



Methodology

Note concerning methodology

To better understand the disparities in routine childhood vaccination we analysed the correlations between vaccination rates and minority populations. A quantitative approach was used to analyse survey data. The differences in mean vaccination rates were noted and compared. Although this research concerns a significant amount of quantitative data, none of the survey characteristics concerning religion, ethnicity and language has been included in survey questions or published in survey findings up until now. The research team focused on responses to questions such as ‘What language do you speak?’ so as to identify minority and majority language speakers respectively. To do this, Minority

Rights Group’s *World Directory of Minorities and Indigenous Peoples*, as well as international reports, national statistics and consultations with experts were used to allocate data concerning majority or minority community members.

Data Sources

The Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) represent internationally renowned databases. These databases provide globally comparable data to monitor and evaluate health indicators. The DHS and MICS survey methodology involves a default or standard set of questions, which is adapted to local circumstances with the involvement of a

locally constituted expert committee and the relevant government department.

Surveys included in this study comprised DHS round 7 and 8¹ and MICS rounds 5 and 6.² This study reviewed the 39 most recently published³ DHS surveys and 49 recently published⁴ MICS survey datasets (Tables 1 and 2).⁵ In total, out of 88 surveys, 78⁶ distinct countries surveyed between 2014 and 2021 were considered. All four types of DHS surveys (Standard, Interim, Continuous and Special) were included. Where more than one interim survey was found, only the most recent published survey for a country was considered.⁷ In the case of MICS, region-specific surveys within a country were grouped together and counted as one.

Table 1: DHS characteristics by survey questions on Religion, Ethnicity and Language

DHS	Survey with a question	Meaningful for Minority Disaggregation	Published
Religion	26	26	1
Ethnicity	17	15	2
Language	34	12	0
Total	77	53	3

Table 2: MICS characteristics by survey questions on Religion, Ethnicity and Language

MICS	Survey with a question	Meaningful for Minority Disaggregation	Published
Religion	31	31	3
Ethnicity	31	25	16
Language	38	27	2
Total	100	83	21

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Methodological Outline

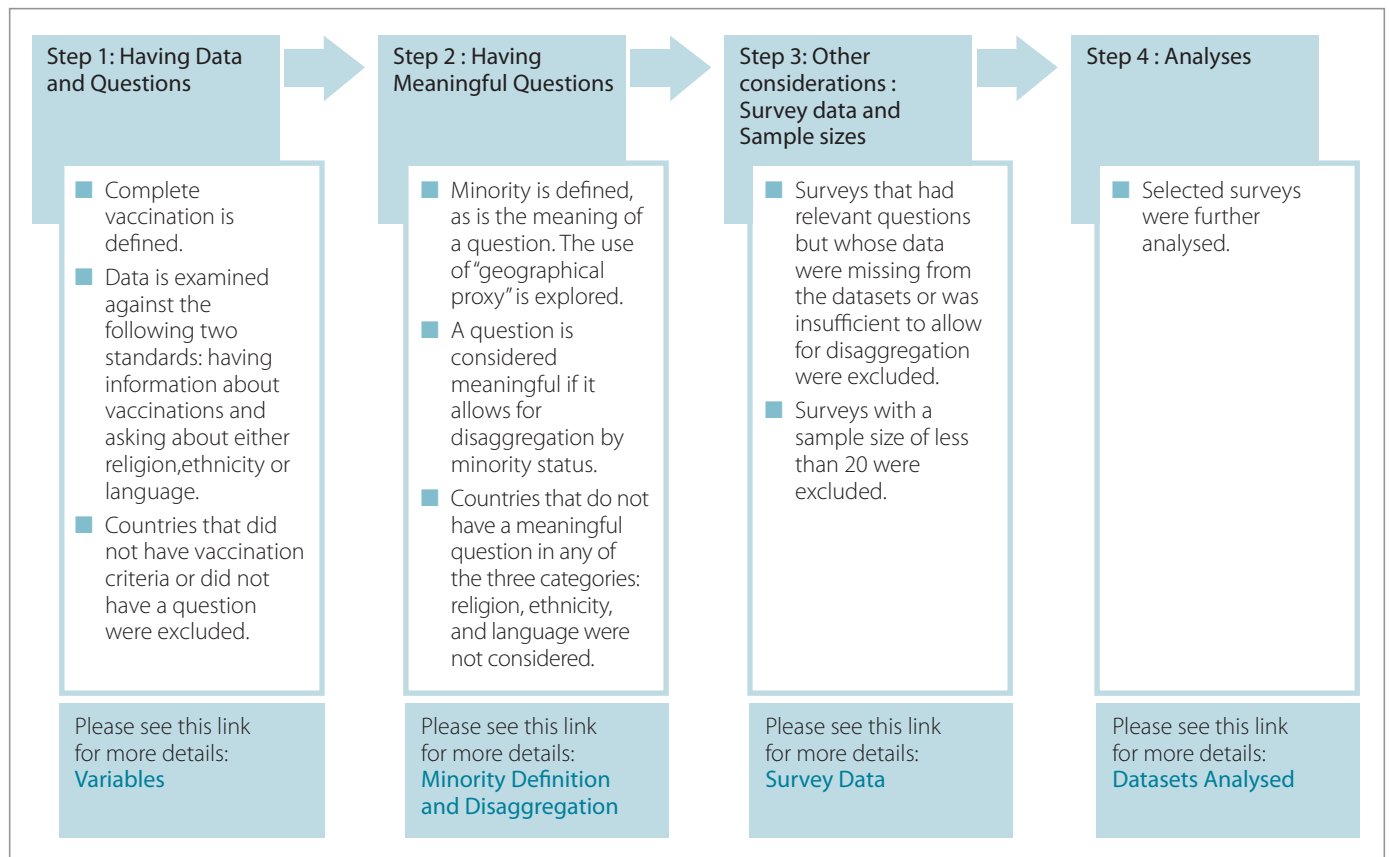
Four steps were taken in the analysis. The first step was to select countries with vaccination data. Within this dataset, we identified country-specific surveys whose questions concerned either religion, ethnicity or language. Following that, the definition of a minority and the meaningfulness of the question were defined. If a question allowed for minority

status to be broken down, it was considered meaningful. The use of an appropriate geographical proxy was investigated and countries without a relevant question in any of the three categories or without an appropriate geographical proxy were excluded.

Sample sizes and the number of entries in

the datasets were taken into consideration for the surveys that had questions enabling meaningful data disaggregation. Survey datasets with insufficient entries for disaggregation were also eliminated, as were samples with less than 20 respondents. Finally, selected surveys that met the criteria were analysed and compared.

Figure 1: A chart that provides a quick overview of the methodology



Variables

Vaccination Status

Vaccination status was determined by answers to the questions pertaining to a vaccination type. These could be based on either the recollection of the mother, or data taken from a vaccination card or both. We treated all reports and recorded data as having the same value.

Vaccination Schedule

A sequence of vaccines, including the scheduling of each dosage, are referred to as a 'vaccination schedule'. Depending on the country of residency, a vaccination schedule may be either recommended or required. The following vaccination schedule is considered to be a Basic Vaccination, that is, the minimum recommended by the World Health Organization (WHO) up until 1992:⁸ 1 dose of the BCG vaccine, 3 doses of the DPT vaccination, 3 doses of the polio vaccine (with the exception of the polio vaccine administered at birth), and 1 dose of the Measles Containing Vaccine (MCV). The DHS and MICS reports contained information on the requirements for both the Basic⁹ and the National Vaccination Schedules, defined as the immunisations received by country members at various stages of their lives.

Completeness

There are two ways of defining 'Complete vaccination'. One would be to consider the number of doses recommended by National Vaccination Schedules. The other would be to consider the Basic Vaccination standards. The National Vaccination Schedule's rules and recommendations vary from one country to another. Not all countries offer the same vaccinations, which is why some data on specific vaccinations draws from a smaller pool of

countries. For the sake of uniformity and simplicity, we considered the Basic Vaccination Schedule. The official vaccination schedule for each country was available in the published reports.

For the DHS surveys, two criteria were used to filter the dataset before analysis. The first was whether the infant was alive, and the second was the child's age in months. Based on how many doses were included in the national schedule, the latter varied. Therefore, we considered the 12- to 23-month age-group for this analysis.

A child is deemed fully vaccinated if he or she meets the standards for vaccination and has received these vaccines in the appropriate time; namely, within 12 to 23 months. For basic immunisation, a child is said to have 'Complete Basic Vaccination' if he or she has received all of the required immunisations (BCG, 3DPT, 3 polio vaccines, excluding the one given at birth, and 1 measles vaccine), 'No Basic Vaccination' if they have received none of the required immunisations, and 'Incomplete Basic Vaccination' if they have received some or most of the required immunisation.

Religion, Language and Ethnicity

The standard questionnaire in the DHS for religion is 'What is your religion?'. The question on ethnicity is '*What is your ethnic group?*', while the question on language is posed at the start of the questionnaire with the question '*Native language of the respondent*'.

The questions in MICS for religion, ethnicity and language were available in the Household survey. The question on religion, language and ethnicity followed the pattern, '*What is the religion of (name of the head of the household from HL2)?*',

'To what ethnic group does (name of the head of the household from HL2) belong?', and '*What is the mother tongue/native language of (name of the head of the household from HL2)?*' with options for each language.

For both DHS and MICS, the questions were closed and specific to particular groupings (in this case, language). However, in cases such as Nepal and Uganda, the questions were more open-ended.

While the questions in the DHS were related to the respondent, the standard questionnaire for MICS concerned the head of the household.

In most cases, the base questionnaire for these rounds did include references to religious, linguistic and ethnic considerations that allowed for disaggregation of data even though in several cases, the question areas had been removed in consultation with national authorities or local experts.

Where data was made publicly available, survey questionnaires and reports for each country were reviewed to ascertain which survey included data on vaccination rates and which data could be used for disaggregation by ethnic, religious and linguistic minority status. Country survey datasets were initially included when they met the following criteria:

- Having data on vaccination; and
- Having questions on any or all the following characteristics: ethnicity, religion and language.

Selection of countries based on vaccination data and religion, ethnicity and language questions

Of the 39 DHS surveys; two¹⁰ were excluded for not having vaccination data,

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one¹¹ was excluded because it failed to include a question on either ethnicity, religion or language (and a viable geographical proxy). Similarly, of the 49 MICS surveys, seven¹² were excluded for not having vaccination data and two¹³ were excluded for not having a question on either ethnicity, religion or language. Overall, out of 78 countries, eight were excluded for not having vaccination¹⁴ data and three were excluded for not having a question on ethnicity, religion or language.

Minority Definition and Disaggregation

As there is no legally agreed international or UN definition of ethnic, religious or linguistic minorities, it was necessary to establish whether individuals counted in the datasets belonged to a majority population or minority population. While it may be tempting to use a simple numerical distinction, such as less than a chosen percentage, in many countries no single ethnic, religious or linguistic group constitutes a clear numerical majority. What is more, there are many examples of numerically small groups that remain politically dominant or who are economically and socially privileged. A case in point is the Afrikaans-speaking community in South Africa. Speakers of international languages were generally not considered to constitute minorities, unless the sources identified them as such.

When referring to indigenous peoples and minorities, the United Nations recognises the right to self-identification. Therefore, recognition of minority status should be

based on objective and subjective criteria as follows:

- objective criteria such as non-dominance in terms of numbers and/or political power and possessing distinct ethnic, cultural, religious or linguistic characteristics, as well as
- subjective criteria of self-definition (i.e., a will on the part of the members of the group in question to preserve these distinct characteristics) (United Nations Development Programme, 2008).

For this reason, the researchers applied a working definition of ethnic, religious and linguistic minority developed by Minority Rights Group, which has been used for many years. Thus, we define minorities as 'disadvantaged ethnic, national, religious, linguistic or cultural groups, which are fewer in number than the rest of the population and which may wish to maintain and develop their identity'. Concomitantly, majorities are thus considered to be ethnic, religious, linguistic or cultural groups who may or may not form more than half of the population, but who enjoy average or above average levels of participation in political, economic processes and who generally speaking benefit from economic, social and health interventions.

The data sources used to allocate ethnic, religious and linguistic communities to either the minority or majority category in each country were MRG's Directory (*World Directory of Minorities and Indigenous Peoples*, 2021), internationally recognized governmental surveys (e.g. *International Religious Freedom Reports* issued by the United States Department of State), national statistics and consultations with MRG experts.

Geographical Proxies

The option of a geographical proxy, where distinct geographical areas are predominantly occupied by minorities, was considered. We found two countries with a feasible geographical proxy: in Tanzania, Arusha, Kilimanjaro, Manyara and Tanga occupied by Maasai and Kaskazini Unguja, Kusini Unguja, Kaskazini Pemba and Kusini Pemba occupied by Zanzibaris (Muslims); and Aceh and Papua in Indonesia occupied by predominantly Acehnese and indigenous Papuans respectively.

Using a definition that includes the term 'disadvantaged'¹⁵ could be tautologous in the sense that if minorities are defined as such, then it follows that vaccination rates are likely to be lower. However, we disagree with this simple argument. Childhood vaccinations offer states a significant opportunity to reach out to disadvantaged communities and intervene in an effort to break the cycle of poverty, ill-health, child mortality and educational exclusion or under-achievement. To meet the 2030 Sustainable Development Goals (SDGs), childhood vaccinations in marginalised and disadvantaged communities of all kinds should reach levels that meet the standards of so-called privileged groups. This study aims to tell us whether that is the case.

Meaningfulness

A review of the ethnicity, religion or language questions in each survey was undertaken to understand whether surveys gathered data that would allow disaggregation by minority status using the above-mentioned criteria (hereafter referred to as *meaningfulness*). This was not always the case. In some cases, the ethnic, linguistic or religious categories captured

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only diversity within the largest population groups in a country, while ignoring minorities.¹⁶ In other cases, surveys only made distinctions between one national language and 'others', for example in Rwanda (2015), where the only language options were Kinyarwanda and 'other'.¹⁷ In some cases, particularly where the only question concerned religion, it was not possible to distinguish a clear religious minority or majority.

The reviews regarding the meaningfulness of a question were made based on expert knowledge of the situation in each country, with additional reliance on MRG's Directory as well the expertise and knowledge of staff.

Data Availability

Meaningful Questions

From the 36 DHS country surveys, 26 of them contained a question on religion, 17 had one for ethnicity and 35 featured one on language. Additionally, the surveys conducted in Indonesia and Tanzania¹⁸ featured geographical proxies for both religion and ethnicity. From the available questions, only 12 out of 35 were meaningful for language, and only 15 out of 17 were meaningful on the subject of ethnicity.

Out of 40 MICS country surveys, 31 included a question on religion, 31 had one on ethnicity and 38 had one on language. From these questions, only 27 out of 38 were meaningful for language, and only 25 out of 31 were meaningful for ethnicity.

In total, from the 67 distinct DHS and MICS countries covered by at least one survey during the period,¹⁹ 45 countries had a question on religion, 42 on ethnicity and 66 on language. However, only 36 country surveys included a meaningful question on ethnicity, and 38 on language. All questions on religion allowed for some minority disaggregation for both DHS and MICS.

Five²⁰ countries from DHS and one²¹ country from MICS did not have a meaningful question in either the ethnic, religious, or linguistic categories. Out of a total of 67 countries, six were excluded for not having a meaningful question on ethnicity, religion or language. An overview of country selection can be found here:

Table 3: Number of countries with a question, number of countries excluded, and number of countries analysed (DHS)

DHS	Had a question	Meaningful question	Proxy available	Published	Excluded	Analysed	Excluded countries
Religion	26	26	2	1	1	27	Papua New Guinea
Ethnicity	17	15	2	2	2	15	Pakistan, Gambia
Language	34	12	–	0	3	9	Gambia, Senegal, Guinea
Total	77	53	4	3	6	51	

Table 4: Number of countries with a question, number of countries excluded, and number of countries analysed (MICS)

MICS	Had a question	Meaningful question	Proxy available	Published	Excluded	Analysed	Excluded countries
Religion	31	31	–	3	1	31	For North Macedonia, this was a two-part survey: one for Roma settlements and another national, so while Roma was removed; the national remained and therefore there are no changes
Ethnicity	31	25	–	16	6	19	Honduras, Turks and Caicos, Tonga, Gambia, Togo, Democratic Rep. of Congo
Language	38	27	–	2	10	17	Costa Rica, Gambia, Malawi, Tonga, Serbia, São Tomé and Príncipe, Lesotho, Guyana, Guinea, Fiji
Total	100	83	–	21	17	67	

Data Availability

Although 77 questions about religion, ethnicity and language were posed in the DHS, only 53 of these allowed for meaningful minority disaggregation (68.8%). More worryingly, the results of the disaggregated data have been published in only three cases (3.9%). Where data is collected but not published it is theoretically available for anyone who registers on the relevant platform to download. However, in reality, advanced research skills are required to either access, analyse or understand such hidden and unpublished data. Similarly,

despite having 100 questions on religion, ethnicity and language in MICS, 17% were not meaningful in terms of minority disaggregation and only 21% of the results were published.

Other Exclusion Criteria

Survey data

Surveys that included a relevant question on one of the three categories but whose data were either missing from the dataset

or insufficient to allow for disaggregation were occasionally excluded.^{22,23}

Sample sizes

Majority and minority groups whose sample size was less than 20 were removed and as a result, 13 surveys were excluded. Of these, 61.5% were linguistic groups and 76% did not have a large enough sample size for minorities.²⁴

Table 5: Showing countries and the number of entries for categories

	Country	Category	Observations	Majority/Minority
1	Costa Rica	Language	1	Minority
2	Serbia: Roma settlements Serbia: Roma settlements Serbia: national	Language Language Language	12 14 14	Majority Minority Minority
3	São Tomé and Príncipe	Language	12	Minority
4	Lesotho	Language	16	Minority
5	Kosovo: Roma, Ashkali and Egyptian Communities	Language	16	Minority
6	Guyana	Language	6	Minority
7	Guinea	Language	11	Majority
8	Tonga	Ethnicity	5	Minority
9	Fiji	Language	4	Minority
10	Turks and Caicos Islands	Ethnicity	7	Minority
11	Democratic Republic of Congo	Ethnicity	13	Minority
12	Papua New Guinea	Religion	17	Minority
13	North Macedonia: Roma settlements	Religion	4	Majority

Datasets Analysed

Despite having 78 questions in DHS and 100 in MICS, only 65.3% (51) and 67% (37) met the criteria for final analysis.

A comprehensive table showing the number of questions and exclusions can be found in *Table 3* and *Table 4*. The total list of datasets analysed can be found in *Table 7*.

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Data Analysis

Data from the survey questionnaires was analysed using the latest version of Stata (Stata 17). For MICS, the childhood questionnaire data and the household questionnaire data were merged according to MICS guidelines using cluster number, house number and line number. DHS childhood datasets were analysed without merging.

The survey design was defined based on weights, sampling units and strata. Primary sampling unit, stratification variable and weight variable were considered to obtain the mean, standard errors and confidence intervals for the surveys.

Where a response was not available, data was classified as missing and was not considered for analysis. Data on basic vaccination (a composite variable consisting of BCG, Polio, DPT and Measles) was disaggregated by 'majority' and 'minority' categories for ethnic, religious and linguistic groups. Vaccination rates were calculated separately for each country using the DHS and MICS survey datasets. The mean for basic vaccination for each country was calculated and compared across all the DHS and MICS surveys.

Further Considerations

We encourage academics and policymakers to recognize data gaps in the datasets. These include surveys lacking a meaningful question, as well as data on ethnicity, religion or/and language. Countries also lacked sufficient sample sizes even when groups were classified as a more inclusive minority category.

Since reweighing primary datasets was not possible due to limitations, the authors of this brief advise academics to take into consideration and perform additional statistical tests such as a T-test, to better understand the significance of the differences, which is why more research is required. These comparisons could also be made between disparities by specific vaccine types, or between complete and incomplete vaccinations by ethnic, religious and linguistic categories. Additionally, correlations between mother's education level, area of residence (urban or rural), and other socio-demographic characteristics must be investigated.

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Tables

Table 6: Names of DHS and MICS countries considered

Country Name (DHS) (N=39)	Country Name (MICS) (N=49)
Madagascar	Pakistan
Mauritania	Vietnam
Rwanda	Fiji
Ethiopia	Argentina
Liberia	Guyana
Gambia	Malawi
Sierra Leone	Samoa
Senegal	State of Palestine
India	Turks and Caicos Islands
Cameroon	Tuvalu
Guinea	Central African Republic
Mali	Guinea Bissau
Nigeria	Belarus
Zambia	Chad
Albania	Cuba
Bangladesh	Dominican Republic
Benin	Honduras
Jordan	Kosovo
Papua New Guinea	Tonga
Pakistan	Bangladesh
Philippines	Nepal
Tajikistan	Serbia
Indonesia	Thailand
South Africa	São Tomé and Príncipe
Maldives	Turkmenistan
Armenia	Zimbabwe
Burundi	Algeria
Timor-Leste	Kiribati
Uganda	North Macedonia
Nepal	Costa Rica
Haiti	Gambia
Myanmar	Iraq
Afghanistan	Georgia
Angola	Kyrgyzstan
Colombia	Lesotho
Guatemala	Madagascar
Malawi	Mongolia
Tanzania	Montenegro
Zimbabwe	Suriname

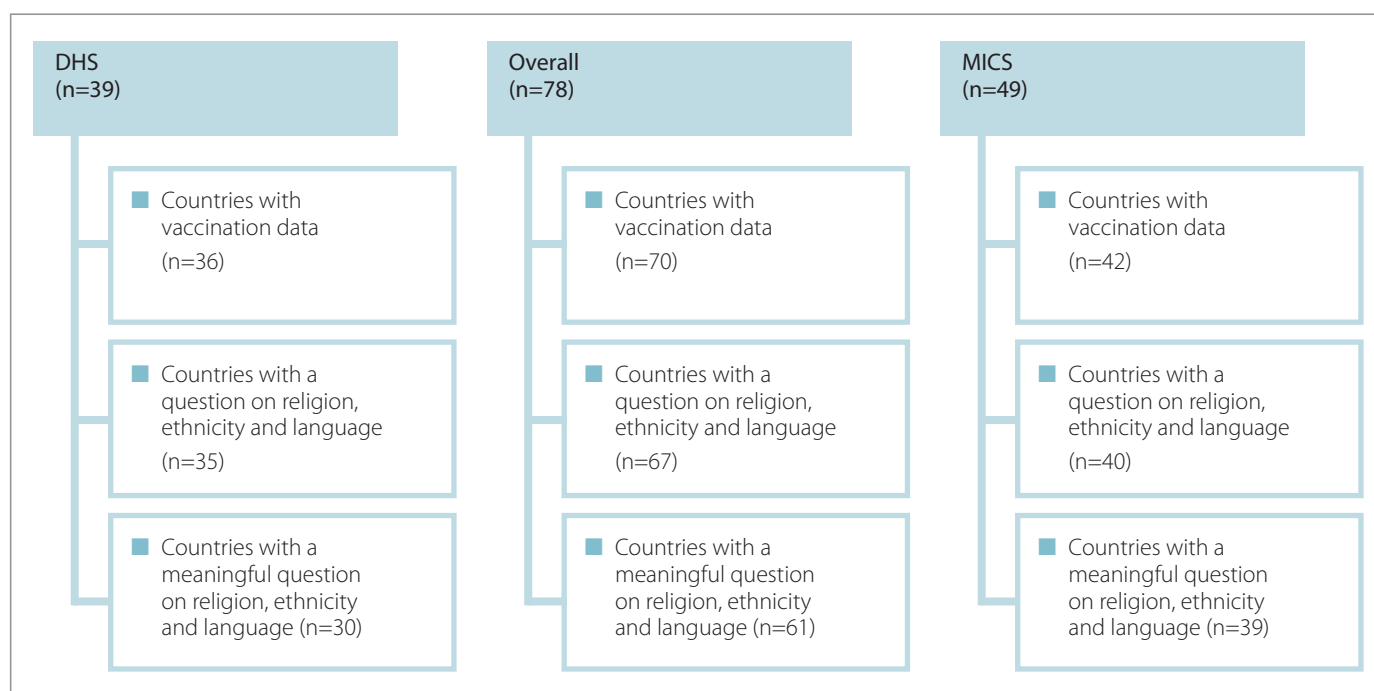


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Table 6: continued...

Country Name (DHS) (N=39)	Country Name (MICS) (N=49)
	Tunisia
	Ghana
	Laos
	Sierra Leone
	Togo
	Nigeria
	Ivory Coast
	Guinea
	Paraguay
	Democratic Republic of Congo

Figure 2: A chart displaying the countries chosen based on criteria



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Table 7: A table showing the total list and the number of countries analysed

	DHS	MICS
Religion	<ol style="list-style-type: none"> 1. Madagascar (2021) 2. India (2019-21) 3. Ethiopia (2019) 4. Gambia (2019-20) 5. Liberia (2019-20) 6. Rwanda (2019-20) 7. Senegal (2019) 8. Sierra Leone (2019) 9. Cameroon (2018) 10. Guinea (2018) 11. Mali (2018) 12. Nigeria (2018) 13. Zambia (2018) 14. Bangladesh (2017-18) 15. Benin (2017-18) 16. Philippines (2017) 17. Burundi (2016-17) 18. Haiti (2016-17) 19. Nepal (2016) 20. Timor-Leste (2016) 21. Uganda (2016) 22. Angola (2015-16) 23. Guatemala (2014-15) 24. Malawi (2015-16) 25. Zimbabwe (2015) 26. Indonesia (2017) 27. Tanzania (2015-16) 	<ol style="list-style-type: none"> 1. Guyana (2019-20) 2. Malawi (2019-20) 3. Samoa (2019-20) 4. Turks and Caicos Islands (2019-20) 5. Tuvalu (2019-20) 6. Chad (2019) 7. Dominican Republic (2019) 8. Honduras (2019) 9. Nepal (2019) 10. São Tomé and Príncipe (2019) 11. Serbia (2019) 12. Thailand (2019) 13. Tonga (2019) 14. Zimbabwe (2019) 15. Central African Republic (2018-19) 16. Guinea Bissau (2018-19) 17. Kiribati (2018-18) 18. North Macedonia (2018-19) 19. Costa Rica (2018) 20. Gambia (2018) 21. Iraq (2018) 22. Madagascar (2018) 23. Mongolia (2018) 24. Ghana (2017-18) 25. People's Democratic Republic of Lao (2017) 26. Sierra Leone (2017) 27. Togo (2017) 28. Nigeria (2016-17) 29. Ivory Coast (2016) 30. Guinea (2016) 31. Paraguay (2016)
Ethnicity	<ol style="list-style-type: none"> 1. India (2019-21) 2. Senegal (2019) 3. Sierra Leone (2019) 4. Guinea (2018) 5. Mali (2018) 6. Nigeria (2018) 7. Benin (2017-18) 8. Ethiopia (2016) 9. Nepal (2016) 10. Uganda (2016) 11. Afghanistan (2015) 12. Guatemala (2014-15) 13. Malawi (2015-16) 14. Indonesia (2017) 15. Tanzania (2015-16) 	<ol style="list-style-type: none"> 1. Vietnam (2020-21) 2. Guyana (2019-20) 3. Kosovo (2019 -20) 4. Malawi (2019-20) 5. Chad (2019) 6. Cuba (2019) 7. Nepal (2019) 8. Serbia (2019) 9. Guinea Bissau (2018-19) 10. North Macedonia (2018-19) 11. Costa Rica (2018) 12. Kyrgyzstan (2018) 13. Lesotho (2018) 14. Mongolia (2018) 15. Ghana (2017-18) 16. People's Democratic Republic of Laos (2017) 17. Sierra Leone (2017) 18. Ivory Coast (2016) 19. Paraguay (2016)

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Table 7: continued...

	DHS	MICS
Language	<ol style="list-style-type: none"> 1. India (2019-21) 2. Sierra Leone (2019) 3. Cameroon (2018) 4. Mali (2018) 5. Benin (2017-18) 6. Pakistan (2017-18) 7. South Africa (2016) 8. Angola (2015-16) 9. Zimbabwe (2015) 	<ol style="list-style-type: none"> 1. Vietnam (2020-21) 2. Kosovo (2019 -20) 3. Pakistan (2018-19) 4. Chad (2019) 5. Dominican Republic (2019) 6. Nepal (2019) 7. Thailand (2019) 8. Zimbabwe (2019) 9. Guinea Bissau (2018-19) 10. North Macedonia (2018-19) 11. Iraq (2018) 12. Kyrgyzstan (2018) 13. Mongolia (2018) 14. Ghana (2017-18) 15. Sierra Leone (2017) 16. Togo (2017) 17. Nigeria (2016-17)

Table 8: A data table displaying, by country, the mean percentages of the minority and majority populations, the difference between the means, and the minority vaccination rate observed from these variance for populations that have not received at least one dose of the Basic Vaccination

Country	Majority Mean	Minority Mean	Total Mean	Difference (between Majority and Minority)	Vaccination rate	Number
Indonesia	6.55	19.85	6.8	-13.3	Lower	1
Philippines	6.8	19.3	9.5	-12.5	Lower	2
Madagascar	5.35	17.45	9.15	-12.1	Lower	3
Angola	15.25	26.1	19.1	-10.85	Lower	4
Benin	5.733333	15.8	10.9	-10.0667	Lower	5
Ethiopia	16.05	20	17.5	-3.95	Lower	6
Pakistan	0	3.3	3.1	-3.3	Lower	7
Cameroon	8.65	11.35	9.7	-2.7	Lower	8
Kosovo	0.733333	3.1	0.933333	-2.36667	Lower	9
Mali	13.16667	15.36667	13.7	-2.2	Lower	10
Mongolia	0.9	2.7	1.02	-1.8	Lower	11
Kyrgyzstan	0	1.8	0.4	-1.8	Lower	12
Liberia	5.7	7.5	6	-1.8	Lower	13
Nepal	0.52	2.12	0.68	-1.6	Lower	14
Haiti	9.5	11.1	9.7	-1.6	Lower	15
Dominican	0.25	1.24	0.3	-0.99	No difference	1
Guyana	0.25	1.1	0.3	-0.85	No difference	2
Uganda	1.35	2.2	1.5	-0.85	No difference	3
North Macedonia	0.725	1.525	1.025	-0.8	No difference	4
Côte d'Ivoire	3.25	4	4.1	-0.75	No difference	5
Guatemala	0.5	0.9	0.6	-0.4	No difference	6
Tonga	0	0.4	0.2	-0.4	No difference	7

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Table 8: continued...

Country	Majority Mean	Minority Mean	Total Mean	Difference (between Majority and Minority)	Vaccination rate	Number
Vietnam	2.35	2.7	2.4	-0.35	No difference	8
Lao People's Democratic Republic	0.1	0.45	0.2	-0.35	No difference	9
Togo	0	0.35	0.2	-0.35	No difference	10
India	3.7	3.9	3.6	-0.2	No difference	11
Paraguay	0.15	0.25	0.1	-0.1	No difference	12
Ghana	0	0	0	0	No difference	13
Guinea Bissau	0	0	0	0	No difference	14
Lesotho	0	0	0	0	No difference	15
Cuba	0	0	0	0	No difference	16
Kiribati	0	0	0	0	No difference	17
São Tomé and Príncipe	0	0	0	0	No difference	18
Turks and Caicos Islands	0	0	0	0	No difference	19
Tuvalu	0	0	0	0	No difference	20
Thailand	0	0	0	0	No difference	21
Malawi	1	0.975	1	0.025	No difference	22
Senegal	2.9	2.8	3.3	0.1	No difference	23
Costa Rica	0.2	0	0.1	0.2	No difference	24
Honduras	0.2	0	0.1	0.2	No difference	25
Chad	1.366667	1.133333	1.3	0.233333	No difference	26
Iraq	0.25	0	0.2	0.25	No difference	27
Rwanda	0.3	0	0.3	0.3	No difference	28
Burundi	0.5	0.1	0.3	0.4	No difference	29
Central African Republic	0.5	0	0.5	0.5	No difference	30
Gambia	0.5	0	0.4	0.5	No difference	31
Samoa	3	2.5	2.9	0.5	No difference	32
Tanzania	2.4	1.8	2.3	0.6	No difference	33
Bangladesh	1.5	0.8	1.4	0.7	No difference	34
Serbia	0.7	0	0.6	0.7	No difference	35
South Africa	5.1	4	4.5	1.1	Higher	1
Sierra Leone	1.671429	0.528571	1.414286	1.142857	Higher	2
Zambia	1.3	0	1.3	1.3	Higher	3
Zimbabwe	5.2	2.075	4.9	3.125	Higher	4
Afghanistan	14.6	11.3	12.6	3.3	Higher	5
Guinée	18.425	14.425	17.45	4	Higher	6
Nigeria	11.55	4.725	9.7	6.825	Higher	7
Timor Leste	19.3	8.1	19.1	11.2	Higher	8
Total	3.91416	4.75841	4.20885	-0.84425	Lower	

A larger minority mean for no vaccination and incomplete vaccination suggests that the rate of vaccination is lower because these communities have not gotten at least one dose or sufficient doses to be completely vaccinated.



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Table 9: A data table displaying, by country, the mean percentages of minority and majority populations, the difference between the means, and the minority vaccination rate inferred from this variation for populations that have not received enough Basic Vaccination doses to be completely vaccinated.

Country	Majority Mean	Minority Mean	Total Mean	Difference (between Majority and Minority)	Vaccination rate	Number
Haiti	47	61.9	48.9	-14.9	Lower	1
Lao People's Democratic Republic	57.25	71.65	64	-14.4	Lower	2
Madagascar	40.2	54.35	45.1	-14.15	Lower	3
Thailand	15.9	29.9	17	-14	Lower	4
Vietnam	43.8	56.35	45.5	-12.55	Lower	5
Nepal	27.2	37.52	30.28	-10.32	Lower	6
Tonga	51.7	61.1	55.4	-9.4	Lower	7
Pakistan	16.925	25.875	25.65	-8.95	Lower	8
Indonesia	27.8	36.6	28	-8.8	Lower	9
Cameroon	34.45	43.25	37.7	-8.8	Lower	10
Costa Rica	32.55	40.4	36.05	-7.85	Lower	11
Paraguay	41.1	48.6	42.1	-7.5	Lower	12
Tuvalu	54.4	61.3	55.9	-6.9	Lower	13
Dominican Republic	54.6	61.35	56.3	-6.75	Lower	14
Philippines	14.4	21	15.8	-6.6	Lower	15
Sao Tome and Principe	16.1	22.1	19.2	-6	Lower	16
Togo	43.65	49.4	46.7	-5.75	Lower	17
Chad	76.5	82.1	81	-5.6	Lower	18
Mongolia	30.18	35.04	30.1	-4.86	Lower	19
Côte d'Ivoire	53.1	57.65	57.3	-4.55	Lower	20
Samoa	70	74.3	70.6	-4.3	Lower	21
Malawi	23.7	27.525	24.825	-3.825	Lower	22
Guatemala	40.95	44.25	40.5	-3.3	Lower	23
Guinea Bissau	30.4	33.63333	34.1	-3.23333	Lower	24
Gambia	14.95	17.7	15.05	-2.75	Lower	25
Uganda	38.15	40.8	38.8	-2.65	Lower	26
Serbia	64.45	66.85	64.7	-2.4	Lower	27
Kosovo	93.3	95.63333	93.56667	-2.33333	Lower	28
Ghana	23.7	25.7	24.3	-2	Lower	29
Senegal	17.85	19.7	19.3	-1.85	Lower	30
South Africa	31.1	32.9	32.2	-1.8	Lower	31
Kiribati	86.5	87.6	86.9	-1.1	Lower	32
Honduras	25.9	26.5	26	-0.6	No difference	1
Sierra Leone	34.17143	34.71429	35.27143	-0.54286	No difference	2
Rwanda	2.9	3.4	3	-0.5	No difference	3
Burundi	14.4	14.6	14.5	-0.2	No difference	4
Lesotho	67.6	67.5	67.6	0.1	No difference	5
Mali	26.86667	26.73333	28.5	0.133334	No difference	6
Guyana	38.05	37.8	37.7	0.25	No difference	7
Nigeria	62.85	62.6	61.775	0.25	No difference	8
Cuba	61	60.7	60.9	0.3	No difference	9
Benin	33	32	32.4	1	Higher	1
Kyrgyzstan	99.3	97.9	99	1.4	Higher	2
India	20.4	18.93333	19.46667	1.466667	Higher	3
Zambia	23.7	21.4	23.7	2.3	Higher	4

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Table 9: continued...

Country	Majority Mean	Minority Mean	Total Mean	Difference (between Majority and Minority)	Vaccination rate	Number
Central African Republic	87.9	85.5	87.6	2.4	Higher	5
Bangladesh	9	6.2	8.9	2.8	Higher	6
Zimbabwe	17.325	13.8	16.825	3.525	Higher	7
Angola	50.45	46.45	50.1	4	Higher	8
Timor Leste	32.1	27.5	32	4.6	Higher	9
Ethiopia	44.2	36.7	41.35	7.5	Higher	10
Tanzania	22.85	15.25	22.3	7.6	Higher	11
Afghanistan	46.4	37.5	41.1	8.9	Higher	12
Guinee	57.425	46.875	56.25	10.55	Higher	13
Liberia	39.7	27.3	37.5	12.4	Higher	14
North Macedonia	60.15	46.3	53.3	13.85	Higher	15
Iraq	67.15	50.75	66	16.4	Higher	16
Turks and Caicos Islands	38.4	21.7	28.3	16.7	Higher	17
Total	40.83347	42.41573	41.525	-1.58226	Lower	

A larger minority mean for no vaccination and incomplete vaccination suggests that the rate of vaccination is lower because these communities have not gotten at least one dose or sufficient doses to be completely vaccinated.

Table 10: A data table displaying, by country, the mean percentages of the minority and majority populations, the difference between the means, and the minority vaccination rate determined from these variances for populations that have received all necessary doses of the Basic Vaccination and are completely vaccinated

Country	Majority Mean	Minority Mean	Total Mean	Difference (between Majority and Minority)	Vaccination rate	Number
Madagascar	55.25	28.15	45.75	27.1	Lower	1
Indonesia	65.6	43.5	65.2	22.1	Lower	2
Philippines	78.8	59.6	74.7	19.2	Lower	3
Haiti	43.5	27	41.4	16.5	Lower	4
Lao People's Democratic Republic	42.65	27.95	35.7	14.7	Lower	5
Thailand	84.1	70.1	83	14	Lower	6
Vietnam	53.85	40.95	52.1	12.9	Lower	7
Nepal	72.28	60.36	69.04	11.92	Lower	8
Cameroon	56.95	45.4	52.5	11.55	Lower	9
Pakistan	83.075	72.45	72.8	10.625	Lower	10
Tonga	48.3	38.6	44.4	9.7	Lower	11
Benin	61.5	52.2	56.7	9.3	Lower	12
Dominican Republic	45.15	37.4	43.4	7.75	Lower	13
Costa Rica	67.25	59.6	63.8	7.65	Lower	14
Paraguay	58.75	51.15	57.7	7.6	Lower	15
Angola	34.3	27.4	30.7	6.9	Lower	16
Tuvalu	45.6	38.7	44.1	6.9	Lower	17
Mongolia	68.92	62.28	68.88	6.64	Lower	18
Togo	56.35	50.25	53.1	6.1	Lower	19
Sao Tome and Principe	83.9	77.9	80.8	6	Lower	20
Côte d'Ivoire	43.65	38.3	38.6	5.35	Lower	21

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Table 10: continued...

Country	Majority Mean	Minority Mean	Total Mean	Difference (between Majority and Minority)	Vaccination rate	Number
Chad	22.13333	16.8	17.8	5.333333	Lower	22
Kosovo	5.933333	1.266667	5.4	4.666667	Lower	23
Malawi	75.325	71.475	74.15	3.85	Lower	24
Samoa	27	23.2	26.5	3.8	Lower	25
Guatemala	58.6	54.85	59	3.75	Lower	26
Uganda	60.5	57	59.7	3.5	Lower	27
Guinea Bissau	69.6	66.36667	65.9	3.233333	Lower	28
Gambia	84.8	82.3	84.75	2.5	Lower	29
Mali	59.93333	57.9	57.9	2.033333	Lower	30
Ghana	76.3	74.3	75.7	2	Lower	31
Senegal	79.25	77.55	77.4	1.7	Lower	32
Serbia	34.85	33.15	34.7	1.7	Lower	33
Kiribati	13.5	12.4	13.1	1.1	Lower	34
South African	63.9	63	63.4	0.9	No difference	1
Guyana	61.65	61.1	61.9	0.55	No difference	2
Honduras	74	73.5	73.9	0.5	No difference	3
Kyrgyzstan	0.7	0.3	0.6	0.4	No difference	4
Rwanda	96.7	96.6	96.7	0.1	No difference	5
Lesotho	32.4	32.5	32.4	-0.1	No difference	6
Burundi	85.1	85.3	85.2	-0.2	No difference	7
Cuba	39	39.3	39.1	-0.3	No difference	8
Sierra Leone	64	64.8	63	-1	Higher	1
India	75.93333	77.16667	76.93333	-1.23333	Higher	2
Central African Republic	11.6	14.5	11.9	-2.9	Higher	3
Bangladesh	89.5	93	89.7	-3.5	Higher	4
Ethiopia	39.7	43.3	41.1	-3.6	Higher	5
Zambia	75	78.6	75	-3.6	Higher	6
Zimbabwe	75.875	81.25	76.725	-5.375	Higher	7
Nigeria	25.6	32.65	28.5	-7.05	Higher	8
Tanzania	74.75	82.9	75.3	-8.15	Higher	9
Liberia	54.6	65.2	56.5	-10.6	Higher	10
Afghanistan	39	51.3	46.3	-12.3	Higher	11
North Macedonia	39.125	52.2	45.7	-13.075	Higher	12
Guinée	24.15	38.7	26.275	-14.55	Higher	13
Timor Leste	48.6	64.4	48.9	-15.8	Higher	14
Iraq	32.6	49.25	33.8	-16.65	Higher	15
Turks and Caicos Islands	61.6	78.3	71.7	-16.7	Higher	16
Total	55.5625	53.15645	54.58145	2.406048	Lower	



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Table 11: A data table showing, by language, the mean percentages of the minority and majority populations, the difference between the means, and the minority vaccination rate for groups that have received all the Basic Vaccination doses and are fully immunised

Country	Majority Mean	Minority Mean	Total Mean (country-wise)	Difference (between Majority and Minority)	Vaccination rate
Mongolia	34.3	67.4	50.85	33.1	Lower
Nepal	34.3	67.4	50.85	33.1	Lower
Angola	14.6	40.3	27.45	25.7	Lower
Thailand	67.2	84.2	75.7	17	Lower
Vietnam	37.3	54.2	45.75	16.9	Lower
Guinea Bissau	64.4	79.4	71.9	15	Lower
Chad	15.2	27.3	21.25	12.1	Lower
Pakistan	72.45	83.075	77.7625	10.625	Lower
Mali	52.2	61	56.6	8.8	Lower
Benin	52.7	61	56.85	8.3	Lower
Dominican Republic	37.9	43.8	40.85	5.9	Lower
Cameroon	51	54.8	52.9	3.8	Lower
Kosovo	0	3.4	1.7	3.4	Lower
Togo	51.5	54.4	52.95	2.9	Lower
South Africa	63	63.9	63.45	0.9	No difference
Kyrgyzstan	0.3	0.7	0.5	0.4	No difference
Sierra Leone	65.05	63.35	64.2	-1.7	Higher
Ghana	76.8	74.7	75.75	-2.1	Higher
Nigeria	18.8	15.4	17.1	-3.4	Higher
India	81.1	73.4	77.25	-7.7	Higher
Zimbabwe	85.5	76.55	81.025	-8.95	Higher
Iraq	44.4	31.5	37.95	-12.9	Higher
North Macedonia	55.45	41.95	48.7	-13.5	Higher
Total (Overall Language)	50.14444	55.11296	52.6287	4.968519	Lower



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Table 12: A data table showing, by ethnicity, the mean percentages of the minority and majority populations, the difference between the means, and the minority vaccination rate for groups that have received all the Basic Vaccination doses and are fully immunised

Country	Majority Mean	Minority Mean	Total Mean (country-wise)	Difference (between Majority and Minority)	Vaccination rate
Côte d'Ivoire	33.7	53.5	43.6	19.8	Lower
Indonesia	49.5	65.4	57.45	15.9	Lower
Guatemala	44.3	59.1	51.7	14.8	Lower
Lao People's Democratic Republic	28.8	43.3	36.05	14.5	Lower
Benin	52.5	61.4	56.95	8.9	Lower
Vietnam	44.6	53.5	49.05	8.9	Lower
Senegal	74.6	81.2	77.9	6.6	Lower
Chad	14.9	21.5	18.2	6.6	Lower
Mali	55.3	61.5	58.4	6.2	Lower
Kosovo	1.9	7.2	4.55	5.3	Lower
Sierra Leone	63.1	67.83333	65.46667	4.733333	Lower
Guyana	57.9	62.5	60.2	4.6	Lower
Paraguay	55	57.8	56.4	2.8	Lower
Malawi	73.05	75.3	74.175	2.25	Lower
Uganda	59	60.4	59.7	1.4	Lower
Mongolia	69.96667	70.86667	70.41667	0.9	No difference
Kyrgyzstan	0.3	0.7	0.5	0.4	No difference
Ghana	75.7	75.8	75.75	0.1	No difference
Serbia	34.7	34.7	34.7	0	No difference
Lesotho	32.5	32.4	32.45	-0.1	No difference
Cuba	39.3	39	39.15	-0.3	No difference
Costa Rica	65.9	62.2	64.05	-3.7	Higher
Guinea Bissau	68	64.1	66.05	-3.9	Higher
Tanzania	82	74.3	78.15	-7.7	Higher
Guinée	32.1	24.1	28.1	-8	Higher
North Macedonia	47.6	37.3	42.45	-10.3	Higher
Afghanistan	51.3	39	45.15	-12.3	Higher
Ethiopia	46.8	33.5	40.15	-13.3	Higher
Nigeria	53	30	41.5	-23	Higher
Total (Overall Ethnicity)	48.6	50.0	49.3	1.40931	Lower



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Table 13: A data table showing, by religion, the mean percentages of the minority and majority populations, the difference between the means, and the minority vaccination rate for groups that have received all the Basic Vaccination doses and are fully immunised

Country	Majority Mean	Minority Mean	Total Mean (country-wise)	Difference (between Majority and Minority)	Vaccination rate
Indonesia	37.5	65.8	51.65	28.3	Lower
Madagascar	28.15	55.25	41.7	27.1	Lower
Cameroon	39.8	59.1	49.45	19.3	Lower
Philippines	59.6	78.8	69.2	19.2	Lower
Costa Rica	53.3	72.3	62.8	19	Lower
Haiti	27	43.5	35.25	16.5	Lower
Lao People's Democratic Republic	27.1	42	34.55	14.9	Lower
Paraguay	47.3	59.7	53.5	12.4	Lower
Thailand	73	84	78.5	11	Lower
Benin	51.4	62.1	56.75	10.7	Lower
Tonga	38.6	48.3	43.45	9.7	Lower
Dominican Republic	36.9	46.5	41.7	9.6	Lower
Togo	49	58.3	53.65	9.3	Lower
Ghana	70.4	78.4	74.4	8	Lower
Tuvalu	38.7	45.6	42.15	6.9	Lower
Ethiopia	39.8	45.9	42.85	6.1	Lower
Sao Tome and Principe	77.9	83.9	80.9	6	Lower
Uganda	55	60.6	57.8	5.6	Lower
Malawi	69.9	75.35	72.625	5.45	Lower
India	73.3	77.8	75.55	4.5	Lower
Nepal	66.3	70.5	68.4	4.2	Lower
Samoa	23.2	27	25.1	3.8	Lower
Serbia	31.6	35	33.3	3.4	Lower
Gambia	82.3	84.8	83.55	2.5	Lower
Kiribati	12.4	13.5	12.95	1.1	Lower
Honduras	73.5	74	73.75	0.5	No difference
Rwanda	96.6	96.7	96.65	0.1	No difference
Burundi	85.3	85.1	85.2	-0.2	No Difference
Nigeria	29.4	28.5	28.95	-0.9	No Difference
Guinea Bissau	66.7	65.3	66	-1.4	Higher
Zimbabwe	77	75.2	76.1	-1.8	Higher
Mongolia	67.2	64.6	65.9	-2.6	Higher
Chad	20.3	17.6	18.95	-2.7	Higher
Central African Republic	14.5	11.6	13.05	-2.9	Higher
Senegal	80.5	77.3	78.9	-3.2	Higher
Bangladesh	93	89.5	91.25	-3.5	Higher
Guyana	64.3	60.8	62.55	-3.5	Higher
Zambia	78.6	75	76.8	-3.6	Higher
Guatemala	65.4	58.1	61.75	-7.3	Higher



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Table 13: continued...

Country	Majority Mean	Minority Mean	Total Mean (country-wise)	Difference (between Majority and Minority)	Vaccination rate
Sierra Leone	67.1	59.5	63.3	-7.6	Higher
Tanzania	83.8	75.2	79.5	-8.6	Higher
Mali	66.2	57.3	61.75	-8.9	Higher
Côte d'Ivoire	42.9	33.8	38.35	-9.1	Higher
Liberia	65.2	54.6	59.9	-10.6	Higher
Angola	40.2	28.3	34.25	-11.9	Higher
North Macedonia	50.3	35.3	42.8	-15	Higher
Timor Leste	64.4	48.6	56.5	-15.8	Higher
Turks and Caicos Islands	78.3	61.6	69.95	-16.7	Higher
Guinée	40.9	24.16667	32.53333	-16.7333	Higher
Iraq	54.1	33.7	43.9	-20.4	Higher
Total (Overall Religion)	55.50	57.27	56.41	1.77	Lower

Table 14: A data table showing, by caste, the mean percentages of the minority and majority populations, the difference between the means, and the minority vaccination rate for groups that have received all the Basic Vaccination doses and are fully immunised

Country	Majority Mean	Minority Mean	Total Mean (country-wise)	Difference (between Majority and Minority)	Vaccination rate
Nepal	67.45	76.5	71.975	9.05	Lower
India	77.1	76.6	76.85	-0.5	No Difference
Total (Overall Caste)	70.66667	76.53333	73.6	5.866666	Lower



Disaggregation

The names of groups and communities were taken from from the DHS and MICS surveys and datasets, therefore they might not exactly correspond to terminology that are widely accepted or advised.

Table 15: A table displaying the survey year and characteristics that were disaggregated into majority and minority category for each country analysed using DHS surveys

Country	Year	Characteristics
Afghanistan	2015	Ethnicity: Pashtun - Majority Tajik, Hazara, Uzbek, Turkmen, Balochi, Pashai, Other - Minority South Asia
Bangladesh	2017-18	Religion: Islam - Majority Hinduism, Buddhism, Christianity, No Religion - Minority South Asia
Burundi	2016-17	Religion: Catholic - Majority Protestant, Muslim, Jehovah's Witness, Sect, Other - Minority East Africa
Cameroon	2018	Religion: Christain - Majority Muslim, Animist, Other - Minority Language: ²⁵ Fulfude, Pidgin, Bassa, Ewondo, Bamileke, Hausa - Majority Bamoun, English, Bamoun, Toupouri, Haoussa, Other - Minority Middle Africa
Ethiopia	2019	Religion: Christian - Majority Muslim - Minority East Africa
Ethiopia	2016	Ethnicity: Oromo, Amhara - Majority Tigrle, Affar, Somalle, Guragie, Sidama, Nuwer, Welaita, Berta, Kefficho, Gumuz, Hadiya, Gamo, Silte, Anyiwak, Kembata, Gedeo, Agew-Awi, Dawuro, Debase/Gewada, Derashe, Dimi, Dizi, Donga, Dime, Fedashe, Agew Hamyra, Gebato, Alaba, Gedicho, Gidole, Goffa, Argoba, Ari, Guagu, Arborie, Harari, Hamer, Irob, Bacha, Basketo, Konta, Komo, Konso, Kore, Koyego, Kunama, Karo, Kusumie, Malie, Maomareko, Mashola, Mere, Me'Enite, Messengo, Mejenger, Mossiye, Mursi, Murle, Nao, Bench, Nyangatom, Bodi, Oida, Qebena, Qeche, Qewama, Shekecho, Sheko, Shinasha, Brayle, Burji, Bena, Surma, She, Chara, Timebaro, Tsemay, Upo, Dasenech, Werji, Yem, Zeyese, Zelmam, Other Ethiopian Ethnic Group, From Different Parents, Other Foreigners - Minority East Africa
Guatemala	2014-15	Religion: ²⁶ Christian - Majority Indigenous, Other, None - Minority Ethnicity: Ladina/Mestiza, Maya - Majority Garifuna, Xinca, Other, Don't Know - Minority Latin America and the Caribbean
Guinea	2018	Religion: Islam - Majority Muslim, Animist, Other - Minority Ethnicity: Peul, Malinke - Majority Soussou, Kissi, Toma, Guerze, Other, Foreign Western Africa
Haiti	2016-17	Religion: Catholic, Protestant - Majority Vaudousant, No Religion, Other - Minority The Caribbean
Indonesia	2017	Geographical proxy: Aceh: Achenese Papua: Papuansi South-East Asia
Liberia	2019-20	Religion: Christian - Majority Islam, Traditional, Other - Minority Western Africa

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Table 15: continued...

Country	Year	Characteristics
Madagascar	2021	Religion: Christian - Majority Muslim, Traditional/Animist, No religion, Other - Minority Eastern Africa
Malawi	2015-16	Religion: Christianity - Majority Islam , Indigenous , Other - Minority Ethnicity: Chewa, Lomwe - Majority Tumbuka, Tonga, Yao, Sena, Nkhonde, Ngoni, Other - Minority Eastern Africa
Nepal	2016	Religion: Hinduism - Majority Buddhist, Muslim, Kirat, Christian - Minority Caste: Hill Chhetri, Brahmin Hill ,Terai Brahmin/Chhetri - Majority Other Terai Caste, Hill Dalit, Terai Dalit, Newar, Hill Janajati, Terai Janajati, Muslim, Other - Minority South Asia
Nigeria	2018	Religion: Islam, Christianity - Majority Traditional, Other - Minority Ethnicity: Hausa, Fulani, Yoruba - Majority Igbo, Ijaw, Kanuri, Ibibo-Efik, Tiv, Edo, Nupe - Minority Western Africa
Philippines	2017	Religion: Catholic - Majority Protestant, Iglesias Ni Cristo, Aligpay, Muslim - Minority East Asia and Pacific
Senegal	2019	Religion: Islam - Majority Christianity, Animist, None - Minority Ethnicity: Wolof - Majority Poular, Serer, Mandinka, Diola, Soninke, Other - Minority Western Africa
Tanzania	2015-16	Geographical proxy: Maasai:Tanzania, Arusha, Kilimanjaro, Manyara and Tanga Zanzibaris (Muslim): Kaskazini Unguja, Kusini Unguja, Kaskazini Pemba and Kusini Pemba Eastern Africa
The Gambia	2019-20	Religion: Islam - Majority Christian, Traditional, Other - Minority Western Africa
Timor-Leste	2016	Religion: Catholic - Majority Muslim, Protestant, Other - Minority East Asia and Pacific
Uganda	2016	Religion: Christian - Majority Islam, Indigenous - Minority Ethnicity: Baganda, Banyankore, Basoga, Bakiga, Iteso - Majority Langi, Banyarwanda, Acholi, Lugbara, Batoro, Bunyoro, Bagwere, Bakonzo, Jopadhola, Karamojong, Basongora, Batwa - Minority [The list contains 64 ethnic groups] Eastern Africa
Zambia	2018	Religion: Christian - Majority Islam, Indigenous, Other - Minority Eastern Africa

English and French are considered as international languages and not considered minority languages.

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Table 16: A table displaying the survey year and characteristics that were disaggregated into majority and minority category for each country analysed using MICS surveys

Country	Year	Characteristics
Central African Republic	2018-19	Religion: Christian - Majority Islam/Animist - Minority West and Central Africa
Chad	2019	Language: Sara, Sango, Arabic, Chadian Arabic, French (official) - Majority Gorane, Kanembou, Maba/ Ouadai, Moundang, Mossye, Peul/Fouulf, Borode, Lele/Marba, Toupori, Boulala, Zaghawa, Other - Minority Religion: Islam, Christianity - Majority Animist, Other Christian, No religion, Other - Minority Ethnicity: Arabe, Kanembou/Bornou, Sara - Majority Wadai/Maba/Masalit/Mimi, Gorane, Masa/Musseye/Musgum, Bulala/Medogo/Kuka, Marba/Lele/Mesme, Mundang, Bidiyo/Migaama/Kenga/Dangleat, Dadjo/Kibet/Muro, Tupuri/Kera, Gabri/Kabalaye/Nanchere/Somrai, Fulani/Peulh/Fulbe/Bodore, Karo/Zime/Peve, Baguirmi/Barma, Zaghawa/Bideyat/Kobe, Tama/Assongori/Mararit, Mesmedje/Massalat/Kadjakse, other, Foreign - Minority West and Central Africa
Costa Rica	2018	Ethnicity: Mestizo, White - Majority Indigenous, Chinese, Mullato - Minority Religion: Catholic - Majority Pentecostal, Mormon, Other; Non-Christian Religion (Animist, Jewish, Islam, Other); Other Religion; No Religion - Minority Latin America and the Caribbean
Cuba	2019	Ethnicity: White - Majority Mestizo, Black, Other - Minority Latin America and the Caribbean
Dominican Republic	2019	Language: Spanish - Majority Creole, Other languages - Minority Religion: Catholic, Evangelical - Majority Jehovah's Witness, Other Religion, No Religion - Minority Latin America and the Caribbean
Ghana	2017-18	Ethnicity: Akan - Majority Mole Dagbani, Ewe, Ga-Dangme, Gurma, Guan, Grusi , Mande And Others - Minority Religion: Christianity - Majority Islam, Traditional, Other - Minority Language: English, Akan - Majority Ga, Ewe, Dagbani Hausa, Other - Minority West and Central Africa
Guinea	2016	Religion: Muslim - Majority Christian, Traditional, Other - Minority West and Central Africa
Guinea-Bissau	2018-19	Religion: Islam - Majority Christian, Animist - Minority Ethnicity/Language: Balanta, Fula - Majority Mandingo, Manjaco, Crioulo , Papel, Felupe, Beafada - Minority West And Central Africa

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Table 16: continued...

Country	Year	Characteristics
Guyana	2019-20	Ethnicity: African, Mixed and East Indian - Majority; Amerindian And Other - Minority. Religion: Christian - Majority; Hindu, Muslim, Rastafarian, Bahai and Other - Minority. Latin America and the Caribbean
Honduras	2019	Religion: Catholic, Evangelical - Majority Jehovah's Witness, Mormon, Adventist, Other, None - Minority Latin America and the Caribbean
Iraq	2018	Religion: Islam - Majority Christian, saBe'E, Azidi - Minority Language: Arabic - Majority Kurdish, Turkman, Asserian, Other - Minority Middle East and North Africa
Ivory Coast	2016	Ethnicity: ²⁷ Akan, Mande- Majority Gru, Kru, Other Ivoirian, Non-Ivoirian - Minority Religion: Muslim - Majority Christianity, None - Minority West and Central Africa
Kiribati	2018-19	Religion: Roman Catholic - Majority Protestant, Kiribati United Church, Latter Day Saints, Bahai, Other, None - Minority East Asia and the Pacific
Kosovo; Kosovo - Roma, Ashkali and Egyptian Communities	2019-20	Ethnicity: Albanian - Majority Bosniaks, Serbs, Turkish, Askhali, Egyptian, Gorani, Roma - Minority Language: Albanian - Majority Serbian, Turkish, Bosnian, Romani, Others - Minority Europe and Central Asia
Kyrgyzstan	2018	Ethnicity: Kyrgyz - Majority Russian, Uzbek, Kazakh, Tajik, Dungan, Uygur - Minority Language: Kyrgyz - Majority Russian, Uzbek, Kazakh, Tajik, Dungan, Uygur - Minority Europe and Central Asia
Laos	2017	Ethnicity: Lao - Majority Thai, Phouthay, Lue, Nhoan, Yang, Xaek, Thaineau , Khmou, Pray, Xingmoun, Phong, Thaen, Oedou, Bid, Lamed, Samtao , Katang, Makong, TRI, YROU, Trieng, Ta-Oy, Yae, Brao, Katu, Harak, Oy, Kriang, Cheng, Sadang, Cuay, Nhaheun, Lavy, Pacoh, Khmer, Toum, Ngouan, Moy, Kree, Hmong, Ewmien, Akha, Pounoy, Lahau, Syla, Hayi, Lolo, Hor, Other, No Response - Minority Religion: Buddhist - Majority Christianity, Islam, Animist, Other - Minority East Asia and the Pacific
Lesotho	2018	Ethnicity: Mosoto - Majority Moxhosa/Mothepu, Mophuthi, Other - Minority Eastern and Southern Africa
Madagascar	2018	Religion: Christian - Majority Islam, Traditional/Animist, Other, None - Minority Eastern and Southern Africa

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Table 16: continued...

Country	Year	Characteristics
Malawi	2019-20	<p>Religion: Christian - Majority Islam, Indigenous, Other - Minority</p> <p>Ethnicity: Chewa, Lomwe - Majority Tumbuka, Tonga, Yao, Sena, Nkhonde, Ngoni, Other - Minority</p> <p>Eastern and Southern Africa</p>
Mongolia (National); Mongolia (Khuvsgul Aimag); Mongolia (Nalaikh District)	2018, 2016, 2016	<p>Ethnicity: Khalkh - Majority Kazakh, Durvud, Buriat, Dariganga, Bayad, Uriankhai, Zakhchin, Darkhad, Khotogoid, Torguud, Uuld, Khoton, Myangad, Tuva, Barga, Sartuul, Uzemchin, Other, Don't Know - Minority</p> <p>Religion: Buddhist - Majority Christian, Muslim, Shamanist, Other, None, Don't Know - Minority</p> <p>Language: Mongolian - Majority Kazakh, Tuva, Other - Minority</p> <p>East Asia and the Pacific</p>
Nepal	2019	<p>Ethnicity: Chhetri, Brahman Hill - Majority Magar, Dalit - Minority [the list includes 128 castes]</p> <p>Language: Nepali - Majority Maithili, Bhojpuri, Tharu, Tamang, Newar, Bajjika, Magar, Doteli, Urdu, Others - Minority [the list includes 114 entries]</p> <p>Religion: Hinduism - Majority, Buddhism, Islam, Kirat, Christianity, Nature, Bon, Jain, Bahaism, Sikhism, No Religion, Others - Minority</p> <p>South Asia</p>
Nigeria	2016-17	<p>Religion: Islam, Christianity - Majority Traditional, Other - Minority</p> <p>Language: Hausa, Kanuri, Ibo, Yoruba, Edo, Efik, Fulfulde, Igala, Izon, Nupe, Tiv - Majority Other, Bura, Shuwa Arabic, Marghi, Kare, Bachama, Mandara, Other - Minority [More than 300 languages listed]</p> <p>West and Central Africa</p>
North Macedonia; North Macedonia (Roma Settlements)	2018-19	<p>Ethnicity: Macedonian - Majority Albanian, Turkish, Roma, Vlach, Serbian, Bosniak - Minority</p> <p>Religion: Orthodox - Majority Islam, Catholic - Minority</p> <p>Language: Macedonian - Majority Albanian, Turkish, Roma, Vlach, Serbian, Bosniak, Other - Minority</p> <p>Europe and Central Asia</p>
Pakistan (Jammu Kashmir)	2018-19	<p>Language: Urdu - Majority Sindhi, Punjabi, Saraiki, Baluchi, Pushto, Other [Minority languages may change at province level]</p> <p>South Asia</p>
Paraguay	2016	<p>Ethnicity: Non-Indigenous - Majority Indigenous, Other - Minority</p> <p>Religion: Catholic - Majority Evangelical, Mormon, Other, None - Minority</p> <p>Latin America and the Caribbean</p>
Samoa	2019-20	<p>Religion: Christian - Majority; Other, None - Minority</p> <p>East Asia and the Pacific</p>

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Table 16: continued...

Country	Year	Characteristics
Sao Tome and Principe	2019	<p>Religion: Roman Catholic - Majority Adventists, Methodists, Jeova, Assembly Of God, God Is Love, Mana, New Apostolic, Kingdom Of God, Messianic World, Other, None - Minority</p> <p>West and Central Africa</p>
Serbia; Serbia (Roma Settlements)	2019	<p>Ethnicity: Serbian - Majority Albanian, Bosnian, Roma, Hungarian, Other - Minority</p> <p>Religion: Orthodox - Majority Catholic, Muslim, Other, None, Doesn't want to declare - Minority</p> <p>Europe and Central Asia</p>
Sierra Leone	2017	<p>Ethnicity: Mende, Krio, Temne - Majority Mandingo, Loko, Sherbro, Limba, Kissi, Kono, Susu, Fullah, Krim, Yalunka, Koranko, Vai, Other - Minority</p> <p>Religion: Islam - Majority Christianity, Traditional, None - Minority</p> <p>Language: English, Mende, Krio, Temne - Majority Limba, Susu, Kono and other languages - Minority</p> <p>West and Central Africa</p>
Thailand	2019	<p>Language: Thai - Majority Burmese, Karen, Malay - Minority</p> <p>Religion: Buddhism - Majority Islam, Christianity, Other, None - Minority</p> <p>East Asia and the Pacific</p>
The Gambia	2018	<p>Religion: Islam - Majority Christianity, Other - Minority</p> <p>West and Central Africa</p>
Togo	2017	<p>Religion: Catholic, Traditional - Majority Muslim, Protestant, Other Christian - Minority</p> <p>Language: French, Ewe, Kabye, English - Majority KotoKoli/Tem, Akposso/Akebou, Ife, Ana, Moba-Goruma, Tchokossi, Bassar/Konkomba, Other national, Foreign - Minority</p> <p>West and Central Africa</p>
Tonga	2019	<p>Religion: Protestant - Majority Catholics, Other Christian, Orthodox - Minority</p> <p>East Asia and the Pacific</p>
Turks and Caicos Islands	2019-20	<p>Religion: Protestant - Majority; Catholic, Other Christians, Other Religions, No Religion - Minority</p> <p>Latin America and the Caribbean</p>
Tuvalu	2019	<p>Religion: Ekt Church Of Tuvalu - Majority; SDA, Jehovah's Witness, Bahai, Catholic, LDS, Other - Minority</p> <p>East Asia and the Pacific</p>
Vietnam	2020-21	<p>Language: Vietnamese - Majority Tay, Muong, Thai, Nung, Khmer, Mong, Other - Minority</p> <p>Ethnicity: Kinh, Hao - Majority Tay, Thai, Muong, Nung, Khmer, Mong, Other - Minority</p> <p>East Asia and the Pacific</p>

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Table 16: continued...

Country	Year	Characteristics
Zimbabwe	2019	Religion: Christian - Majority Islam, Traditional, No Religion, Other Religion - Minority Language: English, Shona - Majority Ndebele - Minority Eastern And Southern Africa

English and French are considered as international languages and not considered minority languages.

Notes

- The DHS Women's questionnaire: <https://dhsprogram.com/pubs/pdf/DHSQ7/DHS7-Womans-QRE-EN-17Dec2018-DHSQ7.pdf>
- The MICS round 6 and round 5 questionnaires can be found here : <https://mics.unicef.org/tools?round=mics6> and <https://mics.unicef.org/tools?round=mics5> respectively.
- For Turkey (2018), Niger (2017) and Sri Lanka (2016), datasets are not available, not distributed and are not in public domain respectively.
- Korea (2017): restricted datasets.
- Democratic Republic of Congo (2017-18) is a DHS-MICS survey and is counted under MICS.
- Of the 88 countries, 10 countries had both DHS and MICS surveys. They are: Bangladesh, Gambia, Guinea, Madagascar, Malawi, Nigeria, Nepal, Pakistan, Sierra Leone and Zimbabwe.
- Unused surveys were Senegal (2018), Senegal (2017), Senegal (2016), Senegal (2015), India (2015-16), Rwanda (2014-15), and Bangladesh (2014). Ethiopia (2016) is only considered for ethnicity.
- A Hepatitis B vaccine was added to the schedule in 1992, and it was recommended as a vaccine to all countries by 1997.
- In the early years (1984) of the WHO Expanded Programme on Immunisation (EPI), just four basic vaccinations against six illnesses were included in national immunisation schedules of low- and middle-income countries: BCG, DTP (3 doses), OPV (3 doses) and MCV. A child was considered 'completely vaccinated' if they were administered all of these.
- This refers to Colombia (2015) and Albania (2017-18). Although Albania had data on vaccination, it was taken from Child Registry and therefore there was no way of knowing the number of people that were not vaccinated and the staff that currently worked on the report are not available.
- Jordan (2017-18).
- Argentina (2019-20), Bangladesh (2019), Belarus (2019), Turkmenistan (2019), Georgia (2018), Montenegro (2018) and Suriname (2018). Suriname had data for all the other vaccines except BCG, which it is needed for assessment of complete Basic Vaccinations.
- Palestine (2019-20) and Algeria (2018-19).
- Although there were seven countries within MICS and two countries in DHS without vaccination data, Bangladesh MICS did not have vaccination data but DHS for Bangladesh did. Therefore, eight countries were excluded.
- Minorities experience a variety of disadvantages, such as poverty, lack of access to justice, discrimination, and poor educational and growth opportunities. The disadvantages in terms of vaccinations and healthcare in general include the accessibility and availability of vaccines and other resources, confidence barriers brought on by prior experiences with medical experiments, and the cost of vaccinations.
- The language options for Tuvalu were Tuvaluan, I-Kiribati and 'Other language'. The language options for Honduras were Spanish, English, Misquito and Garifuna. The language options for Haiti were French and Creole.
- The ethnicity options for Samoa were Samoan, Samoan Chinese, Samoan German, Samoan Tokelauan, Samoan Mixed and Other. Similarly, the ethnicity options for Tuvalu were Tuvaluan, Tuvaluan/ I-Kiribati and Tuvaluan/Other and Other.
- Indonesia and Tanzania are among the 36 countries.
- Although the total number of countries is 76, 9 countries (Gambia, Guinea, Madagascar, Malawi, Nigeria, Nepal, Pakistan, Sierra Leone and Zimbabwe) were present in both DHS and MICS
- Mauritania (2019-21), Tajikistan (2017), Armenia (2015-16), Maldives (2016-17), Myanmar (2015-16)
- Tunisia (2018)
- For ethnicity: Pakistan (2017-18), Honduras (2018), Gambia (2019-20). For language: Pakistan MICS (Khyber Pakhtunkhwa, Gilgit-Baltistan, Sindh) 2018-19, Malawi MICS (2019-20), Senegal DHS (2019), Tonga MICS (2019) and The Gambia.
- All the countries above have either one or another survey question that was analysed and therefore, no country was excluded at this stage. For example, Pakistan had a question on language.
- For Fiji, Democratic Republic of Congo, Papua New Guinea, meaningful questions were only included on the subject of language, ethnicity and religion respectively, therefore three countries were excluded at this stage. The total number of countries at this stage was 58.
- Exceptionally, English is a minority language and not expats speaking English.
- Although they may make up more than 50% of the population, indigenous people are marginalised.
- A highly diverse variety of groups could be included in categories like "non-Ivorian."



**minority
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international**

Minority Rights Group International

Minority Rights Group International (MRG) is a non-governmental organization (NGO) working to secure the rights of ethnic, religious and linguistic minorities and indigenous peoples worldwide, and to promote cooperation and understanding between communities. Our activities are focused on international advocacy, training, publishing and outreach. We are guided by the needs expressed by our worldwide partner network of organizations, which represent minority and indigenous peoples.

MRG works with over 150 organizations in nearly 50 countries. Our governing Council, which meets twice a year, has members from 10 different countries. MRG has consultative status with the United Nations Economic and Social Council (ECOSOC), and observer status with the African Commission on Human and Peoples' Rights (ACHPR). MRG is registered as a charity and a company limited by guarantee under English law: registered charity no. 282305, limited company no. 1544957.

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No Data *is* Data Additional Briefing Material

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Given the importance of data when seeking to better understand health programmes and key aspects of global health such as vaccination, this report cogently argues that current datasets concerning immunisation need to take into serious consideration an inclusion focused and human rights-based approach.

The research that underpins this collaborative report written by Minority Rights Group (as part of the CREID project), clearly shows that current data on immunisation programmes lacks precise and representative data on minority groups. This comes with the risk that groups may still be being left behind, with the ability to track or respond to this severely limited.

At the mid-point of the Sustainable Development Goals period, with just seven years left until 2030 and in order to deliver on the central commitment of the Leave No One Behind campaign, this report argues that clear data about which groups are at risk of neglect is currently absent. The brief assesses the available data regarding childhood routine vaccinations and ethnicity, language and religion and offers suggestions on the relation between childhood vaccinations and diversity across several countries.

No Data is Data has identified gaps in the uptake of life-saving vaccines for children as well as data collected, analyzed or published in the most recent international health surveys and reports covering 71 countries. The analysis shows that 48 years since the inception of WHO's Expanded Programme on Immunisation (EPI), it is still difficult to quantify or understand the uptake of vaccination of minority communities.

In an effort to advance data equity, this report argues that the entire data analysis process, including the collection, storing, analysing and sharing of data should take good care that vulnerable or marginalized groups are properly represented. Furthermore, the authors argue that all regional, national and internationally comparable surveys should operate according to the five principles of the Inclusive Data Collection Charter, in the context of which all populations must be considered in the dataset and all data must be disaggregated and retrieved fairly and in a representative manner.

The brief is supported with graphs and visuals that provide a concise and easy-to-grasp account of current limitations in the immunisation datasets, particularly in terms of a lack of representation of ethnic, linguistic and religious inclusivity and diversity within current vaccination monitoring and data collection programmes at the international level.