

Mapping inequalities in exclusive breastfeeding in low- and middle-income countries, 2000–2018

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Data collection No primary data collection was carried out for these analyses.

Data analysis These analyses were carried out using R version 3.5.0. The main geostatistical models were fit using R-INLA version 18.07.12. All code used for these analyses is publicly available online before publication.

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The findings of this study are supported by data that are available in public online repositories, data that are publicly available on request from the data provider, and data that are not publicly available due to restrictions by the data provider and which were used under license for the current study. Details on data sources can be found on the GHDx website (upon publication: http://ghdx.healthdata.org/lbd-publication-data-input-sources?field_rec_ihme_publication_tid=29093), including information about the data provider and links to where the data can be accessed or requested (where available). We have also provided maps of the data included in our models in Supplementary Figures 1–5. Outputs of these EBF analyses can be explored at various spatial levels (national, administrative, and 5 × 5-km levels) through our customized visualisation tool (<https://vizhub.healthdata.org/lbd/ebf>).

Administrative boundaries were retrieved from the Database of Global Administrative Areas (GADM)[50]. Land cover was retrieved from the online Data Pool,

courtesy of the NASA EOSDIS Land Processes Distributed Active Archive Center, USGS/Earth Resources Observation and Science Center, Sioux Falls, South Dakota [51]. Lakes were retrieved from the Global Lakes and Wetlands Database, courtesy of the World Wildlife Fund and the Center for Environmental Systems Research, University of Kassel [52]. Populations were retrieved from WorldPop [53].

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Life sciences study design

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Sample size	Sample size was calculated as the number of unique data source-location pairs with survey responses regarding the feeding of children less than 6 months old at the time of the survey, in order to estimate exclusive breastfeeding (EBF) prevalence. This sample size is reported in the methods section: "This dataset represents 302,435 infants aged 0–5 months (infants up to the age of 6 months) across 94 LMICs, and was geocoded to 69,179 coordinates corresponding to cluster-level boundaries and 67,750 subnational polygon boundaries. Across the 94 countries in the analysis, there were 1,727 first-administrative-level boundaries (e.g., provinces) and 24,556 second-administrative-level boundaries (e.g., districts)." This is an observational study with no hypothesis testing and the sample size was not pre-specified. We evaluate the overall performance of our modelling strategy, given the available data, as part of a validation exercise as described in the 'Model validation' section of the methods, and as reported in the Supplementary Information (Supplementary Section 4.3).
Data exclusions	Surveys or reports that did not contain the relevant variable (i.e., survey responses regarding the feeding practices of children less than 6 months old at the time of the survey) or did not contain subnational geographic detail or could otherwise not be geolocated, or were outside the geographic (i.e., LMICs) or temporal (i.e., 1998-2018) scope of the study, were excluded as not relevant for these analyses. Surveys with microdata (i.e., individual-level responses) were excluded if they did not contain questions about the age of the child, whether the child is still being breastfed, and whether the child has consumed other food or liquid items. Survey reports without microdata were excluded if the survey did not contain a prevalence number for EBF with a sample size or the lower and upper bounds for the 95% confidence interval. Additionally, we excluded surveys that only asked mothers and caregivers if infants had been exclusively breastfed (e.g., "did you exclusively breastfeed?") without ascertaining further information. This exclusion criterion was established after finding, by comparing responses in surveys containing both types of questions, that many mothers and caregivers stated infants had exclusively breastfed but also answered that they had received food or water in the 24-hour recall questions. This may be due to the respondent misunderstanding the meaning of "exclusive breastfeeding" or the question may have been misinterpreted with translation. Instead, we classified children as exclusively breastfed if survey responses indicated they received only breast-milk and medicines (i.e., oral rehydration salts, vitamins, or other medicines) without other foods or liquids on the 24-hour period prior to the survey.
Replication	This is an observational study using many years of survey and report data and in principle could be replicated. Due to the time required to extract, process, and geo-locate all data, as well as to run the statistical models, we have not undertaken an explicit replication analysis.
Randomization	Randomization was not relevant to this study. This analysis is an observational mapping study and there were no experimental groups.
Blinding	Blinding was not relevant to this study, as it was an observational study using survey and report data.

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