



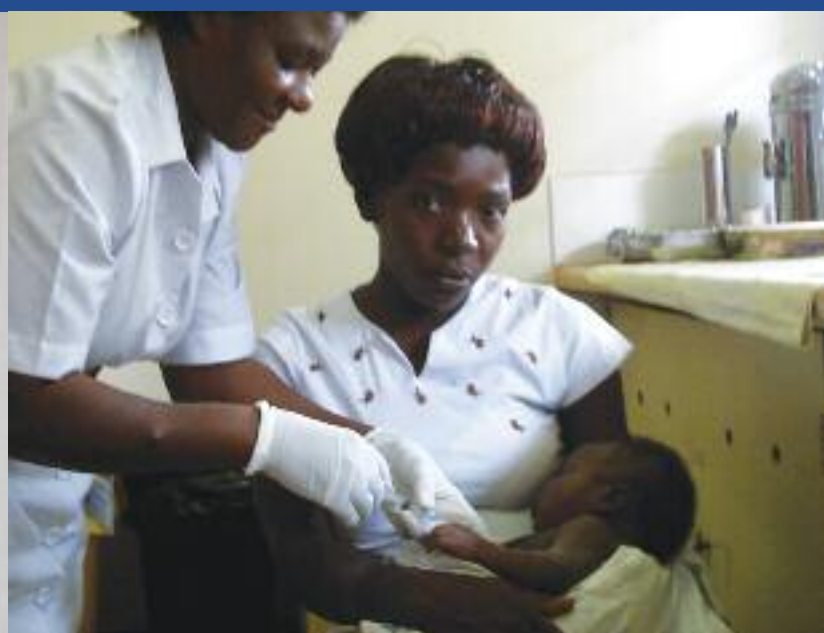
USAID
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REDUCING UNSAFE INJECTIONS IN FOUR AFRICAN COUNTRIES

THE MAKING MEDICAL INJECTIONS SAFER END OF PROJECT REPORT

MARCH 2004 TO SEPTEMBER 2009



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I. OVERVIEW AND INTRODUCTION

Background on Injection Safety in 2004

Of the 16 billion injections given worldwide each year, up to 50 percent are unnecessary and unsafe, according to the World Health Organization (WHO). Estimates of the global burden of disease from unsafe and unneeded injections suggested that in the year 2000, unsafe injections around the world were responsible for 5% of HIV infections, 32% of hepatitis B virus infections, and 40% of hepatitis C virus infections. Based on this evidence, prevention of medical transmission of HIV has been an integral part of the President's Emergency Plan for AIDS Relief (PEPFAR) comprehensive HIV prevention strategy since its inception in 2004. John Snow Inc. (JSI) was contracted by the United States Agency for International Development's (USAID) PEPFAR-funding mechanism to address the problem of HIV transmission in health care settings by implementing a project known as Making Medical Injections Safer (MMIS) over five years (2004-2009) in Ethiopia, Mozambique, Nigeria, and Uganda.

Given the large numbers of HIV-infected patients in many countries, other patients and frontline health workers who provide care are at increased risk of HIV infection because of contaminated needles and syringes reuse and needlestick injuries in health care settings. High patient demand for injections in many developing countries, and health workers' willingness to provide them have resulted in a high volume of medically unnecessary injections, creating greater need for new, sterile injection equipment and a means of safely disposing used sharps waste. Inadequate disposal of sharps waste

contaminates the community, exposing the wider public to health risks. These unsafe and unnecessary injections spread deadly diseases in communities that are already burdened by poverty, pollution and disease and that rarely have the resources to comprehensively address these complex problems.

Through PEPFAR, the U.S. Government established itself as a global leader in the prevention of medical transmission of HIV through unsafe injection practices. Collaboration between project partners, including JSI, PATH, AED, and the Manoff Group, has enabled MMIS to bring together top experts in each of the technical areas that comprise the WHO's three-part strategy to reduce harm caused by unsafe injections. This work marks the first time that HIV transmission through curative sector injections (which comprise 90% of all medical injections) has been addressed in a systematic fashion.

To inform program strategies and begin rapid introduction of MMIS interventions, an initial assessment, which included a review of existing data, a review of existing policies, and baseline data collection, was conducted in each country. The findings from these baseline assessments and complementary data sources were used to develop and implement strategies and interventions to address injection safety in each country through September 2009.



Infection Prevention Committee leaders at Arba Minch Hospital promote behavior change to reduce transmission of HIV/AIDS and other bloodborne diseases caused by unsafe injections in Ethiopia.

While the findings varied by country, all demonstrated an urgent need for injection safety interventions. For example, in Ethiopia less than 10% of injections met the criteria of a safe injection (MMIS); and 25% of facilities with access to safety boxes for sharps disposal did not use them, but instead left sharps lying around facility (MMIS). In Uganda, 23% of injections were deemed unsafe and 30% of patients had more than 5 injections in a year. Also, 70% of health units in Uganda did not have safety boxes for sharps disposal (2003 BASICS project). In Mozambique, the majority of injections were given with sterilizable needles and glass syringes. In addition, 20% of patients brought their own injection equipment (2004 UNICEF). Patients in Nigeria believed injections were more effective than oral medications, and a majority of health facilities had poor disposal practices, and injection practices overall were unsafe (MMIS).



Project Strategy and Implementation Approach

The MMIS strategy to reduce medical transmission of HIV and improve health worker safety through safer injection practices hinges on a multi-faceted technical approach that builds in-country capacity for sustained improvements in injection practices. As a result, the impact of the project will last well beyond the 5-year project and will amplify MMIS's reach. The project based its approach on the basic strategy developed by WHO's Safe

Injection Global Network (SIGN) and adapted it to encompass the following components:

- **Commodity management and procurement:** support for estimating, financing, procuring, and distributing injection equipment and waste disposal containers
- **Behavior change communication and advocacy** to reduce demand for injections
- **Establishing standardized systems for proper sharps disposal**
- **Capacity building and training** in injection practices, supply management, waste handling, and interpersonal communications
- Strategies for working **with private providers and informal sector**
- Establishing a **policy environment** that supports injection safety with guidelines, resources, and monitoring of injection practices
- **Monitoring and evaluating** the impact of interventions, identifying gaps and using data to form programmatic decisions

MMIS tailored and implemented the global strategy to assure relevancy to each country's context. The MMIS project provided technical assistance to ministries of health and practical field expertise in the areas of injection safety and health care waste management. In addition, MMIS worked closely with ministries of health in the development and implementation of interventions. In each country, MMIS

Sister Ruth Nkwanau Kakitto and the administrative team worked in partnership with MMIS to ensure that all health workers at Rubaga Hospital in Uganda had received injection safety and waste management training. In her role as the injection safety focal point, Sister Ruth sees that all new staff receive training in injection safety and appropriate waste management procedures before they begin work.

interventions targeted an initial 3 to 4 pilot districts, as selected by the respective government. These interventions were then scaled up to additional districts and at various levels (local, regional, national) as defined by the country's 5-year expansion strategy. Annual country workplans were developed in collaboration with local government, USAID local missions, and other PEPFAR partners, to guide the implementation of injection safety activities in a coordinated manner. While some health services are provided in the informal, private and public sector, MMIS injection safety interventions focused on the formal public health sector as the sector where it could make the most significant impact to support the respective ministries of health.

Sustainability

The cornerstone of the MMIS project is its field-based approach to project implementation and emphasis on local partnerships. MMIS established 4 field offices, staffed by host country nationals and collaborated with local partners to successfully integrate injection safety and health care waste management into local health systems. Injection safety is a cross-cutting issue and MMIS has relied on in-country partners within and outside the HIV community. During the life of the project, MMIS has included steps towards sustainability for each of the technical areas that comprise injection safety. For example, in the area of capacity building, MMIS trained other health care workers to serve as trainers in injection safety. In the area of policy, MMIS assisted governments to develop guidelines to support

the implementation of national injection safety policies. This approach assured that country ownership of injection safety initiatives progressed and that human and financial resources to strengthen the sustainability of improved injection practices beyond the life of the project were planned for.

This report provides an overview of the cutting edge work that has been implemented to address HIV transmission in the curative sector injections in a systematic manner by the MMIS project. It describes by technical area the interventions, results achieved, and the work that remains to be done in injection safety and HCWM in Ethiopia, Mozambique, Nigeria, and Uganda.

In addition to the project's accomplishments in these countries, MMIS has contributed to the global body of knowledge and experience in reducing the medical transmission of HIV and bloodborne diseases. The international community, through SIGN, has used the results, lessons learned and field-based successes and experiences of MMIS to inform the design and implementation of injection safety interventions and approaches around the world.



In Mozambique, BCC materials including a poster with a working clock that reinforced the 12 steps to injection safety were distributed throughout targeted health facilities.

II. POLICY

Baseline

In Ethiopia, Mozambique and Uganda, the national injection safety assessment Tool C was conducted by their ministries of health (MOH) with the technical assistance of WHO. In Nigeria, MMIS supported the Federal Ministry of Health (FMOH) in conducting the national injection safety assessment and also supported the dissemination of the report. This assessment included a review of existing policies in each country related to injection safety. The key findings from these assessments, specifically the data quantifying the extent of unsafe injection practices, combined with the absence of policies and/or guidelines to protect health care workers, patients, and communities, served as the starting point for identifying the policy work that would be needed in each country.

Actions/Interventions

MMIS's strategic approach to policy work has included: conducting sensitization meetings with stakeholders inside and outside the MOH as well as conducting injection safety and health worker advocacy activities. MMIS has been instrumental in creating injection safety and health care waste management committees composed of multidisciplinary healthcare professionals, who advocated for supportive policies.

MMIS provided technical assistance to the 4 countries in the development and implementation of policies and worked collaboratively with governments to identify ways to improve the effectiveness of existing policies. These policies reflected the context that was relevant for each country. For

example, in some countries where there is a high priority on infection prevention and control (IPC), injection safety and health care waste management issues are addressed through an IPC policy.

These efforts have been critical in fostering an environment where key decision-makers at the national level see injection safety as a priority, take ownership of injection safety programming and work collaboratively towards developing national policies to protect patients, health workers, and the environment from the medical

National Policy in Uganda Aims to Stop Disease Transmission Through Reuse of Injection Equipment

Recognizing the role of injection safety in preventing medical transmission of HIV and other bloodborne diseases, the Government of Uganda launched a national policy in July 2006 that stipulates only syringes with reuse prevention features can be imported and manufactured in the country. Uganda's Minister of Health, Hon. Dr. Stephen Malinga, and the Uganda Injection Safety Taskforce (UNISTAF) led efforts to develop and launch the policy. In preparing for the switch to AD syringes, the Ministry of Health (MOH), with support from MMIS, increased national investment in health care worker training. To ensure proper use of the new injection technology and reduce wastage during the transition, MMIS trained and supervised 12,050 health care workers to ensure they were familiar with the new devices before the policy went into effect. In addition, the MOH, in collaboration with MMIS, launched a behavior change communication strategy designed to increase Ugandans awareness of injection safety's role in disease prevention. To facilitate the transition from standard disposable to AD syringes, MMIS/Uganda used data from an MMIS consumption survey that allowed the National Medical Stores to accurately forecast the country's future AD syringe needs. Acknowledging that standard disposable syringes are needed for certain procedures, the policy allows for up to 10% of national syringe supply to be standard disposable syringes, available exclusively through the National Medical Stores.

transmission of HIV and other bloodborne pathogens. Moreover, the effective implementation of policies establishes injection safety, patient safety and health care worker safety as professional and societal norms.

Partnerships

Assuring a broad base of support, in-country partnerships are the foundation for all of MMIS' work. The process for the development and approval of policies is lengthy and requires not only commitment from the highest levels of government, but also approval from legislative and regulatory authorities. MMIS' approach was to work with country partners to create or strengthen national injection safety committees in each country. These committees, composed of representatives from government ministries, donors, non-government organizations, professional associations and private sector health provider associations were instrumental in garnering support for recommended policies. In Uganda and Mozambique MMIS strengthened existing health committees' involvement in injection safety. In Nigeria and Ethiopia, national injection safety committees were established where none existed before.

Results/Achievements

MMIS has supported governments to create national injection safety committees and sub-committees on specific technical areas such as behavior change communication, health care waste management and commodity management. In all four countries, MMIS helped to establish injection safety contact persons at the central, state/regional, district and facility level. These focal persons worked as a liaison between the MOH and MMIS in the process of developing policies, guidelines, and action plans for implementation at the field. MMIS in all four countries assisted the MOH and partners (such as WHO and GAVI, UNICEF, World Bank) in developing national health care waste management plans to support health care waste management guidelines.

This multi-disciplinary participation in injection safety committees further reinforces that injection safety is a cross-cutting issue, relevant to various health programs and beneficial to the entire community.

In addition to developing injection safety policies and guidelines, MMIS also supported the country governments in making major policy decisions. This has included advocating for the eradication of the reuse of syringes and needles by assuring that the government will support commodities and new syringe technologies that promote health care worker safety. To achieve that goal, MMIS worked with the MOH and the national regulatory authority to ensure sustainability of safe injection commodities in the health care facilities beyond the life of the project. In all countries, the essential medicine

The percent of supervisors who had 3 core policy/guidelines documents increased significantly with MMIS involvement in Nigeria and Uganda from less than 5% of supervisors reporting they had the three documents to approximately 40% after MMIS work.

list now includes injection safety commodities, signifying that these items will be procured by the central government and then made available to lower level health facilities.

The MOH in Uganda adopted a major policy stating the country would only use syringes with re-use and anti-needle stick prevention features in health services (with some exceptions to accommodate syringes that are used for non-injection purposes). In Nigeria, the National Agency for Food and Drug Control (NAFDAC) declared a similar decision to use only re-use prevention syringes in the country by September 2009. Additionally, Nigeria's Federal Ministry of Health included a line item in the budget for injection safety. Mozambique's MOH made a policy decision to transition from the use of glass syringes to single-use syringes in curative health services and is currently procuring mainly re-use prevention syringes and safety boxes for use at public health facilities. In Ethiopia, MMIS supported the MOH's decision to reinforce their cost recovery system by supplying safe injection commodities through the Revolving Fund Pharmacy to ensure security of safe injection commodities. In this way, funds that are generated from the purchase of commodities, are reinvested in the purchase of more commodities.

Unmet Need/Recommendations

MMIS interventions, have improved patient, health care worker and community safety. However, despite marked improvement in health care worker injection practices noted in follow-up health facility assessments, there is still progress to be made.

In Nigeria, for example, over half of the supervisors still do not have access to policy guidelines needed for comprehensive implementation.

Specifically, additional efforts are needed to improve health care workers' access to hepatitis B vaccinations, post-exposure prophylaxis (PEP) treatment, and the accompanying treatment guidelines.

MMIS gathered preliminary data on phlebotomy practices. Phlebotomy is a procedure being performed frequently in different health settings including those that provide HIV testing and treatment. Findings showed that phlebotomy is often performed in an environment without guidelines on best practices, without access to proper equipment, and by personnel with various levels of training in phlebotomy. Developing and implementing interventions to promote safe phlebotomy practices will assure that both patients and health care workers are not exposed to the risks associated with this procedure.



MMIS worked with the MOH in Mozambique to reach a policy decision to transition from the use of glass syringes to single-use syringes in curative health services.

III. COMMODITY PROCUREMENT AND LOGISTICS

Baseline

Findings from country commodity procurement and distribution assessments noted significant problems with both commodity availability and a deficiency of reliable data on the actual numbers of syringes used (syringe consumption) in each country. The assessments also revealed: multiple undocumented procurement mechanisms; limited planning; and little correlation between the injectable drugs ordered and the procurement of supplies needed to administer these drugs. The National Regulatory Agencies (NRA) were not actively monitoring the quality or standards of injection equipment in the countries, and safety boxes were essentially unavailable outside of immunization programs. Addressing these serious challenges became the basis of the commodity strategy that would complement the initial phase.

Actions/Interventions

To reduce syringe reuse and the related transmission of HIV and other bloodborne diseases, sufficient supplies of appropriate injection equipment must be available to ensure the safety of necessary injections. The commodity strategy for the project addressed procurement and logistics related to policies, consumption monitoring of safe injection supplies, and commodity support. As part of an overall effort to introduce safety syringes and other equipment, the commodity strategy was also tied to training initiatives. Key strategic elements to strengthen commodity procurement and logistics included:

Policy: In order to advance the national syringe procurement to meet the needs, policies to support these efforts were required, especially the inclusion of safe injection equipment on Essential Equipment Lists. To support such policies, MMIS worked with local counterparts to assure that national budgets, tender documents, order forms, and equipment catalogues used for ordering were updated to include safe injection equipment. Inclusion of this equipment is a first step in ensuring that national policies are implemented and most importantly that funding for commodities is being allocated to strengthen sustainability. The project provided technical assistance to the NRAs to introduce international standards, such as the WHO Performance, Quality and Safety (PQS) scheme to ensure that all injection products procured by countries meet international quality standards and are safe and effective.

In all 4 countries, the availability of safety boxes in MMIS facilities was almost 100%, a statistically significant increase from baseline where figures ranged from as low as 14% in some countries.

Commodity Support: In the initial rapid-assistance and implementation phase of the project, safe injection commodities such as re-use prevention syringes, needle-stick prevention syringes, safety boxes, and needle removers were considered emergency supplies. These supplies were necessary to address shortages and to support immediate implementation of activities. For this reason, the initial phase of the project emphasized commodity procurement to assure adequate supplies at the country level. The project provided over 175 million safety



As part of an overall plan to introduce safety syringes into curatives services, MMIS provided over 175 million safety syringes and 1.5 million safety boxes for all USAID countries over the life of the project.

syringes and 1.5 million safety boxes for all USAID countries over the life of the project as part of an overall plan to introduce safety syringes into curatives services. The availability of supplies not only provided safe injection equipment to health facilities, but also introduced country governments to new syringe technologies with needle-stick and re-use prevention features that enhance healthcare worker safety. On a larger scale, MMIS and national procurement units collaborated on the procurement, storage, and distribution plans to assure regular and appropriate levels of commodities. Using data from MMIS consumption monitoring activities, the plan addressed the planning deficits identified in the initial assessment. The commodities provided by the project were also carefully integrated into various cost recovery systems, allowing local structures to build a revenue base for local procurement of appropriate supplies in appropriate quantities.

As part of the commodity strategy, the project developed multiple tools to support the personnel responsible for procurement. These include quantification tools, procurement specification templates, and vendor resource guides. In countries where local production of safe injection supplies existed or where there was an expressed interest in local production, MMIS provided technical assistance in quality standards, testing, and production.

Consumption Monitoring: Due to the lack of data on consumption of injection equipment, MMIS trained in-country logisticians on the use of the Logistics Management Information System (LMIS). This tool, developed by MMIS, tracked the levels of commodities during all steps of the product pipeline.

Partnerships

In all countries, MMIS worked with national partners, like the Ministry of Health, Central Medical Stores, National Regulatory Authorities, and associations of pharmaceutical importers and distributors on all commodity interventions. These partnerships were essential in ensuring sustainability of MMIS efforts. To ensure that other projects remained aware and involved, MMIS worked with other USG projects such as the Supply Chain Management System (SCMS) Project, USAID/DELIVER, and other PEPFAR implementers at a global and country level.

Product introduction and policy changes need the support of international stakeholders to be sustainable. To that end, MMIS procurement and logistics efforts included partnerships with

UNICEF, WHO, and country-level industry associations among others. These partnerships addressed various issues, but most importantly, they allowed the project to leverage information widely, and at high levels.

Results/Achievements

The commodity procurement and logistics strategies yielded multiple successes. Policy changes, including the incorporation of safety syringes on Essential Equipment Lists and the development of related supporting documents and processes, occurred in 3 of the 4 countries. Significant increases of government-procured safe injection commodities occurred in all countries.

Procurement transitioned from MMIS to country systems in years 3-5 of the project, and all countries are currently self-procuring. Overall, local procurement in MMIS countries increased up to three-fold, underscoring the benefits and success of commodity support.

Updating systems for procuring syringes included the development of improved tools and the inclusion of quality and performance standards for procurement. The quality of safe injection commodities has improved; both Uganda and Nigeria initiated quality monitoring initiatives which included the requirement that products meet WHO PQS system or ISO standards. Creating quality standards for all procured products ensures that price alone is not the only consideration in procurement decisions. In the long-term, a procurement environment that requires quality is able to

minimize the problem of low-cost but unsafe equipment from flooding the market.

Ministry staff and other counterparts at the country-level continue to use the LMIS tool for commodity management. Prior to MMIS, the only data that existed to estimate need were studies from WHO that provided overall national averages of 1.5 injections per person per year. However, MMIS activities revealed that this figure did not fully illustrate syringe consumption since many injections require multiple syringes and because syringes are also used for non-injection purposes. The LMIS provided accurate data on the consumption of syringes per person per year. This data is used at country levels to advocate to decision-makers for budget allocations and to demonstrate and plan for actual commodity need. Logistics managers use LMIS to proactively manage commodities and assure that commodities are available at service delivery points.

Only 10% of supervisors in the four countries reported a stock out of key injection safety equipment in the last 6 months, a statistically significant and dramatic improvement from baseline figures before MMIS interventions.

The MMIS commodity procurement and logistics experience has been shared globally as a recognized critical component in cross-cutting health areas. MMIS served as a valuable resource of information on the introduction of various injection safety devices, advocacy, consumption monitoring, and policy issues.

Unmet Need/Recommendations

While the overall achievements of the interventions were extensive, health needs are dynamic and continue to evolve. Future needs for injection safety include:

- quantifying and assessing the commodity needs for blood drawing and specialty procedures,
- ensuring neighboring countries also undertake safe injection efforts to avoid pressures to return to former unsafe injection practices,
- assuring commodities for continued training initiatives,
- establishing formal international policy guidelines specific to curative services,
- advancing the integration of injection safety into emerging cross-cutting programs,
- continuing to support cost recovery systems and budget mobilization,
- improving the logistics monitoring and management of injection equipment.

IV. CAPACITY BUILDING AND TRAINING

Baseline

Training and capacity-building efforts are critical to improving healthcare workers practices in injection safety, infection prevention, and proper healthcare waste handling. Assessments and complementary qualitative research conducted at the beginning of the project indicated that healthcare workers and health facilities faced a variety of barriers to providing safe and necessary injections and safely disposing of health care waste. Factors included limited resources, lack of specific knowledge related to safe injection practices, unclear guidelines on practices, and a systematic lack of coordination within the health units. Another key factor is the high level of staff turnover in health facilities which make it a challenge to continually train new staff and maintain safe injection practices. These findings were used to develop a capacity-building strategy and approaches to improve the practices of health care workers both in the short and long-term.

Actions/Interventions

As a first step, MMIS developed a core technical document that includes key technical approaches and messages related to injection safety and healthcare waste management for health care workers, waste handlers, pre-service institutions, supervisors, prescribers and logisticians in primarily the public health sector. This document, the “Do No Harm Facilitator’s Guide,” which was developed in partnership with WHO/AFRO, was used by MMIS countries to develop their country-specific training curricula. As an additional resource to countries, MMIS developed the *Do No Harm: Training Tools and Job Aides*, a resource of materials to complement the *Do No Harm Facilitators’ Guide*.

The in-service trainings are based on adult learning principles and focus on the core competencies that each cadre of healthcare worker, who is currently in the job force, must have to ensure a safe environment for staff as well as patients. These core competencies encompassed the skills, knowledge, and attitudes to be addressed in order for health workers to know what they must do, be motivated to do it, and actually choose to do it. Training for healthcare workers included interpersonal communications with patients and prescribing oral alternatives to injections. MMIS also developed an interactive and hands-on training to address the needs of waste handlers, an important, yet often overlooked cadre of low-literacy healthcare workers. On-the-job training modules on key injection safety practices enables supervisors to train a new employee who may not yet have benefited from a formal in-service training.

In Ethiopia, Nigeria and Uganda injection providers reported far fewer accidental needle stick injuries after implementation of MMIS interventions (6%, 7%, 4%) respectively. In Mozambique the proportion of waste handlers reporting any injuries decreased from 22% at baseline to 0% at follow up.

MMIS recognized that training alone would not bring about improved practices by healthcare workers. For this reason, MMIS implemented a comprehensive strategy to capacity-building which included in-service training as well as complementary approaches such as supportive supervision, feedback, job aids, on-the-job training, and pre-service training.



After providing training to all staff of 39 facilities in four cities (Quelimane, Nampula, Xai-Xai, and the Mavalane Health Area), MMIS distributed materials enabling staff to implement what they have learned. The distribution was coordinated with the Mozambique Ministry of Health (MOH) through the Injection Safety Technical Groups operating in each of the four cities.

In the area of pre-service training, MMIS worked closely with in-country training and educational institutions to incorporate injection safety content into the curricula for future health professionals. For example, Nigeria's major nursing school has integrated injection safety and standard precautions into its national curricula, ensuring that all future nurses will have this training from the beginning of their service.

MMIS also collaborated across health programs to provide training of healthcare workers on injection safety and healthcare waste management issues.

Partnerships

MMIS' approach has been to actively enlist the support of governments and institutions whose commitment to injection safety could last beyond the life of the project. The capacity-building efforts of the MMIS project were planned and implemented in close collaboration with MOH and other agency counterparts so as to ensure that these efforts were coordinated and institutionalized. For example, MOH counterparts were trained to serve as trainers to others on injection safety, thereby improving local capacity and long-term sustainability. MMIS worked with many other stakeholders such as donors, non-government organizations, professional associations and private sector health providers in the review and refinements of training materials. This has been critical to assuring local ownership of capacity building efforts and appropriateness to the context of each country. MMIS has also partnered with pre-service institutions for the integration of injection safety content into curricula. MMIS has

¹ 6 months after project interventions in MMIS target areas

also supported PEPFAR partners in injection safety interventions which enabled MMIS to expand its reach.

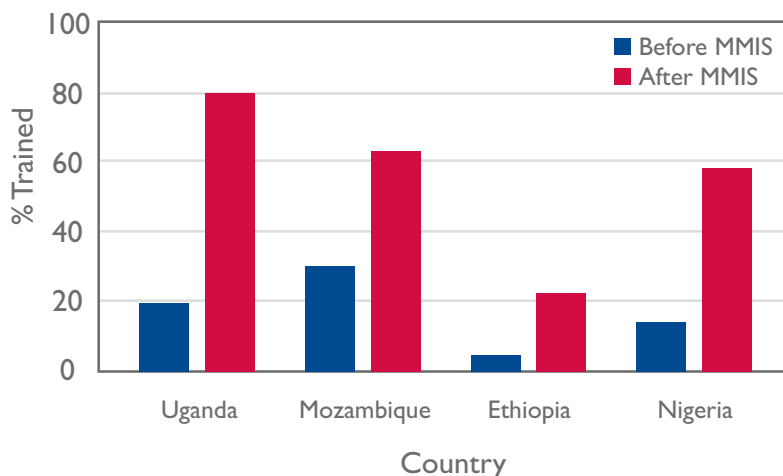
Results/Achievements

Each country's training materials, based on the Do No Harm Facilitators' Guide, have had significant use in the field through MMIS direct training activities as well as through integration into partner training activities where possible. Since 2004, MMIS has trained over 97,000 trainers and health workers, including providers, prescribers, logistician/pharmacists, waste handlers, as-well as pre-service students in Ethiopia, Mozambique, Nigeria and Uganda.

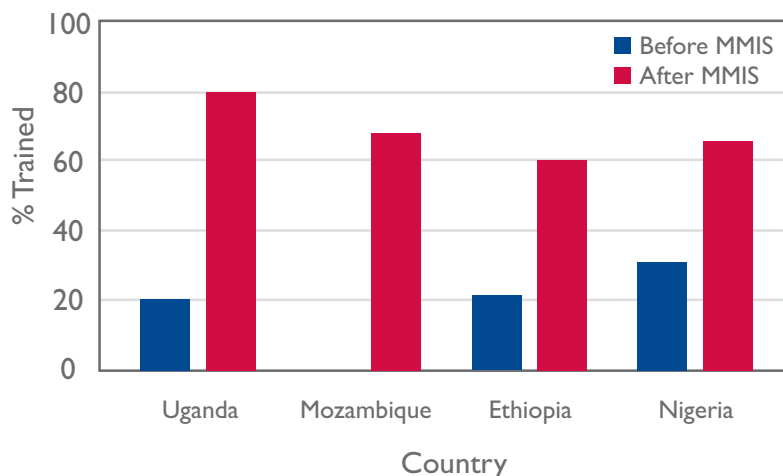
As shown by MMIS facility-based assessments in each country, MMIS achieved coverage rates as high as 78% of injection providers and 79% of waste handlers surveyed in Uganda who reported receiving training in injection safety and waste management. This overview of data on healthcare workers trained in injection safety and healthcare waste management in the tables shown on this page, which are statistically significant, highlight the capacity of a project like MMIS to reach many workers in a short period of time through effective training and capacity building interventions.

Despite the progress made through MMIS interventions, in a country like Ethiopia for example, almost 80% of waste handlers remained untrained. When factors such as that are combined with the reality of high staff turnover rates in health care facilities as well as little supportive supervision, there remain serious gaps in the ability to both train and reinforce safe practices.

Percent of Waste Handlers Trained in Safe Waste Disposal



Percent of Injection Providers Trained in Injection Safety



Infection prevention control (IPC) methods can provide greater safety for patients and providers when health workers trained adopt these methods correctly and consistently. MMIS training reinforced fundamental concepts of IPC in the context of injection safety. In MMIS countries, providers were trained to use a clean, dedicated surface for preparing injections, and



In Nigeria, an MMIS training demonstrates safe disposal of sharps which helps to prevent needlestick injuries.

this practice improved in three out of four countries. Hand-washing was also part of the MMIS curriculum, but results showed it was more difficult to make improvements in this practice, particularly in places with little or no

running water. Despite challenges, hand washing or use of alcohol-based sanitizer did improve at a statistically significant level in Nigeria, Mozambique and dramatically so in Ethiopia. The continuing challenge in this setting is providing both sufficient resources to support this important practice, and supervision to reinforce it.

One of the most important aspects of training for the MMIS project focused on using a new needle and syringe for every injection procedure. Through MMIS training and capacity building interventions, the practice of using a new needle and syringe improved in all four countries. In Mozambique in 2005, 11% of providers interviewed reported having boiled a syringe to sterilize it for reuse. After MMIS interventions in

Mozambique, none of the providers surveyed in 2008 were aware of any cases of reuse of syringes and they indicated it would be an unacceptable practice in health facilities.

In order to improve healthcare worker safety, it is important to prevent accidental needle-stick injuries that can transmit blood-borne diseases including HIV/AIDS and Hepatitis B and C. Healthcare workers were trained through MMIS on the practice of not recapping needles. MMIS data show that in Nigeria, 98% of needles were not recapped after training interventions took place, a significant improvement from the baseline. Recapping also declined in the other three countries as a result of MMIS training and capacity building interventions. Overall, incidence of needle stick injuries among injection providers and waste handlers declined in all four countries after MMIS activities, and three out of four countries achieved a statistically significant decline in this area. MMIS data showed waste handlers were more likely to sustain an injury than injection providers overall. In Ethiopia, for example, only 6% of the injection providers compared to 35% of waste handlers reported one or more accidental needle stick injuries in the six months prior to the follow up survey. This indicates not only the potential for training interventions to successfully reduce needle stick injuries, but also the need for greater emphasis on waste handlers as a target group for training and materials to avoid such injuries in their workplace.

In all four countries, waste handlers showed improved efficiency with ensuring proper disposal of sharps waste. In Mozambique, 41% of health care facilities surveyed at baseline

² There was a non-significant decline in Uganda.

compared to 94% after MMIS interventions showed evidence of good practices for sharps object disposal. In Nigeria, the results improved from 15% to 63%. In Ethiopia, good practices for sharp object disposal improved to 50% of facilities with training, but clearly there is room for improvement.

Segregation of waste was also an important part of MMIS training, and a simple way to protect workers from injury from sharps waste. MMIS reports impressive changes over time. In Ethiopia for example, 46% of MMIS facilities segregated waste in 2008, compared to only 25% in 2005. While a significant improvement, the lack of waste segregation in the majority of health care facilities continues to contribute to a situation in which all waste poses a risk of accidental needle stick injuries to the waste handlers. In fact 45% of the waste handlers in Ethiopia interviewed at follow-up reported they had had at least one or more accidental needle stick injuries during the six months preceding the survey, showing the urgency of continuing efforts to protect this often neglected group of workers.

Unmet Need/Recommendations

Although training was a key intervention of the MMIS project, staff turnover requires that in addition to formal in-service training, one-on-one approaches such as supportive supervision and on-the-job training be available to healthcare workers who have not attended training on injection safety. Efforts to integrate injection safety topics into pre-service curricula to ensure that future providers are taught good injection safety practices should also continue.

Training for Nurse Midwife Instructors For Sustained Safe Practices in Nigeria

In Nigeria, many health care providers never received training to administer injections safely using reuse prevention or needlestick prevention needles and syringes. The MMIS project collaborated with the Nursing and Midwifery Council of Nigeria to address this gap by providing injection safety training to instructors from medical training institutes and teaching hospitals throughout the country. These trained instructors in turn provided injection safety training to Nigeria's future nurse-midwives. This critical step builds local capacity to prevent medical transmission of bloodborne disease and fostering a professional norm of safe practices in Nigeria's health system. The collaboration resulted in seven Training-of-Trainer workshops, reaching 210 nurse/midwife tutors and clinical instructors drawn from nursing and midwifery schools as well as teaching hospitals representing all six of Nigeria's geopolitical zones. The trained trainers are expected to utilize the knowledge and skills acquired through the training workshops to facilitate future injection safety training for other tutors and instructors in their respective training institutions and hospitals. Additionally, MMIS provided technical assistance to the Nursing and Midwifery Council to incorporate relevant aspects of injection safety and health care waste management into the pre-service training curricula for nurse/midwives.

In general, the project has seen very positive achievements resulting from training efforts in conjunction with adequate supply of injection safety and waste management materials (such as disposable syringes and safety boxes). These include using a new sterile needle and syringe for every injection, as well as disposing of used needle and syringe in a safety box or appropriate sharps container. One recommendation is to assure that local entities continue to procure commodity supplies and coordinate training efforts so that workers are able to practically apply new knowledge in their own work environment.

To further strengthen healthcare worker safety, supervisors at health facilities need to continually assess risk factors leading to needle stick injuries for healthcare workers and in particular, waste handlers to identify appropriate interventions to address those risks.

Phlebotomy is a procedure that can put healthcare workers and patients at risk. While some limited data on phlebotomy practices is available from MMIS, more country-specific data is necessary to identify unsafe phlebotomy practices and to use the findings to inform future capacity-building strategies and approaches to promote safe phlebotomy practices.

V. BEHAVIOR CHANGE, COMMUNICATION AND ADVOCACY

Baseline

In accordance with the scope of work, the MMIS project conducted initial qualitative, formative research in each country, the results of which were used to inform the development of behavior change and communication strategies and activities. The findings from the research in each country were then compared with those from the country's health facility assessment to explore the relationship between health workers' stated and actual practices.

Several similar findings were observed across countries. In general, there was low awareness of the risks of unsafe injections among all groups. While health workers generally were aware that unsafe injections could be associated with HIV, most were unaware of additional risk of exposure to hepatitis B and C. Healthcare workers generally did not understand the risks to themselves, their patients, or to waste handlers as a result of unsafe and unnecessary injections.

Prescribers and providers viewed injections as a well-accepted and reliable way of providing medication to patients. Another strong finding across countries was the uniformly high demand for injections among community members and the belief that injected medications were more efficient than oral alternatives.

Across countries, health workers were cited as the most important and credible source of information on health and injection-related matters. However, prescribers of medication and injections generally had very short consultations with patients, allowing limited opportunity to counsel patients on the advantages of oral alternatives to injections. Community members also expressed

reluctance to request oral alternatives from prescribers or insist on safe injection practices from injection providers.

Actions/Interventions

The behavior change communication and advocacy activities undertaken by the MMIS project are intended to raise awareness about and commitment to injection safety and safe healthcare waste management. MMIS efforts are also intended to bring about sustained improvements in health worker practices and create demand among patients and communities for only safe and necessary injections. Most of these activities are cross-cutting in nature and are integral to other areas of project activity including, for example, policy development, training and capacity building, health care waste management and commodity management. The project's planning template for behavior change and communication (BCC) activities embodied a comprehensive approach, in part, as a means of ensuring that BCC efforts were synchronized with other activities.

In Mozambique and Uganda, the MMIS behavior change dissemination strategy was highly successful, with 100% and 86% of facilities having one or more BCC material present at the facility, an increase of 17% and 11% (respectively).

In each country, MMIS developed a multi-year behavior change, communication, and advocacy strategy, with input from key Ministry of Health counterparts. Strategies were based on three main behavioral goals: (1) Reduce unnecessary use of injections; (2) Improve the safety of those injections that are necessary; and (3) Assure the safe disposal and management of sharps waste. A key approach to support these



Mekedes Tekle Selasie, the Sanitarian at Batu Health Center in Ethiopia, is a leader in sustaining waste management practices.

strategies was to define in specific terms the positive behaviors that these different actors should do to reduce risks related to unsafe and unnecessary injections. The BCC advisor of each MMIS country team played an important role in supporting training activities as a means of improving health care worker behavior:

MMIS employed a phased approach to BCC that initially focused on health workers as critical providers of both injections and information to patients. This helped support the project's focus on improving services—including interpersonal communication between health personnel and patients—while avoiding the premature creation of demand among patients that could have led to frustration and distrust of services. MMIS country teams and their MOH counterparts designed BCC materials to remind and support health workers about desirable practices, for example: posters and job aids to reinforce key practices; and posters for prescribers and their patients to enhance the acceptance of oral alternatives to injections.

Increasingly over time, the project added communication activities to reach community members with targeted safe injection messages.

A variety of outlets were used to directly reach community members: print materials to be posted in the community; radio spots and jingles, interactive community theater; and engagement of community volunteers to discuss rational injection use, injection safety, and safe sharps waste management.

Partnerships

A hallmark of MMIS' approach has been to actively enlist the support of governments and institutions whose commitment to injection safety would last beyond the life of the project. Advocacy – that is, actions directed towards decision-makers to support policies, positions, and programs— in combination with compelling data was needed initially to convince health officials that injection safety was an important public health issue justifying the use of their human, financial, and material resources. Throughout the project, advocacy was used at the local, regional, and national levels for specific purposes; for example, in Nigeria, advocacy strategies were successfully used to engage a high-profile national leader to take an active role in discouraging the use of unnecessary injections.

The specific partnerships forged by the project varied from country to country; some examples are described in other sections of this report. MMIS/Nigeria partnered with the Institute of Human Virology and the group, ACTION, to increase the dissemination of messages and materials on injection safety. In Mozambique, advocacy with the Division of Nursing in the MOH resulted in a change to more effective, on-the-job training on injection safety. In Ethiopia, partnering with journalists served to build the capacity for active and

After implementing MMIS interventions to reduce patient preference for injections, only 14% of patient respondents in Mozambique preferred injections over oral medication, 31% in Nigeria and 39% in Uganda. While this is a statistically significant decrease from 50%, 38%, 58% (respectively), patient preference for injections remain high and this is an area where additional progress can be made.

accurate reporting on injection-related issues. MMIS/Uganda partnered with community organizations to carry out orientation workshops to increase community understanding of injection safety.

Results/Achievements

To measure the change in the knowledge, attitudes and practices of patients, healthcare workers, and the community, questions were incorporated into the health facility assessments. Small gains were made in the areas of patient-provider communication but major gains were made among patients understanding what proper injection safety is.

In addition, the use of unnecessary injections appears to have decreased as a result of project interventions, particularly when coupled with changes in treatment guidelines. A review of prescriber practices in Uganda indicated a drop in prescribing of injections that coincided with a change in the standard treatment protocol for malaria that uses an oral form of medication. Similarly, in Mozambique, a change in standard treatment protocol from injected to oral medication for sexually transmitted infections was associated with a decline in use of injections.

Unmet Need/Recommendations

Given the high level of staff turnover at health facilities, the improvements in health worker performance related to injections will need ongoing attention. Initial training will need to be reinforced through institutionalized new employee orientation and supportive supervision on injection safety to help health workers overcome the obstacles they face in providing safe injections. More emphasis needs to be placed on the importance of provider-patient interaction.

With regard to reaching communities and promoting rational use of injections, far more work is needed to build on the inroads that MMIS made in this area. The project's initial, limited mass media and community-based face-to-face efforts will need to be expanded and mainstreamed into the activities of other projects and organizations that are working to reduce HIV transmission. To truly expand efforts in this area, work could be done through the involvement of NGOs, to engage injection providers in the informal health sector – whose injections are likely to be far more dangerous than those provided by public sector health personnel.

Innovative Video Vans Spread Injection Safety Messages in Uganda

Reaching rural populations with behavior change communication messages aimed at raising awareness about safe and necessary injections was a challenge. In Uganda, many communities are far from urban centers and lack electricity, which made reaching men, women, and children in rural areas with effective injection safety messages difficult. In Uganda, MMIS developed a community video that focused on seeking early treatment, use of oral formulations instead of injections when appropriate, the importance of completing the dose of oral medication, and appropriate sharps waste management. To reach rural communities, MMIS used “video vans” or mobile units that traveled to villages, set up a large screen and powerful sound system, and projected the video in community film shows. This means of distribution proved effective in capturing the attention of many community members who might otherwise be unexposed to BCC messages on injection safety. The video was initially launched in March of 2006 with over 40 screenings during a month-long period.



A mobile video van in Uganda sets up to share injection safety messages with community members.

VI. IMPROVING HEALTH CARE WASTE MANAGEMENT

Baseline

Stakeholders conducted national assessments of injection safety and health care waste management (HCWM) in 2003/2004 using the WHO rapid assessment tool. The assessments identified major health care waste management challenges, which generally included lack of policies to support HCWM; no systematic planning nor budgeting at central or local levels; poor segregation of medical waste at the point of generation; lack of safety boxes for sharps waste in curative settings; limited HCWM infrastructure including waste treatment and safe disposal options; poor public and occupational awareness of the risks associated with health care waste; and lack of personal protective equipment (PPE) for health workers. In the first project year, MMIS conducted in-depth assessments in project districts on waste management to begin planning for targeted interventions.

Actions/Interventions

With the widespread introduction of non-reusable needles and syringes and the rapid scale-up of HIV/AIDS prevention and treatment activities through programs like PEPFAR, the volume of contaminated health care waste has substantially increased in recent years. Contaminated needles in medical waste pose a risk of needle stick injury and HIV infection to patients, health workers and the community. The project has worked at the global, national, regional, and local levels to introduce best HCWM practices and build policy and high-level prioritization for HCWM. Experience with locally-appropriate systems for waste segregation, handling, treatment, and disposal has helped MMIS countries identify practical approaches that consider staff, equipment, and financial limitations. These experiences have been applied as MMIS worked with



stakeholders to develop national policy and planning processes appropriate for each country's context.

Planning and Coordination: MMIS provided technical support to conduct country waste management assessments and assisted national injection safety working groups to form HCWM committees by facilitating coordination among key stakeholders. Linkages were made with global partners such as WHO, GAVI, and World Bank to fund HCWM planning and policy development. In countries where funding was limited for national planning activities, MMIS focused on raising awareness among stakeholders by sharing resources and materials and, where possible, supporting attendance at strategic regional or international HCWM meetings. MMIS countries conducted national HCWM planning and training activities to raise awareness among stakeholders of the importance of medical waste issues and helped countries develop detailed plans for improving

MMIS trained waste handlers in the segregation and safe disposal of medical waste as well as the use of personal protective equipment.

MMIS HCWM strategies implement a number of core best practices. A composite indicator, 'satisfactory waste disposal', is made up of no loose waste inside, no loose waste outside and no pierced or overflowing boxes anywhere. With MMIS interventions, this indicator significantly improved in Mozambique and Nigeria from 41% and 61% at baseline to 94% and 76% after MMIS interventions (respectively).

waste management systems. MMIS countries used south-to-south collaborations to share experiences and lessons learned.

For most countries, planning and budgeting for the real costs of waste management is a challenge. MMIS worked with country partners to develop action plans and consider the realistic one-time and recurrent costs for HCWM. A sample costing tool was developed for Nigeria, with country specific data, to assist in their ongoing planning. In order to encourage budget allocations for HCWM, MMIS, along with local partners, advocated to decision-makers for the inclusion of safety boxes, color-coded bins and liners, and PPE on the essential supplies list in order to be available in the national medical stores and for use of credit lines to purchase these commodities.

Infrastructure and Commodities: Because the HCWM infrastructure was overall inadequate in all MMIS countries, a key project strategy was to identify improvements that could be implemented without the purchase of HCWM treatment options such as new incinerators or autoclaves. One of the most valuable approaches was establishing well-defined segregation systems.

Segregating infectious health care waste from general non-infectious health care waste reduces the health risks as well as the cost by reducing the volume of waste that required treatment before final disposal.

Because Uganda's waste management system does not rely on transportation of waste, activities focused on strengthening simple systems at the facilities for final disposal of waste. This involved the installation of protected medical waste pits. Ethiopia improved the performance of existing incinerators and all four countries provided the training and supplies required to properly segregate and incinerate infectious waste to reduce incinerator emissions. Maintenance was undertaken by MOH partners in each country for selected incinerators with preparation of associated ash/needles pits as well as installation of fencing to ensure disposal areas were secure.

Training: MMIS focused on the training of health care workers at the district and state levels during the first phase of the project. Waste handlers and health workers were trained in key aspects of waste management such as minimizing waste and proper segregation of waste. An injection safety training manual, *Do No Harm*, and supporting materials were developed and adapted for use in each country context and serves as the basis of the training.

Technical guidance: MMIS has collaborated closely with WHO to refine global HCWM policy. In collaboration with WHO, MMIS country staff and their counterparts from Ministries of Health and Ministries of Environment reviewed WHO-endorsed approaches and identified those systems most appropriate to MMIS countries. This included harmonizing information provided by WHO to countries on appropriate solutions, such as

incineration. MMIS's work and experiences strongly influenced WHO's HCWM guidelines, *"Management of Waste from Injection Activities at District Level"*.

Partnerships

National-level efforts to bring partners together to address the challenge of health care waste management (HCWM) have involved government ministries, WHO, the World Bank, and international donors as well as local non-governmental organizations (NGO) and other partners. MMIS successfully built partnerships to support the implementation of HCWM systems in each of the four MMIS countries. Guidelines were introduced to all MMIS country directors to help identify approaches in developing a national HCWM strategy. MMIS has been a catalyst in applying for and utilizing GAVI (formerly the Global Alliance for Vaccines and Immunization) funds to develop national health care waste management plans, bringing major stakeholders together to develop a strategy and action plan for improving HCWM in the four USAID-funded countries. Both Uganda and Ethiopia received GAVI funds to facilitate national HCWM plan development. MMIS has assisted countries to identify new funding mechanisms to support HCWM infrastructure and capacity building. The MMIS countries assisted their MOH counterparts with technical input in setting up waste management for measles campaigns. WHO/Nigeria, the European Union Partnership for Reinforcing Immunization Effort (EU/PRIME), and the National Program on Immunization (NPI) sent a consultant on a fact-finding mission to MMIS project sites as part of a proposed collaborative intervention for waste management in six states.

Results/Achievements

Planning and

Coordination:

National HCWM management plans were developed in Ethiopia, Mozambique, Nigeria, and Uganda in collaboration with the MOH and Ministry of Environment (MOE). Plans have also been drafted and/or implemented for the state, district, and/or facility levels, depending on the country.

To further strengthen local capacity building in planning and implementation of HCWM activities, MMIS provided assistance to governments and local partners in the review and standardization of existing HCWM guidelines. Review meetings with other districts or regions in countries were used to share experiences, lessons learned, and improve the implementation of interventions.

Recognizing the importance of HCWM and the need for integrating it into other PEPFAR programming, several USAID missions have supported expansion of the HCWM approach modeled by MMIS. The USAID/Uganda and Nigeria Missions provided additional funds to MMIS to provide technical assistance to other PEPFAR implementing partners in the area of HCWM.

On a broader level, MMIS staff has been integral to the advancement of the Infection Prevention and Control Africa Network (IPCAN) which



Since MMIS interventions, Dr. Hayiluu Abarra, Medical Director, Bishoftu Hospital in Ethiopia feels "Our health care waste management system has changed dramatically. A waste segregation system is in place, on site storage has improved, and the final disposal area is maintained and fenced."

Collaboration Between PEPFAR Partners Improves Health Care Waste Management in Uganda

In Uganda, health care waste management was not articulated well in the country's second National Health Sector Strategic Plan and has historically been a low priority. In addition, PEPFAR projects that generated infectious waste did not have specific policies on HCWM. Although efforts were in place to address HCWM, they were often fragmented, uncoordinated and had limited impact at the facility level. With the addition of routine HIV-related activities, like those of NUMAT, health facilities had to manage increasing volumes of infectious waste, further worsening the dire waste management. A study conducted by Makerere Mbarara University in Uganda revealed that over 90% of reported exposures to infectious fluids were related to sharps medical waste, including contaminated needles used in medical injections.

To address the situation, the MOH developed a policy requiring all programs that generate medical waste to include waste management in their interventions. The MMIS project in Uganda was tasked by USAID with the responsibility of providing HCWM technical assistance to PEPFAR projects. To date, MMIS has provided technical assistance to 16 PEPFAR partner organizations in Uganda. MMIS has supported these organizations as they incorporate HCWM into program work plans. MMIS has offered each PEPFAR partner rapid HCWM assessments; competency-based training of trainers; identification of minimum standards for waste segregation bins, safety boxes, and personal protective equipment (PPE); and facilitation of district-level planning to coordinate partner and MOH efforts.

held its seminal meeting in Kampala in September 2009. This network provides the sort of regional capacity to be an ongoing resource for countries that have not benefitted from MMIS activities.

Infrastructure and commodities: Safety boxes for disposal of sharps are now routinely used for all injections in all countries as well as color-coded segregation of infectious and non-infectious waste. To facilitate the purchase of medical waste segregation supplies and PPE for improved health worker safety, MMIS developed specifications for countries to use as a guideline for in-country purchase of supplies and equipment to assure long-term sustainability of these recurrent costs.

In Uganda, MMIS provided technical assistance to Makerere University and MOH partners on their incinerator designs and operations. This resulted in a locally-manufactured stainless steel incinerator, the Mak IV. MMIS has provided technical assistance to local partners in the rehabilitation of existing incinerators in addition to training on the routine maintenance of incinerators.

Training: MMIS training interventions have resulted in the improvement of healthcare worker practices of properly segregating healthcare waste. These practices are essential to protecting patients, providers, and the community, and also a key step in assuring the proper treatment and final disposal of healthcare waste.

Percent (%) of Healthcare Facilities that Practice Proper Waste Segregation		
	Before MMIS Intervention	After MMIS Intervention
Mozambique	22%	94%
Ethiopia	25%	46%
Nigeria	11%	52%
Uganda	46%	81%

In addition to the training of health care workers on HCWM issues, MMIS specifically sought to train the cadre of waste handlers since they are critical in assuring good HCWM practices at health care facilities. This is a group of personnel, who typically has been overlooked in the health care system. MMIS developed an innovative and interactive, hands-on training to meet the needs of waste handlers, who are generally low-literacy personnel.

Sustainability: Awareness-raising efforts and regional planning in various countries have resulted in local municipal councils and district health teams taking over responsibility for planning and management of health care waste. Building on the PEPFAR partnership, revised district planning meetings have been held in Uganda to incorporate HCWM planning into the national health sector strategic plan and routine MOH annual planning guidelines. Relationships have been built in Uganda with the plastics recycling industry to link them with hospitals in Kampala to set up systems to collect valuable plastics waste that is appropriate for recycling.

Unmet Need/Recommendations

While the global interest in addressing HCWM has progressively increased over the life of the project, financial allocations in HCWM generally remain low. As major vertical programs bring in large quantities of diagnostic and treatment supplies, it is essential to plan for how those supplies will be safely disposed of after use. Advocacy is needed to plan and budget for HCWM supplies including safety boxes, PPE, segregation equipment, and final treatment technologies in all health programs. Mechanisms need to be identified for equitable sharing among the health program implementers for the ongoing costs to create, strengthen, and maintain HCWM systems. Improved, cleaner, and more affordable technologies are needed to treat infectious waste.

In all the MMIS countries, support is still needed to district and state health officials to create terms of reference, action plans, and budgets for infection control committees in order to support implementation of the national HCWM plans. The countries would benefit from continued technical assistance to the MOH and MOE to support the implementation of the national plans. Additional effort is needed to expand the work that began with PEPFAR Partners to raise awareness and meet the demand for training/re-training in HCWM.

VI. FUTURE DIRECTIONS

Current Situation

Over the life of the project, MMIS has produced impressive results in its mission to ensure that every injection given is necessary and safe for patients, health care workers, and their communities. Through MMIS' work, significant contributions have been made to the goal of preventing the medical transmission of HIV and other bloodborne infections. Population level data comparing baseline injection safety to injection safety after MMIS interventions, shows results that are statistically significant in improving injection safety. As a result of this investment, health care worker safety has improved, more patients are receiving safe injections, and the community's awareness of injection safety has increased.

In the four USAID-funded countries of Ethiopia, Mozambique, Nigeria and Uganda, MMIS worked with local counterparts and, particularly ministries of health, to foster a supportive environment that provided the foundation for accomplishments related to injection safety. These partnerships have been an essential part in the local ownership of injection safety activities and will continue to be critical for long-term sustainability of injection safety. MMIS' advocacy work, that targeted key decision-makers at local, regional/district, and national levels on injection safety issues, has enabled each country to further broaden their base of support and make significant achievements in the area of policy development, implementation of best practices, system strengthening and behavior change.

At the end of five years, local support and awareness of injection safety is strong. USAID missions and host country governments recognize the positive, cross-cutting contribution injection safety has made in strengthening health systems, protecting health

care workers, and creating safer environments for providers, waste handlers, patients and their surrounding communities. Support and awareness have resulted in additional funding from USAID missions for the safe injection programs in Ethiopia, Nigeria, and Uganda.

“After the MMIS training and support our work changed dramatically. Professional and non-professional staff were made aware of injection safety”

Maru Mergia, CEO of Arba Minch Hospital.

Unfinished Agenda

While MMIS has made much progress over the last 5 years, including laying the foundation for improved injection practices, the area of injection safety continues to evolve and expand, and additional work remains to be done. Through its work, the project with its country-level partners and stakeholders has contributed substantive experience on safe injection practices and field-tested programmatic approaches for implementing safe injection interventions. This information has not only benefited the four USAID countries, but also the wider global safe injection community. Below are some key recommendations on future directions for injection safety work:

- **Support logistics and commodity management** and budget mobilization efforts. Proper procurement and management of injection equipment plays an important role in assuring injection safety.
- **Institutionalize capacity-building efforts** to support current and future healthcare workers with injection safety training and pre-service training, supervision, and job aids. Use one-on-one approaches like on-the-job

training to address high staff turnover and the need to orient new healthcare workers who have not yet had injection safety training. Assure that the resources to support capacity-building are available.

- **Strengthen health care facilities' capacity in health care waste management** throughout the HCWM cycle from the point of waste generation to final disposal. To operate effectively, this cycle relies on resources for personnel as well as infrastructure and continued advocacy efforts at local, regional, and national levels.
- Encourage all healthcare programs, including donor-funded programs, to **critically assess the health care waste their program creates and to integrate HCWM approaches and resources to safely and effectively manage the waste**. Access to technical support by these health programs at the country level is extremely important in identifying and quantifying HCWM needs, training requirements, and the infrastructure needed to implement HCWM interventions.
- **Gather further information on phlebotomy practices** in low-resource settings and use data to inform strategies to promote safe phlebotomy practices.
- **Strengthen basic infection prevention practices**, particularly through hand washing.
- Provide **personal protective equipment for health workers, particularly waste handlers**. In follow up assessments after MMIS interventions, waste handlers who reported having access to the minimum required personal protective equipment was 20%, 45%, and 55% for Ethiopia, Nigeria and Uganda respectively.

- Provision of **universal access to hepatitis B vaccination and Post-Exposure Prophylaxis (PEP)** for health care workers. Full protection to providers from hepatitis B still lags. The follow-up MMIS assessments revealed that the percent of providers protected from hepatitis B were: 0% in Mozambique, 1% in Ethiopia, 46% in Nigeria and 4% in Uganda. In Uganda and Mozambique only 30% of MMIS facilities reported PEP availability in MMIS follow-up assessment.

- **Expand injection safety messages to the wider community and patients** to decrease unnecessary injections, increase patient advocacy, and strengthen a patient's communication with health care providers. In the follow-up MMIS health facility assessment, 86% of patients in Mozambique still preferred injections over oral medications; a similar preference was revealed in Nigeria (69%) and Uganda (60%).

Ultimately, a key lesson learned throughout the project was the need to **integrate injection safety** across health program as a key component of any health program that seeks to protect patients, providers and communities. Additionally, it is essential to assure that countries that want to conduct initial injection safety assessments have **access to technical assistance**. The MMIS project has developed many valuable injection safety tools, training curricula, and other resources that are accessible to the global community. However, these resources should ideally be complemented by technical assistance to identify best ways to adapt and implement them in country-specific contexts.

Making Medical Injections Safer (MMIS)
John Snow, Inc.
1616 North Ft. Myer Drive, 11th Floor
Arlington, VA 22209 USA
Phone: 703-528-7474
Fax: 703-528-7480
www.mmis.jsi.com