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EVALUATION OF INJECTION SAFETY AND HEALTH CARE WASTE MANAGEMENT IN UGANDA

2009 FINAL REPORT

APRIL 2009

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MMIS
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Abstract: The United States President's Emergency Plan for AIDS Relief (PEPFAR), through USAID, has funded JSI, Inc. for the implementation of the *Making Medical Injections Safer (MMIS)* project on injection safety in Uganda. JSI and its partners are responsible for implementing other similar projects in 10 other countries in Africa and the Caribbean. This report describes the results of the final evaluation on the status of injection safety and health care waste management, which took place during the month of November 2008 in the health districts of Hoima, Kabale, Mbale, and Yumbe.

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List of Abbreviations

AD	Auto-disable
AIDS	Acquired immune deficiency syndrome
BCC	Behavior Change Communication
CDC	U.S. Centers for Disease Control and Prevention
EPI	Expanded Programme on Immunization
HCW	Health care worker
HCWM	Health care waste management
HIV	Human immunodeficiency virus
JSI R&T	John Snow Research and Training Institute, Inc.
MMIS	Making Medical Injections Safer project
MOH	Ministry of Health
PEP	Post-exposure prophylaxis
PEPFAR	President's Emergency Plan for AIDS Relief
PPE	Personal protective equipment
SIGDAS	Injection Safety and Health Care Waste Management
SIGN	Safe Injection Global Network
UNICEF	United Nations Children's Fund
WHO	World Health Organization

EXECUTIVE SUMMARY

One of the objectives of the Ministry of Health (MOH) is to improve the quality of care provided on all levels of the health care pyramid. Previous studies revealed that the problem of injection safety and the management of waste generated by HEALTH CARE activities are acute. In the framework of the implementation of the U.S. Government's PEPFAR, Uganda received technical and financial support to promote injection safety and health care waste management (HCWM). This was made possible through the support of USAID. The injection safety and HCWM project was initiated as a result of activities of the MMIS project and its partners. With the goal of preparing a broad evaluation of injection safety status in Uganda, the MOH organized, with the technical and financial support of MMIS, this global evaluation of injection safety and HCWM at the project intervention sites.

This report presents findings of the final survey in injection safety and waste management. Most of the results are shown in comparison to the baseline. The project was carried out through interviews, observations, and materials inventory in a sample of health care facilities.

Baseline data were collected in August 2005, and follow-up data were collected from November 3, 2008, through November 16, 2008, in the project expansion districts (Hoima, Kabale, Mbale, and Yumbe).

The survey units of this evaluation on injection safety and HCWM were the medicine, pediatrics, gynecology-obstetrics, surgery, outpatient, central pharmacy, and laboratory departments of Mbale, Bududa, Kabale, Hoima, and Yumbe hospitals as well as 84 lower-level health care facilities in these districts. The sources of data for this survey were the central stockrooms, injection providers, supervisors of the staff responsible for administering injections, waste handlers, and patients who had just received one or more injections in the facilities surveyed.

The results obtained through observations in each health care facility surveyed and interviews of the target populations are presented below—accompanied by their main recommendations—in the following areas:

- The availability of reference documents and management tools.
- Stock management in the main stockrooms of the health care facilities.
- Availability of injection equipment and materials for managing waste.
- Materials and equipment for managing waste vis-à-vis accidental needlestick injuries.
- Injection administration practices vis-à-vis accidental needlestick injury.
- Training on and knowledge of blood-borne diseases.
- Health care worker (HCW) protection.

1. Availability of Reference Documents and Management Tools

The study revealed that of the supervisors surveyed 36.0% did not have a copy of the injection safety policy, 60.5% had copies of the standards and guidelines for injection safety and HCWM, and the rest (3.5%) did not know. Over half (63.2%) of supervisors reported having a copy of the injection safety guidelines and 57.9% of the supervisors interviewed reported having copies of waste management guidelines. In the baseline, only 7.0% of supervisors reported having a copy of the injection safety policy and guidelines, and only 5.8% of supervisors reported having a copy of HCWM guidelines. The percent of supervisors reporting having these documents increased from the baseline at a statistically significant level; while this is a significant improvement, there is more work to be done. The principle behind this strategy is that establishment and availability of reference documents to all stakeholders are essential for preservice and in-service training of health care professionals.

However, when the data collectors asked to see these documents, only 40 (58.0%) of the 69 supervisors who said they had a copy of the injection safety policy were able to show the copies compared to 4 out of the 6 supervisors in the baseline. Also, 52.1% of 71 supervisors who reported having a copy of guidelines/recommendations on injection safety were able to show copies to the data collectors, compared to 4 out of the 6 supervisors in the baseline. Similarly, 57.6% of the 66 supervisors who said that they had a copy of the waste management guidelines were able to show them to the data collectors, compared to 4 out of the 5 supervisors in the baseline. Out of 114 supervisors, 9.6% were able to show the health care waste disposal policy compared to 4.7% of the 86 supervisors in the baseline.

Even though the number of supervisors who had and were able to show the documents increased in the follow-up, it is still strongly recommended that MMIS support and promote increased access to such reference documents for better policy reinforcement.

2. Stock Management in the Main Stockrooms of the health care facilities

The results obtained through observations in the main stockroom of each health care facility surveyed highlighted a need for refresher training in logistics management with special emphasis on updating stockcards (general data management) of various products such as sharps boxes and disposable syringes. It is important to note that 74.2%, i.e., 66 of the 89 facilities surveyed reported having stockcards for safety boxes but only 47.0% had updated stockcards. In the baseline, stockcards for monitoring utilization of the safety boxes were only available in 5.8% out of the 86 storerooms where this was assessed, and only two of these have been updated.

Less than a third of the facilities reported having standard disposable syringes. A little over half of these had stockcards. This was not an improvement from the baseline. Only 3 facilities overall had stockcards for manual-disable syringes and only 2 facilities had stockcards for retractables. All products were not tracked with a recordkeeping system, indicating that consumption of some products was not being monitored. Even where the stockcards or registers were available, they were often not updated, and the data recorded were not always consistent with physical inventories conducted in the storerooms.

When data collectors compared the balance of each product recorded on the updated stockcards with the inventory that they had just completed for the safety boxes, they found in only 4 of the 31 health care facilities with an updated stockcard that the number of safety boxes on the card corresponded to the stock in the stockroom for safety boxes.

It is common knowledge that the availability and proper maintenance of management tools facilitate better monitoring of consumption patterns and regular supply of the health care facilities with materials. It is recognized that the lack of a stock management system—updated regularly with each change in inventory—is a factor that not only limits *knowing* whether there were stockouts but also *avoiding* such stock outs. Therefore, it is recommended that refresher courses in logistics management be made part of the targeted training areas.

A strategy for improving the injection safety is to reduce injections to the minimum necessary, but this strategy assumes that the HCWs who write the prescriptions for medications have a choice. When the data collectors looked for the oral form of 4 commonly used medications, they were available in the health care facilities surveyed in 78.7 % of facilities for Coartem, 34.8 % for quinine, 65.2 % for Septrin, and 49.4% for amoxicillin. Furthermore, 93.3 % of the facilities surveyed had a stock of at least *1* medication on this list; 22.5% had a stock of all 4 medications. In the baseline, 67.4% had stock of at least 1 of the 3 medications, and 20.2% had stock of all 3 medications. However, the same oral formulations were not tracked. Only amoxicillin was tracked in both the baseline and the follow-up.

3. Availability of Injection Equipment and Waste Management Materials

Observations in the main stockroom showed that stockouts still occurred and generally lasted a few days. For the safety boxes, of the 31 updated stockcards, 2 showed a stockout during the 6 months prior to the survey.

Among the 113 injection providers who had safety boxes at some time, a majority, 95.6%, had not had a stockout in the 6 months prior to this survey. In the baseline, 90.7% of injection providers reported not having a stockout of safety boxes in the last 6 months. Even though the percent of injection providers reporting no stockouts of safety boxes increased, it was not statistically significant and remained quite high. In the health care facilities surveyed, 92.1% had sharps containers in each place where injections were being administered; and in 97.8% of the health care facilities, all of the sharps containers being used for disposing of sharps in the injection areas were safety boxes.

In the baseline, 66.3% of facilities had sharps containers; and in 44.9% of all facilities, the sharps containers were safety boxes. Both of these variables improved significantly in the follow-up. Nevertheless, while these improvements are encouraging, these findings illustrate the fact that even though actual stockouts of safety boxes have fallen dramatically over time and there is a better match between supplies of medicines, injection devices, and disposal materials for used devices, there is still a need to ensure that adequate supplies are available and distributed to all locations where providers need them for safe disposal after giving injections.

In the follow-up, 89 supervisors were asked: Are stocks of vaccines delivered (available) with adequate quantities of safety boxes. Of the 89 supervisors, 88.8% declared that the vaccines were delivered with adequate safety boxes, while 7.9% said they were not adequate, and 3.4% did not know. This was comparable to the baseline in which there were 89% of 82 supervisors who felt the same way.

In addition, 74.6% of the supervisors interviewed thought that the quantities of needles and syringes provided to them were adequate for curative services provided in their health care facilities. This improved significantly from the baseline in which only 45.9% of supervisors reported feeling that way.

Regarding single-use disposable syringes, 28.3% of injection providers interviewed in this survey had experienced stockouts of single-use disposable syringes in the 6 months prior to this survey. The other 67.3% did not, and 4.4% did not know. In the baseline, 59.1% did not report any stockouts of single use disposable syringes, and 2.3% did not know. There was not much improvement in this variable, and the finding was not significant.

Shortage of needle and syringes was the second most mentioned difficulty by injection providers (14%). The most often mentioned difficulty was shortage of gloves (30%). New gloves were used in only 47% of the 51 phlebotomy injections observed.

In addition, the amount of injection equipment delivered with and at the same time as vaccines and other medications was not adequate according to 41.4% of the supervisors interviewed. This actually decreased from the follow-up in which 66.3% of the supervisors felt the same way. Clearly, the areas of logistics planning, procurement, and delivery must be improved.

Given this situation, it is recommended that the national medical store and districts further improve the logistics system in order to eliminate stockouts.

4. Material and Equipment for Managing Waste vis-à-vis Accidental Needlestick Injuries

The results obtained through observations of the health care facilities surveyed showed that 92.1% of facilities had sharps containers in each place where injections are administered, compared to 72.5% in the baseline. This finding was not statistically significant. There was also a statistically significant improvement for facilities with safety boxes (from 50% at baseline to 97% at follow up).

Additionally, 77.5% of the health care facilities surveyed showed evidence of all 3 good practices for sharps object disposal; i.e., there were no overflowing or punctured safety boxes and no used sharps lying around inside any facilities or outside on the grounds. The health care facilities that lacked at least one of the good practices could not be assessed on this generic indicator. In the baseline, 47.7% of facilities had satisfactory disposal, and this finding was statistically significant.

In addition, in 28.2% of health care facilities surveyed full safety boxes were neither tightly sealed nor stored in a location inaccessible to the public. In the baseline 34.8% of facilities, the

safety boxes were not completely sealed. Furthermore, 37.2% and 31.7% of facilities in the baseline and follow-up, respectively, stored the safety boxes in a locked area inaccessible to the public. All these variables show that the current HCWM still presents factors that put the health care staff and general public at risk of accidental needlestick injuries. In fact, it is important to sensitize HCWs on likely dangers associated with improper sealing practices and poor storage of such medical waste before final disposal.

None of the injection providers interviewed during this survey declared that safety boxes are *never* used. It was, thus, not possible to compare the incidence of needlestick injuries among those with safety boxes as compared to those without them. It is important to note that waste was being segregated in injection areas into different containers for sharps, infectious waste, and noninfectious waste separation, and this was recorded in 80.9% of the facilities surveyed. In the baseline, 45.5% of facilities segregated their waste. This improvement was statistically significant. It was, thus, not possible to meaningfully assess the impact of lack of waste segregation on the risk of accidental needlestick injuries to waste handlers.

Chapter 9 presents the details of the specific methods of sharps waste disposal, which were obtained through interviews of waste handlers. These methods were analyzed into three general categories of "good," "acceptable," and "poor" according to the level of safety of each method and the combination of methods (if more than one is used in a health care facility). When the overall result is calculated on the various combinations of methods using these three categories, the data from the interviews of waste handlers show that health care facilities used open-air burning or dumping to eliminate their waste. The results obtained through observations were compared with the data obtained in the interviews. The waste handlers mentioned several specific problems, which affected their work, such as lack of personal protective gear, paraffin for burning medical waste, and wheelbarrows for transportation.

Of waste handlers who report having at least one personal protective equipment (PPE), 81.6% of waste handlers in the follow-up had one of the following protective equipment: Gloves, boots, heavy gloves, aprons, and masks compared to 54.2% of waste handlers in the baseline. This was a statistically significant improvement.

In light of this situation, there is a need to address safe final disposal. Poor waste disposal methods such as open burning in general and dumping in an unprotected pit are still prevalent in the districts. Good waste disposal methods need to be reinforced in each of the district, and bad waste disposal methods need to be eliminated.

5. Injection Administration Practices vis-à-vis Accidental Needlestick Injuries

The results obtained on general hygiene as it relates to injections showed that 16.2% of injections are not prepared in a clean space. Even though the results improved in the follow-up in which 12.5% did not prepare their injections on a clean table or tray, it was not a significant change.

The results on injection equipment and injection administration practices by observation showed that the needle and syringe were removed from a sterile package in all but 1 of the injections. In the baseline, the needle was removed from a sterile package in all but two injections. In 92.7%

(89 of the 96 observed injections) that involved a multidose vial, the needle was removed from the rubber cap of each multidose vial after withdrawing each dose for administration. In the baseline, in 68.4% of the 38 injections the needles were removed from the rubber cap of each multidose vial. This improvement was significant. "A needle that remains in the rubber cap of a multidose vial risks becoming a route by which microbes gain access to and will contaminate the injectable medication. Removing the needle from the rubber cap after withdrawing the dose to be administered is thus a measure of injection safety." These findings suggest that injection providers are careful to take the needle and syringe from a sealed package or remove the needle from a multidose bottle.

Out of all injections, nearly 8.3% of the injection providers recapped the needle after having finished one or more injections, and 92.0% disposed of the used **needle and syringe** *immediately* after administering each injection by using a safety box or a needle remover device. These improvements also were statistically significant from the baseline. In the baseline, 81.1% of injections, the injection was immediately disposed of after use. In the baseline, in 33.9% of injections, the needle was recapped after use.

All these practices place providers, waste handlers, and/or patients at risk of a blood-borne disease such as human immunodeficiency virus (HIV) or hepatitis. In fact, 8.0% of injection providers interviewed in this survey and 14.1% waste handlers had had one or more accidental needlestick injuries in the 6 months prior to the survey. In the baseline, 33.3% of injection providers and 26% of waste handlers reported needlestick injuries. The percent of injection providers and waste handlers reporting needlestick injuries decreased in the follow-up. These improved practices translated into significantly fewer needlestick injuries—and, hence, less risk of a blood-borne disease such as HIV or hepatitis—at follow-up than at baseline.

Even though providers' practices improved, not all practices significantly improved from the baseline.

6. Training and Knowledge of Injection Providers and Waste Handlers

The results of this survey showed that 77.9% of the injection providers surveyed and 78.7% of waste handlers had received training on injection safety and waste management. In the baseline, only 18.0% of injection providers received training on injection safety and 21.3% of waste handlers received training on waste management. The improvements in these two variables were statistically significant from the baseline, but more must be done to train all injection providers and waste handlers.

Among injection providers interviewed, 100% in the baseline and follow-up survey mentioned HIV spontaneously when the data collectors asked them if they knew of diseases that could be transmitted by reuse of a nonsterile needle or by an accidental injury from a contaminated needle. Hepatitis B, on the other hand, was mentioned by 50.6% and 75% of injection providers in the baseline and follow-up, respectively, which was a statistically significant increase. Hepatitis C was mentioned by only 11.2% and 20.4% of injection providers, respectively, in the baseline and follow-up.

Among the waste handlers interviewed, 95.8% said that they knew of diseases that could be transmitted by accidental injuries with a contaminated or by reuse of a needle. HIV was

mentioned by 97.1 % of the waste handlers interviewed. In the baseline, 100% of waste handlers mentioned HIV.

7. Protection of Health Care Workers

Among injection providers interviewed, 23% declared that they had received the hepatitis B vaccine; but of those who had received the vaccine, only 5 providers had had all 3 doses. In the baseline, no one had received all 3 doses. Only 1 provider reported receiving the vaccine in the baseline. This change is statistically significant. Among the waste handlers interviewed, the hepatitis B vaccine was not common; 2waste handlers received all 3 doses. In the baseline, 4.1% or 2 waste handlers reported receiving the hepatitis B vaccine, and 1 waste handler reported receiving all 3 doses. The other received 2 doses.

Among the waste handlers interviewed, 81.6% mentioned at least one type of PPE that was available in their health care facility and which could protect them against accidental injuries with sharp objects. In the baseline, 54.2% of the waste handlers reported at least one PPE. The types of available equipment mentioned by these waste handlers are the following: Boots or closed-toed shoes mentioned by 69.0% of the waste handlers followed by heavy duty gloves mentioned by 64.4%. Other types of personal protective equiptment mentioned include aprons (13.8%) and masks (2.3%).

8. Behavior Change Communications

The data collectors also observed whether the injection providers used any communication materials while the patients were at the health care facility. Reference to the specific "Drug chart" was recorded for 9.0% of the observations, followed by the poster on "Safe injection administration" (3.0%). This finding highlights a lost opportunity for injection providers to communicate injection safety messages to patients about avoiding loose sharps in the community, insisting on new injection and other similar messages that could protect them from contaminated devices or accidental injuries.

In the follow-up, waste handlers and injection providers were asked what are the sources of information on safe injection practices, safe disposal practices, and reducing the number of injections. The most common source of safe information for providers was a training workshop (66%), poster (37%), and radio (33%). The most common source of such information for patients was radio (60%), followed by health staff/personnel (55%), and poster (6%).

Out of 109 patients who remembered seeing or hearing any information about injections or needles or syringes, the message they remembered the most was "Unsafe injections can transmit HIV/acquired immune deficiency syndrome (AIDS)/hepatitis B/hepatitis C," (51.0%), followed by "Use/ask for a new needle and syringe every time you need an injection" (23.9%).

Overwhelmingly, the posters "Tablets are as effective as injections" and "Segregation of medical waste" were the most observed Behavior Change Communications (BCC) materials during facility observations, 99% and 91%, respectively. Just over half of injection providers reported "Orals are more effective" when asked their opinion on medicine to treat a patient with a simple case of fever, and 49% of patients preferred pills to injections.

Presence of BCC materials increased in the facilities from the baseline due to the development of many different BCC materials.

9. Observations of Phlebotomy

Data collectors also observed 50 phlebotomy practices. Overall, 22% (n=9) of 50 phlebotomy cases followed the recommended procedures for carrying out a safe phlebotomy. For all 9 safe phlebotomy cases, the needle remover or sharps container was within arm's reach and either immediately disposed or a needle remover was used. In all 9 observations, the patient's skin was either cleaned with a clean swab or a swab with an antiseptic. Only 1 out of the 9 phlebotomy procedures was recapped using one hand, and recapping was not observed in the rest of the observations. Blood was transferred using 2 hands in all 27 unsafe phlebotomy observations.

10. Report Structure

The following report is organized into 12 chapters. After the introduction in Chapter 1, the methodology and a summary of the study samples are presented in Chapters 2 and 3, respectively. The specific results drawn from the observations and interviews are detailed in Chapters 4 through 10. The conclusions in Chapter 11 are focused on an analysis of the results vis-à-vis their contribution to the risks of transmitting a blood-borne pathogen such as HIV and the hepatitis B or hepatitis C virus.

Finally, Chapter 12 presents a summary of the main recommendations, which are focused on sustaining the behaviors that are positive and improving those that are less than optimal as follows:

Training, Knowledge of blood-borne diseases, and Equipment for the Protection of Health Care Workers

- Use feedback during supportive supervision visits as a way of providing on-the-job training to providers and waste handlers who were not able to attend training workshops on the key components of injection safety, and/or use previously trained individual as trainers to continue these workshops in new areas and with newly arriving staff.
- Consider adopting a policy of expanding hepatitis B coverage to injection providers and waste handlers to protect them from contracting this disease from accidental sharps injuries. Advocate for policies and vaccines to support hepatitis B vaccination for HCW as part of a commitment to improving health system human resources. Currently, HCW do not enjoy this protection, and providing it would serve to reduce their risk of contracting hepatitis infections on the job.
- Increase availability of PPE to protect workers from accidental occupational injuries.

Availability of Injection Equipment and Waste Management Materials

- Continue to monitor stock levels to ensure that there are no stockouts of safety boxes or syringes.
- Use supervision visits to continue to monitor the satisfactory disposal of used sharps and waste segregation to maintain the results achieved to date.
- Seek additional approaches or partnerships to continue to improve final disposal methods to the "good" level.

Stock Management in the Main Stockrooms of the health care facilities

- Institute individual stock tracking mechanisms such as stockcards or registers for safety boxes and for each type of syringes in the facilities that lack them.
- Train stockroom managers to keep these documents up-to-date, and conduct spot checks as needed to check the stock records against the physical inventory.
- It is recommended that additional efforts be made in identifying the essential, noninjectable medications that can replace the most common injections and ensuring that all facilities have a regular, adequate stock of these medications.
- Increase information directed to patients and the community to motivate them to improve their injection safety behaviors, focusing on the increasing the acceptance of oral medications. Suggested approaches include:
    - Improve capacity of health providers to communicate interpersonally with patients.
    - Play TV/radio materials at health care facilities for patient and visitors in waiting general out patient department rooms and care and treatment centers.
    - Broadcast TV and/or radio materials on air, or use other channels such as video vans and video "houses" in the community, etc.

Avoiding Needlesticks

Although equipping HCWs with appropriate skills in injection administration and provision of proper sharps containers for immediate safe disposal of the used sharps reduced the prevalence of needlestick injuries as demonstrated here, exposure through sharps by other means continues to be problem.

- There is need for health unit managers to continuously assess circumstances leading to needlestick injuries with the aim of identifying the persisting risk factors.
- Immediate supervisors should continue to promote one-handed recapping *when necessary* to reduce needlestick injuries.

Logistics System Improvements

- Continue to support improving the logistics and supply systems at all levels to maintain the improvements already made in terms of ensuring a continuous supply of safe injection devices, safety boxes, oral medications, gloves, and other PPE. Providing sufficient supplies and equipment should help HCWs improve practices and feel less at risk of contracting infections on the job.

Other Important Recommendations

- Develop strategies to improve availability of water (such as simple tippy-taps) and soap for injection providers to facilitate their being able to wash their hands.

The MOH should examine unsafe phlebotomy procedures and design interventions to improve the standards of performance.

1. GENERAL INTRODUCTION

One of the objectives of the MOH is to improve the quality of care provided on all levels of the health care pyramid. Previous studies revealed that injection safety and HCWM are serious problems. In the framework of the implementation of the PEPFAR, Uganda received technical and financial assistance to promote injection safety and HCWM through the support of the USAID. The injection safety and HCWM project known as MMIS was implemented in selected districts with the main objective of rapidly decreasing medical transmission of HIV and other blood-borne pathogen through rapid reduction of unsafe and unnecessary injections. Activities were implemented in over 30 districts, but 4 expansion districts of Hoima, Kabale, Mbale, and Yumbe were focused on for evaluation purposes. The MOH with the technical and financial support of MMIS organized acomprehensive evaluation of injection safety and HCWM at project's intervention sites.

According to the WHO, every year unsafe medical injections are responsible for approximately 8 to 16 million cases of hepatitis B virus infection, 2.3 to 4.7 million cases of hepatitis C, and 80,000 to 160,000 cases of HIV infection globally. Certain high-risk practices, in particular the reuse of nonsterile needle and syringes, increase the risk of transmitting disease.

Given this grave situation, the WHO, in collaboration with partners through the *Safe Injection Global Network* (SIGN) developed and provided to countries an intervention strategy for reducing overuse of injections and promoting the administration of safe injections. The SIGN strategy is articulated around three basic axes, which are:

1. Behavior change of HCWs and patients to ensure safe injection practices and reduce unnecessary injections.
2. Ensure availability of equipment and supplies necessary for injection safety.
3. Manage waste safely and appropriately.

In a majority of developing countries, the WHO strategy is justified by the fact that beyond vaccination programs the issue of injection safety and waste management is not granted appropriate attention by the governments or community of development partners.

In Uganda for example, when observing the use of a new injection device, for the 70 injections observed in the baseline, 97% of injections were given with a new needle and syringe. In the most recent evaluation, this improved even more: For the 260 injections observed, 99% were given with a new syringe. This suggests an improvement in safe injection practices, which directly links into a reduction in associated infections. (MMIS midterm review 2005.) The 2005 baseline evaluation showed that for 53 of the injections observed, 81% were disposed of immediately in a sharps container; while in the follow-up evaluation study, of the 262 injections observed, 92% of them disposed of used needle and syringes without recapping any. This also shows an improvement in waste management after MMIS's intervention.

Previous surveys showed a mismatch between quantities of needle and syringes provided for curative services. Among supervisors, 94% reported that safety boxes were delivered in adequate quantities with needle and syringes for curative services. This was a tremendous improvement from the baseline in which only 4% of providers reported the same. The current survey shows a great improvement as 75% of the supervisors felt that quantities of needle and syringes provided to them were adequate for treatment services in their health care facilities. This finding also shows improvement from the baseline in which only 46% of the supervisors reported adequate availability of equipment and supplies necessary for injection safety.

2. METHODOLOGY

This evaluation of the status of injection safety and HCWM was a descriptive cross-sectional follow-up study. The results presented draw on data from interviews, observations, and stock assessments in a sample of health care facilities in the project's four expansion area health districts (Hoima, Kabale, Mbale, and Yumbe).

2.1 OBJECTIVES OF THE STUDY

The overall objective was to evaluate the overall status of injection safety and HCWM in the health care facilities of the project's four expansion area health districts. The specific objectives of the study were as follows:

1. Evaluate the availability of the injection equipment/materials/products and stock management methods,
2. Evaluate the availability of equipment/materials for collection, transportation, and removal of waste as well as the HCWM practices,
3. Describe the conditions and steps for administering injections in the treatment rooms,
4. Evaluate the existence of reference documents (national policy, norms, guidelines) with the health care staff and managers of health care facilities,
5. Evaluate the adequacy of the quantities of injectable products ordered (vaccines, medications), injection equipment (needle and syringes), and HCWM equipment (safety boxes),
6. Describe the experiences related to injections in the health care facilities and community of patients who received injections on the day of the survey.

2.2 SAMPLING

The survey units and target populations of the injection safety and HCWM evaluation were the general medicine, pediatrics, gynecology-obstetrics, outpatient, and surgery wards as well as central stores and laboratories of the hospitals and lower-level health care facilities. This sample of health care facilities for this evaluation was obtained through a mix of purposeful and random selection. In each district evaluated, purposeful selection was used for the hospitals. Random selection was used for other types (lower level) of health care facilities in the districts.

The target populations, which were planned for this survey, were the stockrooms (for equipment/ medications/vaccines, etc.), injection providers, supervisors of the staff responsible for administering injections, waste handlers, and health care recipients (patients or who had just received an injection(s) in the study facilities) according to the following distribution:

- One central stockroom in each health care facility, for a total of 89 stockrooms.
- Providers administering the largest number of injections in the health care units or 114 injection providers; 1 provider to be interviewed per lower-level health care facility; and for the hospitals, 1 provider to be interviewed per ward.
- 114 staff supervisors responsible for administering injections, or 1 supervisor to be interviewed per lower-level health care facility, and 1 per ward for hospitals.
- 89 waste handlers with 1 participant per health care facility.
- 436 recipients of health care services coming for an injection(s) in the evaluation centers with 20 clients per hospital and 4 per health care center. In addition to the people interviewed, injections were observed in 6 locations with 4 injections observed by ward in each hospital and in each lower-level health care center or private facility. Observations were sought in the following areas: Vaccinations, curative injections, diagnostic injections, including phlebotomy and family planning. Finger pricks also were included in the follow-up.

The next section will show the actual sample attained.

Table 1: Table summarizing the sampling of the target population by section of the form

		Baseline			Follow-up		
Section	**Target Population**	**Hospitals**	**Lower-Level Facilities**	**Total**	**Hospitals**	**Lower-Level Facilities**	**Total**
1	Stockrooms	5	84	89	5	84	89
2	health care facilities	5	84	89	5	84	89
3	Injections observed	7	68	75	120	336	456
4	injection providers	5	84	89	30	84	114
5	Supervisors of the staff responsible for administering injections	5	81	86	30	84	114
6	waste handlers	5	84	78	5	84	89
7	Patients	5	46	51	100	336	436

2.3 DATA COLLECTION TOOL

Data were collected in the field with the aid of an MMIS questionnaire adapted to the context of the health care system in Uganda (See Appendix 2). The MMIS questionnaire includes 7 components or sections related to the specific intervention areas of injection safety and medical waste management. These sections apply to the different stakeholders, which are:

- Stockrooms (equipment/medications/vaccines, etc.): “Section 1.”

- Observations on the structure of care and the waste in each health care facility: "Section 2."
- Observations on the practices of the injection providers: "Section 3."
- Interviews with injection providers: "Section 4."
- Supervisors of the staff responsible for administering injections: "Section 5."
- Waste handlers: "Section 6."
- Recipients of health care services who had just received one or more injections at the health care facilities surveyed: "Section 7."

2.4 DATA COLLECTION

The data were collected from November 3, 2008, through November 16, 2008, in the 4 health districts of Hoima, Kabale, Mbale, and Yumbe. A total of 12 data collectors and 4 supervisors were identified and trained to participate in the collection of data in the health care facilities. Training for the data collectors and supervisors lasted 3 days. Following the training, 4 teams were formed with 3 data collectors and 1 supervisor each. Team leaders from Makerere University and the MMIS project staff provided joint coordination.

Data were collected over a 14-day period. The form was reviewed and validated following a pretest conducted in the 4 health care facilities with the same characteristics as those surveyed. These 4 health care facilities were not included in the survey proper or in the results presented in this report.

2.5 ORGANIZATION AND COORDINATION OF THE DATA ENTRY AND ANALYSIS

The data were analyzed using SPSS V.15 software. This required the contribution of 2 data entry operators with prior training on the use of the data entry program. Each completed questionnaire was reviewed and validated with the team supervisors before being entered and analyzed with the SPSS V.15 software. The proportions of observations were calculated for each component of the form using as a denominator either the number of health care facilities or the number of individuals surveyed or the number of injection observations.

2.6 LIMITATIONS

MMIS implemented targeted interventions for a period of four years, and when that time period was complete, the MOH had full implementing responsibility in those districts. Therefore, part of the evaluation was to evaluate sustainability of achievements.

All the targeted injections could be not be observed both at hospital and lower-level facility level, which made it impossible to perform analysis by injection type especially for diagnostic, finger prick, and family planning injections. This limitation may also compromise study power to detect significant changes in injection practices between baseline and follow-up due to the limited number of observations.

The latter limitation also affected the number of patient exit interviews that could be conducted in the long run. A few data collectors were interviewed on challenges that could have led to this setback, and reasons advanced included changes in injection prescription habits, which was noted in Kabale district, and the data collectors cited logistical challenges like lack of injectable medications in Mbale district.

3. DESCRIPTION OF THE ATTAINED SAMPLE

A total of 89 health care facilities were assessed in the project's expansion districts (Hoima, Kabale, Mbale, and Yumbe). Section 2.2 above presents the overall results of the sampling made by target type and by level of health care facility. This chapter presents this sampling by type of organization (public or private) and the actual attained sample.

Table 2: Sampling by ownership of organization

	Baseline			Follow-up		
	Public	**Private**	**Total**	**Public**	**Private**	**Total**
Observations						
Health care facilities	74	15	89	71	18	89
Stockrooms	74	15	89	71	18	89
Injections observed	63	12	75	224	42	266
Interviews						
injection providers	74	15	89	95	18	113
Supervisors of the staff responsible for administering injections	72	14	86	97	17	114
waste handlers	64	14	78	69	18	87
Patients or parents of patients coming for an injection(s) at the centers	40	11	51	229	36	265

Table 3: Sampling by type of facility

	Baseline			Follow-up		
	Hospital	**Lower-level**	**Total**	**Hospital**	**Lower-level**	**Total**
Observations						
Health care facilities	5	84	89	5	84	89
Stockrooms	5	84	89	5	84	89
Injections observed	7	68	75	93	173	266
Interviews						
injection providers	5	84	89	31	82	113
Supervisors of the staff responsible for administering injections	5	81	86	30	84	114
waste handlers	5	73	78	5	82	87
Patients or parents of patients coming for an injection(s) at the centers	4	47	51	88	177	265

3.1 FACILITY REPLACEMENTS

Some health care facilities could not be accessed at follow-up; the study team replaced these with similar facilities from those same districts. An effort was made to select facilities at similar care levels. In the three cases where there were no such substitutes, health centre IIIs which were not providing maternity services were selected as replacements. The replacements were, thus, considered as level IIIs. All replacements were selected from the MMIS sampling frame. MMIS headquarters was notified before replacement and permission to do the replacement was granted by the Principal Investigator.[1]

3.2 RECORD OF REFUSALS

There was one record of refusal, and the respondent was an injection provider at a health centre III.

[1] In Hoima district, Kitooma health centre II was replaced by Kichumbi Health centre II because it had not been operating for a long time. Kiseke health centre II was replaced with Buraru health centre and Kitooge health centre replaced with Bujumbura because they were closed throughout the data collection period. In Yumbe district, Kochi health centre was replaced with Apo health centre because the bridge was impassable due to bad weather conditions.

4. RESULTS OF THE STOCK OF INJECTION EQUIPMENT AND PRODUCTS IN THE MAIN STOCKROOMS OF THE HEALTH CARE FACILITIES

Of the health care facilities participating in this survey, data collectors evaluated the stockcards for various products such as safety boxes and injection equipment. They noted the availability of a stockcard for each product, whether the card had been updated in the 30 days preceding the survey, stockouts, and the balance indicated on the card. After collecting card data, the data collectors took a physical inventory by counting all products in the stockroom in order to compare the data from the updated stockcards to the physical stock in the stockrooms. Finally, the stocks of a sample of common oral medications were examined. This section contains these results on products available in the main stockroom of each health care facility surveyed. All 89 stockrooms were visited in the baseline and follow-up.

District level analysis and statistical testing were not carried out for this section because only a very few facilities in the baseline showed the presence of a few select products.

4.1 ANALYSIS OF THE STOCKCARDS: AVAILABILITY, UPDATE, AND EVIDENCE OF STOCKOUTS BY PRODUCT

4.1.1 SAFETY BOXES

Of the 89 health care facilities surveyed, data collectors found stockcards available for the 5L safety boxes in 66 health care facilities or for 74.2%. For each stockcard found, the data collectors evaluated whether the card had been updated during the 30 days prior to this survey; 31 stockcards were "up-to-date." Of the 31 updated cards, 2 showed a stockout during the 6 months prior to the survey. These stockcards were in Mbale and Yumbe. Both districts listed one stockout.

In the baseline, while almost all health care facilities had safety boxes for immunization services, none of the health care facilities had any safety boxes supplied for curative services. Stockcards for monitoring utilization of the safety boxes were only available in 5.8% out of the 86 storerooms where this was assessed (or 5 of the 89 facilities surveyed). These stockcards were in Hoima, Kabale, and Mbale. Two of the cards had been updated in the 30 days prior to the day of data collection. These stockcards were found in Mbale and Hoima. While there is much room for improvement, stockcard usage is improving. This is a testament to a successful MMIS intervention. One of MMIS's programmatic interventions was to introduce the safety box as common and standard in each facility.

4.1.2 STANDARD DISPOSABLE SYRINGES

Stockcards were more common for auto-disable (AD) syringes than for safety boxes and standard disposable syringes. Of the 89 health care facilities surveyed, 16.9 % had stockcards for the *standard 10ml disposable syringes*. Of these 15 stockcards, 8 had been updated in the 30

days prior to this survey (53.3 %). For the standard 10ml disposable syringes, 6 of the 8 updated stockcards showed a stockout in the last 6 months. All stockcards listed one stockout. Seven of the facilities *without* stockcards, nevertheless, had a stock of this size of standard disposable syringes with no system for monitoring this stock.

For the *standard 5ml disposable syringes*, out of the 26 facilities that had the product, 53.8% had a stockcard. Of the 14 stockcards available, 9 had been updated (64.3 %). Of the 9 updated stockcards, 5 showed stockouts; 4 stockcards listed 1 stockout, and 1 listed 2 stockouts. It is important to note that 4 of the facilities *without* stockcards had a stock of this size of standard disposable syringes without any mechanism for monitoring this stock.

For the *standard 2ml disposable syringes*, out of the 27 facilities that did have this product, 59.3% did have a stockcard. Six of the 9 facilities with an updated stockcard had experienced a stockout during the last 6 months. Five of stockcard listed 1 stockout and 1 listed 5 stockouts. The stockcard with 5 stockouts was located in Mbale district. Four of the facilities *without* stockcards had a stock of this size of standard disposable syringes without any mechanism for monitoring this stock.

Availability of standards for the different sizes of standards disposable syringes out of all facilities was 59%, 54%, and 17% for the 2ml, 5ml, and 10ml syringes, respectively. Stockouts of the standard disposable syringes were evident on the few stockcards that had been updated in the 30 days prior to the assessment.

This data are summarized in Table 4.

4.1.3 Disposable Syringes with Features that Prevent Reuse (AD)

MMIS interventions included the promotion of the use of the auto-disable syringe, which is safer. Of the 89 health care facilities surveyed, 78.6% had stockcards for the standard *10ml disposable syringes with reuse prevention* out of the 84 facilities where this product is available. Of these 66 stockcards, 28 had been updated in the 30 days prior to this survey (42.4 %). For the 10ml ADSs with reuse prevention features, 6 of the 28 updated stockcards showed a stockout in the last 6 months. All stockcards listed one stockout. Thirteen of the facilities without stockcards, nevertheless, had a stock of this size of standard disposable syringes with reuse prevention with no system for monitoring this stock.

For the *5ml disposable syringes with reuse prevention*, 85.9% of 85 facilities had a stockcard available on the day of the survey. Of the 73 stockcards available, 39 had been updated (53.4%). Of the 39 updated stockcards, 10 showed stockouts. All showed a single stockout, except for one. It is important to note that the 12 facilities without stockcards had a stock of this size of standard disposable syringes without any mechanism for monitoring this stock.

The *2ml disposable syringes with reuse prevention*, 6% of the 82 facilities had a stockcard available on the day of the survey and 36 (50.7%) had been updated. Twelve of the 36 facilities with updated stockcards had experienced a stockout during the last 6 months. Eleven showed 1

stockout, and 1 showed 2 stockouts. Nine of the facilities *without* stockcards had a stock of this size of standard disposable syringes without any mechanism for monitoring this stock.

4.1.4 Disposable Syringes with Features that Prevent Reuse and Accidental needlestick injuries (manual-disable)

Of the 89 health care facilities surveyed, 1.1% had stockcards for the *standard 10 ml disposable syringes with reuse prevention (manual-disable)*. Only one facility reported having the stockcard. This stockcard was updated and located in Hoima and the stockcards showed no stockout in the last six months. There were 2 health care facilities *without* stockcards but with a stock of this size of standard disposable syringes but with no system for monitoring this stock.

For the *5ml disposable syringes with reuse prevention (manual-disable)*, two facilities had a card available on the day of the survey out of four facilities that had the product available. However, the product was listed available in only four facilities. Of the 2 cards available, 1 had been updated. The updated card showed no stockout for the time period in question. It is important to note that there were 2 facilities *without* stockcards but with a stock of this size of standard disposable syringes without any mechanism for monitoring this stock.

For the *3ml disposable syringes with reuse prevention (manual-disable)*, the 4 health facilities that reported using the 2ml disposable syringe had no stockcards or register. Two of the 4 facilities *without* stockcards had a stock of this size of standard disposable syringes without any mechanism for monitoring this stock.

4.1.5 Disposable syringes with reuse and needlestick prevention (such as retractable)

For the *10ml disposable syringes with reuse and needlestick prevention (such as retractables)*, none of 89 health care facilities surveyed had a card available on the day of the survey. There was no stock for the syringes in question in all the facilities on the day of the survey.

For the *5ml disposable syringes with reuse and needlestick prevention (such as retractables)*, none of the 89 health care facilities surveyed had a card available on the day of the survey. There was no stock for the syringes in question in all the facilities assessed on the day of the survey.

For the *2ml disposable syringes with reuse and needlestick prevention (such as retractables)*, of the 89 health care facilities, 2 had stockcards on the day of the survey, and both the stockcards were updated. Of the 2 updated stockcards, 1 showed a single stockout, which lasted 1 day. Four health care facilities *without* stockcards had a stock of this size of disposable syringes with reuse and needlestick prevention without any mechanism for monitoring this stock.

Table 4: Summary of the availability of stockcards, by product

	Baseline			Follow-up		
Products	**Cards Available**	**Facilities Surveyed with Data**	**Percentage**	**Cards Available**	**Facilities Surveyed with Product**	**Percentage**
New, unused safety boxes	5	86	5.8	66	89	74.2
Standard disposable syringes						
10 ml	36	87	41.4	15	89	16.9
5 ml	58	89	65.2	15	26	59.3
2 ml	54	89	60.7	16	27	59.3
1 ml	-	-	-	1	11	9.1
Disposable syringes equipped with features preventing reuse (AD)						
10 ml	-	-	-	66	84	78.6
5 ml	-		-	73	85	85.9
2 ml	-		-	71	82	86.6
1 ml	-		-	6	30	20.0
Disposable syringes equipped with features preventing reuse (MS)						
10 ml	-	-	-	1	89	1.1
5 ml	-	-	-	(2)	(4)	-
3 ml	-	-	-	0	4	0.0
1 ml	-	-	-	0	2	0.0
Disposable syringes equipped with features preventing reuse *and* needlestick injuries						
10 ml	-	-	-	0	89	0.0
5 ml	-		-	0	89	0.0
2 ml	-		-	2	89	2.3
1 ml	-		-	0	1	0.0

Table 5: Summary of the updating of stockcards for health care facilities that have them, by product

	Baseline			Follow-up		
Products	**Updated Cards**	**Available Cards**	**Percentage**	**Updated Cards**	**Available Cards with Data**	**Percentage**
New, unused safety boxes	(2)	(5)		31	66	47.0
Standard disposable syringes						
10 ml	25	34	73.5	(8)	(15)	-
5 ml	33	54	61.1	(9)	(14)	-
2 ml	30	50	60.0	(9)	(16)	-
1 ml	-	-	-	(0)	(1)	-
Disposable syringes equipped with features preventing reuse (AD)						
10 ml	-	-	-	28	66	42.4
5 ml	-	-	-	39	73	53.4
2 ml	-	-	-	36	71	50.7
1 ml	-	-	-	(4)	(6)	
Disposable syringes equipped with features preventing reuse (manual-disable)						
10 ml	-	-	-	(1)	(1)	-
5 ml	-	-	-	(1)	(2)	-
3 ml	-	-	-	(0)	(0)	-
1 ml	-	-	-	(0)	(0)	-
Disposable syringes equipped with features preventing reuse *and* needlestick injuries						
10 ml	-	-	-	(0)	(0)	-
5 ml	-	-	-	(0)	(0)	-
2 ml	-	-	-	(2)	(2)	-
1 ml	-	-	-	(0)	(0)	-

Note: Cases with less than 20 cases are shown in brackets.
Percentages are not calculated for cases with less than 15 cards.

4.2 PRESENCE OF ORAL FORMULATIONS OF COMMON MEDICINES

One strategy for improving injection safety is to reduce the number of injections to the minimum necessary to treat patients' diseases appropriately. However, this strategy assumes that the health care personnel who prepare the medication prescriptions and the injection providers have a choice and the oral substitutes are in stock at the health facility. In order to evaluate the presence or absence of this "choice," the data collectors took notes on the availability of oral forms of four medicines commonly used in the health care facilities surveyed. For each medication, the data collectors evaluated whether there was a stock (of any amount) in the facility at the time of their visit.

In the follow-up, the results for the 4 medications chosen for this analysis, Coartem, quinine, Septrin, and amoxicillin, are listed below. The oral forms of commonly used medicines are available in the health care facilities surveyed in 78.7 % of cases for Coartem, 34.8 % for quinine, 65.2 % for Septrin, and 49.4% for amoxicillin. Of the facilities surveyed, 78.7 % had a stock of at least *1* medication on this list. Only 22.5% had a stock of all 4 medications (Table 8).

Amoxicillin was the only drug that was assessed in both the baseline and follow-up. However, while a higher percentage of facilities had amoxicillin at baseline, the actual number of facilities with amoxicillin was higher at follow-up. The situation did not improve significantly in the follow-up for those facilities that had stock of all oral formulations. It did improve significantly for those that had at least 1 oral formulation ($p<.001$). A majority of the facilities in each district, except for Yumbe (4 out of 12 facilities), had at least 1 oral medication.

Table 6: Stock of oral medications

	Baseline		Follow-up	
	Percentage	**Number of health care facilities**	**Percentage**	**Number of health care facilities**
Coartem	-	-	78.7	89
Quinine	-	-	34.8	
Amoxicillin	56.9	51	49.4	
Chloroquine	84.6	65	-	
Cotrimoxazole (Septrin)	55.4	65	65.2	
Stock of at least **one** oral medication on this list	100%	60	93.3	
Stock of **all** oral medications on this list	30.0	60	22.5	

Few stockcards were up to date and it was therefore very difficult to assess stock balance and stockouts. The teams also noted cases of disorganized stock were observed, which made it impossible to conduct physical inventories in some instances.

Clearly, for facility managers the area of procurement, planning, monitoring, and record keeping are key for preventing stockouts and ensuring appropriate availability of all needed supplies. This is an area for future programmatic attention.

5. OBSERVATIONS ON MATERIALS, EQUIPMENT, AND WASTE MANAGEMENT

In this section of the survey, the data collectors made 1 set of observations on waste management in each of the 5 hospitals and the 84 lower-level facilities in the baseline and follow-up surveys. District- level analysis was presented for the indicators for program purposes. Statistical testing was carried out only for the overall baseline and follow-up results for all sections and not between the districts because of the smaller number of facilities or observations within the districts.

5.1 PRESENCE AND USE OF SAFETY BOXES IN LOCATIONS WHERE INJECTIONS ARE ADMINISTERED

In the follow-up, in the health care facilities surveyed, 92.1% had sharps containers in each place where injections were being administered. In each of these places, the data collectors evaluated whether all sharps containers were safety boxes. They found that in 97.8 % of the health care facilities, all of the sharps containers being used for disposing of sharps in the injection areas were safety boxes (Table 9). This was an increase from the baseline in which overall 66.3% of the facilities surveyed were found to have puncture proof and leak-proof sharps containers in each area where injections are given and 44.9% of the facilities surveyed were only using safety boxes for sharps containers. These two variables improved significantly from the baseline ($p<.001$).

At baseline, facilities in Kabale had the most puncture proof and leak-proof sharps containers (92%), followed by Hoima (72%), Mbale (48%), and Yumbe (5 out of 12 facilities). In the follow-up, all districts except Hoima improved. In Kabale, Mbale, and Yumbe districts, 100% of the facilities were observed to have puncture-proof and leak-proof sharps containers. The district Hoima remained steady at 72%.

All districts improved in the follow-up in terms of using only a safety box for disposing of sharps. In the follow-up, in Kabale, Mbale, and Yumbe, 100% of the facilities were observed to have safety boxes. The district of Hoima improved to 92% in the follow-up. In the baseline, all of the districts surveyed had less than 60% of facilities using only safety boxes for sharps containers. Interestingly, Kabale had the lowest percentage of safety boxes (28%), followed by Yumbe (42% or 5 out of 12 facilities), Mbale (52%), with Hoima having the highest percentage (56%).

Table 7: Observations on the use of safety boxes

	Baseline		Follow-up	
	Percentage	**Number of health care facilities**	**Percentage**	**Number of health care facilities**
Health care facilities with sharps containers for sharp objects in each location where injections are administered	66.3	89	92.1	89
Health care facilities that only use safety boxes in locations where injections are administered	44.9	89	97.8	89

5.2 INDIVIDUAL INDICATORS OF THE DISPOSAL OF USED, SHARP OBJECTS

5.2.1 OVERFLOWING OR PIERCED SAFETY BOXES

The presence of safety boxes in the locations where injections are administered does not guarantee injection safety if those safety boxes are inadequate. For this reason, data collectors evaluated the health facilities in order to see whether there were cases of pierced or overflowing boxes. In 91.0 % of the health care facilities that could be observed, no pierced or overflowing safety boxes were found (Table 10). This variable did not improve from the baseline.

In the follow-up, Mbale and Yumbe had no facilities with overflowing or pierced safety boxes, followed by Kabale (88%), and Hoima (80%). In the baseline, Kabale had the most number of facilities with no overflowing or pierced safety boxes (96%), followed by Mbale (85%), Hoima (84%), and lastly Yumbe (9 out of 11 facilities).

5.2.2 SHARP OBJECTS INSIDE THE HEALTH CARE FACILITY

Overall, 96.6% of the health care facilities surveyed had *no* used sharp objects lying around the facilities. In the rest of the health care facilities, the data collectors found sharp objects lying around where they could expose the injection providers or public to the risk of accidental needlestick injuries (Table 10). This was statistically significant from the baseline in which 62.9% of the facilities had no used sharp objects lying around the facilities ($p<.001$).

In the follow-up, no facilities in Yumbe or Mbale had any sharp objects lying around in an open container. In Hoima, all but 2 facilities, and in Kabale, all but 1 facility had no sharp objects lying around in an open container. In the baseline, at least 50% of the facilities in each district did not have any sharp objects lying around the facilities, Kabale (76%), Hoima (64%), Mbale (56%), and Yumbe (50%).

5.2.3 SHARP OBJECTS OUTSIDE OF THE HEALTH CARE FACILITY

Data collectors evaluated the grounds outside of each health facility surveyed to see whether there were any loose sharps lying around. During this survey period, they found that 89.7% of the facilities that could be observed for this variable had *no* loose (visible) sharps lying around outside. Most of the loose sharps were found at the final disposal site. This had statistically improved from the baseline in which 75% of the facilities had no loose sharps lying around outside the facility ($p<.05$).

In the follow-up, once again no facilities in Yumbe had any sharp objects outside of the health facility, followed by Kabale (96%), Hoima (92%), and Mbale (77%).

At baseline, no loose sharps were found inside (63%) or outside (75%) the health care facilities. Once again, Kabale had the most number of facilities (76%) that did not have used sharps in an open container inside the health care facilities. Kabale also had the most number of facilities (84%) that had no used sharps outside the facility. Hoima had 64% of facilities with no used sharps in an open container inside the health facility, followed by Mbale (56%) and Yumbe (6 out of 12).

In the baseline, after Kabale, Hoima (76%) had the highest percentage of facilities with no used sharps outside the facility, followed by Mbale (73%), and Yumbe (7 out of 12 facilities). In the remaining facilities, data collectors found loose sharps where they could put providers and/or the general public at risk of accidental needlestick injuries.

Table 8: Observations on the condition of the safety boxes and used sharps

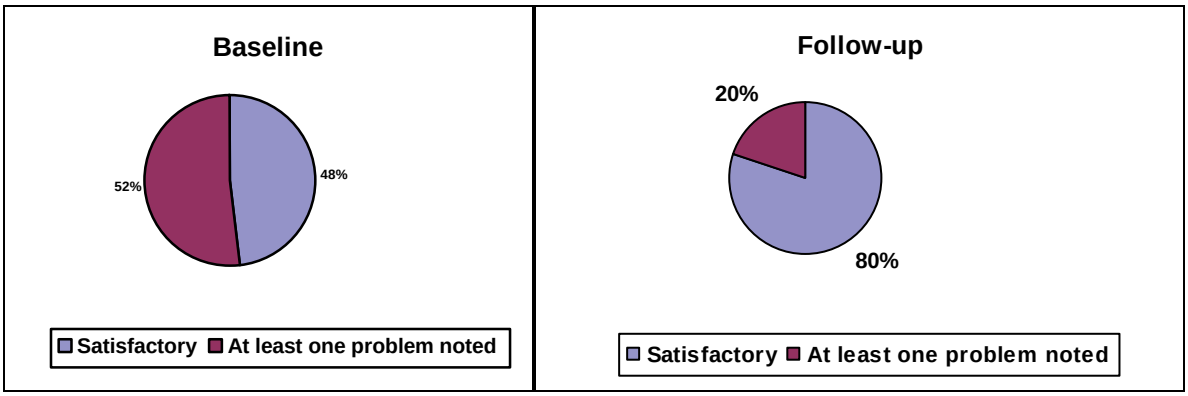
	Baseline		Follow-up	
	Percentage	Number of HCFs	Percentage	Number of HCFS
Health care facilities *without* overflowing or pierced safety boxes	87.5	88	91.0	89
Health care facilities *without* used sharps in open containers or loose *inside* the health care facilities	62.9	89	96.6	88
Health care facilities *without* used sharp objects *outside*	75.0	88	89.7	87

5.2.4 SUMMARY OF SATISFACTORY DISPOSAL PRACTICES

The three individual practices of sharps waste disposal, i.e., a*)no pierced or overflowing boxes b) no sharps lying around inside and c) no sharps outside the facility* were analyzed, but it is also useful to look at a summary of the results for the satisfactory practice of sharps disposal overall. These results show that only 69 out of 86 (80%) health care facilities where the data collectors collected all 3 variables, had the 3 good practices in place throughout the entire facility and on the grounds. The rest of the health care facilities were excluded because they did not have at least one of these good practices (Figure 1). This was statistically significant from the baseline in which 47.7% of the facilities qualified in having satisfactory disposal (p<.001). In the follow-up, all facilities in Yumbe (12 facilities or 100%) had satisfactory disposal, followed by Kabale (21 facilities or 84%), Mbale (20 facilities or 74%), and Hoima (16 facilities or 70%).

In the baseline, 47.7% of the facilities with data on all three variables (n=88) met these conditions for satisfactory disposal. Kabale had the most number of facilities that had satisfactory disposal (16 facilities or 64%), followed by Hoima (12 facilities or 48%), Mbale (11 facilities or 41%), and Yumbe (3 facilities out of 11).

Figure 1: Summary of satisfactory disposal practices at baseline and follow-up



5.3 STORAGE OF FULL SAFETY BOXES

Once safety boxes become full, they must be stored somewhere until their final destruction. The data collectors evaluated whether full safety boxes were stored in a closed location inaccessible to the public on the day of the survey. In the follow-up, in 48 health care facilities, the data collectors could not make these observations (for example, in cases where there were no full boxes). The storage of full safety boxes were inaccessible to the public in 68.3 % of the 41 facilities evaluated (Table 11).

This had increased from the baseline in which 62.8% of the 78 facilities where this could be assessed had stored full safety boxes that were inaccessible to the public but not at a statistically significant level.

In the follow-up, Mbale district (86%) had the highest percentage of full safety boxes that were inaccessible to the public, followed by Kabale (75%), Hoima (50%), and Yumbe (0 out of 3 facilities).

In the baseline, Kabale had the highest percentage of facilities where this observation was made and could be assessed (70%), followed by Hoima (65%), Mbale (64%), and Yumbe (3 out of 9 facilities).

5.4 TIGHTLY SEALED SAFETY BOXES

Safety boxes awaiting final destruction must be tightly sealed. The data collectors evaluated whether this was the case. They recorded their observations for 39 of the 89 health care facilities surveyed. They found that 71.8 % of the facilities evaluated had full boxes that were tightly sealed (Table 11).

In the baseline, in the 69 facilities where they were able to complete this observation, 65.2% were found to have all safety boxes awaiting destruction tightly sealed. Kabale and Mbale districts were above this percentage (79% and 67%, respectively), while Hoima and Yumbe were below (55% and 57%, respectively).

In the follow-up, Mbale (81.8%) had the highest percentage of safety boxes that were tightly sealed, followed by Kabale (80%), Hoima (60%), and Yumbe (1 out of 3 facilities).

Data collectors noted that it was not possible to assess some measures of safe practices. For example, it was not possible to establish whether all full safety boxes are stored in a locked area inaccessible to the public and whether boxes awaiting final destruction were completely closed because there were no full safety boxes. Some waste handlers were not observed handling waste during the visit because some work overnight, yet data collection was done during day time.

Table 9: Observations on the storage of full safety boxes

	Baseline		Follow-up	
	Percentage	**Number of health care facilities with Full safety boxes**	**Percentage**	**Number of health care facilities with Full safety boxes**
Health care facilities in which all full safety boxes are stored in a closed locations inaccessible to the public	62.8	88	68.3	41
Health care facilities in which all safety boxes awaiting final destruction are tightly sealed	65.2	69	71.8	39

5.5 WASTE SEGREGATION

One strategy for reducing the amount of used sharps and infectious waste generated by injections is to segregate the waste into different containers for used sharps, infectious waste, and noninfectious waste. Data collectors found that waste was only sorted in 80.9 % of the 89 health care facilities surveyed (Table 12). This was statistically significant from the baseline in which 45.5% of the facilities were observed to be segregating waste ($p<.001$).

In the follow-up, Mbale had the most number of facilities that were observed to be segregating waste (96%), followed by Kabale and Hoima (76% each), and Yumbe (67%).

In the baseline, in 60% of facilities (15 out of 25 facilities) in Kabale waste was observed to be segregated, followed by Hoima, 52% (13 out of 25), Mbale, 27% (7 out of 26), and Yumbe, 42% (5 out of 12).

5.6 LOOSE BIOLOGICAL WASTE

The data collectors also examined biological (infectious) waste. Specifically, they evaluated whether there was any loose biological waste lying around, visible, in any location inside or outside a health facility. In 77.5 % of the 89 health care facilities surveyed, they did not find any loose biological waste where it could pose a risk of contamination to providers or the public (Table 12). In the baseline, 85.1% of facilities were observed to have no loose biological waste. This variable is the one variable in this section that did not change in a positive direction.

In the follow-up, Mbale (82%) continued to have the most number of facilities in which there was no loose biological waste around the facility followed by Hoima (80%), Kabale (72%), and Yumbe (75%).

In the baseline, Mbale had the highest percentage of facilities with no loose biological waste (96%), followed by Kabale (88%), Yumbe (83%), and then Hoima (71%).

Table 10: Observations on segregation of waste and biological waste

	Baseline		**Follow-up**	
	Percentage	**Number of health care facilities**	**Percentage**	**Number of HCFs**
Health care facilities that segregate their waste in different containers for used sharps, infectious waste and noninfectious waste	45.5	88	80.9	89
Health care facilities *without* loose biological waste	85.1	87	77.5	89

5.7 EVIDENCE OF REUSE

In the follow-up, no facilities had evidence of any attempts to sterilize injection equipment. This is a huge programmatic success. In the baseline, evidence was observed in 9 facilities (Hoima [1], Kabale [5], and Mbale [3]) or 10.2% of all the facilities. The evidence for sterilization included: Health units observed to be using a boiler, stove, and saucepans found in the injection room; needle and syringes found in a dish of water; and lumbar puncture needles found in a kidney dish.

5.8 OBSERVATIONS ON WASTE MANAGEMENT

Data collectors in this survey were instructed to observe waste handlers as they handled waste on the day of the survey to the extent that this was possible. The goal was to compare these observations with the data obtained from interviews of waste handlers. The data collectors observed a total of 24 waste handlers. For each of these observations, the data collectors noted what PPE, if any, the waste handler was using. Boots or closed shoes (20 waste handlers) and heavy-duty gloves (11 waste handlers) were the only types of effective equipment that were used. Eight waste handlers used lighter weight gloves for household chores (which were not considered effective protection for the purposes of this evaluation) (Table 13).

In the baseline, 28 waste handlers were observed in the health care facilities surveyed. The two most common types of protective equipment were boots or closed-toed shoes (16 waste handlers or 57%) and gloves (15 waste handlers or 54%). However, it is important to note that the data collectors found that most of the waste handlers who had gloves were using surgical gloves—which do not protect from needlestick injuries—rather than heavy-duty gloves. This presents a serious area for improvement.

Table 11: Waste management observations

	Baseline		Follow-up	
	Number of waste handlers	**Number of health care facilities**	**Number of waste handlers**	**Number of health care facilities**
Health care facilities in which the waste handlers were observed	28	89	24	89
Boots/closed-toed shoes	16	28	20	24
Gloves, unspecified	15	28	-	-
Heavy-duty gloves	-	-	11	24
Lightweight gloves	-	-	8	24
Aprons	2	28	2	24
Goggles	1	28	0	24
Masks	2	28	0	24
Long-sleeved shirts	5	28	0	24

5.9 WASTE DISPOSAL METHODS

During their visits to the health care facilities, the data collectors observed the main waste disposal method(s) used for sharps waste. The most common method was *open burning on the ground*, which was recorded in 48.3% of the health care facilities. *Open burning in a hole or an enclosure* was recorded in 47.2%. *Dumping in a latrine or other protected pit* was observed in 25.8 % of the facilities, and dumping in an unprotected pit was the method used in 22.5% of the facilities. Burial was mentioned in 6.7% of the facilities, and *low-temperature incineration* were observed in 3.4 % of the health care facilities surveyed, *dumping in an unsupervised location* was rarely mentioned. *Transportation for off-site processing* and *high-temperature incineration* were not mentioned at any facility, and in this case, incineration entailed *high or medium-temperature incineration* (Table 14). Also in the follow-up, one waste handler mentioned dumping sharps and vials in a deep well.

In the follow-up, the most common method of waste disposal observed in Hoima was open burning on the ground (56%), followed by dumping in a protected pit (48%). In Kabale, it also was open burning on the ground (64%), followed by open burning in a hole (32%). In Mbale, it was open burning in a hole (59%), followed by open burning on the ground (37%). In Yumbe, it was open burning in a hole (67%), followed by dumping in an unprotected pit (42%).

In the baseline, the principal methods of waste disposal at the 89 health care facilities surveyed were open burning in a hole or enclosure (observed in 58.4% of the facilities) and dumping in a pit latrine or other secure hole (34.8%) followed by open burning on the ground (19.1%). The most common methods of HC waste disposal in Hoima, Kabale, and Mbale districts are open burning in a hole followed by dumping in a pit latrine. In Yumbe, it was dumping in an unsupervised area (3 facilities).

In the baseline, incinerators were observed in Yumbe (high-temperature incinerator), Mbale (medium and low-temperature incinerators), and Hoima (low-temperature incinerator). In the follow-up, medium and high-temperature incinerators were not observed in any of the districts. In the follow-up, low-temperature incineration was observed in Hoima, Mbale, and Yumbe. This also presents an area for improvement.

Table 12: Observations on the main methods used to dispose of sharps waste at baseline and follow-up

	Baseline		Follow-up	
	Number of health care facilities where method was observed	Percentage	Number of health care facilities where method was observed	Percentage
Open-air burning in a hole or an enclosure	52	58.4	42	47.2
Open-air burning on the ground	17	19.1	43	48.3
High or medium-temperature incineration	2	2.2	0	0
Dumping in a latrine or other protected pit	31	34.8	23	25.8
Dumping in an unsupervised location	3	3.4	1	1.1
Transportation for off-site processing	2	2.2	0	0
Burial	0	0	6	6.7
Low-temperature incineration burning	2	2.2	3	3.4
Dumping in an unprotected pit	0	0	23	22.5

To summarize these results, all of the various methods can be grouped into three general categories of waste disposal: "Good," "acceptable," and "poor." Good final disposal is considered to be one or more of the following: High or medium-temperature incineration, dumping in a protected pit, or transportation for off-site treatment. Acceptable final disposal is considered to be low-temperature incineration /burning. Poor final disposal is calculated as open burning on the ground, open burning in a hole or in an enclosure, burial, dumping in an unprotected pit, or dumping in an unsupervised area. If a facility demonstrates a method from one or more of the three categories, the lowest rating is used for the overall score for each facility. Additionally, protected pit and burial are good options, whereas burial alone is poor. Bad waste disposal methods such as open-air burning in general and dumping in an unprotected pit were still observed in the follow-up.

5.10 OBSERVATIONS ON JOB AIDS

During their visits to the health care facilities, data collectors observed whether there were communication materials (such as reminder charts and/or job aids) encouraging the rational use of injections or medical waste disposal management. They saw materials displayed that

encouraged reducing the use of injections in 45 out of 89 health care facilities (50.6 %). See table 15 below. Data collectors also saw materials displayed that encouraged safe administration of injections in 28 out of the 89 (21.5%) health care facilities. Material which promoted safe disposal of used injection equipment was observed in 66 (74.2%) of the 89 health care facilities. In the baseline, out of the 87 health care facilities where the observation was made, only 5.7% of the health care facilities had reminders or job aids that promoted the reduction of use of injections. Four out of five of the posters were found in Kabale. The poster was found in Hoima.

Table 13: Observation of job aids at sampled facilities

Reminders/job aids: Promote Reducing Injections, N=45	**Number of Facilities which have this BCC material (n)**	**Percentage**
Tablets are as Effective as Injections (Poster)	41	91.1
Safe Injection practices—Leaflet for HCWs	9	20.0
Facts on Injection safety—For Community leaders	2	4.4
Reminders/job aids: Safe Administration of Injections, N= 28	**N**	**%**
Safe Injection Practices (Poster)	20	71.4
Standards for Injection Safety and HCWM Practices	1	3.6
Injection Safety & Appropriate HCWM—Participant's Notes	3	10.7
Do No Harm, Injection Safety in the context of Infection Prevention and Control	2	7.1
Safe Injection practices—Leaflet for HCWs	5	17.9
Facts on Injection safety—For Community leaders	1	3.6
Reminders/job aids: Promoting Safe Disposal, N=66	**N**	**%**
Segregation of medical waste (Poster)	65	98.5
Standards for Injection Safety and Health Care Waste Management Practices	5	7.6
Injection Safety & Appropriate HCWM	3	4.5

6. OBSERVATIONS ON INJECTION ADMINISTRATION PRACTICES

For this survey, up to 4 injection observations per ward where injections were being administered on the day of the survey were planned for hospitals, and up to 4 injection observations per lower-level facility for a total of 456 planned injection observations. However, only 266 injections were observed in total, 93 from hospitals and 173 from lower-level units due to several challenges in the field. Challenges included availability of injectables medications at the health care facilities, availability of personal protective gear like surgical gloves, and power outages, which made laboratory investigations come to a standstill in some districts. Additionally, one health facility rarely prescribed and offered injectables medicines. The analysis presented in this section of the report is the analysis of the four observations by the data collectors in each location.

In the baseline, only 75 injections were observed due to at most 1 injection being observed in each facility.[2] Seven injections were observed in the hospitals, and 68 injections were observed in lower-level facilities.

The injections observed during this survey were administered by various types of health care personnel. A total of 35.0 % of the 266 injections took place in hospitals, compared with 65.0 % on the primary level.

By far, the most frequent type of injection observed was a curative injection followed by preventive injections like vaccination, diagnostic, and family planning. At the time of the baseline survey, phlebotomy and finger-prick observations were included in a general diagnostic category. In the follow-up, phlebotomies and finger pricks were separated for more detailed analysis (Table 16).

[2] The difference between the two time periods is not necessarily evidence of an increase in the number of injections for treatment.

Table 14: Distribution of the injections based on type at baseline and follow-up

	Baseline		Follow-up	
Type of Injection	**Number of Injections Observed**	**Percentage of the Total Observed**	**Number of Injections Observed**	**Percentage of the Total Observed**
Therapeutic injections (Curative)	37	49.3	97	36.5
Preventive injections (Vaccinations)	17	22.7	55	20.7
Family planning	7	9.3	28	10.5
Phlebotomy (blood draw)			50	18.8
Finger pricks			28	10.5
Diagnostic injections (Laboratory)	14	18.7	8	3.0
Total	**75**	**100.0%**	**266**	**100.0%**

6.1 PREPARATION OF INJECTIONS ON A CLEAN WORK TABLE OR TRAY

The data collectors began their observations by focusing on the hygienic conditions of the injections—in particular, whether the injection providers had taken care to prepare the injection on a clean work table or tray where contamination of the injection equipment with blood, dirty swabs, or other biological waste would be unlikely. The overall result was 83.8% of all injections observed that were prepared on a clean surface. Interestingly, this result seems to be higher among lower-level health care facilities than in hospitals (86.7% and 78.5%, respectively). In the baseline, in 87.5% of injection observations, the injection provider prepared the injection on a clean work table or tray. This change was not statistically significant from the baseline (Figure 2).

In the follow-up, Mbale had the most number of injection observations (93%), followed by Yumbe (84%), Kabale (81%), and Hoima (67%) in which the injections were prepared on a clean, dedicated work table or tray.

In the baseline, all injections (100% or 8 injections) in Kabale were prepared on a dedicated working table or tray, followed by Yumbe (92% or 12 injections), Mbale (86% or 19 injections), and Hoima (83% or 24 injections).

6.2 HAND HYGIENE AND USE OF NEW GLOVES

The other aspect of general hygiene that the data collectors analyzed was hand washing. They observed whether injection providers washed their hands with soap and running water or with an alcohol-based hand sanitizer prior to beginning the injection or in cases where there was a risk of contact with soil, blood, or organic fluids. Observers found that injection providers only washed their hands in 47.5% of the injections observed. The other 1.7% used an alcohol-based hand sanitizer. The other 50.8% of providers observed did not wash their hands at all, and the rest

were not observed (Figure 2). Providers working at lower-level facilities (50.3%) seemed to wash their hands more often than providers in hospitals (26.9%).

At baseline, 75.7% of injection providers were observed to wash their hands or used an alcohol-based hand sanitizer, compared to 49.2% of injection providers in the follow-up[3]. This change was statistically significant ($p<.001$) and presents a real area of concern.

In the follow-up, in Kabale, in 67% of the injection observations, the providers were observed to wash their hands, followed by Yumbe (48%), Mbale (44%), and Hoima (37%).

In the baseline, providers were observed to wash their hands before 91% of the injections (or 20 injections) in Mbale, 79% of cases (or 23 injections) in Hoima, 8 out of 13 injections in Yumbe, and 2 out of 6 injections in Kabale.

6.2.1 USE OF NEW GLOVES

New gloves were used in only 27.2% of all injections observed and in 47.1% of 51 phlebotomy injections. Gloves were not changed in 9.0% of the overall injections observed, and no gloves were used in 63.4% of the injections observed. No gloves were used in 33.3% of phlebotomy injections. This variable was not observed in the baseline. Still, the lower-levels highlight an area for improvement.

6.3 CLEANING THE PATIENT'S SKIN BEFORE THE INJECTION

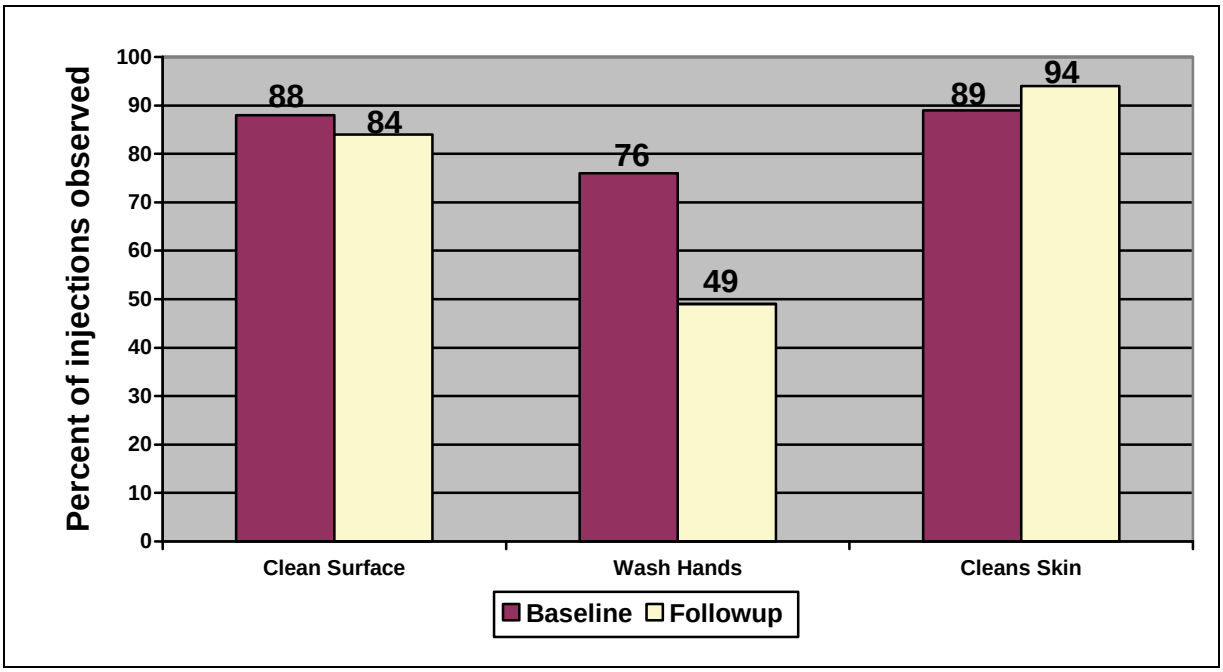
In this survey, data collectors were able to observe the practice of cleaning the patient's skin. In 93.7 % of the 254 injections observed, provider cleaned the skin with a clean swab or a disinfectant before the injection was given. This result varied among injection providers where 91.9% cleaned the patient's skin in lower-level facilities, compared to 84.9% in hospitals. Again, lower-level facilities seem to be adopting better practices.

In the follow-up, in 46.1% of the injections observed, a clean swab was used; in 47.6% of the injections, a swab with antiseptic was used; the skin was not cleaned in 2.4% of the injections; and in 3.9% of the injections, a dirty swab was used. In the follow-up, all injections in Mbale (100% or 105 injections), followed by Kabale (95%), Yumbe (95%), and Hoima (73%), the injection provider was observed to clean the skin with a clean swab or antiseptic. In the follow-up, 1 vaccination out of 54 vaccinations, the skin was cleaned with an antiseptic.

In the baseline, overall 89.3% of the patients (n=56) observed receiving injections had their skin cleaned before the injection was administered. Further analysis revealed that 10 of these patients also had received vaccinations. Hoima had the lowest percentage of patients whose skins were cleaned before the injection (77% or 17 injections). The other districts were over 90%: Mbale (94% or 15 injections), Yumbe (100% or 13 injections), and Kabale (100% or 5 injections).

[3] In the baseline, the questionnaire did not specify whether the IP washed their hands or used an alcohol-based hand sanitizer.

Figure 2: Summary of the observations related to infection prevention and control



In addition to these specific variables related to hygiene, the data collectors made general comments about the other problems observed. These included observations that lack of BCC materials, which compromised reference to safer practices during the injection procedures. Data collectors also noted significant lack of gloves in most health care facilities, which could bias the hand hygiene results. The HCWs seemed to realize the need for changing gloves between procedures but had no option because gloves were simply not available. This similar challenge was also cited among limitations where some procedures were reportedly stopped due to lack of gloves.

6.4 TYPE OF EQUIPMENT USED FOR PROCEDURE

In the follow-up, data collectors observed what kind of equipment injection providers used to administer the injections. ADs were overwhelmingly the most common type of equipment observed (71.8%), followed by lancets (9.4%), and standard disposables (8.6%). As MMIS encouraged the use of autodisposable, this is a great programmatic achievement.

Table 15: Type of equipment used to administer the injection

Type of Equipment	Percentage, N=266
AD	71.8
Lancet	9.4
standard disposable	8.6
Vacuum set	3.4
Cannula	2.3
Retractables	1.5
Disposable (Type unknown)	0.4

6.4.1 PATIENTS AS THE SOURCE OF INJECTION EQUIPMENT

In some health care facilities, if the health care systems do not supply injection providers with sufficient quantities of injection equipment, the patients may be obliged (or want to) to bring their own needle and syringes. In the 264 injections observed for this indicator, 3.8% of the patients brought their own needle and syringes for the injections they received on the day of the survey. At baseline, in 11.4% of the 70 injections observed patients had brought their own needle and syringe. This decline was statistically significant ($p<.05$).

In the follow-up, in Yumbe, no patients were observed to bring their own injection equipment. In the follow-up, 7 patients or 11% were from Kabale district, 2 patients or 5% were from Hoima, and 1 patient or 1% was from Mbale. In the follow-up, all 10 patients who bought their own injection equipment, the equipment was from a new packet. In the baseline, out of the 2 injections that were not from a new packet, 1 was bought by the patient, and 1 was from the health facility.

In the baseline, 7 patients brought their own injection equiptment: 3 patients were from Hoima district and 5 were from Mbale district. The numbers of observed injections that were brought by the patients by services provided were vaccination (1), curative (5), diagnostic (1), and contraceptive (1).

6.5 USE OF NEW NEEDLES AND SYRINGES FOR INJECTIONS AND TO RECONSTITUTE MEDICATIONS

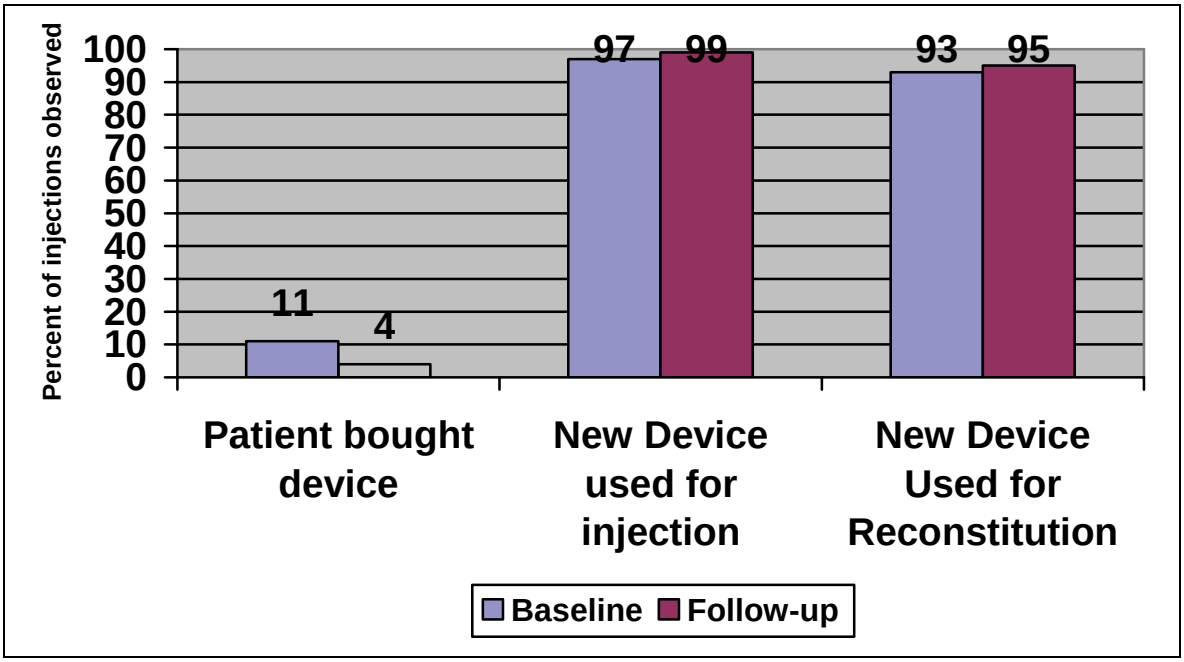
In nearly all the 82 injections (95%) (vaccinations and curative injections only) where the practice of reconstitution could be observed and was applicable, the needle and syringes were taken from a sterile package [4] (Figure 3). In the baseline, use of a new needle and syringe for reconstitution was 92.7%.

[4] If resuse of an injection equipment was about to occur without sterilization, DCs were instructed to intervene and interrupt the procedure as tactfully as possible.

The overall result for the injection providers observed was 99.6% of the providers administered all of their injections with a new needle and syringe taken from a sterile package. This is truly a tremendous achievement. In the follow-up, 1 injection in Mbale was not from a sterile packet or fitted with two caps. It was a phlebotomy procedure using an AD syringe in a lower-level facility. All other injections in other districts were from a new needle and syringe.

At baseline, out of the 70 injections observed for this variable, 97.1% of syringes and needles came from sterile packets. Only 1 injection in Hoima and 1 injection in Mbale were not from a sterile packet. This was not statistically significant between baseline and follow-up.

Figure 3: Summary of the distribution of observations on the sources and practices of using new needle and syringes



6.6 DILUENTS FOR RECONSTITUTION

Although there are cases in which it is not necessary to use diluents from the same manufacturer as the medications (for example, cases of reconstitution that only use sterile saline), in general, using a diluents from the same manufacturer as the vaccines is one important aspect of injection safety. During the course of this evaluation, the data collectors noted that the diluents from the same manufacturer as the vaccine were used in 100% of the reconstituted injections in which this practice could be observed (26 observations). Comparison could not be made between lower-level providers and hospitals because the practice diluents were from the same manufacturer as the medication and vaccine in all the observations.

At baseline, information was obtained for 14 observations. Of these, all 14 were reconstituted with the correct diluent (Figure 4).

6.7 REMOVING NEEDLES FROM THE CAP OF MULTIDOSE VIALS

A needle that remains in the rubber cap of a multidose vial risks becoming a route by which microbes gain access to and will contaminate the injectable medication. Removing the needle from the rubber cap after withdrawing the dose to be administered is, thus, a measure of injection safety. For this variable, the data collectors were able to make 96 observations of injections in which this variable was relevant (i.e., a multidose vial was used). In 92.7% of the observations, the needle was removed from the cap of the multidose vial after withdrawing the dose to be administered every time an injection was prepared (Figure 4). All injections in Yumbe were observed to have the needle removed from the rubber stopper cap, followed by Hoima (94%), Kabale (94%), and Mbale (86%).

Data collectors were able to observe 89 injections in which the variable of cleaning the rubber stopper of the medicine vial was relevant and observed. In 9.0 % of the injections or 8 injections, the rubber stopper of the medicine vial was cleaned with disinfectant before withdrawing the dose. This was not observed in the baseline.

In hospitals, 95.8% of the health care providers removed the needle from the rubber cap after withdrawing the dose to be administered every time that they prepared an injection as compared to the 91.7% for the lower-level facilities.

At baseline, of the 38 injection providers observed handling multidose vials, in 68.4% of the injections, the needle was removed from the rubber cap after withdrawing each dose for administration. In all 5 injections in Kabale, the needle was removed from the rubber cap of the vial after withdrawing each dose. In Mbale, this was the case for 10 out of 12 injections; and in Yumbe, this was the case for 3 out of 4 injections. In Hoima, 8 out of 17 injections were observed to have the needle removed from the rubber cap.

6.8 USE OF CLEAN BARRIERS TO PROTECT FINGERS WHEN BREAKING GLASS AMPOULES

Injection providers can be injured when opening or breaking glass vials, which risks contaminating the injectable medication or injection equipment. For this reason, injection providers were observed while they were preparing injections. The data collectors noted what material (i.e., a sponge, cotton, or gauze) was used by the providers as a barrier to protect their fingers when breaking the ampoules. In the cases in which this variable was relevant (i.e., glass ampoules were used) and in which it could be evaluated, the providers used a clean barrier in 63.8 % of the 47 injections observed.

In the follow-up, in Kabale, 75% or 3 injections, the provider was observed to use a clean barrier to protect fingers when breaking glass ampoules, followed by Mbale 70% or 19 injections, Yumbe 56% or 5 injections, and Hoima 44% or 3 injections.

At baseline, out of the 29 injections observed, 79% of the injection providers protected themselves while breaking the ampoules. Mbale performed the best in this regard, 13 injections or 93%, in which the HCW used a clean barrier. In Yumbe, HCWs used a clean barrier in 5 out of 6 injections, followed by Hoima (5 out of 8 injections). In Kabale, the provider did not use a clean barrier for the 1 injection that was observed

The overall result for the 47 injection providers observed when opening or breaking a glass vial was that 63.8% protected their fingers each time they opened a glass ampoule; the result was higher in hospitals (83.3%) as compared to lower-level health care facilities (51.7%). This could present an opportunity for training.

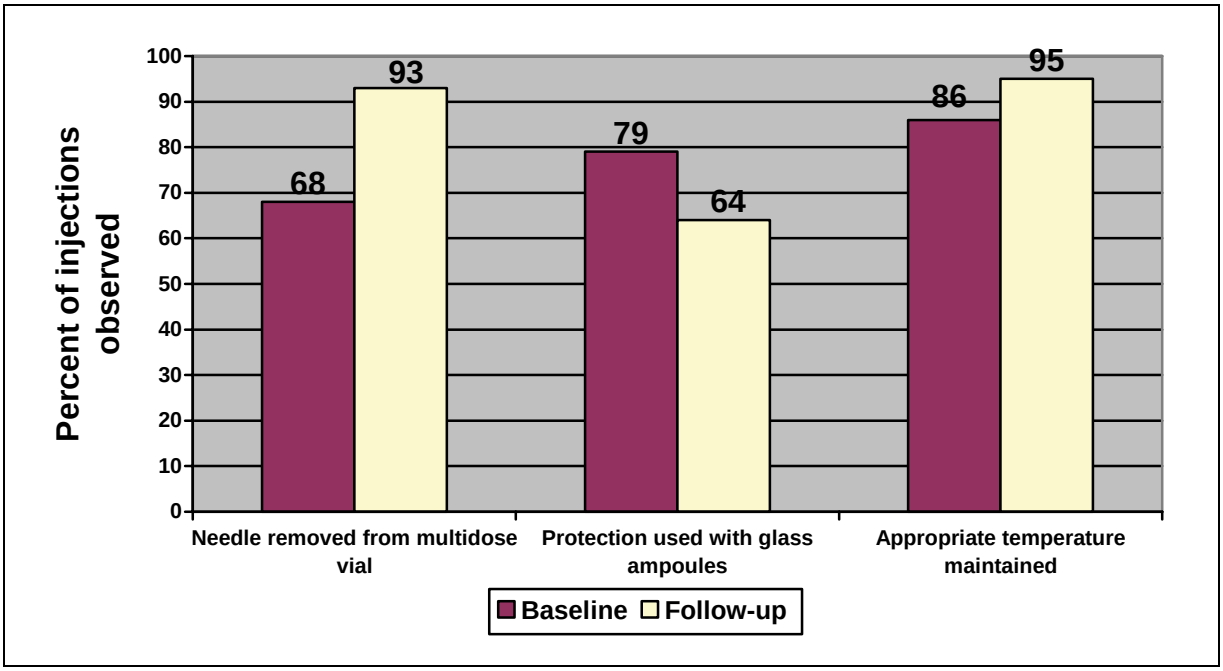
6.9 TEMPERATURE AT WHICH HEAT-SENSITIVE VACCINES WERE STORED

The data collectors observed the temperature at which heat-sensitive vaccines were stored. Vaccines were stored at an appropriate temperature between 2 to 8º C in 94.5 % of the 55 injections observed where temperature is a consideration. The overall result for the 55 injections that were observed showed that 94.5% maintained the heat-sensitive medications and vaccines at an appropriate temperature (Figure 4). The result was higher in lower-level health care facilities (98.0%) as compared to hospitals (60%). In the follow-up, 1 injection in Kabale and 2 injections in Hoima were not stored at heat-sensitive vaccines.

At baseline, of the 14 vaccinations observed, 12 (85.7%) of the HCWs had kept the vials of heat-sensitive vaccines at temperatures between 2 and 8º C, while they were being used. One injection in Hoima and one injection in Yumbe were observed to not have the vaccine kept at the appropriate temperature.

In the follow-up, in 54 out of 55 vaccinations or 98.2%, the skin was cleaned with an antiseptic before the vaccination. In the baseline, 10 out of 11 cases, (90.9%) this was the case.

Figure 4: Summary of observations on disposal of sharp objects after injections



6.10 RECAPPING NEEDLES AFTER ADMINISTERING INJECTIONS

The practice of recapping entails risks for injection providers because it exposes them to blood-borne pathogens. Unlike the preceding surveys which were focused on recapping with *two hands*, for this survey, any recapping of the injection equipment—with one or two hands—was considered unsafe. These results show that for the 254 injections where this practice could be observed 91.7 % of the used syringes were disposed of without being recapped. However, this was a significant increase from the baseline ($p<.001$).

In the follow-up, in 3.9% of injections observed, the needle was recapped with one hand; and in 4.3% of injections observed, the needle was recapped with two hands. Phlebotomy procedures may use one-handed recapping for safe removal of a used sharp before the blood is transferred to a test tube (Figure 5). Again, the finding was higher in lower-level health care facilities (95.1%) as compared to hospitals (85.6%). In the follow-up, the most percentage of injections were observed to be discarded without recapping in Kabale (97%), followed by Yumbe (93%), Mbale (90%), and Hoima (89%).

Vaccinations, family planning, and curative injections should never be recapped. Additionally, finger pricks (lancets) should not be recapped. Diagnostic phlebotomy cases were analyzed separately depending on the type of device and procedures used to transfer blood to a test tube. When diagnostic injections and phlebotomy injections were removed, 96.6% of the existing 175 injections were not recapped after use, compared to 69.4% of the 49 injections at baseline. This finding also was statistically significant. In the follow-up, all injections in Yumbe were discarded without recapping, followed by Kabale (98%), Hoima (96%), and Mbale (94%).
At baseline, out of the 59 HCWs observed, 66.1% were not recapping needles after use. At baseline, the most percentage of injections were observed to be discarded without recapping in Mbale (89%), followed by Hoima (81%), Kabale (60%), and Yumbe (46%).

When diagnostic injections were removed from the analysis, out of the 49 remaining injections, 69.4% of the injections were not recapped. In Mbale, 94% (or 15 injections) of the injections were observed not to be recapped, followed by Hoima 62% (or 13 injections), Kabale (3 out of 5 injections), and Yumbe (3 out of 7 injections).

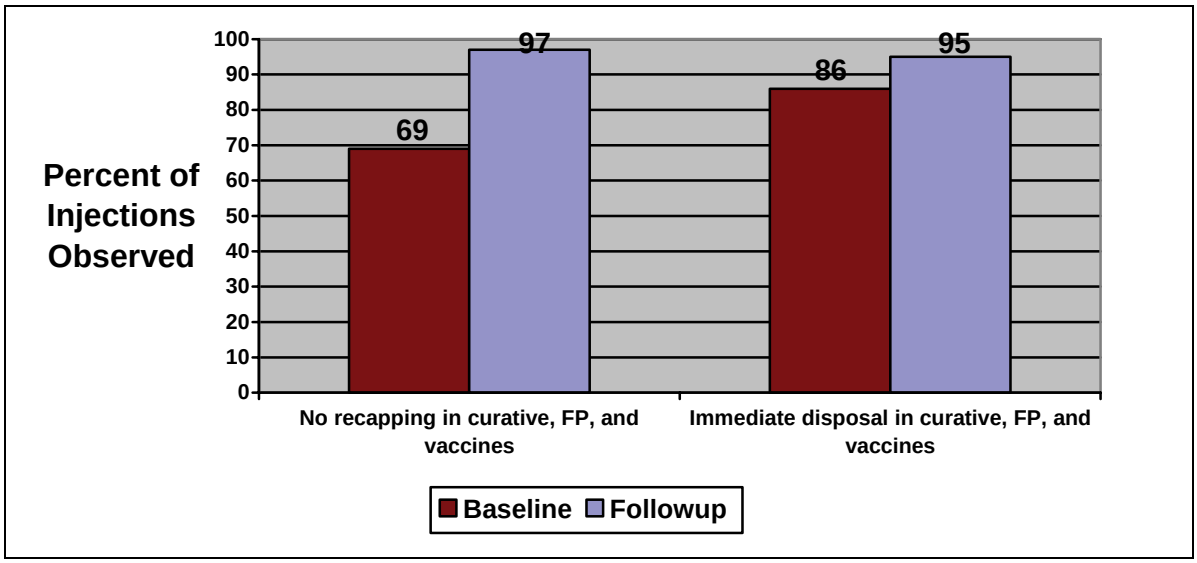
6.11 USE OF A SAFETY BOX FOR IMMEDIATE DISPOSAL OF USED SHARPS

It is important that injection equipment be safely disposed of as soon as injections are administered so that injection providers, patients, and waste handlers are protected from accidental injuries from used sharps. This was a key MMIS project message. Injection providers were observed to evaluate whether they safely disposed of the used **needle and syringe** in a safety box or if they used a needle removal device *immediately* after administering the injection. In fact, providers appropriately disposed of the injection equipment *immediately* after the injection in 92.0 % of the 262 injections observed in this survey. This was a statistically significant increase from the baseline ($p<.05$) and programmatic achievement for the project (Figure 5). Out of those injections that were immediately disposed, 94.1% of the needle removers or sharps containers were within arm's reach of the injection provider and appropriately placed for immediate disposal. Overall, needle remover or a sharps container were within arm's reach in 91% of the observations. The results were higher in lower-level health care facilities (96.9%) as compared to hospitals (88.6%) (Figure 5).

In the follow-up, Mbale had the highest percentage of injections immediately disposed (96%), followed by Kabale (95%), Yumbe (89%), and Hoima (79%).

In the baseline, 81.1% of the 53 injection providers observed disposed the used needle and syringes in safety boxes immediately after use. All the used injections after vaccinations and contraceptives out of those observed were disposed of in safety boxes. In Kabale, all injections (n=5) were disposed of immediately. Injections were observed to be disposed of immediately in 91% of cases (or 21 injections) in Hoima, followed by Mbale (10 out of 12 injections), and Yumbe (7 out of 13 injections).

Figure 5: Summary of the observations on disposal of sharp objects after injections



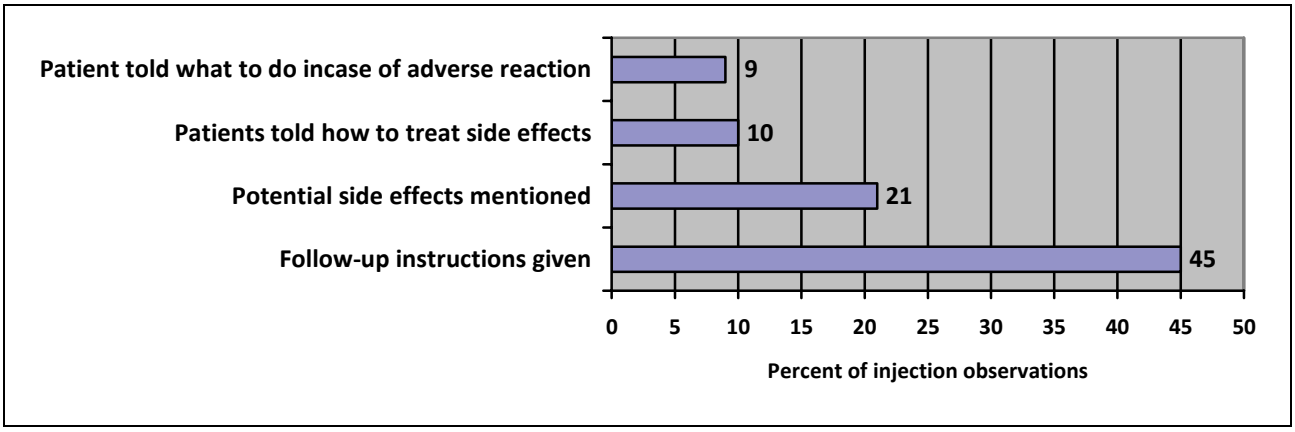
When the analysis only included vaccinations, family planning, and curative injections, in fact, 86.4% of the 44 injections observed at baseline were disposed immediately (Figure 5). The data collectors observed that this practice was 94.9% at follow-up. This was not statistical significant.

6.12 BEHAVIOR CHANGE COMMUNICATION

For the 266 injections observed, data collectors recorded what the injection providers said to the patients receiving the observed injections. *Follow-up of instructions given* was reported in 44.7% of the observations; *potential side effects* were recorded for 20.6% of the observations; *patient told how to treat side effects* recorded for 10.2% of the observations, and patient told *what to do if they have adverse reaction* was recorded for 9.0% of the observations. In summary, communication between providers and patients was quite poor.

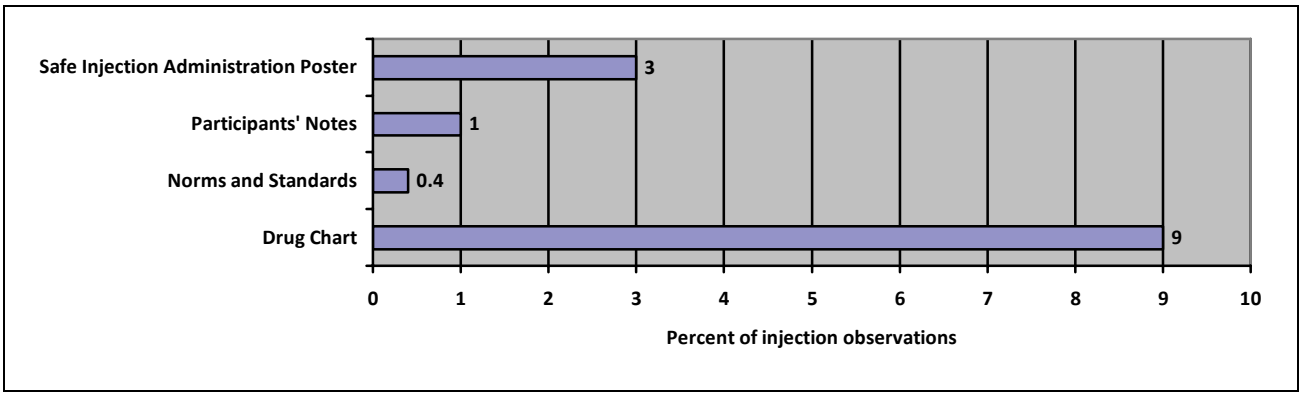
Other messages heard more than once were to put pressure on the injection site with swab (11 times), when to return for next injection (7 times), where to throw away the swab (7 times), bite on the cotton to stop the bleeding (4 times), and wait for results (4 times).

Figure 6: Communication between providers and patients



The data collectors also observed whether the injection providers used any communication materials while the patients were there. This was also very low—with the highest being reference to the specific drug chart, which was recorded for 9.0% of the observations.

Figure 7: Reference to communication materials



6.13 OBSERVATION OF PHLEBOTOMY PRACTICES

Data collectors also observed 41 injections that were classified as "phlebotomy."

Of these 41 injections, blood was transferred from a disposable syringe into a tube or other container in 82.9% of the observations.

For the 33 blood draw procedures observed that used a disposable syringe, the needle was removed prior to transferring the blood in 12% of the cases.

For 5 of these phlebotomy procedures observed on whether the providers used anything other than their hands to remove the needle, it was true for one case. In this case, a needle remover was used.

Data collectors observed the transfer of blood procedure after blood draw, and it was transferred using 2 hands for 89.3 % of the 28 injections in which the observation was made.

For these 50 cases, the analysis was separated by the phlebotomy injections that were carried out with standard disposable syringes and those that were carried out using vacuum and winged collection sets.

AD syringes were used in 68% of the cases, followed by vacuum sets (18.0%), and standard disposables (8.0%). Retractables and lancets were used in 1 case each.

For the 9 cases in which a vacuum set was used, all of were carried out with a needle and syringe. For 1 of the cases, recapping was carried out with 2 hands, while recapping was carried out with 1 hand for 3 cases. The needle was not recapped in 4 observations and not observed in 1 case. In 8 of the 9 cases, the used needle and syringe was immediately disposed in a sharps container.

To be counted as a safe blood draw with a vacuum or winged collection set, a case had to have a new device, immediate disposal, and no recapping. Using these criteria, 4 of the phlebotomy observations out of 9 cases in which a vacuum set was used was considered to have been a safe phlebotomy procedure.

Out of the 39 observations of phlebotomy in which a standard disposable was used, a new needle and syringe was used in all but 1 case. Recapping was observed in 10 cases in which 4 of them was recapped using 2 hands.

To be counted as a safe blood draw with a needle and syringe, a case had to have a new device and immediate disposal. Recapping depends upon whether the needle is removed prior to transfer to a test tube, whether bare hands were used for the transfer, and whether 1 hand or 2 hands were used for the transfer with an exposed sharp. Two-handed recapping is considered unsafe in all circumstances. Using these criteria, 13.1% of phlebotomy cases using a standard disposable were considered “safe.”

Unsafe phlebotomy procedures observed in those cases carried out by a vacuum set were recapping (4 cases), and lack of immediate disposal (1 case).

Unsafe phlebotomy procedures observed in those cases carried out by a standard disposable syringes were recapping with two hands (4 cases), lack of immediate disposal of used sharps (4 cases), exposed needle removed using bare hands (1 case), and 2-handed transfer of blood to vial through exposed needle (22 cases, including 3 in which needles were recapped after transfer).

Overall, 22.5% of 41 phlebotomy cases were considered safe. For all 9 safe phlebotomy cases, the needle remover or sharps container were within arm's reach and either immediately disposed or a needle remover was used. In all 9 observations, the patient's skin was either cleaned with a clean swab or a swab with an antiseptic. Only 1 out of the 9 phlebotomy procedures was recapped using 1 hand, and recapping was not observed in the rest of the observations. Blood was transferred using 2 hands in all 27 unsafe phlebotomy observations, while it was transferred using two hands in only 1 safe phlebotomy procedure.

7. INTERVIEWS WITH INJECTION PROVIDERS

This section contains data on interviews with the injection providers: One per ward was interviewed in each hospital and one injection provider per lower-level facility. In the follow-up survey, a total of 113 injection providers were interviewed, 82 injection providers at the health care centers and 31 at the hospitals. This sample of 113 providers is comprised of 95 (84.1%) in public health care facilities and 18 (15.9%) in private facilities. At baseline, the sample was similar: 83.1% of the 89 injection providers were from public facilities; and the rest, 16.9%, were from private facilities.

The most common qualifications were categorized under "other," which included nursing assistants, midwives, laboratory assistants, and vaccinators (Table 19).

Table 16: Qualifications of the injection providers interviewed

	Baseline		Follow-up	
Qualifications	**Number of injection providers in Total**	**Percentage**	**Number of injection providers in Total**	**Percentage**
Doctors	0	0	0	0
Nurse	27	30.7	47	41.6
Other (nursing assistant, midwives, laboratory assistants, vaccinator, etc.)	61	90.3	66	58.4
Total	**88**	**100.0%**	**113**	**100.0%**

7.1 SOURCES OF NEW, DISPOSABLE NEEDLES AND SYRINGES

In interviews of the injection providers, the data collectors posed questions about the source of the syringes for various types of services: Vaccinations, contraceptive, curative, and diagnostic injections.

Of the other 66 injection providers who perform vaccinations, in all the health care facilities surveyed, only 1.5% (i.e., 1 provider in a health care center) indicated that the patients sometimes bring the syringes for vaccinations. The other 65 (98.5%)—all at health care centers— responded that patients never bring their own syringes.

With regard to *contraceptive services*, only about ½ of the providers gave contractive injections. Of the 52 that did, 2 said that patients sometimes bring the syringes. Fifty responded that patients never bring syringes.

Regarding *curative injections*, of the 90 injection providers that provide such injections, 83.3% responded that the patients never bring syringes; 15.6 % declared that patients sometimes bring them, and 1.1% did not know. Of potential programmatic interest: It appears to be more common for patients to bring their syringes to the hospitals than to the health care centers.

Of the approximately half of the injection providers who provide diagnostic injections, 11.3% declared that their patients sometimes bring their own syringes, in comparison with 86.8% who said that patients never bring them. As was the case with curative injections, for diagnostic injections, it was more common for patients to bring their syringes to the hospitals than to the health care centers.

In the baseline, there was 1 facility where the provider reported that patients always bring their own needle and syringes for contraceptive injections. In the majority of the remaining facilities, patients' own equipment was being brought for mainly curative injections and very rarely for other services. Similarly, the findings of direct observations of patients showed that most patients who brought their own needle and syringes had come for curative services (5 out of 8 observations). The data in the baseline is summarized in Table 21. Clearly, great strides have been made in eliminating the practice of patients bringing their own needle and syringes. There is still room for improvement, particularly for curative injections.

Table 17: Proportion of patients that bring their own needle and syringes in Baseline

Type of injection	Always	Sometimes	Never	Don't know	Not applicable
Vaccination	0.0%	5.7%	93.1%	1.1%	0
Curative	0.0%	47.7%	52.3%	0.0%	1
Contraceptive	1.2%	13.1%	81.0%	4.8%	1
Diagnostic	0.0%	15.3%	76.3%	8.5%	4

Table 18: Proportion of patients that bring their own needle and syringes in follow-up

Type of injection	Always	Sometimes	Never	Don't know	Not Applicable
Vaccination	0.0%	1.5%	98.5%	0.0%	47
Curative	0.0%	15.6%	83.3%	1.1%	23
Contraceptive	0.0%	3.8%	96.2%	0.0%	61
Diagnostic	0.0%	11.3%	86.8%	1.9%	60

Data collectors also asked the injection providers whether it was possible to buy new disposable needle and syringes in the community around the health care facilities surveyed. Overall, 69.9% of the injection providers indicated that it was possible to buy injection equipment in their communities (Hoima 86%, Mbale 81%, Kabale 68%, and Yumbe 54%). The other 23.0% of the injection providers said that it was *not* possible, and the rest (7.1%) did not know.

In the baseline, 69% of the 88 injection providers reported that it was possible to buy injection devices in the community (the same as in follow-up); 2% of providers did not know. Only in Kabale, a majority of the injection providers (60% or 15 providers) said it was not possible to buy injection devices in the community. In the other districts, a majority of the providers said that it was possible to buy injection devices in the community (Mbale 89%, Hoima 72%, and Yumbe [9 out of 11 providers]).

7.2 USE OF ANY DISPOSABLE SAFETY SYRINGES

At follow-up, data collectors asked injection providers about their experience with safety syringes. In the follow-up, all 113 injection providers interviewed reported using any disposable syringes that have features that prevent reuse like AD syringes or ones that prevent needlestick injuries such as retractables. As mentioned before, this was a key intervention of the MMIS project.

Further investigation of those who use safety syringes revealed that 2 types of disposable safety syringes were in use in Ugandan health care facilities, that is, reuse prevention/AD type (used by 90.3% of the injection providers) and reuse and needlestick injury prevention/retractables (used by 9.7% of the injection providers).

Also, 52.2% of the 113 injection providers who reported using syringes with reuse prevention features were using them for vaccinations; 81.4% reported using these syringes for curative injections; 38.1% for family planning injections; 11.5% for diagnostic injections; and 27.4% for

drawing blood procedures[5]. Other cases of utilizations of these syringes included reconstitution, flushing of cannulas, and giving anesthesia.

7.3 RECALL OF STOCKOUTS OF SAFETY BOXES AND SYRINGES

In the follow-up, all the 113 providers reported use of the safety boxes in their respective health care facilities.

In the follow-up, among the 113 injection providers who had safety boxes at some time, 95.6 % had not had a stockout in the 6 months prior to this survey, and 1.8 % did not remember one. Another 1.8% reported having had a stockout for less than 1 week, and the other 0.9 % had stockouts lasting more than a month. Kabale never reported any stockout of safety boxes in the follow-up. Over 90% of all providers in the other districts reported never having a stockout of safety boxes (Mbale 95%, Yumbe 94%, and Hoima, 93%).

In the baseline, 90.7% of 86 injection providers never reported a stockout of safety boxes. Similar to the follow-up, over 90% of providers in all districts, except Yumbe, reported never having a stockout of safety boxes in the 6 months preceding the survey, (Hoima 96%, Mbale 96%, Kabale 91%, and Yumbe [8 out of 12 providers]). This difference between baseline and follow-up was not statistically significant but does show continued good levels of safety box availability.

The results for stockouts of single-use disposable sterile syringes (including standard, ADs, or retractable syringes) in the 6 months prior to this survey showed that stockouts were not very common or long-lasting. Of 113 injection providers, 67.3% interviewed had not had a stockout of syringes during this period, and 4.4 % had a stockout for less than one week. injection providers in Kabale district reported the least stockouts (83%), followed by Hoima (66%), Yumbe (65% or 11 out of 17 providers), and Mbale (57%).

In the baseline, 59.1% of 88 injection providers never reported a stockout of standard disposable syringes. The difference in syringe stockouts between baseline and follow-up also was not statistically significant. The continuous availability of syringes continues to be an area to improve upon.

Providers who reported a stockout (n=32) were asked what they did during the stockout period. Fifteen providers reported that they asked patients to go buy syringes; 1 said that they had stopped administering injections; 5 said that they borrowed equipment.

The responses were similar in the baseline and the follow-up. In both the baseline and the follow-up, the most common response was to “tell patients to go and buy one.”

[5] Multiple answers possible.

Table 19: What providers did during stockout of injection devices

Reason	Baseline N=34	Follow-up N=32
Told patients to go and buy	70.6%	46.9%
Used different size/gauge that was in stock as a substitute for the one that was stocked out	14.7%	37.5%
Borrowed some from another nearby facility/unit	5.9%	15.6%
Other: Referred patients to other health units, Prescribed an oral	5.9%	3.1%
The stockout only lasted a short time so it did not interfere with my work	2.9%	3.1%
Stopped giving injections	0%	3.1%
No Response (Frequency)	2	-

7.4 REUSE OF A NEEDLE OR SYRINGE

When data collectors asked whether the injection providers were aware of any reuse of a syringe on another patient, 111 respondents (98.2 % of the providers interviewed) answered no.

In the baseline, out of the 89 providers, 4.5% of the injection providers reported having reused injection devices on another patient in the prior 6-month period. Two of the providers were located in Kabale, and the other 2 were in Yumbe. The reasons given by respondents for reuse were *the syringe was being used on the same patient* and *the patient was on 6-hourly treatment*. The HCWs said that they sterilized the syringes and needles before reuse by boiling (3) and by autoclaving (1).

All injection providers in the follow-up were asked what conditions may lead to reuse. Seven providers replied “if there is a stockout. One provider answered “if they were in the same family” and “if the patient could not afford to buy another needle and syringe.” Other responses were “when reconstituting/diluting a drug,” “if the drug dose is large for the syringe,” and “to unblock an IV line.”

7.5 USE OF NEEDLE REMOVAL DEVICES

Data collectors asked the injection providers whether they used a needle removal device in the hospital ward or health care facilities where they worked. Overall, 55.8 % of the injection providers declared that they use them. Of these 63 providers, 8 were working in hospitals and 55 in health care centers. In the baseline, only 13.5% of the 89 injection providers interviewed reported that they were using needle removers. This increase was significant ($p<.001$).

The number of providers reporting using needle removers in each district increased from the baseline (Hoima 8% to 59%, Kabale 28% to 57%, Mbale 11% to 65%, and Yumbe 0% to 29%).

7.6 ACCIDENTAL NEEDLESTICK INJURIES

The data collectors asked the injection providers whether they had experienced any accidental needlestick injuries in the 6 months prior to the survey; 92.9% of the injection providers interviewed reported that they did not have any such injuries during this period; 2.7% did not remember; and 4.4 % (or 5 providers) had a single accidental needlestick injury. They were distributed among all four districts (2 in Mbale).

The needlestick injuries reported were associated with curative injection procedures in 2 of the 5 reported cases. One provider reported that it was due to an IV infusion line. Three providers said it was another procedure and did not specify. The needlestick injuries were associated with needles on an AD syringe in 4 of 5 cases. Only 1 of the 5 needlestick injuries was reported to a supervisor.

Respondent who reported the needlestick injury to the supervisor was further interviewed to obtain information on what the supervisor told them to do, and the respondent was apparently advised to test for HIV. The provider also asked the attendant to test the patient. HIV post-exposure prophylaxis (PEP) was reported available by 31.0% of the 113 injection providers interviewed. Mbale district had the most number of providers reporting PEP (41%), followed by Yumbe (35%), Kabale (27%), and Hoima (21%).

In the baseline, out of the 84 injection providers who responded for exposure to needlestick injuries, 66.7% had not sustained any needlestick injuries in the 6 months prior to the survey, while 2.4% could not remember whether they had sustained needlestick injuries. This percent was statistical significant from the follow-up ($p<.001$). Clearly, a marked decrease in accidental needlestick injuries occurred over the life of this project.

The largest number of providers reporting one or more needlestick injuries were from Mbale (13 out of 24), followed by Kabale (7 out of 24), Hoima (4 out of 24), and Yumbe (2 out of 12).

The number of needlestick injuries sustained ranged from 1 to 10 with most injection providers reporting 2 injuries. A total of 75 injuries were reported by 26 HCWs. Therefore, on average, there were 2.9 needlestick injuries per HCW in the 6-month period prior to the survey.

7.7 PROVIDERS' KNOWLEDGE OF DISEASES TRANSMITTED BY REUSE OF NONSTERILE NEEDLES

Of the injection providers interviewed, 100% said that they were aware of the diseases that can be transmitted by reuse of a nonsterile needle or by a needlestick injury. The data collectors then asked *what* diseases can be transmitted in this way. Hepatitis B was mentioned by 74.3 % of the providers interviewed, while hepatitis C was only mentioned by 20.4%; 100% of the providers mentioned HIV; and 18.6% spontaneously mentioned HIV, hepatitis B, and hepatitis C. In all, 4 of the 21 injection providers who mentioned all three diseases worked in hospitals. It appears that staffs at lower-level facilities have better knowledge of disease transmission. While HIV is clearly well known, hepatitis, particularly hepatitis C, needs more awareness. In addition to these

common diseases, 32.7 % of those interviewed mentioned other diseases including tetanus, tuberculosis, syphilis, Ebola, meningitis, gonorrhea, and injection abscess.

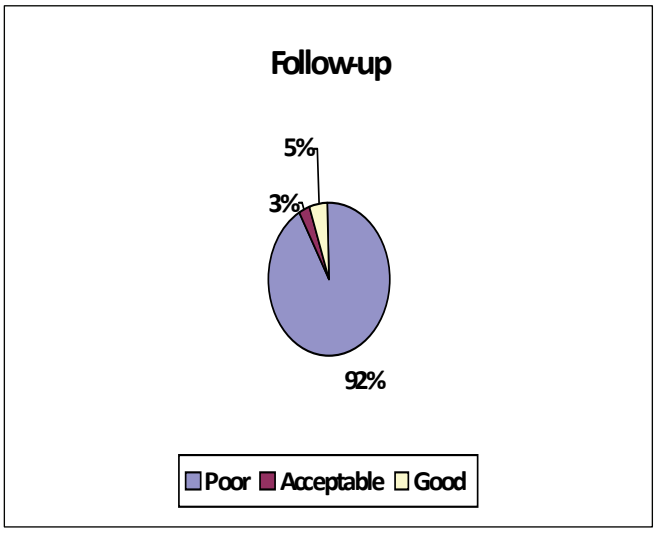
In the baseline, 100% of injection providers were aware of diseases transmitted by reuse of a needle or by a needlestick injury from a used needle, with HIV ranking highest followed by hepatitis B infection (50.6%). Hepatitis C was only mentioned by 11.2% of the providers in the baseline. Syphilis, sexually transmitted diseases in general, Ebola, and abscesses also were mentioned in the baseline.

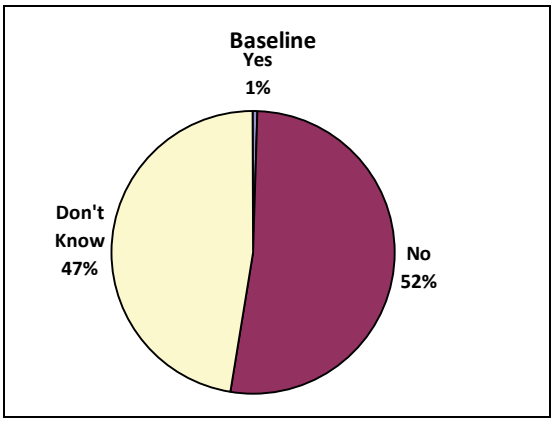
7.8 INJECTION PROVIDERS VACCINATED AGAINST HEPATITIS B

Of the 113 injection providers surveyed, 23.0% recalled that they had received the hepatitis B vaccine; 15.0% of the injection providers did not know; the rest of the injection providers (61.9 %) had never received it (Figure 9). The 26 providers who had received this vaccination were distributed among health care centers (38.5%) and hospitals (61.5%) and among all the districts included in this survey. Six providers in Hoima and Mbale and 7 providers in each of the other 2 districts reported to have received the hepatitis B vaccine. While a tremendous increase from baseline, there is still room for improvement for hepatitis B vaccine coverage among injection providers.

In the baseline, only one provider out of 89 had received the vaccine and reported receiving only one dose. This provider was in Kabale district.

Figure 8: Injection providers who declared receiving the hepatitis B vaccine at baseline and follow-up





While coverage has improved, it is important to note that the providers who had received this vaccine had not always received sufficient doses to protect them completely. Only 5 providers

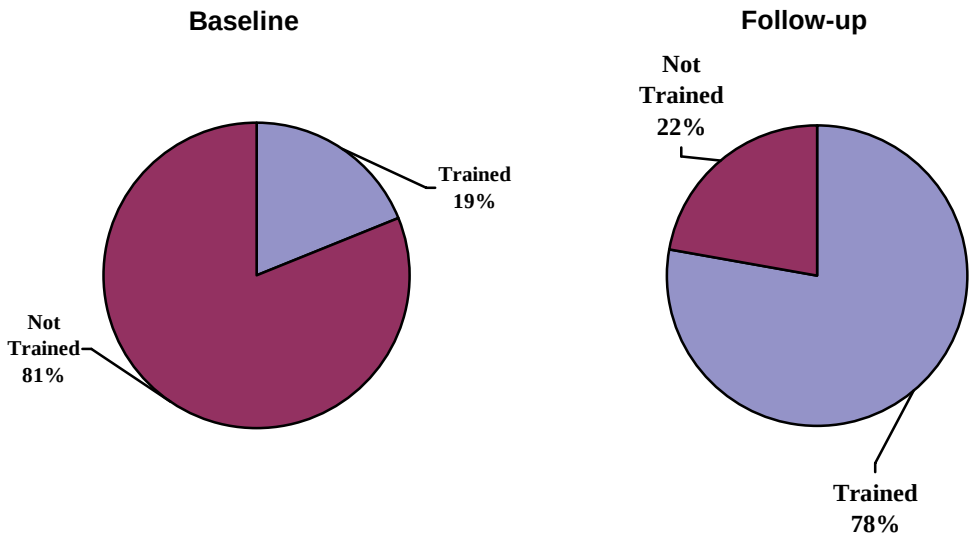
received the 3 necessary doses. Thus, in reality, 1.9% of the injection providers interviewed were completely protected against this disease.

7.9 INJECTION PROVIDERS WHO RECEIVED TRAINING ON INJECTION SAFETY

In the follow-up, 77.9 % of the injection providers surveyed reported received training on injection safety (Figure 10). One provider reported not knowing. The 88 injection providers who received this training were distributed among hospitals (28 people or 31.8%) and the primary level (60 people or 68.2%). Mbale had 84% of the providers reported being trained, Hoima (79%), Yumbe (77%), and Kabale (70%).

In the baseline, only 18% of injection providers had received any training in injection safety. The change in training from the follow-up was statistically significant (p<.001).

Figure 9: Injection providers who declared receiving training on injection safety at baseline and follow-up



7.10 INJECTION PROVIDERS DESCRIPTIONS OF A SAFE INJECTION

The following questions were asked in the follow-up only. Providers were asked "What difficulties, if any, HCWs who give injections have in following safe injection and waste disposal practices." Shortage of gloves was the most mentioned difficulty, mentioned by 30.1% of injection providers. This corresponds with the finding that gloves were not used in 63.4% of the injections observed.

Table 20: Difficulties faced by injection providers in following safe injection and waste disposal practices

Difficulty	N= 113
Shortage of gloves	30.1%
Shortage of N/Ss	15.0%
No difficulties	10.9%
Don't know	8.8%
Not enough time	8.0%
Shortage of oral medications/alternatives to injectables	7.1%
Shortage of safety boxes / sharps containers	3.5%
No water/soap to wash hands	3.5%
Recapping of needle	1.0%

The data collectors requested the injection providers at the respective health care facilities to give personal descriptions of a safe injection; 44.2% defined a safe injection as an injection which does not harm the recipient, the provider, and community; 48.7% mentioned new/sterile injection equipment; and safe disposal of used injection devices was mentioned by 7.2% of the injection providers interviewed. The remaining responses are presented below.

Table 21: Injection providers description of a safe injection

Safe Injection	N=113
New/sterile injection equipment	48.7%
Injection which does not harm the recipient, the provider, and the community	44.2%
Safe disposal of used injection devices	37.2%
Right dose	27.4%
Right anatomic/body site	27.4%
Right medication	22.1%
Right route	18.6%
Wash hands	13.3%
Right volume	12.4%
Clean site of injection	4.5%
Don't know	4.4%
Mixed correctly	2.7%
Wear gloves	1.8%

injection providers were asked whether they had heard or seen anything about reducing number of injections, safe injection practices, and or safe disposal practices and where. The most common responses were training workshop, posters, radio messaging, and from their supervisor. Other responses are presented below.

Table 22: Where injection providers have heard or seen about safe injection/safe disposal practices

Source	N=113
Training workshop	65.5%
Poster	37.2%
Radio	32.7%
Supervisor	23.0%
Other health staff/personnel	14.2%
Booklet/brochure	12.4%
Preservice training	8.8%
Television	7.1%
Newspaper/magazine	6.2%
None/nowhere	3.5%
Don't know/don't remember	1.0%
Drama group/road show	0.0%
Billboards/banners	0.0%

Injection providers were further interviewed on the type of materials available at their respective facilities. Posters were available at 84.1% of the health care facilities; 9.7% had brochures; 4.4% had pocket guides; newsletters were available at 0.9%; videos at 0.9%; and calendars at 0.9%. It is important to note that 10.6% had none of the materials specified for this survey and that those facilities were within MMIS project intervention sites.

Injection providers also mentioned the materials they found useful to themselves or to their patients. Posters were cited as useful by 100% of the injection providers who had them in the clinic; brochures were endorsed by 54.5% of the respondents; and pocket guides were mentioned by 60.0%. The newsletter and video was not considered useful.

Injection providers also gave reasons as to why they found the respective materials useful; almost 90% said it was a good reminder for the injection providers themselves. The remainder of the results are below.

Table 23: Materials found useful by injection providers

Material	Materials present N=113	Materials found useful out of those that have them
Poster	84.1%	100%
None	10.6%	-
Brochure	9.7%	54.5%
Calendar	1.0%	0 %
Newsletter	1.0%	0%
Video	1.0%	100%
Don't Know	1.8%	-
Pocket Guide	4.4%	60%

In the follow-up only, injection providers were asked which method was more effective for treating a fever. A majority of the providers responded that "orals are more effective." This majority is only slight, and more work can be done to reduce unnecessary injections for fevers.

Table 24: Which is more effective for fever—orals or injections

	N=110
Oral more effective	52.7%
Oral just as effective	33.6%
Depends on the probable cause of fever	7.3%
Oral less effective	5.5%
Other	0.9%

8. INTERVIEWS WITH SUPERVISORS OF INJECTION PROVIDERS

A total of 114 supervisors of injection providers were interviewed in this survey including 1 per health care center and 6 per hospital (or 1 in each of the 6 wards per hospital). The total, therefore, included 84 supervisors from health care centers and 30 from hospitals. The supervisors in the hospitals were interviewed in the department of surgery gynecology, out-patient services, laboratory, general medicine, and pediatrics (16.7% in each).

Of those interviewed, 97 supervisors or 85.1 % worked in public health care facilities (67 of which were at the primary level and 30 in hospitals) and 17 worked in private facilities (all of which are lower-level facilities).

In the baseline, 86 supervisors were interviewed. Three were absent from their stations at interview time. In the baseline, 5.8% were from hospitals, 94.2% were from lower-level facilities, 83.7% were from public facilities, and the rest (16.3%) were from private facilities.[6]

8.1 AVAILABILITY OF POLICIES AND GUIDELINES

8.1.1 INJECTION SAFETY POLICY

Overall, of the supervisors surveyed, 36.0% did not have a copy of injection safety policy, 60.5% had the copies, and the rest (3.5%) did not know. This was a significant increase from the baseline in which only 7.0% of 86 supervisors reported having the injection safety policy ($p<.001$). Still, the target of all supervisors having the policies was not met.

In the follow-up, 57 supervisors in health care centers (82.6% of those that had the policy document) said that they had a copy of the injection safety policy, and 17.4% of the hospitals had a copy of the injection safety policy.

In the baseline, Yumbe and Hoima had no copies, and 4 and 2 supervisors in Kabale and Mbale, respectively, reported having copies. In the follow-up, over 50% of supervisors in each district reported having the policy document, Hoima (53%), Mbale (57%), Kabale (67%), and Yumbe (71%).

8.1.2 INJECTION SAFETY GUIDELINES

Seventy-two (or 63.2%) supervisors reported having copies of guidelines/recommendations on injection safety, and of these 14 were from hospitals and 58 were from lower-level health

[6] Initially, the sampling strategy was to interview one supervisor per unit in the hospital, but it was usually the same person for various units; hence, only one supervisor was interviewed in the hospitals.

centres. Of those surveyed, 32 (28.1%) did not know whether they had copies of guidelines on injection safety. This was a statistically significant increase from the baseline in which only 7.0% of the supervisors reported doing so ($p<.001$) but still falls short of the target.

In the baseline, no facilities in Hoima and Yumbe reported having the injection safety guidelines/recommendations. The supervisors fared better in Kabale (16%) and Mbale (8%) where there were copies of the guidelines/recommendations. In the follow-up, the percentage of supervisors who report having the guidelines on injection safety improved with Kabale (53%), followed by Yumbe (59%), Mbale (65%), and Hoima (73%).

8.1.3 HEALTH CARE WASTE MANAGEMENT GUIDELINES

In the follow-up, 57.9% of the supervisors interviewed reported having copies of waste management guidelines; 19 of the 66 supervisors who had the document in question were hospitals and 47 were lower-level health care facilities; 7.9% of those surveyed did not know whether they had the document in question. This also was a significant increase from the baseline in which 5.8% of the supervisors reported having the HCWM guidelines but still below target.

In the baseline, only 6% of supervisors reported having the waste management guidelines. Hoima and Yumbe had no facilities with waste management guidelines. Kabale and Mbale had 4 and 1 facility respectively. In the follow-up, the largest number of supervisors who were able to show the guidelines for waste management were in Mbale (73%) followed by Kabale (63%), Yumbe (58%), Hoima (33%).

8.1.4 ACCESSIBILITY OF POLICIES AND GUIDELINES

However, when the data collectors asked to see these documents, 40 (58.0%) of 69 the supervisors who said they had a copy of the injection safety policy were able to show the copies. This is perhaps a more useful indication of availability and use of policies and guidelines. Among supervisors, 52.1% of the 71 who reported having a copy of guidelines/recommendations on injection safety were able to show copies to the data collectors, while 57.6% of supervisors who said that they had a copy of waste management guidelines were able to show them to the data collectors.

In the baseline, all 4 supervisors in Kabale were able to show the injection safety policy. No one else in the other districts was able to show the injection safety policy. In the follow-up, Mbale had the most supervisors who were able to show the guidelines (71%), followed by Kabale (70%), Yumbe (5 out of 12 facilities), and Hoima (6 out of 16 facilities).

In the baseline, 3 out of 4 facilities in Kabale were able to show the injection safety guidelines, and 1 facility in Mbale was able to show it. In the follow-up, 63% in Mbale were able to show the guidelines, followed by Hoima (57%), Kabale (50%), and Yumbe (2 out of 10 facilities).

In the baseline, 4 facilities in Kabale were able to show the waste management guidelines, and no one in Mbale was able to show the waste management guidelines. In the follow-up, the largest percentage of supervisors able to show the waste management guidelines were in Kabale (68%), followed by Mbale (67%), Hoima (4 out of 10 facilities), and Yumbe (3 out of 10 facilities).

Regarding health care waste disposal policy , 9.6% of all supervisors were able to show the health care waste disposal policy compared to 4.7% of all supervisors in the baseline.

In the baseline, 16% of supervisors in Kabale were able to show the health care waste disposal policy. No other supervisors in the other districts were able to show the health care waste disposal policy. In the follow-up, 16% of supervisors in Kabale were able to show the health care waste disposal policy, followed by Mbale (14%). One supervisor in Hoima was able to show the health care waste disposal policy. No supervisor in Yumbe was able to show the health care waste disposal policy.

In the follow-up, 18.4% of supervisors were not able to show any documents, and 17.5% did not have any documents to show. In the follow-up, 41.2% had all documents, and 4.4% were able to show all documents.

Table 25: Availability and accessibility of policies and guidelines

Availability	Baseline, N=86	Follow-up, N=114
ISP	7.0%	60.5%
Injection Safety Guidelines	7.0%	63.2%
HCWM Guidelines	5.8%	57.9%
Have all 3 documents	3.5%	41.2%
Able to show the following:		
Injection safety policy	4 out of 6	58.0%
Injection Safety Guidelines	4 out of 6	51.4%
HCWM Guidelines	4 out of 5	57.6%
Health care Waste Disposal Policy	4.7%	9.6%
Able to show all 3 documents	4.7%	4.4%

8.2 STOCKOUTS OF SYRINGES AND SAFETY BOXES

The data collectors asked the supervisors whether they had a stockout of single use disposable syringes or safety boxes in any ward they supervised during the 6 months prior to the survey. If they answered in the affirmative, the data collectors asked how long the stockout lasted. Of the 114 supervisors interviewed, 55.3% never had a stockout of syringes during this period; 4.4% did not know/remember. Of the rest, 6.1% reported having had stockouts of syringes for less than 1 week, and 14.9% had had a stockout lasting between 1 week and 1 month. Stockouts of syringes were quite common, and stockouts usually lasted between 3 weeks but less than 3

months. These results are consistent with the results of the interviews of injection providers in which 67.3% never reported a stockout of standard disposable syringes.

In the baseline, 58.1% of supervisors reported never having a stockout of single-use disposable syringes, and 1.2% replied "don't know." This was not statistical significant from the follow-up and represent an area for improvement in supply chain management to prevent stockouts.
The percent of supervisors in each district who replied never having a stockout of standard disposable syringes in the prior 6 months to the survey is as follows: Kabale (17 supervisors or 68%), Hoima (12 supervisors or 52%), Mbale (12 supervisors or 46%), and Yumbe (9 out of 12 supervisors), similar to the injection providers.

In the follow-up, the percent of supervisors in each district who replied never having a stockout of standard disposable syringes in the prior 6 months to the survey is as follows: Hoima (80%), Kabale (67%), Mbale (30%), and Yumbe (47%).

It is interesting to note that while fewer stockouts were recorded for single-use disposable syringes under central pharmacy/main storeroom assessment, supervisors reported slightly higher levels stockouts and longer durations for stockout periods. This could be explained by the fact that the central pharmacy/main storerooms were specific to updated stockcards, or it could highlight reluctance on the part of supervisors of injection providers to collect stock from the central stores.

In the follow-up, 96.3% of supervisors reported no stockouts of safety boxes. This was not statistically significant from the baseline in which 90.4% of the supervisors reported never having a stockout of safety boxes. The duration of stockout for the different items reported by the supervisors is similar to what was reported by the injection providers. This is similar to the 91% of injection providers who reported never having a stockout of safety boxes.

In the baseline, the percent of supervisors in each district who replied never having a stockout of safety boxes in the prior six months to the survey is as follows: Mbale (25 supervisors or 96%), Hoima (21 supervisors or 91%), Kabale (18 supervisor or 82%), and Yumbe (11 out of 12 supervisors), similar to the injection providers**.**

In the follow-up, in all districts, over 94% of supervisors reported no stockouts of safety boxes, Hoima (96% or 27 supervisors), Kabale (96% or 25 supervisors), Mbale (97% or 36 supervisors), and Yumbe (94% or 16 supervisors).

8.3 DELIVERY OF VACCINES WITH CORRESPONDING QUANTITIES OF INJECTION EQUIPMENT AND SAFETY BOXES

Data collectors asked the supervisors whether the stock of *vaccines* were always delivered (or available) with appropriate (corresponding) quantities of injection equipment and safety boxes.

Of the other 87 supervisors to whom the questions about vaccines applied, 88.5% declared that the vaccines were delivered with the corresponding quantities of *injection equipment*, and 11.5%

said that the quantities were not adequate. In the baseline, 95.1% of supervisors reported that they were adequate. This slight decrease was not significant.

In the baseline, all supervisors in Mbale (n=26) reported receiving vaccines with adequate quantities of injection equipment. The remaining districts reported percentages above 90, Hoima (22 supervisors or 96%), Yumbe (11 out of 12 supervisors), and Kabale (19 supervisors or 91%).

In the follow-up, the percentage of supervisors in Mbale who reported receiving vaccines with adequate quantities of needle and syringes was 85%. The remaining districts were above 90 percent, except for Hoima: Hoima (23 supervisors or 83%), Yumbe, (11 out of 12 supervisors), and Kabale, (24 supervisors or 96%).

In response to the question about *safety boxes for vaccines*, of these same 89 supervisors to which the questions about vaccines applied, 88.8% declared that the quantities were adequate; 7.9% said they were not adequate; and 3.4% did not know (Figure 11). In the baseline, 89% of 82 supervisors reported the same.

Once again in the baseline, all supervisors in Mbale reported receiving adequate safety boxes with vaccines. This was followed by Yumbe (92%), Hoima (91%), and Kabale (71%).

In the follow-up, in Mbale and Yumbe, 1 supervisor each said they do not know, and the rest of the supervisors said it was adequate. In Hoima and Kabale, 74% and 92%, respectively, said they were adequate.

8.3.1 DELIVERY OF OTHER MEDICATIONS WITH CORRESPONDING QUANTITIES OF INJECTION EQUIPMENT AND SAFETY BOXES

Stocks of *other injectable medications* were delivered (or available) with the corresponding quantities of *injection equipment* according to 94.7% of all supervisors interviewed or to whom this question was applicable; 38.9 % said that the quantities did *not* correspond; and 0.9% did not know (Figure 12). The remaining 60.2% of 108 supervisors reported that the quantities of injectable drugs were always delivered with adequate quantities of needle and syringes. In the baseline, 35.3% reported adequate quantities. This was a statistically significant increase ($p<.05$). The results were also higher for hospitals as compared to lower-level facilities (56.0% and 61.5%, respectively).

In comparison with the delivery of the injection equipment, it was *less common* to find adequate quantities of *safety boxes* delivered with the stock of other injectable medications. In fact, 72.5% of the supervisors interviewed declared that the quantities corresponded; 25.7 % said they did not; and 1.8 % did not know (Figure 11). In the baseline, it was just 8.3%. This was statistically significant ($p<.001$).

The percentage of interviewees who declared that the quantities of safety boxes corresponded to the injectable medications in hospitals 80.8% as compared to 69.9% in lower-level health care facilities.

The percentages were much lower for injectable drugs. In the baseline, less than 40% of the supervisors in all districts reported receiving injectable drugs with adequate quantities of injection equipment. In the follow-up, the percentages increased, but less than 75% of supervisors in each of the districts reported receiving injectable drugs with adequate quantities of needle and syringes.

Regarding injectable drugs and safety boxes, all supervisors in Kabale and Mbale reported *not* receiving injectable drugs and safety boxes in adequate quantities in the baseline. Only 5 and 2 supervisors in Hoima and Yumbe reported that they were adequate.

In the follow-up, the situation seemed to improve, but there was a range of 47% in Kabale to 94% in Mbale. Hoima and Yumbe fell in the range at 62% and 93%, respectively.

Figure 10: Vaccines delivered in quantities corresponding to the injection equipment and safety boxes at baseline and follow-up

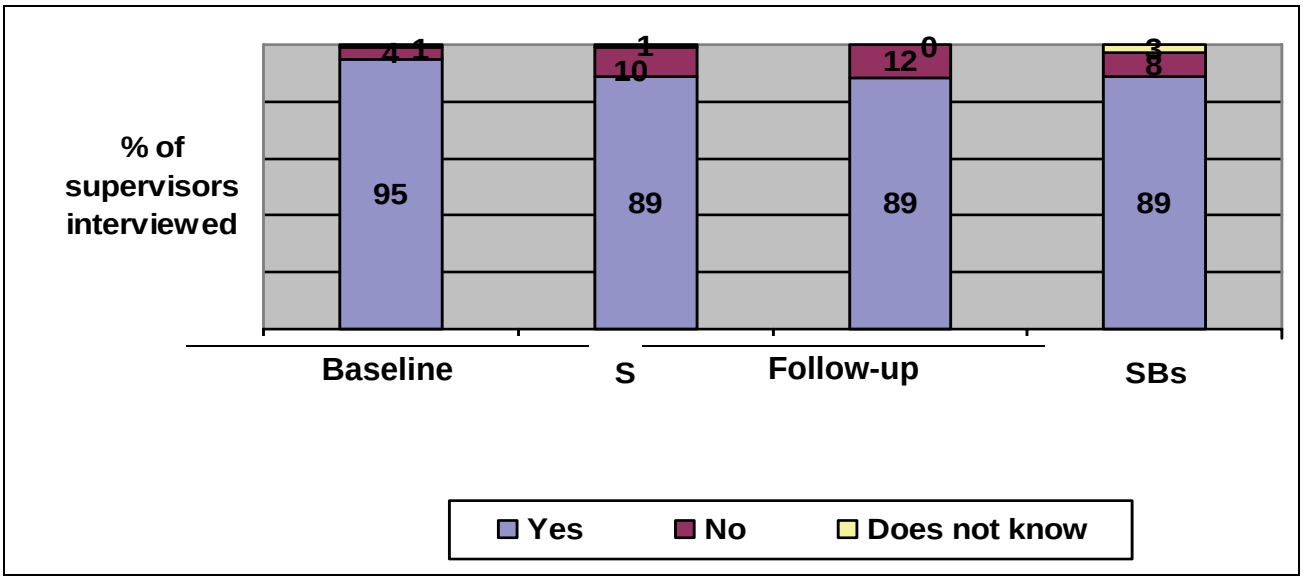


Figure 11: Other medications delivered in quantities corresponding to the injection equipment and safety boxes at baseline and follow-up

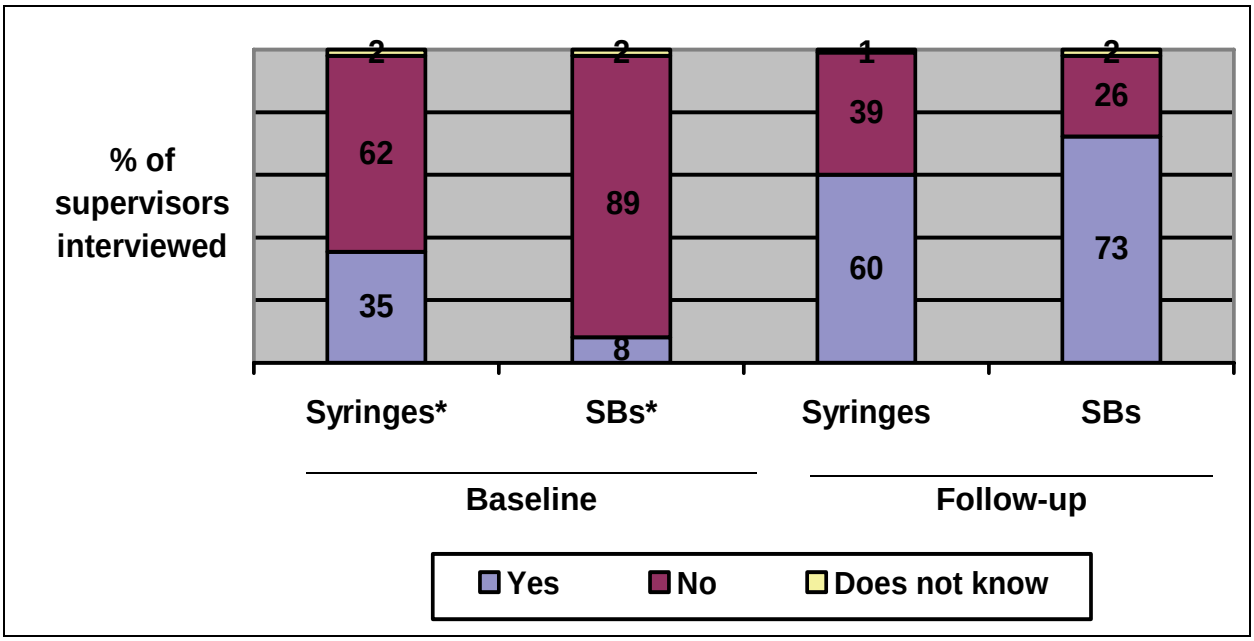
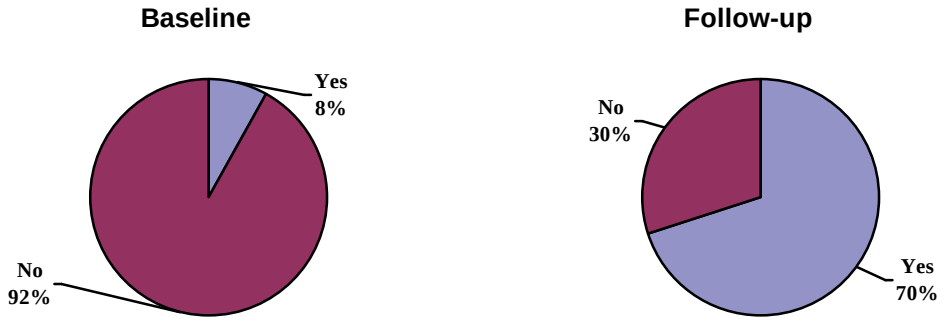
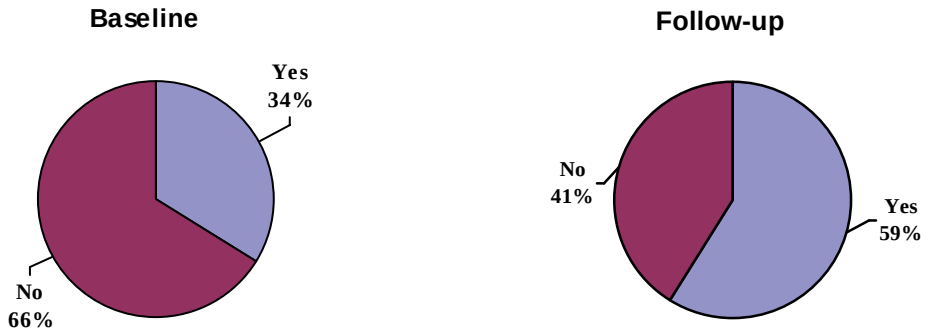


Figure 12: Supervisors' perception that the quantities of safety boxes were adequate for vaccines and other medications at baseline



Adequate Safety Boxes, p<.001

Figure 13: Supervisors' perception that the quantities of injection equipment were adequate for vaccines and other medications at follow-up



Adequate Injection Equipment, p<.001

8.4 SUPERVISORS' PERCEPTION OF THE QUANTITIES OF SYRINGES AND SAFETY BOXES FOR CURATIVE SERVICES

Data collectors asked the supervisors whether they thought the *quantities of needle and syringes* provided to them were adequate for the treatment services in their health care facilities; 74.6% of the supervisors responded in the affirmative; 25.4% thought that they were not adequate. In the baseline, 45.9% of the supervisors reported having adequate quantities of the injection devices. This was a statistically significant increase and speaks to an improvement in appropriate forecasting for supplies (p<.001).

With regard to *safety boxes* for curative services, 93.9% of the supervisors declared that safety boxes quantities were adequate, and 6.1% did not believe so. At baseline, only 3.6% thought there were adequate quantities of safety boxes for curative services—a tremendous increase. This also was statistically significant (p<.001).

In the baseline, for curative services, only 3 supervisors in Hoima (and 3 overall) replied that adequate safety boxes are being delivered for curative services. No supervisors in Kabale, Mbale, and Yumbe reported receiving adequate quantities of safety boxes for curative services. In the follow-up, the situation improved with 100% of supervisors in Mbale and Yumbe reported doing so, followed by Hoima (90%), and Kabale (87%).

In Hoima, 48% or 11 supervisors reported receiving adequate injection equipment for curative services. For the other districts, percentage of supervisors reporting receiving adequate injection equipment for curative services is as follows: Kabale (54% or 13 supervisors), Mbale (27% or 7 supervisors), and Yumbe (8 out of 12 supervisors). There is more room for improvement for appropriate injection equipment for curative services.

Overall, considering only the 86 supervisors with vaccination services in their health care facilities, the supervisors' general perception of the correspondence (or lack of correspondence) between the quantities of injection equipment delivered for vaccines *and* other medications was that 58.6 % of these supervisors thought that *both* quantities were adequate. In the baseline, it was 33.7%, and this increased to 58.6% in the follow-up. This was statistically significant ($p<.001$).

Similarly, 69.8 % of the supervisors thought that the quantities of safety boxes were adequate for the vaccines *and* other medications. In the baseline, it was 8.1%, and this increased to 69.8% in the follow-up. This was statistically significant ($p<.001$).

While there is room for improvement, there is tremendous advance in the area of adequate supplies for curative services.

8.5 BEHAVIOR CHANGE COMMUNICATION

In the follow-up survey only, supervisors were asked what they had to remind injection providers to do. Immediate disposal, washing hands, and use of new (needle and syringe) were what supervisors reported they had to remind injection providers the most.

Table 25: Reminders by supervisors to IPs

Reminders	N=102
Immediately dispose of needles or use a needle remover	54.9%
Wash hands	52.0%
Use new, sealed needle and syringe	38.2%
Be careful of needlesticks	31.4%
Use clean table/tray	27.5%
Do not recap needle	23.5%
Clean patient's skin	19.6%
Do not overfill safety boxes	18.6%
Wear gloves	16.7%
Check dosage of medications	12.7%
Remove needle from rubber cap of multidose vial after withdrawing each dose	3.9%
Use clean barrier, if using ampoule	2.0%

9. INTERVIEWS OF WASTE HANDLERS

A total of 87 waste handlers were interviewed during this survey or one participant per health facility. When a surveyor found several waste handlers, the surveyor interviewed the main person responsible for waste management. Among waste handlers interviewed during this survey, 79.7% were interviewed in public health care facilities (69 people) and 20.7% in private health care facilities (18 people). Among waste handlers, 5.7 % worked in hospitals (5 waste handlers) and 94.3% in other health care facilities (82 waste handlers). For the following analysis, the results will be presented for the entire sampled population (baseline and follow-up) as opposed to by district.

In the baseline, a total of 78 waste handlers were interviewed. Other waste handlers were not present at the time of visit to the health facility. In the baseline, 5 waste handlers were from the hospital, and the rest were from lower-level facilities. In the baseline, 82.1% of the waste handlers were from public facilities, and the rest (17.9%) were from private facilities.

9.1 MAIN METHODS OF WASTE DISPOSAL USED

Data collectors asked the waste handlers to list the main disposal methods used for medical waste in their health care facilities with individual questions about sharps waste, infectious waste, and noninfectious waste. All waste handlers mentioned at least 1 method. Some waste handlers responded by citing several methods (In case where several methods were mentioned, the sum of the results may exceed 100%).

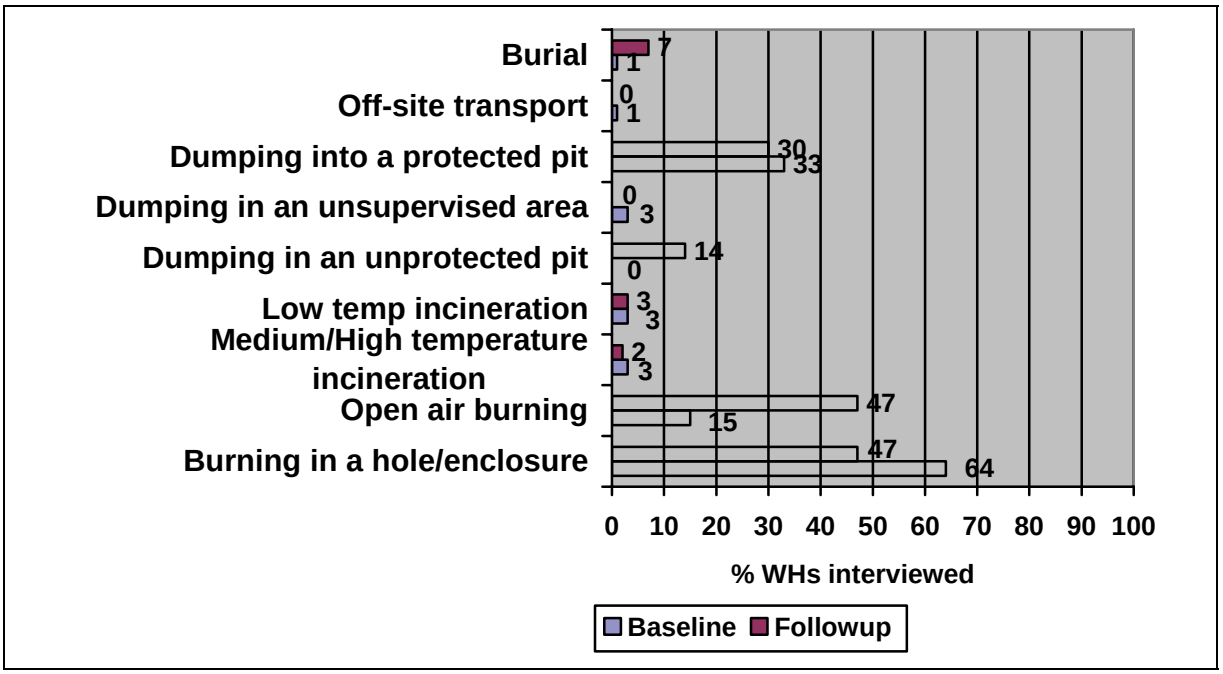
The most common method of disposing of sharps waste was open burning on the ground, which was mentioned by 47.1% of the waste handlers; *open-air burning in a hole or enclosure*, which was also mentioned by 47.1% % of the waste handlers; dumping in a protected pit, which was mentioned by 29.9% of waste handlers; dumping in an unprotected pit, recorded for 13.8% of the waste handlers; burial, which was mentioned by 6.9% of the waste handlers. [7]

Dumping in unsupervised area and transportation off site were not mentioned by any waste handler.

These overall results are presented in Table 32 and Table 33.

[7] *Low-temperature incineration* (as, for example, a single-combustion chamber, “drum,” or brick) was mentioned by 3 WHs, but 2.3 % mentioned *medium-temperature incineration* (i.e., incineration in “Sicim” or “Demonfort” incinerators, which are capable of operating at over 800°C).

Figure 14: Percentage of waste handlers who use different methods to dispose of sharps waste



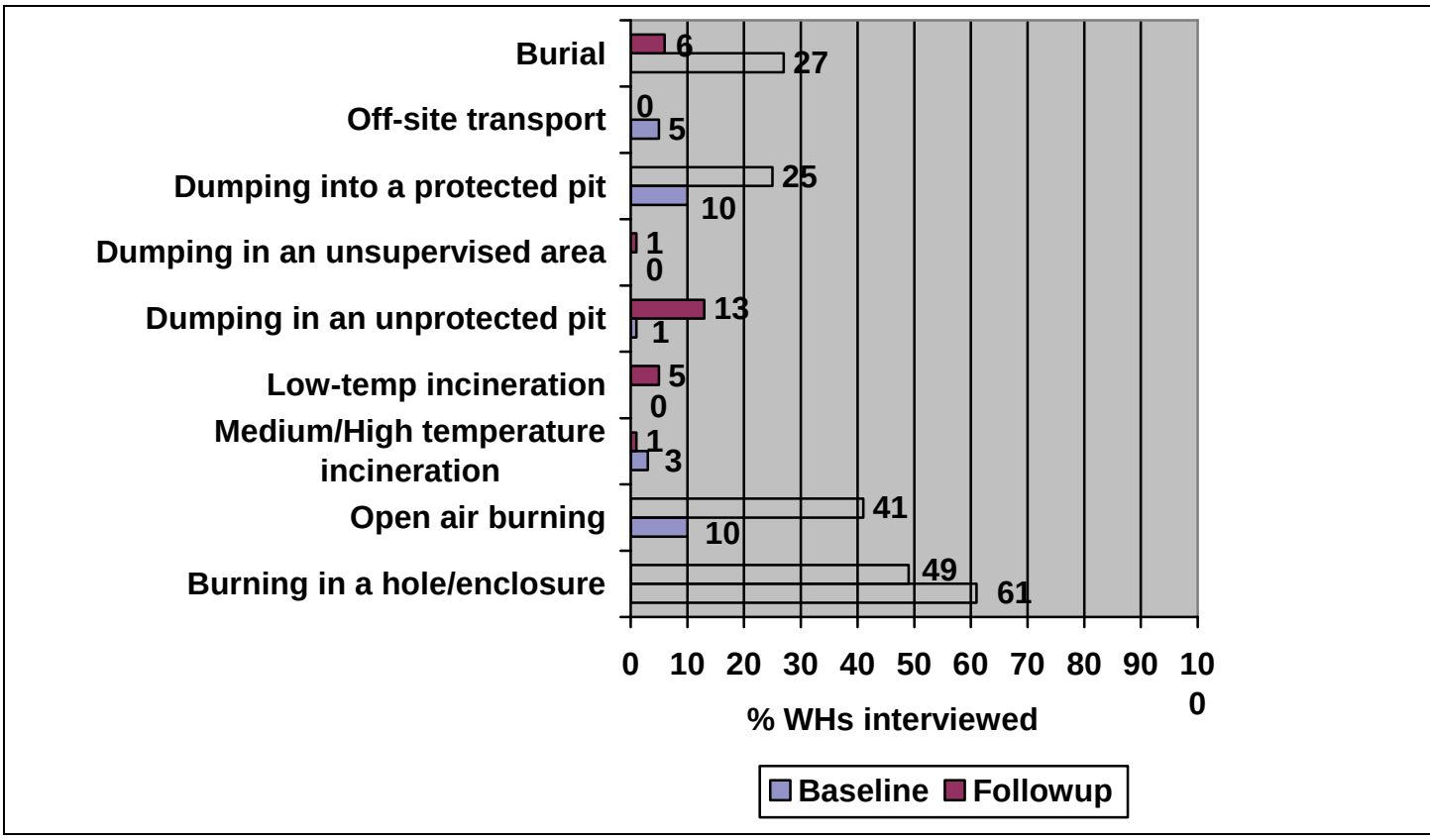
Notice from the graph that in the follow-up the methods of burial, dumping in an unprotected pit, and open-air burning increased—which are not good methods of waste disposal.

In the baseline, waste handlers reported the main method for all three types of waste was open burning in a hole, followed by dumping in a pit latrine for sharps and infectious waste. For noninfectious waste, the second most common response was open burning on the ground.

For all districts, the most common methods of waste disposal for sharps and infectious waste were open burning in a hole, followed by dumping in a pit latrine. The most common forms of noninfectious waste disposal were open-air burning in a hole and open burning on the ground for Hoima, Kabale, and Yumbe. For Mbale district, it was open burning in a hole and dumping in a pit for noninfectious waste.

The most commonly cited methods for disposal for infectious waste were similar: Open-air burning in a hole or enclosure (49.4 % of waste handlers interviewed), open-air burning on the ground (41.4 %), dumping in a latrine or other protected pit (25.3 %), dumping in an unprotected pit (12.6%), and burial (5.8%).

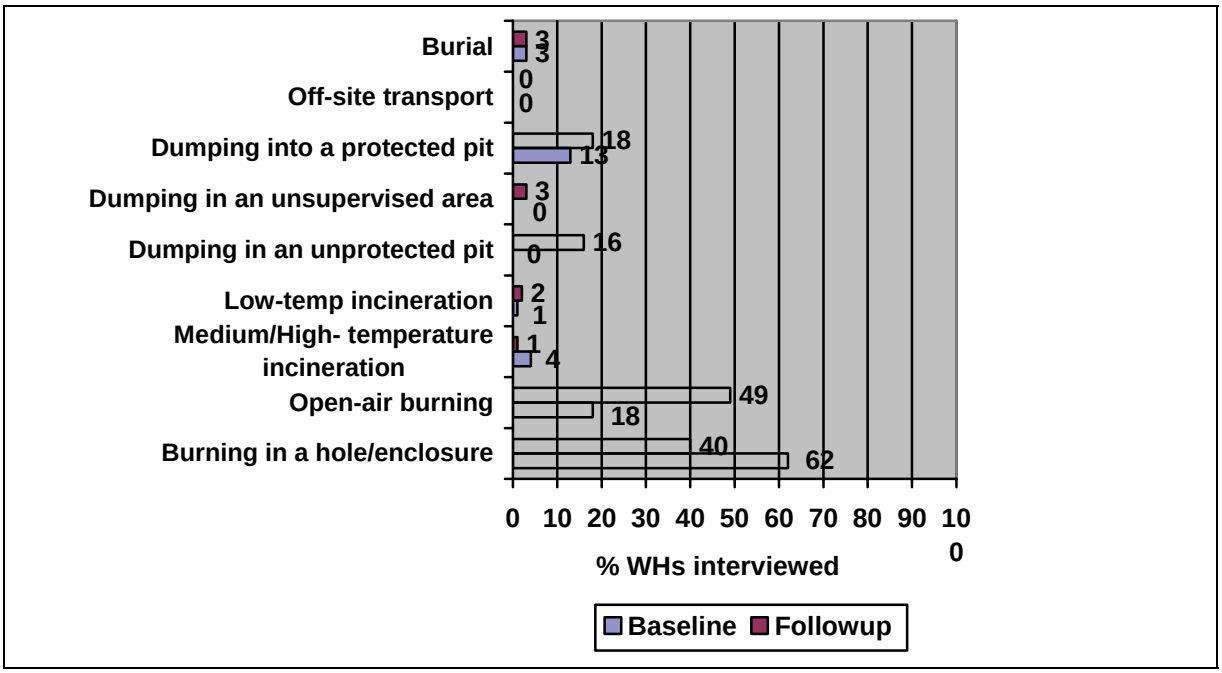
Figure 15: Percentage of waste handlers who use different methods to dispose of infectious waste



Dumping in a protected pit, dumping in an unprotected pit, and open-air burning increased in the follow-up. Dumping in general increased.

The results for noninfectious waste disposal methods are also similar: Open burning on the ground (49.4%); open burning in a hole or in an enclosure (40.2% of waste handlers interviewed); dumping in a protected (secure) pit (including a needle pit) (18.4%); dumping in an unprotected pit (16.1%); burial and dumping in unsupervised area (3.5%) for the both options; and low- temperature incineration (2.3%). Unfortunately, medium or high-temperature incineration and transportation off site were not mentioned by any waste handler.

Figure 16: Percentage of waste handlers who use different methods to dispose of noninfectious waste



Also disappointing, dumping into a protected pit, unprotected pit, and open-air burning increased in the follow-up. Once again, two out of the three are undesirable waste disposal methods.

Overall, the area of waste management/disposal for both infectious and noninfectious waste is an area for improvement.

Tables 32 and 33 presents a summary of the disposal methods used for various types of medical waste. These results are largely consistent with the observations of the methods used on the day of the survey (see Chapter 5).

Table 27: Comparison of the distribution of health care facilities surveyed according to disposal methods for the three types of medical waste: sharps, infectious, noninfectious at baseline

Medical Waste Disposal Method(s)	Infectious: Sharps (*%)	Infectious: Not Sharps (%)	Noninfec-tious	Number of waste handlers Interviewed
High or medium-temperature incineration (>800 C)	2.6	2.6	3.8	78
Low-temperature incineration (<800 C)	2.6	0.0	1.3	
Open-air burning in a hole or enclosure	64.1	61.0	61.5	
Open-air burning on the ground	15.4	10.3	17.9	
Dumping into a latrine or other protected location	33.3	10.3	12.8	
Dumping into an unsupervised location	2.6	0.0	0.0	
Dumping in unprotected pit	0.0	1.3	0.0	
Transportation to another site for processing	1.3	5.1	0.0	
Burial	1.3	27.3	2.6	

Note: The sum of the results is over 100% because some waste handlers mentioned several methods.

Table 28: Comparison of the distribution of health care facilities surveyed according to disposal methods for the three types of medical waste: sharps, infectious, noninfectious at follow-up

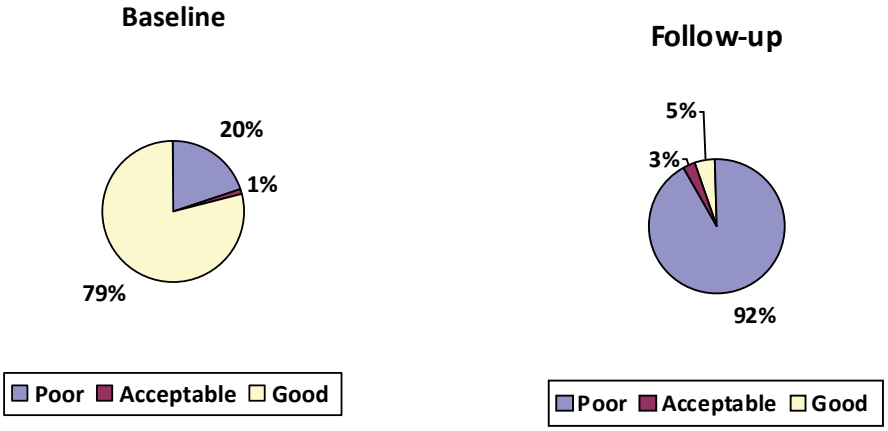
Medical Waste Disposal Method(s)	Infectious: Sharps (%)	Infectious: Not Sharps (%)	Noninfec-tious	Number of waste handlers Interviewed
High or medium-temperature incineration (>800 C)	2.3	1.2	0.0	87
Low-temperature incineration (< 800 C)	3.5	4.6	2.3	
Open-air burning in a hole or enclosure	47.1	49.4	40.2	
Open-air burning on the ground	47.1	41.4	49.4	
Dumping into a latrine or other protected location	29.9	25.3	18.4	
Dumping into an unsupervised location	0.0	1.2	3.5	
Transportation to another site for processing	0.0	0.0	00	
Dumping into an unprotected pit	13.8	12.6	16.1	
Burial	6.9	5.8	3.5	
Dumping in unprotected pit	13.8	12.6	16.1	

Note: The sum of the results is over 100% because some waste handlers mentioned several methods.

To summarize these results, all the individual methods can be grouped into three general categories of waste disposal: “Good,” “acceptable,” and “poor.” Good final disposal is calculated as one or more of the following: High or medium-temperature incineration, dumping in a protected pit, or transportation for off-site treatment. Marginal/acceptable final disposal is calculated as low-temperature incineration/burning. Poor final disposal is calculated as open burning on the ground, open burning in a hole or in an enclosure, burial, dumping in an unprotected pit, or dumping in an unsupervised area. If a facility had options from more than one rating, the lowest rating was used for the overall score for each facility. Protected pit and burial is a good option, whereas burial alone is poor.

When the overall results of the sharps waste disposal methods are calculated based on these three categories, the data from interviews of the waste handlers shows 92 % have poor waste disposal, 3.4 % have acceptable waste disposal, and only 4.6 % have good waste disposal (Figure 18). This was significant from the baseline ($p<.05$). This demonstrates an area for urgent need of attention.

Figure 17: Overall summary of the distribution of health care facilities surveyed according to the general categories of sharps waste disposal at baseline and follow-up



9.2 COMMON PROBLEMS WITH MEDICAL WASTE DISPOSAL

Data collectors asked the waste handlers what problems they encountered in disposal of medical waste; 17.2% of the waste handlers responded by saying that they do not have any problems. The rest of the waste handlers spontaneously mentioned one or more problems; the most common were no incinerator, shortage of fuel, shortage of safety boxes, and lack of protective equipment. These are similar to figures from the baseline. All are presented in the table below

Table 29: Problems encountered in waste management

	Baseline		Followup	
Problem	**Percentage of all waste handlers interviewed who mentioned it**	**Number of waste handlers interviewed**	**Percentage of all waste handlers interviewed who mentioned it**	**Number of waste handlers interviewed**
No problem	14.7	75	17.2	87
No incinerator	32.0		10.3	
Shortage of fuel	45.3		41.4	
Shortage of safety boxes	30.7		2.3	
Nonexistence of site for burial	5.3		3.4	
Unfilled safety boxes	0.0		4.6	
(Other)Lack of personal protective equipment	-		29.8	

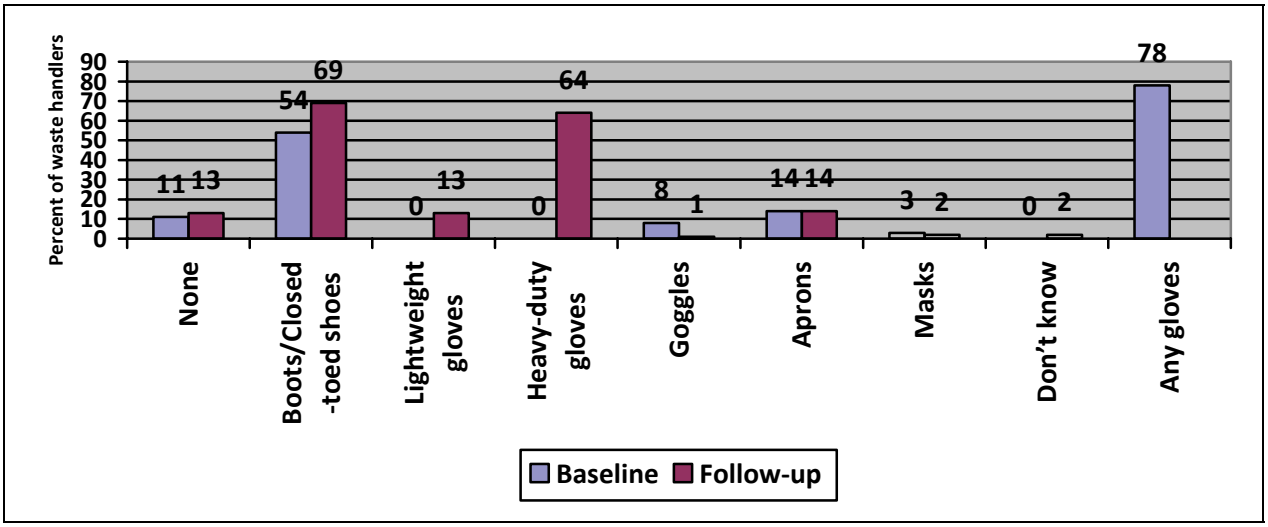
9.3 AVAILABILITY OF PERSONAL PROTECTIVE EQUIPMENT

Data collectors asked questions about the availability of PPE. Seventy-one waste handlers mentioned at least one type of PPE that was *available* in the health facility where they work and could protect them from accidental injuries by sharp objects. Boots, closed-toed shoes, heavy-duty gloves, goggles, aprons, or masks were considered PPE. Some waste handlers mentioned only equipment that did not protect them such as lightweight (latex) gloves and old gumboots.

The types of available equipment mentioned by these waste handlers are presented in Table 18 below.

It should be noted that none of the three waste handlers who mentioned an incinerator as a waste disposal method had only lightweight gloves to protect them in their work.

Figure 18: Distribution of waste handlers according to the type of protective equipment available at the health care facilities surveyed



In the follow-up, 86.2% out of 89 waste handlers had at least 1 of the boots, any gloves, or aprons. In the baseline, it was very similar at 85.3%.

In the baseline, among the commonly used protective wear were boots and gloves. Fewer waste handlers had aprons, goggles, or masks, and 11.1% had no protective wear at all.

In the baseline, although most waste handlers mentioned they had gloves, most were observed to be using surgical gloves and not the heavy-duty gloves. The most common protective equipment mentioned in Hoima and Kabale were gloves. The most common protective equipment mentioned in Mbale and Yumbe were boots.

In the follow-up, Yumbe had 92% or 11 waste handlers, Mbale 82% or 22 waste handlers, Kabale 91% or 20 waste handlers, and Hoima 22 waste handlers or 85% who had at least one type of PPE, even lightweight gloves.

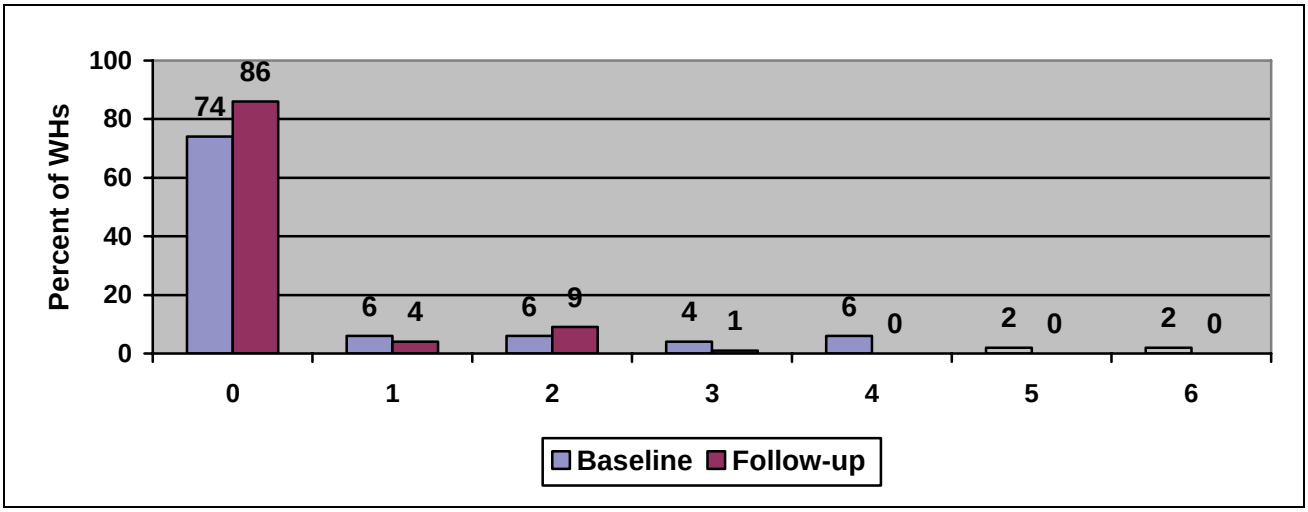
9.4 ACCIDENTAL NEEDLESTICK INJURIES

Among the waste handlers interviewed, 85.9 % confirmed they had not had any accidental needlestick injuries during the 6 months preceding the survey; 4.2% said that they had 1 needlestick injury; 8.5% had two needlestick injuries; and another 1.1% had 3 needlestick injuries (Figure 20). Of the 10 waste handlers who declared having 1 or more needlestick injuries, none worked in hospitals, and all other worked in other health care facilities. No waste handler in Yumbe reported any needlestick injuries; 2 waste handlers in Hoima reported 2 injuries each; 1 waste handler in Kabale reported 1 injury and 3 reported 3 injuries. Two waste handlers in Mbale reported 2, and 1 reported 1 and 2 injuries each.

In the baseline, 50 waste handlers were assessed for history of needlestick injuries in the 6 months prior to the survey.

In the baseline, 26% of respondents reported having an needlestick injury in the 6 months preceding the survey. The number of needlestick injuries ranged from 1 to 6 with most injection providers reporting 1 and 2 injuries. A total of 38 injuries were reported by 13 waste handlers. The largest number of waste handlers who reported 1 or more needlestick injuries were from Mbale (7 waste handlers), followed by Kabale (3), Hoima (2), and Yumbe (1). This order matched the number of providers reporting 1 or more needlestick injuries also. There were fewer accidental needlesticks at follow-up, which is very important.

Figure 19: Distribution of waste handlers according to the number of accidental needlestick injuries in the 6 months preceding the survey



9.5 WASTE HANDLERS' KNOWLEDGE OF DISEASES TRANSMITTED BY NEEDLESTICK INJURIES

Of the 72 waste handlers who responded, 95.8% reported being aware of diseases that could be transmitted by accidental injuries with a contaminated needle or by reuse of a needle or syringe. The waste handlers who knew of the link between unsafe injections and these diseases were distributed between hospitals (all the 5 interviewed in hospitals) and health care centers (64 out of 67 respondents). Two waste handlers or 2.8% did not remember. All waste handlers in Mbale and Yumbe were aware. In Hoima, it was 87% or 13 waste handlers; and in Kabale, it was 94% or 17 waste handlers.

In the baseline, 43 out of 78 waste handlers were aware of diseases transmitted by reuse of a needle or by a needlestick injury from a used needle. Out of all waste handlers who responded, all waste handlers in Hoima and Kabale were aware that disease can be transmitted by needlestick injuries. Only 1 out of 12 providers in Yumbe were aware. All waste handlers

spontaneously reported that HIV can be transmitted by accidental needlestick injuries. Clearly, at follow-up, waste handlers had improved knowledge.

In the follow-up, 69 waste handlers who had reported that they were aware of the diseases were able to name any diseases when the data collector asked for details. Of all those who declared knowing of diseases that could be transmitted this way, HIV was the most frequently mentioned disease. It was mentioned by 97.1 % of all waste handlers surveyed One waste handler in Kabale and Mbale did not list it. In the baseline, it was mentioned by 100% of all waste handlers.

Hepatitis B was mentioned by 24.6 % of all waste handlers surveyed, while hepatitis C was mentioned by 4.4%. No waste handler in Yumbe was able to list hepatitis C, and 1 waste handler in each of the other districts was able to list hepatitis C.

In the baseline, 15 out of 16 waste handlers who responded were able to list hepatitis B (the waste handler who could not list it was from Hoima), and 4 waste handlers who responded were able list hepatitis C. Knowledge about hepatitis C and B can still be improved among waste handlers.

9.6 HEPATITIS B VACCINATION OF WASTE HANDLERS

Among the 72 waste handlers surveyed, 97.2 % were not vaccinated against hepatitis B. The other 2.3% of the waste handlers reported that they had received the hepatitis B vaccination (Figure 21). The waste handlers were from Mbale and Yumbe. Of the 2 waste handlers who had received it, none worked in a hospital; i.e., all worked with lower-level health care centers. Of the 2 waste handlers who had received the vaccination (all at health care centers), one had received 2 doses, and 1 had received three doses. Thus, a total of 2.9 % of all waste handlers or just 1 waste handlers surveyed were completely protected at the time of the follow-up survey.

In the baseline, out of the 49 waste handlers that were asked whether they had received vaccination against hepatitis B, only 2 (from Hoima and Mbale districts) reported having received vaccination against hepatitis B. One waste handler reported receiving all 3 doses. This is also clearly an area for improvement.

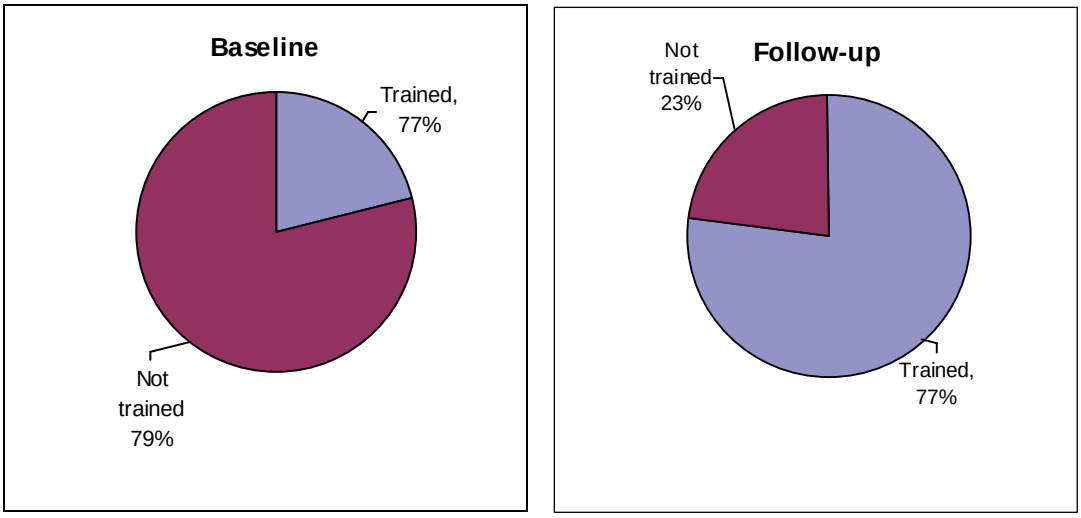
9.7 TRAINING OF WASTE HANDLERS

In this follow-up survey, 68 of the waste handlers interviewed (78.2%) declared having received training on sharps waste management such as low-risk techniques for handling safety boxes (Figure 22). This was significant from the baseline ($p<.001$). Of the 67 who were trained, 4 worked in hospitals, and 63 worked at lower-level facilities; 6 of the 68 waste handlers trained in sharps waste management declared reported having had an accidental needlestick injury in the 6 months prior to this survey.

Hoima had the highest percentage of waste handlers trained (85%), followed by Yumbe (83%), Kabale (77%), and Mbale (70%).

In the baseline, out of 75 waste handlers who responded, 21.3% reported receiving training in handling health care waste such as safety boxes. The number of waste handlers trained in each district is as follows: Yumbe (3 out of 7 waste handlers), Kabale (38% or 8 waste handlers), Hoima (14% or 3 waste handlers), and Mbale, (8% or 2 waste handlers). Only 1 of the waste handlers who had been trained received a needlestick injury. Clearly, there was great improvement in the area of training of waste handlers.

Figure 20: Training of waste handlers at baseline and follow-up



9.8 KNOWLEDGE OF WASTE HANDLERS

In the follow-up only, waste handlers were asked where they have heard or seen anything about safe disposal practices. Of those who had seen or heard information on safe disposal practices, training was the most mentioned (55.2%), followed by poster (24.1%), and by radio and health personnel equally, at (19.5%) each.

Table 30: Where waste handlers have heard or seen anything about safe disposal practices

Source of information on safe disposal practices	N= 87
Training workshop	55.2%
Poster	24.1%
Radio	19.5%
Other health care staff personnel	19.5%
Supervisor	14.9%
None/Nowhere	8.0%
Preservice training	4.6%
Television	3.4%

Booklet/Brochure	3.4%
Don't know/Don't remember	2.3%
Newspaper/Magazine	2.3%
Drama Group/Road show	0.0%
Billboards/Banners	0.0%

Another response was in the church (1 waste handler).

Waste handlers also were asked the extent they were feeling at risk and why at follow-up. A majority of waste handlers felt "very much" at risk (54%), and 20% felt somewhat at risk. Only 5.6% felt no risk and 20% only a little. The reasons why they felt this way are presented below.

Table 31: Reason waste handlers feeling at risk

Extent at Risk	Reason
Very much **N=39**	Exposure to infectious waste Lack of PPE Lack of training Accidental needlestick injuries from needles sticking out Risk of HIV
Somewhat **N=15**	Lack of PPE Infectious waste Fumes from smoke
A little **N=14**	Follows recommended procedure Have knowledge Few patients No PEP If we don't use gloves and gumboots
Not at all **N=4**	Well-trained Protective gear

10. EXIT INTERVIEWS WITH PATIENTS

In the follow-up, 265 patients who had received an injection on the day of the survey were interviewed leaving the health facility, 1 per ward (excluding pediatrics) in hospitals and up to 4 patients per lower-level facility. Out of the 265 patients, 33.2% of the interviews (88) took place in hospitals, while 66.8% (177) in primary health care facilities. Table 38 presents the distribution of the sampling by district of the facilities.

In the baseline, 51 patients were interviewed. Only 4 patients were from hospitals, and 47 patients were from lower-level facilities.

Table 32: Distribution of the sampling of patients by district

District	Baseline, N=51	Follow-up, N=265
Hoima	29.4%	21.1%
Kabale	19.6%	23.8%
Mbale	31.4%	37.7%
Yumbe	19.6%	17.4%

10.1 SOCIODEMOGRAPHIC CHARACTERISTICS OF THE PATIENTS

In the follow-up, all the patients interviewed who had received an injection on the day of the survey were adults. Data collectors asked the adult patients interviewed whether they were between the ages of 18 and 49.[8] (In fact, 99.3% or 263 of the adult patients who received an injection on the day of the survey were of reproductive age.)

Overall, 69.6% of the adults interviewed were women. Among all the adult patients, this result varied between districts as follows: 58.2% of the patients in Hoima were women, 77.8% in Kabale, 72.0% in Mbale, and 66.7% in Yumbe, respectively, were women. The results by facility level (i.e., hospital or primary care facility) were similar between hospitals, where 61.4% of adult patients were females in comparison with 73.7 % at the other facilities.

In the baseline, 59.1% of the 22 adult patients were women, once again the majority. Women were the majority of patients in Kabale and Mbale districts too.

[8] Which is the reproductive age group used by the projects funded by PEPFAR.

Table 33: Sociodemographic characteristics of the adult patients interviewed at baseline

Characteristics	Percentage	Number of Patients Interviewed
Who received the injection		
Adult	45.7	46
Child	52.2	
Person who accompanies a child	2.2	
No response	5 patients	
Age of the adult patients interviewed		
18-49 years old	91.7	24
Other	8.3	
Gender of the adult patients interviewed		
Male	40.9	22
Female	59.1	

Table 34: Sociodemographic characteristics of the adult patients interviewed at follow-up

Characteristics	Percentage	Number of Patients Interviewed
Who received the injection		
Adult	66.0	265
Adults who received injection, but were not observed	34.0	
Age of the adult patients interviewed		
18-49 years old	99.3	265
Other	0.7	
Gender of the adult patients interviewed		
Male	30.4	263
Female	69.6	

For the exit interviews of the patients, data collectors tried to interview patients who they had seen receive an injection as much as possible. In this survey, 66.0% of the adult patients interviewed had been observed receiving an injection.

10.2 PATIENTS' KNOWLEDGE OF THE AVAILABILITY OF needle and syringes IN THE COMMUNITY

The data collectors began the interview by asking the patients whether they knew if it was possible to obtain needle and syringes in new, sealed packages outside of the health care facilities and private pharmacies. Of the 265 patients interviewed, 64.5% (171 people) answered in the affirmative; 70% of providers also answered yes. This difference was not statistically

significant from the baseline in which 74.5% of the respondents said it was possible. The result varied between health facility level as follows: Hospital 83.0%, and 55.4% in lower-level health facilities.

In Hoima, 79% of the patients replied that it was possible to buy injection equipment, followed by Mbale (74%), Kabale (52%), and Yumbe (44%).

10.3 SOURCE OF THE INJECTION EQUIPMENT USED ON THE DAY OF THE SURVEY

Overall, 5.7% of the patients interviewed reported bringing their own equipment for the injection. This was not significant from the baseline in which 8% reported bringing their own injection equipment. This compares with 10 patients or 3.8% who brought their own injections during the observations. The district varied from 3.6% in Hoima, 4.3% in Yumbe, 5.0% in Mbale, to 9.5% in Kabale**.** The results varied between facility types as follows: 73.3% in hospitals, and 26.7% in lower-level providers. The difference between hospitals and lower-level facilities may be of note for future programming.

In the baseline, out of 50 respondents, 4 or 8% had brought their own injections, and 3 of these were in sealed packs. These 4 patients were from Hoima (1), Mbale (2), and Yumbe (1). No respondent from Kabale bought their own equipment.

The 15 patients who brought their own equipment they had just received for the injection answered an additional question about the source of the equipment. Thirteen of the 15 patients who had brought their own injection equipment said that it had come from a new package (86.7%).

For the 250 patients who did *not* bring the equipment (i.e., the equipment used belonged to the HCF), 91.2 % declared that the needle and syringe used for the injection that they received on the day of the survey were taken from a sealed package, and 2.4 % declared that the equipment was already open or detached. The other 6.4 % did not know. Of the 6 patients who said that the equipment was already open, 4 were patients in hospitals and 2 from lower-level health facilities.

In the baseline, out of 44 patients who responded, 97.7% reported that the needle and syringe came from a sealed pack. The 1 person who reported that it was not from a sealed packet was from Mbale district. This coincides with the observation that 1 out of the 2 injections that were not from a sealed pack were from Mbale.

10.4 DISPOSAL OF USED INJECTION EQUIPMENT

In the baseline only, respondents were asked what HCWs did with the needle and syringe after use. Forty responded. A majority of respondents (65%) mentioned that the HCWs disposed of the used injection equipment by disposal in a closed container. and 25 % did not know what the

provider had done. Of the remaining 28 patients who reported that they *had* observed the provider's actions, 65% recalled that the needle and syringe were placed in a closed container; 3% indicated that they were put in a dish of water or open container; 3% of the respondents reported that the provider returned the injection device for future use. The 1 person who reported that it was given back for future use was from Mbale district (Table 41).

If we exclude the patients interviewed who had not observed what the provider did with the used needle and syringe, the good practice of appropriate disposal immediately after the injection was reported by 92.8% of the 28 patients.

10.5 PATIENTS' RECALL OF INJECTIONS RECEIVED IN THE HEALTH FACILITY SURVEYED

The data collectors continued the interview by asking the patients if they had received an injection in the six months prior to this survey in the same health facility where they were being interviewed. Forty percent of the patients (106 people) responded in the affirmative. Eighteen people (6.8%) did not remember the exact number of injections, but the rest of the patients mentioned a number of injections varying from 1 to 60 (Figure 24).

In the baseline, out of 41 respondents, 2 did not receive any other injections, and 6 could not remember the number of injections received. The number of injections ranged from 1 to 8, with a mode of 2 injections. An average of 3.06 injections were received by 33 people.

The next question the data collectors asked the patients who had received at least 1 injection in the 6 months prior to the survey was how many times they had brought their own needle and syringes. Overall, 90.8% of the patients declared that they had *never* brought needle and syringes; 6.7% said that they brought them *sometimes*; and 2.5% answered that they *always* brought them.

In the baseline, patients that received at least 1 injection were asked how often they bought their own injection equipment. Only 1 person replied "Always." Of patients who responded,75.7% out of 37 never bring their own equipment. This was a statistically significant decrease from the follow-up ($p<.05$) and important programmatically. Among respondents who sometimes or never brought their own needle and syringe and responded, all but 1 reported that the needle and syringe came from a sealed pack or was fitted with caps at both ends. The other person did not specify.

10.6 PATIENTS' RECALL OF INJECTIONS RECEIVED OUTSIDE THE HEALTH FACILITY SURVEYED

Once the data collectors had finished the questions about the patients' experiences in the health care facility surveyed, they asked questions about the injections received *outside* of the facility in

the six months prior to the survey. Of the 265 patients interviewed, 25.7% (68 patients) responded that they had received injections somewhere else in the community.

In the baseline, out of 48 respondents, 41.7% of them had received injections from elsewhere. This was not statistically significant.
Among the 68 patients who received injections somewhere else, 4.4% or 3 patients mentioned community member/traditional healer, 57.3% private clinic, 42.7% government health unit, and 2.9% other.

For the community leader, one person bought their own injection, but all three of the respondents who received an injection from the community (leader, member, healer) said that the injection came from a sealed package.

Of the 37 patients who mentioned private clinics as a source of their injections, 40.5% had to provide the injection equipment used for the procedure. For the other 59.5% (22 people), the injection equipment used belonged to the health care facility. All 37 patients (regardless of if they brought their own needle or not) confirmed that the injection equipment that had been used came from a sealed package.

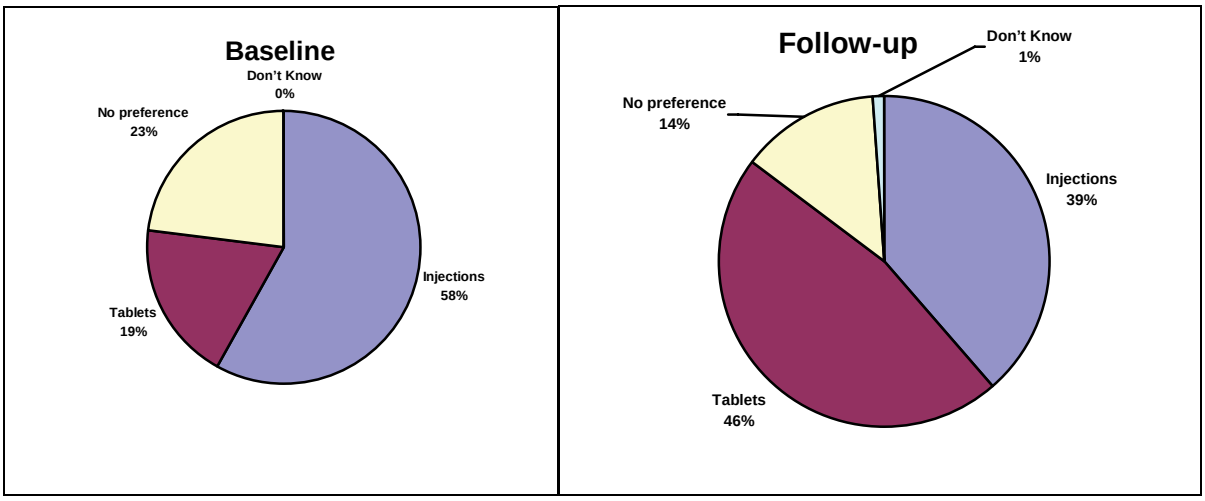
Of the 29 patients who mentioned a public health units as the source for their injections, 34.5% had to provide the injection equipment used. For the other 65.5% (19 people), the injection equipment used belonged to the health care facility. All the injection equipment that the patients bought were new.

10.7 PATIENTS' ATTITUDES ON INJECTIONS

With regard to the preference of an administration route for medication (injection or tablet), when the patient or someone in his family has a fever, 46.8 % of all patients interviewed said that they preferred tablets, and 38.5 % preferred injections. The rest did not express a preference (Figure 25). It was statistically significant from the baseline ($p<.05$). This is a great improvement in reducing the number of desired injections. In the follow-up, all districts except Kabale and Mbale preferred pills: Hoima (59%), Kabale (35%), Mbale (45%), and Yumbe (52%). In addition, 27% of patients in Kabale had no preference.

In the baseline, out of 48 respondents, the majority preferred injections (58.3%). A majority preferred injections in each district except for Yumbe (4 out of 9). The follow-up survey shows a shift in preferences.

Figure 21: Preferences expressed by patients regarding formulations of medications at baseline and follow-up



Data collectors asked the patients who declared having a preference for injections the reasons for their preference. Some patients mentioned several reasons; all mentioned at least one.

Table 35: Reasons for preference of orals and injectables

Preference for Orals	**N= 124**
Don't like needles/injections	49.2%
Faster	17.7%
Better/Stronger	17.7%
Know/Can feel it working	12.9%
Shorter treatement	4.0%
Injections are painful	(11 patients)
You can swallow them anywhere	(4 patients)
Tablets are easily accesible in clinics	(3 patients)
Preference for Injectables	**N=102**
Faster	42.2%
Better/Stronger	42.2%
Pills can make you vomit	6.9%
Shorter treatement	8.8%
Pills are hard to swallow	25.5%
Pills taste bad	16.7%
Know/Can feel it working	3.9%
Tablets cause me to vomit	(7 patients)
Side effects (allergic itching, swelling)	(3 patients)
Tablets not easily absorbed	(1 patient)
Forget to take/adhere to pills	(3 patients)
Tablets do not work	(1 pateint)

10.8 RECALL OF THE MOST RECENT PRESCRIPTION

The data collectors asked all the patients interviewed if they remembered the last time a member of their family received a prescription (61.5 % did).

In the baseline, out of 47 that responded, 78.5 % responded in the affirmative. These 37 respondents were then asked how long ago that prescription had been received.

Of the 136 patients who had received a prescription the last 6 months, 54.4% were prescribed injectable medications; 68 of the 75 remembered the number of injections received, which varied from 1 to 20 injections (Figure 26). The average number of injectable medicines prescribed for the 68 respondents who could recall was 3.1.

In the baseline, those respondents (31) who could recall the prescriptions were asked whether injectables had been prescribed. Out of those that responded, twenty four (77.4%) said that they had received injectables in the prescriptions. The average number of injectable medicines prescribed for the 20 respondents who could recall was 3.1. The average did not change, and this presents an area for improvement among programmers to reduce the number of injectables prescribed.

10.9 SOURCE OF INFORMATION ABOUT INJECTIONS OR NEEDLES OR SYRINGES

Out of 265 patients interviewed, only 41.1% had seen or heard information about injections or needle and syringes. data collectors asked the patients who reported seeing or hearing any information about injections or needles what information or ideas they remembered seeing or hearing about injections or needles or syringes. Out of all 265 patients in the follow-up, the most common responses were: 7.2% mentioned safe injections; approximately 20% mentioned injections can transmit HIV/AIDS/ hepatitis B/hepatitis C; 9.8% recalled the messaging “use/ask for a new needle and syringe every time you need an injection”; 7.2% mentioned oral pills are as effective as injections; and 5.3% mentioned go only to a trained provider/doctor/nurse for injections.

Out of 109 patients who had heard information on safe injections, 48.6% of them preferred tablets. Out of 152 patients who had not heard anything about safe injections, a similar proportion also preferred tablets.

Table 36: Information seen/heard on injections by patients

Information	N= 265
(Unsafe) Injections can transmit HIV/AIDS/ Hepatitis B/Hepatitis C	20.8%
Use/ask for a new needle and syringe every time you need an injection	9.8%
Safer injections	7.2%
Orals/pills are as effective as injections	7.2%
Go only to a trained provider/doctor/nurse for injections	5.3%
Injection waste is dangerous/stay away from injection waste/keep children away from medical waste	2.6%
Don't know/don't remember/nothing	2.3%
Ask for orals/pills when you need medicine (Don't ask for/demand injections)	1.9%
Orals/pills are less expensive than injections	1.1%
Trust the doctor/do what the doctor says	0.4%

The patients were further asked about sources of information for information cited above. Health staff/personnel was mentioned by 55.0%; friends/neighbors/relatives were mentioned by 4.6%; radio was the most common source of information mentioned by 59.6% of the respondents.

Table 37: Patients source of information on injection safety

Source of Information	N= 265
Radio	59.6%
Health staff/personnel	55.0%
Poster	6.4%
Friends/neighbors/relatives	4.6%
Women's group	2.8%
Political leader/Community leader	1.8%
Newspaper/magazine	1.0%
Traditional healer/herbalist	1.0%
Television	1.0%
Video/film	1.0%
School	1.0%
Drama group/road show	1.0%
Church/mosque/religious leader	1.0%
Billboards/banners	0.0%
Calendar	0.0%
Don't know/don't remember/None	0.0%
Pharmacy/market/drug store	0.0%
Booklet/brochure	0.0%
Items: T-shirt, mug, cap, water bottle	0.0%

The data collectors also requested the patients to give their opinions on what a safe injection was. The most common responses were: 64.9%, closed/new package of needle and syringe; 22.6% injection given by a trained /professional provider; and 23.8% mentioned other including when a needle is used and reboiled before being reused. There is significant area for improvement among community awareness about safe injections.

Table 38: Patients' knowledge of safe injection

Safe injection	N= 265
Closed/new package of needle and syringe	64.9%
Injection given by a trained/professional provider	22.6%
An injection which does not harm the patient, the provider and the community	9.4%
Don't know	7.5%
No reaction/side effects	7.2%
Injection site cleaned	5.7%
Injection that is used once	4.9%
If provider says it is safe	4.2%
Provider wears gloves	1.9%
Injection that does not pain	1.1%

When asked about what they can do to make sure that they and the families receive safe injections, 40.0% mentioned make sure needle and syringe come from a new and sealed package; 61.9% mentioned go only to a trained/ professional provider; 6.4% mentioned bring own needle and syringe.

Table 39: Injection safety options available for patients

Safe injection	N=265
Go only to a trained/professional provider	61.9%
Make sure needle and syringe come from a new, sealed package	40.0%
Bring own N/S	6.4%
Don't know	5.3%
Nothing	2.6%

Data collectors asked patients what they could do together with their families to avoid getting stuck by used needle and syringes. Do not touch/pick any needle and syringes was mentioned by 21.9%; 18.9 % mentioned tell children to stay away; 9.4% endorsed wear shoes; 67.9% mentioned dispose of them in pit/latrine/dispose of them safely; 15.9% mentioned burn them; 12.8% mentioned do not bring used needles home; 2.3% mentioned do not use injections. It worth noting that 1.5% mentioned "nothing" and 4.5% do not know.

Table 40: What patients and family members can do to avoid getting stuck by used needles

Ways to avoid getting stuck	N= 265
Dispose of them in pit/latrine/Dispose of them safely	67.9%
Don’t touch/pick up any needle and syringes	21.9%
Tell children to stay away	18.9%
Burn them	15.9%
Don’t bring used needles home	12.8%
Wear shoes	9.4%
Don’t know	4.5%
Don’t use injections; use orals	2.3%
Nothing	1.5%

11. CONCLUSIONS

The progress in African injection safety projects has been reviewed by other researchers from which lessons for scaled-up approaches have been learned. Progress in reducing needle and syringe reuse in public hospitals in Africa to date has been impressive and is enabling the move towards other infection control issues.

The results of this survey reveal that there have been improvements between baseline and follow-up in several aspects of the injection safety program, but there is still room for improvement in other areas. The preceding chapters presented the results of the key indicators for injection safety at the time of this report. This chapter emphasizes what remains to be done with regard to specific variables, which affect each target population studied in this survey.

Once an injection has been administered, the used needle and syringe presents a major risk for the transmission of blood-borne pathogen such as HIV and the hepatitis B or hepatitis C virus. Factors that can potentially contribute to the risk of accidental needlestick injuries and the transmission of blood-borne pathogen to all the target populations (i.e., health care personnel and patients) are: the absence of a sharps box within arm's reach of the injection provider in each location where injections are administered; inappropriate practices for disposal of used sharps; and all inappropriate practices for medical waste disposal inside or outside the health care facility (such as syringes and other loose sharps or open, overflowing, or pierced safety boxes). In this context, the nonexistent or insufficient supply of safety boxes—and especially stockouts of safety boxes—could contribute to the inappropriate disposal of medical waste and, thus, to the increased risk of injuries from used and potentially infectious sharps waste.

In addition to this possibility of transmitting a blood-borne pathogen through used needle and syringes, it is also important to consider the risk associated with other infectious material. It is for this reason that all types of infectious waste in a health care facility pose a risk to the health care personnel, patients, and other people using or visiting the health care facility.

For injection providers and waste handlers, an injection safety policy and norms and guidelines on HCWM are key documents to establish as well as to implement, which establish standards and norms for behaviors and actions that minimize the risk of a needlestick injury.

The absence of these documents, as well as the lack of appropriate equipment for injection safety is a factor that increases the risk to health care personnel. Similarly, the lack of a reminder or job aids is a missed opportunity to remind providers and waste handlers of the desired injection safety practices.

Table 48 presents a summary of the results of this survey in relation to these risk factors. These data show that in the follow-up 81% of the supervisors interviewed had an injection safety policy *or* guidelines *or* HCWM guidelines at the time of this survey. This was a significant increase from the baseline in which only 11 percent of supervisors reported any of the 3 documents.

Stockouts of safety boxes had affected only 3 (4.4%) of the providers interviewed—also a wonderful improvement over the life of the MMIS project. The lack of immediate disposal of used sharps contributed to a situation in which the disposal of waste inside or outside the facility was deemed unsatisfactory in 8% of the facilities surveyed. Out of the 21 injections in which the provider did not immediately dispose, for 9 of those cases, the needle removers or sharps container were not within arm's reach.

In the follow-up, the survey also revealed that 20 (22.5%) of the facilities also had infectious waste lying around inside or outside the facility. The area of HCWM and disposal of waste was an area where much refocus and attention is needed.

Table 41: Common risk factors for HCWs and patients

	Risk Factors	Baseline Result of the Survey (%)	Follow-up Result of the Survey (%)	Statistically significant?
1	Presence of safe injection policy guidelines or waste management guidelines or job aids	11% of supervisors interviewed	71% of supervisors interviewed	Yes P<.001
2	Reported stockouts of a stock of safety boxes	5.8 % of injection providers interviewed	2.6% of injection providers interviewed	No P=.385
3	safety boxes present in each location where injections are administered	45 % of facilities surveyed	98% of facilities surveyed	Yes P<.001
4	Immediate disposal of used sharps (curative, family planning, and preventative vaccinations)	86 % of all injections observed	95% of all injections observed	Yes P<.05
5	Satisfactory disposal of waste inside or outside the facility	48% of facilities surveyed	80% of facilities surveyed	Yes P<.001
6	Infectious waste lying around inside or outside the facility	14.9 % of facilities surveyed	22.5% of facilities surveyed	No P=.139

Notice that indicators 1, 3, 4, 5 presented in the table above are statistically significant improvements from baseline in the right direction and demonstrate great progress for reducing risk factors for HCWs and patients.

Table 49 highlights the risk factors specific to *injection providers*. One important factor, which could contribute to the risk to injection providers, is the lack of training in safe injection practices such as, for example, the immediate disposal—without recapping—of needle and syringes used in medical injections. Availability of the hepatitis B vaccination is also a very important way of reducing risk to providers. Although the survey findings are encouraging with more providers at baseline reported being trained, there are still providers in need of training. The absence of the hepatitis B vaccination is particularly significant, particularly given the fact

that this survey showed that providers continue to have accidental needlestick injuries. However, all these variables significantly improved from the baseline.

Table 42: Risk factors specific to injection providers

	Risk Factors	Baseline Result of the Survey (%)	Followup Result of the Survey (%)	Statistically Significant?
1	Training on injection safety	18 % of injection providers interviewed	79% of injection providers interviewed	Yes P<.001
2	No recapped needles for curative, family planning, and preventative vaccines	69 % of all injections observed	97% of all injections observed	Yes P<.001
3	Hepatitis B vaccination (no dose)	2 % of injection providers interviewed	38% of injection providers interviewed	Yes P<.001

Just as with injection service providers, there are risk factors specific to *waste handlers* such as a lack of training and lack of hepatitis B vaccinations. In addition, the lack of PPE such as heavy-duty gloves or boots or closed-toed shoes (for those working in health care facilities where there are loose sharps) as well as waste that can contain used sharps (in the case where safety boxes are not used or waste is not segregated) pose a risk to these injection providers and waste handlers. Lack of PPE was mentioned several times by both waste handlers and injection providers.

Table 41 presents a summary of the results of this survey related to the factors that affect waste handlers. This data shows that 19 waste handlers (21.8%) had not received training and 85 (97.7%) had not received any doses of the hepatitis B vaccine. However, the percent of waste handlers who had received training increased significantly in the follow-up. Hepatitis B vaccination is still an area for serious improvement.

Table 43: Risk factors specific to waste handlers

	Risk Factors	Baseline Result of the Survey (%)	Followup Result of the Survey (%)	Statistically significant?
1	Training on safe HCWM	21 % of waste handlers interviewed	79% of waste handlers interviewed	Yes P<.001
2	Hepatitis B vaccine (no dose)	4 % of waste handlers interviewed	2% of waste handlers interviewed	No P=.456
3	Lack of ANY personal protective equipment	45.8 % of waste handlers interviewed	18.4% of waste handlers interviewed	Yes P<.001

From the perspective of *patients* who receive an injection, the lack of key infection prevention and control practices contributes to the risk of patients being infected with HIV or hepatitis. Some examples of these key practices are hand washing by the injection providers and preparing the injection on a clean working surface or tray where contamination of the injection device by blood, dirty swabs, or other biological waste would be improbable. Stockouts of new needle and syringes could place patients in a situation where the injection provider is tempted to reuse the syringe. In fact, the use of something other than a new needle and syringe for each injection administered to each patient and for each reconstitution of a medication places the patient at risk. In addition to injections received in the facilities participating in this survey, some patients receive injections from other sources. The presence of materials for BCC on subjects that emphasize injection safety such as, for example, the importance of using a new needle and syringe for each injection received, regardless of the source, the importance of not touching used syringes, and the promotion of oral medications as alternatives to injectables could contribute to reducing the risks to patients of being contaminated by a pathogenic agent, while their absence contributes to increasing these risks. Along those same lines, the lack of interpersonal communications between injection providers and patients represents a missed opportunity to reinforce the key messages. Main sources of injection safety information for patients were radio (59%) and health staff/personnel (55%).

Table 42 presents a summary of the results of this survey related to patients and other members of the community. This data shows that using a new needle and syringe from a sterile, sealed package is the case for 259 (99.7%) injections, which is amazingly high—but in the context of AIDS prevention, it would be desirable to try to make this practice *universal* and also to ensure that *each case* of reconstitution of a medication be carried out with a new needle and syringe from a sterile, sealed package. In both the baseline and follow-up, it was universal for reconstitutions; however, this only applied to 13 and 30 injections in the baseline and follow-up, respectively. Stockouts of new needle and syringes were still common, but the MMIS intervention seems to have brought about a decrease, even if not statistically significant. Other infection prevention practices such as hand washing or use of alcohol-based gel were not practiced in 50.8% of the injections observed. Hand washing increased significantly from the baseline but is still preformed by only half of the providers and, therefore, is still an area for improvement. Lack of a clean working table or tray on which to prepare injections was noted in 16.2% of the injections observed. This increased from the baseline.

Unfortunately, even though the risks to HCWs and waste handlers decreased significantly over a number of factors, the risks to patients did not improve significantly (only in the case of hand washing). This area must be considered further in future programming.

Table 44: Risk factors related to patients and visitors at health care facilities

	Risk Factors	Baseline Result of the Survey (%)	Followup Result of the Survey (%)	Statistically significant?
1	A new needle and syringe from a sterile, sealed package used for the injection	97 % of all injections observed	99 % of all injections observed	No P=.115
2	A new needle and syringe from a sterile, sealed package used to reconstitute a medication (vaccinations)	100 % of injections observed	100% of all injections observed	-
3	Stockouts of new needles and syringes	38.6 % of injection providers interviewed	29.4% of injection providers interviewed	No P=.249
4	Hand washing prior to administering an injection	75% of all injections observed	49% of all injections observed	Yes P<.001
5	Clean working table or tray to prepare injections	88 % of all injections observed	84% of all injections observed	No P=.287

Implementation of the recommendations presented in following chapter is necessary to improve the safety of injections and HCWM in health care facilities, thereby contributing to better quality of care.

RECOMMENDATION

The main recommendations provided in this chapter are focused on sustaining the behaviors that are positive and improving those that are less than optimal as shown in this evaluation.

Training, Knowledge of blood-borne diseases, and Equipment for the Protection of HCWs

- Use feedback during supportive supervision visits as a way of providing on-the-job training to providers and waste handlers who were not able to attend training workshops on the key components of injection safety, and/or use previously trained individual as trainers to continue these workshops in new areas and with newly arriving staff.
- Consider adopting a policy of expanding hepatitis B coverage to injection providers and waste handlers to protect them from contracting this disease from accidental sharps injuries. Advocate for policies and vaccines to support hepatitis B vaccination for HCWs as part of a commitment to improving health system human resources. Currently, HCWs do not enjoy this protection, and providing it would serve to reduce their risk of contracting hepatitis infections on the job.
- Increase availability of PPE to protect workers from accidental occupational injuries.

Availability of Injection Equipment and Waste Management Materials

- Continue to monitor stock levels to ensure that there are no stockouts of safety boxes or syringes.
- Use supervision visits to continue to monitor the satisfactory disposal of used sharps and waste segregation to maintain the results achieved to date.
- Seek additional approaches or partnerships to continue to improve final disposal methods to the “good” level.

Stock Management in the Main Stockrooms of the health care facilities

- Institute individual stock tracking mechanisms such as stockcards or registers for safety boxes and for each type of syringes in the facilities that lack them.
- Train stockroom managers to keep these documents up-to-date, and conduct spot checks as needed to check the stock records against the physical inventory.
- It is recommended that additional efforts be made in identifying the essential, noninjectable medications that can replace the most common injections and ensuring that all facilities have a regular, adequate stock of these medications.

- Increase information directed to patients and the community to motivate them to improve their injection safety behaviors, focusing on the increasing the acceptance of oral medications. Suggested approaches include:

    - Improve capacity of health providers to communicate interpersonally with patients.

    - Play TV/radio materials at health care facilities for patient and visitors in waiting OPD rooms and care treatment centers.

    - Broadcast TV and/or radio materials on air, or use other channels such as video vans, video "houses" in the community, etc.

Avoiding Needlesticks

Although equipping HCWs with appropriate skills in injection administration and provision of proper sharps containers for immediate safe disposal of the used sharps reduced the prevalence of needlestick injuries as demonstrated here, exposure through sharps by other means continues to be problem.

- There is need for health unit managers to continuously assess circumstances leading to needlestick injuries with the aim of identifying the persisting risk factors.
- Immediate supervisors should continue to promote one-handed recapping *when necessary* to reduce needle-stick injuries.

Logistics System Improvements

Continue to support improving the logistics and supply systems at all levels to maintain the improvements already made in terms of ensuring a continuous supply of safe injection devices, safety boxes, oral medications, gloves and other PPE. Providing sufficient supplies and equipment should help HCWs improve practices and feel less at risk of contracting infections on the job.

Other Important Recommendations

- Develop strategies to improve availability of water (such as simple tippy-taps) and soap for injection providers to facilitate their being able to wash their hands.

The MOH should examine unsafe phlebotomy procedures and design interventions to improve the standards of performance.

APPENDIX 1: LIST OF FACILITIES IN THE FOLLOW-UP

	Facility name	District	Facility type	Type of ownership
1	Apo	Yumbe	H/C II	Govt
2	Azur	Hoima	H/C II	NGO
3	Barakale	Yumbe	H/C II	Govt
4	Bubare	Kabale	H/C III	Govt
5	Bubulo	Mbale	H/C III	Govt
6	Bubutu	Mbale	H/C III	Govt
7	Bududa Hospital	Mbale	Hospital	Govt
8	Budwale	Mbale	H/C II	Govt
9	Bufumbo	Mbale	H/C IV	Govt
10	Bufundi	Kabale	H/C III	Govt
11	Bugambe	Hoima	H/C III	Govt
12	Bugambe Tea	Hoima	H/C II	NGO
13	Bugobero	Mbale	H/C IV	Govt
14	Buhanika	Hoima	H/C III	Govt
15	Buhara	Kabale	H/C II	NGO
16	Buhimba	Hoima	H/C III	Govt
17	Bujalya	Hoima	H/C III	Govt
18	Bujugu	Hoima	H/C III	Govt
19	Bujumbura	Hoima	H/C III	Govt
20	Bumwoni	Mbale	H/C III	Govt
21	Bupoto	Mbale	H/C III	Govt
22	Buraru	Hoima	H/C III	Govt
23	Busano	Mbale	H/C III	Govt
24	Buseruka	Hoima	H/C III	Govt
25	Busiu	Mbale	H/C IV	Govt
26	Butema	Hoima	H/C III	Govt
27	Butiru	Mbale	H/C III	Govt
28	Butiru	Mbale	H/C III	NGO
29	Butiru Holy Chrisco	Mbale	H/C III	NGO

30	DMO's Clinic	Hoima	H/C II	Govt
31	Dramba	Yumbe	H/C II	Govt
32	Dwoli	Hoima	H/C III	Govt
33	Gangama	Mbale	H/C II	NGO
34	Habubale	Kabale	H/C II	Govt
35	Hoima Islamic	Hoima	H/C III	Govt
36	Hoima Regional Referral	Hoima	Hospital	Govt
37	Kaara	Kabale	H/C II	Govt
38	Kabale Hospital	Kabale	Hospital	Govt
39	Kahondo	Kabale	H/C II	Govt
40	Kakore	Kabale	H/C II	NGO
41	Kamuganguzi	Kabale	H/C III	Govt
42	Kamwezi	Kabale	H/C IV	Govt
43	Kasheregyenyi	Kabale	H/C II	Govt
44	Kei	Yumbe	H/C III	NGO
45	Kibanda	Kabale	H/C II	Govt
46	Kibuzigye	Kabale	H/C II	Govt
47	Kigorobya	Hoima	H/C III	Govt
48	Kikuube	Hoima	H/C IV	Govt
49	Kisabagwa	Hoima	H/C II	Govt
50	Kitanga	Kabale	H/C III	NGO
51	Kitooma	Kabale	H/C II	Govt
52	Kolonyi	Mbale	H/C III	NGO
53	Kulukulinga	Yumbe	H/C III	Govt
54	Kyabasengya	Hoima	H/C II	Govt
55	Kyakapeya	Hoima	H/C II	Govt
56	Kyanamira	Kabale	H/C III	Govt
57	Kyobugombe	Kabale	H/C II	Govt
58	Lobe	Yumbe	H/C II	Govt
59	Lodonga	Yumbe	H/C III	NGO
60	Lucy Bisereko	Hoima	H/C II	Govt
61	Lwanjusi	Mbale	H/C III	Govt
62	Magale	Mbale	H/C IV	NGO
63	Maluku	Mbale	H/C II	Govt

64	Masasa	Mbale	H/C II	Govt
65	Matuma	Yumbe	H/C II	Govt
66	Mbale Regional Referral	Mbale	Hospital	Govt
67	Mbarara	Hoima	H/C II	Govt
68	Midigo	Yumbe	H/C III	Govt
69	Mparangasi	Hoima	H/C III	Govt
70	Mparo	Kabale	H/C IV	Govt
71	Muhanga	Kabale	H/C II	NGO
72	Muhwiju	Hoima	H/C III	Govt
73	Naiku	Mbale	H/C III	Govt
74	Nakaloke	Mbale	H/C III	Govt
75	Namaitsu	Mbale	H/C II	NGO
76	Namatala	Mbale	H/C III	Govt
77	Nangara	Kabale	H/C II	Govt
78	Nyarurandi	Kabale	H/C II	Govt
79	Nyondo	Mbale	H/C III	NGO
80	Rubaya	Kabale	H/C IV	Govt
81	Ruhija	Kabale	H/C III	Govt
82	Rusikizi	Kabale	H/C II	Govt
83	Rutooma	Kabale	H/C II	Govt
84	St. Austine	Mbale	H/C II	NGO
85	Wambabya	Hoima	H/C IV	Govt
86	Wanale	Mbale	H/C III	Govt
87	Yoyo	Yumbe	H/C II	Govt
88	Yumbe H/C II	Yumbe	H/C II	Govt
89	Yumbe Hospital	Yumbe	Hospital	Govt

For more information, please visit www.mmis.jsi.com.

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