

### Observing risk factors for diarrheal disease and malnutrition in rural Peru

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**Background:** In low and middle income countries, diarrheal disease and associated malnutrition remain leading causes of preventable morbidity and mortality among children under 5 years. In Peru, these conditions are more prevalent in children in rural areas, such as the Ancash region. For instance, while the number of years of life lost due to diarrheal diseases decreased significantly in Peru from 1990 to 2010, the prevalence of diarrhea in children under 5 years old in Ancash increased from 2009 (11%) to 2012 (14.2%). Additionally, 24.5% of children under 5 years of age in this region currently suffer from chronic malnutrition. We hypothesize that various observable elements related to food preparation and access, sanitation, and water in the home contribute to diarrheal episodes and associated malnutrition in children in the Ancash region.

**Methods:** To explore this further, we conducted an observational convenience survey of 28 households in three small towns in Ancash, Peru. Visits were made to kitchen areas, animal housing areas, and bathrooms; cooking practices were directly observed; and a questionnaire was administered by a native Spanish speaker. Qualitative and quantitative data were obtained; quantitative data were analyzed using SPSS software.

**Findings:** The results revealed a number of observable risk factors for fecal-oral contamination, including untreated water, periods of no access to water, animals near food preparation areas, and limited access to sewage collection and disposal systems.

**Interpretation:** The information gathered from this survey will inform future efforts for designing public health interventions to prevent diarrheal disease and malnutrition in this area.

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### Equity measurement in the post-2015: a systematic analysis of inequalities in vaccination coverage in GAVI-supported countries

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**Background:** The Sustainable Development Goals cite equity and the reduction of inequalities as a central principle. When assessing inequalities in the coverage of health interventions, extant practices have largely relied on country-specific wealth quintiles as the sole indicator and on simple comparisons between least and most wealthy, an approach with its limitations. The GAVI Alliance monitors equity in vaccination coverage in the countries supported. We conducted a systematic analysis of inequalities in vaccination coverage and compared various dimensions of inequality and statistical approaches in order to help inform the development of GAVI's new equity indicators for its post-2015 strategic period.

**Methods:** We used data from the most recent demographic and health surveys conducted in 45 of the 73 GAVI-supported countries. We measured inequalities in the receipt of diphtheria-tetanus-pertussis (DTP3) and measles containing vaccines (MCV) in all children aged 12 to 23 months according to various dimensions of inequality (including socioeconomic position (SEP) indicators, nutritional indicators and child gender). We used pairwise comparisons (risk difference; risk ratio) and the slope and relative index of inequality (SII; RII). We pooled the inequalities across countries by random-effects meta-analyses.

**Findings:** Our sample included 63,932 children in 45 countries. National DTP3 coverage ranged from 37.2% in Ethiopia to 97.1% in Rwanda. MCV ranged from 42.1% in Nigeria to 94.9% in Rwanda. Pooled RII were similar across the four SEP indicators and indicated that children at the top of the socioeconomic distribution were 1.4 times more likely to be vaccinated than children at the bottom (95% CI 1.29, 1.57). The absolute difference in DTP3 vaccination coverage between children of least and most educated mothers could be as high as 59, 65 and 85 percentage points in Pakistan, India and Nigeria, respectively. Compared to SII and RII, pairwise comparisons had many limitations for inequality measurement related to precision, feasibility and comparability across countries.

**Interpretation:** Global monitoring of equity in vaccination coverage should be conducted using summary measures of inequality such as the SII and RII and using indicators of SEP that are comparable across countries such as maternal education and the multidimensional poverty index.

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### Impact of women's empowerment on use of modern contraceptives in Nigeria: a cross sectional study

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**Background:** In certain parts of the world, gender gaps in education, employment, and empowerment exist, with men reporting higher levels of empowerment measures than women. Studies have shown that empowering women allows them to take ownership of their welfare, including their reproductive health. However, there