

Rapid Assessment of Perceptions, Knowledge, and Practices Related to Immunization Injection Safety in Nepal

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Executive Summary

At the request of the Ministry of Health, UNICEF Nepal office, and the USAID Nepal mission, General Welfare Pratisthan used qualitative research methods to gain insight into immunization provider and consumer perceptions and knowledge about immunization injection safety and actual field practices. GWP also hired a legal expert to research and document Nepali policy related to medical injections. Financial and technical support was provided by the Gates Children's Vaccine Program at PATH, Seattle, USA.

During March–May 2001, key informant in-depth interviews and direct observations were conducted with 78 immunization providers and managers. Altogether, 42 immunization venues were visited. Twelve focus group discussions (FGDs) also were conducted with 122 mothers. Respondents came from 16 districts across the country and represent Nepal's ethnic and geographic diversity.

The team discovered that, in general, there were sufficient supplies of BCG, DPT, TT, polio and measles vaccines for the expected number of clients. However, a major problem is the lack of regular supply of other required materials, especially replacement parts, syringes, needles, and fuel for sterilization. Almost every provider interviewed reported lack or insufficient supply of kerosene and this ubiquitous problem seriously compromises the safety and effectiveness of EPI throughout Nepal. Many managers and field-level staff complained of needles being repeatedly used until blunt, causing pain and distress for clients. A shortage of syringes and needles is seen across the board in EPI.

The vast majority of immunizations are given with sterilizable syringes and needles. Steam sterilizers are used extensively, though in many venues they had been broken and there were no spare parts. In those cases staff usually would try to boil injection equipment for 20–30 minutes, but even then they had problems related to lack of stoves and fuel. Respondents also reported problems maintaining cold-chain equipment; fortunately, polio vaccine vial monitors (VVM) were found intact in all cases and none of them indicated excessive heat exposure.

The research team found that nearly all managerial level participants had received adequate training and had adequate knowledge of immunization issues and safe injection. They also had knowledge about at least some of the possible consequences of unsafe injections. The

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field level staff stressed that they had only received training once and that that was many years ago. They now need refresher training on immunization, safe injection, and handling and disposal of contaminated waste. A major concern raised by both the managers and field level staff is the age of many immunization providers. Most of the providers are above 40 years of age and many have problems related to failing vision, shaky hands, and other factors making it difficult for them to carry out their immunization outreach duties.

In general immunization injection equipment the team observed in use seemed to have been adequately sterilized. However, in some cases supplies of syringes and needles were inadequate and the provider did not immunize all the children with sterilized equipment. Some vaccinators reported that they dealt with this situation by changing only the needle and simply rinsing out syringes when supplies were low or clients were in hurry. Alarmingly, providers saw nothing wrong with this practice.

Disposal of contaminated medical waste, including disposable needles when used, is a serious problem. While providers are aware that they should handle and dispose of this waste carefully, it is rarely done. Instead, used supplies are tossed into a field or simply out the window of the clinic.

The research team got the general impression that providers were discouraged and immunization safety was compromised because of lack of supportive supervision and monitoring, lack of constructive feedback, and no appreciation for their hard work.

The vast majority of mothers had a positive view of immunization and want to get their children immunized. Most of them lack detailed knowledge about vaccines and the diseases they prevent, however they tend to trust provider assurances that immunization is necessary.

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Background

General Welfare Pratisthan (GWP) is an NGO registered in Nepal in 1993. For years GWP has been concerned about injection safety and the possible consequences of poor knowledge and practices related to the issue. From February to May 2000 GWP conducted a rapid qualitative assessment of public perceptions of injections and private sector injection practices in central Nepal with financial and technical support from the Bill and Melinda Gates Children's Vaccine Program at PATH. Following dissemination of the report in Nepal, the national EPI program and other interested parties, namely UNICEF and USAID, convened an Injection Safety Working Group in which they raised concerned about safety issues in the immunization sector. It is known that the EPI program faces substantial logistic challenges, but perceptions and practices relating to injection safety have not yet been appropriately assessed or documented. Due to the successful assessment and dissemination of the private sector study, GWP was asked by the working group to conduct a qualitative rapid assessment of injection safety in the immunization sector throughout Nepal. The group also asked GWP to review current laws and governmental policies related to injection safety. The Bill and Melinda Gates Children's Vaccine Program at PATH agreed to support the research.

Understanding that this study is exploratory in nature, the team adopted a qualitative research approach. They determined that a rapid appraisal using open-ended interview and observation guides would be the best way to obtain valid, in-depth information about immunization practices and reasons for those practices. It was hoped that these data could then be used to design program interventions or guide future research.

Study Objectives

1. Investigate the attitudes and knowledge of immunization service providers at various levels relating to injection safety;
2. Document injection practices by immunization providers to assess the feasibility of improving practices based on the facilities they have at hand; and
3. Analyze and document existing laws and policies regarding injection practice in Nepal.

Methods Summary

Mr. Mahesh Dev Bhattarai, Principle Investigator and Director of General Welfare Pratisthan and his team designed the study in collaboration with Mr. Scott Wittet, Director of Advocacy, Communications and Training for Gates Children 's Vaccine Program at PATH, designed the study. Mr. Prakash Adhikari, Project Manager and Mr. Adam Kane, a technical advisor assigned to GWP, worked closely with the design team to develop the interview and observation guides and to organize the training of the interview teams.

19 researchers successfully passed a 5 day training course followed by one day field training using guides in the field.. The interviews, focus group discussions, and observations were conducted from March-May 2001 in 16 districts across the country. The respondents came from urban and rural settings and from mountain, hill, and Terai districts. All interviews were conducted in Nepali, Maithali, Tamang, Sherpa or other local languages as per need in the field.

The research team had 89 interactions with total 199 immunization providers and consumers from Mountain, Hills and Terai of Nepal, including;

- 44 Key Informant Interviews with immunization providers,
- 33 Key Informant Interviews with immunization managers,
- 12 Focus Group Discussion with total 122 immunization consumers (mother's of children receiving immunization),
- 15 observations in the high-level immunization venues, and
- 27 observations in the field-level SHP/outreach immunization venues.

For further information see:

- Appendix A- Provider Qualifications
- Appendix B- Interview and Observation Guides
- Appendix C- Methods Details

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Findings from Observations

Findings are presented as general trends in the observation data, along with illustrative descriptions and notes on diversions from those trends, where appropriate. See Appendices C & D for more information.

The data were gathered through observation of immunization sessions at 42 venues including:

- 27 outreach venues and sub-health posts (SHPs),
- 15 health posts (HPs), public health centers (PHCs), and district hospitals
- 16 venues were in Terai districts, 25 in hill districts, and one in a mountain district

Characteristics of HP, PHC, and DPHO Observation Venues and Providers

Research Method	Service Facilities		Geographic Representation			Service providers		Sex of service providers		Total
	HPs	Primary Health Centers/District Public Health Office	Terai	Hill	Mountain	Village Health Worker/Auxiliary Health Worker	Assistant Nurse Midwife/Health Assistant	Male	Female	
Observation	08	07	05	09	01	11	04	09	06	15

Characteristics Of Field Level Outreach And Sub-Health Post Observation Venues and Providers

Research Method	Service Facilities		Geographic Representation			Service providers			Sex of service providers		Total
	Sub Health Posts	Outreach Sessions	Terai	Hill	Mountain	Village Health Workers	Mother Child Health Workers	Aux. Health Workers	Male	Female	
Observation	09	18	11	16	-	21	04	02	16	11	27

General description of immunization venues

Immunizations are given in a wide variety of venues. In addition to immunization sessions at static HPs and SHPs, we observed outreach sessions for injected immunizations in village development committee offices, medical shops, private homes, public schools, teashops, and temples. Some of these venues are near roads and some are more difficult to reach.

The researchers determined that the time it took clients to reach the venues varied from five minutes to five hours.

Some of the sessions were held in good facilities, but many were conducted in dilapidated buildings—we saw immunizations given in concrete buildings, wooden houses, mud huts, and outdoors. In many venues dust fell from the ceiling whenever anyone walked on the floor above (this is a common occurrence in wooden houses in Nepal). This situation makes it very difficult to maintain even basic hygiene at the sites.

By and large immunization venues were rather dirty and it is difficult to maintain good hygiene or aseptic conditions in them.

...The immunization venue was surrounded by dirt. Flies and spider webs covered every nook and corner in the room. Gusts of wind covered the immunization equipment with dust...Bankay District

...The immunization center was located in a very beautiful place but the center itself looked like a junk yard—the plaster in the wall was broken, there were holes in the floor, the doors were broken, etc... Illam

...The sub-health post where immunizations were given looked like a dump with all kinds of dirt. The back wall of the sub-health post was a public urinal—even the sub health post in-charge urinated there! Bankay

... Chickens came into the immunization site and pecked at the vials, thinking it was something to eat... Palpa

Among the static facilities, the HPs in district centers were the cleanest and sessions were best organized there. Facilities were also better there, including electricity for heating sterilization equipment, refrigerators for preserving vaccine, and availability of water. SHPs tended not to have such facilities, but some did try their best to maintain hygienic conditions.

Vaccine supply, storage, and handling

In all but two venues the researchers found sufficient supplies of BCG, DPT, TT, polio, and measles vaccine for expected clients.

In most sessions where there was no refrigerator, vials were brought in Igloo cold boxes with ice packs. In most cases the ice had melted by the time of the session, though the water inside generally was still cool. The temperature in the vaccine carriers ranged from 4 degrees C to 10 degrees C.

...In the district HP vaccines are kept inside the refrigerator until needed. They also have ice packs there... Kavray

...The provider replaced the ice pack immediately when he noticed that the ice had melted... Makwanpur

Polio Vaccine Vial Monitors (VVM) were still intact in all cases and none of the VVMs indicated excessive heat exposure.

Sometimes handling of vaccines during and after the session was not proper.

...In some locations we noticed that the provider placed unfinished vials in the dalin (ceiling) of the house. We don't know what will become of those vials... Illam

...When the provider arrived on his bicycle he brought immunization equipment packed in a plastic tiffin (lunch) box. On one side there were needles and on the other syringes... Saptari

Sterilization and handling of injection equipment and preparation for injection

Most providers sterilized their instruments one day before the session. Only a few sterilized instruments just before the session. There were a few providers who didn't bother with proper sterilization.

...At 10:45 the VHW came with an autoclave—it seemed that it had been used recently as it was still hot. After one hour the peon (servant) from the HP went to district health office and brought required vaccines... Dedeldhura

Most of the providers used the correct needle for a given vaccine medicine. Providers used 0.05 ml and 0.5-ml syringes. Twenty-six gauge needles were used for BCG injections and 23 gauge needles for other vaccines. Eighteen gauge needles normally were used to reconstitute measles and BCG vaccines.

Usually providers used sterilizable injection equipment, but in some cases they used disposable equipment. In a few cases they used auto-disable syringes also.

...In one medical shop, clients were asked to purchase disposable syringes for TT as well as for other immunizations (except BCG). Some clients brought disposable syringes with them, but always syringes still in the package... Kaski

...When clients were asked to bring disposable syringes for TT vaccine they demanded that the syringes come from the HP. When the VHW said that she could not provide them, the women left without being vaccinated... Saptari

... Except for BCG, clients were asked to bring their own disposable syringes from a shop for vaccination. When some clients complained that they did not have money to buy the disposables, the ANM gave them disposable syringes from the HP... Dhanusa

... In this PHC no special syringe was used for reconstituting vaccine. Instead, a regular syringe was used for that purpose... Dang

Almost all providers had autoclaves/steam sterilizers, but most of these pieces of equipment were old, unwashed, or damaged and out of service.

...The autoclave gasket valve was damaged, but it was used for sterilizing anyway... Illam

...The cover of the autoclave was rusted on the inside and the sterilized cotton which was inside the autoclave was also dirty... Saptari

...There was neither a stove nor autoclave. The provider was giving immunization without any sterilization... Rautahat

In general, kerosene, electricity, or firewood were used as fuel for sterilization. In six venues there was no source of heat at the venue and providers had to ask community members for assistance.

...One provider brought the autoclave and the other carried the cold box. The autoclave was given to a housewife for boiling—she brought back within half an hour... Makwanpur

...There was no autoclave in that the immunization center, but when clients asked how the equipment had been sterilized, the provider said that she boiled the equipment in her kitchen... Palpa

When sterilizing equipment during an immunization session, staff usually placed needles and syringes in the autoclaves without washing them first, though sometimes they did wash them. They heated the equipment in the autoclave from 25 to 35 minutes.

The study team did not see TST (Time, Steam & Temperature) stickers used on any autoclaves.

In almost all venues, the study team found that the needles were old and many were blunt, causing unnecessary pain to the child. The providers were seen injecting forcibly and the babies crying profusely.

...Some of the syringes brought for immunization looked yellowish instead of white because they were very old... Makwanpur

...During immunization in some sites we saw providers trying to straighten bent needles using their forceps... Palpa

In general only sterile injection equipment was used. However, in some cases supplies of syringes and needles were inadequate and the provider did not immunize all the children with sterile equipment.

...After vaccinating one person, the used needle and syringe were put in a separate bucket, the provider then prepared the next syringe for next child. During the whole session no syringes or needles were re-used... Rasuwa

...After the syringes and needles had been used, clients were asked to wait while the equipment was re-sterilized for about 35 minutes. Then the session started again... Danusha

...While handling the autoclave it fell and all the needles and syringes scattered on the ground. The provider picked them up and put them back in the autoclave to sterilize them again for 30 minutes, but we could not hear any whistle from the unit. Also, when picking up the needles and syringes first he used his bare hand but when he noticed one of our team member watching, he started using his forceps... Rasuwa

...The vaccinator only had two syringes to use for the entire session—these were re-used without sterilization. We were told that the SHP in-charge had the key to the storeroom and that he was not available... Rauthat

...After giving vaccine to one child he used the same syringe to vaccinate 3 to 4 other children... Rauthat

... While giving measles vaccine only one syringe was used for all the kids. The provider only changed the needles... Dang

Most providers used forceps to assemble the re-usable syringes and needles, but some used a combination of forceps and their hands, or their hands only.

...In spite of using forceps for assembling the syringe, the provider touched the needle and other parts of the syringe with his unwashed hands... Saptari

The immunization process

Male or Female Village Health Workers provided most immunizations. In one place they were given by the MCHW and in one site by an ANM. In general the staff were competent, but there were exceptions.

...The Village Health Worker was supposed to conduct the immunization session but she did not show up. Instead another woman came as a substitute, but she was not that experienced so she stopped after delivering a few injections. Later another lady came to conduct the session, but she also seemed untrained and was having a difficult time matching needles, syringes, and vaccines... Illam

...The provider looked at the card and began to prepare the BCG vaccine, but the mother interrupted and said that her child was supposed to get DPT not BCG. After re-examining the card it was found to be true and child received DPT... Rupendehi

...The VHW was old and his hand was trembling while he tried to administer vaccine. He had trouble drawing the medicine from the vial—sometimes taking too much, sometimes too little. When he gave BCG injections, sometimes all the vaccine ended up outside the body. It also seemed that his eyes were weak ... Kailali

In large venues like PHCs or hospitals more than one provider was involved in the immunization process, but in SHPs and outreach venues, there was only one staff.

The average time for an immunization was two to four minutes. However, in larger venues the average was only one to one and a half minutes. When providers were working alone, it took more time.

...The VHW was the only person handling the immunization, he was keeping the records, filling out the yellow cards, and giving vaccine also. It was creating delays... Rasuwa

In general interactions between immunization providers and mothers was good. Almost all providers were interested, friendly, and gladly gave information to clients in an appropriate way. In most of the locations clients knew providers well since they were from the same village—some were relatives or friends. Many jokes were made and the atmosphere was happy and friendly. However, a few providers scolded their clients if they asked questions. Those providers spent only a few seconds providing immunization and had almost no interaction with clients.

...The provider explained to every mother when she is supposed to return and for what vaccine... Kabre

... A mother mentioned that she had missed a routine vaccine for her child because she was at her maita ghar (parent's house). The provider explained that she could have given the baby's vaccination there as per the proper schedule. It was a new information for that village lady... Kaski

.....The providers explained that there was no need to worry if a slight fever comes after the vaccination... Rupendehi

...There had been little communication with clients about when and what time immunization was going to happen, so lots of village women were confused... Rauthat

...In this site we did not see any parent with a yellow card of vaccination. They had not yet been distributed in that area... Saptari .

Almost every site had a scale for weighing the child if he or she seemed thin. In those cases the providers suggested that parents provide good care and good food.

In several cases there was confusion about whether or not the BCG immunization had been effective. In two cases the provider re-vaccinated the child since the blister had not formed. This did not happen in every case, however.

...During the interaction one mother complained that even after three months the blister had not formed so she requested another BCG vaccination. But the provider said it will form so there is no need... Rupendehi

Most venues (except the district health post) did not have sufficient water for hand washing and other purposes, though a few did. We only observed four providers washing their hands—three did so only at the beginning of the session. Even if they went out to the toilet, they did not wash afterwards. The fourth, an ANM, washed her hands after each break.

In most of the venues TT and childhood vaccines were offered on the same day. But in three sites (HPs) there were separate days for children and other days for mothers to receive TT. In some venues providers tried to deliver the TT vaccine first, then shift to childhood vaccines. But some women came late—in such cases TT vaccine was alternated with other vaccines.

...In one location the VHW was vaccinating children while the peon (servant) was giving TT... Dhanusa

Handling of used injection equipment and disposal of medical waste

In general, used needles and syringes (disposable and re-usable) were handled more carefully and properly than other medical waste such as empty ampoules and vials and bloodied cotton swabs and bandages. Used injection equipment was usually put in special containers while other waste was thrown on the floor or ground. There were exceptions to these practices.

... All the used syringes were put in the inverted cover of the autoclave. Unfortunately, sterile syringes and cotton swabs were also kept in the cover, so there was a chance of contamination or confusing contaminated syringes for sterile ones... Saptari

...During immunization disposable syringes were thrown in a tin container. For the re-usable equipment, after separating the plunger from the barrel, the parts were put in a bucket full of water... Kaski

...This outreach session was held on the porch of a private house. The provider and clients just threw used cotton swabs on the floor. We saw a baby pick up a bloody swab and put in his mouth... Dang

Findings from In-depth Interviews with Managerial Level Injection Providers

Following is a list of trends in the data gathered through 33 in-depth interviews with injection providers at the managerial level. Among those interviewed are District Health Officers, EPI Supervisors, Cold-Chain Assistants, Staff Nurses, Medical Superintendents and District Public Health Officers. Sixteen districts, representative of Nepal's geographic and ethnic diversity, were randomly selected for this study. Illustrative quotations are also mentioned here. Notes on diversions from those trends, qualifications, and training details are included in Appendix A as appropriate.

Characteristics of Managerial Level Injection Providers in In- Depth Interviews

Research Method	Educational Level of Respondents		Sex Of Respondents		Geographic Representation			Age Range		Total
	# of Resp. passed SLC/IA	# of Resp. with Graduation & Above	Male	Female	# of Resp. from Terai	# of Resp. from Hill	# of Resp. from Mountain	20 - 40	41 - 60 above	
In- depth Interview	14	19	30	03	14	14	05	21	12	33

Experience

The formal qualifications, depth, and quality of training as well as experience working in the field of health, and particularly with the EPI program, varied considerably among provider/managers. Their experience in the health field ranges from 5 to 26 Years, experience in EPI related jobs from 1 to 14 years.

Perceptions about injections/immunization

Nearly all managers were well aware of the risks of unsafe injections, both to clients and providers, citing such risks as abscess, fever, swelling, infections, HIV, and hepatitis B.

*...Risks from unsafe injections range from very simple to very complex, but as we do not have any recording system about this, we can't solidly state the extent of the problem...with regard to risks from immunization sometimes we face abscess problems among a few kids...this can be because of blunt needles and sometime unsterilized syringes may bring such problems...
Dhanusa District*

...While giving measles vaccine in one HP... 4 out of 20 kids suffered from abscess...Rautahat

Many mentioned that immunization injections themselves are not dangerous, rather it is how they are given.

Many mentioned that low competence and motivation of some staff, difficulties in cold-chain maintenance, and lack of necessary supplies, such as needles, syringes, and kerosene compromise injection safety. Many managers requested retirement provisions for old staff, so that new younger staff can replace them.

...Because of lack of required equipment in the districts like steam sterilizers, stoves and fuel... and because we are using very old needles and syringes we face many problems related with EPI... Rupendehi

... Providers are too old, unable to give vaccination... Saptari

Most managers said that their staffs are not adequately trained and requested refresher training on vaccines, safe injections and disposal.

... There are many skilled stove repairers from India walking up and down this mountain. Why can't we train them in repairing the disordered medical equipment and mobilize them throughout the district for this purpose?... Mustang

Accountability and motivation of staff are also seen as a major problem. Solutions mentioned include better supervision with provisions for rewarding good work and incentives, especially for difficult outreach sessions. Some respondents mentioned that management training from NGOs had had a good impact in the past. Some respondents strongly emphasized the need for and importance of strict supervision and monitoring from the central and district levels.

...I've been working in this post for the last 5 years and till now my supervisor never visited my site and never asked any questions about vaccines or cold chain. So you can imagine what may be the situation below the district level... Rautahat

Several managers claimed there are no safety problems in EPI in their area (yet many of these same staff also described shortages and constraints that could compromise safety).

...There is no unsafe injection problem in the public sector it is only in the private sector... Bankay

Knowledge about hepatitis (HB) and thoughts about introduction of HB vaccine into EPI

Most managers have basic and accurate knowledge about hepatitis B, such as modes of transmission. Most have heard of HB vaccine, but the majority are uninformed about dosage and schedule.

Some responded that HB is not so common in their area and some that it is a big problem. But the majority did not know its prevalence because no testing had been done. A few thought that the Red Cross had some HB data.

...In Nepal...HB is a great problem...people should be aware and receiving vaccines...and all health staff should receive the vaccine... Dhankuta

...Great problem of HB in this area...there is high frequency...it is necessary to run a HB vaccine program...Saptari

The majority mentioned that that jaundice is very common. There is evidence of confusion about the different causes of jaundice and a sense that hepatitis B vaccination would prevent jaundice, which is an over-simplification.

...If HB vaccine is added to the EPI program, it should be named as a vaccine for yellow disease... then it will be effective... Kavre

Almost all managers were very positive about including HB vaccine in the EPI program. Many responded it could be easily included, and a few mentioned that additional training and resources would be required, and that public awareness campaigns should be run to educate the public about HB and the vaccine. A few mentioned the high cost of the vaccine, and were concerned that the EPI program would need special additional funding to make HB vaccine a continuous addition.

...I think there would be no problem if HB vaccine were added to EPI. EPI sessions are supposed to run for 21 days, but typically they only run for four or five days. VHVs, FHVs and other providers can use those unused days to give HB vaccine... Bankay

...Look even our current vaccines are possible only because of support from donors, and HB vaccine is very expensive so I do not think that HMG can afford this...But if some donor supported us then it may be possible... Makwanpur

Many said that HB vaccine is unavailable in their area, though some responded that it is available in the private sector. A few mentioned that local or international NGOs had carried out some HB vaccine programs, for example in schools.

Measles situation

According to managers, the measles situation in the last few years ranged from very few cases to highly endemic. Often outbreaks were seen in children 5 to 16 years old. Some districts reported success in measles control.

...For the last two years measles has shown up in about 100 kids each year... Even my own 7-month-old son suffered from measles two times within a 15-day period... People are now questioning if vaccinated and not vaccinated children are both getting measles, then what is the point of giving the vaccine... Rautahat

... Last year, the measles outbreak was alarming, with four wards and 103 kids affected...the reason is the same as before...our vaccine coverage is not more than 75%... Dhankuta

...In Kavray district now there is no measles problem... according to the New Era survey, Kavray's EPI program was found quite successful... Kavray

Many managers reported that poor and lower caste children, and those from remote areas, suffer especially from measles.

Many managers reported that considerable numbers of measles cases have shown up in children who had received the vaccine.

Managers attributed the situation to low vaccine coverage (estimated at 62-85%), problems in cold-chain maintenance, problems in sterilization, out-of-date vaccine, geographic inaccessibility, lack of awareness among certain communities and poor community hygiene. Solutions mentioned include improving coverage with better awareness, mopping up areas

with lower coverage, addressing the lack of awareness and motivation in marginal communities, better cold-chain maintenance, and better sterilization practices.

...Within this two year period in five to six villages we have found measles... It may be because the given vaccine quantity was insufficient or because the vaccine itself was damaged...Dhanusa

Safety in EPI

According to managers, nearly all immunization centers have autoclaves/steam sterilizers and vaccine carriers, and vaccines are reportedly in sufficient supply. Reusable needles and syringes generally are used for immunization purposes, except for TT immunizations, which are often or usually given with disposable equipment.

Insufficient and irregular fuel supply, poor condition of equipment (sterilizers, stoves and freezers), lack of maintenance of equipment, lack of required replacement parts, shortages of needles and syringes, and negligence on the part of staff often were cited as compromising safety in EPI. Some managers mentioned that sometimes fuel and electricity were unavailable for several days, affecting the deep freezers, and some said that deep freezers were broken or had been broken for some time. A few managers reported that even where they have electric equipment for sterilization, the electricity charges are beyond their budgets, so the equipment lies idle for a long time. TSTs (Time, Steam and Temperature stickers) are not in use, except in a handful of reported cases. Managers also mentioned the need for thermometers for sterilization and the cold chain, refresher training and incentives for staff, more supervision and better management at each level. Many mentioned that huge electricity bills are pending and were concerned that power supplies may be cut off if these are not addressed.

...As we are using old and broken steam sterilizers, and have no supply of kerosene, maybe sterilization is not being done up to the mark... Rupendehi

...for 6 months we have not received safe, new needles... Banke

...It is difficult to be sure about proper sterilization being carried out. In practice everyone seems to be doing it in his own way. Some say they have sterilized at home, and some are giving vaccine with a single syringe and needle and just washing with water...Rautahat

...We are receiving only 40% of required fuel so when we run out, the cold chain is not maintained...Illam

...There is no provision of refrigerator in this HP. How many days can we preserve vaccine by keeping it only in this Luxembourg (container for keeping vaccine cool) ...Rasuwa

Disposal Process

Nearly all managers were aware of many risks of improper disposal of contaminated needles and syringes. Many expressed concerns about the consequences of unsafe disposal, including risks to children.

...Disposal practice is a disaster here...every type of waste is collected and just thrown in the backyard of the site. Sometimes kids are found playing with syringes and we are lucky that till now we have not faced any accidents from needles...Dhanusa

Most managers reported the correct disposal procedure is to burn waste, and/or to bury it in a pit. A few reported that that is occurring and that there are not many problems with disposal.

Most reported, however, that disposal is a major problem. Much waste gets disposed of improperly, especially at the health post and sub-health post level. Some described the grounds surrounding sites as littered with waste.

...Disposal is a disaster... don't you see the needles and syringes just there? ...when the situation is like this in the district then imagine what it may be like in remote areas... Dhankuta

... If I admit frankly we do not have any system of burning or digging disposal items... Illam

Managers reported that staff lack training on proper disposal. Managers complain that there is no budget for disposal, and that even if they are aware staff are negligent. Nearly all managers said that in fixed sites peons [servants] are responsible for disposal and the vaccinator (VHW or MCHW) is responsible in outreach sessions.

Managers responded that clear regulations regarding disposal are lacking, and that mechanisms for management, supervision and enforcement of disposal procedures are urgently required. They believe that training at all levels, from managers to peons, is the most essential requirement.

...As a solution to the disposal problem...every center needs to have an incinerator and requires boxes for collection of disposal items... also we require training on proper disposal and its importance... Makwanpur

...I am a doctor and ultimately it is my responsibility but I need more training about disposal management... it is not always easy to apply theory into practice... I suggest giving training to each person from each immunization center...Illam

A handful of managers mentioned that the burning and burying of waste causes environmental hazards/pollution.

Improving coverage

Most managers thought that combining mobilization of local leaders with grass-root level groups mainly mother's groups and volunteers, would be the most effective way to improve the community response to EPI and to raise coverage. They also recommended creating awareness programs in local languages and in styles catering to local tastes (radio, TV, pamphlets, and posters).

...There is still a belief that a personal deity is annoyed by vaccines...there should be a special program in local languages to overcome this obstacle... Dhankuta

...In this district, in almost every village development committee, we have mothers' groups... so it will be very effective if we mobilize those groups in association with female health workers (FHWs) for immunization...Makwanpur

... School teachers, NGOs and local leaders should be mobilized. If this happens then the problem of negligence on the part of our staff will also be reduced...Illam

...For mobilizing more people... awareness programmes in the local language and in the local scenario are required. Documentary films will also work better. Campaigns like the one for TT can be used in this regard.....Dhanusa

Findings from In-depth Interviews with Field Level Injection Providers

Following is a list of trends in the data gathered through 44 in-depth interviews with injection providers at the field level. Among those interviewed are FHWs, AHWs, and Assistant Health Workers. The interviews were conducted in 16 districts representative of Nepal's geographic and ethnic diversity and randomly selected for this study. Illustrative quotations are also mentioned in this report. Notes on diversions from those trends, qualifications, and training details are included in Appendix A.

Characteristics of Field Level Injection Providers in In- Depth Interviews

Research Method	Educational Level of Respondents			Sex of Respondents		Geographic Representation			Age Range		Total
	# of Resp. Literate/ Low Literate	# of Resp. passed 5- 10 grade	# of Resp. with SLC or Higher	Male	Female	# of Resp. from Terai	# of Resp. from Hill	# of Resp. from Mountain	20 - 40	41 - 60 above	
In- depth Interview	01	19	24	29	15	20	19	05	20	24	44

Experience

Depth and quality of training/ experience varied considerably among providers, but most of them have had some basic training on immunization. After their initial basic training most of them have not received any further training.

The age of immunization providers ranged between 22 and 62, with most falling between 30 and 50, and a significant proportion above 40. The great majority of providers have experience working in the field of immunization from 5 to 25 years, with an average of approximately 10 years. Level of education received ranges from class 8 to SLC.

As most of the providers are middle-aged or older, they are well experienced but many have difficulties implementing outreach sessions, and some of them lack adequate vision. Peons (helpers) and other unqualified, untrained staff are providing immunizations in some centers. Detailed characteristics of the field level providers are mentioned in Appendix B.

Perceptions about injections/immunizations

Most providers adequately defined a safe injection as one with a new disposable syringe and needle, or with sterilized equipment. Some provided additional criteria such as safe handling procedures, proper maintenance of cold chain, and a handful responded that a safe injection is one that involves no risk to the recipient or provider. Some respondents did not know what an unsafe injection is. Knowledge that a clean disposable syringe was safe seemed to be widespread.

... Any injection which prevents diseases or enhances immunity power is a safe one...I don't know about safe injections...you write it down properly... Kailali District

...Women are coming for TT with their disposal syringes...One client, one syringe is a safe injection... Palpa.

...We encourage clients to bring disposable syringes... Dhanusa.

Knowledge about risks and consequences of unsafe injections nearly always included infection, fever, swelling, nodes, abscess and HIV. Some mentioned itching, fainting, rashes, unconsciousness, TB and hepatitis B. Abscesses are a well-known and frequent problem, and ranged from a few cases per year to a very common complaint. Generally, providers reported a few abscesses per month. They treat them by removing pus, stitching, and giving antibiotics. Abscesses requiring operations are referred to hospitals or PHCs.

...Sometimes mothers come with problems like their kids are sick, or have an abscess...these may happen because of unsterilized syringes or blunt needles... Dhanusa.

Some respondents mentioned that the DPT site sometimes becomes swollen and infected and some said that pregnant women complain about pain after TT. The respondents varied considerably about how many TT injections should be given—generally responses ranged from 2 to 5 (most reported that 5 should be received).

In outreach sessions, providers usually serve from 20 to 100 clients depending on location. In HPs and SHPs 50 to 150 clients are serviced. The average clients per session lies between 50 and 100 clients, however up to 500 clients have been reported for a single session (this was mostly for TT).

Providers report boiling needles and syringe 20 to 30 minutes after the whistle of the steam sterilizer (autoclave). Some providers reported that there are no unsafe injections in their area, yet later reported practices and constraints that could only compromise safety. A handful of providers reported that parents demand they use date-expired vaccines, and that women demand TT as they claim it cures back pain; in both cases the providers admitted complying with client demands.

Knowledge about Hepatitis

Most providers have heard of hepatitis and relate it to jaundice, which is usually locally known as 'yellow disease'. A few know that it is related to liver infection. Some reported drinking alcohol as a cause of hepatitis, and some mentioned special diets for prevention (such as sugar cane, papaya and carrots). Several had no knowledge of hepatitis.

The great majority had no specific knowledge of hepatitis B. A few had heard about it on the radio, but did not know about transmission or prevention. Likewise a handful had heard about the HB vaccine, but they did not know anything about it.

...HB may be transmitted even by air...Rautahat

A handful mentioned that the HB vaccine is available in the private sector in cities, that it is expensive, and that the government should be providing it. Government agencies are not providing hepatitis vaccine, and have not yet provided any information about hepatitis, HB or the vaccine to employees below the managerial level.

...In local language hepatitis is called 'PIARI' or yellow disease... Dhanusa.

Knowledge about Measles

Reports of measles in the last two years vary from just a few cases in some communities, up to a hundred cases per year. Several respondents reported that although there is not an epidemic, the number of cases is on the rise.

Many report that even after immunization measles has shown up. This has caused problems for EPI's public relations, as parents argue that "if measles is showing up even after immunization than what is the meaning of immunization?" In some communities, these types of events contribute to making immunization unpopular.

... People say measles is gosai (God's wrath), but we try to convince them that it may happen because of dirtiness...Kavre.

... Measles is not that common here...only 40/45 kids get measles each year...after receiving vaccine measles is not harmful...measles may also happen because of dirtiness, or lack of good food... here we are giving measles vaccine up to 36 months... Rautahat

... Measles sometimes shows up...we have Tharu communities...they are not interested for immunization... when there is no bread to eat then what is vaccination...One time police were mobilized to give immunization...if 40 members are in one family, not all show up for vaccination...only a few come from the same family.....Dhanusa

Providers mentioned many reasons for measles cases, including:

- Insufficient coverage (required coverage is 85%, but coverage is often 75% or lower).
- Problems in maintaining cold chain.
- Improper sterilization.
- Children are not receiving the full dose.
- Children have less immune power.
- Spirits causes sometimes measles.

According to providers, solutions to the measles problem includes improving coverage, locating and vaccinating missed babies on time, convincing marginal families and communities to come for immunization, better cold-chain maintenance, and quarantine of patients.

Sterilization & Vaccination

Most providers adequately described the sterilization process, and reported always sterilizing before giving vaccines. Some sterilize equipment in the morning before immunization sessions, some sterilize the day before the session and keep equipment in the steam sterilizer (SS) without opening it, but the majority carry SSs to outreach sessions and sterilize at the location or in the village.

... We always use sterilized syringes and needles...when clients brings disposal syringes, except for BCG, we use them... Kaski

Due to widespread lack of stoves and kerosene, providers are asking and often getting support from communities for sterilization. Many, however, report that they must struggle to

obtain fuel, usually firewood. Some providers sterilize equipment in ordinary buckets because many of the SSs are not in operating condition.

Due to frequent lack of sufficient syringes and needles, providers must re-sterilize on the spot, and clients may often wait up to 30 minutes.

...We generally don't have enough needles and syringes for the number of clients...so patients must wait for sterilization... Rautahat

...In our center because of pressure from clients and lack of sufficient syringes and needles we do repeated sterilization... Dhanusa

Some providers reported that they change the needle and just wash the syringe when supplies are low or clients are in a hurry. These providers saw nothing wrong with this practice.

...Syringes can re-used without sterilization for 2 or 3 people just with washing, but needles must be changed or sterilized... Dhankuta

...We ask clients to wait for sterilization for 30 min...but if clients are in a hurry...we just change the needle and wash the syringe... Rupendehi

The great majority of immunization sessions, both outreach sessions and those in HPs and SHPs, lack running water so hand washing is very rare.

Most females coming for TT come with their own disposal syringes and take them back home.

...For TT patients PHC doesn't provide needle and syringe...so clients must provide...either they buy at PHC or elsewhere... Dadeldhura

Some providers reported that they encourage clients to buy disposables and bring them to immunization sessions. A few said that sterilization is not always possible at outreach sessions, so in this case clients must provide their own equipment.

No providers knew what happens with clients' own equipment, with regard to re-use or disposal.

One provider mentioned using a TST, and explained its required color change. But no other providers had received TST or timer clocks, and the vast majority had never heard about TSTs.

Generally, the HP in-charge or the vaccine supervisor (from the district office) checks sterilization records, and occasionally others check them.

The two major problems expressed by providers are the need for new syringes and needles, and lack of kerosene. Generally needles and syringes are used repeatedly for months and months until they are blunt, causing pain for babies, distress for parents and difficulties for providers. One provider reported that his clinic had not been issued new supplies for fourteen months.

... One needle we use for more than 6 months... you can imagine what may happen to the kids when vaccinated...sometime clients lose cards... we do not have a timer or TST sticker...only

once was training received...we need more...also we need more syringes and new needles...Rautahat

... No fuel for sterilization... no appropriate location for the outreach session... sometimes I have to request for water...this is how I must manage...Kaski

The next major problem reported is the poor condition or lack of replacement parts. Many reported lack of stoves, many reported very old or broken steam sterilizers, and lack of parts for broken cold-chain equipment. The need for new steam sterilizers, or parts for broken ones, was very commonly reported. Providers also frequently reported needing soap, towels, separate space for giving and storing vaccines, running water and new vaccine carriers (bags).

Most of the providers received training once just before accepting their jobs, and since then have had no provision for skill development, refresher training or any kind of exposure. Most said that they need refresher training, on vaccines, safe injections and disposal.

A general impression from the respondents is that providers are becoming less serious and less committed towards their work because of no monitoring, no follow-up, no feedback and no appreciation for their hard work.

Field staff requested a field allowance for immunization providers.

Several respondents mentioned problems in management, especially that supervisors are frequently or usually on leave, compromising management. Also, some providers expressed frustration that their requests for new materials, and parts for broken equipment, remain unanswered for long periods of time.

Many providers reported that conducting outreach sessions all by themselves is very difficult, and requested another staff. Providers report that getting materials to outreach sessions is difficult.

... As I am now old I cannot carry VC, SS and fuel to OR sessions... so I need help from a peon... Palpa

... In the field...it is difficult for females to get shelter in the night while going for outreach sessions...Rasuwa

As fuel for sterilization is usually lacking, providers must ask for fuel from communities, often going door to door for firewood. A few even admitted having to steal firewood. Several providers reported that they must buy kerosene with their own pocket money, or take equipment to their houses to use their own kerosene for sterilization.

Securing an adequate location for immunization is a problem in outreach sessions; if conducted outside, wind, rain or strong sunlight may disturb, if conducted inside, the locations are often cramped and dirty. Generally, chairs, tables and running water are unavailable in outreach sessions. Straw mats must be managed from the community, which are always dirty and are risky to use for immunization.

Providers report difficulties in fulfilling the course of immunization in many villages, as mothers will bring infants once but will not follow the given schedule.

...When there is temporary migration... TT vaccine demand increases...and that also makes it difficult to fulfil the course of immunization... Rasuwa.

Disposal Process

The majority of providers know that used medical waste such as cotton swabs, empty vials, ampoules, blades for cutting vials and old needles and syringes are supposed to be collected and disposed of without putting the community at risk. Generally providers reported that waste should be put in a pit and either burned or buried.

...All the disposal items are put in a box then put in a pit and burned once a week...the responsibility of disposal is on the peon...Dhanusa

Many claimed practicing this procedure, but most accept that disposal is a big problem.

Many cannot secure proper places for dumping and burning. Some report throwing waste into wells, other into drainage.

...After immunization sessions... syringes and needles are packed in the SS and all the waste like saw, swab, vials, ampoules etc are put in a pit and burned after some time...there is always a big problem of location for pit and burning... Kaski

... Outside district health office...syringes, vials, saline drips are dispersed all around...even though they are supposed to burn them down...at HP and SHP they dispose anywhere...during Holi (a festival of colors) ten children were playing with needles and syringes... Illam

If providers use others' land for disposing of medical waste after a session, community people may become angry and threaten to not provide their space or houses for future outreach sessions.

Several providers reported that even when they dig pits, children may come and collect syringes and needles to play with. Many providers expressed concern that children are playing with disposed materials.

Generally, in outreach sessions the vaccinator is responsible for disposal, and at PHCs, HPs, and SHPs peons are responsible.

In practice there is no formal process, and procedures have not been fixed for disposal management. Some providers admitted that it is due to negligence that disposal is a problem.

... The office chiefs are responsible...but they sit on their chairs closing their eyes... Saptari

A handful of providers mentioned environmental pollution as one consequence of improper disposal.

Improving coverage

Providers emphasized mobilizing volunteers for outreach sessions, and asked for the provision of some monetary incentives for this purpose. This will apparently help them to get community assistance with fuel and sterilization in the field, which is a major problem.

In order to improve public participation in immunization, providers emphasized that female health volunteers and mothers groups have played a great role, and suggested mobilizing them by giving training, allowance and necessary materials. Also recommended was orientation for and mobilization of social workers, young volunteers, local opinion leaders and VDC members (particularly VDC watchmen).

Providers recommend that people need to be educated about the advantages of vaccines, and the disadvantages of not receiving vaccines. Communities need to be better informed about the schedule of vaccines. Many respondents mentioned that school education programs are needed, and that teachers could play an important role in increasing community awareness. Some providers suggest going through villages with a loudspeaker and microphone announcing sessions a few days before they are conducted.

Many providers said that illiterate, poor and marginal people need to be motivated with cultural programs, and specially addressed with colorful, pictorial educational material. Providers suggest using street-drama, role-plays, slide shows and video films based on local scenarios, in local languages. Many providers recommend simple materials like posters and pamphlets, with many pictures and photos, focusing on individual diseases and vaccines.

...There is a bad rumor that vaccines cause sterility... so some communities are against vaccines... Dadeldhura

...There is no response from villagers...when we come with vaccines...villagers are very illiterate and difficult to convince...Dhankuta

Findings from Focus Group Discussion with Mothers

Experience

Twelve focus group discussions with immunization consumers (mothers having children under 2 years of age) were conducted with a total of 122 respondents. In each district, as far as was possible, participants were representative of the local ethnic constituency. Illustrative quotations and notes on diversions from those are included, as appropriate. More information about respondent characteristics can be found in Appendix E.

The age of consumers varies between 17 and 35. All are housewives and most are illiterate.

Characteristics of Mothers in FGDs

Research Method	Educational Level of FGD participants				Geographic Representation			Age Range		Total
	# of Illiterate women	# of Literate/ Low literate women	# of 5 - 10 class passed women	# of SLC & IA passed women	# of women from Terai	# of women from Hill	# of women from Mountain	20 - 30	31 - 40	
Focus Group Discussion	43	40	28	11	41	60	21	113	09	122

Knowledge, Attitude and Behavior regarding Immunization

All the participants have some basic knowledge about immunization. Most participants, illiterate or literate, have a positive attitude about immunization and bring their children for immunization. A few mothers have negative views of immunization and do not want to trouble their babies with vaccines. There is still resistance from the older generation, however, who hold some negative attitudes about vaccines. In some areas, traditional healers exert a strong influence on local communities, and some try to discourage their communities from immunization.

.....My father and mother-in-law complain that in their time they did not give any vaccination and nothing bad happened, and ask why we are giving immunization and making kids cry...Dhankuta

Almost no participants know details about different types of vaccines and the diseases they prevent, but most follow the instructions of the local public health staff for immunization.

Most participants trust the services from health staff and the health staff themselves. Most participants from hill and mountain areas complain that immunization centers are very far and that walking long distances for immunization is a difficulty. These participants added that it is even more of a problem when they cannot get immunizations after making the long journey, and that this is their main concern.

Many women complained that because of crowds at outreach sessions, and because they are late to come home they may miss services and do not get the opportunity to learn about TT and other vaccines. In most immunization centers, due to a lack of enough staff, and a disorganized and hectic atmosphere, there are very few appropriate interactions between health staff and clients with regard to health issues and vaccines.

.....When I went to D___ for vaccination...could not get it...then I went to S___ ... there also I missed...they asked me to come next month... by then my kid was already 7 months and we got the chance to get only one immunization... Dang

... During immunization...if everybody could work in a team in the HP then maybe immunization will become fast and we can go home quickly... Rasuwa

Participants are quick to complain about adverse consequences, they frequently mention fever, crying of their babies, and numbness and pain following TT.

Knowledge about Measles, Hepatitis & Tetanus

Measles is frequently showing up in the community. In the last 2 to 3 years its frequency has increased. Most participants feel that measles vaccination is important. Most have a strong belief that measles after immunization has a less negative effect, but some express the sentiment that if measles happens even after immunization then what is the point of giving immunization?

...Community people have very little knowledge about measles...according to them a small patch on the skin like a water bubble is measles...but all believe they should get immunization to protect against measles... Rupendehi

... Measles is a communicable disease...if two kids sleep together and if one of them has measles...then the other also gets infected... Dhankuta

...Most community people know about measles but they believe it is 'Gosie' given by God...so if they go for treatment of measles God may be angry and more harm may happen...but for some this an old idea now and they suggest to go for treatment... Rautahat

... If a hen or goat given bali (offering to God) then measles may be cured.....this is the practice here... Dhankuta

...Previously when measles used to come it remained 22days or one month...and all the house used to tel barnay (use protective oil). But now it remains just 4 or 5 days and goes away... maybe it is because of measles immunization... Makwanpur.

Most of the participants have heard about or seen jaundice, and it is known as yellow disease or as 'piari.' Many local remedies are used for treatment. Very few respondents have heard of hepatitis, hepatitis B, or the vaccine for hepatitis B.

...Kids are mostly affected by jaundice...if it happens then we go for jharfuk... it is suggested to give sugercane, mewa, gajar... Kaski

Tetanus is well known among participants. They know if they are cut by something contaminated with rust, mud, cow-dung, or other dirty things, they can be infected with tetanus. Nearly all participants know the only protection is receiving a TT immunization within 24 hours of such a cut or injury. All participants emphasized the importance of TT vaccination for pregnant women. Nearly all participants know that tetanus is not a communicable disease. Many mothers do not have clear-cut information about the immunization schedule and advantages of TT for pregnant women, but heard from radio and friends that it is necessary. Also some people believe that if females take oral contraceptives pills during pregnancy they may get tetanus.

Knowledge and Perceptions of Safety of Injections

Most of the participants have some basic knowledge about safe and unsafe injections. Many know that if unsafe injections are received then infections may occur. HIV and STDs were mentioned as possible consequences. Most know that if the same syringes and needles are used for different people, it may be unsafe. Many know equipment is unsafe if not boiled or if kept in a dirty place. Some participants complained about use of the same syringe for 3 to 4 children.

...An unsafe injection is unclean, multiple use, stored in dirty place. If syringe is unsafe then it may transmit various disease like bhaghutay , measles, TB, HIV, jaundice etc... Illam

Most participants said that now-a-days immunization providers are boiling syringes and needles to the required level, but some disagreed. None of the participants feel confident confronting providers if they have any doubt about the safety of immunizations.

...We don't think that in our outreach sessions unsafe injections are given...previously they used to give injections with only one syringe but not these days... Dang

... In the village the same syringe is used for different persons...in the SHP first all the needles and syringes are boiled in one bucket and then the same syringe is used for different clients...just flushing it with water... Rautahat

Disposal

From descriptions by participants and in participants' opinions, disposal is a major problem. Syringes, needles, cotton swabs, vials, ampoules and other waste are carelessly thrown in and around immunization centers or around HPs or SHPs. Children are picking up waste, including used syringes and needles, playing with them and injuring themselves. Pedestrians also are getting hurt from needles tossed on pathways.

... Disposal items are just scattered everywhere on the ground near the HP...my house is near the HP...we are in trouble ...Dhankuta

...All the disposal of the SHP is thrown in my bari...I am a neighbor of the SHP...when I complain nobody cares... so I am cleaning up the disposal and burning it in a pit...Rautahat

...All the disposal of the HP including needles and syringes are just scattered on the grounds of the HP...school kids when passing by pick up and play with them...Makwanpur

Improving coverage

Regarding community awareness and motivation, it is important to give accurate information about the benefits, advantages and importance of immunization, and about particular vaccines and the diseases they prevent.

...Need canvassing...door-to-door health education including vaccines...public meetings should be called...pamphlets and radio talks are needed...Dhanusa

... Meeting with leaders' groups is necessary...mobilizing mothers' groups is a must ...posters and pamphlets are required...Saptari

... When we encourage... then other friends also become ready for immunization...if centers are nearer more will be able to come...polio providers go door to door and so get so many people...Dang

...Door-to-door visits will convince our father and mother-in-laws...Rasuwa

Legal Provisions On Injection Practices In Nepal

Nepalese laws is silent on the question of injection. There are no specific enactments related to it and no policy has been formulated in relation to production, quality, import or application of injection equipment. There is no specific law, rule, guidelines, policy, or qualification for persons who provide injections.

There are some broad provisions in connection to treatment, surgery, etc., as follows:

In the Muluki Ain (the General Act) there is a chapter on medical treatment. This is the single spoken law on treatment, surgery and nursing. Under the provisions of different sections of this law, only qualified doctors, baidyas, hakims are allowed to practice sophisticated medical procedures on human beings. For more common treatments, namely application of injections, dressings, and providing or applying medicines, the law allows qualified doctors, health workers, paramedical staff, or any body who has gained experience in the relevant field. The paramedicals or experienced persons are restricted to increase or decrease the doses prescribed by the qualified medical practitioners and they are not allowed to perform surgery or other sophisticated procedures themselves. Any acts which contravene these provisions of the law, are subject to penalty and or imprisonment.

There is another Act related to health, the Drugs Act of 2055. This Act is solely devoted to the management of drugs. There are provisions on the quality, composition, formula, prescription, sales, production, storage, distribution, application of drugs, but this Act is also silent on injection.

The Nepal Standardization Act of 2037 and the rules formulated thereunder are also silent on injections. The Department of Standardization has not formulated any quality or standardization manual on production and quality of injection equipment in Nepal.

Discussion with Recommendations

The managers of Nepal's EPI program and representatives from UNICEF, which provide major support to the EPI program, have been concerned for some time about the safety and quality of service provided by the EPI program. At the central level there is awareness of substantial logistic, technical and financial constraints. Recently, it has been documented that unsafe and unnecessary injections, along with other risky medical practices, are very common in the public sector in Nepal². Following this recent heightened awareness about these problems, especially issues related to injection safety, concerned groups were interested to investigate safety and quality in EPI at the district and field level. Qualitative research methods were selected for this study, in order to gather in-depth, descriptive information that is useful for designing intervention strategies and health education products.

Many interesting and troubling findings came out of this research. The safety and quality of service, and problems and constraints, varied according to the geographical and ethnic characteristics of each district, and there were discrepancies between the reports of managerial and field level staff. Nevertheless, there are many common trends in the data across EPI in Nepal.

A major problem in EPI is the lack of regular supply of required materials, especially replacement parts, syringes, needles, and fuel for sterilization. Almost every provider interviewed reported lack or insufficient supply of kerosene and this ubiquitous problem seriously compromises the safety and effectiveness of EPI throughout Nepal. Many managers and field-level staff complained of needles being repeatedly used until blunt, causing pain and distress for clients. A shortage of syringes and needles is seen across the board in EPI.

There was great variability in the responses regarding clients bringing their own injection equipment. Some reported that clients rarely bring them, and that if they do, providers will not use this equipment. Others reported that clients often bring disposables with them, as EPI equipment is not trusted, and that the staff are obliged to use this equipment. Others reported that they encourage clients to bring their own equipment, and some even reported that clients are required to provide their own equipment, as sterilization is not possible. It was frequently reported that pregnant women must provide their own injection equipment for TT vaccines. No providers knew what happens with clients' own injection equipment, with regard to re-use or disposal.

The managerial level respondents nearly all received adequate training, and therefore had adequate knowledge on immunization issues and safe injection practices. Nearly all were well aware of the risks of unsafe injections, both to consumers and providers, and most were aware of the risks of improper disposal. Managers reported needing training on disposal management. Most field staff could adequately define a safe injection, and had knowledge about at least some of the possible consequences of unsafe injections.

However, the field-level staff repeatedly stressed that they had only received training once, often many years ago, and they badly need refresher training on immunization and safe injections. It was frequently reported that there is a shortage of well-trained staff. No field

² Public Perceptions of Injections and Private Sector Injection Practices in Central Nepal, Bhattra, M and Wittet, S. 2000.

staff had received training on disposal, and as peons carry out the brunt of disposal, all staff, including peons, require training on safe disposal practices.

A major problem, identified both by managers and field level staff, is the age of field staff. Many are substantially above 40, and problems such as poor vision, shaking hands and general lack of strength and vigor compromise their ability to carry out their duties, especially immunization outreach sessions. Managers requested a retirement provision, so new, younger staff could replace old staff. In some centers peons (helpers) and other untrained staff are providing immunizations. Although this is not officially recognized, nor condoned by EPI regulations, it is a reality, and therefore these providers require training.

The reports about sterilization in EPI were mixed. On the one hand, nearly all managers and field-level staff are aware of proper, or at least acceptable, procedures. Steam sterilizers are in widespread use, and most report boiling equipment for 20–30 minutes. On the other hand, substantial constraints to proper sterilization are common throughout EPI, namely lack of replacement parts for old and broken equipment, lack of stoves and especially lack of fuel for sterilization. Usually firewood must be foraged or solicited from communities, especially for outreach sessions. Timers for sterilization are very often lacking, and TST stickers have hardly reached any immunization sites—we did not see any during our observations.

Most providers report following safety procedures during immunization. Many providers know they should not touch sensitive parts of the syringes and needles with their hands, but they often touch them anyway because of carelessness. Thus training on safe handling is urgently required. The great majority of immunization sessions, both outreach sessions and those in HPs and SHPs, lack running water, so hand washing is very rare.

Alarming, some field-level staff reported that they change the needle and simply wash the syringe when supplies are low or clients are in a hurry. These providers saw nothing wrong with this practice.

Cold-chain maintenance is badly needed, and thermometers and electricity provisions are often lacking. Many field-level staff requested training on cold-chain maintenance. From observations, the cold-chain was usually unsatisfactorily maintained. Usually ice was found melted in the pack during the session, except very few exceptions. Some providers reported broken refrigerators. Many managers and field-level staff requested additional cold-chain capacity, for each HP and SHP. Field-staff very frequently reported difficulties in maintaining the cold-chain, especially when long distances had to be covered and in the hot season.

Most managers and field-level staff are aware of acceptable disposal procedure, i.e. to burn waste, and/or to bury it in a pit. But most report that disposal is a major problem. Especially at the health post and sub-health post level, improper disposal is very common. In our observations, the surroundings of some venues were littered with vials, syringes and needles. We also observed that the needle would be bent and the syringe (used for TT vaccine) would be thrown out the window or door. Mothers reported during FGDs that in most centers disposal systems are unsafe and risky. Many providers expressed concern that children are playing with disposed materials. In outreach sessions, the vaccinator is responsible and otherwise peons generally are carrying out disposal and are responsible. Clear regulations regarding disposal are lacking, and mechanisms for management, supervision and enforcement of disposal procedures are urgently required. Training at all levels, from

managers to peons, would be the most essential provision. Optimally, each center should be equipped with an incinerator, so disposal items may be burnt quickly and easily each day.

From our observations, providers usually spoke with clients about immunization or other health topics in a congenial atmosphere. But in some cases when clients asked questions the provider was too arrogant or too busy to answer. Mothers reported in FGDs that most immunization centers lack enough staff, and therefore have a disorganized and hectic discussion atmosphere. Mothers feel there are very few appropriate interactions between staff and clients with regard to health issues and vaccines.

A general impression from managers and field-level staff is that providers are becoming less serious and less committed towards their work because of a lack of monitoring, follow-up, feedback, and appreciation for hard work. Solutions mentioned included offering incentives for field work and rewards for good work. Some respondents mentioned that management training from NGOs had had a good impact in the past.

Most mothers lack knowledge about the different types of vaccines and the diseases they prevent, but they follow instructions of health workers, whom they trust. Most mothers have a positive view of immunization, and want to get their children immunized, but many face substantial difficulties in attending outreach sessions, especially due to distance, their home workload, and lack of support from some elders. Some mothers have a negative view of vaccines, as do some elders, and prefer to use herbal medicines and faith healers when health problems arise. It is therefore important to give accurate information about the benefits, advantages and importance of vaccines.

In order to improve public participation in immunization, providers emphasized that female health volunteers and mother's groups have contributed in the past, and suggested mobilizing them by providing training, transportation, field allowances, and necessary materials. Also recommended was orientation for and mobilization of social workers, young volunteers, local opinion leaders and VDC members (particularly the VDC secretary).

For improving timeliness and coverage, providers recommend that people need to be educated about the advantages of vaccines, and the disadvantages of not receiving vaccines. Communities need to be better informed about the schedule of vaccines. Many respondents mentioned that school education programs would be beneficial. Many providers said that illiterate, poor and marginal people need to be motivated with programs suitable for them. With regard to public education, providers suggest using street-dramas, role-plays, slide shows and video films based on local scenarios, in local languages.

There is a severe policy gap in Nepal vis-à-vis injection safety. In light of the present and potential health hazard linked to improper injection practices, it is crucial to formulate clear and enforceable policies aimed at reducing cross-infection through injection and other small, invasive procedures. HMG/Nepal should constitute a policy formulation team of experts of this field and consider their recommendations. Specific medical procedures should be regulated through the existing Medical Council Act and Rules as well as through the nursing Council Act 2052.

Appendix A

Provider Qualifications (Managerial Level)

Training of provider **No. of providers = 33**

Formal Training including Immunization/Injection techniques: 15

*Basic Training on Expanded Program on Immunization,
Training on Cold Chain System*

Some formal Health Care Training: 17

*Family Planning, General Medicines, Leprosy,
Assistant Nursing Midwifery, TOT on Nursing,
Training on Vasectomy, Doctor's course on Tuberculosis,
Sterilization, Health Assistant Training,
Integrated Epidemic & Management Training*

Data not available: 01

Total: 33

Years of experience in public health **No. of providers = 33**

< 01 Year 00

01 - 05 03

06 - 10 08

11 - 20 17

21 - above 05

Data not available 00

Total: 33

Provider Qualifications (Field Level)

Training of provider **No. of providers = 44**

Formal Training including immunization/Injection techniques: 27
Basic Training on Expanded Program on Immunization,

Some formal Health Care Training: 17
*Village Health Workers' Training, Training on Diarrhea,
 Training on TB, Leprosy, Family Planning, Training on
 Sexually Transmitted Diseases, ARI Training, Training on Midwifery,
 Community Medical Assistant, Malaria, maternity Child Health Care,
 Auxiliary Health Assistant's Training, Assistant Nursing Midwifery*

Data not available: 00

Total: **44**

Years of experience in public health **No. of providers = 44**

< 01 Year 00

01 - 05 08

06 - 10 05

11 - 20 21

21 - above 10

Data not available 00

Total: **44**

Years of injection/immunization experience **No. of providers = 44**

< 01 Year 00

01 - 05 08

06 - 10 05

11 - 20 19

21 - above 11

Data not available 01

Total: **44**

Appendix B

Interview and Observation Guides

Topic Guide for Focus Group Discussion (For Mothers Having Children Under Two Years)

Introduction and Warm-up

Spend 5-10 minutes for warming-up the group. Putting them at ease.

I. Moderator's Opening:

- Describe what a focus group is: an opportunity to get together and discuss on your thoughts and feelings about a particular topic.
- Explain the purpose of the group: we will be discussing some aspects of immunization and would like to get your suggestions/opinions.
- Explain they can feel free & frank to place their opinions.
- Assure the group that this session is only for research purpose and all comments will be kept confidential and be used for research purpose only.
- Explain that it is an opportunity to share ideas, it is not a test, and therefore there is no right or wrong opinions. All comments are valuable -- both positive and negative.
- Create trust and security among the participants -- we are like brothers and sisters.

II. Warm-up Questions:

Introduce the team (*moderator/ recorder*) and provide warm-up information.

Ask the participants to introduce themselves (*collect basic demographic and other information of the participants: name, age, caste/ethnicity, education, occupation, & number of children*)

Perceptions Regarding Immunization

1. What do you know about immunization? Is it important to immunize children? (*Probe for why, when, what types of immunization and how many times.*)
2. Have you immunized your children? If yes, why have you immunized your children? Who motivated/encouraged you to immunize your children? If not, why?
3. What interaction do you have with health workers (*HA, AHW, MCHW, VHW, FCHV and others*) regarding immunization?
4. What is the attitude of local people regarding immunization? (*Probe for positive and negative thinking and its reasons*)

Knowledge about Measles, Hepatitis and Tetanus

1. Have you heard about measles? If yes, what is measles? How can it be prevented?
2. Have you seen measles cases in children in last 2 years? If yes, when & in how many children? What might be the cause of measles in these children?
3. Have you heard about Hepatitis/Jaundice? If yes, what is hepatitis/ Jaundice? How is it transmitted? How can it be prevented?
4. Have you heard about Tetanus? If yes, what is Tetanus? How is it infected? How can it be prevented?

Perceptions Regarding Injections

1. What is an unsafe injection? What types of risks are associated with unsafe injections?
2. Have you seen/heard about unsafe injections? If yes, how & where are they unsafe? (*Probe for these institutions -at Hospital, PHC, HP/SHP/ Immunization Outreach Session*)
3. Have you seen/heard about reuse of needles or syringes at the Immunization places? If yes, how were they reused?
4. What happens to syringes, needles and other materials after they have been used /discarded at the immunization places?

Problems and Solutions

1. What problems have you & your children faced regarding immunization? (*Probe for problems regarding transport.etc*)
2. How could these problems be overcome?
3. Have you seen/heard of children/pregnant mothers in this area having health problems resulting from immunization? If yes, what kinds of problems? What could be done to prevent these problems? (*probe at Hospital, PHC HP/SHP/Immunization Outreach Sessions*)
4. Have you seen/heard/seen any problems due to improperly disposed needles/syringes and other materials (*cotton, gauze, sharp materials*) in this area? If yes, how could they be solved?
5. What kinds of IEC activities would be very effective for motivating and encouraging the people for the expansion and timely immunization?

In-depth Interview Guidelines (Managerial Level Providers)

(Managerial Staff: DHO/EPI supervisor/cold chain assistant/staff nurse)

General Information

1. District
2. Designation
3. VDC/Municipality
4. Age
5. Sex
6. Education/Training
7. Name of Interviewer
8. Date of Interview

Work Experience

1. How long have you been working in the public health sector?
2. How long have you held this post here?

Perceptions Regarding Injections

1. Are there any risks associated with injections? (*Probe for risks to the recipient, risks to the provider and risks to the public*)
2. How common are such risks in this area?
3. Are unsafe injections a problem in the public health sector? In this district?

Hepatitis/Measles

1. Could you please tell me about hepatitis B? (*Probe for transmission and prevention*)
2. Is hepatitis B a problem in this area?
3. Could you please tell me something about hepatitis B vaccine? (*Probe for schedule, dosage, availability in the area*)
4. How would introduction of hepatitis B vaccine affect the current EPI system? and how to start?
5. Have you seen cases of measles in last two years? (*If yes, ask in how many children and why there is a measles outbreak*)
6. What can be done to prevent measles?

Safety Issues

1. What are the sterilization practices for syringes and needles in EPI program?
2. What problems does your staff face regarding sterilization?
3. Has your program faced shortages of electricity/kerosene/firewood? (For sterilization and cold chain) How did they cope?
4. Has your program ever had more clients than supplies? In what situations? How did they cope?

Disposal Issues

1. What are the disposal procedures regarding syringes/needles & medical waste? (*Probe for District Hospital, PHCC, HP/SHP and outreach immunization session*)
2. Who are responsible at each level?
3. Are there risks or problems that result from disposal practice of these things? (*Probe for sorts of problems*)
4. In your opinion, how could these problems be overcome?

Problems/Solutions

1. What constraints are your staffs facing in delivering safe injections?
2. What problems are your staffs facing in giving safe immunization?
3. How might these constraints be overcome?
4. What would you need to improve safety, handling and disposal of injection equipment at all levels regarding immunization?
5. What constraints does the EPI program face in general? (*Probe for equipment, personnel, training*)
Regarding cold chain? (*Probe for equipment, maintenance, capacity, fuel shortages*)
6. What would you need to improve the quality of service in EPI program?
7. What difficulties do your staffs have with the public regarding immunization?
8. What sorts of IEC activities would be good for encouraging and motivating the public for immunization? For improving timeliness and coverage?
9. How might public awareness be increased regarding unsafe and unnecessary injections?

In-depth Interview Guidelines (Field Level Providers)

(For Injection Providers: HA/ANM/AHW/VHW/MCHW)

General Information

1. District
2. VDC
3. HP/SHP
4. Age
5. Sex
6. Education/Training v 7. Experience
8. Designation
9. Name of Interviewer
10. Date of Interview

Training

1. Since how long have you been giving injection?
2. When and where did you learn to give injections?
3. What type of injections you provide? (Probe for immunization, TT and others)
4. Could you please explain me how you immunize?
5. How often do you provide immunizations? (*Ask for frequency in day/week/month*)
6. Who else gives immunization in this office? Could you please tell me what was their training?

Perceptions Regarding Immunization/Injections

1. In your opinion, what is a safe injection?
2. Are there any risks associated with injections? In other words, can injections ever harm someone? How? (*Probe for knowledge of hepatitis B, Hepatitis C and HIV transmission, allergic reactions between patients or from patient to provider following needle stick injury and how providers have obtained knowledge of safety issues*)
3. How common are such risks regarding immunization in this area?
4. Do you ever get any complaints from parents & pregnant women related to immunization? If yes, what types of complaints? Could you tell me why?
5. Have you ever seen an abscess following immunization? How often have you seen abscesses? What do you do in case of abscess?
6. How many times should a pregnant woman get TT vaccine?
7. How do you communicate with children, parents & pregnant women?

Knowledge of Hepatitis/Measles

1. What do you know about hepatitis? How is it transmitted? How can it be prevented?
2. What do you know about hepatitis B? How is it transmitted? How can it be prevented? (*If vaccine is mentioned, explore schedule, dosage, and availability in the area and have they ever recommended it, and if they don't know ask simply, Have you heard about HB vaccine?*)
3. Have you seen cases of measles in last two years? If yes, in how many children and why is there a measles outbreak?
4. What can be done to prevent measles?

Injection and Sterilization Practices During Immunization

1. What kinds of syringes do you usually use? When and why do you use each kind?
2. What do you do with the equipment after injecting?
3. How is equipment prepared for immunization?
4. Could you please tell me how you sterilize the immunization equipment before use? (*Probe for TST standard*)
5. How do you sterilize them for next use? (Probe for 'Why do you sterilize them' if mentioned about sterilization?)
6. Do you have any problems regarding sterilization? (If yes, probe for what and how they are managed?)
7. Have you ever run out of kerosene/electricity/firewood for sterilization? If yes, could you please tell me how did you solve these problems?
8. Where do you keep the needles/syringes for immunization?
9. What do you do when you have more clients than vaccines?
10. Do pregnant women/parents ever bring in their own syringes? (If yes, probe for why?)
11. Could you tell me who checks your immunization records?

Disposal

1. What materials do you use for injecting people? (*Probe for sharps/blood stained materials...*)
2. Is there any disposal system?
3. In your opinion, who is responsible for disposal?

4. What problems/risks may/can come after such disposal? Could you tell me please what could be done to reduce/prevent these problems?

Problems and Solutions

1. In your opinion, what are some ways to improve the quality of your service?
2. Is there anything you would like to do but cannot because of your situation? If yes, then what are they?
3. What constraints have you faced in delivering safe immunization?
4. What type of support would you need to deliver safe immunizations? (*Probe for specifics, materials, IECs for Health Workers.*)
5. What kinds of IEC activities would be very effective for motivating and encouraging the public for immunization? For improving timeliness and coverage?

Observation Guidelines

(For District Hospitals, Primary Health Centers, Health/Sub-Health Posts and Immunization Outreach sessions)

General Information

1. District
2. VDC/Municipality
3. Facility
4. Name of Observer
5. Date

Description of the Location (place, accessibility, overall cleanliness and surroundings)

Observation of Logistics and Disposal

1. Availability of water, its source and distance.
2. Storage of vaccine.
3. Storage of syringes/needles and kinds of syringes/ needles.
4. Presence and use of a steam sterilizer.
5. Source of heat (*electric hotplate, stove, fireplace...*) for boiling water.
6. Evidence of unsafe use or reuse of syringes or needles (carelessly scattered, open packets, unpacked materials, lying in a pan or bucket of water.)
7. Evidence of how waste is disposed off
8. Presence of used syringes and needles in the workplace/on the ground nearby.
9. Presence of other medical waste (*gauze, bloody materials, sharps...etc.*) exposed in the workplace/exposed nearby.

Observation of Immunization Process

1. Person immunizing.
2. Type of interaction between provider and clients (any discussion, explanation...).
3. Type of syringe used.
4. Evidence of how and where the storage of syringe/needles was.
5. Whether the Provider washed his/her hands before/after injecting or not. (Give details about soap, cleanliness and source of water, ash.)
6. Proper handling of equipment (syringe/needle /vaccines/medicine etc).
7. Was it put on dirty surfaces?
8. How was the medication handled for the immunization?
9. How was the syringe filled with vaccine?
10. How was the injection sites (arm, thigh) cleaned?
11. What was done with the syringe after use?
12. Time given by the provider for each client (child/mother).
13. Behavior of the provider with the clients (with care and patience, brusquely, harshly etc)
14. Total number of clients at the location
15. Number of syringes and needles with the provider (at the Immunization outreach session only).
16. Evidence of unsafe use or reuse of syringes or needles (lack of clear separation between sterile and recently used equipment).
17. Situation of TT vaccinations Vs. child immunizations (If they are managed together or separately)

Appendix C

Methods Details

The Research Team

Mr. Mahesh Dev Bhattarai, Principle Investigator and Director of General Welfare Pratisthan and Mr. Scott Wittet, Director for Advocacy, Communication, and Training of the Gates Children's Vaccine Program at PATH, designed the study along with Mr. Adam Kane and Mr. Prakash Adhikari, both working at GWP

Each member of the researcher team successfully passed a three-days training course with one day field test of developed study tools. The researchers also were trained to probe for details in an appropriate manner.

The researchers were selected based on their experience in qualitative research techniques, their interpersonal communication skills, their ability to speak one or more local languages. Most had participated in a previous GWP rapid assessment of injection practices in the private sector.

Research Methods

Three different qualitative research methods were used in the study: direct observation of immunization venues in urban and rural communities, in-depth interviews with immunization providers at the managerial and field levels, and focus group discussions with mothers of young children. The interview guides in Appendix Three remind interviewers to concentrate on topics like respondent attitude towards immunization, awareness related with immunization, and respondent awareness of waste disposal issues.

Direct observations: Researchers quietly watched activities and interactions between consumers and providers during actual immunization sessions. The observations lasted from two to four hours.

In-depth interviews: The individual, in-depth interviews with immunization providers and with immunization managers were conducted in private and typically lasted from 60 to 90 minutes.

Focus Group Discussions: The focus groups were segregated by rural or urban and as much as possible, by educational level. The focus groups usually lasted 90 minutes to two hours.