record; for these IUs the cumulative MDA can be one round lower than the rounds counted since 2013. When the calculation gives a negative or missing value in any year, only the rounds counted since 2013 are used for that IU.

4.7 Post-intervention surveillance

For 2013 to 2019, an IU reported as endemic is classified as under post-intervention surveillance when the contemporary classification places it under surveillance, its cumulative MDA, including the historical record, is at least five and no MDA was delivered in the year. The population requiring PC and the population targeted are set to zero for all IUs under surveillance.

4.8 IUs created by redistricting

IUs created by the division of a parent IU (redistricting type 1) from 2014 to 2025 add the rounds, effective rounds and epidemiological rounds counted in their parent IU in the year before their creation to their own, in every year. In the first year of a new IU, its cumulative MDA is the larger of its own cumulative MDA and that of the parent IU in the year before, plus the round of that year; the rounds of later years are then added. Only the first parent of a new IU is used. A parent IU without a record in the year before the creation adds no rounds. When the parent IU was itself created during the period, only the rounds counted in it since its creation are passed on.

4.9 Final classification and population no longer requiring treatment

Each IU-year receives one of the output categories of Table 4. In countries validated by WHO as having eliminated LF as a public health problem (Malawi and Togo in the current processing), IUs reported as non-endemic that were under post-intervention surveillance in any year are kept under post-intervention surveillance. The population no longer requiring treatment equals the total population for IUs under post-intervention surveillance, the total population minus the population requiring PC for IUs under targeted treatment, and zero otherwise.

Table 4. Output categories of the LF tables

Category	Condition
Endemic (under MDA)	Endemic, with an MDA round in the year
Endemic (MDA not delivered)	Endemic, without MDA round in the year
Endemic (under post-intervention surveillance)	Under surveillance (Sections 4.1, 4.7 and 4.9)
Endemic (under targeted treatment)	Category 15, stopped MDA and targeted treatment
Endemicity unknown	Unknown
Non-endemic	Non-endemic, including countries listed in SOP-01
Not reported	No JRF or JRSM record for the IU-year

4.10 Country and regional indicators

Country tables are built for each country and year by summing the IU values (Table 5). Treatment indicators are summed over the IUs under MDA, with MDA not delivered, under post-intervention surveillance and under targeted treatment. Regional tables sum the country values by United Nations subregion (within each WHO region) and year, and recalculate coverage from the summed populations; no total for the whole region is calculated. A country is counted as having submitted its JRF in a year when it reported at least one IU, or when it is listed as not implementing MDA that year.

Table 5. Indicators of the LF country and regional tables

Indicator	Definition
IUs by category	Number of IUs in each category of Table 4
Population requiring PC	Sum over IUs under MDA, with MDA not delivered and under targeted treatment
Population no longer requiring treatment	Sum over IUs under post-intervention surveillance and targeted treatment
Population targeted, treated	Sums over the treatment categories
IUs requiring MDA	IUs under MDA or with MDA not delivered (IUs under targeted treatment excluded)
IUs with MDA, with effective MDA	Number of IUs with an MDA round, with an effective round
Programme and epidemiological coverage	Summed population treated / summed population targeted (or requiring PC) × 100
IUs by regimen	Number of IUs under MDA, with MDA not delivered or under post-intervention surveillance, by regimen (ALB+IVM, ALB+DEC, ALBx2, IDA, not delivered); IUs under targeted treatment are not included

Indicator	Definition
JRF submitted	Country submitted the JRF or was not implementing MDA (country level); number of such countries (regional level)

4.11 Finalisation and publication

Before publication each category is given its standard numeric identifier, coverage is rounded to two decimals and other values to whole numbers, and the IU, country and regional tables are written to the ESPEN analytical database. The IU MDA history used in the processing is published for reference.

5. Quality assurance

- The number of IU-years whose endemicity was changed by the reconciliation is reported at each run, with a cross-tabulation of reported and retained categories.
- For each regimen, the number of records whose IU code was completed or replaced, not found, removed by the decisions of SOP-01 or duplicated is reported.
- The IUs under targeted treatment are listed by country and year, with a warning when none is found.
- New IUs and inconsistent parent names are written to log files. For IUs created by redistricting, the records whose cumulative MDA is lower than their rounds since 2013 are identified for review; they are not corrected automatically.
- The number of records stored in the database is checked against the number prepared.

6. Limitations

- The reconciliation with the contemporary classification is applied to 2013–2019 only; later years rely on the category reported.
- When several regimens are reported in the same IU and year, the largest figures are retained rather than their sum, and at most one round is counted per year.
- Treatment reported in IUs under post-intervention surveillance is kept in the population treated, while their population targeted is zero; country coverage can therefore exceed 100%.
- The inheritance of rounds by new IUs assumes that MDA was delivered uniformly in the parent IU.
- Cumulative MDA depends on the completeness of the historical record and on the assumption that it includes the 2014 round; the period covered by the historical record is under review.

7. Revision

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-02, prepared from the code of the processing scripts.

References

1. World Health Organization. Monitoring and epidemiological assessment of mass drug administration in the global programme to eliminate lymphatic filariasis: a manual for national elimination programmes. Geneva: World Health Organization; 2011. Available from: <https://www.who.int/publications/i/item/9789241501484>
2. World Health Organization. Monitoring and epidemiological assessment of mass drug administration in the global programme to eliminate lymphatic filariasis: a manual for national elimination programmes. 2nd ed. Geneva: World Health Organization; 2025. Available from: <https://www.who.int/publications/i/item/9789240105959>
3. World Health Organization. Guideline: alternative mass drug administration regimens to eliminate lymphatic filariasis. Geneva: World Health Organization; 2017. Available from: <https://www.who.int/publications/i/item/9789241550161>

Annex A. Processing scripts

Step	Script	Role in this procedure
1.4	LF_AT_v05.R	Sections 4.1 to 4.10
1.9	ESPEN_AT_Transpose_v02.R	Section 4.11: standard identifiers, rounding and publication
–	Functions/JAP_functions.R	Import and linkage of the MDA records (import_mda_scheme)

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-03

Onchocerciasis: processing of endemicity and mass drug administration data

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-03
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	Endemicity, population requiring PC, MDA with ivermectin, coverage, cumulative rounds and elimination-mapping flag of onchocerciasis at implementation unit (IU), country and regional level, 2013–2025
Data sources	Harmonised IU endemicity and population (SOP-01); JRF MDA data for ivermectin with albendazole and ivermectin alone; ESPEN contemporary IU endemicity (2020); historical record of ivermectin treatment; list of redistricted IUs
Outputs	Onchocerciasis analytical tables at IU, country and regional level; onchocerciasis MDA history
Processing scripts	Steps 1.5 and 1.9 (Annex A)
Related documents	SOP-00; SOP-01; SOP-02 (shared MDA records and linkage); SOP-07

Abbreviations

ALB	Albendazole	LF	Lymphatic filariasis
APOC	African Programme for Onchocerciasis Control	MDA	Mass drug administration
IU	Implementation unit	OEM	Onchocerciasis elimination mapping
IVM	Ivermectin	PC	Preventive chemotherapy
JRF	Joint Reporting Form	PTS	Post-treatment (post-intervention) surveillance

1. Purpose and scope

This procedure describes how the onchocerciasis data reported by countries are processed into the ESPEN onchocerciasis analytical tables: the classification of each IU, the population requiring, targeted and treated, MDA rounds and their effectiveness, the identification of IUs of unknown status that may require onchocerciasis elimination mapping (OEM), and the summary indicators by country and region. It uses the same linkage of MDA records and the same reconciliation of endemicity as the LF procedure (SOP-02). The WHO criteria for stopping MDA and verifying elimination provide the programmatic background [1].

2. Data sources

Table 1. Data sources

Source	Content used
Harmonised IU dataset (SOP-01)	Onchocerciasis endemicity category, population and population requiring PC by IU and year, and the national population growth multiplier by year
JRF, MDA sheets	Population targeted, population treated and coverage for ivermectin with albendazole (ALB+IVM, shared with LF) and ivermectin alone (IVM)
Contemporary IU endemicity (2020)	Reference classification of the onchocerciasis status of each IU, updated at a regional workshop with national programme and data managers (end of 2019) on the basis of the survey data available
Historical treatment record	Number of years of ivermectin treatment of each IU in the historical record compiled from APOC records; the processing assumes that the record includes the 2014 round
List of redistricted IUs; countries not implementing MDA	As in SOP-02

3. Definitions

Population requiring PC, population targeted and treated, programme and epidemiological coverage and MDA round are defined as in SOP-02. The definitions specific to onchocerciasis are given in Table 2.

Table 2. Terms specific to onchocerciasis

Term	Definition
Effective MDA round	IU-year with programme coverage of at least 80% (epidemiological: epidemiological coverage of at least 80%).
Cumulative MDA	Years of ivermectin treatment of the historical record, minus the round of 2014, plus the rounds counted since 2013 (Section 4.5).
Unknown, to consider for OEM	IU of unknown endemicity with no population treated (100 or more) with ALB+IVM or IVM in any year from 2013 to 2025, including years after the year concerned.
Unknown, under LF MDA	IU of unknown endemicity in which a population treated with ALB+IVM or IVM has been reported in at least one year from 2013 to 2025.
Population no longer requiring treatment	For IUs under post-intervention surveillance: the population requiring PC of the last year before surveillance, carried forward with the national growth multiplier (Section 4.7).

4. Processing steps

4.1 Reconciliation of reported endemicity (2013–2019)

The contemporary IU classification (2020) results from a regional workshop held at the end of 2019, to which national programme managers and data managers were invited, which updated the endemicity status of each IU on the basis of the survey data available. It is used as a benchmark and applied retrospectively to the years before the workshop (SOP-02, Section 4.1). The reported category is

reconciled with the contemporary IU classification for 2013–2019 with the same rules as for LF (SOP-02, Table 3); an IU listed in the contemporary classification without a recognised category is treated as non-endemic. From 2020 onwards the reported category is kept. The category originally reported is kept in the internal processing tables; it is not included in the published IU tables.

4.2 Population requiring PC

Endemic IUs keep the population requiring PC reported; when it is below 100, the total population of the IU is used (a missing value is set to zero). All other categories have no population requiring PC.

4.3 Linkage and combination of the MDA records

- The ALB+IVM records are those imported for LF; the IVM records are imported with the same linkage to IUs, the same application of the decisions of SOP-01 and the same rule of one record per IU, year and regimen (largest population treated).
- For each IU-year, the population targeted, the population treated and the coverage are taken from ALB+IVM when that value is reported and non-zero, and from IVM otherwise; values below 100 are set to zero. The regimen is the one with the larger population treated.
- When people were treated but the population targeted is missing or below 100, the population targeted is set to the population requiring PC. It is set to zero for IUs that are not endemic.
- When the population treated with ALB+IVM exceeds the population requiring PC of an endemic IU, both the population targeted and the population treated are limited to the population requiring PC.

4.4 MDA rounds and coverage

Programme and epidemiological coverage are calculated as for LF. An MDA round is counted when coverage is above zero and an effective round when it reaches 80%. MDA rounds are counted only in endemic IUs, at most one per IU and year.

4.5 Cumulative rounds

Rounds and effective rounds are accumulated for each IU from 2013. The cumulative MDA is the number of years of ivermectin treatment of the historical record, minus the round of 2014 (which the record is assumed to include), plus the rounds counted since 2013. The 2014 round is subtracted for every IU, including IUs without a historical record, whose cumulative MDA can therefore be one round lower than the rounds counted since 2013. When the calculation gives a negative or missing value in any year, only the rounds counted since 2013 are used for that IU.

4.6 IUs created by redistricting

New IUs add the rounds and effective rounds counted in their first parent IU in the year before their creation to their own, and their cumulative MDA starts from the larger of their own value and that of the parent IU, with the same rules as in SOP-02 (Section 4.8).

4.7 Final classification and population no longer requiring treatment

Each IU-year receives one of the output categories of Table 3. For IUs under post-intervention surveillance, the population no longer requiring treatment starts from the population requiring PC of the last year before surveillance and is carried forward each year with the national growth multiplier (value of the previous year $\times$ multiplier of the year); it is never larger than the total population, and equals the total population when the carried value is zero. When the multiplier of a year is missing, or no population requiring PC is available for the year before surveillance, the total population is used from that year onwards.

Table 3. Output categories of the onchocerciasis tables

Category	Condition
Endemic (under MDA)	Endemic, with an MDA round in the year
Endemic (MDA not delivered)	Endemic, without MDA round in the year
Endemic (under post-intervention surveillance)	Under surveillance
Unknown (consider Oncho Elimination Mapping)	Unknown, no population treated (100 or more) with ALB+IVM or IVM in any year from 2013 to 2025
Unknown (under LF MDA)	Unknown, otherwise
Non-endemic	Non-endemic, including countries listed in SOP-01
Not reported	No JRF or JRSM record for the IU-year

4.8 Country and regional indicators

Country and regional tables are built as for LF (SOP-02, Table 5); regional tables are by United Nations subregion within each WHO region. Treatment indicators are summed over the IUs under MDA, with MDA not delivered and under post-intervention surveillance; IUs requiring MDA are those under MDA or with MDA not delivered; IUs are counted by regimen (ALB+IVM, IVM, not delivered); coverage is recalculated from the summed populations.

4.9 Finalisation and publication

Categories are given their standard identifiers, values are rounded (coverage to two decimals) and the IU, country and regional tables and the MDA history are written to the ESPEN analytical database.

5. Quality assurance

- The number of IU-years whose endemicity was changed by the reconciliation is reported at each run.
- For the IVM records, the results of the linkage (codes completed or replaced, records not found, removed or duplicated) are reported.
- For IUs created by redistricting, the records whose cumulative MDA is lower than their rounds since 2013 are identified for review (not corrected automatically); a warning is given if a country has more than one growth multiplier in a year.
- Categories found in the data but not foreseen in the country tables are reported.

6. Limitations

- The reconciliation with the contemporary classification is applied to 2013–2019 only.
- Loiasis co-endemicity is not used in this procedure; it is taken into account in the co-endemicity tables (SOP-07).
- The OEM flag is based on the absence of any treatment with ALB+IVM or IVM reported from 2013 to 2025, including years after the year concerned; it is an indication for review, not a programmatic decision.
- Ivermectin delivered as IDA for LF is not counted for onchocerciasis (treatment, rounds, coverage or OEM flag).

- Treatment reported in IUs under post-intervention surveillance is kept in the population treated, so country coverage can exceed 100%.
- The population no longer requiring treatment of IUs under surveillance is an estimate based on national growth rates.

7. Revision

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-03, prepared from the code of the processing scripts.

References

1. World Health Organization. Guidelines for stopping mass drug administration and verifying elimination of human onchocerciasis: criteria and procedures. Geneva: World Health Organization; 2016. Available from: <https://www.who.int/publications/i/item/9789241510011>

Annex A. Processing scripts

Step	Script	Role in this procedure
1.5	Oncho_AT_v05.R	Sections 4.1 to 4.8
1.9	ESPEN_AT_Transpose_v02.R	Section 4.9
–	Functions/JAP_functions.R	Import of the IVM records (import_mda_scheme); population carried forward (carry_forward_pop)

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-04

Soil-transmitted helminthiases: processing of endemicity and preventive chemotherapy data

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-04
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	Endemicity, population requiring PC, PC delivered, coverage and cumulative rounds of soil-transmitted helminthiases (STH), by age group, at implementation unit (IU), country and regional level, 2013–2025
Data sources	Harmonised IU endemicity and population (SOP-01); JRF PC data of the regimens containing albendazole or mebendazole, except albendazole twice a year for LF (ALBx2); JRF version; ESPEN contemporary IU endemicity (2020); list of redistricted IUs
Outputs	STH analytical tables at IU level (by target population), country and regional level; class of JRF version by country and year (also used in SOP-05)
Processing scripts	Steps 1.6 and 1.9 (Annex A)
Related documents	SOP-00; SOP-01; SOP-02 (shared LF MDA records); SOP-05; SOP-07

Abbreviations

ALB	Albendazole	MDA	Mass drug administration
DEC	Diethylcarbamazine	PC	Preventive chemotherapy
IA	Impact assessment	Pre-SAC	Pre-school-age children
IDA	Ivermectin, diethylcarbamazine and albendazole	PZQ	Praziquantel
IU	Implementation unit	SAC	School-age children
IVM	Ivermectin	SCH	Schistosomiasis
JRF	Joint Reporting Form	STH	Soil-transmitted helminthiases
LF	Lymphatic filariasis	WRA	Women of reproductive age
MBD	Mebendazole		

1. Purpose and scope

This procedure describes how the STH data reported by countries are processed into the ESPEN STH analytical tables. STH tables are produced by age group: pre-school-age children (pre-SAC), school-

age children (SAC) and women of reproductive age (WRA), and for the total. They count PC delivered to pre-SAC, SAC and WRA with any regimen containing albendazole or mebendazole except albendazole twice a year for LF (ALBx2), including the treatment of children delivered with LF MDA and the treatment delivered with praziquantel. The programmatic background is the WHO guideline on PC for STH [1] and the monitoring and evaluation framework for schistosomiasis and STH [2].

2. Data sources

Table 1. Data sources

Source	Content used
Harmonised IU dataset (SOP-01)	STH endemicity category, population by age group, population requiring PC of WRA
JRF, PC sheets	Population targeted, treated and coverage by age group for: praziquantel with albendazole or mebendazole (PZQ+ALB/MBD); albendazole or mebendazole alone (ALB/MBD, up to three rounds a year); and, from the LF sheets, ALB+IVM, ALB+DEC and IDA
JRF, introduction sheet	Version of the form submitted by the country
Contemporary IU endemicity (2020)	Reference classification of the STH status of each IU, updated at a regional workshop with national programme and data managers (end of 2019) on the basis of the survey data available
List of redistricted IUs	As in SOP-02

3. Definitions

Table 2. Terms and indicators

Term	Definition
Endemicity categories	Categories of the earlier reporting scheme (high prevalence $\geq 50\%$, moderate 20–49%, low $<20\%$, endemic with unknown prevalence) and of the updated scheme introduced with version 4 of the JRF (prevalence 50% and above, 20–49%, 10–19%, 2–9%, surveillance $<2\%$), plus unknown, non-endemic and not reported.
Categories requiring PC	High prevalence (50% and above); moderate prevalence (20–49%); endemic with unknown prevalence; prevalence 50% and above; 20–49%; 10–19%; 2–9%.
Class of JRF version	"Earlier scheme" for versions 1 to 3 of the form, "updated scheme" from version 4 (Section 4.2).
Programme coverage	Population treated (limited to the population requiring PC) / population targeted $\times 100$, by age group and in total.
Epidemiological coverage	Population treated (limited to the population requiring PC) / population requiring PC $\times 100$; zero when the population requiring PC is below 10.
PC round	IU-year with programme coverage above zero (for the total, or for an age group in the tables by target population).
Effective PC round	IU-year with total programme coverage of at least 75% (for an age group: coverage of that group of at least 75%).

4. Processing steps

4.1 Reconciliation of reported endemicity (2013–2019)

The contemporary IU classification (2020) results from a regional workshop held at the end of 2019, to which national programme managers and data managers were invited, which updated the endemicity status of each IU on the basis of the survey data available. It is used as a benchmark and applied retrospectively to the years before the workshop (SOP-02, Section 4.1). For 2013 to 2019, a reported category "Unknown" or "Endemic/prevalence unknown" takes the contemporary category of the IU when one exists, and a reported high, moderate or low prevalence becomes non-endemic when the contemporary classification is non-endemic. A reported non-endemic category is not changed. In the contemporary classification, an IU listed without a recognised category is treated as non-endemic; IUs not listed in it keep the category reported. From 2020 onwards the reported category is kept.

4.2 Class of JRF version

Countries adopted the updated WHO monitoring and evaluation categories [2] at different times, so each country and year is assigned to the earlier or the updated scheme. The class is taken from the version of the JRF submitted (versions 1 to 3: earlier scheme; version 4 onwards: updated scheme). When the version is missing or not recognised, the country-year is assigned to the updated scheme if any of its IUs reports, before reconciliation, one of the STH or SCH categories introduced with version 4 (including the surveillance categories), and to the earlier scheme otherwise. The class is used here and in SOP-05.

4.3 Import of the PC data

- The PZQ+ALB/MBD and ALB/MBD (three rounds) records are linked to IUs as described in SOP-02, Section 4.3; the ALB+IVM, ALB+DEC and IDA records imported for LF are reused.
- Adults were not reported in the earlier forms: their fields are set to zero for country-years of the earlier scheme and for those without a class.
- Adults reported in the PZQ+ALB/MBD sheet are counted in the WRA group as reported. In the ALB/MBD sheets, adults whose category is "Other" or not stated are converted to WRA by applying the national fraction of WRA.

4.4 Combination of the regimens

- For each age group, the population targeted and the population treated of the IU-year are the largest values reported across regimens and rounds; regimens and rounds are not added together. Within the PZQ+ALB/MBD sheet, the two fields of population targeted of a group are added (only one is expected to be filled).
- The regimen of the IU-year is the one with the largest total population treated reported (PZQ+ALB/MBD, ALB/MBD, ALB+IVM, ALB+DEC or IDA).
- Totals targeted and treated are the sums of the three age groups. Only the figures by age group are used: treatment reported only as a total is not counted. From the LF sheets, only pre-SAC and SAC are counted; adults treated in LF MDA are not counted for STH. The largest total reported is kept separately for reference.

4.5 Population requiring PC

In IUs whose category requires PC (Table 2), the population requiring PC is the whole pre-SAC population and the whole SAC population of the IU, plus the population requiring PC of WRA reported by the country; in other IUs it is zero. The same rule is applied to all years and to both reporting schemes.

4.6 Coverage and rounds

- The population treated of each age group is limited to its population requiring PC.
- When people were treated but the population targeted of a group (or of the total) is missing or not above 5, it is set to the population requiring PC.
- Programme and epidemiological coverage are calculated by age group and in total (Table 2). A PC round is counted when total programme coverage is above zero and an effective round when it reaches 75%.
- Rounds and effective rounds are accumulated for each IU from 2013; new IUs created by redistricting add the rounds counted in their first parent IU in the year before their creation (SOP-02, Section 4.8).

4.7 Tables by target population

Before publication, the IU table is reorganised so that each IU and year has one record for each target population (pre-SAC, SAC, WRA and total). For each age group, a PC round is counted when the coverage of that group is above zero and an effective round when it reaches 75%, and the rounds are accumulated by IU; new IUs inherit the rounds of their parent IU for each target population. A year in which the rounds delivered did not include an age group is not counted for that group.

4.8 Country and regional indicators

Country tables sum the IU values over the IUs whose category requires PC and the IUs of low prevalence (less than 20%), by country and year. They report the number of IUs by category, the populations requiring, targeted and treated by age group and in total, the number of IUs requiring PC, with a PC round and with an effective round, programme and epidemiological coverage by age group and in total (calculated from the summed populations) and the number of IUs by regimen. IUs of low prevalence contribute their population targeted but no population treated, because their population requiring PC is zero; this lowers the programme coverage of the country. Regional tables sum the country values by United Nations subregion (within each WHO region) and year and recalculate coverage.

4.9 Finalisation and publication

Categories are given their standard identifiers, values are rounded (coverage to two decimals) and the IU (by target population), country and regional tables are written to the ESPEN analytical database.

5. Quality assurance

- Country-years recorded with an earlier version of the form but reporting new categories are listed for review; the recorded version is kept.
- A country-year with more than one version class is reported with a warning; the processing stops if a treatment record of that country-year is linked to it.
- The results of the linkage of each regimen and round are reported (codes completed or replaced, records not found, removed or duplicated).
- Records with population treated but no breakdown by age group, and age-group rounds exceeding the total, are reported when the tables by target population are built.
- Categories found in the data but not foreseen in the country tables are reported.

6. Limitations

- The population requiring PC uses the whole pre-SAC and SAC populations of the IU rather than the values reported for these groups, and the same rule for both reporting schemes.
- Several rounds delivered in a year are counted as one round; the treatment frequency recommended for each category is not assessed.
- Effective PC is defined on total programme coverage, which combines age groups.
- Albendazole delivered as ALBx2 for LF is not counted for STH, and neither are adults treated in LF MDA nor treatment reported only as a total, without breakdown by age group.
- IUs of low prevalence reporting a population targeted lower the programme coverage of the country, since their population treated is not counted.
- The reconciliation with the contemporary classification is applied to 2013–2019 only.

7. Revision

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-04, prepared from the code of the processing scripts.

References

1. World Health Organization. Guideline: preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups. Geneva: World Health Organization; 2017. Available from: <https://www.who.int/publications/i/item/9789241550116>
2. World Health Organization. Assessing schistosomiasis and soil-transmitted helminthiases control programmes: monitoring and evaluation framework. Geneva: World Health Organization; 2024. Available from: <https://www.who.int/publications/i/item/9789240099364>

Annex A. Processing scripts

Step	Script	Role in this procedure
1.6	STH_AT_v05.R	Sections 4.1 to 4.6 and 4.8; class of JRF version (Section 4.2)
1.9	ESPEN_AT_Transpose_v02.R	Sections 4.7 and 4.9
–	Functions/JAP_functions.R	Import of the PC sheets (import_mda_scheme, import_t3_round), class of JRF version (complete_jrf_version), rounds by target population (pc_by_target_group, inherit_parent_pc)

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-05

Schistosomiasis: processing of endemicity and preventive chemotherapy data

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-05
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	Endemicity, population requiring PC, PC with praziquantel, coverage and cumulative rounds of schistosomiasis (SCH), by age group, at implementation unit (IU), country and regional level, 2013–2025
Data sources	Harmonised IU endemicity and population (SOP-01); JRF PC data for praziquantel alone and with albendazole or mebendazole; class of JRF version (SOP-04); ESPEN contemporary IU endemicity (2020); list of redistricted IUs
Outputs	SCH analytical tables at IU level (by target population), country and regional level
Processing scripts	Steps 1.7 and 1.9 (Annex A)
Related documents	SOP-00; SOP-01; SOP-04 (class of JRF version); SOP-07

Abbreviations

ALB	Albendazole	Pre-SAC	Pre-school-age children
IA	Impact assessment	PZQ	Praziquantel
IU	Implementation unit	SAC	School-age children
JRF	Joint Reporting Form	SCH	Schistosomiasis
MBD	Mebendazole	STH	Soil-transmitted helminthiasis
PC	Preventive chemotherapy		

1. Purpose and scope

This procedure describes how the SCH data reported by countries are processed into the ESPEN SCH analytical tables, by age group (pre-SAC, SAC and adults) and in total. Because countries adopted the updated WHO monitoring and evaluation categories for schistosomiasis and STH [1] at different times, the population requiring PC is calculated with one of two rule sets, chosen for each country and year according to the reporting scheme of its JRF. The WHO guideline on control and elimination of human schistosomiasis provides the programmatic background [2].

2. Data sources

Table 1. Data sources

Source	Content used
Harmonised IU dataset (SOP-01)	SCH endemicity category, population by age group, population requiring PC by age group reported by the country
JRF, PC sheets	Population targeted, treated and coverage by age group for praziquantel with albendazole or mebendazole (PZQ+ALB/MBD) and praziquantel alone (PZQ)
Class of JRF version (SOP-04)	Earlier or updated reporting scheme of each country and year
Contemporary IU endemicity (2020)	Reference classification of the SCH status of each IU, updated at a regional workshop with national programme and data managers (end of 2019) on the basis of the survey data available
List of redistricted IUs	As in SOP-02

3. Definitions

Table 2. Terms and indicators

Term	Definition
Categories of the earlier scheme	High prevalence (50% and above); moderate prevalence (10–49%); low prevalence (less than 10%); endemic with unknown prevalence.
Categories of the updated scheme	Prevalence 50% and above; prevalence 10–49%; prevalence 1–9%; surveillance (prevalence less than 1%).
Other categories	Unknown; non-endemic; not reported.
Programme coverage	Population treated (limited to the population requiring PC) / population targeted × 100, by age group and in total.
Epidemiological coverage	Population treated (limited to the population requiring PC) / population requiring PC × 100; zero when the population requiring PC is below 100.
PC round; effective PC round	IU-year with total programme coverage above zero; of at least 75% (by age group in the tables by target population).

4. Processing steps

4.1 Reconciliation of reported endemicity (2013–2019)

The contemporary IU classification (2020) results from a regional workshop held at the end of 2019, to which national programme managers and data managers were invited, which updated the endemicity status of each IU on the basis of the survey data available. It is used as a benchmark and applied retrospectively to the years before the workshop (SOP-02, Section 4.1). For 2013 to 2019, a reported category "Unknown", "Endemic/prevalence unknown" or "Non-endemic" takes the contemporary category of the IU when one exists, and a reported high, moderate or low prevalence becomes non-endemic when the contemporary classification is non-endemic. In the contemporary classification, an IU listed without a recognised category is treated as non-endemic; IUs not listed in it keep the category reported. From 2020 onwards the reported category is kept.

4.2 Import and combination of the PC data

- The PZQ+ALB/MBD and PZQ records are linked to IUs as described in SOP-02, Section 4.3.
- Pre-SAC were not reported in the earlier forms: their fields are set to zero for country-years of the earlier scheme and for those without a class.
- For each age group, the population targeted and treated of the IU-year are the larger of the values of the two regimens. In the PZQ+ALB/MBD sheet, the SAC and adult population targeted is the sum of the praziquantel-specific and general fields of the group (only one is expected to be filled).
- Totals targeted and treated are the sums of the age groups. Only the figures by age group are used: treatment reported only as a total is not counted. The largest total reported is kept separately and used to choose the regimen of the IU-year.

4.3 Population requiring PC

The rule set depends on the class of JRF version of the country and year (SOP-04, Section 4.2). Country-years of the earlier scheme, and those without a class, use the earlier rules; country-years of the updated scheme use the updated rules (Table 3).

Table 3. Population requiring PC by reporting scheme

Category	Earlier scheme	Updated scheme
High prevalence ($\geq 50\%$)	SAC: 100% of SAC; adults: 100% of adults	Values reported by the country
Moderate prevalence (10–49%); endemic with unknown prevalence	SAC: 50% of SAC; adults: 20% of adults	Values reported by the country
Low prevalence ($< 10\%$)	SAC: 33% of SAC; adults: none	None
Prevalence 50% and above	As high prevalence, when no value is reported; none when a value is reported	Values reported by the country
Prevalence 10–49%	As moderate prevalence, when no value is reported; none when a value is reported	Values reported by the country
Prevalence 1–9%	As low prevalence, when no value is reported; none when a value is reported	Values reported by the country
Surveillance ($< 1\%$), unknown, non-endemic, not reported	None	None

- Earlier scheme: pre-SAC have no population requiring PC; the total is the sum of SAC and adults.
- Updated scheme: the pre-SAC, SAC, adult and total values reported by the country are used; when a value is missing, the population targeted of that group is used instead.

4.4 Coverage and rounds

- The population treated of each age group is limited to its population requiring PC.

- When people were treated but the population targeted of a group (or of the total) is missing or below 100, it is set to the population requiring PC (earlier scheme: SAC, adults and total; updated scheme: all groups and total).
- Programme and epidemiological coverage are calculated by age group and in total (Table 2). A PC round is counted when total programme coverage is above zero and an effective round when it reaches 75%.
- Rounds are accumulated by IU from 2013 and new IUs add the rounds counted in their first parent IU in the year before their creation (SOP-02, Section 4.8).

4.5 Tables by target population

As for STH (SOP-04, Section 4.7), the IU table is reorganised with one record per target population (pre-SAC, SAC, adults and total), and rounds and effective rounds (coverage of the group of at least 75%) are counted and accumulated for each group. Under the earlier scheme pre-SAC have no population requiring PC, so no round is counted for them.

4.6 Country and regional indicators

Country tables sum the IU values over the IUs of the high, moderate, low and unknown-prevalence categories of the earlier scheme and of the categories "Prevalence 50% and above", "Prevalence 10%-49%" and "Prevalence 1%-9%" of the updated scheme (surveillance excluded). The number of IUs requiring PC counts those categories, the IUs of low prevalence (less than 10%) being counted only for years before 2023. This cut-off is the calendar year, not the reporting scheme: from 2023, low-prevalence IUs of country-years processed under the earlier scheme contribute a population requiring PC but are not counted as IUs requiring PC. IUs without a population requiring PC (such as low-prevalence IUs under the updated scheme) contribute their population targeted but no population treated, which lowers the programme coverage of the country. Tables report the IUs by category, the populations requiring, targeted and treated by age group and in total, the IUs requiring PC, with a round and with an effective round, programme and epidemiological coverage by age group and in total (from the summed populations) and the IUs by regimen. Regional tables sum the country values by United Nations subregion (within each WHO region) and year and recalculate coverage.

4.7 Finalisation and publication

Categories are given their standard identifiers, values are rounded (coverage to two decimals) and the IU (by target population), country and regional tables are written to the ESPEN analytical database.

5. Quality assurance

- The number of IUs by year and reporting scheme, and the source of the class (version of the form or categories reported), are reported at each run.
- IUs processed under the earlier scheme that report a new category with a population requiring PC are listed, since the reported value is not used.
- A country-year with more than one version class stops the processing.
- The results of the linkage of each regimen are reported, and categories not foreseen in the country tables are reported.

6. Limitations

- Under the earlier scheme the population requiring PC is estimated from fixed fractions of the age groups by prevalence category, not from the values reported.

- Under the updated scheme the reported total is used and may differ from the sum of the age groups; missing values are replaced by the population targeted, in which case epidemiological and programme coverage coincide.
- The reporting scheme applied to each IU-year is not shown in the published tables.
- Several rounds delivered in a year are counted as one; effective PC is defined on total programme coverage.
- Treatment reported only as a total, without breakdown by age group, is not counted.
- The reconciliation with the contemporary classification is applied to 2013–2019 only.

7. Revision

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-05, prepared from the code of the processing scripts.

References

1. World Health Organization. Assessing schistosomiasis and soil-transmitted helminthiasis control programmes: monitoring and evaluation framework. Geneva: World Health Organization; 2024. Available from: <https://www.who.int/publications/i/item/9789240099364>
2. World Health Organization. WHO guideline on control and elimination of human schistosomiasis. Geneva: World Health Organization; 2022. Available from: <https://www.who.int/publications/i/item/9789240041608>

Annex A. Processing scripts

Step	Script	Role in this procedure
1.7	SCH_AT_v05.R	Sections 4.1 to 4.4 and 4.6
1.9	ESPEN_AT_Transpose_v02.R	Sections 4.5 and 4.7
–	Functions/JAP_functions.R	Import of the PC sheets (import_mda_scheme), earlier-scheme fields (zero_prior_v4), limitation of treated to required (cap_treated_to_required), rounds by target population

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-06

Trachoma: processing of survey and mass drug administration data from the global trachoma database

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-06
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	Trachoma endemicity (TF and TT categories), survey history, MDA with azithromycin, coverage, cumulative rounds and trichiasis surgery at the implementation-unit (IU) level of the global trachoma database, with country and subregional summaries (from 2014)
Data sources	Global trachoma database (GET2020) maintained by the International Trachoma Initiative (ITI); reconciled list of ITI IUs with parent IUs; UN WPP 2024 growth rates; ITI IU boundaries; ESPEN country summary of the previous release
Outputs	Trachoma analytical tables at IU, country and regional level
Processing scripts	Steps 1.8 and 1.9 (Annex A)
Related documents	SOP-00; SOP-07 (trachoma in country summaries and the trachoma and WASH table); SOP-08 (trachoma map layers)

Abbreviations

GET2020	WHO Alliance for the Global Elimination of Trachoma by 2020 (database held by ITI)	PC	Preventive chemotherapy
IU	Implementation unit	TF	Trachomatous inflammation–follicular
ITI	International Trachoma Initiative	TT	Trachomatous trichiasis
MDA	Mass drug administration	WPP	World Population Prospects (United Nations)

1. Purpose and scope

Trachoma data are not reported through the WHO Joint Reporting Form. They are obtained from the global trachoma database (GET2020) maintained by the International Trachoma Initiative (ITI) on behalf of national programmes [1], and processed for the countries of the ESPEN country list, except four countries of the WHO Eastern Mediterranean Region (Section 4.1), at the level of the IUs used by that database. This procedure describes how survey results and treatment data are processed into the ESPEN trachoma tables. The WHO criteria for the elimination of trachoma as a public health problem provide the background for the categories used [2].

2. Data sources

Table 1. Data sources

Source	Content used
Global trachoma database (ITI)	By IU, year and survey: survey type and order, TF and TT categories and prevalence; IU population, population targeted, number treated, coverage and distribution of azithromycin; trichiasis surgery (total, women, men)
Reconciled list of ITI IUs	IUs that are parents of current IUs, link between current IUs and their parent, current TF category of each IU
UN WPP 2024 [3]	National annual population growth multiplier
ITI IU boundaries	Current IUs of countries without data in the trachoma database
ESPEN country summary (previous release)	Country-level trachoma status of countries without data in the trachoma database (SOP-07)

3. Definitions

Table 2. Terms and indicators

Term	Definition
TF category	Category of the prevalence of trachomatous inflammation–follicular of the IU: <5%, 5–9.9%, 10–29.9%, 30–49.9%, ≥50%; or endemicity unknown, suspected endemic, not suspected; or under post-MDA surveillance (Section 4.5).
TT category	Category of the prevalence of trachomatous trichiasis: <0.2%, 0.2–0.9%, 1.0–4.9%, ≥5.0%; or unknown, suspected endemic, not suspected.
Type of most recent survey	Baseline, impact or surveillance survey that provides the current status of the IU, or none.
Eligible IU	IU with TF of 5% or more.
MDA round	IU-year in which azithromycin distribution is reported (or inherited from the parent IU) or in which the recalculated coverage is above zero. Normally one round per IU and year (Section 4.5).
Coverage (IU)	Number treated / IU population × 100.
Geographical coverage	Number of IUs with an MDA round / number of eligible IUs × 100 (country and subregion).
Epidemiological coverage	Population treated / population requiring PC × 100 (country and subregion).

4. Processing steps

4.1 Selection and de-duplication

Records of the countries of the ESPEN country list are kept, except those of Djibouti, Egypt, Somalia and Sudan (WHO Eastern Mediterranean Region). Yemen, which is also in the ESPEN country list, is not excluded. One record is kept per IU, year and survey, giving priority to records with a round number above one, then to records with a reported number treated, then to the largest number treated, and finally to the highest round number.

4.2 IU population

Missing IU populations are estimated within each IU by linear interpolation between reported years and, for years before the first or after the last available value, by applying the national annual growth multiplier (WPP 2024) year by year, forward from the last value and backward from the first; a missing multiplier leaves the value missing. Values of 1 or less are treated as missing. Reported populations are always kept. The estimate replaces only missing values, and is used only to complete the population of IU-years with treatment (Section 4.5).

4.3 Current and parent IUs

The reconciled list identifies parent IUs (units that existed before redistricting) and current IUs, with the parent of each current IU. When a survey field of a current IU (survey, type, order, TF and TT category and prevalence) is missing in a year, it is taken from the record of its parent IU for that year that has a TF category. A parent with several surveys in one year repeats the records of its current IUs; the number of records added is reported. IUs of the trachoma database that are not in the reconciled list are reported and excluded.

4.4 Endemicity of current IUs

1. In each IU and year, trichiasis-only survey records (and records without a survey name) are removed when the IU-year has more than one record, and the record with the highest survey order is retained. The name of any trichiasis survey of the year is kept as the TT survey of the IU-year.
2. A missing TF category is derived from the TF prevalence of the same record: <5%, 5–9.9%, 10–29.9%, 30–49.9% or ≥50%.
3. The results of the most recent survey are carried forward to the following years, so that the status of a year is that of the latest survey up to that year.
4. Years before the first survey of an IU take, for both the TF and the TT category, the current TF category recorded in the reconciled list for the IU or, if it is missing, for its parent.
5. Remaining gaps are classified as "Endemicity unknown" (TF) and "Unknown" (TT).

4.5 Treatment

- Population, population targeted and number treated of 1 or less are treated as missing. When the number treated is missing, the azithromycin distribution value reported for the IU-year is used instead (unless it is 1).
- An IU-year has an MDA round when azithromycin distribution is reported or, when the IU reports no distribution value, when a round is reported for its parent that year, or when the recalculated coverage is above zero.
- For current IUs, when the population is missing and coverage is reported, the population is derived as number treated / coverage (coverage above 2 is read as a percentage). If it is still missing and more than 100 people were treated, the estimated population of Section 4.2 is used. Parent IUs use only the estimated population. When the population targeted is missing and more than 100 people were treated, it is set to the IU population.
- Coverage is recalculated as the number treated divided by the IU population. Cumulative rounds are counted by IU.
- Records of an IU-year that report the same number treated are merged. Records of the same IU-year that report different numbers treated are kept, reported for review, and each one is counted as a round.
- IUs with TF below 5% whose most recent survey is a surveillance survey, which have received MDA before but not in the current year, are classified as under post-MDA surveillance.

4.6 Countries without data in the trachoma database

Countries of the region whose IUs are in the ITI boundaries but not in the trachoma database are added with all their IUs and years, without treatment. Their status is taken from the most recent ESPEN country summary: "not requiring PC" gives the category not suspected (TF and TT); any other value gives endemicity unknown.

4.7 Country and regional indicators

Country tables (from 2014) report, by country and year: the number of IUs; the number of IUs in each TF category; the number of eligible IUs; the number of IUs by type of most recent survey; the number of IUs with a first TT survey in the year; the populations requiring PC, targeted and treated; the number of IUs with an MDA round; geographical and epidemiological coverage; and trichiasis surgeries. The population requiring PC of current IUs counts only IUs of the categories requiring PC (TF $\geq 5\%$). For parent IUs, it counts the IU-years with MDA whatever their category, and the IU-years without MDA whose TF category is not $< 5\%$, unknown, suspected or not suspected. For populations and surgeries, the larger of the totals computed over parent IUs and over current IUs is chosen separately for each indicator, so the numerator and denominator of epidemiological coverage may come from different sets of IUs. Regional tables sum the country values by United Nations subregion (within each WHO region) and recalculate coverage; no total for the whole region is calculated.

4.8 Finalisation and publication

TF and TT categories are given their standard identifiers, values are rounded and the IU, country and regional tables are written to the ESPEN analytical database. The TF and TT prevalence values are withheld from the published IU table; they are kept in the trachoma and WASH table (SOP-07) and in the yearly trachoma map layers (SOP-08). In the published IU table, the field of population requiring PC holds the IU population whatever the TF category; the restriction to IUs with TF $\geq 5\%$ is applied only in the country and subregional totals.

5. Quality assurance

- Records sharing an IU, year and survey are checked after de-duplication; IUs absent from the reconciled list are reported.
- The number of records added when parent survey values are linked to current IUs is reported.
- The numbers of records with no TF category and a TF prevalence, of "NULL" TF and TT categories, of current-IU records with coverage above 2, and of IU-years with MDA in categories not requiring PC are reported for review. TF and TT categories without a standard identifier are not reported.
- The order and names of the output fields are checked before the tables are written.

6. Limitations

- Trachoma tables use the IU geography of the trachoma database, which may differ from the ESPEN IUs used for the other diseases.
- Apart from deriving a missing TF category from the TF prevalence (Section 4.4), the decision rules use only the 5% TF threshold (eligibility and population requiring PC). TT categories are taken as recorded in the database or in the reconciled list.
- Normally one MDA round is retained per IU and year; records of the same IU-year with different numbers treated are each counted.

- In the IU table, the population requiring PC is the IU population whatever the TF category.
- The current category of an IU is applied to the years before its first survey.
- Geographical coverage counts all IUs with an MDA round, including IUs whose category does not require PC, against the eligible IUs; it can therefore exceed 100%.
- Countries without data in the trachoma database are represented with country-level status only.

7. Revision

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-06, prepared from the code of the processing scripts.

References

1. International Trachoma Initiative. Trachoma data and the global trachoma database [Internet]. Decatur (GA): Task Force for Global Health; [cited 2026 Oct 19]. Available from: <https://www.trachoma.org>
2. World Health Organization. Validation of elimination of trachoma as a public health problem. Geneva: World Health Organization; 2016 (WHO/HTM/NTD/2016.8). Available from: <https://www.who.int/westernpacific/publications/i/item/who-htm-ntd-2016.8>
3. United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects 2024 [Internet]. New York: United Nations; 2024 [cited 2026 Oct 19]. Available from: <https://population.un.org/wpp/>

Annex A. Processing scripts

Step	Script	Role in this procedure
4.1	ITI data feed (outside the R folder)	Loading of the global trachoma database into the ESPEN data store
1.8	Trachoma_AT_v05.R	Sections 4.1 to 4.7
1.9	ESPEN_AT_Transpose_v02.R	Section 4.8
–	Functions/JAP_functions.R	Population completion (fill_pop_growth), duplicate checks

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-07

Co-endemicity, water and sanitation, and country summaries across PC-NTDs

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-07
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	Access to water and sanitation by implementation unit (IU); co-endemicity of PC-NTDs and recommended MDA strategy by IU; country, subregional and regional summaries across PC-NTDs for the country pages of the ESPEN NTD Portal
Data sources	Disease analytical tables (SOP-02 to SOP-06); IHME geospatial WaSH estimates; JMP country WASH data; ESPEN table of MDA scenarios; country loiasis and onchocerciasis status; JRF and JRSM submission status (SOP-01); WHO PCT Databank; NTD system-integration indicators
Outputs	IU tables of access to water and sanitation; IU co-endemicity table with recommended MDA strategy; trachoma and WASH table; country, subregional, WHO African Region and continental summaries
Processing scripts	Steps 2.1, 1.10 and 1.11 (Annex A)
Related documents	SOP-00; SOP-01 to SOP-06; SOP-08 (map layers of co-endemicity and WASH)

Abbreviations

ALB	Albendazole	LF	Lymphatic filariasis
IA	Impact assessment	MDA	Mass drug administration
IHME	Institute for Health Metrics and Evaluation	PC	Preventive chemotherapy
IU	Implementation unit	PC-NTD	NTD amenable to preventive chemotherapy
IVM	Ivermectin	PZQ	Praziquantel
JMP	WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene	SCH	Schistosomiasis
JRF	Joint Reporting Form	STH	Soil-transmitted helminthiasis
JRSM	Joint Request for Selected PC Medicines	WASH	Water, sanitation and hygiene

1. Purpose and scope

This procedure describes three components that combine the disease-specific results: (i) indicators of access to water and sanitation by IU; (ii) the co-endemicity table, which brings together the status of lymphatic filariasis (LF), onchocerciasis, loiasis, soil-transmitted helminthiasis (STH) and

schistosomiasis (SCH) in each IU and assigns a recommended MDA strategy; and (iii) the country summaries across PC-NTDs used in the country pages of the ESPEN NTD Portal. The principles of coordinated PC for co-endemic diseases are set out by WHO [1].

2. Data sources

Table 1. Data sources

Source	Content used
Disease analytical tables	IU endemicity category, MDA or PC rounds, effective rounds, populations requiring, targeted and treated (SOP-02 to SOP-06)
IHME geospatial WaSH estimates [2]	Raster surfaces of the proportions using each type of drinking-water source and sanitation facility, 2000–2017
JMP [3]	Country WASH indicators (stored for reference)
ESPEN table of MDA scenarios	Recommended MDA strategy and medicines for each combination of disease codes, country status and year
Country loiasis and onchocerciasis status	Country-level status used as keys of the MDA scenarios
JRF and JRSM submission status (SOP-01)	Whether each country submitted each form in each year
WHO PCT Databank [4]	Country-level status of LF, onchocerciasis, STH and SCH
JRSM (SCH)	PC rounds planned by IU, used as the reference of the SCH country MDA status (Section 5.3)
NTD system-integration indicators	Qualitative country indicators of the integration of NTDs in health systems, compiled by ESPEN

3. Access to water and sanitation by IU

For each year from 2013 to 2025, the value of each indicator in an IU is the mean of the raster cells within the IU boundary, each cell weighted by the share of its area inside the IU. The calculation is made on the ESPEN IU boundaries of each year and, for the trachoma tables, on the IU boundaries of the global trachoma database. The estimates end in 2017; the 2017 values are used for all later years. The mean is not weighted by population. IUs without raster values are stored with the code 999 in the database tables of access to water and sanitation, and are left blank in the files used for the co-endemicity tables and the map layers.

Table 2. WASH indicators produced

Group	Indicators
Sanitation	Improved sanitation; piped sanitation (sewer, septic tank); other improved sanitation (improved and ventilated latrines, compost toilets); unimproved sanitation; open defecation
Drinking water	Improved water; piped water; other improved water (protected wells and springs, rainwater, bottled water); unimproved water; surface water

In the co-endemicity tables, access to improved water and to improved sanitation of each IU is compared with the median of the IUs of its country in the same year: the IU is classified as high (1) when its value is above the median, low (0) when it is at or below the median, and left blank when its value is missing. The median is calculated over the IUs of the country that have a value.

4. Co-endemicity and recommended MDA strategy

4.1 Disease codes

The frame of the table is the IU list of the LF table. For each IU and year, the categories of the five diseases are converted into codes (Table 3).

Table 3. Coding of the diseases in the co-endemicity table

Disease	Code
LF	1 (requiring treatment) when the IU is endemic under MDA, endemic with MDA not delivered, under targeted treatment after stopping MDA, or pending impact assessment with MDA delivered in the year; 0 otherwise.
Onchocerciasis	1 when the IU is endemic under MDA, endemic with MDA not delivered, or pending impact assessment with MDA delivered in the year; 0 otherwise.
Loiasis	1 when the IU is hyper-, meso- or hypo-endemic, or endemic; 0 otherwise.
STH	Ordered levels 0 to 4 assigned from the standard identifier of the STH endemicity category (ESPEN endemicity codebook); for one category, the level also depends on whether PC was delivered in the year. Categories not assigned a level are coded 0.
SCH	Ordered levels 0 to 3 assigned from the standard identifier of the SCH endemicity category; for one category, the level (0 or 2) depends on whether PC was delivered in the year. Categories not assigned a level are coded 0.

The number of LF MDA rounds still needed is estimated as five minus the number of effective rounds already delivered (minimum zero), and set to zero when LF does not require treatment.

4.2 Recommended MDA strategy

The recommended MDA strategy and medicines of each IU-year are taken from the ESPEN table of MDA scenarios, by matching the five disease codes, the country status of loiasis and onchocerciasis, the year and the number of LF rounds still needed. The medicines, combinations and precautions of each scenario are defined in that table, in line with WHO guidance on the coordinated use of anthelmintic medicines [1] and on alternative LF regimens [5]. IU-years whose combination is not yet in the table are listed so that the scenario can be added.

4.3 Additional classifications

- Filarial co-endemicity: only LF, only onchocerciasis, only loiasis, LF and onchocerciasis, LF and loiasis, onchocerciasis and loiasis, all three, or none.
- Combined codes defined for a partner project: the high/low access flag (1/0) followed by a separate STH or SCH prevalence code (1–3 for the categories of the earlier scheme, 11–31 for those of the updated scheme, 99 surveillance, 9 unknown or not reported, 0 other). These codes differ from the levels of Table 3.
- A separate table links the trachoma categories of each trachoma IU with access to water and sanitation on the same boundaries, from 2013. This table also holds the TF and TT prevalence values, rounded to two decimals.

5. Country summaries across PC-NTDs

5.1 IU indicators

For each IU and year from 2014, flags are computed for each disease (Table 4) and then combined across LF, onchocerciasis, STH and SCH.

Table 4. IU flags used in the country summaries

Flag	Definition
Requiring PC	LF and onchocerciasis: endemic under MDA or with MDA not delivered (IUs pending impact assessment, and LF IUs under targeted treatment, are not counted). STH: categories of moderate or high prevalence, endemic with prevalence unknown, prevalence 10% and above, or prevalence 2–9% with PC delivered. SCH: categories of moderate or high prevalence, endemic with prevalence unknown, prevalence 10% and above, low prevalence (less than 10%) before 2023, or prevalence 1–9% with PC delivered. IUs of unknown endemicity are counted under Unknown, not as requiring PC.
MDA	MDA or PC delivered in the year (epidemiological round of the disease table).
Effective MDA	Effective round (epidemiological) in the year.
Unknown	Endemicity unknown.
Stopped	Under post-intervention or post-MDA surveillance.

- IUs requiring PC for at least one PC-NTD, with MDA for at least one PC-NTD, of unknown status or stopped for at least one PC-NTD.
- IUs with effective MDA for all PC-NTDs requiring PC: IUs where the number of PC-NTDs with an effective round equals the number of PC-NTDs requiring PC (at least one).
- Population requiring PC for at least one PC-NTD: for IUs requiring PC for at least one PC-NTD, the largest population requiring PC in the disease tables. For LF and onchocerciasis, the population requiring PC is set to zero only for IUs under surveillance, so this maximum can include the population of IUs pending impact assessment or under targeted treatment. Populations targeted and treated are obtained in the same way among the IUs with MDA.
- The total population of IUs of unknown status, and of IUs that stopped MDA, for at least one PC-NTD is also reported.

5.2 Country indicators

IU indicators are summed by country and year. Trachoma indicators are added from the trachoma tables on their own IU geography: the number of IUs requiring PC (TF $\geq 5\%$), the number of IUs with MDA, and two yes/no flags showing whether the country has at least one IU of unknown endemicity and at least one IU under post-MDA surveillance (when summed above country level, these flags give numbers of countries). The summaries also report the number of IUs of the country in each year under each recommended MDA strategy and under each medicine combination (Section 4.2), whether the JRF and the JRSM were submitted, the country status in the WHO PCT Databank, and the NTD system-integration indicators.

5.3 MDA status of each country

The MDA status of each country, year and disease combines the country status of the PCT Databank with the IU counts (Table 5).

Table 5. Country MDA status by disease

Status	Condition
Non-endemic / not requiring PC	Country status in the PCT Databank is non-endemic or not requiring PC
Post-MDA surveillance (LF)	Country status: surveillance
Post-validation surveillance (LF)	Country status: eliminated
MDA not delivered	Country endemic or requiring PC, and no IU with MDA
MDA delivered but not 100% geographical coverage	IUs with MDA fewer than IUs requiring PC (SCH: fewer than the rounds expected in the JRSM)
MDA 100% geographical coverage	IUs with MDA at least equal to IUs requiring PC (SCH: to the rounds expected in the JRSM)

Countries whose PCT Databank status matches none of these conditions (for example, an onchocerciasis status other than non-endemic, not requiring PC or endemic, or a missing status) have no MDA status; onchocerciasis has no surveillance or elimination status. The coverage statuses compare numbers of IUs, not individual IUs, and the IUs with MDA can include IUs not counted as requiring PC. For SCH, the reference is the sum of the PC rounds planned by IU in the JRSM of the year; for 2013–2016, when the JRSM gives none, the number of IUs requiring PC is used.

5.4 Subregional, regional and continental summaries

Country summaries are added up by subregion (United Nations subregion within each WHO region), for the WHO African Region and for all countries of the table (continent); the number of countries submitting the JRF and the JRSM is reported at each level.

6. Quality assurance

- Joins between disease tables stop the processing if a key is duplicated; the fields selected by name are checked against the field positions of the previous version of the scripts.
- Scenarios missing from the table of MDA scenarios are listed after each run; duplicated scenarios are reported.
- Country names that cannot be matched between sources are reported, as are MDA statuses without a standard identifier.
- For the co-endemicity and country tables, the number of records stored is compared with the number prepared (a difference gives a warning); the WASH tables are written without this check.

7. Limitations

- WASH estimates end in 2017 and are repeated for later years; IU values are area-weighted and may differ from population-level access.
- The recommended MDA strategy reflects the scenario table and the reported status; it does not replace national planning decisions.
- LF IUs under targeted treatment count as requiring LF treatment in the co-endemicity table but not in the count of IUs requiring PC in the country summaries.

- Trachoma indicators are counted on a different IU geography from the other diseases.
- Country MDA status depends on the timeliness of the PCT Databank status.

8. Revision

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-07, prepared from the code of the processing scripts.

References

1. World Health Organization. Preventive chemotherapy in human helminthiasis: coordinated use of anthelmintic drugs in control interventions. A manual for health professionals and programme managers. Geneva: World Health Organization; 2006. Available from: <https://www.who.int/publications/i/item/9241547103>
2. Local Burden of Disease WaSH Collaborators. Mapping geographical inequalities in access to drinking water and sanitation facilities in low-income and middle-income countries, 2000–17. *Lancet Glob Health*. 2020;8(9):e1162–85. doi:10.1016/S2214-109X(20)30278-3
3. WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. JMP WASH data [Internet]. [cited 2026 Oct 19]. Available from: <https://washdata.org>
4. World Health Organization. PCT databank [Internet]. Geneva: World Health Organization; [cited 2026 Oct 19]. Available from: <https://www.who.int/teams/control-of-neglected-tropical-diseases/data-platforms/pct-databank>
5. World Health Organization. Guideline: alternative mass drug administration regimens to eliminate lymphatic filariasis. Geneva: World Health Organization; 2017. Available from: <https://www.who.int/publications/i/item/9789241550161>

Annex A. Processing scripts

Step	Script	Role in this procedure
2.1	Processing_WASH.R	Section 3
1.10	Coendemicity_AT_v02.R	Section 4
1.11	Country_Coendemicity_AT_v03.R	Section 5
–	Functions/JAP_functions.R	Classification of WASH access (wash_high_low), checks and database writing

WHO Regional Office for Africa | ESPEN

ESPEN-DP-SOP-08

Cartography, map layers and portal specifications: maps and charts of the ESPEN NTD Portal

Expanded Special Project for Elimination of Neglected Tropical Diseases (ESPEN)

Document type	Standard operating procedure — data processing
Reference	ESPEN-DP-SOP-08
Version and status	Draft v0.1, for internal review
Date	19 October 2026
Prepared by	ESPEN Data Team, WHO Regional Office for Africa
Scope	Publication of the ESPEN and trachoma cartography as analytical tables; yearly IU map layers; definition of the map types, legend categories and maps available in the Map Generator Tool; definition of the charts of the country dashboards
Data sources	ESPEN annual boundaries (simplified); IU boundaries of the global trachoma database; disease, co-endemicity and WASH analytical tables (SOP-02 to SOP-07); JRF submission status (SOP-01); list of countries not implementing MDA; curated specification tables maintained by ESPEN
Outputs	Cartography tables by year; compiled GeoJSON of IU boundaries; yearly IU map layers; lookup tables of map types, legend categories, regions, maps available and dashboard charts
Processing scripts	Steps 1.12, 5.1, 6.1, 6.2 and 6.3 (Annex A)
Related documents	SOP-00; SOP-01 to SOP-07

Abbreviations

ITI	International Trachoma Initiative	SAC	School-age children
IU	Implementation unit	SCH	Schistosomiasis
JRF	Joint Reporting Form	STH	Soil-transmitted helminthiasis
LF	Lymphatic filariasis	WASH	Water, sanitation and hygiene
MDA	Mass drug administration		

1. Purpose and scope

This procedure describes how the boundaries and the analytical tables are prepared for display on the ESPEN NTD Portal [1]: the publication of the cartography, the production of yearly IU map layers, and the specification of the maps offered by the Map Generator Tool and of the charts of the country dashboards. Indicator values are not recalculated at these steps, except access to any water source and to any sanitation facility, and the JRF flag of countries that did not implement MDA (Section 3).

2. Cartography tables

- The simplified annual boundary layers of the ESPEN cartography (country, first administrative level and IU) are combined into one table with one record per geographic unit and year from 2013, with the boundary stored in GeoJSON format and standard field names.
- The administrative level of each record is taken from the cartography; when it is missing, it is set to the country or to the first administrative level according to the fields available.
- A separate table holds the most recent IU and first-level boundaries of the global trachoma database.
- Both tables are replaced in full at each update. The ESPEN table is loaded in blocks and the trachoma table in one block, both with automatic retries; the upload stops if the number of records stored differs from the number prepared.
- A compiled GeoJSON file of the IU boundaries of every year from 2014 is exported, in WGS84 coordinates (RFC 7946) with six decimals.

3. Yearly IU map layers

- For each year from 2013 to 2025, the IU tables of LF, onchocerciasis, loiasis, STH, SCH and co-endemicity are joined to the IU boundaries of that year by IU code and year. For STH and SCH, separate layers are produced for the total target population and for school-age children.
- Trachoma indicators for 2010 to 2025 are joined to the most recent boundaries of the global trachoma database by its geographic identifier. The trachoma layers carry all the fields of the trachoma IU table used for the joins, including the TF and TT prevalence values.
- Water and sanitation layers are produced from the IU WASH tables (SOP-07); access to any water source and to any sanitation facility is derived as the complement of surface-water use and of open defecation, respectively. The fields of the layers are selected by position; in the current version, the last indicator of each group (unimproved water, unimproved sanitation) is not carried into the layers.
- Country layers for 2021 to 2025 hold a flag of the JRF reporting status of each country and year; a country that did not implement MDA in a year is given the same value as a country that submitted its JRF (nothing to report).
- IUs without data are kept in the layers with empty attributes.

4. Map Generator Tool

4.1 Map types, legend categories and regions

The map types, the legend categories of each map type, the regions used for regional maps and the countries of each region are maintained as curated tables. They are loaded in full at each update, after checking that map types and region-country links have complete and unique identifiers and that each legend category has a map type identifier (the regions table is checked only for being non-empty); legend categories that refer to an undefined map type are reported. The published version of each table is saved as a dated backup before it is replaced.

4.2 Maps available by country and period

1. **Countries.** For the latest reporting year, maps are added for the countries that submitted their JRF, the countries that did not implement MDA that year, and the countries of the region without any JRF record.

2. **Map set.** Each of these countries receives the set of IU-level maps available in the previous year, taken from the country with the most complete set. Availability therefore follows the reporting status; the presence of data for each disease is not checked at this step.
3. **Periods.** Single-year maps are moved to the new year; cumulative maps keep their start year and are extended to the new year.
4. **Revised map types.** Legacy map types are replaced by their revised versions where the legend categories changed: from 2021 for LF and onchocerciasis endemicity and coverage; from 2023 for SCH and STH endemicity and coverage maps, and for SCH and STH maps of MDA rounds whose period ends in 2023 or later; and from 2025 for LF endemicity (which includes the category of targeted treatment). The rules are applied to existing and new entries.
5. **Regional maps** are extended to a new year when the regional reference year is advanced by the ESPEN data team, once reporting for that year is considered complete. The completeness of JRF reporting is reported, with a warning (not a stop) when the year is incomplete. A regional year is added only if none of its entries exists yet.
6. **Checks.** The update stops if it would create duplicated entries; existing duplicates are removed and the entries renumbered, with a record of the changes; the published lists are backed up before they are replaced.

5. Charts of the country dashboards

The charts of the country dashboards are defined by two curated tables: the chart types (data source, titles, axis labels and tooltips in English, French and Portuguese) and the series of each chart (position, colour, label and rule used to compute it). Both are replaced in full at each update, after checking that the identifiers of charts and series are complete and unique; series that refer to an undefined chart, and charts without series, are reported. The published tables are backed up before they are replaced.

6. Quality assurance

- For every table written to the database, the number of records stored is compared with the number prepared: the cartography upload stops on a difference, the other tables give a warning. Specification tables with no records are not written.
- Specification tables are backed up before each replacement.
- Map entries that refer to undefined map types, entries whose period starts one year before it ends (a sign of single-year maps recorded with a wrong start year), and the completeness of JRF reporting by year are reported.

7. Limitations

- The availability of a map for a country and period follows its reporting status, not the content of the disease tables; a map may therefore show no data for a disease that is not endemic in the country.
- Trachoma layers for all years are drawn on the most recent trachoma boundaries; units that no longer exist cannot be shown.
- Field names of the shapefile layers are limited to ten characters and may be shortened.

8. Revision

This procedure describes the processing as implemented in the versions of the R scripts listed in Annex A (October 2026). It is revised whenever a decision rule, threshold, category or data source changes, and at least once a year before the new reporting cycle. Each revision is recorded in the table below.

Version	Date	Changes
0.1	19 October 2026	First draft of SOP-08, prepared from the code of the processing scripts.

References

1. World Health Organization Regional Office for Africa. ESPEN NTD Portal [Internet]. Brazzaville: WHO Regional Office for Africa; [cited 2026 Oct 19]. Available from: <https://espen.afro.who.int>

Annex A. Processing scripts

Step	Script	Role in this procedure
5.1	IU_AT_GeoJSON.R	Section 2
1.12	IU_AT_shp_v02.R	Section 3
6.1	Maps_Specs_Categories_v02.R	Section 4.1
6.2	Maps_Specs_v04.R	Section 4.2
6.3	Chart_Specs_v02.R	Section 5
–	Functions/JAP_functions.R	Key checks, backups, deployment and revision of map types