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A Forgotten Population: Estimating the Number of Children Outside of Households in Cambodia

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Abstract Two national household surveys, the Demographic and Health Surveys and the Multiple Indicator Cluster Surveys, drive assessment of the Millennium Development Goals, Poverty Reduction Strategies, and other major international platforms in most low- and middle-income countries. However, little attention has been given to the fact that household surveys are limited to people living in households, therefore excluding some of the world's most vulnerable populations and including the homeless, people living in institutions, and migrant laborers. The situation of children living outside of households is particularly precarious because many of these children are also outside of families or in families that cannot adequately care for them. Deprivation and stress related to these early life experiences can negatively affect health and productivity across the life course. This manuscript reviews the issues facing children outside of households and argues for the importance of gathering robust data about this population to formulate responsive policies and services, mobilize resources, and foster accountability. Cambodia is highlighted to illustrate the recent work that the government has undertaken to quantify two key subgroups of children outside of households: children living in residential care institutions and homeless children living on the street or in other public places. The methods, ethical considerations, and implications of Cambodia's enumeration are discussed.

Keywords Estimation · Street children · Residential care institutions · Children outside of households · Cambodia

Two national surveys, the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS), drive assessment of the Millennium Development Goals, Poverty Reduction Strategies, and other major national and international platforms in most low- and middle-income countries. Such household surveys are essential to monitoring development progress and informing government priorities. Little attention has been given, however, to the fact that by definition, household surveys are limited to people living in households. Our most important source of global data systematically excludes some of the world's most vulnerable populations, including the homeless, people living in institutions, and migrant laborers.

While children outside of households may represent a small percentage of children overall, in almost all cases, they are living in extreme poverty. One estimate calculated that household surveys may overlook up to a quarter of the poorest wealth quintile (Carr-Hill 2013). Inclusion of these "missing millions" would paint a more realistic picture of child health, child nutrition, and socioeconomic inequality. In sub-Saharan Africa, for example, it is currently thought that 59 % of people in the poorest wealth quintile have access to improved water sources, but with adjustments for the missing millions, this figure could be as low as 13 % (Carr-Hill 2013).

The situation of children outside of households is particularly precarious because many of these children are also living outside of families or in families that cannot adequately care for them. These children lack the most fundamental

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protections provided by a permanently engaged and/or minimally resourced parent or caregiver, with grave consequences for their physical, intellectual, and emotional growth (Smyke et al. 2009; van Ijzendoorn et al. 2007).

Deprivation and stress experienced by children living in residential care institutions has been shown to cause anatomical changes in brain structure and function. Compared to children growing up in family environments, children growing up in institutional care have smaller amounts of gray and white matter and lower levels of electrical activity (Bick et al. 2015; Vanderwert et al. 2010). These changes in the brain measurably impede children from developing to their full capacities. For example, children raised in institutions have significantly lower IQs than their non-institutionalized peers and diminished emotional responsiveness (Smyke et al. 2009; van Ijzendoorn et al. 2008). Similarly, low achievement has been observed in executive functioning skills and school performance of homeless and highly mobile children who live in situations of extreme poverty (Masten et al. 2012).

Moreover, the disadvantages of childhood adversity appear to persist over time. As children who experience toxic stress in early life become adults, they are more likely to have poor health and limited productivity, compared to children who do not experience toxic stress (Anda et al. 2006; Felitti et al. 1998). On a societal level, this trajectory is a threat to equitable social and economic development and runs counter to national interests (Chan 2013).

The most critical period for intervening to reverse the effects of childhood deprivation and stress is in the first 1000 days of life. In fact, in one study, high-quality foster care was shown to reverse many of the cognitive and developmental delays associated with institutionalization if children were placed in foster families by 24 months of age, with decreasing benefits for children placed in foster care at older ages (Nelson et al. 2007). Interventions that are targeted at very young children tend to be cost-effective to society because the benefits reverberate throughout the life course, even though many of the returns accrue over the long term (Chan 2013; Gertler et al. 2014).

Yet despite the scientific and ethical imperative to respond to the care needs of children living outside of households, information about the magnitude and characteristics of this population is lacking. This gap in information impedes our ability to formulate responsive policies and services, mobilize resources, and foster accountability. Where data do exist, it is highly fragmented and of dubious quality. Estimates of the number of children outside of households tend to be conducted in relation to services provided, without robust sampling frames (Street Kids International 2013). The focus of estimates is usually on restricted subpopulations such as children on the street or children orphaned by HIV/AIDS without precise or consistent case definitions (Arora et al. 2015; Hatloy and Huser 2005; Retrak 2015). Longitudinal data on trends over time are non-existent. Such statistical obscurity compounds the marginalization that these children already face.

A Call to Action

Recognizing this gap, the US Government Action Plan on Children in Adversity, launched in December of 2012, lays out a coordinated policy to increase the coherence and accountability of US government assistance to vulnerable children internationally (US Department of State and USAID 2012). Through this mechanism, resources are being committed to place children outside of households on the map, strategically and statistically, and social welfare actors are beginning to take up this call to action (Clay et al. 2012).

Drawing on lessons learned from scientific methods to measure hard-to-reach populations, a comprehensive set of guidelines for the enumeration of children outside of households was developed in 2014 (Stark et al. 2014). These guidelines establish the rationale and technical foundation for monitoring children outside of households. By presenting several potential data collection methods and analytical techniques that could be applied to this population, the guidelines enable national and international actors to monitor children outside of households in a rigorous manner.

Cambodia is the first country to incorporate and adapt these guidelines as part of its national strategy for children. While some of the methods employed by Cambodia have been used to measure similar populations in other contexts, this is the first known application at the national level in a low- or middle-income country, as well as the first time that multiple groups of children outside of households have been measured in tandem (Gurgel et al. 2004; Hatloy and Huser 2005; Retrak 2015). The enumeration of children outside of households in Cambodia complements other high-priority government initiatives in the country to improve the protection of poor and vulnerable children (Ministry of Women's Affairs et al. 2014). The National Institute of Statistics has led the adaptation and implementation of the guidelines in Cambodia with technical support from Columbia University. The partnership has drawn on the strengths of the National Institute of Statistics in terms of local knowledge, access to trained enumerators, and strong linkages to other ministries whereas Columbia University has contributed methods, tools, and training materials. By establishing a collaboration that bridges academia and government, the project is well-positioned to produce findings that meet rigorous scientific standards and also respond to pressing policy questions.

The methods used in Cambodia have been designed to enumerate two key subgroups of children outside of households: children living in residential care institutions and homeless children living on the street or in other public places. Although there are likely additional subgroups of children

outside of households in Cambodia (e.g., children working as migrant laborers on farms, children living in brothels), these subgroups were chosen as proxies because they are thought to capture a large proportion of children outside of households in Cambodia and because they are relatively accessible with limited safety risks to the child or the enumerator.

Data collection has recently been completed in 24 sentinel sites across the country. The sentinel sites for children in residential care were selected by the National Institute of Statistics using the probability-proportionate-to-size method. This method allows for each study site to be selected with a probability that takes into account the size of the site, proportional to the total size of the entire sampling population (World Health Organization 2008). The sampling frame was constructed from the national commune database, which enlists community representatives to report data on a wide range of indicators on an annual basis. The sentinel sites for homeless children were selected by NGO partners working with this population. The final roster of sites captured a diversity of regions, population sizes, and numbers of children outside of households. This sampling approach was intended to enable a national estimation of the total prevalence of these populations of children living outside of households in Cambodia.

Methods for Residential Care Institutions

Many government, non-government, and bilateral agencies working in the field of child protection and care in Cambodia believe that the existing administrative data on children in residential care institutions in Cambodia underestimate the true number of children living in such facilities. There is also a commonly held belief that unregistered or improperly registered institutions are contributing substantially to this underestimation. At the same time, there are concerns that some institution directors are incentivized to over-report the number of children in their care as a means of procuring extra funding.

A methodology was therefore designed to allow for triangulation and verification of both the number of institutions and number of children in those institutions. First, key informant interviews were conducted to identify all known residential care institutions in a selected sentinel surveillance area. Then, each identified institution was visited twice (one visit during the daytime to review existing records and one visit at night to assess the degree to which the information in the registry was consistent with the children who were present). In addition to these components, individual interviews were conducted with all children between 13 and 17 years of age in the sampled institutions. These interviews gathered data on children's circumstances, including their education, work, health, and social support structures.

Methods for Children Living on the Street

Enumeration of children living on the street is complicated by several factors. First, the definition of "living on the street" is difficult to operationalize. Even the construct of "house" is not straightforward. For example, despite the fact that most outsiders would classify them as homeless, children who sleep in a shelter made of plastic tarps may not identify as street-living. Other children who are not homeless, but who work on the street to earn income on a daily basis, are often mistakenly classified as street-living by observers. In our study, children were classified as "living on the street" if they were under 18 years of age and always or sometimes lived on the street or in public places (according to self-report). They were also classified as "living on the street" if they slept in dwellings that did not offer approximately 3.5 m^2 of covered space per person and did not provide basic protection from the elements (Red Cross and Red Crescent 2011). This definition was established based on international standards, field observations, and extensive conversations with NGO outreach workers and members of the inter-agency technical working group guiding the project. The criteria were discussed until consensus was reached.

Second, street-living children are generally a mobile population. They have a tendency to occupy isolated, hard-to-reach locations and often have a deep mistrust of outsiders. For these reasons, traditional household survey methods will not be successful in capturing street-living children. Third, the ethics of engaging minors in research can be challenging, especially when the minors do not have an adult guardian who can consent on their behalf.

To address these complications, another multi-staged methodology was designed. As with the residential care institutions, the aim was to maximize quality control while undertaking the research in an ethically sound manner. First, two separate teams of enumerators conducted two independent counts on two separate days of all homeless children in a given sentinel site. Enumerator pairs were assigned small subareas within the sentinel site. The reason for the two counts was to use the overlap between counts (i.e., matching the same children identified in both counts) to estimate the completeness of the first count. The final estimate was calculated by multiplying the first count by the second count and then dividing this product by the number of matched respondents. This technique is known as capture-recapture or multiple systems estimation (Stephen 1996; Lum et al. 2013). For the purpose of this study, matching was achieved by comparing the following variables: family name, given name, nickname, sex, age, parents' names, and province of origin.

Second, all street-living children who were encountered were asked for the names and basic characteristics of their friends who also live on the street. The purpose of asking about children's social networks was to expand the reach of

the enumeration to children who might otherwise be elusive. The social network approach assumes that visible street children who are encountered by enumerators are networked with at least some less visible street children who are not encountered by enumerators. Friends named in the social network were added to the total for each count and included in the capture-recapture estimation.

As in the residential care institutions, individual interviews were conducted with all street-living children between 13 and 17 years of age to gather data on children's circumstances.

Ethical Considerations

Recognizing the extreme sensitivity of implementing a system that seeks to enumerate children living outside of households, the team spent considerable time and effort designing protocols and supports designed to protect the children involved in the enumerations. Eligibility for direct participation in interviews was therefore restricted due to concerns regarding the capacity of children under 13 to completely understand the possible risks and benefits of consenting to the collection of personal information. Children's participation in the research was of particular concern for children living outside of households who have no adult guardian to consent on their behalf. (Children under 13 were counted, but only their age and sex were recorded. Consent was not required.)

The minimum age of 13 years was selected based on extensive conversations with social workers in Cambodia who work with the target population and regularly observe children's decision-making skills in action. The minimum age of 13 was also consistent with another recent survey of children in Cambodia (Ministry of Women's Affairs et al. 2014). Furthermore, the process used for determining eligibility is consistent with current international recommendations, which state that adolescents' ability to meaningfully participate in the consent process is informed by their cultural and experiential context (Alderson 2007; Petersen and Leffert 1995). Given the independence and responsibility required of street-living children and children living in residential care institutions, it is within accepted reason to argue that adolescents in these situations are mature minors capable of making informed choices (Ritterbusch 2012).

Identifiable information was recorded only for 13- to 17-year-old street-living children. Collection of identifying information for this group enabled a complete and statistically rigorous enumeration of street-living children by allowing researchers to evaluate the overlap between different counts through capture-recapture methods (capture-recapture could not be performed on the subset of data from children younger than 13 years of age). To ensure confidentiality of the identifiable data, data was only accessible to research team leads on a password-protected server. All identifying information was deleted immediately after matching was complete. Still, despite these precautions, there remained a small risk that confidentiality would be breached, hence the requirement of informed consent and the restriction against participation by children under 13 years of age. Raids and arrests of street-living children regularly occur in Cambodia, and therefore breaches of confidentiality could have serious consequences for this population.

Double-counting was less of a concern for children in residential care institutions compared to street-living children due to the limited mobility of this population. Collection of identifying information for children in residential care institutions was thus deemed unnecessary. However, the reason that interviews in residential care institutions were also limited to children 13 years of age and above was due to the potential emotional risks that the interviews might involve for young children.

Many data collectors were hired through partnerships with local NGOs and thus already had substantial experience working with vulnerable children prior to this study. Regardless of prior experience, all data collectors received training on child protection as part of the study procedures. Specific referral protocols were established for data collectors to follow if they encountered a child who was in danger or asked for help, and these protocols were codified in a statement signed by all data collectors. All children who were encountered were given a small snack whether or not they consented to participate in the research.

Ethical approval was obtained from the Institutional Review Board at Columbia University (AAAP2507) as well as the Cambodian National Ethics Committee. Both committees agreed with the procedures described above. We advised researchers to plan for extra time for the dual review process when developing project timelines.

Implications and Applications

The ultimate goal of the enumeration is to quantify trends in populations of children outside of households by estimating the size of this population at several points in time using easily repeatable methods. All methods were designed to yield statistical measures of accuracy for all estimates, which are standard for counts of other populations but new for children outside of households. When the baseline results from this first estimation are released, they will be used to set national reduction targets, propose solutions, and advocate for funding in the same manner as routine data on HIV/AIDS, primary school enrollment, and other social issues. In particular, the findings will help shape the direction of the Family Care First Initiative, a multi-year process to create and implement solutions to measurably reduce the number of children living outside of family care in Cambodia (USAID 2015). Another

enumeration will be conducted in Cambodia in 3 to 5 years, and data from this follow-up enumeration will be compared to the baseline to assess progress. Benchmarks will be tracked on a national scorecard.

USAID and other partners are also exploring similar enumerations in other low- and middle-income countries where there are thought to be significant numbers of children living outside of households and there is a strong government commitment to an inclusive child development agenda. Although methods in other countries will necessarily need to be adapted based on local circumstances, it is hoped that core methodological elements can be standardized across countries to facilitate cross-country comparisons. Fora to encourage south-south exchanges between countries should be supported to foster ongoing learning.

By investing in marginalized children, we have the potential to mitigate the deleterious effects of poverty, social inequality, and exclusion. Evidence has shown that these investments can sustain long-lasting gains that benefit families, communities, and nations (Engle et al. 2007; Irwin et al. 2007). In developing robust, population-based approaches to monitor children currently invisible to the system, we have the opportunity to recognize and reach millions of the most vulnerable members of our society.

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