



Cost-effectiveness of alternative models of CHW for Promotion of Maternal, Newborn and Childhealth in Northern Nigeria

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W4H Rationale for a CHW cost-effectiveness analysis study



- For work in Northern Nigerian communities a woman-to-woman approach is preferred for MNCH services, and W4H works to increase the supply of female health workers in 5 partner states in N. Nigeria.
- CHWs can support and enhance the productivity of the nurse/midwife.
 - There are different CHW models.....
 - Which type of female CHW is the most effective?
- CHW support entails costs, and cost-effectiveness analysis quantifies the trade-offs between maximal MNCH outcomes at minimal cost

Roll-out of the W4H Cost-Effectiveness Analysis Study



- Established partnership:
 - SURE-P MCH, sponsoring agency for VHWs
 - PRRINN-MNCH, program leading CV and JCHEW-CBSD programs in Northern Nigeria
 - Women4Health, provided the technical expertise on protocol design, supported data collection and analysis
- Joint development of study protocol to integrate data from three partner states (Jigawa, Katsina, Zamfara) into multi-state analysis comparing the three CHW models
- W4H led in implementation of the study, 2012-2014, with data contributed by the partners, states, and SURE-P.

CHW models adopted in Northern Nigeria



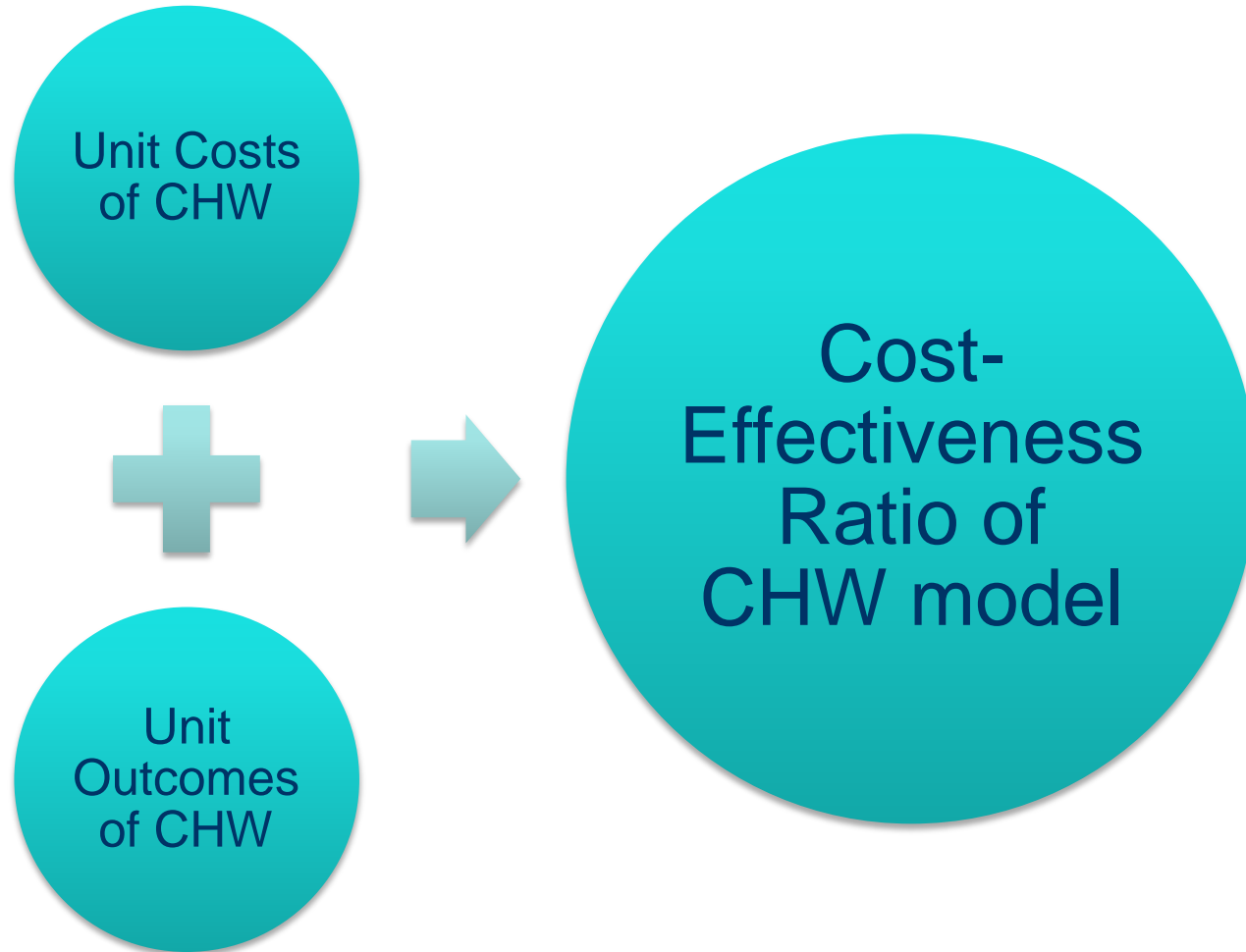
- **Community volunteers:** Developed by PATHS and PRRINN, volunteers recruited and trained by the state and NGO partners to educate on essential primary health care. Variants of CV in a variety of vertical health programs (malaria, immunizations, nutrition). Unpaid, but may receive per diem for mobilization days.
- **SURE-P MCH VHW:** Launched since 2012, recruited by the village but trained and mentored by a CHEW based at the PHC serving the area. Makes home visits to focus on promoting ANC and SBA. Volunteer but receives small monthly stipend.
- **JCHEW doing CBSD:** Scaled down version of the MDG CHW, providing CBSD to families in hard to reach communities, via home visits and satellite services. Adaptation of IMNCI, with many PHC services included in the package. Paid for full-time work.

Study Aim: Compare cost-effectiveness of these CHW models



- What is the most cost effective female CHW model to increase maternal health service utilization?
- What is the most cost effective female CHW model for increasing uptake of essential newborn care?
- What is the most cost effective female CHW model for improving maternal health outcomes?

What is needed to calculate a Cost-Effectiveness Ratio?



Methodology



- Collected data on inputs and their costs from each state and partner: Recruitment, training, supervision, support & materials.
- Documented specific activities of each CHW cadre
- Collected outcome data from household surveys & clinical registers
- Calculated the unit monthly and annual costs of each CHW type, normalizing by the # trained and active in each state
- Calculated unit outcomes based on the specific activities and coverage rates.
- Calculated unit cost per unit outcome for each CHW model, using data integrated across all three participating states
- Calculated cost-effectiveness ratio as unit costs divided by unit outcomes

Which inputs were included?

- # Persons mobilized or reached by the CHW
- # Home visits made
- # pregnant women educated about ANC and SBA
- # attending group education sessions
- Specific supports to maternal health
 - # Escorts to ANC
 - # Escort to SBA

Activity Inputs from the CHWs: Average Annual Interactions and Services per State by CHW model



Type of Interaction	CV (n=1727)	VHW (n=96)	JCHEW- CBSD (n=50)
Contacts between CHW and individuals villagers	68,590	19,648	24,602
Pregnant women educated about ANC and birth preparations	23,543	12,353	6,121
Referrals or escorts to ANC	NA	14,776	11,018
Referrals for SBA	1,761	2,613	6,121
Group education sessions	20,724	2,684	2,400

Activity Inputs from the CHWs: Average Annual Interactions and Services per CHW by CHW model

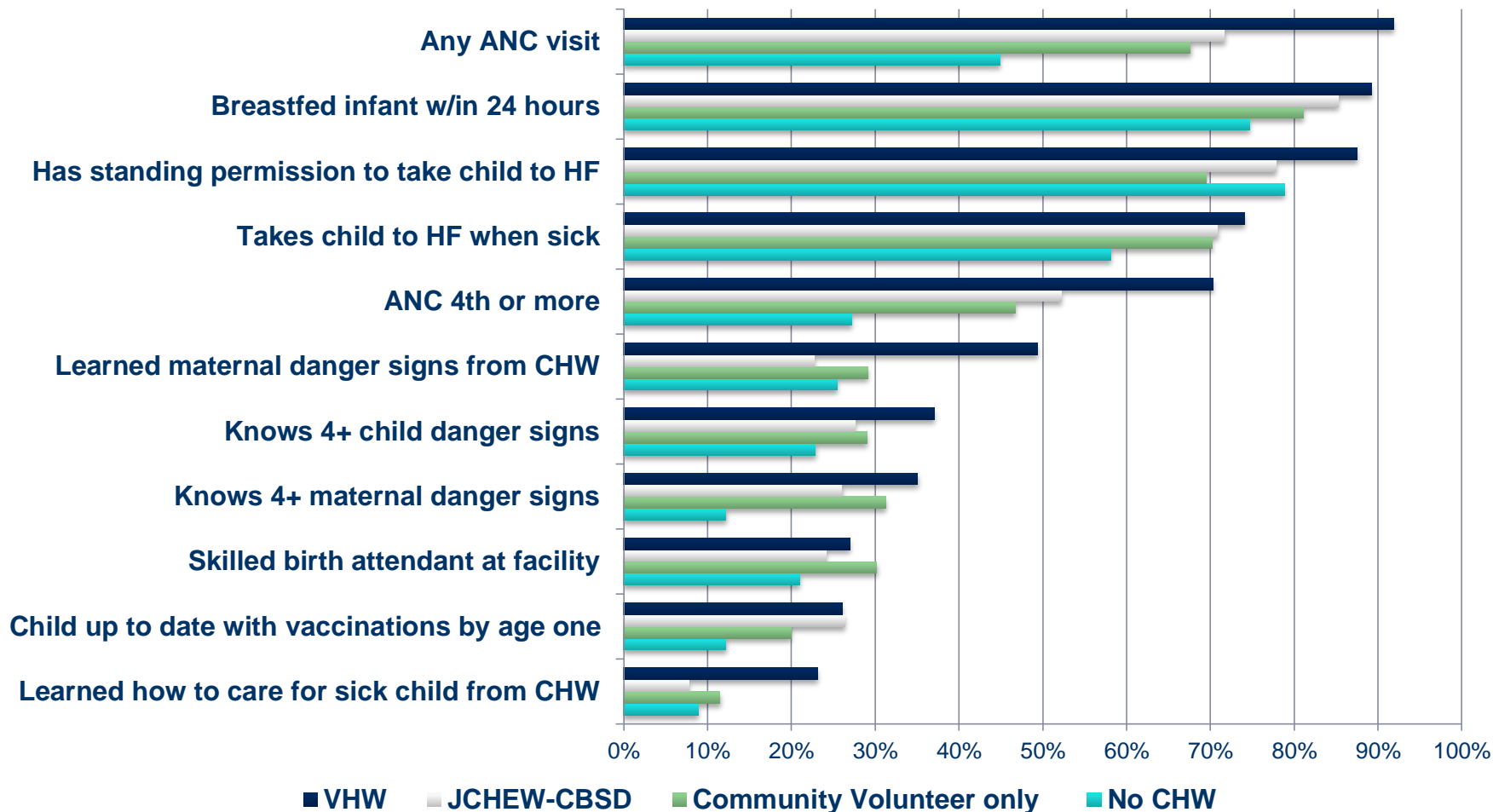


Type of Interaction	CV	VHW	JCHEW-CBSD
Contacts between CHW and individuals villagers	40	205	492
Pregnant women educated about ANC and birth preparations	14	129	122
Referrals or escorts to ANC	NA	154	220
Referrals for SBA	1	27	122
Group education sessions	12	28	48

Which outcomes were included?

- Any ANC visit to the PHC during last pregnancy
- At least 4 ANC visits in last pregnancy
- Infant delivered by a skilled birth attendant
- Changes in maternal health knowledge
 - Knowledge of Danger signs
 - Birth preparations
 - Newborn health check
- Immunizations for children (by age one)
- ***Double measurement of most of these outcomes from PHC registers, CHW activity records, and household survey of women***

Comparison of CHW outcomes (PRRINN-MNCH Endline Survey 2013)



Average Annual Facility Consultation Rates at PHCs with CHWs (per State per CHW model, 2012-13)



Outcome per CHW	CV 2012	CV 2013	CV Average	VHW 2012	VHW 2013	JCHEW-CBSD 2012	JCHEW-CBSD 2013	JCHEW-CBSD Average
				(pre-VHW)				
ANC1 visit	5.2	12.5	12.5	75.6	118	429.6	270.9	350.3
ANC4 visit	2.9	6	4.5	35.7	58.8	227.6	131.6	179.6
Any ANC visit	10.3	24.6	17.5	153.2	281	760.3	534.9	647.6
SBA for delivery	1.3	2.8	2.1	12.2	33.3	102	61.4	81.7
OPV at birth	2.4	3.7	3.1	32.6	54.9	169.5	81.2	125.4

Average annual costs per State per CHW model



	Planning & Review	<u>Personnel</u>	<u>Recurrent Costs</u>	<u>Start-up Costs (Amortized)</u>	<u>Recurrent Training</u>	<u>Total</u>
VHW	9,140 ₺	14,880,000 ₺	30,833,280 ₺	3,165,419 ₺	845,076 ₺	49,169,531 ₺
CBSD	3,002,000 ₺	27,828,048 ₺	2,866,250 ₺	1,067,766 ₺	1,859,800 ₺	35,832,065 ₺
CV	20,013 ₺	22,690,509 ₺	6,091,344 ₺	1,868,650 ₺	4,728,600 ₺	35,399,116 ₺

Unit Costs per State per CHW (Start-up costs amortized over 3 years)

CHW Model	Total Costs	Unit Costs
VHW	49,169,531 N	512,183 N
JCHEW-CBSD	35,832,065 N	716,641 N
CV	35,399,116 N	20,509 N

CHW units per state: CV=1727 active per year, VHW=96, JCHEW-CBSD=50

Cost-Benefit Ratios: Unit return per 1000 Naira invested



Unit return/1000 Naira	CV	VHW	JCHEW-CBSD
ANC1 visit	0.61	4.34	2.65
ANC4 visit	0.29	8.71	5.45
Any ANC visit	1.20	1.82	1.34
SBA for delivery	0.14	15.47	11.67
OPV at birth	0.18	9.33	8.83

Incremental Cost-Effectiveness Ratio (Naira/Health Outcome increment)

Naira/Health outcome increment	VHW model	JCHEW-CBSD Model
ANC 1	12,080	16,551
ANC 4+	22,172	65,149
Any ANC visit	4,005	5,429
SBA for Delivery	24,506	72,388
OPV at birth (newborn exam)	22,968	NA

Conclusions:



- The JCHEW-CBSD (comparable to the Ethiopian CHEW model) had the highest cost, the VHWs had costs 25% less, and the CV had by far the lowest unit costs
- The VHWs had the highest cost-benefit ratio for the basic MCH health outcomes, while the CV's had the lowest.
- The VHW model had the lowest incremental costs per unit outcome.
- Of the three models, the SURE-P VHW model offers the most promise for supporting cost-effective MNCH care in Northern Nigeria.

Recommendations to Nigeria based on the CEA study



- Consolidate support for the VHW model via the Road Map
- Strengthen funding for VHWs w. the National Health Act
- Integrate training of the VHW under the National Community Health Practitioner Board
- Retain models of CHWs directly linked to the PHC system, but avoid making duplicating roles and training so that they are like CHEWs at the facility.

Implications for other CHW programs



- These data highlight that “free” community volunteers do have costs associated with them. Investments are necessary for them to be productive, but our Nigerian case study suggests that they are less likely to produce the desired health outcomes than a slightly more trained and reimbursed CHW.
- Caution is needed in moving all the way to the fully empowered and trained CHEW-in-the-field model for CHWs, as they were outperformed by the VHW for every outcome and at every unit cost calculation.

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