

for trainees after they graduate is a crucial component of long-term success.

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### Individual and community factors contributing to anemia among women and children living in a rural community in Baja California, Mexico

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**Background:** A disproportionately high prevalence of anemia has been found among the families of agricultural laborers in Baja California, Mexico. The purpose of this study was to measure anemia prevalence and to identify the individual and community factors contributing to causes of anemia among women and children living in a rural, agricultural community.

**Methods:** A cross-sectional study was performed in October 2012 among women (15-49 years) and their children (24-59 months) living in a rural, agricultural community in Baja California, Mexico. Recruitment of participants was performed by the random selection of community households and through the random selection of attendees at a free, temporary medical clinic. A survey comprised of demographic, socioeconomic (SES), health, and dietary questions was administered to all participants via face-to-face interview. A capillary blood sample was obtained from all participants and a HemoCue photometer was used to measure hemoglobin and diagnose anemia. A sample of venous blood was collected from anemic women and children and sent to a laboratory for analysis. Anemic participants received vitamin supplements and nutritional counseling. Six community grocery stores were also visited to ascertain the types of foods available for purchase.

**Findings:** A total of 118 women (15-49 years of age) and 25 children (24-59 months of age) participated in the study. Prevalence of anemia was 22% among women and 20% among children. Blood tests revealed all cases of anemia were due to nutritional deficiencies, with iron deficiency being the primary culprit in 100% of children and 80.8% of women. Other causes of anemia in women were vitamin B-12 deficiency (11.5%) and combined iron and vitamin B-12 deficiency (7.7%). Among women, low SES was significantly associated with being anemic ( $p=0.008$ ) and enrollment in the government assistance program Oportunidades was associated with being anemic ( $p=0.042$ ). Vitamin supplement use was protective against being anemic ( $p=0.024$ ). Dietary assessments showed limited consumption of iron absorption promoting foods. Grocery store assessments revealed at least one type of meat and citrus fruit available for purchase at each store; however, leafy green vegetables were only available for purchase at one store.

**Interpretation:** All cases of anemia were attributed to nutritional deficiencies. While vitamins are a temporary solution, improved knowledge, access, and affordability of iron absorption promoting foods is needed in this community. Government assistance programs

like Oportunidades are available, but other subsidies may be necessary, especially for low SES households.

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### The effects of household assets inequality and conflict on population health in Sudan

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**Program/Project Purpose:** We explored the effects on health of both household asset inequality and political armed conflict in Sudan. Using the 2010 Sudan household survey, we evaluated the role of both household asset distribution (measured by the Gini coefficient) and armed conflict status at the state level. We measured associations with six health-related outcomes: life expectancy, infant mortality, height-for-age (stunting), adequacy of food consumption, teenage birth rates and vaccination coverage for young children. We hypothesize a relationship between household assets inequality, conflict and poor health outcomes in Sudan. We sought to understand the effects on health of both inequality and political armed conflict in Sudan, a northeast African country with seven international borders. Sudan's 31 million people represent diverse cultures, both Arabic and African. Sudan is a poor country, with a Human Development index of 0.41, ranking 171st of 187 countries. The country has suffered political instability since independence from Britain in 1956, with two revolutions and a 40-year civil war. Armed conflict in western Sudan and states bordering South Sudan are ongoing.

**Structure/Method/Design:** We analyzed the relationship between household assets inequality, conflict and health outcomes in Northern Sudan, using data from Sudan's recently released cross-sectional household health survey conducted in the period (March - May 2010). For most of our health outcomes, as well as for our measures of household assets and their unequal distribution. We used census data for measures of mortality rates. Data analysis: we used the statistical program "R" (a GNU free software project, <http://www.r-project.org>) to calculate Gini coefficients following the specification of two vectors:  $Gini(x, weights = rep(1, length=length(x)))$  where the first vector,  $x$ , is the z-score value of assets for each household, and where the second vector,  $weights$ , is the sampling weight for  $x$ . This second vector was necessary to calculate the Gini for Sudan as a whole since the survey sampling was a complex one, divided into various strata and clusters. Results: For each of six measures of health in Sudan, outcomes were significantly worse in the states with more unequal asset distribution, with correlation coefficients ranging between -0.56 (stunting) and -0.80 (life expectancy).

**Outcomes & Evaluation:** Wealth inequality and armed conflict predicted worse health outcomes in Sudan. Policies and public health strategies are required to address the distribution of resources and associated health problems.

**Going Forward:** Wealth redistribution in the more unequal states, as well as a political resolution of conflict, may improve population health.

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