Appendix S1. Detailed Methods

Chlorhexidine Coverage and Compliance Survey

Twenty-one districts were selected at random using sampling proportional to population size (PPS). From each selected district, 8 Village Development Committees (VDCs, a lower administrative unit comprised of 9 wards) were again selected by PPS, selecting a total of 168 VDCs from the 21 districts. After selecting the VDCs, 2 wards from each VDC were again selected using PPS; these wards were considered the primary cluster for this survey. So, 16 clusters were selected from each district, coming to a total of 336 clusters from 21 districts. A census/listing of all households in the identified clusters was carried out to determine the total number of households having a “recently delivered woman” (i.e. a woman reporting a completed pregnancy over the previous year, RDW). Clusters having more than 600 households were segmented. After conducting the census, 11 households with RDW were selected randomly, drawn from a hat. If the cluster had less than the required 11 RDW, the remaining samples were selected from an adjoining ward by repeating the census/listing procedure. If the selected households had more than 1 RDW, 1 was randomly selected to participate in the survey.

Tools were translated from English to Nepali. There were 2 sets of screening questionnaires and a structured questionnaire for the RDW. The first screening questionnaire was administered at the household listing stage to the head of the household or a knowledgeable person in the household in order to determine the existence of resident women 15-49 years who had been pregnant in the past 2 years. This form included information on the usual number of women age 15-49 residing in the households, and their name, age and marital status. For all ever-married women, further information was collected on their pregnancies over the previous 2 years. From among households in a cluster having RDW, 20 were randomly selected (if they had more than 20 eligible women) to proceed to a more detailed screening. The day after initial screening, interviewers returned to 11 households selected randomly from the 20 in order to approach each woman to solicit her written consent to participate in the survey and conduct a more detailed screening of her pregnancy(ies). All eligible women in the household were again screened to determine who was an RDW (with a pregnancy lasting at least 7 months since April 2016). In cases where the household had more than 1 RDW, 1 was randomly selected. If the household did not have an eligible RDW, a 12th household was randomly selected from the original 20 and the Screening 2 instrument was administered. If the household had an eligible RDW who was not at home at the time the interviewer visited, the interviewer returned later up to 3 times. If she was still absent, no replacement was sought. If RDWs were present and refused to participate, replacement RDWs were also not sought.

After confirming that a woman had had a pregnancy lasting at least 7 months since April 2016, the main survey instrument was administered. This included questions about respondent background and socioeconomic characteristics, knowledge, receipt and use of chlorhexidine, use and experiences of delivery care, immediate newborn care, and newborn care over the first month after birth.

A total of 40 supervisors, 80 interviewers and 4 quality controllers were recruited for the survey. All had previous experience working on similar surveys. A pre-test was conducted to test and refine survey instruments and field procedures and familiarize the survey team members.
Data collection was done over the period from late May through early August, 2017. Progress of the fieldwork was monitored closely from the New ERA central office. The field teams submitted collected data as soon as possible after gathering it. For this, 2 runners were mobilized throughout the survey period to bring the collected data from the field. All teams were provided a cluster summary sheet and asked to send the sheet after completion of each cluster via internet. The completed survey instruments were edited at 2 levels: first, by the field supervisors in the field and, then, by New ERA staff who checked them thoroughly before they were sent to the data entry department. The following measures were taken during the data collection period to ensure valid and reliable data: checking the correct identification of the RDW; ensuring each instrument was filled in correctly by checking it before terminating each interview; instruments checked by the Field Supervisor for consistency and errors; and interviewers wrote their names on the survey instruments, making it possible for clarification if certain information was not clear during the data coding and entry period. New ERA core team members also conducted several phases of fieldwork supervision throughout the fieldwork period. The team leader, research officers, research assistant, data supervisor and 4 quality controllers supervised the field work. During the monitoring, core study team members verified consistency and accuracy of the completed instruments, which was already checked in by the supervisors assigned in each team. Group meetings and interaction with the team were conducted and feedback was provided. Core team members checked the quality of data received from the field on daily basis. The list of data errors, notes from the field, and responses under the ‘others’ categories were all closely reviewed. The error messages for each cluster were checked and re-confirmed. The team members were given regular feedback, and when necessary, asked to explain inconsistencies.

Immediately after mobilizing the field teams, a software package for data entry was developed in FoxPRO (Microsoft Corp. Redmond, WA). Programming for data entry and analysis was done based on the survey instruments and expected outputs. A number of quality-check mechanisms, such as range checks and skip instructions, were developed to detect errors during data entry. New ERA started processing and entering the data soon after receiving them from the field. Before entering data, all completed instruments were thoroughly checked. Each was double-entered by 2 New ERA staff, and the 2 copies were validated using an edit program in FoxPRO. Errors in data entry were identified using consistency and logic checks of the 2 copies and followed-up by manual checking of completed instruments. A data programmer closely monitored data entry activities.

A wealth index score, as a measure of socio-economic status, was constructed for each woman using household assets and characteristics, including household ownership of radio, bicycle, mobile telephone, television, fridge, furniture, computer, and car; the type of materials used to construct the floor, walls and roof of the dwelling; and the type of water and toilet facilities the household used. Respondents were ranked according to this total wealth score and divided into quintiles.
FCHV Survey 2015

For a more detailed description of methodology - Advancing Partners & Communities. 2015. Female Community Health Volunteer (FCHV) National Survey Report. Arlington, VA: Advancing Partners & Communities, see...


Implemented by New ERA, under the APC project, as a nationally representative survey of Nepal’s Female Community Health Volunteer program, the survey reached 4,302 FCHVs. Systematic random sampling was applied with the ward as the primary sampling unit (with at least 1 FCHV based in each ward). A sampling frame of wards was developed; and a sampling interval was applied to randomly select every ‘nth’ ward until the appropriate sample for that domain was reached. Within each ward, if 2 or more FCHVs were present, a single FCHV would be randomly selected, so only 1 FCHV would be sampled for each ward. Sample selection was stratified by urban and rural wards to ensure adequate representation.

A mobile platform called Enketo was used to streamline quantitative data collection and analysis efforts. This was linked to another mobile platform called Survey CTO, which housed the data forms and the data. The paper-based survey was programmed into Microsoft Excel 2010 and uploaded into SurveyCTO’s online platform. The electronic form was then downloaded on to Enketo from the SurveyCTO platform on to Windows-based tablets, ready for use by data collectors. After data were collected and saved, they were sent to the SurveyCTO server; data were then saved there until all data collection was complete. The account was password-protected and only accessible to key staff working with the data.

A team of supervisors received training on data quality assurance methods, the re-sampling protocol, and on managing data collection teams in the field. During the training sessions, to provide context for their interviews, field staff received orientation on the commodities that FCHVs were distributing in the community, and on any registers or training materials provided to the FCHVs. Data collection was conducted in 3 phases between August 2014 and February 2015. Two supervisors from Kathmandu were responsible for monitoring field work through regular telephone communication with the field researchers. At the field level, supervisors from Kathmandu visited field researchers periodically, observed interviews, and provided feedback.

At JSI’s Washington, DC office, quantitative data from SurveyCTO were directly transferred into Microsoft Excel, cleaned, and uploaded to STATA 13 for data analysis. Univariate and bivariate analysis were conducted for key variables outlined in the analysis plan. Results were weighted based on the relative size of the districts in the 13 domains. Weights were calculated using ward as the primary sampling unit and residence (urban vs. rural) as the strata. For the purposes of this paper, analysis was restricted to the 42 districts where chlorhexidine had been rolled out by the time of the survey.

Ethical approval for the survey was obtained from the Nepal Health Research Council.

National Health Facility Survey 2015 (Apr – Nov)
This survey used methods standard to MeasureDHS’s Service Provision Assessment (SPA) surveys. A master list of 4,719 Health facilities in Nepal was obtained from the Ministry of Health and used as the sampling frame for the survey. Eighty percent of the facilities in the sampling frame were health posts. For private hospitals, only those with >14 beds were included in the master list. The sample (N=992) included all nonspecialized government hospitals, all private hospitals with ≥100 inpatient beds, all PHCCs and a sample of health posts and private hospitals with 15-99 beds. This data source was used to determine in-stock status for chlorhexidine, disaggregating by type of HF, and reported “routine use of chorhexidine as a component of newborn care”.

Nepal Ministry of Health—Health Management Information System: July 2016-July 2017

The Health Management Information System used by the Ministry of Health receives regular reports from from hospitals and peripheral level Health facilities offering birthing services as well as from some private hospitals and nursing homes providing childbirth care, notably for those participating in the government’s AMMA free childbirth services. Use of chlorhexidine after birth is one of the data elements captured and reported. For home births, female community health volunteers have contact with women at or after birth and document and report some interventions, including use of chlorhexidine. From Health facilities, close to 100% of expected HMIS reports are actually received. For FCHVs, approximately 90% of expected reports are received. Coverage calculations are made, using “expected live births” as denominator. This is calculated from census data. No specific measures have been taken to document data quality for reported chlorhexidine use.