

Release Statement

Population, vaccination coverage, and zero-dose children estimates for Mali version 1.0

5 June 2025

These data were produced by the WorldPop Research Group at the University of Southampton. This work was part of the **Reach the Unreached – Digital technologies to map zero-dose and unreached children in West and Central Africa** project, funded by UNICEF — The United Nations Children’s Fund (contract No. 43387656). The project is led by UNICEF West Africa Regional Office focusing on five West African countries: Cameroon, Chad, Côte D’Ivoire, Guinea and Mali. The partners include the UNICEF Country Offices, WorldPop at the University of Southampton, MapAction and CartONG.

This data release provides gridded population, vaccination coverage and zero dose children estimates for Mali. The reference year of this data package is 2023. **N.B.** Please note the uncertainties resulting from the old DHS data utilised for this study.

All GIS files in this data release have the geographic coordinate system of WGS84 (World Geodetic System 1984).

Population modelling used a Random Forest (RF)-based dasymetric mapping approach of observed or projected census population counts, developed by Stevens et al. (2015) and implemented in the popRF ‘R’ package by Bondarenko et al. (2021). The modelling disaggregated the 2023 census projections. These population estimates have a spatial resolution of approximately 100-metre (0.0008333 decimal degrees grid) and also contain age and sex disaggregated results with the same spatial resolution.

Geo-statistical estimates of under-vaccinated (DPT3 antigen coverage) and zero-dose (DPT1 coverage) children under one-year-old utilised a Bayesian spatial regression model (Utazi et al. 2021; 2022; 2023), implemented by Chaudhuri et al. (2025). This application utilised the 2018-19 DHS for the modelling. The vaccination coverage estimates have a spatial resolution of approximately 1-kilometre resolution (0.008333 decimal degrees grid), but the results are also aggregated up to the various administrative levels in GIS shapefile and table formats.

The **number of zero dose and under-vaccinated children for DTP1 and DTP3** was estimated by integrating the estimated number of children under the age of 1 and the

vaccination coverage estimates in a GIS workflow (https://github.com/wpgp/RtU_vaccination_modelling/tree/main/Zero-dose). The zero dose children estimates have a spatial resolution of approximately 1-kilometre resolution (0.008333 decimal degrees grid), but the results are also aggregated up to the various administrative levels in GIS shapefile and table formats.

Details of the inputs, methodologies and outputs are found in the specific subfolders (Population Estimates, Vaccination Estimates, Zero-dose results).

The authors followed rigorous procedures designed to ensure that the used data, the applied method and thus the results are appropriate and of reasonable quality. If users encounter apparent errors or misstatements, they should contact WorldPop at release@worldpop.org.

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SUGGESTED CITATIONS

Chaudhuri S., Gadiaga A. N., Olowe I., Tejedor-Garavito N., Utazi C. E., Lazar A. N. 2025 Population, vaccination coverage, and zero-dose children estimates for Mali (2023) version 1.0. WorldPop, University of Southampton. DOI: <https://dx.doi.org/10.5258/SOTON/WP00824>

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by Olowe I. with oversight from Tejedor-Garavito N. The project implementation was led by Lazar A.N. The WorldPop group is also acknowledged for overall project support.

CODE DOWNLOAD:

- WorldPop's Reach the Unreached GitHub page: https://github.com/wpgp/RtU_vaccination_modelling/tree/main
- UNICEF's Reach the Unreached GitHub page: <https://github.com/unicef-drp/reach-the-unreached?tab=readme-ov-file>

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