IMMUNIZATION COVERAGE AND EQUITY IN AFGHANISTAN (2015)

VERSE Equity Assessment

Report prepared by Haijun Zhang. For errors or omissions, please contact the VERSE team.

The Vaccine Economics Research for Sustainability and Equity (VERSE) project produces measures of efficiency (*vaccine coverage*) and equity to track the progress made by immunization programs worldwide. As equity measures, the present report features concentration indices (Wagstaff and Erreyger) and the absolute equity gap accounting for key unfair factors (as a **composite** measure, see VERSE Methods) or socioeconomic status only (the traditional **wealth** measure).

This analysis was produced by Johns Hopkins Bloomberg School of Public Health.

Highlights

Key highlights from the DHS data

- In 2015, despite limited coverage (26-80%), vaccine distribution was equitable (favoring slightly the poorest households) in Afghanistan, when considering only the households' socioeconomic status. However, inequity is revealed with significantly disadvantaged groups when including other factors such as maternal education and the region of residence for most vaccines – most significantly for BCG, DTP, PCV, and MCV. For instance, when considering factors beyond wealth, the 20% most disadvantaged households have a vaccine coverage averaging between 35 and 63 percentage points lower than the 20% most privileged.

- While routine immunization and supplementary immunization activities (SIA) in Afghanistan have reached well children from the poorest households, inequity associated with women's education level and the region of residence remains. Vaccination rates are heterogenous across regions, particularly affecting regions bordering Pakistan.

- While maintaining the regular provision of vaccines to all regions, efforts should be made to alleviate the impact of low maternal education and literacy on vaccination uptake.

National overview

The routine immunization program for children in Afghanistan needs to be improved. The low overall vaccination rates of all vaccines indicate that Afghanistan needs to strengthen its childhood immunization program, especially for DTP, BCG, Polio, and MCV vaccines. With a prevalence of 17% in 2015, zero-dose status is a priority in Afghanistan to ensure children do not drop out of the expanded program for immunization (EPI). Only 22% of children received their full course of vaccines (FULL) scheduled for their age. Furthermore, only 13% of children two years old or older received all their scheduled vaccines (COMPLETE), indicating that children may receive their vaccines late or miss them altogether.

Coverage and equity level estimates for Afghanistan (2015)

| Vaccine | Coverage | Concentration indices (95% confidence interval) | | | | Absolute Equity Gap |
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)	Composite
ZERO	17.17%	0.464 (0.449; 0.479)	0.257 (0.242; 0.272)	-0.064 (-0.069; -0.059)	-0.191 (-0.196; -0.186)	0.346 (0.334; 0.358)
FULL	22.18%	0.276 (0.263; 0.289)	0.245 (0.232; 0.258)	-0.019 (-0.022; -0.016)	-0.058 (-0.061; -0.055)	0.334 (0.32; 0.348)
COMPLETE	13.14%	0.394 (0.373; 0.415)	0.207 (0.186; 0.228)	-0.03 (-0.035; -0.025)	-0.089 (-0.094; -0.084)	0.277 (0.263; 0.291)
BCG	67.11%	0.168 (0.162; 0.174)	0.451 (0.445; 0.457)	-0.004 (-0.007; -0.001)	-0.011 (-0.014; -0.008)	0.625 (0.611; 0.639)
DTP1	63.59%	0.18 (0.173; 0.187)	0.447 (0.44; 0.454)	-0.006 (-0.008; -0.004)	-0.019 (-0.021; -0.017)	0.61 (0.596; 0.624)
DTP2	57.87%	0.201 (0.194; 0.208)	0.447 (0.44; 0.454)	-0.003 (-0.005; -0.001)	-0.008 (-0.01; -0.006)	0.624 (0.61; 0.638)
DTP3	47.73%	0.223 (0.215; 0.231)	0.4 (0.392; 0.408)	-0.001 (-0.003; 0.001)	-0.002 (-0.004; 0)	0.561 (0.547; 0.575)
POLIO1	79.62%	0.096 (0.093; 0.099)	0.3 (0.297; 0.303)	-0.034 (-0.037; -0.031)	-0.101 (-0.104; -0.098)	0.386 (0.372; 0.4)
POLIO2	73.00%	0.112 (0.108; 0.116)	0.315 (0.311; 0.319)	-0.03 (-0.033; -0.027)	-0.089 (-0.092; -0.086)	0.408 (0.392; 0.424)
POLIO3	60.25%	0.144 (0.138; 0.15)	0.327 (0.321; 0.333)	-0.02 (-0.023; -0.017)	-0.06 (-0.063; -0.057)	0.451 (0.435; 0.467)
PCV1	41.24%	0.218 (0.211; 0.225)	0.353 (0.346; 0.36)	-0.01 (-0.012; -0.008)	-0.029 (-0.031; -0.027)	0.455 (0.439; 0.471)
PCV2	32.84%	0.229 (0.219; 0.239)	0.29 (0.28; 0.3)	-0.007 (-0.009; -0.005)	-0.02 (-0.022; -0.018)	0.4 (0.386; 0.414)
PCV3	25.66%	0.277 (0.265; 0.289)	0.268 (0.256; 0.28)	-0.011 (-0.013; -0.009)	-0.033 (-0.035; -0.031)	0.354 (0.34; 0.368)
MCV1	58.36%	0.196 (0.189; 0.203)	0.388 (0.381; 0.395)	-0.019 (-0.022; -0.016)	-0.058 (-0.061; -0.055)	0.479 (0.463; 0.495)

ZERO: Zero-dose status is defined as the child not receiving either DPT, BCG, Polio, or MCV within the first year of life. FULL: Full immunization for age is defined as the child having received all scheduled vaccines for their current age (at the time of the survey). COMPLETE: Child is over two years old and has received all scheduled vaccines.

Zero-dose children

Zero-dose status is defined as the child not receiving either DPT, BCG, Polio, or MCV within the first year of life.

Zero-Dose Prevalence Map

Zero-Dose Equity Heat Map
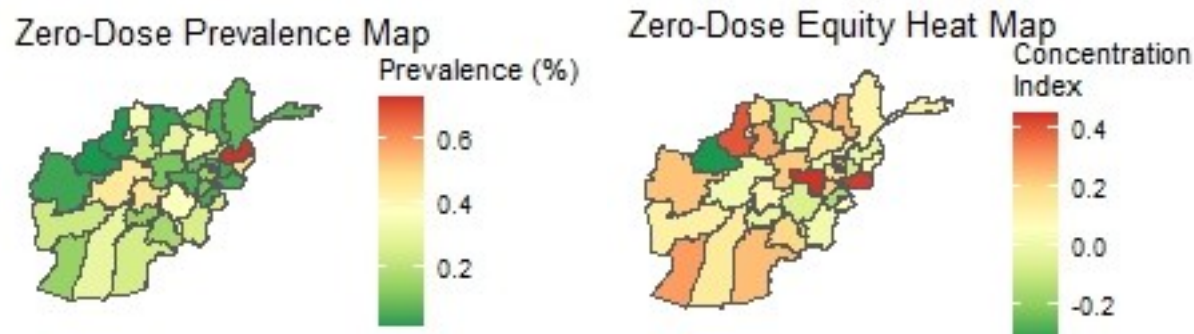
The EPI doesn't successfully reach every child in most regions of Afghanistan. Nooristan, Kunarha and Daykundi could further reduce their high zero-dose prevalence (currently over 45%). They are followed by Ghor, Ghazni, Jawzjan, Baghlan and Helmand districts (over 30%). All the other districts also showcased a high prevalence of zero-dose status of the children, expect for a few districts (e.g. Badghis and Faryab).

Zero-dose prevalence and equity by district

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**72.30%**	-0.012	-0.028	0.011	0.028
Kunarha	**48.80%**	0.082	0.119	-0.038	-0.111
Daykundi	**46.40%**	0.100	0.142	-0.049	-0.076
Ghor	45.50%	0.018	0.027	-0.053	-0.076
Ghazni	36.70%	-0.056	-0.072	-0.018	-0.055
Jawzjan	34.50%	0.191	0.235	-0.089	-0.263
Baghlan	33.40%	0.158	0.179	-0.183	-0.424
Helmand	30.50%	0.144	0.154	-0.079	-0.236
Samangan	29.60%	0.018	0.017	-0.139	-0.290
Khost	25.80%	0.056	0.050	-0.033	-0.112
Paktika	25.50%	0.018	0.015	0.000	0.001
Kandahar	24.80%	0.244	0.189	-0.099	-0.367
Farah	23.40%	0.123	0.095	-0.128	-0.288
Sar-E-Pul	23.10%	0.279	0.201	-0.101	-0.196
Panjsher	21.40%	0.089	0.069	-0.090	-0.196
Zabul	17.30%	0.199	0.111	0.031	0.129
Kabul	15.60%	0.170	0.083	-0.043	-0.194
Nimroz	14.80%	0.295	0.144	-0.049	-0.196

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Urozgan	14.70%	-0.007	-0.003	-0.006	-0.015
Kunduz	14.10%	0.252	0.117	-0.137	-0.368
Bamyan	11.40%	0.223	0.080	-0.149	-0.232
Logar	11.00%	0.221	0.079	-0.022	-0.067
Parwan	8.60%	0.006	0.002	-0.079	-0.228
Badakhshan	7.90%	0.111	0.027	-0.108	-0.191
Kapisa	7.30%	0.262	0.062	-0.018	-0.047
Wardak	6.10%	0.449	0.090	-0.182	-0.459
Takhar	6.10%	0.254	0.049	-0.158	-0.378
Paktya	5.50%	-0.138	-0.026	-0.034	-0.103
Nangarhar	5.30%	0.438	0.073	-0.090	-0.340
Laghman	4.50%	-0.085	-0.013	-0.081	-0.244
Herat	4.40%	0.236	0.034	-0.195	-0.516
Balkh	3.60%	-0.107	-0.012	-0.183	-0.497
Faryab	2.30%	0.402	0.029	-0.061	-0.184
Badghis	1.80%	-0.330	-0.019	-0.071	-0.123

Subnational regions as presented in the 2015 DHS for Afghanistan.

For mathematical reasons, when the prevalence/coverage outcome is low, the Wagstaff and Erreyger indices may produce conflicting results in terms of order of magnitude: for instance, the Wagstaff (composite) index could report a value of 0.312 (significant inequity) whereas the Erreyger-corrected index would report 0.033 (very equitable distribution). Both indices are positive: privileged people benefit most.

Where the wealth quintile was the dominant factor (4.6%) contributing to differences in zero-dose status prevalence in Afghanistan, indicating low family income may still be the obstacle of EPI. Accounting for regional differences, maternal education level contributes significantly to the variation in zero-dose status (4.4%). A significant proportion of children in the DHS dataset were underaged for the vaccine (17%), explaining why they did not receive it (they are not included in the equity metrics calculations). Efforts to facilitate and encourage vaccination and any initiative to reach out to disadvantaged and marginalized households would help further reduce the prevalence of zero-dose children.

Decomposition of Zero-Dose Inequity

- Underage: 17%
- District: 0.8%
- Urban/Rural: 0%
- Maternal Education Level: 4.4%
- Wealth Quintile: 4.6%
- Sex of Child: 0%
- Covered by Health Insurance: 0.21%
- Unexplained Variation: 72.9%
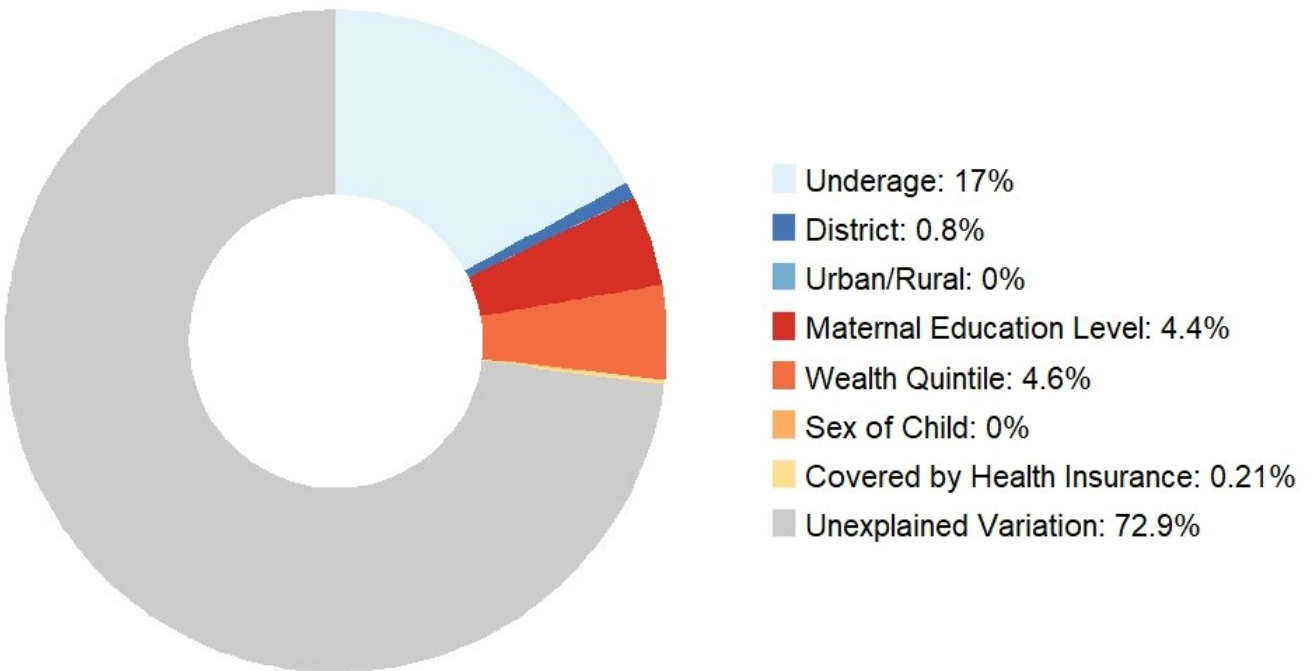
Full immunization

Full immunization for age is defined as the child having received all scheduled vaccines for their current age (at the time of the survey).
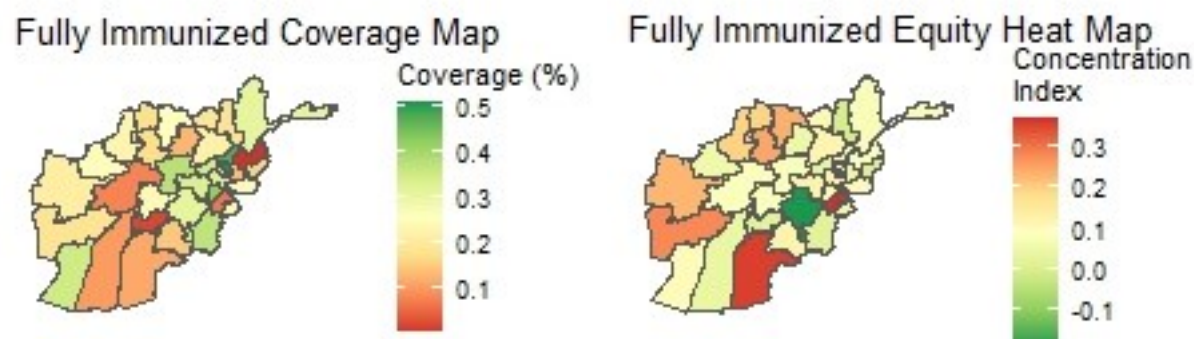
Ensuring that children complete their vaccine schedule without delays, thus achieving full immunization for age, is a priority for the government of Afghanistan. Seventeen of the 34 district's coverage fall below the national average of 22%, ranging from 0.2% (Nooristan) to 21.8% (Baghlan). Kapisa shows the best coverage, with slightly more than half of the children receiving all the vaccines scheduled for their age. Paktya shows a significantly less equitable distribution (CI composite = 0.368).

Fully immunized status coverage and equity by district

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**0.2%**	0.094	0.001	-0.002	-0.004
Urozgan	**1.8%**	0.018	0.001	-0.015	-0.040
Paktya	**6.3%**	**0.368**	0.093	-0.025	-0.076
Ghor	7.7%	0.079	0.024	-0.026	-0.038
Helmand	10.1%	0.037	0.015	-0.080	-0.238
Kandahar	11.4%	0.356	0.163	-0.066	-0.245
Samangan	12.7%	0.048	0.024	-0.141	-0.294
Laghman	13.2%	0.043	0.023	-0.060	-0.181
Zabul	14.4%	0.121	0.070	0.055	0.232
Kunarha	15.5%	0.007	0.004	-0.018	-0.053
Sar-E-Pul	17.0%	0.247	0.168	-0.003	-0.005
Jawzjan	17.3%	0.195	0.134	-0.040	-0.120
Takhar	18.2%	-0.009	-0.007	-0.125	-0.298
Farah	18.4%	0.279	0.206	-0.052	-0.116
Kunduz	18.9%	0.111	0.084	-0.083	-0.223
Herat	20.9%	0.229	0.192	-0.089	-0.234

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Baghlan	21.8%	0.118	0.102	-0.080	-0.186
Faryab	22.7%	0.196	0.178	-0.003	-0.010
Khost	22.9%	0.054	0.049	-0.021	-0.072
Daykundi	23.8%	0.080	0.076	-0.033	-0.051
Nangarhar	24.1%	0.101	0.098	-0.046	-0.176
Badghis	24.8%	0.051	0.050	-0.037	-0.065
Balkh	25.2%	0.237	0.240	-0.069	-0.188
Badakhshan	30.7%	0.073	0.089	-0.073	-0.130
Ghazni	30.9%	-0.194	-0.240	-0.079	-0.238
Kabul	32.3%	0.119	0.153	-0.018	-0.084
Wardak	33.4%	0.127	0.170	-0.062	-0.156
Parwan	34.6%	0.027	0.038	-0.044	-0.127
Nimroz	34.8%	0.098	0.137	-0.012	-0.048
Paktika	36.9%	0.019	0.028	0.011	0.030
Bamyan	37.5%	0.078	0.116	-0.063	-0.098
Logar	42.1%	0.108	0.182	-0.002	-0.005
Panjsher	47.2%	0.082	0.155	-0.027	-0.059
Kapisa	50.7%	0.066	0.133	0.006	0.017

Subnational regions as presented in the 2015 DHS for Afghanistan.

Regional differences (District: 12.2%) contribute most to the variation in full immunization for age, indicating potential shortfalls in vaccine supply and delivery. Maternal education level (11.1%) and wealth quintile (6.2%) have a significant influence on coverage. No other sociodemographic factor significantly affects the coverage for full immunization for age.

Decomposition of Fully Immunized for Age Equity

- Underage: 0%
- District: 12.2%
- Urban/Rural: 0.2%
- Maternal Education Level: 11.1%
- Wealth Quintile: 6.2%
- Sex of Child: 0.1%
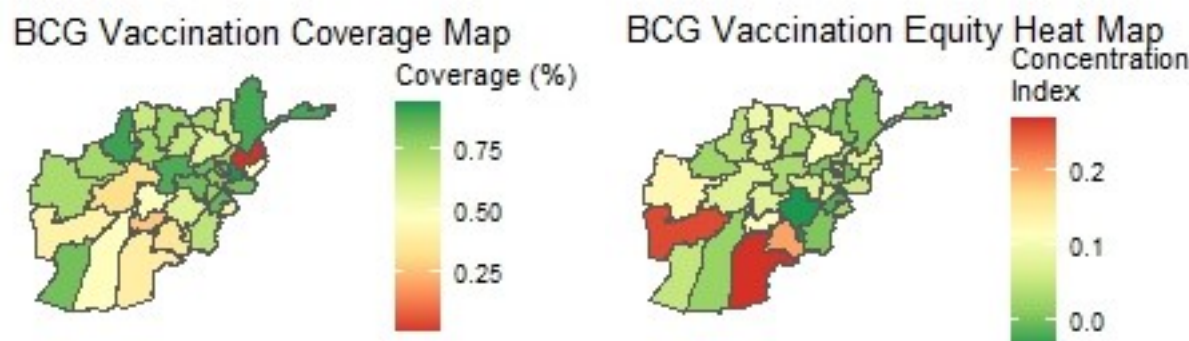- Covered by Health Insurance: 0%
- Unexplained Variation: 70.2%
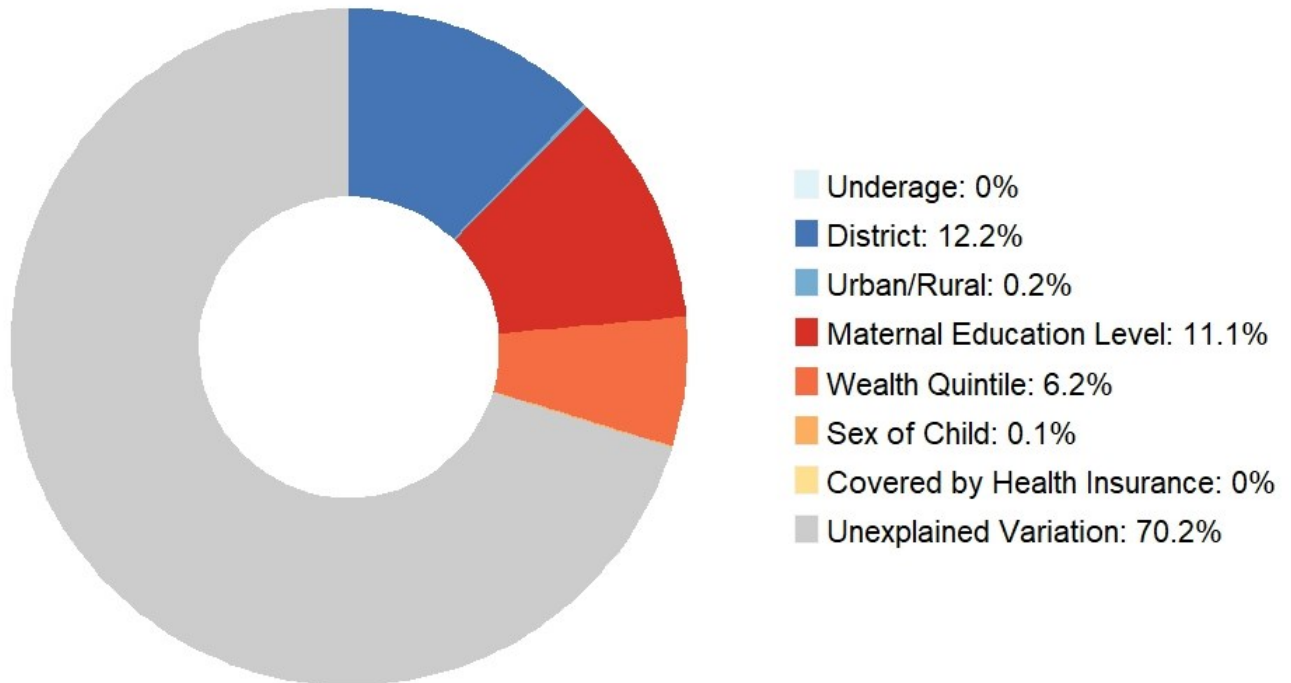
Individual vaccines

BCG immunization

The BCG vaccine is given at birth inAfghanistan and protects against Tuberculosis.

The BCG vaccine provided at birth fully benefits from improved maternal and child healthcare, providing essential neonatal care nationwide. The lowest coverage of 1-32% is found in Nooristan, Urozgan and Ghor. The highest coverage of BCG is found in Faryab and Laghman (over 90%). The BCG vaccine delivery shows a significantly less equitable distribution in several districts, such as Kandahar and Farah, etc.
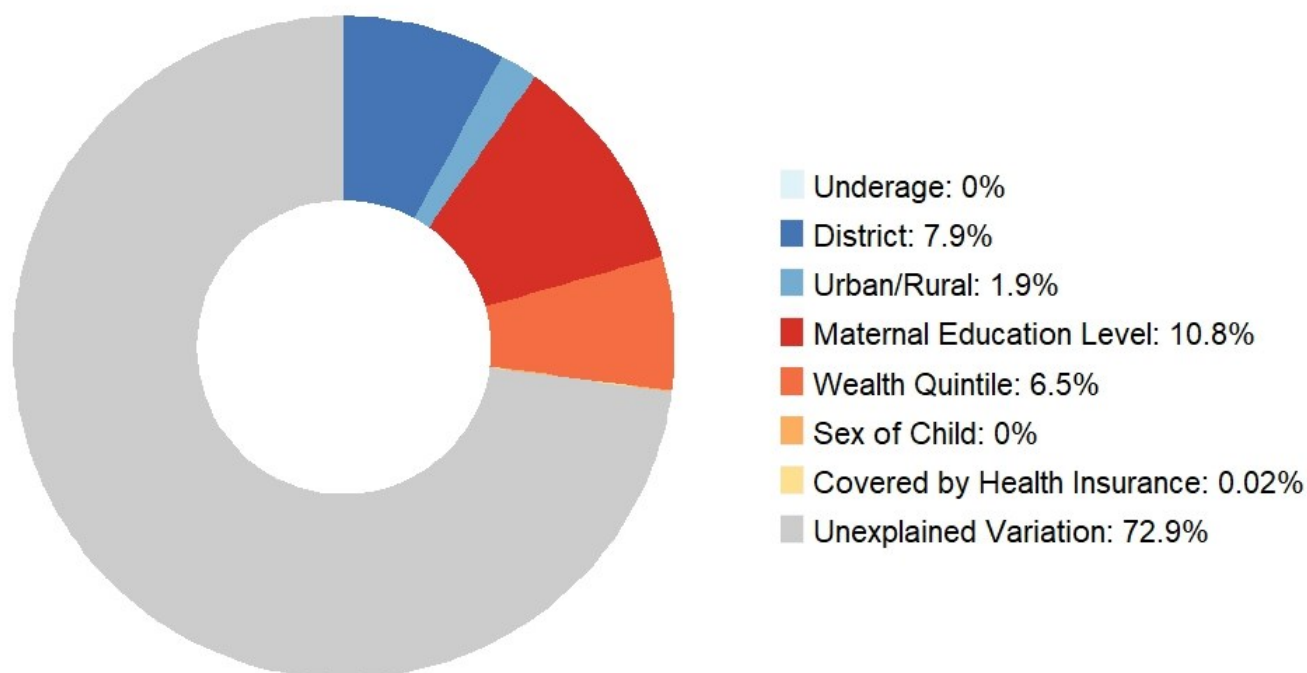
BCG immunization coverage and equity by district

District	Coverage	Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
		Concentration indices			
Nooristan	**1.00%**	0.078	0.003	0.000	-0.001
Urozgan	**27.00%**	0.120	0.130	0.007	0.018
Ghor	**32.30%**	0.074	0.096	0.009	0.013
Zabul	35.50%	0.208	0.295	0.058	0.244
Kandahar	38.80%	0.272	0.422	0.001	0.005
Farah	41.10%	0.260	0.428	0.029	0.064
Helmand	46.80%	0.021	0.039	-0.045	-0.134
Daykundi	48.00%	0.079	0.152	-0.006	-0.010
Kunarha	48.10%	0.074	0.143	0.004	0.011
Khost	54.00%	0.032	0.070	-0.010	-0.034
Baghlan	58.00%	0.110	0.256	-0.017	-0.040
Ghazni	59.10%	-0.038	-0.089	-0.053	-0.161
Takhar	63.00%	0.008	0.020	-0.089	-0.214
Jawzjan	66.10%	0.095	0.252	0.008	0.024
Samangan	66.50%	0.031	0.083	-0.093	-0.194
Paktika	68.30%	0.005	0.015	0.008	0.021

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Herat	72.40%	0.130	0.377	-0.029	-0.077
Kunduz	72.70%	0.032	0.093	-0.068	-0.184
Badghis	73.50%	0.025	0.073	-0.047	-0.081
Panjsher	73.90%	0.051	0.151	-0.049	-0.107
Sar-E-Pul	74.20%	0.077	0.230	-0.008	-0.015
Balkh	75.10%	0.089	0.268	-0.059	-0.159
Logar	75.80%	0.073	0.220	0.017	0.051
Kabul	77.90%	0.035	0.109	-0.026	-0.118
Nimroz	82.20%	0.051	0.167	-0.021	-0.085
Nangarhar	82.30%	0.058	0.192	-0.038	-0.145
Kapisa	83.00%	0.054	0.179	0.010	0.025
Wardak	83.10%	0.076	0.252	-0.064	-0.162
Parwan	83.30%	0.005	0.017	-0.068	-0.197
Paktya	84.50%	-0.017	-0.058	-0.037	-0.110
Bamyan	88.00%	0.033	0.117	-0.096	-0.149
Badakhshan	89.10%	0.007	0.024	-0.083	-0.148
Faryab	90.10%	0.046	0.164	-0.017	-0.052
Laghman	93.30%	-0.004	-0.017	-0.073	-0.219

Subnational regions as presented in the 2015 DHS for Afghanistan.

Decomposition of BCG Coverage Equity

- Underage: 0%
- District: 7.9%
- Urban/Rural: 1.9%
- Maternal Education Level: 10.8%
- Wealth Quintile: 6.5%
- Sex of Child: 0%
- Covered by Health Insurance: 0.02%
- Unexplained Variation: 72.9%

DTP1 immunization

The first dose of the DTP vaccine is given six weeks after birth as part of the Pentavalent vaccine (DTP-HepB-Hib) in Afghanistan which provides protection against Diphtheria, Whooping Cough (Pertussis), Tetanus, Hepatitis B, and Haemophilus influenza type B.
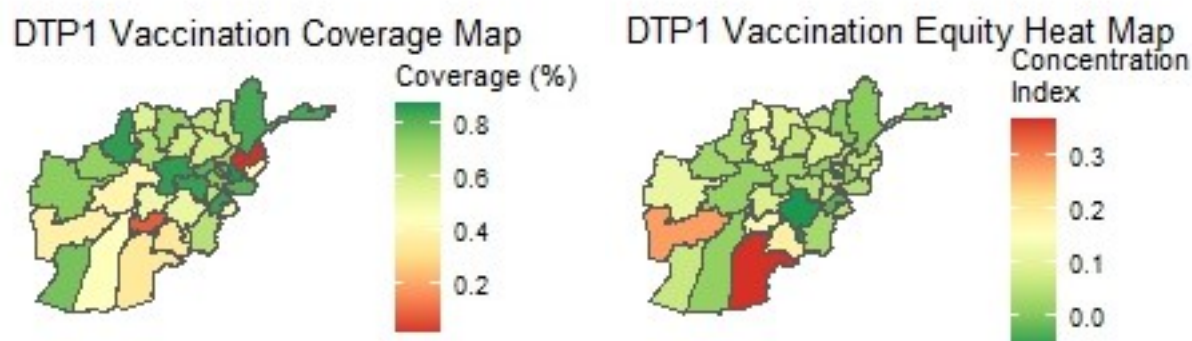
Coverage for the first dose of the DTP vaccine is heterogenous, with wide variations between districts. Wardak, Paktya, Bamyan, Faryab, and Laghman all perform well with over 85% coverage, while Nooristan, Urozgan and Zabul see much lower coverage rates of 0.7-34%. The delivery of the first dose of the DTP vaccine also shows a significantly less equitable distribution. For example, Kandahar shows a significantly less equitable distribution (CI composite = 0.371).
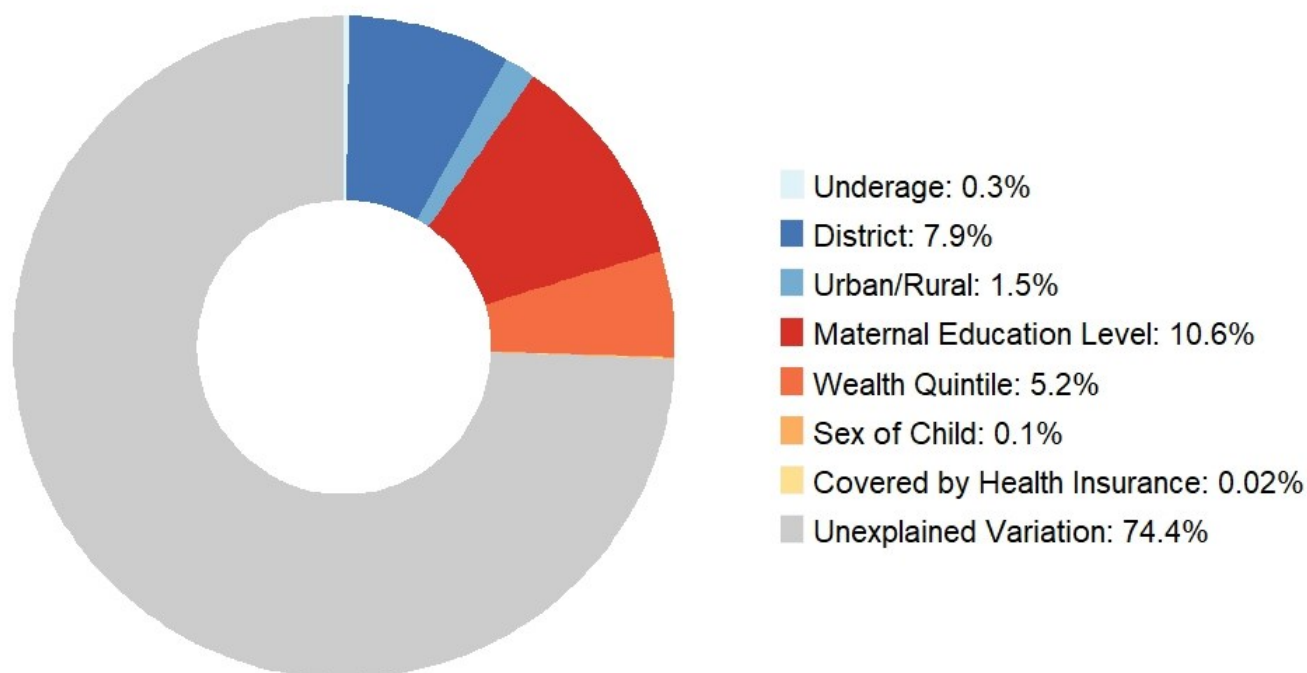
DTP1 immunization coverage and equity by district

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**0.70%**	0.052	0.001	-0.001	-0.004
Urozgan	**7.10%**	0.136	0.038	-0.008	-0.021
Zabul	**33.80%**	0.189	0.251	0.055	0.233
Kandahar	34.00%	0.371	0.496	0.010	0.037
Farah	37.90%	0.284	0.417	0.032	0.071
Ghor	39.50%	0.013	0.021	-0.004	-0.006
Kunarha	40.70%	0.084	0.131	0.005	0.014
Helmand	44.80%	0.011	0.019	-0.051	-0.153
Khost	48.40%	0.050	0.095	-0.007	-0.025
Daykundi	50.20%	0.086	0.168	-0.005	-0.007
Ghazni	52.00%	-0.066	-0.136	-0.058	-0.174
Jawzjan	56.60%	0.135	0.304	0.019	0.057
Baghlan	59.60%	0.085	0.201	-0.040	-0.092
Samangan	59.90%	0.059	0.136	-0.086	-0.180
Takhar	61.10%	0.004	0.010	-0.089	-0.213
Kunduz	63.50%	0.051	0.127	-0.053	-0.143

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Logar	64.20%	0.050	0.124	0.001	0.002
Paktika	65.30%	0.030	0.074	0.018	0.050
Sar-E-Pul	66.30%	0.092	0.239	-0.015	-0.028
Panjsher	70.10%	0.054	0.150	-0.048	-0.105
Balkh	71.00%	0.091	0.249	-0.045	-0.121
Badghis	72.70%	0.025	0.072	-0.048	-0.083
Kabul	74.10%	0.042	0.122	-0.024	-0.110
Herat	74.10%	0.113	0.332	-0.047	-0.124
Nimroz	77.10%	0.063	0.190	-0.020	-0.082
Kapisa	79.20%	0.071	0.219	0.014	0.037
Parwan	81.00%	0.009	0.028	-0.062	-0.179
Nangarhar	81.50%	0.043	0.137	-0.043	-0.163
Badakhshan	83.60%	0.003	0.009	-0.083	-0.148
Wardak	85.70%	0.046	0.155	-0.088	-0.221
Paktya	85.80%	-0.031	-0.104	-0.042	-0.126
Bamyan	86.30%	0.024	0.080	-0.093	-0.145
Faryab	86.40%	0.034	0.116	-0.020	-0.060
Laghman	88.00%	0.007	0.023	-0.059	-0.178

Subnational regions as presented in the 2015 DHS for Afghanistan.

Decomposition of DTP1 Coverage Equity

- Underage: 0.3%
- District: 7.9%
- Urban/Rural: 1.5%
- Maternal Education Level: 10.6%
- Wealth Quintile: 5.2%
- Sex of Child: 0.1%
- Covered by Health Insurance: 0.02%
- Unexplained Variation: 74.4%

JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

IVAC
International Vaccine
Access Center

Page 12 of 34

DTP2 immunization

The second dose of the DTP vaccine is given ten weeks after birth as part of the Pentavalent vaccine (DTP-HepB-Hib) in Afghanistan.
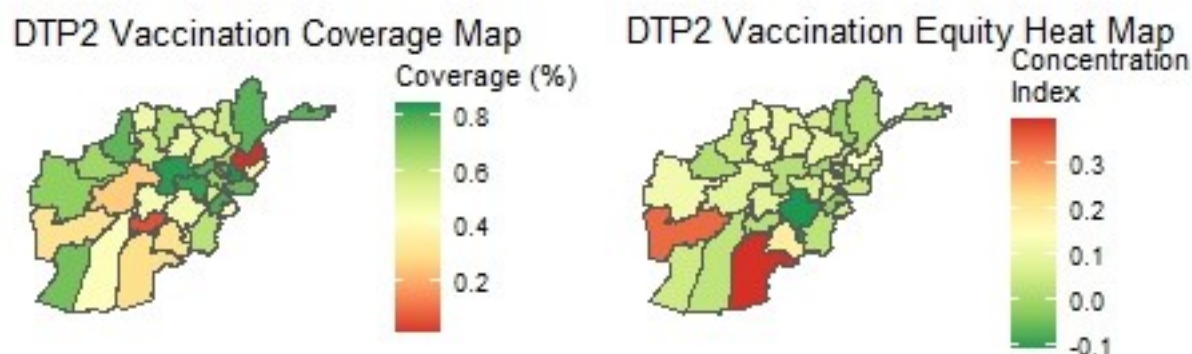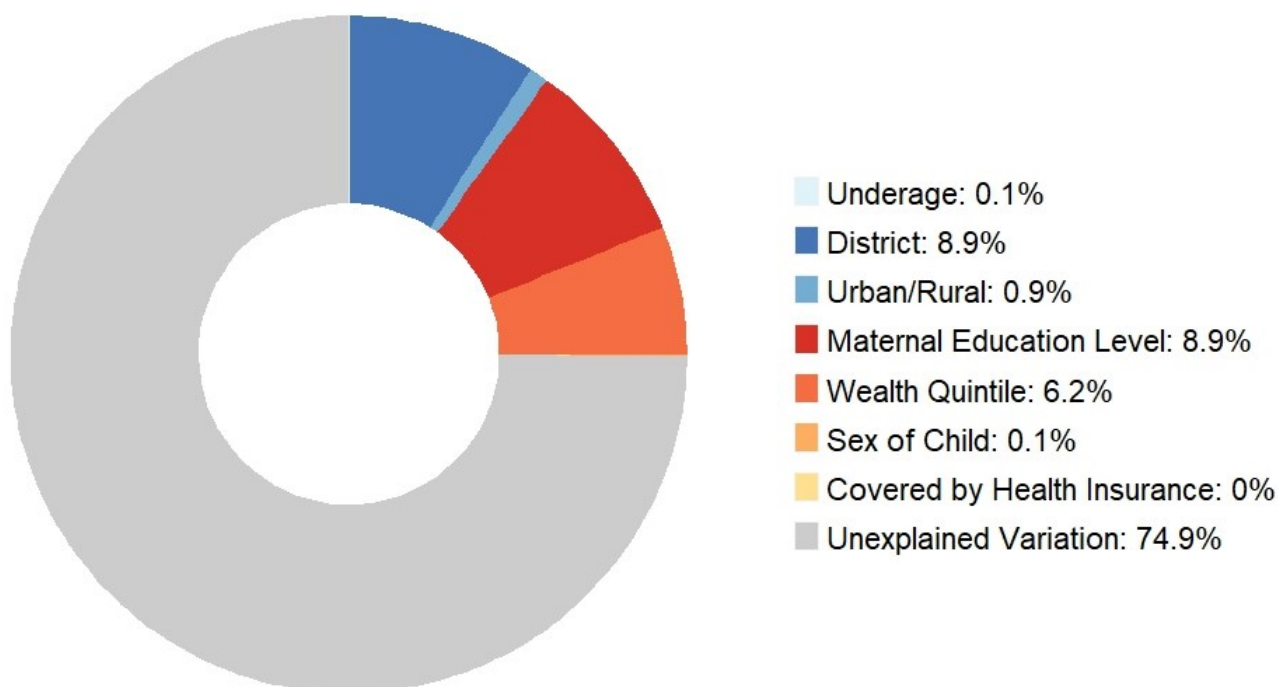

DTP2 immunization coverage and equity by district

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**0.3%**	0.141	0.002	-0.001	-0.004
Urozgan	**4.7%**	0.019	0.004	-0.009	-0.025
Ghor	**25.1%**	0.083	0.081	-0.004	-0.006
Kandahar	28.9%	0.397	0.439	-0.001	-0.003
Zabul	29.7%	0.190	0.219	0.054	0.226
Farah	30.2%	0.348	0.394	0.029	0.066
Kunarha	35.1%	0.046	0.060	0.001	0.001
Helmand	43.1%	0.031	0.054	-0.052	-0.155
Khost	43.4%	0.059	0.098	-0.010	-0.034
Daykundi	46.0%	0.087	0.153	-0.013	-0.020
Ghazni	46.3%	-0.110	-0.199	-0.066	-0.199
Jawzjan	48.2%	0.122	0.231	-0.002	-0.006
Samangan	48.5%	0.096	0.178	-0.065	-0.135
Baghlan	53.0%	0.101	0.211	-0.022	-0.050
Kunduz	54.6%	0.061	0.129	-0.053	-0.143
Logar	56.6%	0.050	0.104	-0.002	-0.007
Sar-E-Pul	58.4%	0.105	0.234	-0.001	-0.002
Takhar	58.6%	-0.009	-0.020	-0.090	-0.215
Paktika	62.4%	0.027	0.062	0.017	0.046
Balkh	63.4%	0.104	0.251	-0.029	-0.079
Panjsher	65.4%	0.049	0.126	-0.045	-0.099
Badghis	67.3%	0.016	0.041	-0.051	-0.089

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Kabul	68.9%	0.077	0.202	-0.017	-0.077
Herat	70.3%	0.117	0.321	-0.043	-0.114
Nimroz	74.2%	0.048	0.137	-0.021	-0.086
Kapisa	75.9%	0.071	0.207	0.013	0.035
Nangarhar	76.5%	0.044	0.129	-0.037	-0.140
Faryab	77.1%	0.051	0.152	-0.005	-0.016
Badakhshan	77.9%	0.011	0.032	-0.065	-0.115
Parwan	78.5%	-0.001	-0.002	-0.057	-0.166
Paktya	80.0%	-0.024	-0.075	-0.037	-0.110
Wardak	82.5%	0.065	0.203	-0.057	-0.145
Bamyan	83.6%	0.019	0.062	-0.086	-0.133
Laghman	84.5%	0.009	0.029	-0.052	-0.155

Subnational regions as presented in the 2015 DHS for Afghanistan.

Decomposition of DTP2 Coverage Equity

- Underage: 0.1%
- District: 8.9%
- Urban/Rural: 0.9%
- Maternal Education Level: 8.9%
- Wealth Quintile: 6.2%
- Sex of Child: 0.1%
- Covered by Health Insurance: 0%
- Unexplained Variation: 74.9%

JOHNS HOPKINS
BLOOMBERG SCHOOL of PUBLIC HEALTH

IVAC
International Vaccine Access Center
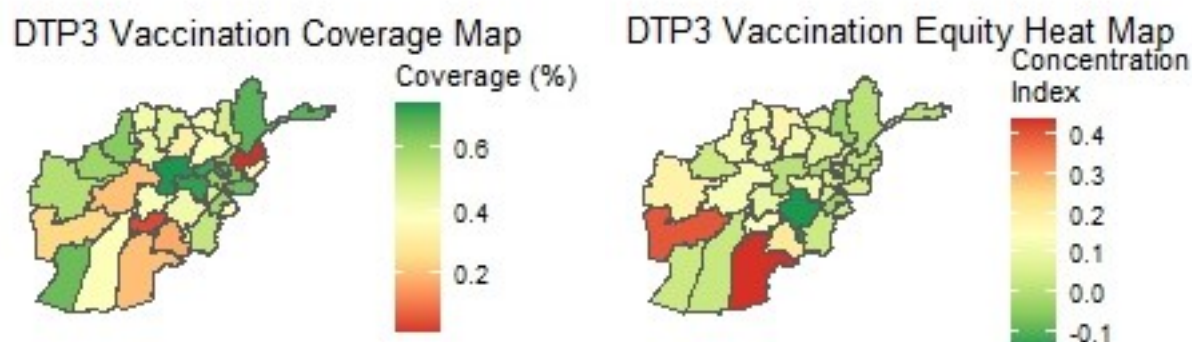
DTP3 immunization

The third dose of the DTP vaccine is given 14 weeks after birth as part of the Pentavalent vaccine (DTP-HepB-Hib) in Afghanistan.

Vaccination coverage for the third dose of the DTP vaccine still sustains low coverage that is similar with the first two doses. Nooristan, Urozgan, and Zabul districts show 0.2-17% coverage, the lowest in the country. DTP3 coverage isn't good in most other districts, and the coverage in all districts are below 75%. There are significant inequities in the vaccine's distribution. For example, Kandahar shows a significantly less equitable distribution (CI composite = 0.435).

DTP3 immunization coverage and equity by district

District	Coverage	Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
		Concentration indices			
Nooristan	**0.20%**	0.020	0.000	-0.002	-0.004
Urozgan	**3.10%**	0.139	0.017	-0.009	-0.024
Zabul	**17.00%**	0.213	0.135	0.055	0.233
Kandahar	20.00%	0.435	0.326	-0.029	-0.109
Ghor	20.30%	0.126	0.097	-0.007	-0.010
Farah	23.90%	0.399	0.344	0.011	0.025
Samangan	31.60%	0.117	0.139	-0.077	-0.159
Kunarha	32.10%	0.028	0.033	-0.005	-0.014
Khost	38.30%	0.043	0.062	-0.016	-0.054
Helmand	38.50%	0.030	0.045	-0.056	-0.168
Baghlan	39.00%	0.084	0.126	-0.034	-0.079
Daykundi	39.10%	0.096	0.139	-0.018	-0.027
Kunduz	41.10%	0.069	0.109	-0.061	-0.163
Jawzjan	41.60%	0.119	0.193	-0.013	-0.039
Ghazni	41.70%	-0.142	-0.226	-0.072	-0.216
Sar-E-Pul	43.50%	0.104	0.168	0.005	0.010
Balkh	46.10%	0.179	0.308	-0.015	-0.042

| District | Coverage | Concentration indices | | | |
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Logar	48.80%	0.056	0.099	-0.004	-0.013
Takhar	50.10%	-0.026	-0.047	-0.099	-0.236
Paktika	53.30%	0.035	0.066	0.017	0.047
Herat	56.00%	0.186	0.397	-0.008	-0.022
Panjsher	59.00%	0.068	0.156	-0.034	-0.074
Badghis	59.50%	0.038	0.085	-0.038	-0.066
Paktya	59.60%	-0.023	-0.051	-0.028	-0.083
Kabul	60.70%	0.064	0.145	-0.017	-0.079
Faryab	63.20%	0.123	0.294	0.024	0.071
Laghman	63.40%	0.012	0.028	-0.033	-0.100
Nimroz	66.60%	0.033	0.083	-0.024	-0.096
Nangarhar	66.70%	0.053	0.133	-0.030	-0.115
Kapisa	67.90%	0.060	0.154	0.011	0.029
Badakhshan	68.80%	0.010	0.025	-0.065	-0.115
Parwan	72.30%	0.000	0.000	-0.053	-0.152
Wardak	72.90%	0.114	0.309	-0.019	-0.048
Bamyan	74.60%	0.010	0.028	-0.080	-0.125

Subnational regions as presented in the 2015 DHS for Afghanistan.
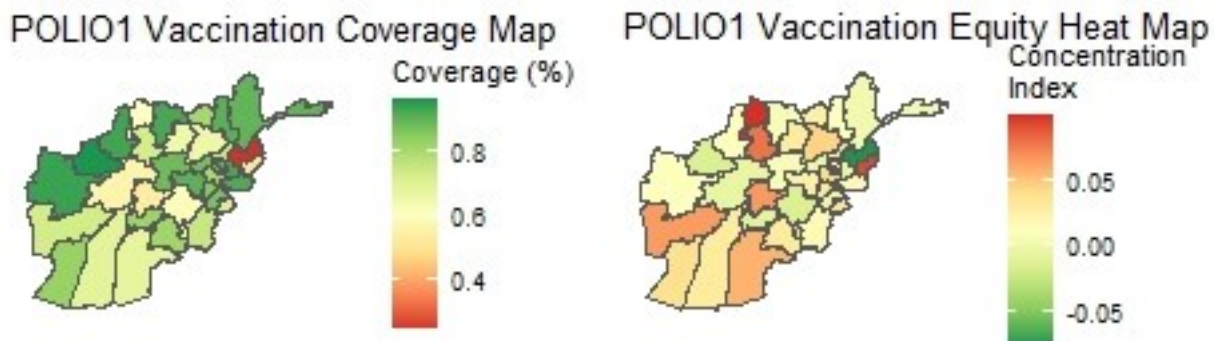
District differences were the dominant factor (11.4%) contributing to differences in DTP3 receipt across Afghanistan, followed by Maternal education level (10.8%). A significant proportion of children in the DHS dataset were unexplained variation (67.3%).

Decomposition of DTP3 Coverage Equity
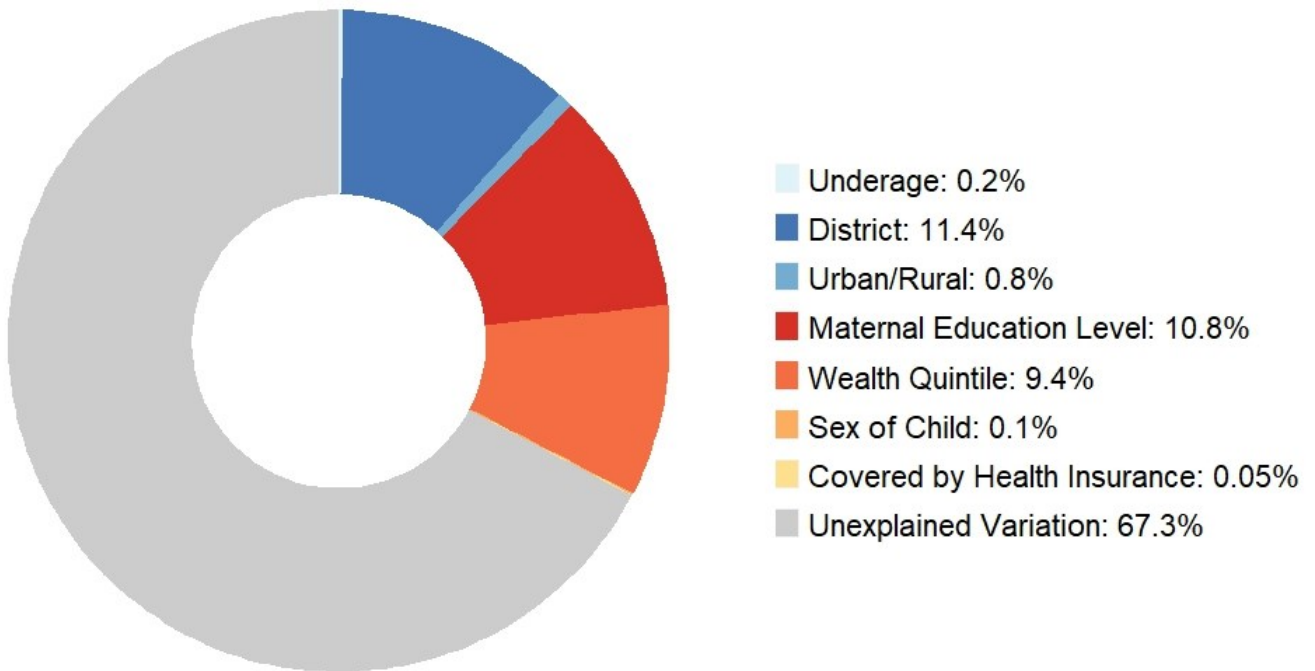
- Underage: 0.2%
- District: 11.4%
- Urban/Rural: 0.8%
- Maternal Education Level: 10.8%
- Wealth Quintile: 9.4%
- Sex of Child: 0.1%
- Covered by Health Insurance: 0.05%
- Unexplained Variation: 67.3%

POLIO1 immunization

The first dose of the polio vaccine is given six weeks after birth in Afghanistan.

POLIO1 Vaccination Coverage Map
Coverage (%)

POLIO1 Vaccination Equity Heat Map
Concentration Index

Coverage for the first dose of the polio vaccine is heterogenous, with wide variations between districts. Faryab, Herat and Badghis all perform well with over 90% coverage, while Nooristan, Kunarha and Daykundi see much lower coverage rates of 24-53%. When accounting for factors beyond wealth, the vaccine appears equitably distributed.
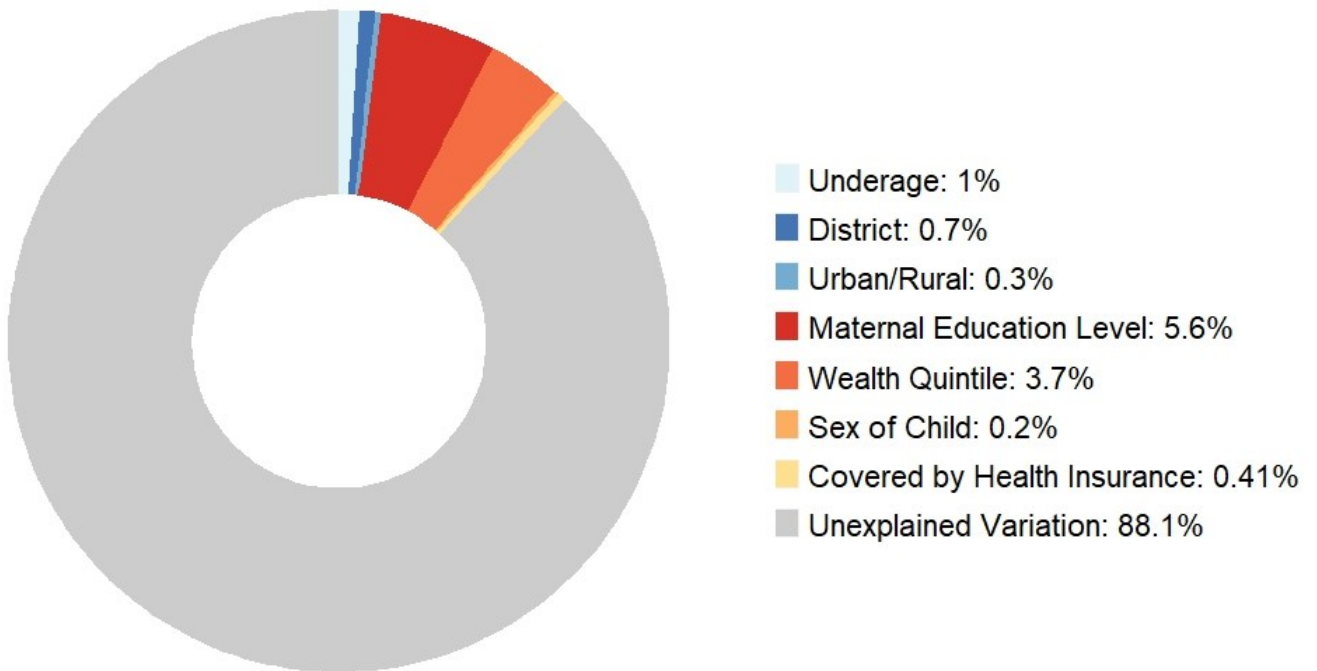
POLIO1 immunization coverage and equity by district

District	Coverage	Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
		Concentration indices			
Nooristan	**24.40%**	-0.075	-0.071	-0.014	-0.037
Kunarha	**50.30%**	0.093	0.180	0.008	0.022
Daykundi	**53.20%**	0.066	0.135	-0.010	-0.016
Ghor	55.90%	-0.004	-0.009	-0.007	-0.011
Jawzjan	60.40%	0.099	0.239	0.008	0.025
Ghazni	61.60%	-0.013	-0.031	-0.059	-0.179
Samangan	65.20%	0.030	0.077	-0.093	-0.193
Baghlan	65.80%	0.045	0.117	-0.049	-0.113
Kandahar	68.00%	0.057	0.153	-0.038	-0.142
Helmand	68.80%	0.030	0.084	-0.039	-0.117
Khost	71.40%	0.036	0.101	-0.013	-0.045
Sar-E-Pul	72.80%	0.079	0.223	0.002	0.005
Farah	73.20%	0.065	0.183	-0.063	-0.142
Panjsher	74.70%	0.032	0.096	-0.051	-0.110
Paktika	74.90%	0.017	0.048	0.002	0.006
Kabul	80.50%	0.042	0.133	-0.027	-0.125
Kunduz	80.80%	0.026	0.083	-0.087	-0.234
Zabul	81.70%	0.031	0.099	0.051	0.215
Urozgan	82.40%	-0.008	-0.027	-0.015	-0.039
Nimroz	82.70%	0.039	0.127	-0.026	-0.105
Logar	85.80%	0.032	0.106	0.005	0.016
Paktya	87.10%	-0.001	-0.004	-0.034	-0.102
Parwan	87.50%	-0.003	-0.010	-0.075	-0.217
Bamyan	88.30%	0.007	0.024	-0.105	-0.162
Kapisa	89.80%	0.011	0.041	-0.006	-0.016
Badakhshan	89.90%	0.003	0.009	-0.093	-0.164
Wardak	90.50%	0.025	0.088	-0.113	-0.285
Takhar	90.80%	0.013	0.045	-0.117	-0.279
Nangarhar	92.00%	0.018	0.064	-0.063	-0.239
Laghman	92.60%	-0.004	-0.015	-0.074	-0.222
Balkh	92.70%	0.007	0.025	-0.169	-0.459
Faryab	93.40%	0.013	0.046	-0.044	-0.133
Herat	94.00%	0.012	0.043	-0.168	-0.444
Badghis	96.20%	-0.013	-0.050	-0.090	-0.157

Subnational regions as presented in the 2015 DHS for Afghanistan.

Decomposition of POLIO1 Coverage Equity

- Underage: 1%
- District: 0.7%
- Urban/Rural: 0.3%
- Maternal Education Level: 5.6%
- Wealth Quintile: 3.7%
- Sex of Child: 0.2%
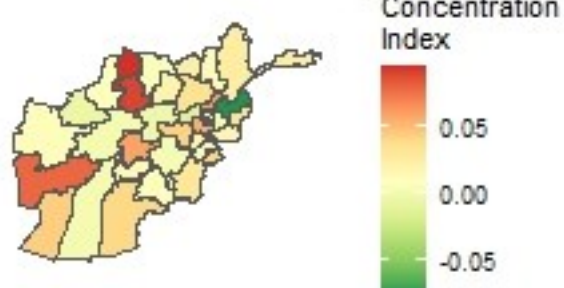- Covered by Health Insurance: 0.41%
- Unexplained Variation: 88.1%

POLIO2 immunization

The second dose of the polio vaccine is given ten weeks after birth in Afghanistan.

POLIO2 Vaccination Coverage Map
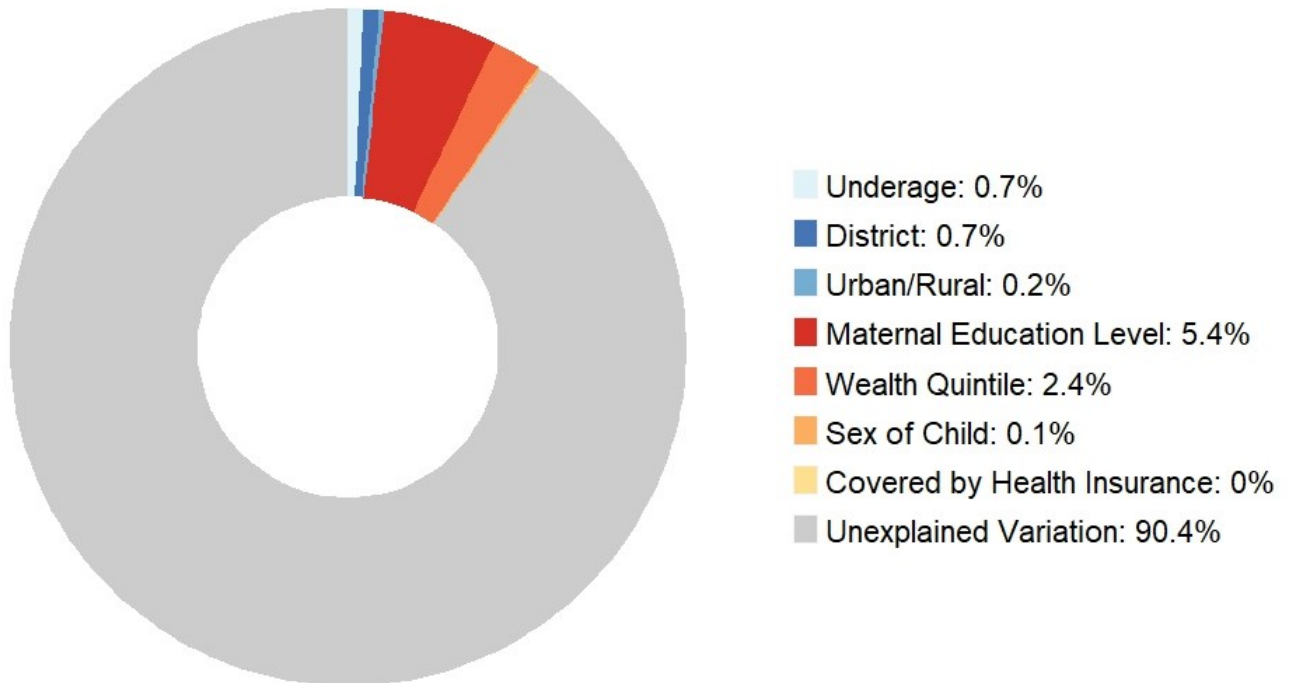Coverage (%)
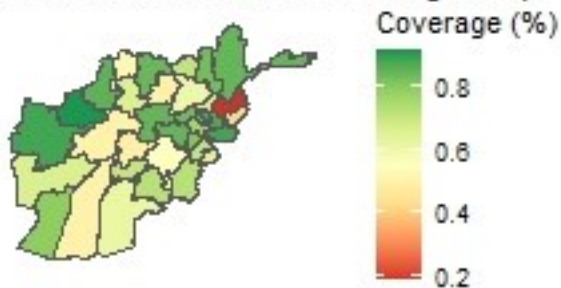
POLIO2 Vaccination Equity Heat Map
Concentration Index

POLIO2 immunization coverage and equity by district

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**18.50%**	-0.077	-0.054	-0.009	-0.025
Kunarha	**41.50%**	0.032	0.049	0.000	0.000
Daykundi	**49.30%**	0.059	0.112	-0.019	-0.029
Samangan	49.70%	0.019	0.036	-0.077	-0.160
Ghor	49.90%	0.001	0.001	-0.010	-0.014
Helmand	50.60%	0.001	0.002	-0.036	-0.108
Jawzjan	52.60%	0.095	0.196	-0.005	-0.016
Ghazni	55.30%	0.003	0.006	-0.064	-0.193
Baghlan	60.20%	0.035	0.083	-0.040	-0.092
Kandahar	61.40%	0.040	0.095	-0.040	-0.147
Khost	64.20%	0.041	0.104	-0.014	-0.047
Sar-E-Pul	65.80%	0.090	0.225	0.025	0.048
Panjsher	66.20%	0.059	0.154	-0.038	-0.082
Farah	66.70%	0.079	0.197	-0.055	-0.123
Urozgan	70.80%	0.014	0.037	-0.013	-0.036
Kunduz	71.40%	0.024	0.067	-0.082	-0.219
Paktya	71.50%	0.014	0.039	-0.022	-0.066
Paktika	72.70%	0.030	0.081	0.000	0.001
Zabul	72.90%	0.011	0.030	0.042	0.178
Kabul	76.40%	0.055	0.162	-0.021	-0.096
Nimroz	79.70%	0.044	0.137	-0.025	-0.100
Logar	81.10%	0.018	0.054	0.001	0.003
Takhar	83.10%	0.014	0.044	-0.100	-0.240
Parwan	83.80%	-0.013	-0.042	-0.065	-0.189
Balkh	84.60%	0.006	0.018	-0.144	-0.391
Badakhshan	84.90%	0.025	0.082	-0.074	-0.131
Bamyan	85.00%	-0.004	-0.012	-0.099	-0.154
Wardak	85.10%	0.043	0.139	-0.068	-0.172
Faryab	85.80%	0.008	0.026	-0.038	-0.116
Kapisa	87.50%	0.003	0.010	-0.009	-0.023
Laghman	87.80%	0.002	0.006	-0.062	-0.186
Nangarhar	88.60%	0.017	0.057	-0.056	-0.214
Herat	88.70%	0.011	0.040	-0.153	-0.406
Badghis	91.80%	-0.005	-0.018	-0.084	-0.146

Subnational regions as presented in the 2015 DHS for Afghanistan.

JOHNS HOPKINS
BLOOMBERG SCHOOL *of* PUBLIC HEALTH

IVAC
International Vaccine
Access Center

Page 20 of 34

Decomposition of POLIO2 Coverage Equity

- Underage: 0.7%
- District: 0.7%
- Urban/Rural: 0.2%
- Maternal Education Level: 5.4%
- Wealth Quintile: 2.4%
- Sex of Child: 0.1%
- Covered by Health Insurance: 0%
- Unexplained Variation: 90.4%

POLIO3 immunization

The third dose of the polio vaccine is given 14 weeks after birth in Afghanistan.

POLIO3 Vaccination Coverage Map
Coverage (%)

POLIO3 Vaccination Equity Heat Map
Concentration Index
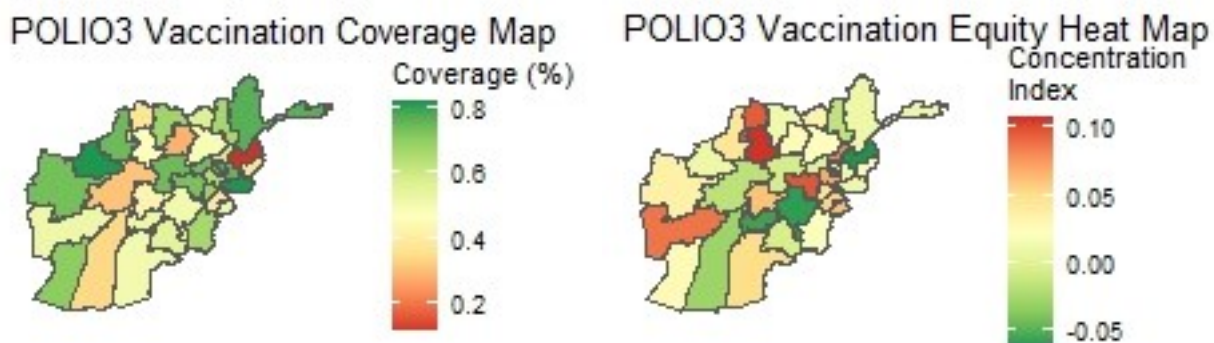
Coverage for the third dose of the polio vaccine is heterogenous, with wide variations between districts. Kapisa, Badakhshan, Badghis and Nangarhar districts all perform well with 77-82% coverage, while Nooristan, Samangan and Ghor see much lower coverage rates of 11-31%. When accounting for factors beyond wealth, the vaccine appears equitably distributed.

JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

IVAC
International Vaccine
Access Center

POLIO3 immunization coverage and equity by district

District	Coverage	Composite (Wagstaff)	Concentration indices		
			Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**11.20%**	-0.064	-0.026	-0.007	-0.020
Samangan	**28.10%**	0.027	0.028	-0.087	-0.182
Ghor	**30.70%**	-0.018	-0.021	-0.008	-0.012
Helmand	33.90%	-0.030	-0.040	-0.055	-0.164
Kunarha	37.00%	0.028	0.038	-0.008	-0.024
Jawzjan	37.00%	0.096	0.139	-0.015	-0.046
Paktya	38.40%	0.055	0.082	-0.009	-0.026
Daykundi	42.70%	0.061	0.097	-0.016	-0.024
Sar-E-Pul	46.40%	0.108	0.187	0.042	0.082
Baghlan	49.00%	0.023	0.044	-0.022	-0.050
Kandahar	50.40%	0.051	0.097	-0.049	-0.181
Ghazni	50.70%	-0.061	-0.118	-0.070	-0.212
Urozgan	51.80%	-0.058	-0.114	-0.014	-0.038
Farah	51.90%	0.088	0.165	-0.035	-0.077
Khost	52.10%	0.063	0.125	-0.009	-0.031
Zabul	55.10%	-0.007	-0.015	0.033	0.139
Kunduz	56.70%	0.034	0.074	-0.070	-0.187
Panjsher	58.10%	0.081	0.184	-0.019	-0.042
Kabul	64.50%	0.070	0.169	-0.018	-0.082
Paktika	66.80%	0.020	0.047	0.003	0.008
Takhar	67.00%	-0.017	-0.042	-0.089	-0.212
Balkh	67.90%	0.011	0.028	-0.100	-0.272
Logar	68.70%	0.047	0.115	0.000	0.001
Nimroz	70.70%	0.027	0.073	-0.029	-0.117
Wardak	73.20%	0.098	0.269	-0.026	-0.064
Herat	73.60%	0.035	0.098	-0.103	-0.271
Parwan	74.30%	0.000	-0.001	-0.053	-0.154
Bamyan	74.70%	-0.008	-0.023	-0.087	-0.135
Faryab	74.70%	0.044	0.124	-0.019	-0.059
Laghman	75.80%	0.011	0.032	-0.045	-0.134
Kapisa	76.90%	0.010	0.028	-0.008	-0.022
Badakhshan	77.10%	0.009	0.026	-0.076	-0.135
Badghis	82.10%	0.009	0.028	-0.071	-0.123
Nangarhar	82.20%	0.009	0.029	-0.052	-0.197

Subnational regions as presented in the 2015 DHS for Afghanistan.

JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

IVAC
International Vaccine
Access Center

Differences in coverage in Afghanistan for the third dose of the polio vaccine are essentially explained by maternal education level (6%). A significant proportion of children in the DHS dataset were unexplained variation (84.4%).

Decomposition of POLIO3 Coverage Equity

Underage: 2.2%
District: 2.8%
Urban/Rural: 0.6%
Maternal Education Level: 6%
Wealth Quintile: 3.8%
Sex of Child: 0.1%
Covered by Health Insurance: 0.04%
Unexplained Variation: 84.4%
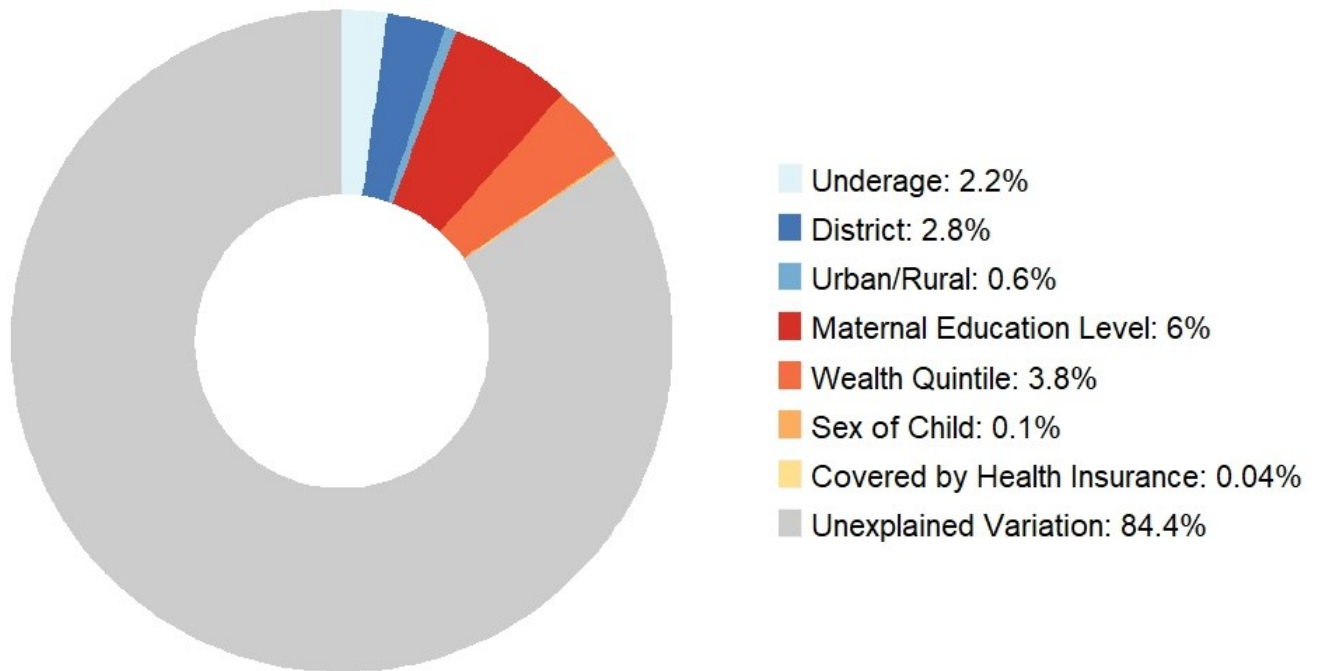
MCV1 immunization

The first dose of the MCV is given nine months after birth in Afghanistan and provides protection against measles.

MCV1 Vaccination Coverage Map
Coverage (%)
0.8
0.6
0.4
0.2
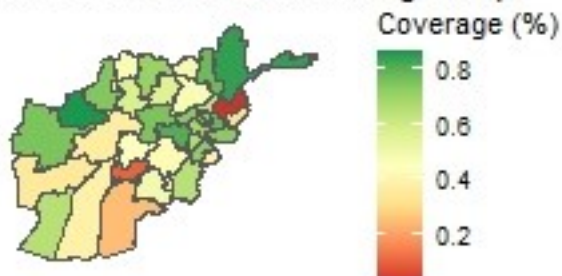
MCV1 Vaccination Equity Heat Map
Concentration Index
0.3
0.2
0.1
0.0
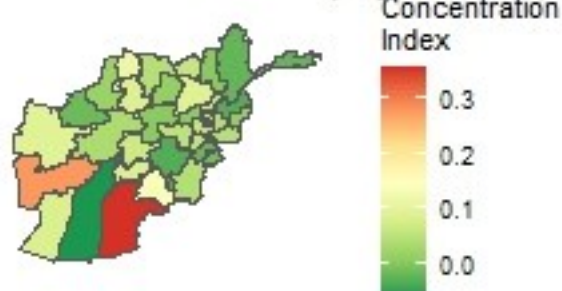
Coverage for the first dose of MCV is heterogenous, with wide variations between districts. Wardak, Badakhshan and Badghis districts all perform well with over 80% coverage, while Nooristan, Urozgan and Kandahar see much lower coverage rates of 3-25%. There are significant inequities in the vaccine's distribution among several districts. For example, Kandahar shows a significantly less equitable distribution (CI composite =0.356).

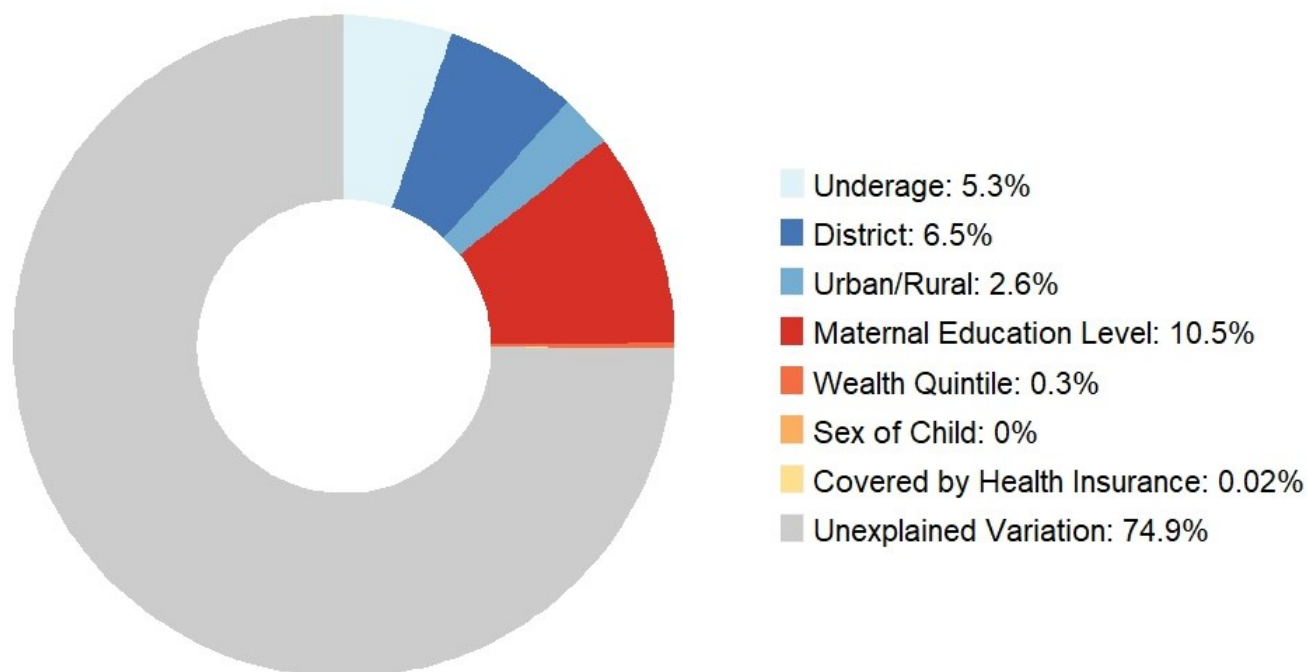*MCV1 immunization coverage and equity by district*

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**2.70%**	-0.032	-0.003	-0.006	-0.016
Urozgan	**9.60%**	0.083	0.026	-0.010	-0.028
Kandahar	**24.50%**	0.356	0.282	-0.033	-0.121
Kunarha	30.80%	0.010	0.011	-0.010	-0.028
Farah	34.50%	0.278	0.319	0.013	0.028
Ghor	36.20%	0.037	0.046	0.012	0.017
Helmand	38.30%	-0.060	-0.085	-0.058	-0.174
Khost	38.40%	-0.012	-0.016	-0.019	-0.064
Ghazni	42.00%	-0.032	-0.048	-0.064	-0.194
Daykundi	45.00%	0.067	0.098	-0.016	-0.025
Jawzjan	47.10%	0.114	0.197	-0.011	-0.031
Baghlan	47.20%	0.091	0.152	-0.048	-0.110
Kunduz	48.40%	0.060	0.099	-0.053	-0.142
Zabul	49.20%	0.139	0.235	0.050	0.210
Samangan	56.00%	0.012	0.022	-0.093	-0.193
Sar-E-Pul	57.70%	0.088	0.166	0.003	0.005
Panjsher	62.40%	0.067	0.155	-0.038	-0.082
Paktika	64.40%	0.043	0.091	0.009	0.025
Nimroz	64.80%	0.084	0.186	-0.020	-0.080
Logar	66.30%	0.056	0.121	0.001	0.003
Kabul	68.80%	0.056	0.132	-0.019	-0.088
Balkh	70.80%	0.045	0.106	-0.083	-0.224
Kapisa	71.90%	0.052	0.128	0.006	0.016
Paktya	72.90%	-0.020	-0.051	-0.036	-0.108
Nangarhar	73.00%	0.045	0.109	-0.029	-0.108
Parwan	73.50%	0.005	0.013	-0.048	-0.138
Faryab	74.30%	0.019	0.046	-0.020	-0.061
Bamyan	75.00%	0.005	0.012	-0.062	-0.096
Herat	75.10%	0.094	0.249	-0.064	-0.169
Takhar	77.20%	0.004	0.010	-0.092	-0.220
Laghman	77.90%	0.041	0.108	-0.032	-0.095
Wardak	80.50%	0.053	0.144	-0.048	-0.122
Badakhshan	84.30%	-0.022	-0.061	-0.069	-0.123
Badghis	86.20%	-0.016	-0.048	-0.082	-0.143

JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

IVAC
International Vaccine
Access Center

		Concentration indices			
District	Coverage	Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)

Subnational regions as presented in the 2015 DHS for Afghanistan.

Maternal education level was the dominant factor for MCV1 coverage, explaining 10.5%, followed by districts (6.5%). A significant proportion of children in the DHS dataset were unexplained variation (74.9%).

Decomposition of MCV1 Coverage Equity

Underage: 5.3%
District: 6.5%
Urban/Rural: 2.6%
Maternal Education Level: 10.5%
Wealth Quintile: 0.3%
Sex of Child: 0%
Covered by Health Insurance: 0.02%
Unexplained Variation: 74.9%

PCV1 immunization

The first dose of the pcv vaccine is given six weeks after birth in Afghanistan.
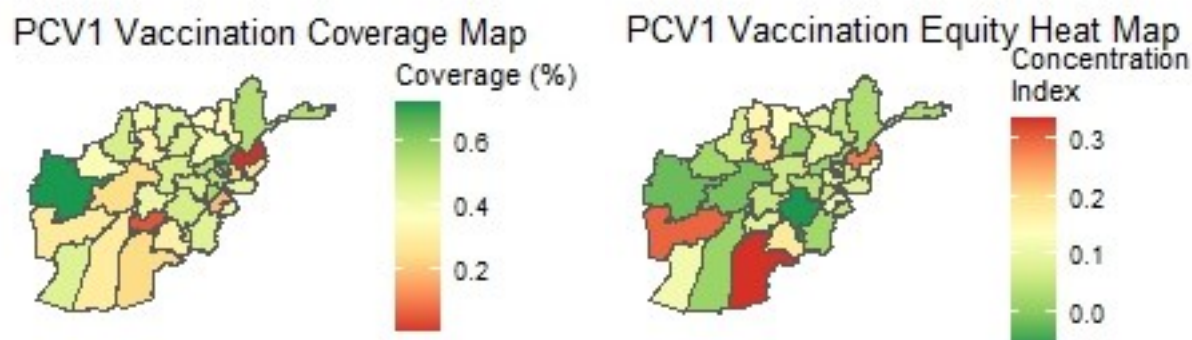
The PCV was introduced in 2013 in Afghanistan's EPI, making the 2015 DHS for Afghanistan was the first to feature PCV coverage. Coverage for the first dose of PCV is heterogenous, with wide variations between districts. Kapisa, Panjsher and Herat districts all perform relatively well with over 60% coverage, while Nooristan, Urozgan and Paktya see much lower coverage rates of 1-18%. There are significant inequities in the vaccine's distribution. For example, Kandahar shows a significantly less equitable distribution (CI composite =0.335).

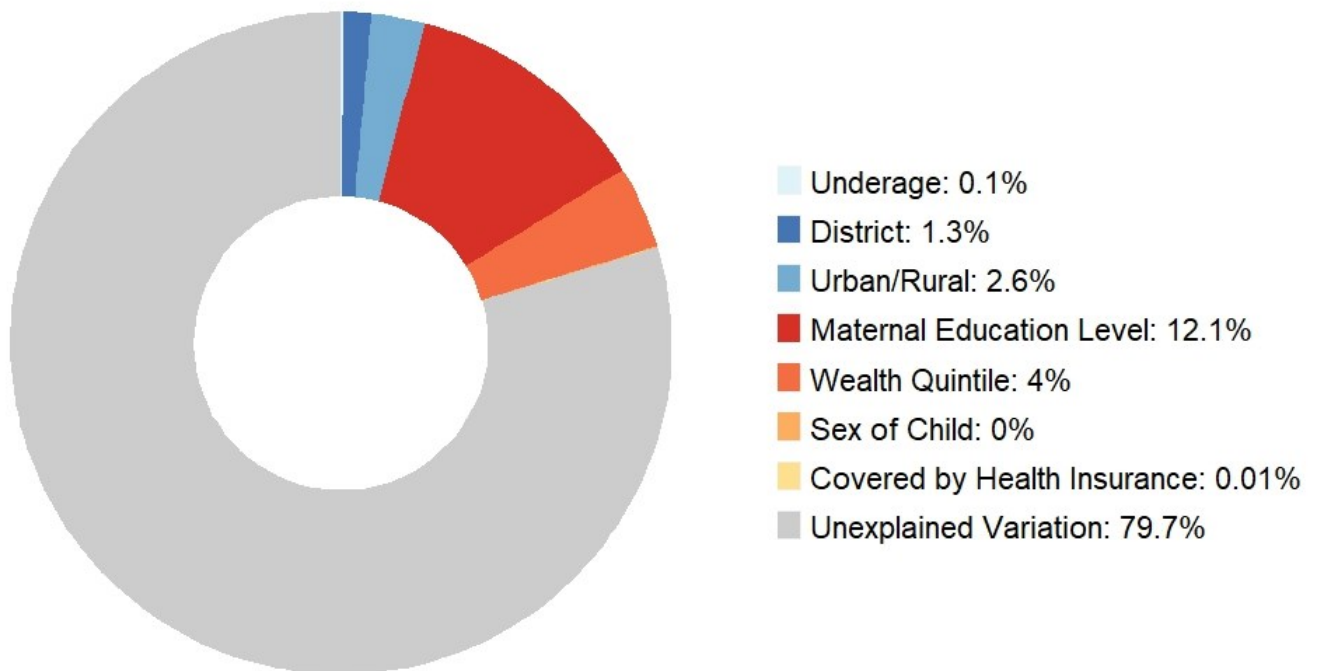*PCV1 immunization coverage and equity by district*

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**0.50%**	0.282	0.005	-0.002	-0.005
Urozgan	**4.60%**	0.086	0.016	-0.012	-0.032
Paktya	**18.30%**	0.112	0.082	-0.020	-0.059
Laghman	23.70%	0.065	0.060	-0.043	-0.128
Kandahar	23.80%	0.335	0.313	-0.026	-0.095
Ghor	24.10%	-0.013	-0.012	-0.025	-0.035
Kunarha	24.80%	0.117	0.113	-0.002	-0.007
Farah	28.40%	0.300	0.329	-0.002	-0.004
Helmand	28.80%	0.014	0.016	-0.056	-0.168
Zabul	30.30%	0.180	0.214	0.055	0.232
Sar-E-Pul	31.60%	0.204	0.253	0.014	0.027
Takhar	33.80%	0.050	0.066	-0.086	-0.206
Kunduz	35.80%	0.092	0.129	-0.045	-0.122
Badghis	37.90%	0.019	0.029	-0.039	-0.067
Baghlan	39.10%	0.091	0.142	-0.045	-0.105
Jawzjan	39.70%	0.158	0.250	0.009	0.028
Khost	40.80%	0.050	0.081	-0.007	-0.023

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Daykundi	41.90%	0.056	0.091	-0.009	-0.014
Nangarhar	43.50%	0.085	0.145	-0.028	-0.107
Balkh	44.60%	0.134	0.230	-0.049	-0.134
Paktika	45.20%	0.021	0.037	0.015	0.041
Samangan	45.90%	0.010	0.018	-0.101	-0.211
Nimroz	46.00%	0.114	0.205	-0.004	-0.017
Wardak	46.80%	0.041	0.075	-0.073	-0.184
Bamyan	47.20%	0.061	0.112	-0.053	-0.082
Faryab	48.00%	0.074	0.139	-0.004	-0.011
Ghazni	48.20%	-0.063	-0.120	-0.061	-0.183
Parwan	52.50%	0.015	0.030	-0.045	-0.130
Kabul	52.80%	0.096	0.199	-0.013	-0.057
Badakhshan	53.90%	0.032	0.068	-0.067	-0.119
Logar	55.50%	0.057	0.123	-0.001	-0.004
Kapisa	64.40%	0.072	0.182	0.010	0.027
Panjsher	64.70%	0.033	0.086	-0.060	-0.131
Herat	71.70%	-0.021	-0.059	-0.147	-0.389

Subnational regions as presented in the 2015 DHS for Afghanistan.

Maternal education level was the dominant factor for the first dose of PCV coverage, explaining 12.1%, followed by wealth quintile (4%). A significant proportion of children in the DHS dataset were unexplained variation (79.7%).

Decomposition of PCV1 Coverage Equity

Underage: 0.1%
District: 1.3%
Urban/Rural: 2.6%
Maternal Education Level: 12.1%
Wealth Quintile: 4%
Sex of Child: 0%
Covered by Health Insurance: 0.01%
Unexplained Variation: 79.7%

PCV2 immunization

The second dose of the pcv vaccine is given ten weeks after birth in Afghanistan.

PCV2 Vaccination Coverage Map

Coverage (%)
0.6
0.5
0.4
0.3
0.2
0.1

PCV2 Vaccination Equity Heat Map
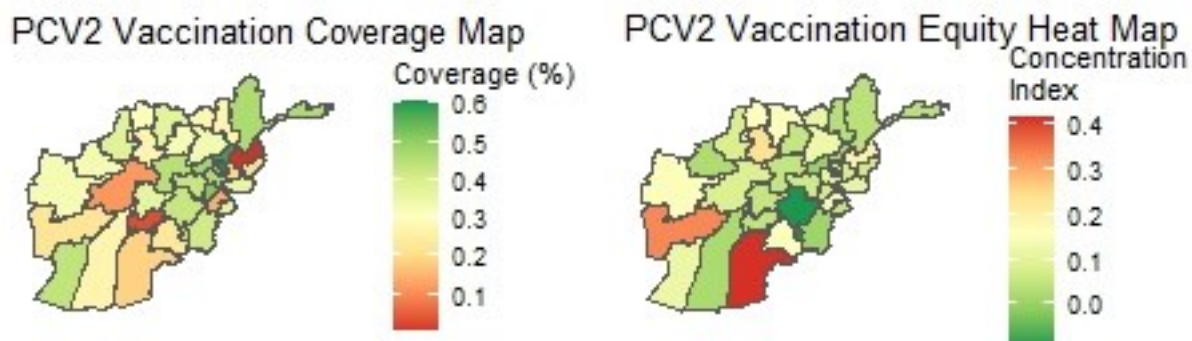
Concentration Index
0.4
0.3
0.2
0.1
0.0

PCV2 immunization coverage and equity by district

District	Coverage	Concentration indices			
		Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
Nooristan	**0.2%**	0.198	0.002	-0.002	-0.004
Urozgan	**2.8%**	0.045	0.005	-0.015	-0.040
Ghor	**11.5%**	0.086	0.038	-0.026	-0.037
Paktya	13.9%	0.137	0.075	-0.025	-0.073
Kandahar	18.7%	0.418	0.299	-0.039	-0.143
Laghman	19.3%	0.070	0.052	-0.051	-0.152
Kunarha	20.2%	0.064	0.048	-0.008	-0.023
Farah	22.4%	0.337	0.281	-0.019	-0.043
Zabul	23.0%	0.155	0.138	0.047	0.198
Sar-E-Pul	27.0%	0.241	0.247	0.009	0.018
Helmand	27.1%	0.020	0.021	-0.061	-0.182
Takhar	27.3%	0.032	0.033	-0.105	-0.251
Kunduz	27.6%	0.113	0.121	-0.058	-0.156
Jawzjan	31.3%	0.166	0.205	-0.009	-0.028
Samangan	32.5%	0.051	0.063	-0.104	-0.216
Herat	32.5%	0.155	0.197	-0.065	-0.171
Badghis	32.7%	0.024	0.030	-0.045	-0.077
Baghlan	33.4%	0.121	0.158	-0.057	-0.131
Nangarhar	36.1%	0.108	0.151	-0.032	-0.121
Khost	36.6%	0.049	0.069	-0.010	-0.033
Daykundi	36.8%	0.051	0.071	-0.022	-0.034
Balkh	37.5%	0.151	0.216	-0.056	-0.152
Faryab	38.1%	0.078	0.116	-0.008	-0.023
Paktika	41.6%	0.006	0.009	0.013	0.035
Ghazni	42.9%	-0.098	-0.164	-0.065	-0.197
Wardak	43.2%	0.062	0.101	-0.068	-0.173
Nimroz	43.9%	0.119	0.202	-0.008	-0.030
Bamyan	45.0%	0.049	0.084	-0.056	-0.086
Kabul	46.2%	0.108	0.192	-0.013	-0.058
Badakhshan	46.6%	0.038	0.069	-0.064	-0.113
Parwan	48.2%	-0.005	-0.010	-0.045	-0.130
Logar	52.0%	0.066	0.127	-0.002	-0.007
Panjsher	58.5%	0.020	0.046	-0.053	-0.116
Kapisa	60.6%	0.088	0.206	0.012	0.032

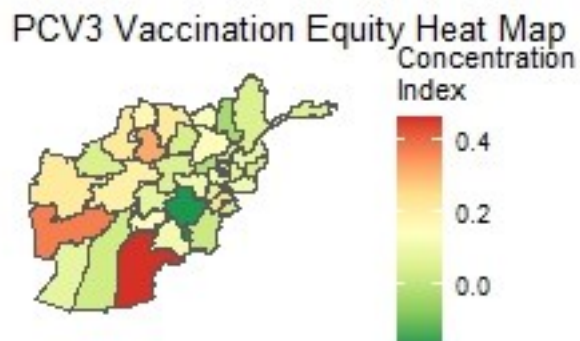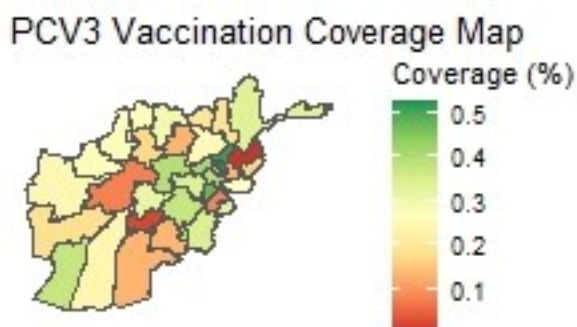Subnational regions as presented in the 2015 DHS for Afghanistan.

Decomposition of PCV2 Coverage Equity

Underage: 1.3%
District: 10.1%
Urban/Rural: 2.4%
Maternal Education Level: 12.9%
Wealth Quintile: 8%
Sex of Child: 0.1%
Covered by Health Insurance: 0.1%
Unexplained Variation: 65.2%
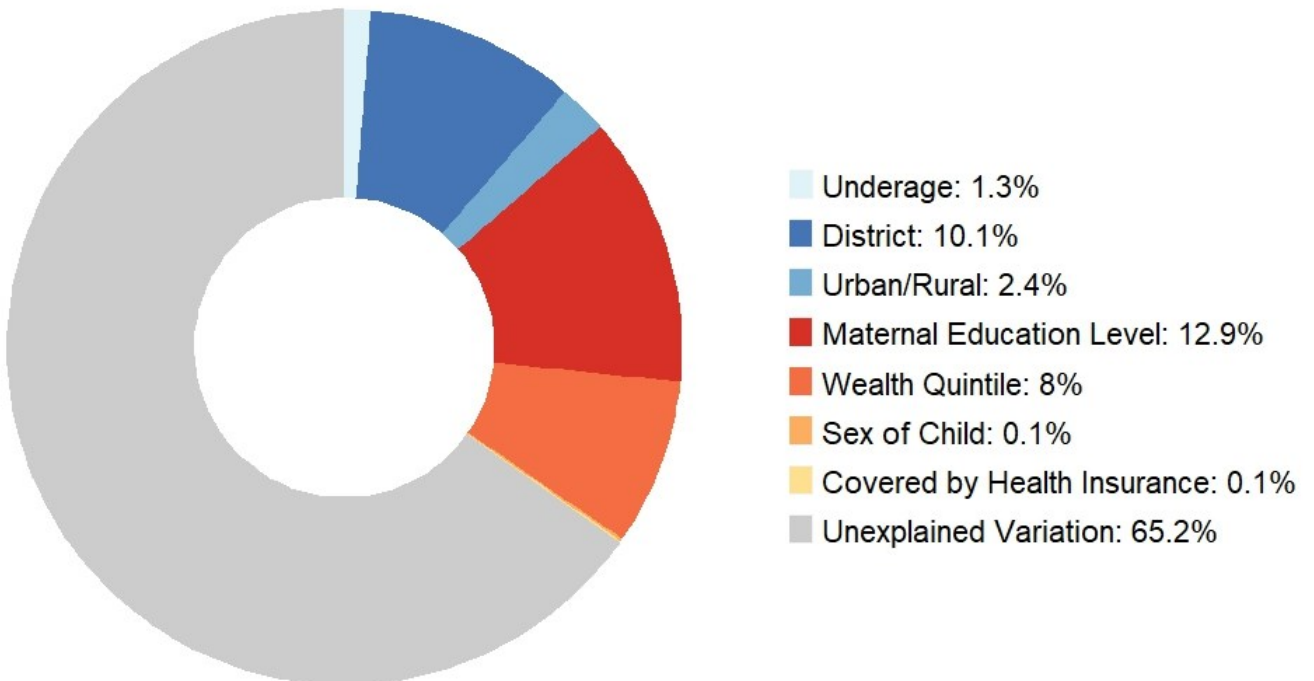
PCV3 immunization

The third dose of the pcv vaccine is given 14 weeks after birth in Afghanistan.

PCV3 Vaccination Coverage Map
Coverage (%)
0.5
0.4
0.3
0.2
0.1

PCV3 Vaccination Equity Heat Map
Concentration Index
0.4
0.2
0.0

PCV3 immunization coverage and equity by district

District	Coverage	Composite (Wagstaff)	Composite (Erreyger)	Wealth (Wagstaff)	Wealth (Erreyger)
		Concentration indices			
Nooristan	**0.20%**	0.094	0.001	-0.002	-0.004
Urozgan	**1.90%**	0.158	0.012	-0.014	-0.039
Ghor	**7.60%**	0.196	0.056	-0.022	-0.032
Paktya	8.10%	0.248	0.077	-0.028	-0.084
Laghman	12.90%	0.074	0.036	-0.058	-0.175
Samangan	13.10%	0.040	0.020	-0.146	-0.304
Kandahar	13.10%	0.463	0.227	-0.057	-0.213
Zabul	13.20%	0.114	0.056	0.054	0.226
Kunarha	16.40%	0.043	0.026	-0.014	-0.040
Sar-E-Pul	16.90%	0.322	0.203	0.005	0.010
Farah	18.30%	0.377	0.249	-0.037	-0.083
Takhar	18.80%	-0.030	-0.020	-0.130	-0.310
Kunduz	19.10%	0.133	0.097	-0.077	-0.206
Helmand	23.80%	0.030	0.028	-0.065	-0.194
Herat	24.50%	0.215	0.201	-0.078	-0.205
Baghlan	25.10%	0.158	0.153	-0.065	-0.151
Jawzjan	25.50%	0.171	0.170	-0.027	-0.081
Nangarhar	26.70%	0.106	0.106	-0.043	-0.164
Badghis	27.00%	0.049	0.050	-0.042	-0.072
Faryab	27.20%	0.219	0.225	0.007	0.022
Balkh	29.30%	0.216	0.236	-0.062	-0.169
Daykundi	31.20%	0.082	0.095	-0.020	-0.031
Khost	31.70%	0.038	0.046	-0.016	-0.055
Badakhshan	33.20%	0.052	0.065	-0.069	-0.122
Wardak	33.90%	0.107	0.135	-0.074	-0.187
Paktika	34.40%	0.021	0.025	0.015	0.039
Ghazni	37.50%	-0.170	-0.243	-0.076	-0.229
Nimroz	37.50%	0.083	0.119	-0.014	-0.058
Bamyan	39.40%	0.055	0.080	-0.067	-0.104
Kabul	39.60%	0.118	0.177	-0.017	-0.077
Parwan	41.20%	-0.012	-0.019	-0.049	-0.141
Logar	47.60%	0.065	0.111	-0.005	-0.015
Panjsher	51.10%	0.053	0.106	-0.039	-0.086
Kapisa	52.60%	0.058	0.116	0.006	0.015

Subnational regions as presented in the 2015 DHS for Afghanistan.

Decomposition of PCV3 Coverage Equity

- Underage: 1.2%
- District: 10.2%
- Urban/Rural: 1%
- Maternal Education Level: 12.8%
- Wealth Quintile: 10%
- Sex of Child: 0.1%
- Covered by Health Insurance: 0.09%
- Unexplained Variation: 64.6%
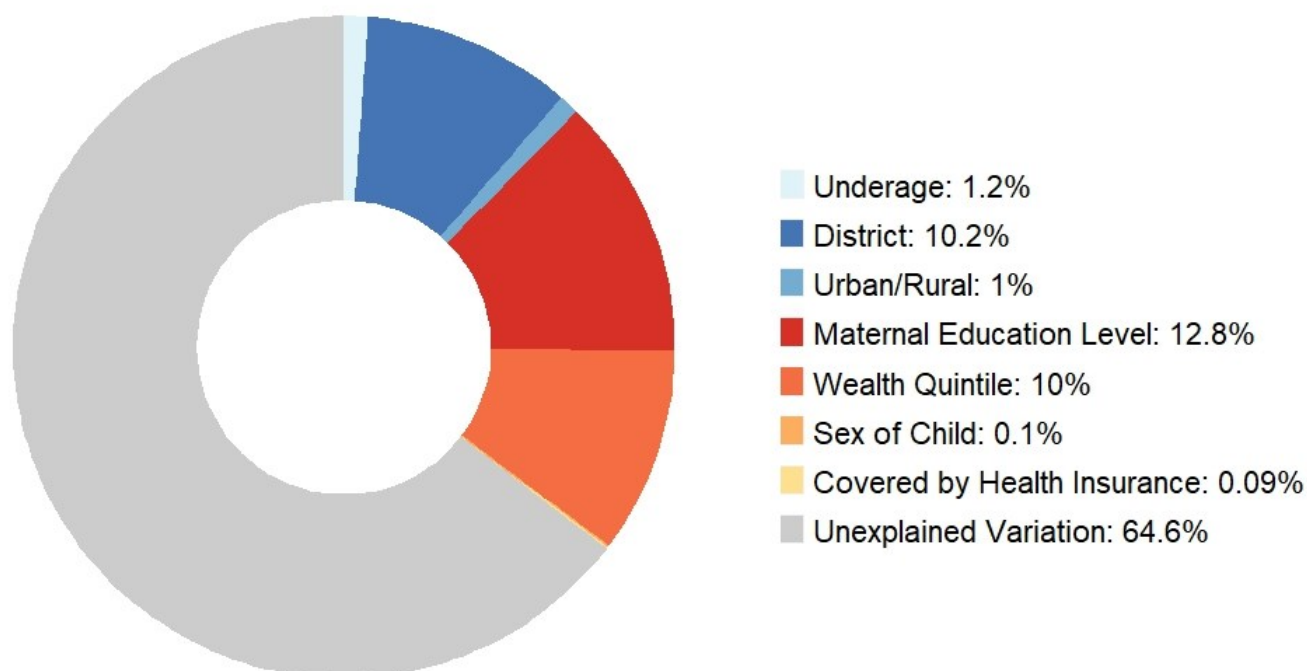
Publications & Resources

- Full Methodological Paper for the VERSE Equity Toolkit
    – Patenaude et al. (2022). A standardized approach for measuring multivariate equity in vaccination coverage, cost-of-illness, and health outcomes: Evidence from the Vaccine Economics Research for Sustainability & Equity (VERSE) project. *Social Science & Medicine, 302,* 114979.
- Global comparison of VERSE composite against wealth-based equity measures
    – Patenaude et al. (2023). Comparing Multivariate with Wealth-Based Inequity in Vaccination Coverage in 56 Countries: Toward a Better Measure of Equity in Vaccination Coverage. *Vaccines, 11*(3), 536.

JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

IVAC
International Vaccine
Access Center

Methods

VERSE Equity Toolkit

The Vaccine Economics Research for Sustainability and Equity (VERSE) Equity Toolkit provides a quantitative measure of immunization coverage and equity by (1) ranking the sample population with a composite direct unfairness index and (2) generating efficiency (coverage) and equity metrics.

Our fair source of variation is defined as the child's age – children too young to receive routine immunization are not expected to be vaccinated. Unfair sources of variation are the child's region of residence, whether they live in an urban or rural area, the mother's education level, the household's socioeconomic status, the child's sex, and their insurance coverage status. We identify a "more privileged" situation for each unfair variation source. Equity measures using socioeconomic status only ("wealth", traditionally used to discuss inequalities) are also presented for comparison.

The model enables analysts to assess the equity and efficiency tradeoffs in achieving the immunization program's targets, including reaching vulnerable populations. Read the full methodology on Social Science & Medicine (2022).

Data source

The toolkit was applied to the Demographic and Health Survey for Afghanistan in 2015. The data are available to the public on dhsprogram.com.

How to read the metrics

- Efficiency metric
    - **Vaccine coverage**: An estimate (based on DHS data) of the vaccine coverage (or zero-dose status prevalence) in the national and district-level populations
- Equity metric
    - **Concentration index**: The difference between the current distribution of vaccine coverage and perfect equity.
    - **Absolute equity gap**: The difference between health outcome attainment between the most advantaged 20% of the population and the least advantaged 20% of the population.
    - **Relative equity gap**: The relative difference in vaccine coverage between two groups. Those two groups are defined based on one of the following binary unfair factors of inequity: health insurance, sex of the child, whether in a rural area.
    - **Slope index of inequity**: The difference in estimated values of a health indicator between the 20% most advantaged and 20% most disadvantaged households, while accounting for other subgroups.
    - **Relative index of inequity**: The relative difference in estimated values of a health indicator between the 20% most advantaged and 20% most disadvantaged households, while accounting for other subgroups.

Acronyms

- AEG: Absolute Equity Gap
- BCG: Bacille Calmette Guerin vaccine
- CI: Concentration index (Wagstaff)
- CIE: Concentration index (Erreyger)
- DHS: Demographic & Health Surveys
- DTP/DPT: Diphtheria Tetanus Pertussis vaccine
- EPI: Expanded Program for Immunization
- FULL: Fully immunized for age
- MCV: Measles-Containing Vaccine
- PCV: Pneumococcal Conjugate Vaccine
- SIA: Supplementary Immunization Activities
- VERSE: Vaccine Economics Research for Sustainability and Equity
- ZERO: Zero-dose status

For errors or omissions, please contact the VERSE team.