

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
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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