Preventive Medicine and Community Health

Research Article ISSN: 2516-7073

Implementing the census-based, impact-oriented approach to comprehensive primary health care over three decades in Montero, Bolivia: 2. Program achievements, including long-term trends in mortality of children and mothers

Dardo Chavez[1], Mitma Claure[1], Hilary Moshman[2], Nathan C Robison[1,2], Ramiro Llanque[1] and Henry B Perry[2,3*]

[1]El Consejo De Salud Rural Andino, Montero, Bolivia

[2]Curamericas Global Inc, Raleigh, North Carolina, USA

[3]Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

Abstract

Background: Even though strengthening primary health care (PHC) is now widely accepted as essential for achieving global health goals, evidence regarding the long-term effectiveness of comprehensive PHC programs remains limited. In contrast, the evidence for effectiveness of selected interventions assessed over shorter periods of time is abundant.

Objectives: This report is the second in a series of two papers. The first paper describes the history and implementation features of the census-based, impact-oriented (CBIO) approach by the *Consejo de Salud Rural Andino* (CSRA)/Montero Comprehensive Primary Health Care Program that has been in operation for three decades, since 1988. This second paper in the series presents evidence of program effectiveness, including long-term trends in child and maternal mortality.

Methods: We reviewed available documents, prior evaluations, and health information system data. We carried out interviews with 19 key informants. Finally, we reviewed data from the program's health information system, which contains vital events and related information (including cause of death) arising from routine systematic visitation of all homes in the program area at least every six months.

Results: A comprehensive PHC program that incorporates principles of the CBIO approach has achieved near-universal coverage of key child survival interventions and achieved levels of child and maternal mortality comparable to those in the United States. The CSRA/Montero Comprehensive PHC Program is now also addressing non-communicable diseases. Community collaboration, routine systematic home visitation, and targeted visits to high-risk households are vital components of the program.

Conclusions: The CSRA/Montero Comprehensive PHC Program provides an example worthy of replication, expansion, and further rigorous evaluation. CBIO principles are relevant for strengthening the PHC movement, achieving Universal Health Coverage, ending preventable child and maternal mortality, and eventually reaching Health for All.

Abbreviations: CBIO: Census-Based Impact-Oriented; CBPHC: Community-Based Primary Health Care; CSRA: *Consejo de Salud Rural Andino* (Andean Rural Health Care); IRB: Institutional Review Board; TB: Tuberculosis; USAID: United States Agency for International Development.

Introduction

The previous article in this series [1] described the history and implementation of the comprehensive primary health care (PHC) program over three decades (1988 to 2019) by the *Consejo de Salud Rural Andino* (CSRA) in Montero, Bolivia and its application of the census-based, impact-oriented (CBIO) approach. This article is the second of a two-part series of articles that describes a comprehensive PHC program in a peri-urban area of the city of Montero, Bolivia, that has been in operation for 32 years. This second article presents evidence of the program's effectiveness in delivering services to the population it serves and changes in mortality of children and mothers.

Methods

The information provided in this article was obtained through document review, key informant interviews, observation of program activities, and analysis of data from the CSRA/Montero Program's health information system. Some of this information was obtained by one of the co-authors (HM) and two local interviewers working with her in 2010. Detailed findings of these activities are available elsewhere

Correspondence to: Henry B Perry, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA, E-mail: hperry2@jhu.edu

Key words: *Community health, primary health care, maternal health, child health, peri-urban health, census-based impact-oriented (CBIO) approach, community participation, Bolivia*

Received: May 02, 2020; **Accepted:** May 15, 2020; **Published:** May 25, 2020

[2]. The qualitative data collected in 2010 consisted of key informant interviews with 16 program staff and three community leaders along with observation of activities inside the health centres and in the program neighbourhoods. Topics explored included the history, current program activities, health impact, and lessons learned. Additional key informant interviews were conducted in 2019 with the program leadership staff by two of us (HP and HM). Further details about the methods are provided in the first paper in this series [1]. Further details about the 2007 household survey to measure population coverage of key services have been reported previously [3]. The procedures for the key informant interviews are described in the first paper [1].

Mortality rates for children younger than 5 years of age (hereafter referred to as under-5 children) were calculated for each time period by dividing the number of under-5 deaths by the number of live births during the same time period for the entire program area and then multiplying this by 1,000. Maternal mortality rates were calculated similarly except for multiplying the risk by 100,000. The 95% confidence intervals were calculated using the following formula, where P is the mortality rate (expressed as a proportion calculated by dividing the number of births by the number of deaths) and n is the total number of births: $P \pm 1.96\sqrt{((p(1-p))/n)}$. Cause of death was determined from a non-standardized verbal autopsy carried out by a program nurse during a follow-up home visit.

Results

We present here findings that concern the effectiveness of the CSRA/Montero Program that are obtained from key informant interviews, from formal assessments of the TB program, from household surveys regarding the population coverage of key interventions, and from analysis of the vital events data.

The importance of teamwork, staff commitment, and home visits

From the perspective of CSRA staff, the routine home visits, the follow-up home visits to monitor the status of sick children, the quality and attitude of the health staff, and the quality of outpatient care at the health centres have brought the greatest benefit to the health of the target population. Typical of many comments made by those interviewed was from one staff member who stated that the provision of high-quality care has been possible

"… because of the support for and training of staff, the teamwork, and the staff's attitude toward their work. The CSRA/Montero [Program] work culture is such that the management encourages all personnel to think independently and creatively, and to develop personally and professionally through their work, such as the pursuit of higher education, improvement of work performance, and development of new skills…. The support for all staff to develop their abilities means that each staff member contributes as an equal on the team and that all are committed to their work and to the organization. They contribute towards the joint decision-making process and the growth of the program. Decision-making by the whole team averts a mistake that might be made by just one person [2]."

According to the program leaders, the Community Health Volunteers (later called *Vigilantes*), who carried out home visits, developed stronger communication and leadership skills, became more confident in making their own decisions, and increased their self-esteem and empowerment through having been given important responsibilities and professional support. The modest salary that they later received several years after beginning their work as volunteers has been an important source of additional income to their families. Many have gone on to become auxiliary nurses, and some have received educational scholarships from the CSRA/Montero Program to do so. Others have started their own small businesses such as selling cell phones, bread, tamales, or clothing.

The staff is committed to and believes in CBIO principles and the work required to faithfully implement these principles. Their work is a source of pride and empowerment. In 2010, one of the supervisors stated the following:

"How will I convince families to change their way of thinking that their health is important and that they have to do something about it? I have been face to face with professionals that say 'She doesn't want to receive help. It's not important for her, and I have visited her three or four times and she still doesn't care. So, if she doesn't care anymore it's her responsibility.' And I have learned through this [CBIO] methodology that it's not her responsibility. It's my responsibility. How can I make her learn? How can I make her to change her attitude? If it takes two years for this family to change, it's my responsibility for two years to walk beside them so they'll learn. That's what I've learned with this methodology. This is what I teach to young professionals" [2].

Although virtually all CSRA/Montero Program staff members are Montero natives, they found at the outset that gaining trust and support from the community was a great challenge. When the CSRA/Montero Program initiated household visitation, many residents refused home visits and vaccinations (which were given in the home). By 1993, most accepted the home visits, but about 60% of mothers still refused vaccinations for themselves and their children. In one dramatic example, a mother who had recently arrived in Villa Cochabamba from the highlands repeatedly refused tetanus immunization while pregnant. When her newborn died of tetanus she became one of the community's strongest promoters of immunizations. Now, almost all mothers not only accept vaccinations, but they bring their children to the health centre to be vaccinated. Today, the auxiliary nurses administer vaccinations at home (or at the mother's market stall where she works) to only a small minority of children.

New families who move into the area still pose a challenge. They must be educated on health topics and also be convinced of the benefit of obtaining health services. Moreover, it is difficult to provide continuity of care to a highly mobile target population, especially to children who need regular scheduled immunizations.

Although the CSRA/Montero Program has largely overcome the issue of residents refusing home visits, the time spent visiting the houses is another challenge. Because some residents are not at home at the time of the home visit or have moved since the previous visit, considerable time can be spent visiting homes without being able to deliver the intended service. However, the staff believes that the time and cost required to conduct visits is worth the benefit derived. The staff are convinced that household visits save the lives of women and children.

"Home visits have a cost, but compared to the benefit, it's very cheap. Because the … visit will help to save the life of children and women…. That's our goal—that children don't die.... The [CBIO] model tells us that [home] visits shouldn't have a cost; they have to be an investment, and we're investing [2]."

The tuberculosis program

The CSRA/Montero Program began its TB program in Villa Cochabamba and was the first program in the country to implement the DOTS strategy (Directly Observed Treatment – Short Course) recommended by the World Health Organization. As of 2010, the program had a 100% completion of treatment rate and a 100% cure

rate, and it has received several awards as the best national TB program in the country. The cure rate was 94% in 2018.

Expansion of coverage of services

In Villa Cochabamba, in the first four years of program operations (early 1988 to late 2001), the number of annual clinic consultations increased from 1,031 to 4,682, the number of annual home visits increased from 51 to 6,504, and the percentage of children 12-23 months of age fully vaccinated increased from 45% to 82%. In 1989, 90% of births occurred at home. By 2010, 98% of births in the CSRA/Montero Program area took place in a health facility.

A 2007 household survey in the CSRA/Montero Program area found that almost all population-based key child survival indicators had reached a level of 90% or greater: 94% of cases of childhood diarrhoea were treated with oral rehydration fluid or another recommended home fluid, 98% of children with rapid and/or difficult breathing were treated by a trained health provider, 99% of pregnant women received at least one antenatal care visit (and 83% received at least four), 96% of deliveries were attended by a trained provider, 94% of mothers reported that they washed their hands at appropriate times, 91% of mothers knew at least two post-partum danger signs, and 92% knew at least two danger signs among newborns [3].

Long-term trends in child and maternal mortality

The registration of vital events at the time of regular, routine home visits has made it possible for the CSRA/Montero Program to measure trends in child and maternal mortality. Figure 1 presents the annual under-5 mortality rates for the CSRA/Montero Program area based on the collected vital events and compares them to those for Bolivia as a whole, for urban Bolivia, and for the Santa Cruz Department. Starting with an under-5 mortality rate of 109 deaths per 1,000 live births in 1992, the rate in the CSRA/Montero Program area has gradually declined and since 2007 has been less than 7. The rate in 2019 was 3.2. By comparison, the under-5 mortality rate reported for Bolivia in 2018 was 27, and for the United States in 2018 it was 7 [4]. Over the past decade, from 2009 to 2018, the CSRA/Montero Program registered 4 maternal deaths and 11,802 live births, yielding a maternal mortality ratio of 33.8 maternal deaths per 100,000 live births for this 10-year period compared to 156 for Bolivia as reported in 2017 and 19 for the United States in 2017 [4]. Appendix Table 1 contains the actual under-5 mortality rates and their 95% confidence intervals.

Table 1 presents the annual numbers of births and deaths of mothers and children, and Tables 2-4 present the causes of death for children, mothers, and adults. Diarrhea was by far the leading cause of death among children at the outset of the program, followed by pneumonia/breathing difficulty. Complications of diabetes during pregnancy and eclampsia were the leading causes of maternal mortality. Among men 25-49 years of age, accidents/injuries were by far the leading cause of death, followed by cardiac disease. Among women 15-49 years of age, cancer was the leading cause of non-maternal death.

Discussion

The evidence presented here concerning the effectiveness of the CSRA/Montero Program suggest that a strong team has been established that is deeply committed to serving the people in its program area with high-quality services. The CBIO approach, through its emphasis on community partnerships and frequent home visits, fosters a sense of empowerment and responsibility among program staff for improving the health of everyone in the program area. The CBIO approach also makes it possible to achieve near-universal coverage of services for the benefit particularly to mothers and children, who now have levels of mortality that are equivalent to those in the United States.

The findings presented here strongly suggest that the features of this program deserve replication and scaling up both in Bolivia and beyond. The key features are (1) developing a census of the entire population,

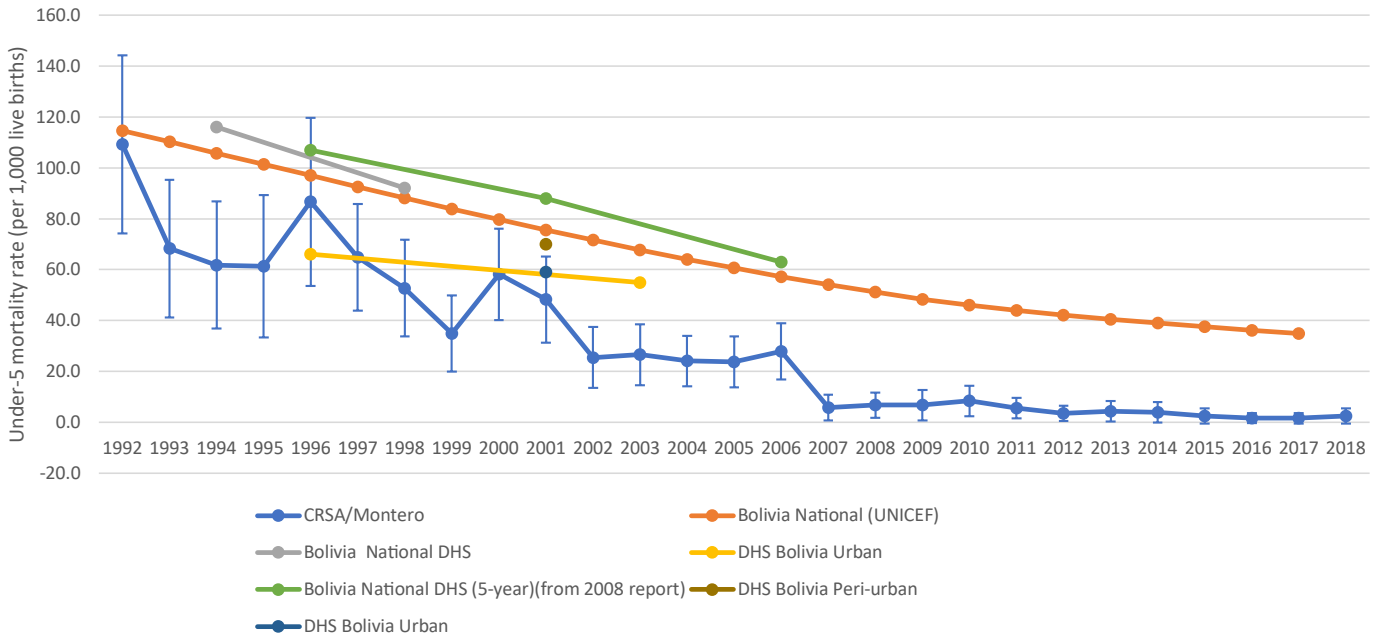

Figure 1. Long-term trends in under-5 mortality, CSRA/Montero Program area, 1992-2018, compared with those for Bolivia nationally, for the Department of Santa Cruz, and for urban Bolivia.
Note: 95% confidence intervals for the CSRA/Montero Program under-5 mortality rates are shown. DHS: Demographic and health survey
References: CSRA/Montero Program vital events data. Other sources of data: [14,15]

Table 1. Number of child and maternal deaths and number of live births by year, 1992-2018, CSRA/Montero Program

Year	Number of deaths among infants	Number of deaths among under-5 children	Number of maternal deaths	Number of live births
1992	16	33	1	302
1993	16	23	0	337
1994	13	22	1	356
1995	8	17	0	277
1996	14	25	0	277
1997	14	34	1	525
1998	12	28	0	531
1999	12	19	0	545
2000	23	36	1	619
2001	24	30	0	622
2002	8	16	0	630
2003	14	20	1	753
2004	17	20	0	832
2005	16	20	0	841
2006	18	24	0	861
2007	5	5	0	875
2008	5	7	0	1,046
2009	6	7	0	1,040
2010	5	9	0	1,071
2011	5	6	1	1,085
2012	3	4	0	1,184
2013	2	5	1	1,184
2014	4	6	2	1,275
2015	2	3	0	1,188
2016	0	2	0	1,235
2017	2	2	0	1,305
2018	3	4	0	1,235

Table 2. Causes of Death in the *Consejo de Salud Rural Andino*/Montero Program Area, 1998-2018

Number of deaths by cause among children younger than 5 years of age		
Cause	**Age at death**	
	0 ≤ 12 months	**0 ≤ 5 years**
Diarrhea	78	146
Pneumonia/breathing difficulty	68	81
Undernutrition	22	43
Accident/injury	12	29
Infection (unspecified)	15	18
Abdominal disorder (without diarrhea)	10	14
Fever	10	11
Meningitis/encephalitis	8	10
Prematurity	10	10
Cancer	1	7
Congenital deformity/defect	4	7
Intrapartum-related event/birth asphyxia	6	6
Hepatitis	2	4
Anemia	2	3
Bleeding	1	3
Low birthweight	3	3
Neonatal jaundice	3	3
Allergic reaction	1	2
Cerebral palsy	1	2
Dysentery	1	2
Congenital syphilis	1	1
Dengue	0	1
HIV	1	1
Measles	1	1
Neonatal tetanus	1	1
Post-operative complication	1	1
Other	13	16
Total	**276**	**426**

Table 3. Causes of maternal death in the *Consejo de Salud Rural Andino*/Montero Program Area, 1998-2018

Cause	Number
Diabetes	8
Eclampsia	6
Pulmonary embolism	5
Abdominal disorder	4
Infection	3
Anemia	2
Hemorrhage	2
Malnutrition	1
Poisoning	1
Renal condition	1
Respiratory condition	1
Other	2
Total	**36**

Table 4. Causes of death in the Consejo de Salud Rural Andino/Montero Program Area among adults 15-49 years of age (excluding maternal deaths), 1998-2018

Cause	Females	Males	Total
Accident/injury	16	81	97
Cancer	52	13	65
Cardiac disease	21	31	52
Abdominal disorder	7	11	18
Tuberculosis	8	7	15
Diabetes	8	4	12
Liver disease	3	9	12
Neurological disorder	4	7	11
HIV/AIDS	0	7	7
Embolism	5	2	7
Renal disorder	4	2	6
Anemia	1	4	5
Infection	0	4	4
Rheumatological disorder	3	1	4
Pneumonia	1	2	3
Hypertension	1	1	2
Anemia/hemorrhage	1	0	1
Dengue	1	0	1
Post-surgery complication	0	1	1
Other	2	2	4
Total	**138**	**189**	**327**

(2) mapping and enumeration of households, (3) regular visitation of all households to provide health education, build trust, identify health needs, and register vital events, and (4) develop a health information system based on family health folders that are identified by the number of the house in the census and that can be taken with the health staff member for the home visit.

CSRA has a track record of excellence in PHC programming on the northern Altiplano for more than a decade in the 1980s and 1990s and in Montero since 1988. The CBIO approach and CSRA's implementation of it have served as a model for the government of Bolivia's national health services. One of the outcomes has been the national implementation of visits to homes with at-risk mothers and children (Franz Trujillo, personal communication).

The registration of vital events at the time of routine visitation of all homes is not a widespread practice among PHC programs. The need for "real time" mortality monitoring of health programs has been widely recognized [5], and the accuracy of vital events registration by community health workers has shown variable results in trials from Ethiopia, Malawi and Mali [6]. However, in none of these field tests was routine visitation of all homes an embedded activity of the community health workers as is the case in Montero and with the CBIO approach more generally.

An innovative program in peri-urban Mali implementing frequent home visits and facilitation of referral of sick children has achieved an under-5 mortality of 7, the lowest yet reported for Africa [7]. Elements of the CBIO approach (mapping of all households and census registration along with routine visitation of all households) have been incorporated into large-scale programs in Bangladesh (the Manoshi Maternal, Neonatal and Child Health Project serving 7 million people in the slums of urban areas of Bangladesh [8]) and Ethiopia's national Health Extension Program serving 100 million people [9].

The CSRA/Montero Program is one of only a few PHC programs that have documentation of evidence of longer-term under-5 mortality impact. A comprehensive review of programs published in 2017 identified only four programs with evidence of 10 or more years of impact [10]. Since then, the above-mentioned program from peri-urban Mali has demonstrated 7 years of mortality impact [7]. All of the programs have similar features, including regular visitation to all homes in the service area.

Limitations

The findings reported here are for a small program, serving at present a population of 40,000 people. Of course, the findings would be more significant if they had been achieved in a larger population. However, the findings reported here together with the evidence of CBIO program effectiveness from other programs in Bolivia and beyond collectively provide a strong argument for further development of the CBIO approach. In addition, the length of effectiveness of the CSRA/Montero Programs adds to the strength of the evidence despite the small size of the program population.

Another limitation is that the vital events and other monitoring data have all been collected by the CSRA/Montero Program staff and have not been externally verified. Underreporting of deaths could lead to artificially low mortality rates. However, even if errors or biases had crept into the monitoring data, it is highly unlikely that they would have been sufficient to have had any notable effect on the overall findings.

Finally, in the absence of a control area that is similar in all respects to the CSRA/Montero Program, we cannot claim with certainty that the program was responsible for the low mortality achieved. Nonetheless, our findings are consistent with that conclusion and are bolstered by the high coverage of key child survival interventions against the leading causes of under-5 mortality in the program area (diarrhea and pneumonia) and of high coverage of antenatal care and safe delivery.

Broader implications

The recognition that strong and effective PHC systems are essential for achieving universal health coverage as well as for achieving optimal and equitable population health is now moving into the forefront of discourse on global health and development. This is reflected by the attention it received at the 2019 United Nations Global Health Assembly in New York City in September 2019. Multiple high-level calls were made by the Secretary General of WHO and other UN officials for countries to strengthen national PHC systems by increasing the investments in PHC by 1% of the gross domestic product (GDP) [11-13]. Further documentation of the effectiveness of innovative and cost-effective approaches to the provision of comprehensive PHC

services, such as that provided here, is needed to further fuel the gaining momentum for stronger PHC programming. We view our findings as a valuable contribution to the science and practice of comprehensive PHC and further validation of the CBIO approach as a methodology for improving population health through a comprehensive PHC approach.

Conclusion

This 30-year history of the Consejo de Salud Rural Andino/ Montero primary health care program in Bolivia provides an example of how community collaboration and community-based service delivery can produce excellent results at modest cost ($11 per capita per year as reported in the first article). The census-based, impact-oriented approach, as implemented in this example, deserves broader recognition as a valuable pathway for strengthening PHC services around the world. This description of the CSRA/Montero Program and its effectiveness provides valuable insights into the strengths of the CBIO approach for effective PHC programming.

Ethics approval and consent to participate

The Emory University Institutional Review Board (IRB) determined that the results were not generalizable as defined by the Emory IRB, and that IRB approval was not required. All those interviewed gave informed verbal consent. No information about those interviewed was obtained – only information about the program itself.

Availability of data and materials

The data from the CSRA/Montero Program's health information system used for this study are available from the corresponding author on request.

Funding

Curamericas Global and its donors (including the USAID Child Survival and Health Grants Program) provided start-up funding for the CSRA/Montero Program. As a graduate student, HM received a scholarship from the Rollins School of Public Health, Emory University, which partially funded her field research in Bolivia in 2010. Some of the work carried out by HP for this paper has been supported by the Gates Foundation, Grant OPP1197181. The funders had no role in the design of the study, collection, analysis, and interpretation of data and in writing the manuscript.

Authors' contributions

HM and HP wrote the first draft of this article. DC provided the leadership and ongoing support for the CSRA/Montero Program for the past three decades. MC provided program support for three decades. NR and RL have provided long-term support to CSRA and its programs in Bolivia. All authors participated in the development of this paper and approved the final manuscript.

Acknowledgements

We are grateful to the CSRA/Montero Program staff who assisted with the collection and analysis of the information reported here. In particular, we thank Mirtha Sanjines, Leticia Machuca, Daniel Ortiz, Victor Cordova, 19 key informants, and the qualitative research assistants Daniel Paredes, and Ronald Quezada. We are grateful to Stanley Foster for his guidance in 2011 for HM's master's thesis at Emory University. We also thank George Mwinnyaa for his assistance in preparing Figure 2. Finally, we pay homage to John Wyon for his guidance and support during the early years of this program which left an indelible impact on all the authors and the CSRA/Montero Program.

References

1. Chavez D, Claure M, Moshman H, Robison N, Llanque R, et al. (2020) Implementing the census-based, impact-oriented approach to comprehensive primary health care over three decades in Montero, Bolivia: 1, Program description. *Prev Med Commun Health* 3: 1-7.

2. Moshmanc H. Description and Impact Evaluation of a Model Community-based Primary Health Care Program in Montero, Bolivia. Thesis for the Master of Public Health Degree 2011 [30 April 2020]; Available from: https://etd.library.emory.edu/concern/etds/mw22v608n?locale=en.

3. Crespo R. Providing Child Survival Services to Rural and Peri-Urban Populations in Bolivia: Final Evaluation Report. 2007 [30 April 2020]; Available from: https://www.curamericas.org/wp-content/uploads/2015/06/CS18_Bolivia_Final-Eval-2007.pdf.

4. UNICEF. State of the World's Children 2019: Children, Food and Nutrition -- Growing Well in a Changing World. 2019 [30 April 2020]; Available from: https://www.unicef.org/media/63016/file/SOWC-2019.pdf.

5. Bryce J, RMM Working Group (2016) "Real-Time" Monitoring of Under-Five Mortality: A Vision Tempered by Reality. *PLoS Med* 13: e1001912. [PubMed]

6. Silva R, Amouzou A, Munos M, Marsh A, Hazel E, et al. (2016) Can Community Health Workers Report Accurately on Births and Deaths? Results of Field Assessments in Ethiopia, Malawi and Mali. *PLoS One* 11: e0144662. [PubMed]

7. Johnson AD, Thiero O, Whidden C, Poudiougou B, Diakité D, et al. (2018) Proactive community case management and child survival in periurban Mali. *BMJ Glob Health* 3: e000634.

8. Marcil L, Afsana K, Perry HB (2016) First Steps in Initiating an Effective Maternal, Neonatal, and Child Health Program in Urban Slums: the BRAC Manoshi Project's Experience with Community Engagement, Social Mapping, and Census Taking in Bangladesh. *J Urban Health* 93: 6-18. [PubMed]

9. Assefa Y, Gelaw YA, Hill PS, Taye BW, Damme WV (2019) Community health extension program of Ethiopia, 2003-2018: successes and challenges toward universal coverage for primary healthcare services. *Global Health* 15: 24.

10. Perry HB, Rassekh BM, Gupta S, Freeman PA (2017) Comprehensive review of the evidence regarding the effectiveness of community-based primary health care in improving maternal, neonatal and child health: 7. shared characteristics of projects with evidence of long-term mortality impact. *J Glob Health* 7: 010907. [PubMed]

11. UNGA. Resolution adopted by the General Assembly on 10 October 2019: Political declaration of the high-level meeting on universal health coverage. 2019 [30 April 2020]; Available from: https://undocs.org/en/A/RES/74/2.

12. WHO. Primary Health Care on the Road to Universal Health Coverage. 2019 [30 April 2020]; Available from: https://www.who.int/docs/default-source/documents/2019-uhc-report.pdf.

13. WHO. Countries must invest at least 1% more of GDP on primary health care to eliminate glaring coverage gaps. 2019 [30 April 2020]; Available from: https://www.who.int/news-room/detail/22-09-2019-countries-must-invest-at-least-1-more-of-gdp-on-primary-health-care-to-eliminate-glaring-coverage-gaps.

14. INE. Encuesta Nacional de Demographia y Salud, ENDSA 2008. 2008 [30 April 2020]; Available from: https://dhsprogram.com/pubs/pdf/FR228/FR228[08Feb2010].pdf.

15. UNICEF. Trends in Under-five Mortality Rate. 2019 [30 April 2020]; Available from: https://data.unicef.org/country/bol/.