Caesarean delivery and anaemia risk in children in 45 low- and middleincome countries (低中所得45か国における帝王切開と出生 児の貧血リスク)

Calistus Wilunda

This is the accepted version of the following article: Wilunda C, Yoshida S, Blangiardo M, Betran AP, Tanaka S, Kawakami K. Caesarean delivery and anaemia risk in children in 45 low- and middle-income countries. Matern Child Nutr. 2017;e12538. https://doi.org/ 10.1111/mcn.12538, which has been published in final form at http://onlinelibrary.wiley.com/doi/10.1111/mcn.12538/full. This article may be used for noncommercial purposes in accordance with the Wiley Self-Archiving Policy [https://authorservices.wiley.com/author-resources/Journal-Authors/licensing-openaccess/open-access/self-archiving.html]

Title: Caesarean delivery and anaemia risk in children in 45 low- and middle-income countries

Authors and affiliations:

Calistus Wilunda,¹ Satomi Yoshida,¹ Marta Blangiardo,² Ana Pilar Betran,³ Shiro Tanaka,¹ Koji Kawakami¹

¹Department of Pharmacoepidemiology, Graduate School of Medicine and Public Health, Kyoto University, Japan

²Department of Epidemiology and Biostatistics, School of Medicine, Imperial College, London, United Kingdom

³Department of Reproductive Health and Research, World Health Organization, Geneva, Switzerland

Acknowledgements: We thank Measure DHS and the national statistical offices/centres of the included countries for supplying the data freely through the Demographic and Health Surveys online archive (http://www.measuredhs.com).

Source of funding: Calistus Wilunda was supported by the 2016 Kyoto University School of Public Health - Super Global Course's travel scholarship to the United Kingdom through the Top Global University Project "Japan Gateway: Kyoto University Top Global Program", sponsored by the Ministry of Education, Culture, Sports, Science and Technology, Japan

Conflict of interest: The authors declare that they have no conflict of interest.

Contributor statement: CW conceived the study and acquired data. CW, SY, and MB designed the study. CW performed statistical analyses under the supervision of SY and MB. CW drafted the initial manuscript. All authors participated in interpreting the data and in critically revising the manuscript for important intellectual content. All authors read and approved the final manuscript.

ABSTRACT

Caesarean delivery (CD) may reduce placental transfusion and cause poor iron-related haematological indices in the neonate. We aimed to explore the association between CD and anaemia in children aged < 5 years utilising data from Demographic and Health Surveys conducted between 2005 and 2015 in 45 low- and middle-income countries (N = 132 877). We defined anaemia categories based on haemoglobin levels, analysed each country's data separately using propensity-score weighting, pooled the country-specific odds ratios (ORs) using random effects meta-analysis, and performed metaregression to determine whether the association between CD and anaemia varies by national CD rate, anaemia prevalence, and gross national income. Individual-level CD was not associated with any anaemia (OR 0.95, 95% confidence interval (CI) 0.86 to 1.06; $I^2 = 40.2\%$), mild anaemia (OR 0.91, 95% CI 0.81 to 1.02; $I^2 = 24.8\%$), and moderate/severe anaemia (OR 0.97, 95% CI 0.85 to 1.11; $I^2 =$ 47.7%). CD tended to be positively associated with moderate/severe anaemia in upper middle-income countries and negatively associated with mild anaemia in lower middle-income countries, however, meta-regression did not detect any variation in the association between anaemia and CD by the level of income, CD rate, and anaemia prevalence. In conclusion, there was no evidence for an association between CD and anaemia in children younger than 5 years in low- and middle-income countries. Our conclusions were consistent when we looked at only countries with CD rate > 15% with data stratified by individual-level wealth status and type of health facility of birth.

Keywords: Anaemia, child nutrition, demographic and health survey, haemoglobin, caesarean section, low- and middle-income countries

INTRODUCTION

The proportion of caesarean deliveries (CD) in the world has increased to unprecedented levels (Betran et al., 2016). This global trend is to a certain extent driven by non-medical factors (Murray, 2000, Arikan et al., 2011, Cotzias et al., 2001) rather than by medical indication, and potentially unnecessary CDs even in settings with low access have been reported (Maaloe et al., 2012). An ecological study revealed that population level CD rates higher than 10% are not associated with reductions in maternal and newborn mortality rates (Ye et al., 2016). In a recent statement on CD rates, however, the World Health Organization did not recommend any population-level CD rate threshold, highlighting the gaps in knowledge (World Health Organization, 2015).

CD has been linked to adverse maternal, neonatal, and perinatal outcomes (Villar et al., 2006) and to long-term effects such as childhood-onset type 1 diabetes and asthma in the offspring (Thavagnanam et al., 2008, Cardwell et al., 2008). The rising CD rates and the potential risks to offspring health have prompted calls to consider the risks of CD on long-term child health (Blustein and Liu, 2015).

Anaemia is a major public health problem among pregnant women and children (Kassebaum et al., 2014). Globally, about 43% of children under 5 years old are anaemic (Stevens et al., 2013). Anaemia in children is caused by many factors that act during the prenatal and postnatal periods. These include malaria infection, human immunodeficiency virus infection, intestinal helminths, poor maternal nutrition, poor child nutrition, micronutrient deficiencies, sickle cell disorders, and thalassemias (Crawley, 2004b, Kassebaum et al., 2014). Most anaemia cases are due to iron deficiency (Kassebaum et al., 2014). Iron deficiency anaemia in infants is associated with potentially irreversible diminished mental; motor; and behavioural development (Lozoff et al., 2006, Lozoff et al., 1991).

CD may reduce placental transfusion and cause poor iron-related haematological indices in the neonate (Zhou et al., 2014). Despite this risk and the rising CD rates worldwide, only a few studies have assessed the relationship between CD and anaemia in children. In two large Chinese birth cohorts, CD was associated with anaemia in children at 12 and at 58 months (Li et al., 2015). Crosssectional studies have shown inconsistent results with some suggesting no association between CD

and anaemia (Wilunda et al., 2016) and others showing increased anaemia risk among children born by CD (Cotta et al., 2011, Granado et al., 2013). We aimed to investigate the association between CD and anaemia in children under 5 years old in low- and middle-income countries (LMICs) and to explore whether this association varies by country level CD rate, anaemia prevalence, and per-capita gross national income (GNI).

KEY MESSAGES

- Caesarean delivery (CD) may reduce placental transfusion and cause poor iron-related haematological indices in the neonate.
- Overall, in this study, there was no evidence for an association between CD and any anaemia, mild anaemia, and moderate/severe anaemia among children aged < 5 years.
- These results were consistent when the analysis was restricted to countries with CD rates > 15% with data stratified by individual-level wealth status and by type of health facility of birth.
- The effect estimates vary moderately across countries but this is uninfluenced by national CD rate, anaemia prevalence, and affluence level.

METHODS

Data source

This study utilised datasets from standard Demographic and Health Surveys (DHS) conducted between 2005 and 2015 in LMICs. All countries with data on both CD and haemoglobin (Hb) measurement were included (supplementary Table 1). The detailed methodology of DHS is available on the program's website (http://dhsprogram.com). In brief, DHS utilise stratified multistage cluster sampling method to select participants. In the first stage, clusters are selected from a list of enumeration areas using stratified random sampling. The second stage involves systematically sampling households in selected clusters. Eligible persons include all women aged 15-49 years and their children aged 0-59 months. Blood samples are collected in all the households or in a random subset of selected households based on considerations such as the required sample size and financial costs. Data are collected using interviewer-administered questionnaires.

Study population

The study population was singleton children aged less than 5 years and their mothers. The analysis was restricted to the most recent birth to avoid clustering of children at the woman level, to minimise recall bias, and because some covariates applied only to the most recent birth.

Variables

The outcome variable was anaemia defined based on altitude adjusted Hb levels as follows: none [Hb ≥ 11.0 grams/decilitre (g/dL)], mild (Hb 10-10.9 g/dL), moderate (Hb 7.0-9.9 g/dL), and severe (Hb < 7.0 g/dL) (World Health Organisation, 2011). Because the number of children with severe anaemia in most countries was small, the last two categories were combined. In the DHS program, Hb levels are measured in a standardized way (Sharman, 2000): blood specimens are collected from children aged less than 5 years using a microcuvette from a drop of blood taken from a finger or heel prick, and Hb analysis is carried out on-site using a portable HemoCue® analyser; a highly valid method when compared to standard laboratory methods (Nkrumah et al., 2011).

The exposure variable was the mode of delivery [CD or vaginal delivery (VD)] ascertained by asking the respondent whether a child born five years preceding the survey was born by CD.

In propensity score weighting of individual participant's data (described below), we considered, *a priori*, the following variables to be potential confounders based on previous studies (Wilunda et al., 2016, Mishra and Retherford, 2007, Kyu et al., 2010): region within the country, residence (urban/rural), wealth index quintile, mother's age at childbirth, mother's education, parity, births in the preceding 5 years, number of antenatal visits, prenatal iron supplementation, prenatal deworming, mother's height, use of biomass for cooking, birth size (or birthweight if available), child's sex, child's age at Hb measurement, and caste (for India). Definitions of the potential confounders are available in supplementary file S1. In meta-regression (described below), we included the following national level covariates: per capita GNI based on the Atlas method (2016 US\$) (The World Bank, 2016), CD rate, anaemia prevalence in children younger than 5 years, year of the survey, and geographic region. For these variables, we used published data that corresponded to the year of the respective DHS.

Statistical analyses

After excluding children from households not selected for Hb measurement, those without Hb measurement, visitors, non-last-born children, multiple births, and those with missing data on childbirth mode, the final samples of mother-child dyads included in the study are as shown in supplementary Table S1. For all the countries, only the following variables had any missing data: number of antenatal visits, birth size (or birth weight), mother's height, prenatal deworming, prenatal iron supplementation, and use of biomass for cooking. The proportion of missing values for any of these variables was generally low and varied by country (supplementary Table S2). There was no association between the indicators for the missing values and anaemia. Thus, we performed single imputation of missing values using chained equations (StataCorp, 2013). The imputation model included all the variables included in the propensity score model (explained below) plus anaemia. For Albania, Armenia, Jordan, Kyrgyz Republic, Moldova, Namibia, Peru, Rwanda, and Sao Tome and

Principe, >90% of children had data on birth weight and we used this variable instead of birth size when computing propensity scores.

The main analysis consisted of three steps: 1) propensity score weighting to obtain country specific logarithms of odds ratios (ORs) and standard errors; 2) meta-analysis to obtain pooled ORs with 95% confidence intervals (CIs); and 3) meta-regression to assess whether the relationship between CD and anaemia varies by country level: CD rate, anaemia prevalence, and per capita GNI.

Propensity score weighting

Propensity score, defined as the probability of being assigned to a treatment group given an individual's observed covariate values (D'Agostino, 1998), was used to ensure that the CD and VD groups in the study were comparable in terms of potential confounders. Because of the complex sampling design used in DHS, we used the approach of propensity score weighting for complex surveys (Dugoff et al., 2014). First, we generated propensity scores by including sample weight as one of the covariates. Sample weights are adjustments applied to survey data to correct for oversampling, undersampling, and differences in survey response rates (http://dhsprogram.com/faq.cfm). We then assessed whether the scores were balanced across the CD and VD groups within blocks of the propensity score. Next, we weighted the CD and VD groups by the propensity score based on the inverse probability of treatment weighting method using doubly robust estimation (Funk et al., 2011). Each child born by CD received a weight equal to the inverse of the propensity score, and each comparison child received a weight equal to the inverse of one minus the propensity score (Garrido et al., 2014). The resultant propensity score weight was then multiplied by the sample weight to obtain a 'composite' weight. We then 'svyset' the dataset by the 'composite' weight variable, the cluster, and the strata. We used either multinomial logistic regression (for anaemia categorized as none, mild, moderate/severe) or binary logistic regression [for any degree of anaemia (hereafter any anaemia) categorized as yes or no], using the 'svy' prefix, to obtain country specific log odds ratios for the association between CD and anaemia, with adjustment for any covariate that did not meet the propensity score balancing property.

Meta-analyses

To account for moderate heterogeneity (assessed using the I^2 statistic) in the effect estimates across countries, we performed random effects meta-analyses to obtain summary ORs for the association between CD and any anaemia, mild anaemia, and moderate/severe anaemia. The unit of analysis was the country. We assessed for any bias in the selection of countries included in this study using a funnel plot and tested for the plot's symmetry using the Egger's test.

Meta-regression

We performed meta-regression to determine whether the association between CD and any anaemia varies by national level CD rate, anaemia prevalence, and GNI per capita. These variables were entered into the model as predictors whilst the country specific logarithms of ORs was the outcome.

Stratified and subgroup analyses

Because CD rates tend to be higher among wealthier women (Ronsmans et al., 2006) and those who deliver in private health facilities (Vieira et al., 2015), we performed two sets of stratified analyses among countries with national CD rate > 15%. We stratified children by wealth status (lower two wealth quintiles or upper two wealth quintiles) and by type of health facility of birth (public sector or private sector) and assessed for the association between CD and anaemia in these strata. Because the risk of anaemia in children varies by child's age (Crawley, 2004a), for each country, we stratified children by age (< 23 months or 24-59 months) and repeated the analyses in each age stratum using the same approach and variables as in the main analyses.

All statistical analyses were performed using STATA 14 (StataCorp, College Station, TX, USA).

Ethics

Country-specific DHS protocols were approved by relevant ethics committees and authorities in each country by ICF International institutional review board. Because this study utilised de-identified open source datasets, it did not require ethical review.

RESULTS

This study included 45 countries; a majority (23/45) were in the low-income group (Table 1). Seven and 18 of the countries had national CD rates of > 15% and < 5%, respectively. Supplementary Table S1 presents sample characteristics of mother-child dyads included in the study.

Of the 132 877 children studied, 80 375 had any anaemia, 32 617 had mild anaemia, and 47 758 had moderate/severe anaemia. The pooled ORs showed no evidence for an association between individual-level CD and any anaemia (OR 0.95, 95% confidence interval (CI) 0.86 to 1.06; $I^2 = 40.2\%$, Figure 1), mild anaemia (OR 0.91, 95% CI 0.81 to 1.02; $I^2 = 24.8\%$, supplementary Figure S1), and moderate/severe anaemia (OR 0.97, 95% CI 0.85 to 1.11; $I^2 = 47.7\%$, Figure 2) in children under 5 years of age. There was moderate heterogeneity in the ORs across the countries. There was no association between CD and any anaemia in strata defined by country-level variables and between CD and mild anaemia and moderate/severe anaemia within the region, national CD rate, and anaemia prevalence strata (Table 2). CD was, however, positively associated with moderate/severe anaemia in upper middle-income countries (OR 1.22, 95% CI 1.01 to 1.47; $I^2 = 0.0\%$) and negatively associated with mild anaemia in lower middle-income countries (OR 0.84, 95% CI 0.74 to 0.95; $I^2 = 0.0\%$). CD was not associated with moderate/severe anaemia in low-income and lower middle-income countries and with mild anaemia in upper middle-income anaemia in low-income countries (Table 2).

There was no evidence of bias in the selection of countries included in this study as assessed based on any anaemia (p = 0.549, supplementary Figure S2). Meta-regression showed that the ORs for any anaemia did not vary by national CD rate; anaemia prevalence; and per capita GNI (Table 3). Supplementary Figure S3 further shows no evidence for an association between national income level on a continuous scale and the log odds ratio for anaemia.

Stratified and subgroup analyses

Among 64 037 children aged < 2 years, 16 684 had mild anaemia and 29 015 had moderate/severe anaemia. In this age group in which CD would potentially have the greatest effect on anaemia, there was no association between individual-level CD and any anaemia (OR 1.01, 95% CI 0.86 to 1.18; I^2 =

45.4%, supplementary Figure S4), mild anaemia (OR 0.98, 95% CI 0.98 to 1.14; $I^2 = 25.2\%$, supplementary Figure S5), and moderate/severe anaemia (OR 1.07, 95% CI 0.88 to 1.30; $I^2 = 51.3\%$, supplementary Figure S6).

Among 68 840 children aged 2-5 years, 15 933 had mild anaemia and 18 743 had moderate/severe anaemia. In this age group, there was no association between individual-level CD and any anaemia (OR 0.88, 95% CI 0.78 to 1.00; $I^2 = 22.6\%$, supplementary Figure S7), and moderate/severe anaemia (OR 0.86, 95% CI 0.74 to 1.01; $I^2 = 23.9\%$, supplementary Figure S8). However, children born by CD tended to have a reduced mild anaemia risk (OR 0.81, 95% CI 0.68 to 0.95; $I^2=40.4\%$ supplementary Figure S9) compared to those born by VD.

In subgroup analyses restricted to countries with CD rate of > 15%, we did not find any association when data were stratified by wealth quintile and by type of health facility (private or public) (supplementary Table S3).

DISCUSSION

Overall, we did not observe any association between CD and any degree of anaemia, mild anaemia, and moderate/severe anaemia among children aged less than 5 years in LMICs. These findings were consistent when we restricted our analyses to countries with CD rate higher than 15% with data stratified by children's wealth status and by type of health facility of birth. There was moderate heterogeneity in the effect estimates across countries but the associations did not vary by national CD rate, anaemia prevalence, and per capita GNI. However, we noticed that CD tended to be more positively associated with moderate/severe anaemia in upper middle-income countries and more negatively associated with mild anaemia in lower middle-income countries. Similarly, there was no evidence for an association between CD and any anaemia and moderate/severe anaemia when children were stratified by age (younger than 2 years and 2-5 years).

In a meta-analysis of seven observational studies, Hb levels were 0.51 g/dL lower in neonates born by CD compared with those born vaginally (Zhou et al., 2014). CD may reduce Hb and other haematological indices in neonates through different mechanisms. CD may be associated with a shortened period of placental transfusion due to immediate umbilical cord clamping (Shirvani et al., 2010). Indeed, delayed cord clamping for at least 60 seconds after birth results in better haematological indices in neonates (McDonald et al., 2013) and WHO strongly recommends late cord clamping (performed about 1 to 3 minutes after birth) for all births (World Health Organisation, 2012). A recent trial in Nepal (Ashish et al., 2017) has found improved haemoglobin levels at 8 and 12 months, improved iron status at 8 months, and low risk of iron deficiency anaemia at 8 months after delayed cord clamping. However, a study in Sweden (Andersson et al., 2014) did not find an association between cord clamping CD (Jain and Eaton, 2006), lower maternal blood pressure associated with the use of anaesthesia (Klohr et al., 2010), and delayed onset of respiration associated with CD (Redmond et al., 1965) may result in a weaker placental transfusion force. Additionally, delayed microbiota acquisition in children born by CD can affect their immunophysiological

development and increase the risk of infections (Gronlund et al., 1999), which would decrease iron absorption (Hurrell, 2012) or even cause anaemia. CD may also increase the risk of anaemia in children by disrupting breastfeeding (Prior et al., 2012) and maternal general health (Villar et al., 2006). A higher amount of intrapartum and postpartum blood loss associated with CD (Bateman et al., 2010) may cause maternal anaemia (Butwick et al., 2017) and reduce the amount of iron in breast milk.

Although an improvement in iron stores may persist up to six months in infants whose cord clamping was delayed (McDonald et al., 2013), it is plausible that differences in Hb concentration found shortly after birth due to the timing of cord clamping and mode of delivery may not persist into early childhood (McDonald et al 2013). This might partly explain the overall lack of association between CD and anaemia in children under 5 years of age or even in those under 2 years of age. Moreover, routine early-childhood anaemia control interventions such as iron supplementation, exclusive breastfeeding, and adequate nutrition may eliminate any differences in Hb concentration between CD and VD groups.

A study in China found that CD was weakly associated with increased anaemia risk in children aged 12 months and 58 months but not among those aged 6 months (Li et al., 2015). The authors, however, did not give a reason for this inconsistency. Two cross-sectional studies from Brazil (Cotta et al., 2011, Granado et al., 2013) have also reported an increased risk of anaemia among children born by CD. Of note is that China and Brazil are upper middle-income countries. We observed a higher moderate/severe anaemia risk among children born by CD in upper middle-income countries. This seems to be consistent with the findings in previous studies (Li et al., 2015, Cotta et al., 2011, Granado et al., 2013). Although we observed a reduced mild anaemia risk among children in the lower middle-income countries and among those aged 2-5 years, the forest plots (supplementary Figures S9 and S10) show that the number of children born by CD in each country was generally small and extreme odds ratios were more likely to be observed among countries with smaller numbers of children born by CD than in countries with larger samples. Thus, the observed negative associations could be by chance.

To our knowledge, this is the first single study on the relationship between CD and anaemia in children in LMICs using nationally representative data. Our study is based on a large sample of children from multiple countries included in the DHS program. The DHS program uses standardised data collection methods and is often considered to be the best available source of data for many health, nutrition, and demographic indicators in LMICs. We used propensity score weighting to adjust for confounding, and incorporated country- and individual-level data in the analyses. In propensity score weighting, we used doubly robust estimation which combines outcome regression and propensity score approaches to obtain unbiased effect estimators (Funk et al., 2011). The use of data from a large number of countries with varying levels of CD rates, affluence, and anaemia burden together with the lack of evidence of bias in the selection of the countries increases the generalisability of our findings to LMICs. This study, however, has limitations. First, we assumed that anaemia in childhood reflects iron status. However, anaemia is not a specific indication of iron deficiency. Thus, the association between CD and iron related anaemia could have been masked by the presence of anaemia due to other factors. Second, although we adjusted for many potential confounders in the analysis of individual level data, the results are still subject to unmeasured confounding by factors such as mother's prenatal anaemia status, pregnancy complications, and the practice of delayed cord clamping (DHS did not collect data on these variables). Moreover, we could not obtain national level data on cord clamping practices to account for this factor in meta-regression. The degree to which the unmeasured confounding might have affected our results remains uncertain. Third, information related to the prenatal period was ascertained retrospectively and may have been affected by recall bias. To minimise this bias, we limited our analysis to the youngest child. Finally, only seven countries had Hb data of children aged < 6 months. Given that CD would potentially have the most influence on anaemia among younger children because iron acquired before birth is the main source of iron for infants during the first months of life (Chaparro, 2008), and given that any effect of CD on anaemia is likely to be short term, lack of association between CD and anaemia in the present study could partly be because the participants were mainly aged 6-59 months. Nonetheless, a previous study did not find an association between CD and anaemia in infants aged 6 months (Li et al., 2015).

In conclusion, overall, there is no evidence for an association between CD and anaemia in children younger than 5 years in LMICs, although moderate differences in the associations exist across countries. Even though we cannot infer causality, our findings are reassuring in this era of increasing CD rates globally. Nevertheless, further and better-designed studies are needed to explore the relationship between CD and anaemia especially in upper middle-income countries and to elucidate the likely mechanism of any observed association.

REFERENCES

- Andersson O., Domellof M., Andersson D. & Hellstrom-Westas L. (2014) Effect of delayed vs early umbilical cord clamping on iron status and neurodevelopment at age 12 months: a randomized clinical trial. *JAMA Pediatr* **168**, 547-554.
- Arikan D.C., Ozer A., Arikan I., Coskun A. & Kiran H. (2011) Turkish obstetricians' personal preference for mode of delivery and attitude toward cesarean delivery on maternal request. *Arch Gynecol Obstet* 284, 543-549.
- Ashish K.C., Rana N., Målqvist M., Jarawka Ranneberg L., Subedi K. & Andersson O. (2017) Effects of delayed umbilical cord clamping vs early clamping on anemia in infants at 8 and 12 months: A randomized clinical trial. *JAMA Pediatrics* 171, 264-270.
- Bateman B.T., Berman M.F., Riley L.E. & Leffert L.R. (2010) The epidemiology of postpartum hemorrhage in a large, nationwide sample of deliveries. *Anesth Analg* **110**, 1368-1373.
- Betran A.P., Ye J., Moller A.B., Zhang J., Gulmezoglu A.M. & Torloni M.R. (2016) The Increasing Trend in Caesarean Section Rates: Global, Regional and National Estimates: 1990-2014.
 PLoS One 11, e0148343.
- Blustein J. & Liu J. (2015) Time to consider the risks of caesarean delivery for long term child health. *BMJ* **350**, h2410.
- Butwick A.J., Walsh E.M., Kuzniewicz M., Li S.X. & Escobar G.J. (2017) Patterns and predictors of severe postpartum anemia after Cesarean section. *Transfusion* **57**, 36-44.
- Cardwell C.R., Stene L.C., Joner G., Cinek O., Svensson J., Goldacre M.J., et al. (2008) Caesarean section is associated with an increased risk of childhood-onset type 1 diabetes mellitus: a meta-analysis of observational studies. *Diabetologia* **51**, 726-735.
- Chaparro C.M. (2008) Setting the stage for child health and development: prevention of iron deficiency in early infancy. *J Nutr* **138**, 2529-2533.
- Cotta R.M., Oliveira Fde C., Magalhaes K.A., Ribeiro A.Q., Sant'Ana L.F., Priore S.E., et al. (2011) Social and biological determinants of iron deficiency anemia. *Cad Saude Publica* 27 Suppl 2, S309-320.

- Cotzias C.S., Paterson-Brown S. & Fisk N.M. (2001) Obstetricians say yes to maternal request for elective caesarean section: a survey of current opinion. *Eur J Obstet Gynecol Reprod Biol* **97**, 15-16.
- Crawley J. (2004a) Reducing the burden of anemia in infants and young children in malaria-endemic countries of Africa: from evidence to action. *Am J Trop Med Hyg* **71**, 25-34.
- Crawley J. (2004b) Reducing the Burden of Anemia in Infants and Young Children in Malariaendemic Countries of Africa: From Evidence to Action In: The Intolerable Burden of Malaria II: What's New, What's Needed. (eds Breman JG, Alilio MS & M. A). American Society of Tropical Medicine and Hygiene, Northbrook (IL).
- D'Agostino R.B., Jr. (1998) Propensity score methods for bias reduction in the comparison of a treatment to a non-randomized control group. *Stat Med* **17**, 2265-2281.
- Dugoff E.H., Schuler M. & Stuart E.A. (2014) Generalizing observational study results: applying propensity score methods to complex surveys. *Health Serv Res* **49**, 284-303.
- Funk M.J., Westreich D., Wiesen C., Stürmer T., Brookhart M.A. & Davidian M. (2011) Doubly Robust Estimation of Causal Effects. *American Journal of Epidemiology* **173**, 761-767.
- Garrido M.M., Kelley A.S., Paris J., Roza K., Meier D.E., Morrison R.S., et al. (2014) Methods for constructing and assessing propensity scores. *Health Serv Res* **49**, 1701-1720.
- Granado F.S., Augusto R.A., Muniz P.T. & Cardoso M.A. (2013) Anaemia and iron deficiency between 2003 and 2007 in Amazonian children under 2 years of age: trends and associated factors. *Public Health Nutr* **16**, 1751-1759.
- Gronlund M.M., Lehtonen O.P., Eerola E. & Kero P. (1999) Fecal microflora in healthy infants born by different methods of delivery: permanent changes in intestinal flora after cesarean delivery. *J Pediatr Gastroenterol Nutr* **28**, 19-25.
- Hurrell R.F. (2012) Influence of inflammatory disorders and infection on iron absorption and efficacy of iron-fortified foods. *Nestle Nutr Inst Workshop Ser* **70**, 107-116.
- Jain L. & Eaton D.C. (2006) Physiology of Fetal Lung Fluid Clearance and the Effect of Labor. Seminars in Perinatology **30**, 34-43.

- Kassebaum N.J., Jasrasaria R., Naghavi M., Wulf S.K., Johns N., Lozano R., et al. (2014) A systematic analysis of global anemia burden from 1990 to 2010. *Blood* **123**, 615-624.
- Klohr S., Roth R., Hofmann T., Rossaint R. & Heesen M. (2010) Definitions of hypotension after spinal anaesthesia for caesarean section: literature search and application to parturients. *Acta Anaesthesiol Scand* 54, 909-921.
- Kyu H.H., Georgiades K. & Boyle M.H. (2010) Biofuel smoke and child anemia in 29 developing countries: a multilevel analysis. *Ann Epidemiol* 20, 811-817.
- Li H.T., Trasande L., Zhu L.P., Ye R.W., Zhou Y.B. & Liu J.M. (2015) Association of cesarean delivery with anemia in infants and children in 2 large longitudinal Chinese birth cohorts. *Am J Clin Nutr* **101**, 523-529.
- Lozoff B., Jimenez E. & Smith J.B. (2006) Double burden of iron deficiency in infancy and low socioeconomic status: a longitudinal analysis of cognitive test scores to age 19 years. Arch Pediatr Adolesc Med 160, 1108-1113.
- Lozoff B., Jimenez E. & Wolf A.W. (1991) Long-term developmental outcome of infants with iron deficiency. *N Engl J Med* **325**, 687-694.
- Maaloe N., Bygbjerg I.C., Onesmo R., Secher N.J. & Sorensen B.L. (2012) Disclosing doubtful indications for emergency cesarean sections in rural hospitals in Tanzania: a retrospective criterion-based audit. *Acta Obstet Gynecol Scand* **91**, 1069-1076.
- McDonald S.J., Middleton P., Dowswell T. & Morris P.S. (2013) Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes. *Cochrane Database Syst Rev*, Cd004074.
- Mishra V. & Retherford R.D. (2007) Does biofuel smoke contribute to anaemia and stunting in early childhood? *Int J Epidemiol* **36**, 117-129.
- Murray S.F. (2000) Relation between private health insurance and high rates of caesarean section in Chile: qualitative and quantitative study. *BMJ* **321**, 1501-1505.

- Nkrumah B., Nguah S.B., Sarpong N., Dekker D., Idriss A., May J.u., et al. (2011) Hemoglobin estimation by the HemoCue® portable hemoglobin photometer in a resource poor setting. *BMC Clinical Pathology* **11**.
- Prior E., Santhakumaran S., Gale C., Philipps L.H., Modi N. & Hyde M.J. (2012) Breastfeeding after cesarean delivery: a systematic review and meta-analysis of world literature. *Am J Clin Nutr* 95, 1113-1135.
- Redmond A., Isana S. & Ingall D. (1965) Relation of onset of respiration to placental transfusion *Lancet* **1**, 283-285.
- Ronsmans C., Holtz S. & Stanton C. (2006) Socioeconomic differentials in caesarean rates in developing countries: a retrospective analysis. *The Lancet* **368**, 1516-1523.
- Sharman A. (2000) Anemia testing in population-based surveys: General information and guidelines for country monitors and program managers. ORC Macro, Calverton, Maryland USA.
- Shirvani F., Radfar M., Hashemieh M., Soltanzadeh M.H., Khaledi H. & Mogadam M.A. (2010) Effect of timing of umbilical cord clamp on newborns' iron status and its relation to delivery type. Arch Iran Med 13, 420-425.
- StataCorp (2013) *Stata Multiple Imputation Refence Manual: Release 13*. Stata Press, College Station, Texas, USA.
- Stevens G.A., Finucane M.M., De-Regil L.M., Paciorek C.J., Flaxman S.R., Branca F., et al. (2013) Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995-2011: a systematic analysis of population-representative data. *Lancet Glob Health* 1, e16-25.
- Thavagnanam S., Fleming J., Bromley A., Shields M.D. & Cardwell C.R. (2008) A meta-analysis of the association between Caesarean section and childhood asthma. *Clin Exp Allergy* 38, 629-633.

The World Bank (2016) GNI per capita, Atlas method (current US\$). The World Bank.

- Vieira G.O., Fernandes L.G., de Oliveira N.F., Silva L.R. & Vieira Tde O. (2015) Factors associated with cesarean delivery in public and private hospitals in a city of northeastern Brazil: a crosssectional study. *BMC Pregnancy Childbirth* 15, 132.
- Villar J., Valladares E., Wojdyla D., Zavaleta N., Carroli G., Velazco A., et al. (2006) Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *Lancet* 367, 1819-1829.
- Wilunda C., Tanaka S., Esamai F. & Kawakami K. (2016) Prenatal anemia control and anemia in children aged 6-23 months in sub-Saharan Africa. *Matern Child Nutr*.
- World Health Organisation (2011) Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System, World Health Organization, Geneva.
- World Health Organisation (2012) WHO recommendations for the prevention and treatment of postpartum haemorrhage. WHO, Geneva.

World Health Organization (2015) WHO Statement on Caesarean Section Rates. WHO, Geneva.

- Ye J., Zhang J., Mikolajczyk R., Torloni M.R., Gulmezoglu A.M. & Betran A.P. (2016) Association between rates of caesarean section and maternal and neonatal mortality in the 21st century: a worldwide population-based ecological study with longitudinal data. *Bjog* **123**, 745-753.
- Zhou Y.B., Li H.T., Zhu L.P. & Liu J.M. (2014) Impact of cesarean section on placental transfusion and iron-related hematological indices in term neonates: a systematic review and metaanalysis. *Placenta* **35**, 1-8.

Tables and Figures

Character	ristic	Frequency	Percent
		(n=45)	
Year of s	urvey		
	2005-2008	9	20.0
	2009-2011	15	33.3
	2012-2015	21	46.7
Income le	evel		
	Low	23	51.1
	Lower middle	17	37.8
	Upper middle	5	11.1
National	Anaemia prevalence in children		
	< 40%	11	24.4
	40-60%	15	33.3
	>60%	19	42.2
Region ^a			
	NA/WA/CA/E	8	17.8
	SSEA	4	8.9
	SSA	28	62.2
	LA&C	5	11.1
National	CD rate		
	> 15%	7	15.6
	5-15%	20	44.4
	< 5%	18	40.0

 Table 1 Characteristics of the included countries

^aModelled on the WHO classification of regions.

NA/WA/CA/E, North Africa/Western Asia/Central Asia/Europe; SSEA, South and South East Asia; SSA, Sub-Saharan

Africa; LA&C, Latin America and the Caribbean; CD, cesarean delivery

	Any anaemia	1	Mild anaemi	a	Moderate/severe a	naemia
	OR (95% CI)	I ²	OR (95% CI)	I ²	OR (95% CI)	I^2
Overall	0.95 (0.86 to 1.06)	40.2%	0.91 (0.81 to 1.02)	24.8%	0.97 (0.85 to 1.11)	47.7%
Region						
NA/WA/CA/E	0.87 (0.69 to 1.11)	44.3%	0.86 (0.66 to 1.11)	33.4%	0.95 (0.74 to 1.22)	27.6%
SSEA	0.86 (0.70 to 1.06)	0.0%	0.92 (0.73 to 1.17)	0.0%	0.89 (0.51 to 1.56)	73.1%
SSA	1.06 (0.89 to 1.27)	42.7%	0.99 (0.81 to 1.22)	32.8%	1.03 (0.84 to 1.27)	49.0%
LA&C	0.86 (0.68 to 1.09)	53.1%	0.85 (0.67 to 1.06)	37.5%	0.90 (0.67 to 1.22)	56.2%
National CD rate						
More than 15%	0.96 (0.84 to 1.10)	38.4%	0.93 (0.80 to 1.08)	25.9%	1.08 (0.89 to 1.33)	49.1%
5-15%	0.92 (0.78 to 1.09)	36.5%	0.89 (0.76 to 1.04)	4.8%	0.91 (0.75 to 1.11)	44.6%
Less than 5%	1.04 (0.78 to 1.37)	49.2%	0.95 (0.69 to 1.31)	43.2%	0.98 (0.71 to 1.34)	51.5%
Anaemia prevalence ^a						
Less than 40%	0.97 (0.82 to 1.15)	51.1%	0.94 (0.76 to 1.16)	58.0%	1.07 (0.94 to 1.22)	0.0%
40-60%	0.99 (0.78 to 1.25)	46.1%	0.91 (0.72 to 1.16)	18.5%	1.00 (0.73 to 1.38)	63.5%
More than 60%	0.92 (0.77 to 1.11)	40.2%	0.89 (0.76 to 1.05)	0.0%	0.89 (0.72 to 1.11)	44.8%
National income level						
Upper middle	1.12 (0.97 to 1.29)	0.0%	1.07 (0.90 to 1.27)	0.0%	1.22 (1.01 to 1.47) ^b	0.0%
Lower middle	0.89 (0.78 to 1.01)	14.1%	0.84 (0.74 to 0.95) ^c	0.0%	0.93 (0.75 to 1.14)	48.5%
Low	0.96 (0.78 to 1.18)	52.1%	0.90 (0.72 to 1.12)	37.8%	0.93 (0.74 to 1.17)	50.6%

 Table 2 Summary odds ratios for the associations between CD and any anaemia, mild anaemia and moderate/severe anaemia

 in children aged under 5 years in low- and middle-income countries stratified by national characteristics

^aIn children aged less than 5 years; ^bP=0.043; ^cp=0.007

The odds ratios are adjusted for region within the country, residence (urban/rural), wealth index, mother's age at childbirth, mother's education, parity, births in the past 5 years, number of antenatal visits, prenatal iron supplementation, prenatal deworming, mother's height, use of biomass for cooking, size of the baby at birth or birth weight, sex of the baby, and child's age in months.

CI, confidence interval; OR, Odds ratio. The other abbreviations are as under Table 1

Covariate	Unadjusted OR (95% CI)	Adjusted ^a OR (95% CI)
National CD rate		
Less than 5%	1	1
5-15%	0.94 (0.69 to 1.29)	0.87 (0.57 to 1.30)
More than 15%	0.99 (0.71 to 1.37)	1.09 (0.58 to 2.07)
Anaemia prevalence		
Less than 40%	1	1
40-60%	1.00 (0.74 to 1.35)	0.82 (0.51 to 1.31)
More than 60%	0.95 (0.71 to 1.25)	0.77 (0.48 to 1.22)
Income level		
Low	1	1
Lower middle	0.98 (0.79 to 1.21)	1.14 (0.77 to 1.67)
Upper middle	1.24 (0.97 to 1.59)	1.34 (0.82 to 2.20)

Table 3 Meta-regression with odds ratios of any degree of anaemia as the dependent variable and national-level caesarean

1 1'	•	1 1	•.		• 1	1 11
dolivory roto	onoomio provo	lance and ner	· consta aroce	notional inco	ma ac indanan	dant variables
UCHVELV LAIE.	מוומכוווומ נתכעמ	יסטרטיב אווער אברי	-Capita gruss	חמווטחמו חוגט	пре ах нисерен	UEHI VAHADIES.
actively race,	and office prove	temee and per	empire groop	man meo	me as maepen	Gente / Gentelores
			1 0			

^aAdjusted for all the three group level covariates plus region and year of survey

CD, cesarean delivery; CI, confidence interval; OR, Odds ratio.

Figure 1 Association between caesarean delivery and any anaemia in children aged under 5 years in low- and middle-income countries

Country	VD (n/N)	CD (n/N)	Odds ratio (95% CI)	% Weight
Armenia	239/694	22/66	0.25 (0.05, 1.32)	0.40
Haiti	1679/2429	72/123	0.39 (0.14, 1.04)	1.03
Guinea	1456/1852	35/51	0.44 (0.08, 2.36)	0.39
SaoTome&P	693/1066	29/49	0.45 (0.19, 1.07)	1.27
Yemen	1925/2144	94/114	0.46 (0.19, 1.08)	1.30
Moldova	289/898	24/80	0.48 (0.24, 0.96)	1.81
Tanzania	2342/3601	102/176	0.51 (0.29, 0.92)	2.33
Zimbabwe	1552/2498	59/108	0.58 (0.31, 1.07)	2.18
Burundi	829/1724	45/117	0.58 (0.27, 1.26)	1.54
Cambodia	1699/2929	106/212	0.66 (0.35, 1.24)	2.05
Bolivia	913/1387	178/346	0.69 (0.47, 1.02)	3.76
BurkinaFaso	3506/3861	68/87	0.72 (0.26, 1.97)	0.99
Mozambique	1872/2717	87/142	0.77 (0.42, 1.40)	2.26
Benin	1246/2001	58/109	0.78 (0.45, 1.35)	2.56
Kyrgyz	1062/2230	59/142	0.78 (0.48, 1.28)	2.91
India	14 179/20 963	1647/2819	0.84 (0.65, 1.09)	5.23
Rwanda	814/2072	118/305	0.85 (0.58, 1.24)	3.89
Honduras	1809/5387	331/1120	0.85 (0.71, 1.02)	6.07
Senegal	1544/1911	67/88	0.87 (0.45, 1.65)	2.02
Lesotho	541/1006	33/58	0.91 (0.37, 2.21)	1.22
Egypt	492/1470	45//15//	0.91 (0.75, 1.11)	5.89
Guyana	371/880	29/83	0.92 (0.44, 1.93)	1.64
Gnana	1053/1460	10//186	0.95 (0.53, 1.71)	2.31
Togo	1412/1869		0.97 (0.54, 1.74)	2.31
Gabon	1224/1837	69/124	0.99 (0.61, 1.60)	3.00
Bangladesn	2547/3900	115/190	1.02 (0.62, 1.66)	2.92
Cameroon	1/41/2649	60/103	1.02 (0.57, 1.84)	2.30
Azerbaijan	409/1100	21/02	1.00 (0.02, 2.16)	1.74
Jordan	883/2421 1060/5000	313/882	1.09 (0.81, 1.40)	4.//
Peru	740/4440	48//14/2	1.11(0.92, 1.35)	5.97
Nepai Giarral agos	/ 10/1440	100/130	1.10 (0.40, 2.97)	0.45
Namibia	2240/2700	70/150	1.23 (0.70, 2.10)	2.40
Cote d'Ivoire	1/07/1917	20/49	1.27 (0.74, 2.10)	2.57
Swaziland	E0E/1100	50/48	1.30 (0.23, 0.30)	1.00
Malawi	1010/2662	74/114	1.40 (0.73, 2.03)	2.00
CongoDR	2547/2002	115/190	1.50 (0.80, 2.85)	2.00
Albania	172/886	43/193	1.51 (0.80, 2.01)	2.00
Ethionia	2772/5220	68/141	2 08 (0 72 5 99)	0.91
Uganda	546/997	38/67	2 11 (0 92 4 82)	1 38
CongoB	1634/2374	67/95	2 16 (1 09 4 27)	1.87
Niger	1993/2429	40/48	2 58 (0 75 8 94)	0.68
Mali	2110/2553	80/103	2.77 (0.60, 12.80)	0.47
Madadascar	1675/3092	29/54	3.41 (0.99, 11.77)	0.69
Gambia	1389/1749	34/46	4.68 (1.42, 15.44)	0.73
Overall (I-squ	ared = 40.2%, p =	0.003)	0.95 (0.86, 1.06)	100.00
NOTE: Weight	ts are from rando	n effects analysis		
		1 25 5 1 5 10		

Figure 1 legend: VD: Vaginal delivery; CD: Caesarean delivery; n: any anaemia cases; N: number of children. Propensity score weighting was used to adjust the odds ratios for region within the country, residence (urban/rural), wealth index, mother's age at childbirth, mother's education, parity, births in the past 5 years, number of antenatal visits, use of iron supplements during pregnancy, use of deworming drugs during pregnancy, mother's height, use of biomass for cooking, size of the baby at birth or birth weight, sex of the baby, and child's age in months. We did not adjust for use of biomass for cooking for some countries either because almost all or no household used this fuel (Burundi, Rwanda, Gabon, Guinea, Madagascar, Malawi, Mali, Sierra Leone, Tanzania, Togo, and Uganda), or data were not collected (Jordan and Egypt). Armenia, Bangladesh, Bolivia, Jordan, Lesotho, and Tanzania did not have data on prenatal deworming. Yemen lacked data on woman's education and Bangladesh lacked data on prenatal iron supplementation.

Figure 2 Association between caesarean delivery and moderate/severe anaemia in children aged under 5 years in low- and middle-income countries

Country	VD (n/N)	CD (n/N)	Odds ratio (95% CI)	% Weigt
Burundi	409/1304	19/91	0.25 (0.08, 0.75)	1.21
SaoTome&P	346/719	11/31	0.26 (0.09, 0.73)	1.29
Armenia	124/579	8/52	0.27 (0.06, 1.10)	0.79
Haiti	920/1670	38/89	0.39 (0.13, 1.12)	1.25
Cambodia	845/2075	54/160	0.46 (0.23, 0.90)	2.36
Yemen	1676/1895	79/99	0.46 (0.19, 1.11)	1.67
Guinea	1030/1426	20/36	0.48 (0.08, 2.82)	0.53
Tanzania	1299/2558	62/136	0.53 (0.28, 0.99)	2.54
Cote d'Ivoire	968/1378	17/35	0.54 (0.18, 1.66)	1.17
Mozambique	1158/2003	46/101	0.61 (0.34, 1.09)	2.78
Moldova	92/701	13/67	0.64 (0.26, 1.55)	1.66
Bolivia	567/1041	106/274	0.66 (0.43, 1.00)	3.68
Zimbabwe	838/1784	37/86	0.70 (0.36, 1.38)	2.36
BurkinaFaso	2875/3230	53/72	0.70 (0.25, 1.98)	1.32
Swaziland	295/899	25/78	0.73 (0.40, 1.31)	2.74
Benin	709/1464	33/84	0.80 (0.43, 1.47)	2.64
Vepal	312/1042	12/55	0.80 (0.30, 2.12)	1.44
ndia	8664/15 448	939/2111	0.81 (0.61, 1.08)	4.59
Senegal	1078/1445	49/70	0.83 (0.43, 1.57)	2.50
Ghana	664/1071	58/137	0.86 (0.47, 1.56)	2.69
Guyana	160/669	13/67	0.91 (0.37, 2.21)	1.64
Lesotho	283/748	13/38	0.92 (0.29, 2.90)	1.12
Kvravz	543/1711	39/122	0.97 (0.60, 1.56)	3.34
Rwanda	348/1606	50/237	0.99 (0.60, 1.62)	3.22
Honduras	638/4216	127/916	0.99 (0.75, 1.32)	4.59
Jordan	396/1934	115/684	0.99 (0.65, 1.52)	3.66
Тодо	916/1373	42/80	- 1.02 (0.53, 1.98)	2.41
Egypt	175/1153	173/1293	1.06 (0.80, 1.39)	4.62
Peru	786/3916	209/1144	1.22 (0.94, 1.59)	4.72
Gabon	659/1272	39/94	1.24 (0.71, 2.17)	2.89
SierraLeone	1545/2065	66/96	1.25 (0.67, 2.31)	2.62
Cameroon	992/1900	35/78	1.40 (0.74, 2.65)	2.52
Vamibia	299/762	44/124	1.46 (0.80, 2.64)	2.71
zerbaijan	184/911	13/48	1.46 (0.58, 3.67)	1.56
lalawi	1171/2015	45/85	1.46 (0.70, 3.06)	2.11
Ibania	61/775	17/167	1.64 (0.75, 3.62)	1.94
Jganda	310/761	21/50	1.67 (0.71, 3.91)	1.74
CongoDR	1561/2914	75/150	• 1.88 (1.02, 3.46)	2.65
Bangladesh	1561/2914	75/150	1.98 (1.10, 3.56)	2.75
Gambia	992/1352	19/31	♦ 2.27 (0.56, 9.22)	0.80
CongoB	896/1636	37/65 I	2.37 (1.11, 5.09)	2.03
Viger	1411/1847	27/35	a 2.48 (0.60, 10.17)	0.79
Mali	1575/2018	58/81	3.33 (0.66, 16.87)	0.62
Ethiopia	1633/4081	36/109	3.51 (1.07, 11.51)	1.06
Madagascar	712/2129	17/42	4.56 (0.97, 21.42)	0.67
Overall (I-squ	ared = 47.7%, p	0.000)	0.97 (0.85, 1.11)	100.0
NOTE: Weight	s are from rand	n effects analysis		
		1 5 1	5 10	

Figure 2 legend: VD: Vaginal delivery; CD: Caesarean delivery; n: moderate/severe anaemia cases; N: number of children. The other details are as provided in Figure 1 legend.

Caesarean delivery and anaemia risk in children in 45 low- and middle-income countries

Supplementary figures

Supplementary Figure S1 Association between caesarean delivery and mild anaemia in children aged under 5 years in 45 low- and middle-income countries

Country	(n/N)	n/N)	Odds ratio (95% CI)	Weig
Guinea	426/822	5/31	0.35 (0.07, 1.86)	0.45
Haiti	759/1509	4/85	0.39 (0.14, 1.11)	1.10
Moldova	197/806	3/74	0.41 (0.18, 0.94)	1.60
Yemen	249/468	5/35	• 0.44 (0.14, 1.35)	0.96
Zimbabwe	714/1660	2/71	0.44 (0.20, 0.98)	1.76
Tanzania	1043/2302	0/114	0.50 (0.24, 1.02)	2.08
Kyrgyz	519/1687	20/103	 0.58 (0.25, 1.36) 	1.60
Cameroon	749/1657	25/68	0.59 (0.30, 1.16)	2.36
Ethiopia	1139/3587	2/105	0.60 (0.13, 2.87)	0.52
SaoTome&P	347/720	8/38	0.68 (0.24, 1.94)	1.10
Gabon	565/1178	30/85	 0.73 (0.38, 1.41) 	2.42
Bolivia	346/820	2/240	0.74 (0.44, 1.24)	3.47
Azerbaijan	275/1002	4/49	- 0.74 (0.33, 1.65)	1.74
Rwanda	466/1724	8/255	0.75 (0.49, 1.14)	4.55
Benin	537/1292	.5/76	- 0.76 (0.39, 1.48)	2.35
Honduras	1171/4749	.04/993	0.78 (0.63, 0.96)	8.28
BurkinaFaso	631/986	5/34	0.80 (0.22, 2.97)	0.72
Egypt	317/1295	284/1404	0.84 (0.66, 1.07)	7.76
Cambodia	854/2084	i2/158	0.86 (0.40, 1.81)	1.95
Togo	496/953	2/70	0.86 (0.43, 1.75)	2.16
Lesotho	258/723	20/45	0.89 (0.34, 2.33)	1.27
India	5515/12299	708/1880 —	0.89 (0.67, 1.19)	6.71
Guyana	211/720	6/70	0.92 (0.34, 2.52)	1.18
Burundi	420/1315	.6/98	0.92 (0.38, 2.24)	1.48
Senegal	466/833	8/39	0.96 (0.35, 2.65)	1.15
CongoDR	986/2339	0/115	0.97 (0.53, 1.75)	2.83
Bangladesh	986/2339	0/115	1.01 (0.56, 1.81)	2.89
Armenia	115/570	4/58	1.04 (0.23, 4.79)	0.54
Mozambique	714/1559	1/96	1.04 (0.45, 2.44)	1.58
Peru	1182/4312	278/1213	1.05 (0.84, 1.32)	7.98
Mali	535/978	2/45	1.05 (0.33, 3.39)	0.89
Namibia	270/733	34/114	1.07 (0.54, 2.14)	2.22
Ghana	389/796	9/128	1.10 (0.42, 2.89)	1.26
Jordan	487/2025	98/767	1.16 (0.82, 1.63)	5.75
SierraLeone	700/1220		1.18 (0.62, 2.26)	2.47
Nepal	406/1136	7/60	1.41 (0.44, 4.50)	0.90
Albania	111/825	26/176	• 1.49 (0.73, 3.04)	2.11
Malawi	647/1491	9/69	1.57 (0.69, 3.57)	1.68
CongoB	738/1478	30/58	1.91 (0.86, 4.27)	1.74
Swaziland	290/894	25/78	2.09 (0.93, 4.70)	1.71
Madagascar	963/2380	2/37	2.53 (0.47, 13.59)	0.45
Uganda	236/687	7/46	2.75 (0.83, 9.12)	0.85
Niger	582/1018	3/21		0.47
Cote d'Ivoire	439/849	3/31	3.13 (0.42, 23.38)	0.32
Gambia	397/757	5/27	10.21 (2.51, 41.62)	0.63
Overall (I-squ	ared = 24.8%,	= 0.070)	0.91 (0.81, 1.02)	100.0
NOTE: Weigh	ts are from ran	m effects analysis		

VD: Vaginal delivery; CD: Caesarean delivery; n: mild anaemia cases; N: number of children. Propensity score weighting was used to adjust for region within the country, residence (urban/rural), wealth index, mother's age at childbirth, mother's education, parity, births in the past 5 years, number of antenatal visits, use of iron supplements during pregnancy, use of deworming drugs during pregnancy, mother's height, use of biomass for cooking, size of the baby at birth or birth weight, sex of the baby, and child's age in months. We did not adjust for use of biomass for cooking for some countries either because almost all or no household used this fuel (Burundi, Rwanda, Gabon, Guinea, Madagascar, Malawi, Mali, Sierra Leone, Tanzania, Togo, and Uganda), or data were not collected (Jordan and Egypt). Armenia, Bangladesh, Bolivia, Jordan, Lesotho, and Tanzania did not have data on prenatal deworming. Yemen lacked data on woman's education and Bangladesh lacked data on prenatal iron supplementation.

Supplementary Figure S2 A funnel plot with pseudo 95% confidence intervals for the relationship between CD and any anaemia in children in 45 low- and middle-income countries.



Note: Results from small studies are scattered widely at the bottom of the graph and the spread narrows among larger studies. In the absence of bias, the plot will resemble a symmetrical, inverted funnel.

Supplementary Figure S3 Association between the national income level and the log odds ratio for anaemia in children under 5 years in 45 low- and middle-income countries



The graph shows a fitted regression line together with circles representing the estimates from each country; the size of each circle indicates the precision of each estimate. For every one US\$ increase in national income, the odds ratio for anaemia is multiplied by 1.00 (p=0.096)

Supplementary Figure S4 Caesarean delivery and any anaemia risk in children aged under 2 years in 45 low- and middle-income countries

Country	VD (n/N)	CD (n/N)	Odds ratio (95% CI)	% Weigh
Armenia	142/278	12/30	0.07 (0.01, 0.47)	0.63
Guinea	794/944	22/27	0.27 (0.03, 2.22)	0.52
SaoTome&P	396/509	15/22	0.34 (0.09, 1.25)	1.22
Yemen	1004/1082	51/56	0.34 (0.09, 1.32)	1.16
BurkinaFaso	1824/1923	33/40	0.37 (0.07, 1.82)	0.86
Mozambique	1170/1505	38/60	0.40 (0.18, 0.91)	2.39
Zimbabwe	900/1221	35/51	0.44 (0.17, 1.16)	1.91
laiti	966/1176	40/55	0.50 (0.17, 1.51)	1.58
Burundi	551/976	32/68	0.51 (0.19, 1.38)	1.87
Bolivia	528/658	96/153	0.55 (0.30, 1.01)	3.34
Cambodia	914/1231	68/107	0.61 (0.27, 1.37)	2.46
Benin	675/1011	32/53	0.66 (0.29, 1.51)	2.41
Vamibia	342/504	40/69	0.70 (0.34, 1.42)	2.84
Bangladesh	1593/2296	79/116	0.70 (0.33, 1.49)	2.66
Gabon	756/1016	39/60	0.79 (0.37, 1.65)	2.73
Swaziland	404/610	38/58	0.84 (0.43, 1.65)	3.05
Albania	83/292	20/57		2 28
(vravz	636/1105	34/63		2 62
Equat	304/664	315/827	• 0.00 (0.11, 1.00)	5 55
Joldova	165/398	17/30	0.02 (0.11, 1.21)	1 53
ameroon	1127/1524	40/63	0.30 (0.31, 2.30)	2 50
Zwanda	180/050	76/142		2.00
Sonogal	409/909 860/101 <i>1</i>	34/40		1 65
Jonduroo	11/1/2/12	211/451		5.55
ndia	7221/01/5	211/431		5.55
agetho	211/400	16/00		0.10
lordon	511/499	202/426		4 70
Fore	769/009	202/420		4.70
l ugu Doru	1165/1012	44/J7 226/565		Z.34 5 24
Peru	1105/1912	320/303		3.34
Suyana	234/410	17/35		1.50
onana	548/687	55/80		1.73
anzania	1404/1893	70/93	1.41 (0.71, 2.80)	2.97
SierraLeone	1136/1335	49/57	1.59 (0.55, 4.56)	1.70
Vepal	399/576	21/32	1.68 (0.52, 5.41)	1.45
Azerbaijan	248/498	23/35		1.61
ote d'Ivoire	820/958	17/23		0.62
CongoDR	1593/2296	/9/116		3.46
/lalawi	1086/1389	45/56		2.03
thiopia	1599/2451	41/69	2.38 (0.79, 7.16)	1.59
Jganda	380/593	25/34	2.58 (0.85, 7.83)	1.57
CongoB	996/1253	41/49	2.89 (0.98, 8.57)	1.63
/ladagascar	917/1449	14/21	3.54 (0.68, 18.34)	0.82
liger	1140/1318	23/24	4.13 (0.43, 39.72)	0.46
Aali	1136/1288	40/44	9.54 (1.52, 59.95)	0.68
Sambia Overall (I-sou	893/1049 ared = 45.4%	15/16 n = 0.001)	→ 33.59 (3.40, 332.01) 1 01 (0.86 1 18)	0.45
	te are from ror	r = 0.001		100.0
NOTE. Weight		uom enecis analysis		

VD: Vaginal delivery; CD: Caesarean delivery; n: any anaemia cases; N: number of children. Other details are as presented in Supplementary Figure S1 legend

Supplementary Figure S5 Caesarean delivery and mild anaemia risk in children aged under 2 years in 45 low- and middle-income countries

Country	VD (n/N)	CD (n/N)	Odds ratio (95% CI)	% Weigł
BurkinaFaso	247/346	6/13	0.18 (0.03, 1.22)	0.67
Guinea	204/354	10/15	0.27 (0.03, 2.10)	0.57
Armenia	64/200	8/26	0.33 (0.05, 2.03)	0.73
Mozambique	391/726	13/35	0.36 (0.11, 1.19)	1.54
Zimbabwe	364/685	9/25	0.36 (0.10, 1.31)	1.37
Namibia	141/303	14/43	0.40 (0.17, 0.93)	2.76
Haiti	369/579	14/29	0.48 (0.13, 1.73)	1.38
/emen	98/176	7/12	0.49 (0.09, 2.53)	0.87
Cameroon	453/850	14/37	0.54 (0.21, 1.34)	2.40
Gabon	325/585	15/36	0.57 (0.21, 1.54)	2.14
Bolivia	162/292	33/90 -	0.58 (0.24, 1.37)	2.62
SaoTome&P	159/272	8/15	0.59 (0.12, 2.88)	0.93
(vravz	281/750	10/39	0.67 (0.18, 2.47)	1.34
esotho	135/323	7/14	0.68 (0.11, 4.11)	0.73
Renin	276/612	14/35	0.00 (0.11, 4.11)	2.00
Sambodia	363/680	30/69		1 75
avnt	178/538	179/691	0.81 (0.59, 1.12)	7.74
-gypt Burundi	270/605	19/55	0.81 (0.35, 1.12)	1 60
Aoldova	111/312	9/24	0.87 (0.20, 2.33)	1.05
Rwanda	255/725	41/107	0.88 (0.49, 1.57)	4.57
londuras	684/1056	118/358	0.00 (0.45, 1.37)	9.12
lbonio	604/1950 50/250	12/40	0.91 (0.07, 1.23)	0.13
	30/239	12/49		2.07
	2409/4333	320/000		0.73
	341/340 501/1229	16/24		1.30
Sweetland	170/076	13//390		2.40
Swazilanu	170/376	17/37	1.14 (0.53, 2.45)	3.10
anzania	567/1056	21/44	1.19 (0.48, 2.98)	2.39
thiopia	603/1455	17/45	1.20 (0.25, 5.76)	0.95
ogo	223/363	19/32	1.24 (0.47, 3.27)	2.20
Suyana	125/307	9/27	1.28 (0.30, 5.54)	1.08
senegal	236/390	8/14 -	1.30 (0.27, 6.33)	0.94
vepai	204/381	11/22	1.33 (0.39, 4.51)	1.49
ordan	263/843	125/349	1.39 (0.85, 2.28)	5.42
CongoDR	599/1302	27/64	1.44 (0.75, 2.77)	3.93
Bangladesh	599/1302	27/64	1.50 (0.78, 2.88)	3.92
zerbaijan	131/381	12/24	1.52 (0.50, 4.64)	1.74
Aali	275/427	11/15	1.92 (0.48, 7.74)	1.18
Shana	171/310	20/45	1.97 (0.38, 10.31)	0.86
CongoB	392/649	15/23	2.00 (0.59, 6.80)	1.48
/lalawi	344/647	17/28	2.22 (0.61, 7.99)	1.37
ladagascar	465/997	5/12 -	2.52 (0.25, 25.45)	0.46
Jganda	159/372	11/20	3.67 (0.83, 16.33)	1.04
liger	300/478	5/6	4.91 (0.37, 65.93)	0.37
Cote d'Ivoire	220/358	5/11	5.74 (0.55, 59.35)	0.45
Gambia	249/405	8/9	► 105.38 (10.29, 1079.18)	0.45
Overall (I-squ	ared = 25.2%	p = 0.066)	0 .98 (0.83, 1.14)	100.0
OTE: Weigh	ts are from rai	dom effects analysis		

VD: Vaginal delivery; CD: Caesarean delivery; n: mild anaemia cases; N: number of children. Other details are as presented in Supplementary Figure S1 legend

Supplementary Figure S6 Caesarean delivery and moderate/severe anaemia risk in children aged under 2 years in 45 low- and middle-income countries

Armenia 78/214 4/22 0.05 (0.01, 0.42) 0.75 SaoTome&P 237/350 7/14 0.20 (0.05, 0.86) 1.38 Burund 237/350 7/14 0.22 (0.05, 0.86) 1.38 Guinea 5907/40 12/17 0.23 (0.08, 1.29) 1.66 Marcambique 0.32 (0.08, 1.29) 0.48 0.32 (0.08, 1.29) 1.48 BurkinaFaso 1577/1676 27/34 0.49 (0.18, 1.32) 2.22 Cambodia 55/868 38/77 0.44 (0.18, 1.32) 2.22 Cambodia 56/867 26/41 0.44 (0.18, 1.32) 2.27 Cambodia 56/868 38/77 0.44 (0.22, 1.06) 2.87 Beinin 39/735 18/39 0.64 (0.30, 1.36) 3.00 Swaziland 23/4/40 21/41 0.44 (0.22, 1.06) 2.82 Cote d'voire 0.67 (0.14, 3.16) 1.25 2.72 2.02 Swaziland 32/4/2 8/45 0.67 (0.14, 3.16) 2.82 Swaziland 32/4/40 2.141 0.44 (0.30, 2.16) 2.84 Namibia 201/363 2.653	Country	(n/N)	(n/N)	Odds ratio (95% CI)	Weigh
SarTome&P 237/50 7/14 02/1003 24/077 08/21 02/1003 2.62 0.66 138 Guinea 580/740 12/17 Guinea 580/740 12/14 Guinea 580/740 12/14 Guinea 382/42 64/45 Guinea 382/42 64/45 Guinea 382/42 64/45 Guinea 281/740 21/14 Guinea 481/77/301 Guinea 481/77/301 Guinea 487/742 93/333 Guinea 487/742 93/333 Guinea 580/740 12/18 Guinea 387/1326 49/72 Guinea 457/729 93/333 Guinea 580/24 11/20 Guinea 11/20 Gui	Armenia	78/214	4/22	0.05 (0.01, 0.42)	0.79
Burundi 2817/06 13/49 0.24 (007, 0.89) 162 Guinaa 590/740 12/17 0.27 (0.03, 2.62) 0.66 BurkineFaso 1577/1676 27/34 0.32 (0.03, 1.96) 1.17 Mozambique 55/0867 26/42 0.44 (0.00, 2.64 Zimbabwe 55/0867 26/42 0.49 (0.22, 1.00) 2.67 Hait 597/807 26/41 0.65 (0.16, 1.59) 1.99 Bolivia 396/496 63/120 0.65 (0.26, 1.54) 2.52 Benin 399/735 18/39 0.66 (0.26, 1.54) 2.58 Swaziland 33/242 8/45 0.67 (0.25, 2.27) 2.02 Stanegal 201/41 0.65 (0.25, 2.27) 2.02 Gale divoire 600/738 12/18 0.67 (0.25, 2.27) 2.02 Stanegal 201/63 2.6/55 0.92 (0.40, 2.13) 2.27 Maiti 4912/6736 517/865 0.97 (0.43, 2.16) 2.26 Moldova 55/0268 8/21 0.97 (0.61, 1.59) 1.22 Moldova 55/0268 8/21 0.97 (0.61, 1.59) 1.22 Moldova 55/0268 8/21 0.97 (0.61, 1.59) 1.22 Moldova 55/0268 8/21 0.97 (0.62, 2.27) 2.02 Gale divoire 600/738 12/18 0.97 (0.61, 1.59) 1.22 Moldova 55/026 2.47/18 2.465 0.97 (0.43, 2.16) 2.26 Gibon 431/891 2.445 0.97 (0.43, 2.16) 2.26 Gibon 431/891 2.445 0.97 (0.43, 2.16) 2.26 Moldova 55/026 8/21 0.10 (0.43, 2.16) 2.06 Galon 431/891 2.445 0.97 (0.43, 2.16) 2.06 Hodi 4912/6736 517/865 0.10 (0.73, 1.51) 4.55 Togo 545/828 8/21 1.10 (0.45, 2.26) 3.55 Togo 545/828 8/21 1.10 (0.45, 2.26) 3.55 Togo 545/828 8/21 1.10 (0.44, 2.26) 1.77 Cameroon 674/1071 2.6/49 1.16 (0.59, 3.16) 2.72 Lesotho 17/67.04 9/16 1.12 (0.34, 4.20) 1.77 Cameroon 674/1071 2.6/49 1.36 (0.59, 3.16) 2.72 Lesotho 17/67.684 9/16 1.12 (0.43, 4.20) 1.74 Maiawi 742/1045 2.8/39 CongoDR 994/1697 5.279 1.88 Banjaldesh 994/1697 5.279 1.88 Banjaldesh 994/1697 5.279 1.88 Banjaldesh 994/1697 5.279 1.58 Banjaldesh 994/1697 5.279 1.	SaoTome&P	237/350	7/14	0.20 (0.05, 0.86)	1.38
Guinea 500/740 12/17 0.27 (0.03, 2.62) 0.66 Yemen 906/984 4449 0.33 (0.08, 1.29) 1.46 BurkmaFaso 507/1676 27/34 0.42 (0.18, 1.00) 2.66 Mozambique 779/1114 25/47 0.42 (0.18, 1.00) 2.67 Camboolia 551/868 38/77 0.49 (0.18, 1.59) 1.94 Bolivia 366/867 26/41 0.49 (0.18, 1.59) 1.94 Bolivia 366/866 63/120 0.56 (0.16, 1.59) 1.94 Bolivia 366/46 63/120 0.54 (0.28, 1.00) 3.53 Swaziland 23/4/44 21/41 0.64 (0.29, 1.00) 3.53 Swaziland 23/4/74 36/55 0.90 (0.31, 2.56) 2.13 Jordan 261/341 77/101 0.97 (0.60, 1.56) 4.06 Jordan 261/41 77/201 0.97 (0.64, 2.16) 3.06 Gabon 431/651 57/865 1.05 (0.73, 1.51) 4.55 Grana 27/7516 35/60 1.10 (Burundi	281/706	13/49	0.24 (0.07, 0.89)	1.62
Yernen 906/84 4/4/9 0.32 (0.08, 1.29) 1.48 BurkinaFaso 1577/1676 27/3 0.39 (0.08, 1.96) 1.17 Maxambique 53/857 26/42 0.49 (0.22, 1.08) 2.27 Cambodia 55/867 26/42 0.49 (0.22, 1.08) 2.27 Cambodia 55/867 26/41 0.49 (0.22, 1.08) 2.27 Baiti 55/867 26/41 0.51 (0.16, 1.59) 1.94 Bolivia 396/396 63/120 0.54 (0.22, 1.09) 2.55 Swaziland 23/4/40 21/41 0.64 (0.30, 1.36) 3.00 Cote d'ovire 0.0738 12/18 0.67 (0.14, 3.16) 1.22 Albania 33/242 8/45 0.76 (0.14, 3.16) 1.22 Albania 33/242 8/45 0.97 (0.66, 1.56) 4.00 Sonegal 22/4778 26/32 0.97 (0.66, 1.56) 4.00 Jordan 25/841 1.02 (0.44, 2.16) 3.04 Jordan 23/704 35/101 1.05 (0.73, 1.10	Guinea	590/740	12/17	0.27 (0.03, 2.62)	0.66
BurkinaFaso 1577/1676 2734 Mozambique 759/1114 25/47 Cambooli 551/868 38/77 Hati 551/868 38/77 Hati 551/868 38/77 Hati 551/868 38/77 Hati 366/496 63/120 Benin 396/496 63/120 Cote d'lovin 406/108, 132) 227 O.49 (0.18, 1.00) 2.66 O.51 (0.16, 1.59) 1.94 O.51 (0.16, 1.59) 1.92 Swaziland 23/4/40 21/41 O.67 (0.41, 3.16) 1.22 Albania 33/242 8/45 O.90 (0.31, 2.56) 2.07 O.90 (0.31, 2.56) 2.07 O.90 (0.31, 2.56) 2.07 O.97 (0.60, 1.55) 4.00 O.97 (0.60, 3.216) 2.77 Jordan 261/841 77/301 O.97 (0.60, 3.216) 2.62 Kyrgyz 355/824 24/53 Inoia 41/26736 517/865 O.97 (0.61, 3.56) 4.00 Syaziland 23/4/74 35/101 Inoia 41/26736 35/60 Inoia 41/26736 35/767 Inoia 41/26736 2.73 Inoia 41/26736 2.73 Inoia 41/26736 2.73 Inoia 41/26736 2.73 Inoi 0.62, 2.169 Inoi 0.63, 1.60 Inoi 0.63, 1.60	Yemen	906/984	44/49	0.32 (0.08, 1.29)	1.49
Mazambique 779/1114 25/47 Cambodia 55/1868 38/77 Cambodia 55/1868 38/77 Hali 597/807 26/41 Bolivia 399/735 18/39 Swaziland 23/4/40 21/141 Cost of Uvire 600/738 12/18 Albania 33/242 8/45 Core divoire 600/738 12/18 Core divoire 61/19 2/445 Core divoire 61/19 2/49 Core divoire 61/19 2/49	BurkinaFaso	1577/1676	27/34	0.39 (0.08, 1.96)	1.17
Zimbalwe 536/857 26/42 0.49 (0.18, 1.32) 227 Haliti 597/807 26/41 0.49 (0.22, 1.08) 287 Haliti 597/807 26/41 0.51 (0.16, 1.59) 1.94 Bolivia 366/496 63/120 0.53 (0.29, 1.00) 3.53 Swaziland 234/440 21/41 0.64 (0.30, 1.36) 3.00 Core d'Noire 600/738 12/18 0.67 (0.14, 3.16) 1.22 Albania 33/242 8/45 0.76 (0.25, 2.27) 2.02 Senegal 62/4778 26/32 0.90 (0.31, 2.56) 2.13 Amibia 201/363 26/55 0.90 (0.31, 2.56) 2.13 Jordan 261/841 77/301 0.97 (0.60, 1.56) 4.00 Gabon 431/691 24/45 0.97 (0.60, 1.56) 4.00 Syzy 355/824 24/53 0.97 (0.60, 1.56) 4.00 Styry 355/824 24/53 0.97 (0.60, 1.56) 4.00 Shara 377/516 35/65 1.06 (0.73, 1.51) 4.55 Holdova 59/265 8/21 1.10 (0.48, 2.16) 3.00 Hondia 4612/6736 517/865 Togo 545/685 25/38 1.19 (0.47, 2.98) 2.48 Honduras 457/172 9.3333 1.19 (0.83, 1.71) 4.54 Honduras 457/172 9.3333 1.19 (0.82, 2.57) 1.55 Honduras 457/173 2.64 Honduras 457/172 9.3333 1.19 (0.82, 2.57) 1.55 Honduras 457/172 9.3333 1.19 (0.83, 1.71) 4.54 Honduras 457/172 9.3333 1.19 (0.82, 2.57) 1.55 Honduras 457/172 9.26 Honduras 457/172 9.274 (1.44, 2.22) 3.11 Hondu 4.14 (2.22, 1.74) 0.64 Honduras 457/172 9.274 (1.44, 2.22) 3.11 Hondu 4.14 (1.22, 3.90) 0.00 Hondu 4.148(0 0.78) 4.34 Honduras 457/172 9.274 (1.44, 5.22) 3.11 Hondu 4.14(1.42, 2.28) 0.90 Hondu 4.148(0 0.78) 4.144 (1.22) 4.24 Honduras 457/173 0.16, 4.28 Honduras 457/173 0.16, 4.28	Mozambique	779/1114	25/47	0.42 (0.18, 1.00)	2.64
Cambodia 551/868 38/77 Haiti 557/807 26/41 Bolivia 366/496 63/120 0.54 (0.29, 1.00) 3.53 Benin 399/735 18/39 Waziland 234/440 6.030, 1.36 0.66 (0.30, 1.36) 1.25 Swaziland 23/4/44 0.30, 1.45 Cote d'hvire 600/738 12/18 Albania 33/422 4/45 Senegal 624/778 26/32 Namibia 201/363 26/55 0.92 (0.40, 2.13) 2.77 Jordan 201/363 26/55 Moldova 59/285 8/21 1.02 (0.48, 2.16) 2.86 Senegal 624/778 24/35 Moldova 59/285 8/21 1.12 (0.31, 4.10) 1.62 Cambod 21/744 35/101 Tago 54/5685 25/38 Honduras 457/1729 93/333 Cambod 234/744 35/101 Tago 54/685 25/38 Honduras 457/1729 93/333 Cambod 21/741 26/49 Lesotho 176/364 9/16 Peru 576/1432 10/21 2.04 (0.52, 8.27) 2.02 2.03 (0.55, 7.67) 1.86 Algo (0.59, 3.16) 2.77 1.12 (0.31, 4.10) 1.62 2.05 (0.55, 7.67) 1.86 Cambod 224/743 31/101 Cameroon 674/1071 26/49 Lesotho 176/364 9/16 Peru 575/94 33/41 Uganda 221/434 14/23 Napal 195/372 10/21 2.04 (0.52, 8.27) 2.02 CongoDR 994/1697 52/89 Bangladesh 996/1848 24/52 Madagascar 4456 (0.53, 30.04) 0.77 Moldagascar 4456 (0.54, 30.04) 0.95	Zimbabwe	536/857	26/42	0.49 (0.18, 1.32)	2.27
Haiti 597/807 26/41 Bolivia 398/735 18/39 Swaziland 234/440 21/41 Cote d'Noire Swaziland 234/440 21/41 Cote d'Noire Steragal 62/4778 26/32 Steragal 62/478 Steragal 62/478 26/32 Steragal 62/478 Steragal 62/478 26/32 Steragal 62/478 Steragal 62/478 26/32 Steragal 62/478 Steragal 62/478 Stera	Cambodia	551/868	38/77	0.49 (0.22, 1.08)	2.87
Bolivia 366/496 63/120 Benin 399/735 18/39 Swaziland 234/440 21/41 O.64 (0.20, 1.36) 3.00 Crite divoire 600/738 12/18 Johania 33/242 8/45 Senegal 624/778 26/32 Namibia 201/363 26/55 Jordan 25/824 24/53 Jordan 26/1841 77/301 Jordan 261/841 77/301 Jordan 27/516 35/60 Holdova 59/265 8/21 Lis (0.73, 1.51) 455 Jordan 2377/516 35/60 Holdova 59/265 8/21 Lis (0.62, 2.15) 3.50 Jordan 2347/04 35/101 Jordan 2447/04 35/101 Jordan 2447/32 Jordan 199/218 8/26 Jordan 199/218 8/26 Jordan 199/218 8/26 Jordan 24480 Jordan 2447/20 Jordan 224/434 14/23 Jordan 199/218 8/26 Jordan 2447/34 Jordan 2447/32 Jordan	Haiti	597/807	26/41	0.51 (0.16, 1.59)	1.94
Benin 399/735 18/39 Benin 399/735 18/39 Octo divoire 600/738 12/18 Octo divoire 600/738 12/17 Octo divoire 600/73 Octo divoire 600/73 Oc	Bolivia	366/496	63/120	0.54 (0.29, 1.00)	3.53
Swaziland 234/440 21/41 Cote d'lvoire 600/738 12/18 Albania 33/242 8/45 Senegal 624/778 26/32 Jordan 261/841 77/301 Gabon 431/691 24/45 O.97 (0.43, 216) 1.25 Gabon 431/691 24/45 O.97 (0.43, 2.16) 2.26 Gabon 431/691 24/45 O.97 (0.43, 2.16) 2.26 Shana 377/516 35/60 Hold va 59/265 8/21 Hold va 59/268 Hold va 4/400 Hal Walawi 742/1045 28/39 Congob R 94/1697 52/89 Z74 (1.44, 5.22) 3.42 Hold va 4.54 (0.53, 3.90.4) 0.55 Hold Va 4.54 (0.53, 3.90.4) 0.55 Hold Va 4.54 (0.53, 3.90.4) 0.55 Hold Va 4.52 8/33 Hold Va 4.54 (0.53, 3.90.4) 0.55 Hold Va 4.52 8/33 Hold Va 4.54 (0.53, 3.90.4) 0.55 Hold Va 4.52 8/33 Hold Va 4.52 8/33 Hold V	Benin	399/735	18/39	0.63 (0.26, 1.54)	2.58
Cate d'ivoire 600/738 12/18 0.67 (0.14, 3.16) 1.22 Senegal 624/778 26/32 0.90 (0.31, 2.58) 2.13 Namibia 201/363 26/55 0.92 (0.40, 2.13) 2.74 Namibia 201/363 26/55 0.92 (0.40, 2.13) 2.74 Uproved 11/365 26/32 0.97 (0.43, 2.16) 2.68 Kyrgyz 355/824 24/53 0.97 (0.43, 2.16) 2.68 Kyrgyz 357/81 357 (0.75, 3.22) 3.11 Uganda 221/434 14/23 0.901 0.96 Feru 574/1321 169/408 1.48 (1.03, 2.14) 4.55 Tanzania 837/1326 49/72 1.22 Uganda 221/434 14/23 0.901 0.96 Kaerbaijan 117/367 11/23 0.901 0.96 Ethiopia 994/1697 52/89 Ethiopia 996/1848 24/52 4.59 CongoDR 904/861 26/34 0.76 CongoDR 904/861 26/34	Swaziland	234/440	21/41	0.64 (0.30, 1.36)	3.00
Albania 33/242 8/45 0./6 (0.25, 22/) 2/0 Senegal 62/4778 26/32 0.90 (0.31, 2.58) 2.13 Namibia 201/363 26/55 0.92 (0.40, 2.13) 2.74 Jordan 261/841 77/301 0.97 (0.43, 2.16) 2.86 Gabon 431/691 24/45 0.97 (0.43, 2.16) 2.86 Kyrgyz 355/824 24/53 1.02 (0.44, 2.16) 3.04 India 4812/6736 517/865 1.05 (0.73, 1.51) 4.55 Koldova 59/265 8/21 1.12 (0.31, 4.10) 1.62 Koyana 109/291 8/26 1.19 (0.45, 2.68) 2.46 Honduras 457/1729 93333 1.19 (0.47, 2.98) 2.46 Honduras 457/1729 93333 1.19 (0.47, 2.98) 2.46 Cameroon 67/1071 26/49 1.24 (0.36, 4.26) 1.74 Cameroon 67/1071 26/49 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.82 (0.62, 5.7) 2.05 Uganda 221/434 14/23 2.33 (0.	Cote d'Ivoire	600/738	12/18	0.67 (0.14, 3.16)	1.25
Senegal 024/178 20/32 Jordan 261/841 77/301 Gabon 431/691 24/45 Jordan 261/841 77/301 Gabon 431/691 24/45 Gabon 431/691 24/45 Uganda 21/26736 517/865 Ghana 377/516 35/60 1.05 (0.73, 1.51) 4.55 Ghana 377/516 35/60 1.00 (0.48, 2.16) 3.50 Togo 545/685 25/38 1.19 (0.47, 2.98) 2.48 Hoduras 24/704 35/101 1.19 (0.47, 2.98) 2.48 Hoduras 457/1729 93/333 Guyana 109/291 8/26 Cameroon 674/1071 26/49 Lesotho 176/364 9/16 Peru 574/1321 169/408 Tanzania 837/1326 49/72 Lesotho 176/326 9/72 Tanzania 837/1326 49/72 Lesotho 176/377 10/21 Azerbaijan 117/367 11/23 Gambia 644/800 7/8 Nepal 195/372 10/21 Azerbaijan 644/800 7/8 Sengal 64/800 7/8 Sengal 994/1697 52/89 Bangladesh 994/1697 52/89 David Bangladesh 994/1697 52/89 Bangladesh 994/1697 52/89 Banglade	Albania	33/242	8/45	0.76 (0.25, 2.27)	2.02
Naminia 20/1363 20/55 0.92 (0.40, 2.13) 2.14 Gabon 431/691 24/45 0.97 (0.43, 2.16) 2.86 Kyrgyz 355/824 24/53 1.02 (0.48, 2.16) 3.04 India 4412/6756 1.05 (0.73, 1.51) 4.56 Ghana 377/516 35/60 1.10 (0.45, 2.68) 2.57 Moldova 59/265 8/21 1.12 (0.31, 4.10) 1.65 Kwanda 234/704 35/101 1.15 (0.68, 2.15) 3.50 Togo 545/685 25/38 1.19 (0.47, 2.98) 2.48 Honduras 457/1729 93/333 1.19 (0.83, 1.71) 4.56 Cuyana 109/291 8/26 1.24 (0.36, 4.26) 1.74 Cameroon 74/1071 26/49 1.48 (0.33, 2.14) 4.55 Tanzania 837/1326 49/72 1.56 (0.75, 3.22) 3.11 SierraLeone 795/994 3/3/11 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 2.04 (0.52, 8.06) 1.50 Azerbaijan 117/367 11/23 2.04 (0.52, 8.06)	Senegal	624/778	26/32	0.90 (0.31, 2.58)	2.13
Jordani 2010ani 2010ani 2010ani 2010ani 2017	Namibia	201/363	20/55	0.92 (0.40, 2.13)	2.74
Gabolini 431091 2443 0.37 (0.43, 2.16) 2.04 Midia 4812/6736 517/865 3.04 India 4812/6736 517/865 3.04 Moldova 59/265 8/21 1.10 (0.45, 2.68) 2.57 Rwanda 234/704 35/101 1.15 (0.62, 2.15) 3.50 Togo 545/685 25/38 1.19 (0.83, 1.71) 4.56 Guyana 109/291 8/26 1.24 (0.36, 4.26) 1.74 Cameroon 674/1071 26/49 1.45 (0.23, 9.01) 0.96 Peru 574/1321 169/408 1.48 (10.03, 2.14) 4.55 Tanzania 837/1326 49/72 1.55 (0.75, 3.22) 3.11 Sierraleone 795/994 3.341 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.82 (0.62, 5.37) 2.06 Sambia 64/4800 7/8 2.33 (0.84, 6.47) 2.20 CongoDR 94/1697 52/89 2.74 (1.39, 5.39) 3.02 Bangladesh 94/1697 52/89 3.83 (0.34, 43.45) 0.96	Cohon	201/041	24/45	0.97 (0.00, 1.30)	4.09
Nyg2 303/024 24/3 1.02 (0.40, 2.10) 3.04 India 4812/673 517/865 1.00 (0.40, 2.10) 3.55 Ghana 377/516 35/60 1.00 (0.45, 2.68) 2.57 Moldova 59/265 8/21 1.10 (0.45, 2.68) 2.57 Moldova 59/265 8/21 1.12 (0.31, 4.10) 1.65 Togo 545/685 25/38 1.19 (0.47, 2.98) 2.48 Honduras 457/1729 93/333 1.19 (0.47, 2.98) 2.48 Guyana 109/291 8/26 1.24 (0.36, 4.26) 1.74 Cameroon 674/1071 26/49 1.36 (0.59, 3.16) 2.72 Lesotho 176/364 9/16 1.45 (0.23, 9.01) 0.96 Peru 574/1721 169/408 1.48 (1.03, 2.14) 4.55 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.88 Nepal 195/372 10/21 2.06 (0.55, 7.67) 1.55 Gambia 644/800 7/8 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.44, 5.22)	Gabon	431/091	24/43	0.97 (0.43, 2.10)	2.00
Anda 40 (2010) 5 (100) 1000 40 (2010) 40	ndia	4812/6736	517/865	1.05 (0.73, 1.51)	J.04 4 55
Analitik 51/16/5 8/21 Rwanda 234/704 35/101 1.12 (0.31, 4.10) 1.65 Rwanda 234/704 35/101 1.15 (0.62, 2.15) 3.50 Togo 545/685 25/38 1.19 (0.47, 2.98) 2.48 Honduras 457/1729 93/333 1.19 (0.47, 2.98) 2.48 Guyana 109/291 8/26 1.24 (0.36, 4.26) 1.74 Cameroon 674/1071 26/49 1.36 (0.59, 3.16) 2.72 esotho 176/364 9/16 1.45 (0.23, 9.01) 0.96 Peru 574/1321 169/408 1.48 (10.3, 2.14) 4.55 Tanzania 837/1326 49/72 1.55 (0.75, 3.22) 3.11 Sierraleone 795/994 33/41 4.20 4.56 1.56 (0.55, 7.67) 1.58 Jganda 21/434 14/23 2.04 (0.52, 8.06) 1.55 0.59, 5.97) 1.89 Valawi 742/1045 28/39 2.04 (0.52, 8.06) 1.52 0.40 2.23 (0.21, 21.74) 0.44 Congo DR 994/1697 52/89 2.74 (1.44, 5.22)	Ghana	377/516	35/60	1 10 (0 45, 2 68)	2 57
Rivanda 234/704 35/101 1.15 (0.62, 2.15) 3.50 Togo 545/685 25/38 1.19 (0.47, 2.98) 2.48 Honduras 457/1729 93/333 1.19 (0.83, 1.71) 4.54 Guyana 109/291 8/26 1.45 (0.59, 3.16) 2.72 Lesotho 176/364 9/16 1.45 (0.59, 3.16) 2.72 Lesotho 176/364 9/16 1.45 (0.59, 3.16) 2.72 SieraLeone 795/94 33/41 1.87 (0.59, 5.97) 1.88 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.88 Vepal 195/372 10/21 2.04 (0.52, 8.06) 1.50 Sambia 644/800 7/8 2.13 (0.21, 21.74) 0.64 Walawi 742/1045 28/39 2.74 (1.39, 5.39) 3.30 CongoDR 994/1697 52/89 3.49 3.43 1.93 Siger 80/1018 18/19 3.39 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 3.9.04) 0.73 Walawi 742/1045 28/34 <	Moldova	59/265	8/21	1 12 (0 31 4 10)	1.62
Togo 545/685 25/38 1.19 (0.47, 2.98) 2.48 Honduras 457/1729 93/333 1.19 (0.47, 2.98) 2.48 Guyana 109/291 8/26 1.74 Cameroon 674/1071 26/49 1.36 (0.59, 3.16) 2.72 esotho 176/364 9/16 1.45 (0.23, 9.01) 0.96 Peru 574/1321 169/408 1.48 (1.03, 2.14) 4.55 Tanzania 837/1326 49/72 3.11 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.88 2.04 (0.52, 8.06) 1.50 Vepal 195/372 10/21 2.04 (0.52, 8.06) 1.50 Azerbaijan 117/367 11/23 2.04 (0.52, 8.06) 1.50 Gambia 644/800 7/8 2.33 (0.84, 647) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 3.49 (1.09, 11.16) 1.88 Niger 80/1013 29/33 3.49 (1.09, 11.16) 1.88 Madagagacar 4	Rwanda	234/704	35/101	1.15 (0.62, 2.15)	3.50
Honduras 457/1729 93/333 1.19 (0.83, 1.71) 4.54 Guyana 109/291 8/26 1.24 (0.36, 4.26) 1.74 Cameroon 674/1071 26/49 1.36 (0.59, 3.16) 2.72 Lesotho 176/364 9/16 1.45 (0.23, 9.01) 0.96 Peru 574/1321 169/408 1.45 (0.23, 9.01) 0.96 Tanzania 837/1326 49/72 1.55 (0.75, 3.22) 3.11 SierraLeone 795/994 33/41 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.88 Nepal 195/372 10/21 2.04 (0.52, 8.06) 1.50 Azerbaijan 117/367 11/23 2.04 (0.52, 8.06) 1.50 Gambia 644/800 7/8 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Egypt 126/486 136/648 3.49 (1.09, 11.16) 1.88 CongoDS 604/861 26/34 3.49 (1.09, 11.16) 1.88 Niger 840/1018 18/19	Τοαο	545/685	25/38	1.19 (0.47, 2.98)	2.48
Guyana 109/291 8/26 1.24 (0.36, 4.26) 1.74 Cameroon 674/1071 26/49 1.36 (0.59, 3.16) 2.72 Lesotho 176/364 9/16 1.45 (0.23, 9.01) 0.96 Peru 574/1321 169/408 1.48 (1.03, 2.14) 4.55 SierraLeone 795/994 33/41 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.88 Nepal 195/372 10/21 2.05 (0.55, 7.67) 1.56 Azerbaijan 117/367 11/23 2.05 (0.55, 7.67) 1.58 Gambia 644/800 7/8 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 2.74 (1.44, 5.22) 3.42 Kiger 840/1018 18/19 3.03 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 3.09 (0.53, 38.04) 0.73 Madagascar 452/984 9/16 4.64 (0.77, 8.36) 0.90 Madagascar 452/984 9/16	Honduras	457/1729	93/333	1.19 (0.83, 1.71)	4.54
Cameroon 674/1071 26/49 1.36 (0.59, 3.16) 2.72 Lesotho 176/364 9/16 1.45 (0.23, 9.01) 0.96 Peru 574/1321 169/408 1.48 (1.03, 2.14) 4.55 Tanzania 837/1326 49/72 1.55 (0.75, 3.22) 3.11 SierraLeone 795/994 33/41 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.88 Nepal 195/372 10/21 2.04 (0.52, 8.06) 1.50 Azerbaijan 117/367 11/23 2.05 (0.55, 7.67) 1.58 Gambia 644/800 7/8 2.13 (0.21, 21.74) 0.64 Malawi 742/1045 28/39 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.44, 5.22) 3.42 Bangladesh 994/1697 52/89 3.83 (0.34, 43.45) 0.55 Ethiopia 996/1848 24/52 3.49 (1.09, 11.16) 1.88 Madagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Madagascar 452/984 9/1	Guyana	109/291	8/26	1.24 (0.36, 4.26)	1.74
Lesotho 176/364 9/16 Peru 574/1321 169/408 Tanzania 837/1326 49/72 Uganda 221/434 14/23 Uganda 221/434 14/23 Uganda 221/434 14/23 Nepal 195/372 10/21 Azerbaijan 117/367 11/23 Gambia 644/800 7/8 Malawi 742/1045 28/39 CongoDR 994/1697 52/89 Bangladesh 994/1697 52/89 CongoDB 604/861 26/34 Niger 840/1018 18/19 Ethiopia 996/1848 24/52 Madagascar 452/984 9/16 Mai 861/1013 29/33 Overall (I-squared = 51.3%, p = 0.000) NOTE: Weights are from random effects analysis	Cameroon	674/1071	26/49	1.36 (0.59, 3.16)	2.72
Peru 574/1321 169/408 1.48 (1.03, 2.14) 4.55 Tanzania 837/1326 49/72 1.55 (0.75, 3.22) 3.11 SierraLeone 795/994 33/41 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.89 Nepal 195/372 10/21 2.04 (0.52, 8.06) 1.55 Azerbaijan 117/367 11/23 2.05 (0.55, 7.67) 1.58 Gambia 644/800 7/8 2.13 (0.21, 21.74) 0.64 Malawi 742/1045 28/39 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.49, 5.22) 3.42 Bangladesh 994/1697 52/89 2.74 (1.44, 5.22) 3.42 CongoDB 604/861 26/34 3.02 (0.97, 9.44) 1.93 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Madagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Madagascar 451/013 29/33	Lesotho	176/364	9/16	1.45 (0.23, 9.01)	0.96
Tanzania 837/1326 49/72 1.55 (0.75, 3.22) 3.11 SieraLeone 795/994 33/41 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.89 Nepal 195/372 10/21 2.04 (0.52, 8.06) 1.55 Xzerbaijan 117/367 11/23 2.05 (0.55, 7.67) 1.58 Gambia 644/800 7/8 2.13 (0.21, 21.74) 0.64 Malawi 742/1045 28/39 2.33 (0.84, 6.47) 2.205 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 94/1697 52/89 2.74 (1.44, 5.22) 3.42 Kiger 840/1018 18/19 3.6648 3.49 (1.09, 11.16) 1.88 CongoB 604/861 26/34 3.83 (0.34, 43.45) 0.55 Miadagascar 452/984 9/16 4.54 (0.53, 39.04) 0.73 Madagascar 452/984 9/16 4.54 (0.53, 39.04) 0.73 Madagascar 452/984 9/16 4.51 (0.74, 28.80) 0.96 Madagascar 452	Peru	574/1321	169/408	1.48 (1.03, 2.14)	4.55
SierraLeone 795/994 33/41 1.82 (0.62, 5.37) 2.06 Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.88 Nepal 195/372 10/21 2.04 (0.52, 8.06) 1.50 Azerbaijan 117/367 11/23 2.04 (0.52, 8.06) 1.50 Gambia 644/800 7/8 2.13 (0.21, 21.74) 0.64 Malawi 742/1045 28/39 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 2.74 (1.44, 5.22) 3.42 CongoB 604/861 26/34 3.02 (0.97, 9.44) 1.93 Niger 840/1018 18/19 3.69 (1.09, 11.16) 1.88 Ethiopia 996/1848 24/52 4.54 (0.53, 38.04) 0.73 Madagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Matagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Matagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Moti 861/1013 29/33 </td <td>Tanzania</td> <td>837/1326</td> <td>49/72</td> <td>1.55 (0.75, 3.22)</td> <td>3.11</td>	Tanzania	837/1326	49/72	1.55 (0.75, 3.22)	3.11
Uganda 221/434 14/23 1.87 (0.59, 5.97) 1.88 Nepal 195/372 10/21 2.04 (0.52, 8.06) 1.50 Azerbaijan 117/367 11/23 2.05 (0.55, 7.67) 1.58 Gambia 644/800 7/8 2.03 (0.24, 21.74) 0.64 Malawi 742/1045 28/39 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 2.74 (1.44, 5.22) 3.42 Egypt 126/486 136/648 3.02 (0.97, 9.44) 1.93 CongoD & 604/861 26/34 3.03 (0.34, 43.45) 0.59 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Madagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Malii 861/1013 29/33 11.77 (1.77, 78.36) 0.90 NOTE: Weights are from random effects analysis 10.07 10.01 100	SierraLeone	795/994	33/41	1.82 (0.62, 5.37)	2.06
Nepal 195/372 10/21 2.04 (0.52, 8.06) 1.50 Azerbaijan 117/367 11/23 2.05 (0.55, 7.67) 1.58 Gambia 644/800 7/8 2.13 (0.21, 21.74) 0.64 Valawi 742/1045 28/39 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 2.74 (1.44, 5.22) 3.42 Egypt 126/486 136/648 3.02 (0.97, 9.44) 1.93 CongoDB 604/861 26/34 3.49 (1.09, 11.16) 1.88 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Wadagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Wali 861/1013 29/33 11.77 (1.77, 78.36) 0.90 NOTE: Weights are from random effects analysis 100 107 (0.88, 1.30) 100	Jganda	221/434	14/23	- 1.87 (0.59, 5.97)	1.89
Azerbaijan 117/367 11/23 2.05 (0.55, 7.67) 1.58 Gambia 644/800 7/8 2.13 (0.21, 21.74) 0.64 Valawi 742/1045 28/39 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 2.74 (1.44, 5.22) 3.42 Egypt 126/486 136/648 3.02 (0.97, 9.44) 1.93 CongoDB 604/861 26/34 3.49 (1.09, 11.16) 1.88 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Walagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Wali 861/1013 29/33 11.77 (1.77, 78.36) 0.90 NOTE: Weights are from random effects analysis 100 107 (0.88, 1.30) 100	Nepal	195/372	10/21	2.04 (0.52, 8.06)	1.50
Gambia 644/800 7/8 2.13 (0.21, 21.74) 0.64 Malawi 742/1045 28/39 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 2.74 (1.44, 5.22) 3.42 Egypt 126/486 136/648 3.02 (0.97, 9.44) 1.93 CongoDB 604/861 26/34 3.49 (1.09, 11.16) 1.88 Viger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Walagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Wali 861/1013 29/33 11.77 (1.77, 78.36) 0.90 NOTE: Weights are from random effects analysis 100 100 100	Azerbaijan	117/367	11/23	2.05 (0.55, 7.67)	1.58
Walawi /4/2/1045 28/39 2.33 (0.84, 6.47) 2.20 CongoDR 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 2.74 (1.49, 5.22) 3.42 Egypt 126/486 136/648 3.02 (0.97, 9.44) 1.93 CongoB 604/861 26/34 3.49 (1.09, 11.16) 1.88 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.58 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Walagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Wali 861/1013 29/33 11.77 (1.77, 78.36) 0.99 Overall (I-squared = 51.3%, p = 0.000) 10.07 (0.88, 1.30) 100 NOTE: Weights are from random effects analysis 100 107 10.88, 1.30) 100	Gambia	644/800	7/8	2.13 (0.21, 21.74)	0.64
CongoD K 994/1697 52/89 2.74 (1.39, 5.39) 3.30 Bangladesh 994/1697 52/89 2.74 (1.39, 5.39) 3.32 Egypt 126/486 136/648 3.02 (0.97, 9.44) 1.93 CongoB 604/861 26/34 3.02 (0.97, 9.44) 1.83 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Madagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Wali 861/1013 29/33 11.77 (1.77, 78.36) 0.90 Dverall (I-squared = 51.3%, p = 0.000) 10.07 (0.88, 1.30) 100 NOTE: Weights are from random effects analysis 10.71 1.77 (0.88, 1.30) 100	Malawi	742/1045	28/39	- 2.33 (0.84, 6.47)	2.20
Sangacoesni 994/1097 52/89 2.74 (1.44, 5.22) 3.42 Egypt 126/486 136/648 30.02 (0.97, 9.44) 1.93 CongoB 604/861 26/34 3.49 (1.09, 11.16) 1.88 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ehiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Madagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Vali 861/1013 29/33 11.77 (1.77, 78.36) 0.90 Overall (I-squared = 51.3%, p = 0.000) 1.07 (0.88, 1.30) 100.	CongoDK	994/1697	52/89	2.74 (1.39, 5.39)	3.30
Egypt 120/400 100/040 3.02 (0.97, 9.44) 1.93 CongoB 604/861 26/34 3.49 (1.09, 11.16) 1.88 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Madagascar 452/984 9/16 4.61 (0.74, 28.80) 0.90 Voreall (I-squared = 51.3%, p = 0.000) 11.77 (1.77, 78.36) 0.90 NOTE: Weights are from random effects analysis 1.07 (0.88, 1.30) 100.	∃angladesh	994/1697		2.74 (1.44, 5.22)	3.42
Congob 604/061 20/34 3.49 (1.09, 11.16) 1.00 Niger 840/1018 18/19 3.83 (0.34, 43.45) 0.59 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Madagascar 452/984 9/16 4.61 (0.74, 28.80) 0.90 Mali 861/1013 29/33 11.77 (1.77, 78.36) 0.90 Overall (I-squared = 51.3%, p = 0.000) 1.07 (0.88, 1.30) 100.	=gypt CongoD	126/486	136/648	3.02 (0.97, 9.44)	1.93
Wiger 0.40/1016 10/15 3.63 (0.34, 43.45) 0.95 Ethiopia 996/1848 24/52 4.54 (0.53, 39.04) 0.73 Wadagascar 45/2984 9/16 4.61 (0.74, 28.80) 0.96 Mali 861/1013 29/33 11.77 (1.77, 78.36) 0.90 Overall (I-squared = 51.3%, p = 0.000) 10.77 (0.88, 1.30) 100 NOTE: Weights are from random effects analysis 100 107	Nigor	004/001 840/1019	18/10	3.49 (1.09, 11.16)	1.00
Allogita 25/1040 24/32 4.34 (0.33, 39.04) 0.13 Wadagascar 452/984 9/16 4.61 (0.74, 28.80) 0.96 Mali 861/1013 29/33 11.77 (1.77, 78.36) 0.90 Overall (I-squared = 51.3%, p = 0.000) 10.07 (0.88, 1.30) 100 NOTE: Weights are from random effects analysis 100	Thionia	040/1010	24/52		0.59
Mali Solution Solution <th< td=""><td>Madagascar</td><td>452/984</td><td>9/16</td><td>4.54 (0.55, 59.04)</td><td>0.73</td></th<>	Madagascar	452/984	9/16	4.54 (0.55, 59.04)	0.73
Overall (I-squared = 51.3%, p = 0.000) Image: squared = 51.3\%, p = 0.0000) Image: squared = 51.3\%, p = 0.000)	Mali	861/1013	29/33	11 77 (1 77 78 36)	0.90
NOTE: Weichts are from random effects analysis	Overall (I-squ	ared = 51.3%,	= 0.000)	1.07 (0.88, 1.30)	100.0
	NOTE: Weight	s are from ran	om effects analysis		

VD: Vaginal delivery; CD: Caesarean delivery; n: moderate/severe anaemia cases; N: number of children. Other details are as presented in Supplementary Figure S1 legend

Supplementary Figure S7 Caesarean delivery and any anaemia risk in children aged 2-5 years in 45 low- and middle-income countries

Cole d'Ivoire 587/859 13/25 0.23 (0.06, 0.94) Moldova 124/527 7/50 0.24 (0.09, 0.67) Elhiopia 13/276 2.28 (0.05, 1.52) 0.23 (0.06, 0.94) Haiti 71/1322768 2.28 (0.05, 1.52) 0.23 (0.08, 1.65) Vernen 921/1052 43/85 0.33 (0.08, 1.69) SarOme&P 278/748 13/49 0.56 (0.11, 1.35) Burundi 278/748 13/49 0.56 (0.21, 1.45) Guyana 137/464 12/48 0.68 (0.39, 1.17) Krygiz 426/1125 25/79 0.56 (0.21, 1.45) Guyana 137/464 12/48 0.68 (0.39, 1.17) Krygiz 426/1125 25/79 0.68 (0.39, 1.17) Krygiz 426/1125 25/79 0.77 (0.23, 1.65) Cambodia 785/1969 38/105 0.77 (0.23, 1.65) Cambodia 65/1277 24/57 0.76 (0.35, 1.65) Lesotho 23/507 17/35 0.76 (0.35, 1.65) Lesotho 23/507 17/36 0.77 (0.58, 1.	Country	VD (n/N)	CD (n/N)				Odds ratio (95% CI)	% Weigł
Moldova 124/627 7/50 0.24 (0.09, 0.67) Ehiopia 1179/2769 29/61 0.29 (0.13, 0.66) Haiti 7117/2753 32/68 0.30 (0.08, 1.09) Azerbaija 0.21 (0.08, 1.45) 0.30 (0.08, 1.45) Burund 221/1062 43/58 0.50 (0.15, 1.20) SaoTome&P 297/57 14/27 0.55 (0.21, 1.45) Guyana 137/464 12/453 0.66 (0.38, 1.71) Kyrgyz 426/1125 25/79 0.66 (0.38, 1.30) Cambodia 78/7(898 38/105 0.77 (0.22, 1.65) Ghana 505/773 52/106 0.77 (0.23, 1.65) Zambodia 78/1689 38/105 0.77 (0.23, 1.65) Ghana 505/773 52/106 0.77 (0.23, 1.65) Cambodia 78/1698 38/105 0.77 (0.22, 22) Hoidia 68/2974 120/669 0.78 (0.58, 1.00) Bolivia 38/5729 82/193 0.78 (0.58, 1.01) Bolivia 38/5729 82/193 0.99 (0.32, 2.66) SierraLeone 10.99 (0.32, 2.66) 0.99 (0.32, 2.66) <td< td=""><td>Cote d'Ivoire</td><td>587/859</td><td>13/25</td><td>•</td><td></td><td></td><td>0.23 (0.06, 0.94)</td><td>0.73</td></td<>	Cote d'Ivoire	587/859	13/25	•			0.23 (0.06, 0.94)	0.73
Ehiopia 1173/2769 2772 0.28 (0.06, 1.52) Enizyana 93/1708 2783 32/83 0.29 (0.26, 1.52) Haiti 713/1253 32/83 0.29 (0.26, 1.52) Vermen 92/17082 42/81 32/83 0.20 (0.08, 1.09) Azerbaijan 211/888 4/27 0.30 (0.08, 1.09) Azerbaijan 211/888 4/27 0.30 (0.08, 1.09) SaoTome&P 27/757 14/27 0.50 (0.16, 1.78) SaoTome&P 27/757 14/27 0.55 (0.21, 1.45) Guyana 137/464 12/48 0.66 (0.28, 1.52) Gyana 137/464 12/48 0.66 (0.28, 1.52) Cambodia 785/1698 38/105 0.70 (0.28, 1.65) Cambodia 785/1698 38/105 0.70 (0.72, 2.22) Easotho 230/607 17/35 0.70 (0.72, 2.22) Honduras 668/2974 120/669 0.77 (0.27, 2.22) Bolivia 3857/29 82/193 0.77 (0.27, 2.22) Bolivia 3857/29 82/193 0.98 (0.56, 1.04) India 668/2914 120/669 0.99 (0.32, 2.66) Bolivia 3857/29 82/193 0.98 (0.56, 1.16) Cambod 14/125 20/40 0.99 (0.32, 2.65) Derv 0.030/3166 16/1657 0.99 (0.42, 1.16) Cambod 16/4/125 20/40 0.99 (0.32, 2.65) Derv 0.030/3168 16/1657 0.99 (0.47, 2.07) Malawi 732/1273 29/58 0.91 (0.46, 1.88) SierraLoone 1109/1430 60/62 0.90 (0.38, 2.90) Bolivia 359/1317 111/456 0.91 0.90 (0.32, 2.56) Bongladesh 95/4/604 367/4 0.99 (0.47, 2.47) Malawi 732/1273 29/58 0.91 (0.46, 2.53) Bongladesh 95/4/604 367/4 0.99 (0.47, 2.48) Nger 853/1111 17/24 0.55 7.9 Nger 853/1111 17/24 0.56 7.9 CampOD 638/122 2.640 0.99 (0.33, 2.97) Mozambigue 702/121 2.486 0.9 1.29 (0.47, 2.48) Nger 853/1111 17/24 0.55 7.9 1.29 (0.48, 0.40) 1.29 (0.42, 2.59) Mozambigue 702/121 2.486 0.9 1.29 (0.47, 4.80) NDE: Weights are from random effects analysis	Moldova	124/527	7/50	•	1		0.24 (0.09, 0.67)	1.32
Tanzania 938/1708 3283	Ethiopia	1173/2769	27/72	•			0.28 (0.05, 1.52)	0.52
Halti 713/1253 32/68 0.30 (0.08, 1.09) Yernen 921/1082 43/58 0.50 (0.18, 1.35) Burundi 2707/48 13/49 0.53 (0.16, 1.78) Burundi 2707/48 13/49 0.53 (0.16, 1.78) Burundi 2707/48 13/49 0.53 (0.16, 1.78) Guyana 137/464 12/48 0.64 (0.25, 1.62) Guyana 137/464 12/48 0.68 (0.39, 1.17) Kyrgyz 426/1125 25/79 0.69 (0.36, 1.30) Cambodia 756/1638 33/105 0.77 (0.27, 2.22) Cambodia 756/1638 33/405 0.77 (0.27, 2.22) Essente 200/57 17/35 52/106 0.77 (0.27, 2.22) Essente 200/57 17/35 52/106 0.77 (0.27, 2.22) Essente 200/57 17/35 52/106 0.77 (0.27, 2.22) Honduras 665/2174 12/150 0.77 (0.27, 2.22) Essente 200/57 17/35 0.77 (0.27, 2.22) Essente 200/57 17/35 0.77 (0.27, 2.22) Essente 200/57 17/35 0.77 (0.27, 2.22) Essente 200/58, 1.10) India 6658/11818 101/1634 0.79 (0.58, 1.04) Engline 662/908 13/24 0.99 (0.47, 2.07) Essente 103/3186 161/357 0.99 (0.47, 2.07) Essente 103/3186 162/1383 35/47 0.99 (0.47, 2.07) Essente 103/3186 162/1383 35/47 0.99 (0.47, 2.07) Essente 103/3186 162/1383 35/47 0.99 (0.47, 2.48) Essente 103/3186 162/138 35/47 0.99 (0.47, 2.48) Essente 103/3186 162/1383 35/47 0.99 (0.47, 2.48) Essente 103/3186 162/1383 35/47 0.99 (0.47, 2.48) Essente 103/3186 162/1383 35/47 0.99 (0.47, 2.48) Essente 103/3186 162/138 35/47 0.99 (0.47, 2.48) Essente 103/3186 17/3 0.90 (0.47, 2.48) Essente 103/3186 17/3 0.90 (0.47, 2.48) Essente 103/3186 17/3 0.90 (0.47, 4.50) Essente 103/3186 17/3 0.90 (0.47, 4.50) Essente 103/318 0.90 (0.47, 4.50) Essente 103/318/32 0.90 (0.47, 4.50) Esse	Tanzania	938/1708	32/83 -	•			0.29 (0.13, 0.66)	1.92
Azerbaijan 211/688 4/27 Warenen 921/1062 4/5/8 0.50 (0.18, 1.36) Burundi 278/748 13/49 0.53 (0.16, 1.78) SaoTome&P 297/557 14/27 Guyana 137/464 12/48 0.64 (0.25, 1.62) Guyana 325/1113 42/163 Kwanda 325/1113 42/163 Cambodia 785/1698 38/105 Ghana 505/773 52/106 Chabdia 785/1698 38/105 Cambodia 785/1898 38/105 Cambodia 785/1898 38/105 Cambodia 785/1990 20/56 Cambodia 142/750 Cambodia 142/750 Cambodia 142/750 Cambodia 142/750 Cambodia 142/750 Cambodia 142/750 Cambodia 142/752 Cambodia 399/1317 111456 Cambodia 399/1317 111456 Cambodia 399/1317 111456 Cambodia 954/1604 36/74 1.08 (0.47, 2.48) Niger 853/1111 17/24 Cabon 468/221 29/8 Mozambique 702/1212 49/82 Madagascar 786/1643 36/74 1.22 (0.68, 2.29) Maria 974/126 40/59 Maria 974/127 (0.64, 2.280) Capodia 83/121 26/66 Cambodia 18/1579 12/45 Capodia 22/758 38/89 Albania 89/594 23/136 Cambodia 18/1579 12/45 Cambodia 18/1579 12/4	Haiti	713/1253	32/68	•			0.30 (0.08, 1.09)	0.87
Yernen 921/1022 43/58 0.50 (0.18, 1.35) Burundi 278/748 13/49 0.53 (0.16, 1.78) SacTome&P 297/557 14/27 0.55 (0.21, 1.45) Guyana 137/464 12/48 0.66 (0.28, 1.62) Kwanda 325/113 42/163 0.68 (0.39, 1.17) Kyrgyz 426/1125 25/79 0.69 (0.38, 1.30) Cambodia 785/1698 38/105 0.70 (0.23, 1.65) Shenegal 68/4897 3/348 0.76 (0.28, 1.65) India 958/11818 810/1634 0.77 (0.27, 2.22) Honduras 68/2974 120/669 0.78 (0.65, 1.04) India 958/11818 810/1634 0.79 (0.58, 1.10) Bolivia 385/729 82/193 0.85 (0.62, 1.16) Guinea 662/908 13/24 0.99 (0.39, 2.08) Togo 64/4961 30/55 0.99 (0.39, 2.08) Benin 571/990 26/56 0.99 (0.39, 2.08) Cameroon 1109/1430 60/82 0.39 (0.47, 2.07) Malay 954/1604 36/74 1.02 (0.63, 2.26)	Azerbaijan	211/688	4/27	•			0.33 (0.08, 1.45)	0.68
Burundi 278/748 13/49 0.53 (0.16, 1.78) SaoTom&P 297/557 14/27 0.55 (0.21, 1.45) Suyana 325/113 42/163 0.66 (0.38, 1.10) Yigyz 426/1125 25/79 0.69 (0.38, 1.30) Cambodia 785/1698 38/105 0.70 (0.29, 1.65) Dinabawe 652/1277 24/57 0.76 (0.35, 1.65) Senegal 684/897 33/48 0.76 (0.35, 1.65) Senegal 684/897 33/48 0.76 (0.25, 1.61) Jointa 569/713 52/106 0.77 (0.27, 2.22) Horiz 668/2974 120/669 0.77 (0.27, 2.22) Horiz 385/729 82/133 0.76 (0.35, 1.16) Suinea 662/908 13/24 0.96 (0.62, 1.16) Suinea 662/908 13/24 0.96 (0.22, 2.66) Peru 803/3166 161/857 0.97 (0.45, 1.86) Suinea 662/908 10.08 (0.47, 2.07) 0.86 (0.62, 2.16) Suinea 662/904 10.08 (0.47, 2.48) 0.99 (0.47, 2.74)<	Yemen	921/1062	43/58				0.50 (0.18, 1.35)	1.36
BarTome&P 297/557 14/27 0.55 (0.21, 1.46) Suyana 137/464 12/48 0.64 (0.25, 1.62) Wanda 325/1113 42/163 0.68 (0.39, 1.17) Y(ryy 426/1125 25/79 0.69 (0.38, 1.30) Combodia 755/1698 38/105 0.77 (0.22, 1.65) Shana 505/773 52/106 Zimbabwe 652/1277 24/57 0.72 (0.31, 1.66) Senegal 668/2974 120/669 0.78 (0.58, 1.10) noduras 668/2974 120/669 0.78 (0.58, 1.10) noduras 668/2974 120/669 0.78 (0.58, 1.10) Solivia 385/729 82/193 0.64 (0.55, 1.65) Sameo 614/1918 10/1634 0.90 (0.32, 2.66) Sent 0.57 (0.22, 1.16) Sunea 662/908 13/24 0.90 (0.32, 2.66) Sent 0.57 (0.25, 1.16) Sunea 662/908 13/24 0.90 (0.32, 2.68) Sent 0.57 (0.27, 1.22) Sameo 614/1915 20/40 0.99 (0.47, 2.14) Mali 974/1265 0/40 0.99 (0.47, 2.14) Sunina 639/1317 1114/56 SieraLeone 1109/1430 60/82 Mali 974/1265 40/59 Sunina 652/1027 22/52 Sangladesh 954/604 36/74 Uger 853/1111 17/24 3abon 468/821 30/64 3angladesh 954/604 36/74 Uger 162/1333 0.577 CongoB 638/112 26/46 Sangladesh 954/604 36/74 Uger 453/1111 17/24 3abon 468/821 30/64 3angladesh 954/604 36/74 122 (0.66, 2.25) 3angladesh 954/604 36/74 122 (0.64, 2.50) Jganda 116/279 12/45 3angladesh 954/604 36/74 122 (0.66, 2.55) 3angladesh 954/604 36/74 122 (0.64, 2.50) Jganda 118/779 12/45 3angladesh 954/604 36/74 122 (0.64, 2.50) Jganda 118/679 12/45 223 (0.33, 5.37) Watai 89/594 23/136 Wambia 227/528 38/89 Wambia 39/594 23/136 Wambia 496/700 19/30 Wazambique 4 22.6%, p = 0.093)	Burundi	278/748	13/49				0.53 (0.16, 1.78)	0.98
Juyana 137/464 12/48 Wanda 325/1113 42/163 Wanda 325/1113 42/163 Gyrgyz 426/1125 25/79 Jamba 050773 52/106 Jinhan 55/173 0.70 (0.29, 1.65) Jamba 652/1277 24/67 Zimbalwe 652/1277 24/67 Seengal 68/4/897 3/48 Seenda 230/507 17/35 Holia 668/2974 120/669 Juinea 668/2974 120/669 Juinea 662/908 13/24 Opgo 644/961 30/55 Jurian 359/1317 111/456 JongoDR 96/4/961 30/65 JongoDR 96/4/961 30/62 Jongala 108/042 103 (0.67, 1.56) JongoDR 96/4/961 30/62 103 (0.67, 1.56) JongoDR 96/4/961 30/62 103 (0.62, 2.50) JongoDR 96/4/1044 3/33 129 (0.49, 3.40) Wali 319/87/2 8/40 122 (0.66, 2.25)	SaoTome&P	297/557	14/27	•			0.55 (0.21, 1.45)	1.43
Nwanda 325/1113 42/163 0.68 (0.39, 1.77) Syrgyz 426/125 25/79 0.69 (0.36, 1.30) Sambodia 505/773 52/106 0.71 (0.25, 1.45) Sinaa 505/773 52/106 0.71 (0.25, 1.45) Sinaa 505/773 52/106 0.77 (0.25, 1.45) Sinaa 505/773 52/106 0.77 (0.25, 1.45) Sinaa 668/2974 120/669 0.77 (0.27, 2.22) Ionduras 698/11818 810/1634 0.79 (0.58, 1.04) Jolivia 355/729 22/133 0.84 (0.51, 1.36) Suinea 662/908 13/24 0.90 (0.32, 2.56) Fogo 614/125 20/40 0.99 (0.32, 2.56) Samood 614/125 20/40 0.99 (0.32, 2.56) Cordo 614/125 20/40 0.99 (0.32, 2.56) Samood 614/125 20/40 0.99 (0.47, 2.07) Vali 73/1273 29/58 1.00 (0.47, 1.45) Jordan 359/1317 111/456 1.03 (0.57, 1.56)	Guyana	137/464	12/48				0.64 (0.25, 1.62)	1.57
Syrgyz 426/1125 25/79 0.69 (0.36, 1.30) Cambodia 785/1698 38/105 0.70 (0.29, 1.65) Shana 505/773 52/106 0.77 (0.25, 1.45) Zimbabwe 652/1277 24/57 0.72 (0.23, 1.65) Shenegal 664/897 33/48 0.77 (0.27, 2.22) Hondras 668/2974 120/669 0.78 (0.58, 1.04) Jolivia 385/729 82/193 0.84 (0.51, 1.36) Sunea 662/906 142/750 0.85 (0.62, 1.16) Sunea 662/908 13/24 0.99 (0.32, 2.56) Cogo 644/961 30/55 0.90 (0.32, 2.56) Sunea 662/908 13/24 0.99 (0.47, 2.07) Valawi 32/1273 29/58 0.99 (0.47, 2.07) Valawi 359/1317 111/456 1.03 (0.63, 2.00) Valai 974/1265 40/59 1.00 (0.47, 2.48) Viger 853/1111 17/24 1.29 (0.49, 3.40) Sangladesh 166/24 30/64 1.29 (0.49, 3.40)	Rwanda	325/1113	42/163		▶┼┼		0.68 (0.39, 1.17)	3.58
Dambodia 785/1698 38/105 0.70 (0.29, 1.65) Shana 505/773 52/106 0.71 (0.35, 1.45) Cimbabwe 652/1277 24/57 0.76 (0.35, 1.45) Senegal 684/897 33/48 0.76 (0.35, 1.65) seotho 230/507 17/35 0.77 (0.27, 222) Honduras 668/2974 120/669 0.77 (0.27, 222) Honduras 668/2974 120/669 0.78 (0.58, 1.04) Opioi 355/729 82/193 0.84 (0.51, 1.36) Sigypt 188/806 142/750 0.85 (0.62, 1.16) Suna 662/908 13/24 0.90 (0.32, 2.08) Feru 803/3186 161/857 0.94 (0.71, 1.25) Sameroon 161/41125 20/40 0.99 (0.47, 2.47) ValkinaFaso 168/19138 55/72 0.94 (0.71, 1.25) Sameroon 1109/1430 60/82 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.67, 2.48) Wiger 853/1111 17/724 1.08 (0.32, 2.09) Jabon 46/821 36/74 1.22 (0.66, 2.25)	Kyrgyz	426/1125	25/79		●┼┼━		0.69 (0.36, 1.30)	2.89
Shana 505/773 52/106 0.71 (0.35, 1.45) Zimbabwe 652/1277 24/57 0.72 (0.31, 1.65) Senegal 684/897 33/48 0.76 (0.25, 1.65) -esotho 230/507 17/35 0.77 (0.27, 2.22) ionduras 668/2974 120/669 0.78 (0.58, 1.04) odia 6958/11818 810/1634 0.79 (0.58, 1.16) Solinea 662/808 142/750 0.85 (0.62, 1.16) Suinea 662/806 142/750 0.85 (0.62, 1.16) Suinea 662/806 13/24 0.90 (0.32, 2.56) Fogo 644/961 30/55 0.94 (0.71, 1.25) Samin 571/990 26/56 0.91 (0.45, 1.88) Paru 803/3166 161/857 0.94 (0.71, 1.25) Carmeroon 614/1125 20/40 0.99 (0.47, 2.07) Valawi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.53, 1.60) SierraLeone 1109/1430 60/82 1.03 (0.53, 2.00) Valiei 95/4/1604 36/74 1.22 (0.66, 2.25)	Cambodia	785/1698	38/105		• •		0.70 (0.29, 1.65)	1.76
Zimbalwe 652/1277 24/57 0.72 (0.31, 1.65) Senegal 684/897 33/48 0.76 (0.35, 1.65) esotho 230/507 17/35 0.77 (0.27, 2.22) 4nduras 668/2974 120/669 0.78 (0.58, 1.04) nolia 958/11818 810/1634 0.79 (0.58, 1.10) Solivia 385/729 82/193 0.84 (0.51, 1.36) Solivia 36/55 0.90 (0.32, 2.56) 0.90 (0.32, 2.56) Fogo 64/961 30/55 0.99 (0.47, 2.07) Valakwi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 35/1317 111/456 1.03 (0.53, 2.00) Vilger 853/1111 17/24 1.22 (0.66, 2.25) Jangladesh 954/604 36/74 1.22 (0.66, 2.25) <td>Ghana</td> <td>505/773</td> <td>52/106</td> <td></td> <td>+ +</td> <td></td> <td>0.71 (0.35, 1.45)</td> <td>2.45</td>	Ghana	505/773	52/106		+ +		0.71 (0.35, 1.45)	2.45
Senegal 64/897 33/48 0.76 (0.35, 1.65) Lesotho 230/507 17/35 0.77 (0.27, 2.22) India 658/2974 120/669 0.78 (0.58, 1.04) Solivia 385/729 82/193 0.78 (0.58, 1.10) Solivia 385/729 82/193 0.84 (0.51, 1.36) Suinea 662/2908 13/24 0.90 (0.32, 2.56) Soninea 662/908 13/24 0.90 (0.39, 2.08) Seneroon 614/1125 20/40 0.90 (0.39, 2.08) Seneroon 614/1125 20/40 0.99 (0.47, 2.07) Valawi 73/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.67, 1.56) SierraLeone 109/1430 60/74 1.08 (0.39, 2.97) Congol Sta/1604 36/74 1.08 (0.39, 2.97) 1.08 (0.39, 2.97) Congol Sta/1604 36/74 1.02 (0.66, 2.25) 1.02 (0.66, 2.25) Jagnladesh 954/604 36/74 1.22 (0.66, 2.25) Jagnladesh 954/604 1.23	Zimbabwe	652/1277	24/57		+ +		0.72 (0.31, 1.65)	1.86
esectho 230/507 17/35 0.77 (0.27, 2.22) Honduras 668/2974 120/669 0.78 (0.58, 1.04) Jolivia 385/729 82/193 0.84 (0.51, 1.36) Solivia 385/729 82/193 0.84 (0.51, 1.36) Solivia 385/729 82/193 0.84 (0.51, 1.36) Solivia 385/729 82/193 0.86 (0.62, 1.16) Solivia 30/55 0.90 (0.39, 2.08) Solivia 30/55 0.90 (0.39, 2.08) Senin 571/990 26/56 0.91 (0.45, 1.88) Peru 803/3166 161/857 0.94 (0.71, 1.25) Zameroon 614/1125 20/40 0.99 (0.47, 2.07) Valaiwi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.63, 2.00) Valiger 853/1111 17/24 1.08 (0.47, 2.48) Niger 853/1111 17/24 1.27 (0.64, 2.50) Jangladesh 95/4604 36/74 1.27 (0.64, 2.50) Jangladesh	Senegal	684/897	33/48		•		0.76 (0.35, 1.65)	2.09
Honduras 668/2974 120/669 0.78 (0.58, 1.04) notia 6958/11818 810/1634 0.79 (0.58, 1.10) Solivia 357/29 82/193 0.84 (0.51, 1.36) Egypt 188/806 142/750 0.85 (0.62, 1.16) Suinea 662/908 13/24 0.90 (0.32, 2.56) Fogo 644/961 30/55 0.91 (0.45, 1.88) Senin 571/990 26/56 0.91 (0.47, 2.07) Malawi 732/1273 29/58 0.99 (0.47, 2.07) Valawi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.53, 2.00) Mali 974/1265 40/59 1.07 (0.30, 3.82) SurkinaFaso 168/2/1938 35/47 1.08 (0.47, 2.48) Viger 853/1111 17/24 1.22 (0.66, 2.25) Japaldesh 954/1604 36/74 1.22 (0.66, 2.25) Valadagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoD B 638/1121 26/46 1.45 (0.59, 3.57) </td <td>_esotho</td> <td>230/507</td> <td>17/35</td> <td></td> <td>• ' · · · · · · · · · · · · · · · · · ·</td> <td></td> <td>0.77 (0.27, 2.22)</td> <td>1.24</td>	_esotho	230/507	17/35		• ' · · · · · · · · · · · · · · · · · ·		0.77 (0.27, 2.22)	1.24
ndia 6958/11818 810/1634 0.79 (0.58, 1.10) Bolivia 385/729 82/193 0.84 (0.51, 1.36) Solurea 662/908 13/24 0.90 (0.32, 2.56) Togo 644/961 30/55 0.90 (0.32, 2.56) Bolivia 732/1273 29/58 0.94 (0.71, 1.25) Carreroon 614/1125 20/40 0.99 (0.47, 2.07) Valawi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 108/1028 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.22 (0.66, 2.25) Japanda 166/404 13/33 1.29 (0.47, 2.48) Viger 853/111 17/24 1.08 (0.47, 2.48) Viger 853/111 17/24 1.08 (0.47, 2.48) Viger 853/111 17/24 1.29 (0.48, 3.40) Sabon 468/821 30/64 1.22 (0.66, 2.25) Bangladesh 954/643 15/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.32, 5.29) <	Honduras	668/2974	120/669		→		0.78 (0.58, 1.04)	7.16
Solivia 386/729 82/193 0.84 (0.51, 1.36) Egypt 188/806 142/750 0.85 (0.62, 1.16) Suinea 662/908 13/24 0.90 (0.32, 2.56) Fogo 644/961 30/55 0.90 (0.32, 2.56) Samin 571/990 26/56 0.94 (0.71, 1.25) Zameroon 614/125 20/40 0.99 (0.47, 2.07) Valawi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.53, 2.00) SierraLeone 1109/1430 60/82 1.03 (0.53, 2.00) Vali 974/1265 40/59 1.07 (0.30, 3.82) JurkinaFaso 1682/1938 35/47 1.08 (0.47, 2.48) Viger 853/111 17/24 1.21 (0.25, 5.74) Sabon 468/821 30/64 1.29 (0.49, 3.40) Vepal 19/872 8/40 1.29 (0.49, 3.40) Vagambique 702/1212 49/82 1.45 (0.59, 3.57) Vadagascar 758/1643 15/33 2.29 (0.35, 4.59) Jangladesh 954/464 2.47/528 38/89	ndia	6958/11818	810/1634		•		0.79 (0.58, 1.10)	6.56
Egypt 188/806 142/750 0.85 (0.62, 1.16) Suinea 662/908 13/24 0.90 (0.32, 2.56) Fogo 644/961 30/55 0.91 (0.45, 1.88) Senin 571/990 26/56 0.91 (0.45, 1.88) Peru 803/3186 161/857 0.99 (0.47, 2.07) Valaiwi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) Sierraleone 1109/1430 60/82 1.03 (0.67, 1.56) Sierraleone 109/1430 66/21 30/64 Sapladesh 954/1604 36/74 1.08 (0.47, 2.48) Viger 853/1111 17/24 1.22 (0.66, 2.25) Jaapladesh 954/604 36/74 1.22 (0.66, 2.25) Jaapladascar 758/1643 15/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Joangb 638/1121 26/46 2.89 (0.59, 3.57) Madagascar 758/1643 15/33 2.29 (0.95, 4.59)	Bolivia	385/729	82/193		—		0.84 (0.51, 1.36)	4.19
Guinea 662/908 13/24 0.90 (0.32, 2.56) Fogo 644/961 30/55 0.90 (0.39, 2.08) Benin 571/900 26/56 0.91 (0.45, 1.88) Peru 803/3186 161/857 0.99 (0.47, 2.07) Adalawi 732/1273 29/58 0.99 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.53, 2.00) Adai 974/1265 40/59 1.07 (0.30, 3.82) SierraLeone 1109/1430 60/82 1.08 (0.39, 2.97) SongoDR 954/1604 36/74 1.08 (0.47, 2.48) Viger 853/1111 17/24 1.21 (0.25, 5.74) Sabon 468/821 30/64 1.22 (0.66, 2.25) Sangladesh 954/1604 36/74 1.29 (0.32, 5.29) Vadagascar 758/1643 15/3 1.29 (0.32, 5.2) Jganda 166/404 13/33 1.29 (0.32, 5.2) Vadagascar 758/1643 15/3 2.26 (0.76, 6.9)	gypt	188/806	142/750	-			0.85 (0.62, 1.16)	6.65
Togo 644/961 30/55 0.90 (0.39, 2.08) Benin 571/990 26/56 0.91 (0.45, 1.88) Peru 803/3186 161/857 0.94 (0.71, 1.25) Cameroon 614/1125 20/40 0.99 (0.47, 2.07) Aalawi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.63, 2.00) Aali 974/1265 40/59 1.07 (0.30, 3.82) SurkinaFaso 1682/1938 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.08 (0.47, 2.48) iiger 853/111 17/24 1.02 (0.66, 2.25) Sabon 468/821 30/64 1.22 (0.66, 2.25) Jagada 166/404 13/33 1.29 (0.42, 5.00) Joagaba 166/404 13/33 1.29 (0.42, 5.57) Adaigascar 758/1643 1.5/3 1.29 (0.42, 5.57) Adagascar 758/1643 1.5/3 2.26 (0.76, 6.69) Adagascar 758/1643 1.5/3 2.23 (0.93, 5.32) </td <td>Guinea</td> <td>662/908</td> <td>13/24</td> <td></td> <td>•</td> <td></td> <td>0.90 (0.32, 2.56)</td> <td>1.27</td>	Guinea	662/908	13/24		•		0.90 (0.32, 2.56)	1.27
Benin 571/990 26/56 0.91 (0.45, 1.88) Peru 803/3186 161/857 0.94 (0.71, 1.25) Cameroon 614/1125 20/40 0.99 (0.47, 2.07) Malawi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) Silerrateone 1109/1430 60/82 1.03 (0.67, 1.56) Valia 974/1265 40/59 1.07 (0.30, 3.82) JurkinaFaso 1682/1938 35/47 1.08 (0.38, 2.97) CongoDR 954/1604 36/74 1.08 (0.47, 2.48) Viger 853/1111 17/24 1.22 (0.66, 2.25) Sangladesh 954/604 36/74 1.27 (0.64, 2.50) Jagnada 166/404 13/33 1.29 (0.42, 5.29) Jagnada 166/404 13/33 1.29 (0.42, 5.29) Vozambique 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 2.26 (0.76, 6.69) Vaamibia 227/528 38/89 2.26 (0.76, 6.69) Vaamibia 297/91 1.245 2.46 (0.78, 7.75)	Годо	644/961	30/55		•		0.90 (0.39, 2.08)	1.86
Peru 803/3186 161/857 0.94 (0.71, 1.25) Cameroon 614/1125 20/40 0.99 (0.47, 2.07) Walawi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.53, 2.00) Wali 974/1265 40/59 1.07 (0.30, 3.82) BurkinaFaso 1682/1938 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.21 (0.25, 5.74) Sappladesh 954/604 36/74 1.22 (0.66, 2.25) Sangladesh 954/604 36/74 1.22 (0.66, 2.25) Jganda 166/404 13/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Vacambigue 702/1212 49/82 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Vacambigue 702/528 38/89 2.29 (0.74, 4.80)	Benin	571/990	26/56		•		0.91 (0.45, 1.88)	2.38
Cameroon 614/1125 20/40 0.99 (0.47, 2.07) Malawi 732/1273 29/58 1.00 (0.47, 2.07) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.53, 2.00) Mali 974/1265 40/59 1.07 (0.30, 3.82) BurkinaFaso 1682/1938 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.02 (0.65, 2.574) Babon 468/821 30/64 1.22 (0.66, 2.25) Bangladesh 954/604 36/74 1.22 (0.64, 2.50) Jganda 166/404 13/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Vozambique 702/1212 49/82 1.45 (0.59, 3.57) Madagascar 758/1643 15/33 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 2.92 (0.74, 11.57)	Peru	803/3186	161/857				0.94 (0.71, 1.25)	7.21
Malawi 732/1273 29/58 1.00 (0.47, 2.14) Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.67, 1.56) Wali 974/1265 40/59 1.07 (0.30, 3.82) BurkinaFaso 1682/1938 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.08 (0.47, 2.48) Viger 853/1111 17/24 1.21 (0.25, 5.74) Babon 468/821 30/64 1.22 (0.66, 2.25) Bangladesh 954/604 36/74 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Vadagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Vamibia 227/528 38/89 2.09 (0.95, 4.59) Albania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75)	Cameroon	614/1125	20/40				0.99 (0.47, 2.07)	2.27
Jordan 359/1317 111/456 1.03 (0.67, 1.56) SierraLeone 1109/1430 60/82 1.03 (0.53, 2.00) Wali 974/1265 40/59 1.07 (0.30, 3.82) JurkinaFaso 1682/1938 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.08 (0.47, 2.48) Niger 853/1111 17/24 1.21 (0.25, 5.74) Babon 468/821 30/64 1.22 (0.66, 2.25) Bangladesh 954/1604 36/74 1.29 (0.42, 5.07) Jganda 166/404 13/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.32, 5.29) Mozambique 702/1212 49/82 1.45 (0.59, 3.57) Madagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Vamibia 227/528 38/89 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Bambia 496/700 19/30 0.88 (0.78, 1.00)	Malawi	732/1273	29/58		•		1.00 (0.47, 2.14)	2.20
SierraLeone 1109/1430 60/82 1.03 (0.53, 2.00) Wali 974/1265 40/59 1.07 (0.30, 3.82) BurkinaFaso 1682/1938 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.08 (0.47, 2.48) Niger 853/1111 17/24 1.21 (0.25, 5.74) Sabon 468/821 30/64 1.22 (0.66, 2.25) Jangladesh 954/1604 36/74 1.29 (0.49, 3.40) Jganda 166/404 13/33 1.29 (0.32, 5.29) Mozambique 702/1212 49/82 1.45 (0.59, 3.57) Madagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Varmenia 97/416 10/36 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.246 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	Jordan	359/1317	111/456				1.03 (0.67, 1.56)	4.99
Mali 974/1265 40/59 1.07 (0.30, 3.82) BurkinaFaso 1682/1938 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.21 (0.25, 5.74) Gabon 468/821 30/64 1.22 (0.66, 2.25) Bangladesh 954/604 36/74 1.22 (0.64, 2.50) Jganda 166/404 13/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.25, 5.74) Madagascar 758/1643 15/33 1.29 (0.49, 3.40) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Varmenia 97/416 10/36 2.23 (0.93, 5.32) Numenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 2.92 (0.74, 11.57) VCTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	SierraLeone	1109/1430	60/82		•		1.03 (0.53, 2.00)	2.70
BurkinaFaso 1682/1938 35/47 1.08 (0.39, 2.97) CongoDR 954/1604 36/74 1.21 (0.25, 5.74) Jaabon 468/821 30/64 1.22 (0.66, 2.25) Bangladesh 954/604 36/74 1.22 (0.64, 2.50) Jganda 166/404 13/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Vacambique 702/1212 49/82 1.45 (0.59, 3.57) Madagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Varmenia 97/9416 10/36 2.23 (0.93, 5.32) Warmenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	Mali	974/1265	40/59			_	1.07 (0.30, 3.82)	0.88
CongoDR 954/1604 36/74 1.08 (0.47, 2.48) Viger 853/1111 17/24 1.21 (0.25, 5.74) Gabon 468/821 30/64 1.22 (0.66, 2.25) Jangladesh 954/604 36/74 1.29 (0.49, 3.40) Jganda 166/404 13/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.32, 5.29) Mozambique 702/1212 49/82 1.45 (0.59, 3.57) Madagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Vamibia 227/528 38/89 2.09 (0.95, 4.59) Abania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Bambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00)	BurkinaFaso	1682/1938	35/47		1		1.08 (0.39, 2.97)	1.34
Niger 853/1111 17/24 1.21 (0.25, 5.74) Gabon 468/821 30/64 1.22 (0.66, 2.25) Bangladesh 954/604 36/74 1.27 (0.64, 2.50) Jganda 166/404 13/33 1.29 (0.49, 3.40) Vepal 319/872 8/40 1.29 (0.49, 3.40) Mozambique 702/1212 49/82 1.45 (0.59, 3.57) Vadagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Vamibia 227/528 38/89 2.09 (0.95, 4.59) Valbania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Bambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	CongoDR	954/1604	36/74				1.08 (0.47, 2.48)	1.89
Gabon 468/821 30/64 1.22 (0.66, 2.25) Bangladesh 954/604 36/74 1.27 (0.64, 2.50) Jganda 166/404 13/33 1.29 (0.32, 5.29) Mozambique 702/1212 49/82 1.45 (0.59, 3.57) Madagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Vlanibia 227/528 38/89 2.09 (0.95, 4.59) Vlanibia 227/528 38/9 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Bambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	viger	853/1111	17/24				1.21 (0.25, 5.74)	0.60
Jangladesh 954/604 36/74 1.27 (0.64, 2.50) Jganda 166/404 13/33 1.29 (0.49, 3.40) Nepal 319/872 8/40 1.29 (0.49, 3.40) Mozambique 702/1212 49/82 1.45 (0.59, 3.57) Madagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Namibia 227/528 38/89 2.09 (0.95, 4.59) Albania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	Gabon	468/821	30/64				1.22 (0.66, 2.25)	3.03
Jganda 166/404 13/33 1.29 (0.49, 3.40) lepal 319/872 8/40 1.29 (0.32, 5.29) Alozambique 702/1212 49/82 1.45 (0.59, 3.57) Adagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Namibia 227/528 38/89 2.09 (0.95, 4.59) Nbania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Gambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	Bangladesh	954/604	36/74	•			1.27 (0.64, 2.50)	2.62
Vepal 319/872 8/40 1.29 (0.32, 5.29) Mozambique 702/1212 49/82 1.45 (0.59, 3.57) Madagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Namibia 227/528 38/89 2.09 (0.95, 4.59) Nubania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 0.88 (0.78, 1.00) Vorrall (I-squared = 22.6%, p = 0.093) 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	Jganda	166/404	13/33			-	1.29 (0.49, 3.40)	1.45
Adozambique 702/1212 49/82 1.45 (0.59, 3.57) Adadgascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Amibia 227/528 38/89 2.09 (0.95, 4.59) Nbania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 0.88 (0.78, 1.00) Vorrall (I-squared = 22.6%, p = 0.093) 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	lepal	319/872	8/40				1.29 (0.32, 5.29)	0.73
Adadagascar 758/1643 15/33 1.55 (0.41, 5.94) CongoB 638/1121 26/46 1.88 (0.74, 4.80) Jamibia 227/528 38/89 2.09 (0.95, 4.59) Vbania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	Nozambique	702/1212	49/82	-			1.45 (0.59, 3.57)	1.65
CongoB 638/1121 26/46 1.88 (0.74, 4.80) Vamibia 227/528 38/89 2.09 (0.95, 4.59) Albania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	Madagascar	758/1643	15/33				1.55 (0.41, 5.94)	0.80
Namibia 227/528 38/89 2.09 (0.95, 4.59) Albania 89/594 23/136 2.23 (0.93, 5.32) Armenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Gambia 496/700 19/30 2.92 (0.74, 11.57) Overall (I-squared = 22.6%, p = 0.093) 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	CongoB	638/1121	26/46				1.88 (0.74, 4.80)	1.53
Albania 89/594 23/136 2.23 (0.93, 5.32) trmenia 97/416 10/36 2.26 (0.76, 6.69) Swaziland 18/1579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 2.92 (0.74, 11.57) Overall (I-squared = 22.6%, p = 0.093) 0.88 (0.78, 1.00) 0.88 (0.78, 1.00)	Namibia	227/528	38/89				2.09 (0.95, 4.59)	2.05
Armenia 9//416 10/36 2.26 (0.76, 6.69) Swaziland 181/579 12/45 2.46 (0.78, 7.75) Sambia 496/700 19/30 2.29 (0.74, 11.57) Overall (I-squared = 22.6%, p = 0.093) 0.88 (0.78, 1.00) 0.88 (0.78, 1.00) NOTE: Weights are from random effects analysis 1 1	Albania	89/594	23/136				2.23 (0.93, 5.32)	1.74
waziland 181/5 / 9 12/45 2.46 (0.78, 7.75) Gambia 496/700 19/30 2.92 (0.74, 11.57) Overall (I-squared = 22.6%, p = 0.093) 0.88 (0.78, 1.00) 0.88 (0.78, 1.00) NOTE: Weights are from random effects analysis 1 1	Armenia	97/416	10/36				2.26 (0.76, 6.69)	1.18
Jambia 496/700 19/30 2.92 (0.74, 11.57) Overall (I-squared = 22.6%, p = 0.093) 0.88 (0.78, 1.00) 0.88 (0.78, 1.00) NOTE: Weights are from random effects analysis 1 1	Swaziland	181/579	12/45				2.46 (0.78, 7.75)	1.07
Jverall (I-squared = 22.6%, p = 0.093) 0.88 (0.78, 1.00) VOTE: Weights are from random effects analysis 1	Jambia	496/700	19/30				2.92 (0.74, 11.57)	0.76
NOTE: Weights are from random effects analysis	Overall (I-squ	ared = 22.6%, p	= 0.093)		Ŷ		0.88 (0.78, 1.00)	100.0
	NOTE: Weight	s are from rand	om effects analysis		-i			

VD: Vaginal delivery; CD: Caesarean delivery; n: any anaemia cases; N: number of children. Other details are as presented in Supplementary Figure S1 legend

Supplementary Figure S8 Caesarean delivery and moderate/severe anaemia risk in children aged 2-5 years in 45 low- and middle-income countries

Country	VD (n/N)	(n/N)	ratio (95% CI)	% Weigh
Azerbaijan	144/621	2/25	0.06 (0.01, 0.25)	1.08
Ethiopia	536/2132	15/60	0.14 (0.04, 0.46)	1.49
Moldova	91/494	4/47	0.18 (0.05, 0.63)	1.47
Cote d'Ivoire	219/491	8/20	0.19 (0.05, 0.75)	1.23
'emen	151/292	8/23	0.30 (0.09, 1.00)	1.50
laiti	390/930	20/56	0.31 (0.08, 1.18)	1.31
anzania	476/1246	19/70	0.37 (0.14, 1.00)	2.04
Guinea	222/468	5/16	• 0.39 (0.11, 1.37)	1.44
Syrgyz	238/937	10/64	0.49 (0.18, 1.34)	1.98
imbabwe	350/975	13/46	0.49 (0.18, 1.31)	2.06
Rwanda	211/999	27/148	0.59 (0.34, 1.02)	3.98
Buyana	86/413	7/43	0.67 (0.21, 2.07)	1.68
Shana	218/486	29/83	0.67 (0.35, 1.26)	3.48
CongoDR	387/1037	13/51	- 0.68 (0.28, 1.64)	2.36
Senegal	230/443	10/25	0.69 (0.25, 1.88)	2.00
Cameroon	296/807	11/31	- 0.69 (0.27, 1.78)	2.17
aoTome&P	188/448	10/23	0.70 (0.26, 1.90)	2.02
odo	273/590	13/38	0.70 (0.25, 1.99)	1.90
angladesh	387/1037	13/51	071 (0.30, 1.72)	2.39
londuras	487/2793	86/635	0.73(0.52, 1.02)	5 43
lenin	261/680	11/41	0.80 (0.34, 1.89)	2 47
Solivia	184/528	39/150		3.59
avot	139/757	105/713	0.87 (0.61, 1.25)	5.26
ambodia	491/1404	22/89	0.89 (0.34, 2.27)	2 18
ndia	3106/7966	388/1212	0.89 (0.61, 1.29)	5 16
Sahon	240/593	15/49	0.90 (0.35, 2.29)	2 21
Burundi	150/620	7/43	0.91 (0.24, 3.46)	1 20
ordan	224/1182	73/418	- 0.96 (0.60, 1.56)	4.42
Aali	260/551	11/30	0.97 (0.24, 3.99)	4.42
Poru	501/2074	121/817	0.97 (0.24, 3.33)	5.47
eru	122/400	12/21	1 14 (0.26, 2, 59)	1.64
laondo	77/215			1.04
ligor	202/540	0/20		0.74
ligei Iolowi	202/040	12/41	1.20 (0.20, 7.90)	0.74
	303/644	27/40	1.27 (0.51, 5.16)	2.20
	1/0/252	7/19	1.20 (0.24, 7,00)	2.90
annua IurkinaEaaa	140/302	9/21		0.03
lonal	202/755	6/38		1.40
lepal Iadagaaaar	202/100	7/25		1.07
llania	490/1303	1/20		0.99
lomihic	120/420	20/71		2.10
ambiana	123/430	20//1		2.32
iozambique	323/033			1.74
ongoe	346/829	15/35		1.85
waziiand	120/518	0/41	3.43 (1.02, 11.57)	1.50
	51/3/U		4.58 (0.69, 30.28)	0.71
	$a_1 = 40.4\%$	= 0.003	0.61 (0.68, 0.95)	100.00
iore. weight				
			5 40	

VD: Vaginal delivery; CD: Caesarean delivery; n: moderate/severe anaemia cases; N: number of children. Other details are as presented in Supplementary Figure S1 legend.

Supplementary Figure S9 Caesarean delivery and mild anaemia risk in children aged 2-5 years in 45 low- and middle-income countries

Country	VD (n/N)	(n/N)	ratio (95% CI)	% Weigh
Burundi	128/598	6/42	0.13 (0.04, 0.48)	1.36
Tanzania	462/1232	13/64	0.20 (0.08, 0.54)	2.17
Vepal	117/670	2/34	0.21 (0.04, 1.11)	0.87
Cote d'Ivoire	368/640	5/17	0.25 (0.04, 1.52)	0.74
laiti	323/863	12/48	0.28 (0.06, 1.40)	0.92
esotho	107/384	4/22	0.29 (0.07, 1.21)	1.12
SaoTome&P	109/369	4/17	0.30 (0.07, 1.32)	1.04
Cambodia	294/1207	16/83	0.38 (0.12, 1.24)	1.55
/loldova	33/436	3/46	0.40 (0.09, 1.69)	1.09
Swaziland	61/459	4/37	0.52 (0.15, 1.78)	1.46
thiopia	637/2233	12/57	0.54 (0.05, 6.23)	0.41
'emen	770/911	35/50	0.55 (0.19, 1.54)	1.95
Guyana	51/378	5/41	- 0.59 (0.18, 1.98)	1.50
ndia	3852/8712	422/1242	0.72 (0.51, 1.03)	6.96
Ghana	287/555	23/77	0.76 (0.26, 2.17)	1.88
Peru	212/2595	40/736	0.77 (0.48, 1.25)	5.38
Egypt	49/667	37/645	0.78 (0.45, 1.35)	4.67
Azerbaijan	67/544	2/25	0.78 (0.15, 3.92)	0.90
Senegal	454/667	23/38	• 0.79 (0.34, 1.83)	2.72
Bolivia	201/545	43/154	0.81 (0.45, 1.47)	4.26
//alawi	429/970	17/46	- 0.82 (0.33, 2.03)	2.39
Rwanda	114/902	15/136	- 0.84 (0.36, 1.97)	2.62
Ionduras	181/2487	34/583	0.90 (0.53, 1.51)	4.96
SierraLeone	750/1071	33/55	- 0.90 (0.43, 1.88)	3.24
(yrgyz	188/887	15/69	- 0.94 (0.46, 1.95)	3.33
/adagascar	260/1145	8/26	0.97 (0.28, 3.34)	1.44
Nozambique	379/889	21/54	0.98 (0.40, 2.41)	2.42
BurkinaFaso	1298/1554	26/38	0.98 (0.34, 2.83)	1.88
Zimbabwe	302/927	11/44	0.99 (0.36, 2.75)	2.00
Benin	310/729	15/45	1.01 (0.44, 2.30)	2.77
δαο	371/688	17/42	1.05 (0.39, 2.80)	2.12
/ali	714/1005	29/48	1.10 (0.29, 4.21)	1.25
lordan	135/1093	38/383	1.15 (0.59, 2.24)	3.71
Guinea	440/686	8/19	1 16 (0.37, 3.57)	1 69
liger	571/829	9/16		0.64
Cameroon	318/829	9/29	1.31 (0.55, 3.11)	2.57
Jaanda	89/327	7/27	1.35 (0.41 4 39)	1.56
CongoDR	567/1217	23/61	1.37 (0.53, 3.56)	2.22
Bangladesh	567/1217	23/61	1.51 (0.61, 3.77)	2.38
CongoB	292/775	11/31	1.58 (0.51, 4.87)	1.70
Gabon	228/581	15/49	1.59 (0.76, 3.34)	3 23
rmenia	46/365	4/30	1 77 (0 54 5 76)	1 56
Jamibia	98/399	18/69	2 24 (0.87 5 73)	2 27
Ibania	28/533	9/122		2.27
Sambia	348/552	12/23	3 58 (0.82, 15 50)	1.04
Overall (I-sour	ared = 23.9%	= 0.079)	0.86 (0.74 1.01)	100.00
NOTE: Weight	s are from ran	om effects analysis	0.00 (0.14, 1.01)	
		1 5 1	5 10	

VD: Vaginal delivery; CD: Caesarean delivery; n: mild anaemia cases; N: number of children. Other details are as presented in Supplementary Figure S1 legend.

Supplementary Figure S10 Association between caesarean delivery and mild anaemia in children aged under 5 years in 45 low- and middle-income countries, stratified by national income level

Country	VD (n/N)	CD (n/N)	Odds ratio (95% CI)	% Weigl
ow income		!		
Burundi	420/1315	26/98	0.92 (0.38, 2.24)	1 48
CongoDR	986/2339	40/115	- 0.97 (0.53, 1.75)	2.83
Jiger	582/1018	13/21	2 81 (0.54, 14.62)	0.47
Thionia	1130/3587	32/105		0.52
Madagascar	063/2380	12/37	2,53 (0,47, 13,59)	0.02
Cuinco	426/022	15/31	2.33 (0.47, 13.33)	0.45
Molowi	420/022	20/60	1.57 (0.60, 3.57)	1 69
Mazamhiaua	74 4/4550	29/09	1.57 (0.69, 3.57)	1.00
Zimbahuua	714/1559	41/96		1.50
Zimbabwe	/14/1660	22//1	0.44 (0.20, 0.98)	1.70
	496/953	32/70		2.16
Gambia	397/757	15/27	10.21 (2.51, 41.62)	0.63
BurkinaFaso	631/986	15/34	0.80 (0.22, 2.97)	0.72
Jganda	236/687	17/46	2.75 (0.83, 9.12)	0.85
Nepal	406/1136	17/60	1.41 (0.44, 4.50)	0.90
Tanzania	1043/2302	40/114	0.50 (0.24, 1.02)	2.08
Rwanda	466/1724	68/255	0.75 (0.49, 1.14)	4.55
SierraLeone	700/1220	43/73	1.18 (0.62, 2.26)	2.47
Haiti	759/1509	34/85	0.39 (0.14, 1.11)	1.10
Mali	535/978	22/45	1.05 (0.33, 3.39)	0.89
Benin	537/1292	25/76	0.76 (0.39, 1.48)	2.35
India	5515/12 299	708/1880	0.89 (0.67, 1.19)	6.71
Moldova	197/806	13/74	0.41 (0.18, 0.94)	1.60
Cambodia	854/2084	52/158	- 0.86 (0.40, 1.81)	1.95
Subtotal (I-squ	ared = 37.8%, p =	35)	0.90 (0.72, 1.12)	40.19
ower middle-ir	ncome			
Senegal	466/833	18/39	0.96 (0.35, 2.65)	1.15
SaoTome&P	347/720	18/38	0.68 (0.24, 1.94)	1 10
Kyrayz	519/1687	20/103	0.58 (0.25, 1.36)	1 60
Bandladesh	086/2330	40/115	1 01 (0.56, 1.81)	2 80
Lesotho	258/723	20/45	0.89 (0.34, 2.33)	1 27
Comoroon	230/123	26/43	0.53 (0.54, 2.55)	2.26
	149/1037	10/01	0.59 (0.30, 1.10)	2.30
Cole d Ivoire	439/649		3.13 (0.42, 23.38)	0.32
remen	249/468	15/35	0.44 (0.14, 1.35)	0.96
Bolivia	346/820	72/240	0.74 (0.44, 1.24)	3.47
Armenia	115/570	14/58	1.04 (0.23, 4.79)	0.54
Ghana	389/796	49/128	1.10 (0.42, 2.89)	1.26
Azerbaijan	275/1002	14/49	• 0.74 (0.33, 1.65)	1.74
Honduras	1171/4749	204/993	0.78 (0.63, 0.96)	8.28
CongoB	738/1478	30/58	1.91 (0.86, 4.27)	1.74
Swaziland	290/894	25/78	2.09 (0.93, 4.70)	1.71
Guyana	211/720	16/70	0.92 (0.34, 2.52)	1.18
Egypt	317/1295	284/1404	0.84 (0.66, 1.07)	7.76
Subtotal (I-squ	ared = 0.0%, p = 0	4)	0.84 (0.74, 0.95)	39.33
Jpper middle-ir	ncome			
Albania	111/825	26/176	1.49 (0.73, 3.04)	2.11
Jordan	487/2025	198/767	1.16 (0.82, 1.63)	5.75
Peru	1182/4312	278/1213	1.05 (0.84, 1.32)	7.98
Namibia	270/733	34/114	1.07 (0.54, 2.14)	2.22
Gabon	565/1178	30/85	0.73 (0.38 1 41)	2 42
Subtotal (I-squ	ared = 0.0%, p = 0	5)	1.07 (0.90, 1.27)	20.48
Overall (I-squa	red = 24.8%, p = 0	0)	0.91 (0.81, 1.02)	100.0
NOTE: Weights	are from random	ects analysis		

The countries are assorted in ascending order by their per capita gross national income. Other details are as presented in the Supplementary Figure S1 legend.

Caesarean delivery and anaemia risk in children in 45 low- and middle- income countries: Supplementary tables

Supplementary	Table S1 Sample cl	naracteristics of the	e study participan	ts by country

					Maternal	Education (%)					Antonatal	Prenatal		Child's
	Country	N	Age at delivery Mean (SE)	None	Primary	Secondary	Higher	Urban (%)	Parity Median (IQR)	Height, m Mean (SE)	visits Median (IQR)	supple- mentation (%)	Male child (%)	months Mean (SE)
1	Albania	1079	27.9 (0.2)	0.8	63.6	25.1	10.5	42.0	2 (1-3)	1.61 (0.00)	5 (3-6)	32.2	51.5	33 (0.6)
2	Armenia	760	25.2 (0.2)	0.0	1.0	76.3	22.7	61.9	2 (1-2)	1.58 (0.00)	5 (3-7)	18.7	55.9	28.6 (0.7)
3	Azerbaijan	1248	26.2 (0.2)	1.3	1.7	83.1	13.9	52.4	2 (1-3)	1.59 (0.00)	3 (1-6)	23.0	57.2	27.7 (0.5)
4	Bangladesh	4090	27.9 (0.1)	19.8	41.6	37.1	1.5	30.0	4 (2-6)	1.56 (0.00)	3 (1-5)	59.5	50.8	22.9 (0.2)
5	Benin	2110	28.2 (0.2)	70.4	16.1	12.4	1.2	40.6	3 (2-5)	1.60 (0.00)	4 (3-6)	80.5	52.2	25.6 (0.3)
6	Bolivia	1733	27.4 (0.2)	4.0	52.0	31.2	12.9	57.4	3 (1-4)	1.52 (0.00)	5 (3-7)	78.2	51.8	27.8 (0.5)
7	BurkinaFaso	3948	28.1 (0.1)	81.9	12.0	5.8	0.3	18.9	5 (2-6)	1.63 (0.01)	3 (3-4)	92.6	51.5	25.2 (0.2)
8	Burundi	1841	29.1 (0.2)	54.2	39.4	5.9	0.5	8.5	4 (2-6)	1.55 (0.00)	3 (3-4)	74.4	51.5	23.7 (0.3)
9	Cambodia	3141	27.0 (0.1)	12.9	55.3	29.6	2.3	14.1	2 (1-3)	1.53 (0.07)	5 (4-7)	95.8	51.4	29.2 (0.4)
10	Cameroon	2752	26.9 (0.2)	26.2	39.3	31.3	3.3	46.4	3 (2-5)	1.60 (0.00)	4 (3-6)	81.8	49.6	23.6 (0.3)
11	CongoDR	4090	27.9 (0.1)	19.8	41.6	37.1	1.5	70.0	4 (2-6)	1.57 (0.00)	3 (2-5)	59.5	50.8	22.9 (0.2)
12	CongoB	2469	27.3 (0.2)	6.5	30.1	59.22	4.1	0.62	3 (2-3)	1.59 (0.00)	5 (4-6)	85.0	47.5	25.1 (0.4)
13	Cote d'Ivoire	1865	27.2 (0.2)	63.4	26.2	9.5	0.9	38.7	3 (2-5)	1.59 (0.00)	3 (2-5)	78.3	47.2	24.8 (0.5)
14	Egypt	3047	27.5 (0.1)	17.5	9.8	56.1	16.7	32.3	2 (2-3)	1.59 (0.00)	8 (5-12)	66.5	53.7	27.2 (0.3)
15	Ethiopia	5361	27.8 (0.1)	68.4	27.8	2.4	1.5	13.8	4 (2-6)	1.56 (0.00)	0 (0-3)	17.1	50.6	26.5 (0.4)
16	Gabon	1961	27.4 (0.2)	7.6	24.9	60.6	6.9	86.1	3 (1-4)	1.60 (0.00)	6 (4-7)	90.0	51.7	26.0 (0.5)
17	Gambia	1795	27.9 (0.2)	58.2	13.7	25	3.1	47.7	3 (2-5)	1.63 (0.00)	5 (4-6)	96.8	52	23.4 (0.4)
18	Ghana	1646	29.4 (0.2)	27.5	19.9	49.7	2.9	47.1	3 (2-5)	1.59 (0.00)	6 (5-8)	92.3	53.1	26.9 (0.5)
19	Guinea	1903	27.2 (0.2)	78.1	12.0	8.8	1.0	26.7	3 (2-5)	1.60 0.00)	4 (2-6)	81.4	52.7	24.8 (0.4)
20	Guyana	963	26.3 (0.3)	3.5	21.0	68.7	6.8	22.4	2 (1-4)	1.56 (0.00)	7 (5-10)	82.3	50.8	27.9 (0.6)
21	Haiti	2552	28.1 (0.2)	21.3	41.0	34.6	3.1	35.7	2 (1-4)	1.59 (0.00)	5 (3-7)	76.1	50.6	26.7 (0.4)
22	Honduras	6507	26.0 (0.1)	4.8	59.0	31.7	4.5	45.7	2 (1-3)	1.53 (0.00)	7 (5-8)	57.7	52	28.7 (0.2)

				Maternal Education (%)					Antenatal	Prenatal		Child's		
			Age at						Parity		visits	supple-	Male	months
	Country	Ν	delivery Mean (SE)	None	Primary	Secondary	Higher	Urban (%)	Median (IQR)	Height, m Mean (SE)	Median (IQR)	(%)	child (%)	Mean (SE)
23	India	23782	25.0 (0.5)	47.6	14.2	32.5	5.6	25.9	2 (2-4)	1.52 (0.00)	3 (1-5)	65.9	54.9	28.3 (0.1)
24	Jordan	3303	30.1 (0.2)	1.7	6.1	63.3	28.9	81.8	3 (2-5)	1.58 (0.00)	9 (7-10)	84.0	54.2	28.4 (0.4)
25	Kyrgyz	2372	28.0 (0.2)	0.0	0.3	56.9	42.8	29.3	2 (1-3)	1.59 (0.00)	6 (5-8)	45.0	52.3	26.8 (0.3)
26	Lesotho	1064	26.0 (0.2)	1.8	53.6	40.6	4.1	19.9	2 (1-3)	1.57 (0.00)	5 (3-6)	46.5	49.9	27.0 (0.5)
27	Madagascar	3146	27.1 (0.2)	24.0	54.6	20.7	0.7	11.5	3 (2-5)	1.53 (0.00)	3 (3-4)	59.6	49.4	27.0 (0.3)
28	Malawi	2776	26.8 (0.1)	16.3	67.9	15.3	0.5	16.1	3 (2-5)	1.56 (0.00)	3 (3-4)	90.4	50.1	25.4 (0.3)
29	Mali	2656	27.4 (0.2)	82.4	9.4	7.6	0.7	19.1	4 (2-5)	1.62 (0.00)	3 (0-4)	66.9	51.2	25.2 (0.3)
30	Moldova	978	25.5 (0.2)	0.3	0.7	81.1	18.0	37.5	2 (1-2)	1.61 (0.00)	8 (6-10)	70.6	52.0	29.4 (0.5)
31	Mozambique	2859	27.0 (0.2)	35.8	50.5	13.1	0.6	28.7	3 (2-5)	1.55 (0.00)	4 (3-5)	81.3	49.5	23.9 (0.3)
32	Namibia	1190	27.9 (0.2)	5.8	21.7	66.9	5.6	46.3	2 (1-4)	1.61 (0.00)	6 (4-8)	89.7	48.4	27.0 (0.5)
33	Nepal	1520	25.5 (0.2)	45.5	19.7	29.4	5.4	9.6	2 (1-3)	1.51 (0.00)	3 (2-5)	78.0	51.6	29.3 (0.5)
34	Niger	2477	28.0 (0.2)	84.2	10.9	4.5	0.4	14.8	5 (3-7)	1.60 (0.00)	3 (2-4)	81.6	49.9	22.6 (0.3)
35	Peru	6520	28.0 (0.1)	2.8	27.6	45.8	23.8	66.8	2 (1-3)	1.52 (0.00)	9 (7-11)	87.5	52.1	30.5 (0.3)
36	Rwanda	2377	28.7 (0.1)	14.6	72.5	10.9	2.0	16.3	3 (1-4)	1.57 (0.00)	3 (3-4)	78.6	50.8	26.8 (0.3)
37	SaoTome&P	1115	27.7 (0.3)	4.2	71.2	24.4	0.3	49.4	3 (2-5)	1.59 (0.00)	6 (4-7)	92.9	49.6	26.6 (0.6)
38	Senegal	1999	28.2 (0.2)	69.0	20.9	9	1.1	42.6	3 (2-5)	1.64 (0.00)	4 (3-4)	94.4	47.8	25.5 (0.5)
39	Sierra Leone	2904	28.0 (0.2)	68.6	13.0	17.5	0.9	26.2	3 (2-5)	1.58 (0.00)	6 (5-10)	94.4	48.4	25.8 (0.3)
40	Swaziland	1292	26.4 (0.2)	8.4	36.7	48.9	6.0	17.1	2 (1-4)	1.59 (0.00)	5 (4-6)	90.1	51.0	25.8 (0.5)
41	Tanzania	3777	28.0 (0.2)	23.6	69.4	6.8	0.2	21.3	3 (2-5)	1.56 (0.00)	3 (3-4)	59.7	49.4	25.4 (0.3)
42	Тодо	1981	28.6 (0.2)	40.1	37.2	20.9	1.8	35.9	3 (2-5)	1.59 (0.00)	4 (3-5)	86.7	51.5	26.7 (0.3)
43	Uganda	1064	28.2 (0.2)	12.8	64.0	18.6	4.5	15.2	4 (2-7)	1.59 (0.00)	3 (3-4)	76.0	49.5	23.3 (0.5)
44	Yemen	2258	28.2 (0.2)	XX	XX	XX	xx	31.4	4 (2-6)	1.54 (0.00)	1 (0-3)	71.1	50.8	25.4 (0.4)
45	Zimbabwe	2606	26.3 (0.1)	2.2	31.9	63.6	2.3	25.3	2 (1-4)	1.60 (0.00)	4 (3-6)	49.8	50.6	26.4 (0.3)

Supplementary table S1 continued from previous page

xx means that the variable was not used/not available. The percentages, means, and medians are weighted. Standard errors are adjusted for clustering

		% missing data										
Country	N	Biomass for cooking	Prenatal iron supplementation	Prenatal deworming	Birth size	Birth weight	Mother's height	Number of antenatal	caste			
Albania	1079	0.00	1.39	0.37	xx	3.44	0.19	0.83	xx			
Armenia	760	0.00	0.00	xx	1.18	xx	0.92	0.92	xx			
Azerbaijan	1248	XX	2.72	0.64	16.02	XX	0.56	3.77	XX			
Bangladesh	4090	0.00	XX	XX	1.40	XX	0.90	0.00	XX			
Benin	2110	0.00	1.90	3.36	8.10	XX	1.52	6.35	xx			
Bolivia	1733	0.00	0.00	XX	0.81	XX	1.15	0.40	xx			
BurkinaFaso	3948	0.10	0.05	0.85	0.17	XX	0.50	0.10	XX			
Burundi	1841	XX	0.05	0.22	1.30	XX	0.76	0.38	XX			
Cambodia	3141	0.00	0.10	1.66	0.45	XX	0.13	0.45	XX			
Cameroon	2752	0.00	0.15	2.65	0.62	XX	0.33	0.66	xx			
CongoDR	4090	0.00	0.66	0.90	1.40	XX	0.90	0.91	XX			
CongoB	2469	0.00	0.69	0.24	1.58	XX	0.77	0.61	xx			
Cote d'Ivoire	1865	0.05	1.93	4.02	2.68	XX	1.39	0.54	xx			
Egypt	3047	XX	0.62	0.53	0.46	XX	0.23	0.49	xx			
Ethiopia	5361	0.00	0.28	0.71	0.13	XX	0.50	0.32	XX			
Gabon	1961	0.05	0.66	1.78	4.9	xx	0.76	1.22	xx			
Gambia	1795	0.00	0.06	2.45	0.22	xx	1.95	0.28	XX			
Ghana	1646	0.00	0.67	2.43	0.12	XX	0.18	0.49	xx			
Guinea	1903	XX	0.11	1.26	0.21	xx	0.42	0.32	XX			
Guyana	963	0.21	1.35	2.70	1.97	xx	0.42	14.54	XX			
Haiti	2552	0.00	0.04	2.27	0.08	xx	0.12	0.39	xx			
Honduras	6507	0.00	0.28	0.28	0.11	xx	0.17	0.15	XX			
India	23782	0.02	0.48	0.93	1.59	XX	0.39	1.00	4.57			

Supplementary Table S2 Percent of the missing data by country

Supplementary Table S2 continued from previous page

Jordan	3303	XX	0.24	XX	XX	0.79	0.12	0.00	xx
Kyrgyz	2372	0.08	0.17	1.77	XX	0.63	0.21	2.70	XX
Lesotho	1064	0.00	3.10	xx	0.56	xx	0.47	1.60	xx
Madagascar	3146	xx	1.11	0.92	1.27	XX	0.54	0.29	XX
Malawi	2776	xx	0.00	0.40	1.66	xx	0.61	0.79	xx
Mali	2656	xx	0.34	5.10	3.66	xx	0.91	1.33	xx
Moldova	978	0.00	24.00	xx	XX	0.41	0.2	3.68	xx
Mozambique	2859	0.00	0.28	3.88	3.64	xx	0.35	1.50	xx
Namibia	1190	0.08	0.50	3.45	XX	10.76	1.85	21.09	xx
Nepal	1520	0.00	0.00	1.05	0.07	XX	0.2	0.00	XX
Niger	2477	0.00	0.12	1.33	2.58	XX	1.41	0.52	XX
Peru	6520	0.00	0.06	0.12	xx	6.54	0.14	0.11	XX
Rwanda	2377	XX	0.13	0.25	xx	6.6	0.08	0.00	XX
SaoTome&P	1115	0.00	0.27	2.60	xx	18.12	1.35	5.29	XX
Senegal	1999	0.00	0.300	4.20	0.4	xx	1.75	1.80	XX
Sierra Leone	2904	XX	0.41	2.00	1.96	XX	1.17	11.05	XX
Swaziland	1292	0.08	1.32	5.73	2.32	15.56	0.7	2.71	XX
Tanzania	3777	xx	0.21	xx	2.86	xx	0.21	0.45	xx
Togo	1981	XX	0.61	3.28	0.61	XX	0.05	0.20	XX
Uganda	1064	XX	0.94	1.32	2.16	XX	0.56	1.88	XX
Yemen	2258	0.58	1.33	0.62	0.27	xx	0.80	0.58	XX
Zimbabwe	2606	XX	0.65	0.31	2.0	xx	0.35	1.11	XX

xx means that the variable was not used

The percentages are unweighted

	Any anaemi	a	Mild anaem	ia	Moderate/severe anaemia		
	OR (95% CI)	I^2	OR (95% CI)	I^2	OR (95% CI)	I^2	
Wealth index quintiles							
Lower two	1.11 (0.82 to 1.50)	67.1%	0.94 (0.76 to 1.17)	21.9%	1.26 (0.87 to 1.89)	69.9%	
Upper two	0.96 (0.82 to 1.13)	0.0%	0.89 (0.74 to 1.07)	0.0%	1.07 (0.82 to 1.41)	16.7%	
Place of delivery							
Public sector	0.96 (0.83 to 1.12)	31.0%	0.88 (0.77 to 1.01)	0.0%	1.10 (0.91 to 1.34)	21.2%	
Private sector	1.00 (0.82 to 1.23)	0.0%	1.01 (0.78 to 1.30)	0.0%	1.01 (0.77 to 1.33)	0.0%	

Supplementary Table S3 Summary odds ratios for the associations between CD and any anaemia, mild anaemia, and moderate/severe anaemia among children younger than 5 years in countries with national CD rate >15%, stratified by wealth and place of delivery

Countries included in the analyses were Albania, Bangladesh, Bolivia, Egypt, Honduras, Jordan, and Peru. Albania was excluded from the analysis stratified by place of delivery because almost all the women delivered in the public sector. Propensity score weighting was used to adjust for region within the country, residence (urban/rural), wealth index, mother's age at childbirth, mother's education, parity, births in the past 5 years, number of antenatal visits, prenatal iron supplementation, prenatal deworming, mother's height, use of biomass for cooking, size of the baby at birth or birth weight, sex of the baby, and child's age in months. The summary odds ratios were obtained by pooling country specific odds ratios using random effects meta-analysis.