PREVENTING THE MEDICAL TRANSMISSION OF HIV IN ZAMBIA

FINAL EVALUATION REPORT

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AD	Auto-disable
BCC	Behavior Change Communications
DHMT	District Health Management Team
FGDs	Focus Group Discussions
GRZ	Government of the Republic of Zambia
HP	Health Post
HIV	Human Immunodeficiency Virus
IP	Infection Prevention
IS	Injection Safety
M&E	monitoring and evaluation
MISP	Zambia Medical Injection Safety Project
MOH	Ministry Of Health
PEPFAR	President's Emergency Plan for AIDS Relief
PEP	Post-exposure prophylaxis
PPE	Personal Protective Equipment
RHC	Rural Health Center
SIGN	Safe Injection Global Network
UHC	Urban Health Centre
WHO	World Health Organization

SECTION ONE

Background

The World Health Organization (WHO) estimates unsafe administration of injections in health care settings is responsible for 8 to 16 million cases of hepatitis B infections, 2.3 to 4.7 million cases of hepatitis C, and 80,000 to 160,000 cases of HIV infections annually.[1] In response to this crisis the WHO, in collaboration with partners from the Safe Injection Global Network (SIGN), developed an intervention strategy aimed at reducing the incidence of unsafe and unnecessary injections. The main areas of focus of the SIGN are:

1. Behavior change of health care workers and patients to ensure safe injection practices and reduce unnecessary injections.
2. Ensuring availability of equipment and supplies.
3. Managing medical waste safely and appropriately.

Zambia was one of 15 priority countries identified in the President's Emergency Plan for AIDS Relief (PEPFAR) for preventing the spread of HIV infections. In 2004, in accordance with PEPFAR activities aimed at eliminating the preventable medical transmission of HIV, Chemonics International — in partnership with Jhpiego and the Manoff Group — began implementing the Zambia Medical Injection Safety Project (MISP). The project focuses on improving systems and practices related to infection prevention and injection safety (IP/IS). Since 2004 Chemonics has expanded the project to a national scale, with the MISP team providing training, procurement, follow-up and supportive supervision, and behavior change communication (BCC) programs in health care facilities in all 72 districts of the nine provinces of Zambia.

A. Statement of the Problem

The Global Burden of Health study conducted by the World Health Organization in collaboration with the Ministry of Health in 2000 (unpublished) showed that despite improvements in injection safety practices in Zambia, there were still gaps in knowledge, attitudes and practices among health care providers and the community at large that increase the risk of transmission of HIV and other blood-borne diseases. A baseline assessment of injection safety practices conducted by the Zambia Medical Injections Safety Project and the Ministry of Health (MOH) in May 2006 revealed that, notwithstanding improvements in specific areas, injections were frequently administered improperly and that the quality of the sharps boxes was often inadequate. A midterm evaluation conducted by the project in collaboration with the MOH in June 2008 also revealed areas requiring further attention.

B. Purpose

To assess the extent to which the project met its long-term objectives and to identify areas in which attention still needs to be paid.

[1] World Health Organization. WHO/EHT/04.04 Safety of Injections. Global Facts and Figures.

C. Objective

The main objective of the final evaluation was to assess progress over time compared to results from the baseline evaluation conducted in May 2006. To achieve this objective the evaluation specifically looked at:

1. Availability of IP/IS equipment and methods of managing stock-outs
2. IP/IS practices of health care providers
3. Availability of equipment/materials for the collection, transportation, and elimination of waste
4. Procedures and practices related to medical waste injection management activities
5. Availability and accessibility of reference documents (national policy, standards, guidelines) in health facilities
6. Experiences related to IP/IS in health facilities and the community of those patients (parents/families of those patients) who will have received injections on the day of the survey

D. Methodology

Before commencing the research exercise, an orientation meeting was convened between the Client (Chemonics International/MISP) and the Consultants (University of Zambia) at which the Client elaborated on the vision for the assignment. Issues pertaining to sample selection, tools for data collection, duration of the assignment, and logistics were discussed. The Consultants then carried out a review of the baseline and midterm reports as well as the end-of-evaluation research protocol. The documents, together with the monitoring and evaluation plan developed by the MISP team, gave the Consultants the necessary background information on MISP.

Sixteen research assistants (with a combination of social science and medical backgrounds) were recruited and trained to assist the Consultants in data collection. The Consultants and MISP staff facilitated a one-day training workshop on March 28, 2009 at the University of Zambia. They introduced IP/IS concepts and trained the research assistants to accurately observe IP/IS practices.

The research assistants were divided into three data collection groups by district (Chingola, Monze, and Solwezi). During the baseline evaluation the MISP team picked Chingola, Monze, and Solwezi to survey because of their representation of urban versus rural settings and the diversity of health facilities accessible in each district. These same districts were surveyed to ensure comparability of results.

D1. Data Collection

Data collection activities were conducted between April 1 and April 15, 2009 and involved an inventory of district facilities, provider observations, and interviews with in-charges, prescribers, providers, and waste handlers.

The survey team collected data in 63 health facilities in Chingola, Solwezi, and Monze through purposive selection (meaning a non-representative non-random convenience sampling method): 13 health facilities (1 district hospital and 12 health centers/health posts) in Chingola, 20 health facilities (1 district hospital and 19 heath centers/health posts) in Monze, and 30 health facilities (1 district hospital and 29 health centers/health posts) in Solwezi.

Before data collection, the teams presented themselves at the District Health Management Team (DHMT) offices in each district and held meetings with the district directors of health. At these meetings, maps of all the health facilities in each district were given to the teams and plans on how to execute the assignment were discussed. Immediately after the meetings, the teams went into the field to commence data collection. Each team was assigned a district focal point person who was familiar with the location of the facilities as well as the terrain in the study sites.

Both quantitative and qualitative data were collected to inform the evaluation, using the same questionnaires from the baseline and midterm evaluations, to ensure comparability across studies. A number of data collection methods including direct observation, face-to face interviews, and focus group discussions were used. The main sources of information/data included: procurement/stores managers in charge of IP/IS equipment, medications, and vaccines; injection prescribers; injection providers; facility managers (in-charges); waste handlers; and patients receiving services at the facility at the time of the survey. The breakdown of sources of information and tools in the three sites is presented below.

Table 1. Number of Observations Collected Per Collection Tool and Districts Visited

Tool	Total at Baseline	Total at Midterm	Total at Final Disaggregated by District			Total at Final
			Chingola	Monze	Solwezi	
Facility inventory observations	**59**	**69**	13	20	30	**63**
Injection provider interviews	**162**	**83**	22	22	33	**77**
Injection provider observations	**146**	**208**	65	79	35	**179**
Injection prescriber interviews	**97**	**83**	19	26	30	**75**
Supervisor interviews	**73**	**77**	15	20	30	**65**
Interviews with waste handlers	**77**	**66**	13	20	30	**63**
Client/patient exit interviews	**282**	**247**	60	71	76	**207**
Focus group discussions	**9**	**9**	3	3	3	**9**

A total of 738 activities (487 interviews, 179 observations, 63 inventories, and 9 focus group discussions) were conducted to provide data for the final evaluation.

D2. Data Management

To ensure data quality, all questionnaires were checked for errors and consistency on the day of administration before being entered into the database. Each team had one person designated for data entry so that data entry started in the field to ensure completion of the evaluation within the stated time. Each data-collection activity was led by a team leader with a medical background. Their role was to participate in and closely supervise the data-collection exercise. There were daily meetings to discuss the events of the day and plans for the next day. The Lead Consultant travelled to Chingola on April 3, 2009 to ensure quality data collection and check for progress in the field. He also participated in some of the daily preview and review meetings. The team used thematic analysis for qualitative data and the Statistical Package for Social Sciences (SPSS) software for quantitative data analysis.

D3. Limitations

The baseline survey was conducted in May 2006. When the baseline survey was designed, budgetary and time constraints limited surveying to three districts. The three districts allowed comparison between urban and rural settings in districts that had yet to receive MISP activities but would be eventual recipients and which possessed all types and levels of health facilities. However, the locations chosen and the sample sizes surveyed were not statistically representative samples of the entire population and were never intended as such. The team was attempting to gain some understanding of IP/IS activities in Zambia and gaps in knowledge, practices, and behaviors. In much the same way, the data gathered during the final evaluation is an attempt to identify trends in infection prevention and injection safety and highlight areas still requiring further attention, but should not be interpreted as representative of the situation in Zambia as a whole.

Interventions in the three districts occurred after the baseline evaluation, between 2006 and 2007. The midterm evaluation was not conducted until spring 2008 and the final evaluation in spring 2009. It is difficult to make meaningful comparisons or analyze trends with such a short time lapse in between the midterm and final evaluations, and for that reason the midterm evaluation has not been included in this report.

Similar constraints of budget and time also resulted in the MISP team having to utilize the Consultants services, introducing a possible element of bias to the data collection and interpretation process, as the Consultants were not as familiar with the data collection instruments and definitions as the original surveyors. However, the MISP team, having worked closely with the Consultants, can with a degree of confidence say that the information provided is in line with current literature on the subject and illustrates that while progress is being made, injection safety continues to be an important issue and requires further attention in Zambia to meet international standards.

SECTION II

FINDINGS

A. Overall Performance Indicators

As a PEPFAR recipient, the MISP project regularly reports on the following medical injections indicators:

- Average number of injections per person per year for persons age 15-49 years
- Proportion of individuals age15-49 reporting that their last health care injection was given from a syringe set from a new, unopened package
- Number of health care providers trained in IP/IS

The number of health care providers trained was recorded through project training activities and therefore not directly measured through evaluation studies. The remaining PEPFAR indicators were explored through exit interviews of patients at health care facilities.

A1. Average Number of Medical Injections per Person per Year

The average number of injections per person per year was found to be 2.96 (as shown below in Table 2). The average number of injections received by any person in the three age group categories per year has increased for both the 0-14 and the 15-49 age groups from the baseline survey, although a decrease was noticed in the 50+ age group.

Table 2. Average Number of Medical Injections per Person per Year by District, Facility Type, Age Group and Gender

Study	Age Group	District			Facility				Gender		Overall
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	Male	Female	
Base-line	0-14 (n=100)	0.40	1.68	2.32	1.89	0.50	2.00	3.38	2.28	1.48	**1.91**
	15-49 (n=118)	0.91	1.05	3.20	2.06	0.60	3.67	1.64	1.49	2.67	**2.18**
	50+ (n=27)	0.00	1.07	4.90	0.82	0.00	13.33	3.33	3.05	1.50	**2.46**
Final	0-14 (n=38)	3	2	3	3.40	1.71	6	4	2	3.57	**2.66**
	15-49 (n=151)	2.4	3.1	3.86	3.38	2.58	3.4	3.38	3.78	2.68	**3.01**
	50+ (n=18)	1	0	3	3	1	0	0	3	2.33	**1.33**

Increases within age groups were witnessed in all districts, though decreases were most noticeable amongst the 50+ age group within hospital settings.

A2. Proportion of Persons Age 15-49 Reporting Last Injection Was Given With a Syringe/Needle from a New, Unopened Package

Like many other countries in the sub-Saharan region, Zambia has also adopted PEPFAR and WHO protocols where use of single-use needles and syringes is encouraged. Table 3 provides information on the proportion of patients receiving injections from new, unopened packages, and Table 4 shows the proportion of facilities reusing needles and syringes.

Table 3. Proportion of Patients 15-49 Years of Age Reporting Last Injection Given With a Syringe/Needle from a New, Unopened Package

Study	District (%)			Facility (%)				Overall (%)
	Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Baseline (n=59)	100	100	97.2	100	100	92.9	100	**98.3**
Final (n=207)	100	100	100	100	100	100	100	**100**

Table 4. Proportion of Facilities Reusing Needles and Syringes for Injection

Health care worker	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Reuse of syringes or needles for immunization injection	**Baseline (n=59)**	0	0	0	0	0	0	0	**0**
	Final (n=63)	7.7	0	0	2.2	0	0	0	**2.5**
Reuse of syringes or needles for curative injections	**Baseline (n=59)**	0	0	0	0	0	0	0	**0**
	Final (n=63)	7	0	6.7	6.7	0	0	0	**4.4**

A significant success in injection safety promotion is evidenced by the 100 percent of patients 15-49 reporting that they received their last injection from a new, unopened package. There was a slight increase in the number of facilities witnessed to be still reusing syringes and needles for immunization and curative injections (2.5 percent and 4.4 percent respectively). It is the hypothesis of the researchers that this is a sampling error. It is also important to note that the trend predominates in rural health centers, suggesting a need for further interventions in harder-to-reach areas.

A3. Post-Exposure Prophylaxis Provision and Immunization against Hepatitis B

Administration of injections by health personnel exposes them to blood-borne diseases such as HIV/AIDS and hepatitis B. This evaluation prioritized the need to obtain information on the number of health facilities providing post-exposure prophylaxis (PEP) and the percentage of health care workers immunized against Hepatitis B in response to the emphasis placed on the importance of this indicator by the project. Close to half (42.6 percent) of health facilities in this survey as reported by supervisors and more than half (62.4 percent) the surveyed facilities reported by providers themselves state that PEP is provided, well above the target of 40 percent of providers providing PEP.

Table 5. Facilities/Departments Providing Post-Exposure Prophylaxis to Staff after Injury

Health care worker	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Supervisors reporting facilities provide PEP to staff	Baseline (n=67)	53.9	34.6	32.1	12.2	33.3	92.3	85.7	**37.3**
	Final (n=64)	71.4	40	16.7	20.9	61.5	100	50	**42.6**
Providers reporting facilities provide PEP to staff	Baseline (n=143)	43.2	57.5	51.5	38.2	19.1	84.2	100	**51.5**
	Final (n=69)	81.8	77.8	27.6	39.4	32.5	100	80	**62.4**

While the overall trend shows improvements in the percentage of providers and supervisors reporting PEP from baseline to final, a decrease in the percentage of providers and supervisors reporting PEP provided to staff was noticeable in Solwezi. This is especially relevant because of the high number of rural health centers in Solwezi and because the complexity of traveling and accessing these centers makes routine provision for these facilities difficult.

Approximately 13 percent of health facilities reported offering hepatitis B immunization at final evaluation, up from 2.7 percent at baseline, which is a noticeable increase. However, up-take of hepatitis B immunization decreased from 10.7 percent to 3.3 percent among health care providers, with a moderate increase witnessed among waste handlers. Due to time constraints, survey teams were not able to confirm results from supervisors against a registry of immunizations or health care workers medical records, so reporting is based on perception, which may not be accurate.

Table 6. Supervisors Reporting Hepatitis B Vaccine Provided to Facility Staff

Health care worker	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Supervisors reporting Hepatitis B vaccine provided to staff	Baseline (n=71)	15.4	0	0	2.3	16.7	0	0	**2.7**
	Final (n=63)	26.7	11	3.3	9.3	14.3	20	0	**13.3**

Table 7. Proportion of Health Workers Immunized Against Hepatitis B

Health care worker	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Health care provider	Baseline (n=159)	25.6	9.3	2.7	8.2	28	7.3	0	**10.7**
	Final (n=65)	6.6	0	3.3	2.3	0	20	100	**3.3**
Waste handler	Baseline (n=77)	0	3.7	0	0	0	0	12.5	**1.3**
	Final (n=62)	7.7	0	3.3	4.8	0	0	0	**3.7**

In the case of health care providers immunized against hepatitis B, the sample size surveyed at final was approximately 40 percent smaller, making comparison of these results difficult. One hypothesis for the lower number of health care providers immunized against hepatitis B at the time of the final survey is that staff attrition may have resulted in those initially immunized moving on, and a lack of sensitization of new people to the importance of immunization upon arrival at the new facility.

B. Commodity Management and Procurement

MISP worked closely with the MOH to build capacity in the financing, procurement, and distribution of appropriate levels of injection equipment. The result has been systematic data collection on the stock of injection equipment available at health facilities. Information collected includes stock-outs of IP/IS equipment, quantities of injection equipment available, quantities of puncture-proof safety containers in stock, availability of personal protective equipment, and standard procurement systems used by health facilities.

B1. Stock-Outs of IP/IS Equipment

The project monitored stock levels of essential IP/IS equipment — including disposable syringes, disposable needles, auto-disabled (AD) syringes, and sharps boxes — that should be continuously available at all facilities. The final evaluation indicated a sharp decrease in stock-outs of IP/IS equipment compared to the baseline (disposable syringes stock-outs dropped from about 45.2 percent to 9 percent).

Table 8. Percent of Facility Supervisors Reporting Stock-Outs of IP/IS Equipment

Equipment	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Disposable Syringe	Baseline (n=73)	30.8	36.7	60	46.7	16.7	46.2	55.6	**45.2**
	Final (n=68)	13.3	0	13.8	11.7	14.2	0	0	**9**
Disposable needles	Baseline (n=73)	15.4	41.4	55.2	45.5	16.7	46.2	37.5	**42.3**
	Final	NA	NA	NA	NA	NA	NA	NA	**NA**
AD Syringes	Baseline (n=61)	20	36.4	44.8	32.6	50	33.3	100	**37.7**
	Final (n=68)	13.4	0	6.7	4.7	14.2	0	0	**6.7**
Sharps Boxes	Baseline (n=65)	50	44	70	47.6	50	90.9	66.7	**56.9**
	Final (n=68)	20	5	6.8	7	14.2	25	0	**10.6**

Table 9. Percent of Facility Supervisors Reporting Stock-Outs of IP/IS Equipment during Final Evaluation

Equipment	Length	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Disposable Syringes and needles	Never	86.7	100	82.8	100	100	100	100	**89.8**
	Less than 1 month	13.3	0	6.9	0	0	0	0	**6.7**
	More than 3 months	0	0	1	0	0	0	0	**0.3**
AD Syringes	Never	86.6	100	92.9	95.3	84.6	100	100	**93.2**
	Less than 1 month	6.7	0	7.1	4.7	7.7	0	0	**4.6**
	More than 3 months	6.7	0	0	0	7.7	0	0	**2.2**
Sharps Boxes	Never	80	95	93.2	93	85.7	75	100	**89.4**
	Less than 1 month	13.3	5	3.4	4.7	7.1	0	0	**7.2**
	More than 3 months	6	0	3.4	2.3	7.1	0	0	**3.1**

Whereas information in the baseline was collected separately for needles and syringes, the final evaluation instrument combined the two instruments making comparison among the survey points difficult. What was captured, however, were instances of stock-outs of IP/IS equipments for cases categorized as "never," "less than one month," and "more than three months." The majority of health institutions indicated that they never run out of syringes and needles (Table 8). From Table 9, it is possible to see that with the

exception of Solwezi, most health facilities surveyed did not experience stock-outs of any essential equipment of more than three months.

B2. Availability of Sufficient Injection Equipment

Tables 10 and 11 present information on health providers reporting availability of sufficient quantities of injection equipment and puncture-proof safety containers at their health facilities in study districts.

Table 10. Percent of Providers Reporting Sufficient Quantities of Injection Equipment Available

Equipment	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
New, single-use syringes and needles available	Baseline (n=161)	90.1	95.5	93.2	95.3	96.2	85.4	100	**93.2**
	Final (n=77)	100	100	97	100	97.5	100	50	**99**
Sharp boxes available to safety dispose of sharps	Baseline (n=161)	61.4	63.6	24.7	50.6	80.8	19.5	11.1	**45.3**
	Final (n=77)	100	100	96.2	97.1	100	100	100	**98.7**

Almost all health facilities (99 percent) reported having sufficient quantities of new, single-use syringes and needles available with the exception of a noticeable decrease in mission hospitals (from 100 percent to 50 percent).

Table 11. Quantities of Puncture-Proof Safety Containers Observed In Stock

Number of puncture-proof safety containers	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
0	Baseline	77.8	50	42.3	45.5	55.6	100	75	**50.9**
	Final	7.7	10.5	3.3	6.8	8.3	0	0	**7.2**
1-4	Baseline	10	17.4	46.2	30.4	33.3	0	0	**28.8**
	Final	23.1	26.3	23.3	20.5	33.3	0	0	**24.2**
5-9	Baseline	0	26.1	3.9	15.2	0	0	0	**11.9**
	Final	0	10.5	26.7	22.7	0	0	0	**12.4**
10-20	Baseline	11.1	8.3	7.7	9.1	11.1	0	0	**8.5**
	Final	30.8	26.3	26.7	29.5	0	0	50	**27.9**
20+	Baseline	0	0	0	0	0	0	0	**0**
	Final	50	50	44	44	58.3	100	100	**47.1**

Similarly, 98 percent of health facilities have sharp boxes available, with only 7.2 percent of facilities having no puncture-proof safety containers available, down from 50.9 percent at baseline. There was a noticeable percentage decrease in the stocking of 1-4 puncture-proof safety containers from baseline, however in all other denominations there were

noticeable increases, with 47.1 percent of health facilities reporting having more than 20 puncture-proof safety containers. It is important to point out that at baseline no hospitals had zero puncture-proof containers.

B3. Availability of Personal Protective Equipment (PPE)

The availability of uniforms, surgical gloves, gumboots, face masks, and plastic aprons improved significantly between baseline and final evaluation (as seen in Table 12), indicating an increased demand for PPE among health care workers and the recognition of its importance by facility managers and those procuring the equipment. There was a decrease in the availability of some personal protective equipment such as heavy duty gloves, utility gloves, and examination gloves. The availability of heavy duty gloves decreased from 49.2 percent to 27.3 percent, and from 88.1 percent to 35.8 percent in the case of examination gloves, between baseline and final evaluation.

Table 12. Availability of Personal Protective Equipment to Health care Workers

Personal Protective Equipment	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Uniform	Baseline (n=59)	100	12.5	19.2	81.8	77.8	50	25	**28.8**
	Final (n=63)	53.8	60	30	40	58.3	50	100	**47.9**
Surgical gloves	Baseline (n=59)	77.8	37.5	46.2	43.2	66.7	50	50	**47.5**
	Final (n=63)	46.2	30	76.7	60	41.7	100	50	**51**
Gumboots	Baseline (n=59)	0	20.8	7.7	13.6	0	0	25	**11.9**
	Final (n=63)	38.5	80	36.7	46.7	50	100	100	**25.1**
Facemasks/ Goggles	Baseline (n=59)	0	8.3	7.7	6.8	0	0	25	**6.8**
	Final (n=63)	38.5	15	30	24.4	16.7	100	100	**22.8**
Heavy duty gloves	Baseline (n=59)	88.9	41.7	42.3	40.9	77.8	50	75	**49.2**
	Final (n=63)	38.5	85	43.3	55.6	41.7	100	100	**27.3**
Utility gloves	Baseline (n=59)	77.8	41.2	42.3	40.9	66.7	50	75	**47.5**
	Final (n=63)	30.8	30	30	26.7	33.3	100	50	**20.3**
Examination gloves	Baseline (n=59)	88.9	95.8	80.8	86.4	88.9	100	100	**88.1**
	Final (n=63)	30.8	50	76.7	62.2	33.3	100	100	**35.8**
Plastic aprons	Baseline (n=59)	11.1	12.5	11.5	9.1	11.1	50	75	**11.9**
	Final (n=63)	30.8	85	60	62.2	50	100	100	**30.3**

As a result of interventions made by the MISP project, demand for much of the equipment above increased as health care workers became sensitized to the importance of PPE in protecting themselves and their patients. This is witnessed in the decrease in

availability of all types of gloves (with the exception of surgical gloves), which is not surprising considering the frequency that gloves are used in a health care setting.

B4. Procurement Systems

There are two procurement systems often used by health service providers — the push system and the demand-based system. (In some instances both systems are used). Because of its responsiveness to the needs of the individual institution, the MISP project advocated use of the demand-based system during trainings and follow-up supervision visits to health facilities. The push system relies on pre-determined assessments of what is needed by a facility usually during planning stages, but is not necessarily as responsive to changing needs and demands.

Table 13. Procurement Systems Used by Health Facilities as Reported by Facility Managers

Procurement system	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Push System	Baseline (n=72)	7.7	0	3.33	2.2	0	7.7	0	**2.7**
	Final (n=65)	0	35	3.3	14	7.1	0	0	**12.8**
Demand-Based	Baseline (n=72)	92.3	100	90	95.6	100	84.6	100	**93.1**
	Final (n=65)	100	45	83.3	69.8	85.7	100	100	**76.1**
Both	Baseline (n=72)	0	0	6.7	2.2	0	7.7	0	**2.7**
	Final (n=65)	0	20	13.3	16.3	7.1	0	0	**11.1**

Despite efforts of the MISP project, the MOH continues to rely on centralized procurement systems that may not be addressing the needs of health facilities adequately. Data presented in Table 13 shows an increase in the percentage of health facilities using the push system, from about 2.7 percent at baseline to 12.8 percent at final evaluation. Given the decrease in the use of demand-driven systems between the baseline and final evaluation (93 percent to 76 percent), more needs to be done to support systems that are responsive to individual facilities' needs.

C. Capacity Building and Training

The project aimed to improve health workers' practices through capacity building and by reinforcing best practices.

C1. Health Care Providers' Behavior

Noticeable improvements were seen in important hygiene behaviors, with a marked increase in the number of health care providers observed washing hands before injection (up from 26.4 percent at baseline to 73.6 percent at final evaluation) and after injection

(up from 35.5 percent to 71 percent). In addition, safe disposal of sharps in boxes was observed 99.6 percent of the time at final evaluation. Also, the proportion of health care providers observed leaving a needle inserted in the vial for multiple doses dropped from 42.9 percent at baseline to 29 percent at final evaluation.

The proportion of health care providers observed recapping increased from 12.6 percent at baseline to about 17 percent at final evaluation. It is possible that evaluators did not understand that recapping is often necessary in surgical and dental procedures and that the project promoted one-hand recapping. This is a serious data limitation.

Table 14. Observed Behaviors by Health Care Providers

Behavior/ Practice	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Patient shown new needle/syringe	Baseline (n=146)	43.2	56.4	50	54.2	50	39.4	57.1	**46.6**
	Final (n=179)	40	40	57.1	37.5	46.1	9.1	65.2	**45.7**
Recapped after injection	Baseline (n=143)	23.7	11.1	6.7	6.4	8	27.3	28.6	**12.6**
	Final (n=179)	38.5	6.3	5.7	9.4	28.9	36.4	0	**16.8**
Disposal in sharps box	Baseline (n=130)	60.6	84.1	79.2	87.8	83.3	37.5	62.5	**76.2**
	Final (n=179)	100	98.7	100	100	100	100	96.3	**99.6**
Hands washed before injection	Baseline (n=144)	23.7	32.6	23.3	28.2	8	33.3	37.5	**26.4**
	Final (n=179)	86.2	71.8	62.9	70.3	78.9	63.6	80.8	**73.6**
Hands washed after injection	Baseline (n=138)	39.5	41.3	25.9	36.7	24	36.7	37.5	**35.5**
	Final (n=179)	90.6	45.3	77.1	63.5	77.3	72.7	54.2	**71**
Needle left inserted in vial	Baseline (n=120)	61.8	26.8	42.2	37.3	47.6	52	42.9	**42.5**
	Final (n=179)	27.7	22.2	37.1	61.9	59.2	36.4	52.4	**29**

Comparisons by facility type indicate that the proportion of injection providers observed showing a patient a new needle or syringe dropped significantly in all types of health facilities, except mission hospitals, between 2006 and 2009. The proportion of health care providers observed recapping increased from 6.4 percent to 9.4 percent in rural health centers and from 8 percent to 28.9 percent in urban health centers, although the proportion declined in hospitals from 28.6 percent to 0 percent during the reference period. Furthermore, the proportion of injection providers observed leaving a needle inserted in a vial for the purpose of drawing several doses decreased overall. However, in rural health centers, urban health centers, and mission hospitals, increases were noted between 2006 and 2009.

Encouragingly, the proportion of health care providers disposing needles/syringes in sharps boxes increased significantly from 87.8 percent, 83.3 percent and 37.5 percent (in rural health centers, urban health centers, and hospitals, respectively) to 100 percent. At mission hospitals, the increase was from 62.5 percent to 96.3 percent between baseline and final evaluation. Also encouraging is the finding that the proportion of health care workers observed washing hands before and after giving an injection increased in all facility types.

C2. Needle-Stick Injuries

The project aimed to reduce the incidence of needle-stick injuries among health care workers, while simultaneously creating an environment in which workers readily report needle-stick injuries and receive appropriate care to mitigate disease transmission. The proportion of health care providers reporting needle-stick injuries dropped from an average of 17.6 percent at baseline to 6.6 percent at final evaluation. The drop in the proportion of health care providers reporting needle-stick injuries was particularly remarkable in Monze, where it dropped by more than 23 percentage points between baseline and final evaluation, compared to 4.5 and 7.8 percent drops for Chingola and Solwezi, respectively.

Table 15. Proportion of Health Care Workers Interviewed Reporting Needle-Stick Injuries

Position	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Health care provider	Baseline (n=159)	13.6	27.9	13.9	18.1	11.5	14.6	44.4	**17.6**
	Final (n=77)	9.1	4.5	6.1	2.5	8	16.7	20	**6.6**
Waste handler	Baseline (n=76)	0	7.7	3.3	4.4	0	0	14.3	**3.9**
	Final (n=63)	7.7	10	3.3	7.3	7.1	0	0	**7**

As shown in Table 15 the incidence of needle-stick injuries increased among waste handlers from 3.9 to 7 percent between baseline and final evaluation. Traditionally support staff are forgotten in the compliance of safety measurements and are not always supported properly. They often lack sufficient provision of PPE and do not feel empowered to advocate for themselves.

C3. Use of Personal Protective Equipment

The use of PPE by auxiliary staff (waste handlers) — including uniforms, gumboots, facemasks, heavy duty gloves, and plastic aprons — all increased during facility inspections, which again suggests an increase in demand. However, as noted previously, the ability of facilities to meet demand through their procurement systems still needs to be improved. Again availability of examination gloves, utility gloves, and overalls declined by 46.1, 17.1, and 75.7 percentage points respectively, suggesting a continued need to address procurement issues for some of the more in-demand equipment.

Table 16. Use of Personal Protective Equipment in Sharps Disposal by Auxiliary Staff as Observed During Facility Inspection

Personal protective equipment	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Uniform	Baseline (n=55)	100	12.5	30.8	20.5	77.8	100	50	**33.9**
	Final (n=63)	61.5	30	43.3	42.2	41.7	100	50	**44.9**
Overalls	Baseline (n=55)	100	83.3	100	93	100	100	75	**93.2**
	Final (n=63)	15.4	20	17.2	13.3	16.7	100	50	**17.5**
Gumboots	Baseline (n=55)	11.1	12.5	15.4	13.6	11.1	0	25	**13.6**
	Final (n=63)	53.8	75	56.7	66.7	41.7	100	50	**61.8**
Facemasks	Baseline (n=55)	0	0	7.7	4.6	0	0	0	**3.4**
	Final (n=63)	23.1	5	23.3	15.6	16.7	50	50	**17.1**
Heavy duty gloves	Baseline (n=55)	66.7	20.8	42.3	31.8	66.7	50	25	**37.3**
	Final (n=63)	46.2	80	46.7	60	41.7	50	100	**57.6**
Utility gloves	Baseline (n=55)	44.4	16.7	34.6	27.3	44.4	50	0	**28.8**
	Final (n=63)	0	15	20	20	0	0	0	**11.7**
Exam Gloves	Baseline (n=55)	44.4	70.8	73.1	75	55.6	50	25	**67.8**
	Final (n=63)	7.7	20	36.7	28.9	16.7	0	0	**21.7**
Plastic Aprons	Baseline (n=55)	0	4.2	3.9	4.6	0	0	0	**3.4**
	Final (n=63)	15.4	80	56.7	60	33.3	50	100	**50.7**

D. Behavior Change Communication

D1. Health Care Providers' Perception of Patient Treatment Preference

One of the objectives of the project has been to reduce demand for and provision of unnecessary injections by changing the beliefs of providers and community members that injections are more effective than oral medications. Injection prescribers and providers perceived that their patients' preference for injections decreased (see Table 17). It is difficult to determine what percentage of this decrease is directly attributable to the behavior change communication initiatives undertaken by the project and is a measure of

providers' perception of patient preferences, and not actual patient preferences, as shown in Table 18.

Table 17. Percent of Providers Reporting Patient Preference for Injections When Presenting With Febrile Illness

Provider	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Injection providers reporting patient preference	Baseline (n=148)	62.5	38.5	58	52.6	70.8	54.1	22.2	**54.1**
	Final (n=77)	45.5	33.3	56.3	47.4	44	83.3	20	**45**
Injection prescribers reporting patient preference	Baseline (n=96)	75	39	66.7	59.7	75	41.7	30	**56.3**
	Final (n=75)	36.8	38.5	63.3	50	47.4	40	50	**45.9**

D2. Patient Treatment Preference

Table 18 presents findings on patients' preference for injections versus an equivalent oral medication. The findings indicate no significant difference in patient preference for injection between the time of the baseline and final evaluations.

Table 18. Percent of Patients Reporting Preference for Injections over Oral Medications

Preference	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Preferred Injection	Baseline (n=170)	64.1	53.9	44.6	48.3	73.3	47.1	37.5	**51.2**
	Final (n=207)	51.7	54.9	4.61	45.2	52.4	63.6	53.8	**50.9**

Examination of focus group discussions supports the evidence that a significant proportion of patients still prefer injections. As detailed below, patients' responses to the question of preference show a multitude of reasons for why there may not have been significant change in this indicator.

Figure 1. Results of Focus Group Discussion Suggesting Patient Preference for Injection

- Feel that the injections are more powerful and better.
- "We want injections to heal quickly."
- "We prefer injections because injections are stronger, work faster with almost 100% of curing common diseases."
- Injections are better especially on children because they tend to vomit when they take drugs orally.
- Injections are stronger and always work better than oral drugs.
- All injections are better and heal faster, because the medicine goes directly to the blood.
- When patients are given injections, they quickly recover, even when people are treated for malaria or TB.
- Oral drugs are not as effective as injections.
- Injections and IV-fluids are better for patients who cannot swallow.
- Injections and IV-fluids go directly to the blood and therefore work faster.
- "We prefer injections because they are very effective."

Diseases for which injections were believed to be particularly effective include TB, malaria, diarrhea, sharp pains, syphilis, rash, sores, snake bites, dog bites, crocodile bites, toothache, pain in the waist area, bilharzias, abscesses, and blood in the stool. Injections are also believed to be more effective for patients who are weak or very ill, have difficulties in swallowing oral medicines, such as those who vomit after taking oral medications, and children.

The conclusion that patients prefer injections is further supported by an increase in the proportion of injection prescriptions from 39.7 percent in 2006 to more than half (50.9 percent) in 2009. On the other hand, oral medication prescriptions dropped from 50.5 percent to 33.6 percent between 2006 and 2009. The rest of the results are presented in Table 19.

Table 19. Treatment Prescribed to Patients Interviewed

Treatment	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Injection	Baseline (n=277)	43.8	32.7	44	21.7	33.3	59	21.7	**39.7**
	Final (n=207)	51.7	54.9	46.1	45.2	52.4	63.6	53.8	**50.9**
Oral	Baseline (n=277)	37.5	57.7	49.6	52.8	50	30.8	65.2	**50.5**
	Final (n=207)	40	42.3	18.4	25	40.5	27.3	38.5	**33.6**
Both	Baseline (n=277)	16.7	9.6	6.4	7.9	16.7	7.7	13	**9.4**
	Final (n=207)	8.3	2.8	35.5	29.8	7.1	9.1	7.7	**15.5**
None	Baseline (n=277)	2.1	0	0	0	0	2.6	0	**0.4**
	Final (n=207)	0	0	0	0	0	0	0	**0**

Patient perception is difficult to change in as short a timeframe as the implementation period. The literature supports the fact that globally, the use of injections has completely overtaken the real need, reaching proportions no longer based on rational medical practice.[2] Patients often feel that if they have traveled long distances or have waited a long time to meet with a doctor they should receive an intervention, and they associate receiving an injection as proper treatment despite what might be medically advised (see Table 20). This ultimately puts pressure on providers.

Table 20. Patients Who Received an Injection Reporting That Provider Suggested the Treatment

Provider	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Health care provider suggested injection	Baseline (n=133)	100	95.2	100	97.6	100	100	100	**98.5**
	Final (n=207)	31.7	15.5	38.3	32.1	25	54.5	19.2	**28.5**

At baseline, the proportion of health facilities in which project-developed BCC materials were appropriately displayed was reported at 46.6 percent. Appropriate display means the messages were not displayed in combination with different health messages, enough space was provided between messages, and there was a balance between text and graphic materials for non-literate patients. By 2009, at the time of final evaluation, this proportion had increased to about 86 percent (Table 21).

Table 21. Percent of Facilities in Which BCC Materials Were Appropriately Displayed

	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hospital	Mission Hosp.	
Appropriate display of BCC material	Baseline (n=70)	61.5	33.3	53.3	37.8	33.3	76.9	55.6	**46.6**
	Final (n=63)	73.3	100	84.2	90.6	76.9	80	50	**85.8**

The percentage of patients who reported they had seen or heard about BCC messages related to injection safety increased by almost 5 percentage points from 54.1 percent in 2004 to 59 percent in 2009 as seen below.

Table 22. Percent of Patients Reporting That They Had Heard or Seen BCC Messages about Injection Safety

	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Patients exposed to IP/BCC message	Baseline (n=27)	41.3	78.4	38.5	60.1	38.9	31.6	68.2	**54.1**
	Final	65	47.9	64.5	67.5	59.5	27.3	46.2	**59**

[2] Gisselquist, D; Rothenberg, R; Potterat, J; Drucker, E. "HIV Infections in Sub-Saharan Africa Not Explained by Sexual or Vertical Transmission," *International Journal of STD & AIDS*, 2002; 13: 657-666.

	(n=207)								

Despite a dramatic decrease in the percentage of providers suggesting injections (see Table 20 above) and increases in the numbers of patients reporting that they have been exposed to BCC messages, it is clear that more interventions are needed to curb the demand for unnecessary injections.

E. Medical Waste Management

The study looked at medical waste disposal in the 63 health facilities and noted that there was a reduction in the incidence of overflowing sharps containers (from 10 percent at baseline to 5.9 percent at final). It was interesting to observe that there was a reduction in the presence of sharps in facilities' immediate surroundings, from 22 percent at baseline to 0 percent at final evaluation. There was also an improvement in the securing of disposal sites from 22 percent to 35.8 percent at end of evaluation. There was also a marked improvement in the labeling of disposal sites from 1.7 percent at baseline to 34.8 percent at end of evaluation.

Table 23. Percent of Health Facilities with Satisfactory Disposal of Used Injection Equipment

Observation	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Sharps in open containers	Baseline (n=59)	0	33.3	15.4	20.5	0	0	75	**20.3**
	Final (n=63)	0	0	10	4.4	8.3	0	0	**3.3**
Overflowing sharps containers	Baseline (n=59)	11.1	4.2	15.4	9.1	11.1	50	0	**10.2**
	Final (n=63)	7.7	10	0	2.2	16.7	0	0	**5.9**
Presence of used sharps in immediate surroundings	Baseline (n=58)	44.4	4.2	30.8	15.9	55.6	50	0	**22**
	Final (n=63)	0	0	0	0	0	0	0	**0**
Secured disposal site	Baseline (n=59)	22.2	20.8	26.9	20.5	11.1	100	50	**23.7**
	Final (n=63)	23.1	80	43.3	54.5	25	100	100	**35.8**
Properly labeled disposal site	Baseline (n=59)	11.1	0	0	0	0	50	0	**1.7**
	Final (n=63)	20	61.1	23.3	40.5	16.7	50	100	**34.8**

In terms of sharps waste disposal methods, it was observed that open burning in a hole or enclosure was the primary method used (51.7 percent), followed by incineration (24.7 percent). The collection of waste by a hired contractor was also becoming a common method of waste disposal, increasing from zero to 10.3 percent.

Table 24. Primary Methods Used for Sharps Waste Disposal

Disposal practice	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
Open burning on the ground	Baseline (n=59)	44.4	45.8	15.4	25.0	55.6	0.0	75.0	**32.2**
	Final (n=63)	0	25	0	12.2	0	0	0	**8.3**
Open burning in a hole or enclosure	Baseline (n=59)	22.2	25.0	42.3	36.4	33.3	0.0	0.0	**32.2**
	Final (n=63)	38.5	50	66.7	58.5	50	0	33.3	**51.7**
Incineration	Baseline (n=59)	55.6	20.8	11.5	13.6	33.3	100.0	50.0	**22.0**
	Final (n=63)	30.8	20	23.3	22	21.4	100	33.3	**24.7**
Burial	Baseline (n=59)	0.0	0.0	7.7	2.3	11.1	0.0	0.0	**3.4**
	Final (n=63)	0	0	0	0	0	0	0	**0**
Dumping in a pit latrine or other secure pit	Baseline (n=59)	11.1	50.0	7.7	25.0	11.1	0.0	75.0	**25.4**
	Final (n=63)	0	5	6.6	4.8	0	0	33.3	**3.9**
Dumping in an unsupervised area	Baseline (n=59)	0.0	8.3	23.1	18.2	0.0	0.0	0.0	**13.6**
	Final (n=63)	0	0	3.3	2.4	0	0	0	**1.1**
Collected by contractor	Baseline (n=59)	0	0	0	0	0	0	0	**0**
	Final (n=63)	30.8	0	0	0	28.6	0	0	**10.3**

The study has established that sharps disposal is becoming a priority at most health facilities surveyed. However, it was also noted that in some facilities the different types of waste were not segregated, and once outside the facility the waste was thrown into the same shallow pit. Sometimes it would be partially burned or (partially) buried. Information/education is only one factor that can address this problem. Lack of clear norms, lack of implementation follow-up and supervision, lack of recognizable, adequate waste bins for waste segregation, and a lack of space around the facility for proper elimination are but a few barriers that can be ascribed to this situation.

Technologies are available for the treatment and disposal of wastes. Their use can be controversial, however, particularly when the type chosen depends more on the economics of the system than on environmental performance. A lack of adequate funding remains a serious issue, particularly for publicly operated hospitals. Frequently the budgets are stretched. As a result, managers naturally look at what offers the best performance for the money available.

F. Policy Environment

To establish a policy environment that ensured the availability of relevant guidelines and adequate resources for safe injection practice, MISP worked with the Ministry of Health to make IP/IS guidelines available at all facilities and to integrate the policies into their standard operating procedures.

Table 25. National IP/IS Guidelines Implemented at the Facility Level

Action Plan	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
IP/IS guidelines available	Baseline (n=71)	42.2	50	47.7	46.7	66.7	46.2	44.4	**48**
	Final (n=75)	40	90	94.7	88.2	61.5	40	100	**74.9**
Health care waste management guidelines available	Baseline (n=66)	38.5	26.7	6.7	11.1	16.7	38.5	44.4	**20.6**
	Final (n=75)	60	68.4	33.3	50	57.1	40	0	**53.9**

Of the supervisors interviewed, 74.9 percent indicted the availability of IP/IS guidelines at their facilities, an increase of 26.9 percent since the baseline study.

The availability of health care waste management guidelines has also showed a significant increase, from 20.6 percent at baseline to 53.9 percent at end-line. One of the project's major challenges, however, is to get IP/IS in the top priorities of the MOH so that it is also budgeted for and activities related to IS are included in the routine work plans and supervisions.

G. Monitoring and Evaluation

MISP worked with the Ministry of Health at the district and facility levels to establish a system for continuous monitoring and evaluation of injection safety.

The study has established that 74.4 percent of the supervisors interviewed indicated that their facilities had an M&E plan in place to monitor the IP/IS activities, compared to 31.5 percent at baseline.

Table 26. Supervisors Reporting That Facility Has an M&E Plan to Monitor IP/IS and Other Practices

Action	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
M&E in place to monitor activities	Baseline (n=73)	46.2	36.7	20	26.7	66.7	23.1	44.4	**31.5**
	Final (n=65)	80	83.3	60	70.7	78.6	80	50	**74.4**

A significant number (83 percent) of the supervisors reported that IP/IS activities had been incorporated in their action plans.

Table 27. Supervisors Reporting IP/IS Activities in Current Facility Action Plans

Action plan	Study	District (%)			Facility (%)				Overall (%)
		Chingola	Monze	Solwezi	RHC	UHC	Hosp.	Mission Hosp.	
IP/IS activities in action plan	Baseline (n=62)	38.5	70	43.3	53.3	66.7	23.1	88.9	**53.4**
	Final (n=65)	100	90	60	72.1	92.9	100	50	**83.3**

SECTION III

DISCUSSION AND CONCLUSIONS

A. Overall Performance Indications

There have been considerable successes and challenges for the project as witnessed in the overall performance indicators.

The number of injections has increased by about 1 injection per person per year for both males and females, resulting in an average of 2.96 injections per person per year. The averages obtained in the survey were slightly above the national average of less than 1 medical injection per person per year, as suggested in the 2007 Zambia Demographic Health Survey. Differences in sample population and sample size can account for much of the difference in estimates. Other factors include the inability of the project, due to limited resources and time, to provide continuous supportive supervision to each district, resulting in a lack of reinforcement of positive IP/IS messages.

In addition, private sector promotion of injections and injection equipment and the proliferation of immunization and vaccination campaigns can send mixed messages about the necessity and effectiveness of injections. Ultimately patient preference plays a large part in the demand for injections, but changing perception and preference will also be one of the hardest and slowest changes to effect.

It was encouraging to note that there was remarkable improvement in the percentage of people between 15-49 years of age reporting having been given an injection with a syringe/needle from a new, unopened package, and that the results were consistent across all districts.

There was a slight trend, particularly in Solwezi district, of needle reuse, suggesting that rural facilities continue to be a cause for concern and require further attention. The literature suggests that up to 70 percent of rural facilities in some provinces in Zambia are managed by Classified Daily Employees who lack the education and training to implement hygiene best practices and encourage behavior change among patients.[3]

The project was unable to provide training in all rural health centers and hoped that districts could scale up efforts and that information would trickle down, but many of the facilities remain difficult to access or visit routinely both for the project and for DHMTs.

In the area of PEP and hepatitis B vaccinations, there is a general record of improvement between the baseline and the final evaluation. More supervisors reported offering PEP to health personnel at the final evaluation compared to the baseline. Similarly there are more health care providers reporting that the facility offers PEP now compared to the baseline (51.5 percent at baseline compared to 62.4 percent at final evaluation). There seems to be a gradual decrease in hepatitis B vaccinations for health workers but a slight increase for

[3] Ministry of Health HRIS Data Base 2004–2005 and National Health Strategic Plan 2006.

workers who handle health waste. These data point to mixed achievements. These areas will be improved when the MOH develops and actively promotes policy recognizing PEP and hepatitis B as integral components of the IP/IS policy and provides adequate resources and budget to support implementation.

B. Commodity Management and Procurement

The case of commodity management procurement has also posted both successes and challenges. Few health facilities are currently experiencing stock-outs of essential IP/IS commodities, which is a significant improvement: Close to half (45 percent) of health facilities reported stock-out of disposable syringes and needles at baseline, the current overall stock-outs of the same equipment is now 9 percent. Furthermore, health facilities have recorded an increase in the quantities of new single-use syringes and needles and the availability of sharp boxes and puncture-proof containers for the period of the project. This is an example of the successes made during the entire project. Another critical aspect of achievement in terms of commodity management procurement is the availability of personal protective equipment for health workers. It is worth noting that there has been a general improvement of availability of personal protective equipment except for examinations gloves, which have seen a decrease from close to 90 percent at baseline to just about 35 percent at final evaluation.

C. Capacity Building

There have been a number of successes during the project's lifespan from 2006 to 2009 in the area of capacity building. Notable among these have been increases in the proportion of: health care providers observed washing hands before and after injection (from 26.4 percent to 73.6 percent and from 35.5 percent to 71 percent, respectively); safe disposal of needles (from 76 percent to 99.6 percent); and health care providers reporting needle-stick injuries (from 17.6 percent to 6.6 percent at final evaluation). Also the proportion of health care providers observed leaving needles inserted in the vial for multiple doses dropped from 42.5 percent to 29 percent during the reference period.

D. Behavior Change Communication

In the area of BCC the project showed improvements in: the proportion of health facilities in which BCC materials were appropriately displayed (from 46.6 percent to 86 percent); and (b) the percentage of patients who reported they had seen or heard about BCC messages related to infection prevention (from 54.1 percent to 59 percent) between 2006 and 2009.

There still remain some challenges, including the fact that (a) the proportion of health care providers observed recapping increased from 12.6 percent to about 17 percent at final evaluation, (b) a significant proportion of injection providers (45 percent) and prescribers (45.9 percent) still believe that patients prefer injections when they present with febrile illness, and (c) there was no significant difference in patient preference for injections between 2006 (51.2 percent) and 2009 (50.9 percent). Probably as a consequence of the above, there was an increase in the proportion of injection

prescriptions from 39.7 percent in 2004 to more than half (50.5 percent) between 2006 and 2009. On the other hand, oral medication prescriptions dropped by almost 17 percentage points (16.9 percent) between 2006 and 2009.

Another worrisome finding is that the incidence of needle-stick injuries increased among waste handlers from 3.9 to 6.6 percent between baseline and final evaluation, although the proportion reporting needle-stick injury at midterm was 1.6 percent among this group. Also, although needle-stick injuries among health care providers reportedly dropped from 17.6 percent to 6.6 percent between 2006 and 2009, this drop is far below desirable levels. The increase in needle-stick injuries and modest decline in the same among health care providers could probably be attributed to the observed decline in the use of personal protective equipment, particularly examination gloves and utility gloves as a result of increased demand and decreased availability. The proportion of health care providers observed using these personal protective equipment declined quite significantly by about 46.1 and 17.1 percentage points, respectively.

In focus group discussions, providers and patients alike said it was more risky to receive unneeded shots than to accept oral prescriptions. However, in individual interviews providers and prescribers acknowledged feeling a lot of pressure from clients to receive injections, particularly when a patient had traveled long distances to receive treatment or had waited a long time to be seen by a doctor.

E. Conclusions and Recommendations

After five years of implementation of the Medical Injection Safety Project (MISP), the evaluators have acknowledged that there are some important conclusions that can be drawn from the data collected.

Hand-washing practices before and after injections improved considerably. This single practice is still a big challenge in most important hospitals in the world, including the United States and Europe. The Ministry of Health should continue targeting this simple approach to guarantee continued prevention of infections.

Provision of hepatitis B vaccine for health care workers and waste handlers also requires increased attention and commitment from the MOH. As provision has not become standardized policy, individual facilities must prioritize and budget for these vaccines in their annual budgets. National policy would help facilities in making funds available to procure prophylaxis for their staff.

Increases in the provision of PPE for health care workers and waste handlers were witnessed across facilities and show an improvement in the commitment of facility supervisors to the protection of their staff. However, it is clear that availability still does not match demand. The MOH should re-invigorate the demand-based procurement system — giving provincial and district offices autonomy in their procurement plans — and push for budgets that allow facilities to provide PEP to their staff. These plans should be prepared using data produced by their health information systems. This practice could introduce important efficiencies in their systems and allow managerial teams to use

resources in a more efficient way. In addition, it is important for continue advocating for PPE for waste handlers, as they are often unable to advocate for themselves but are continuously at risk as a result of the nature of their job.

It is important to recognize that behavior change is a process that requires long-term investment. Important setbacks occurred between the baseline and the final evaluation as a result of a lack of repeated and continuous supportive supervision to reinforce behaviors. The MOH should discuss the results with the provincial and district offices to identify strategies that can allow DHMTs to address preferences, perceptions, and practices between providers and patients in terms of unneeded injections versus oral treatments. In the planning process of these campaigns, providers from the private sector should be included to analyze different messages used by them in the promotion of some devices and treatments. It would be interesting to do policy research on the effects of immunization and vaccination campaigns on patient perception of efficacy of injections and uptake.[4] The area of incentives and recognition should be addressed with providers and policy makers. For those facilities and providers that have reduced the number of unneeded injections, special recognition campaigns could be designed and promoted to highlight best practices.

It is clear that the MISP project has contributed significantly in the training and follow-up of different cadres of human resources. But it was also evident that important shortfalls still exist. Many of these are produced because of the high mobility of already-trained staff to more attractive posts. To mitigate this effect, the MOH should use the inventory of trained human resources that MISP shared with provincial and district managers to design systems and put them in place before these movements occurred. It is also recommended that the information collected during the life of the project be shared by the MOH with other donors and agencies, especially those that will be working with retention schemes. That way, cadres already trained in IP/IS could remain working, especially in the hard-hit rural areas.

[4] World Health Organization. WHO/EHT/04.04 Safety of Injections. Global Facts and Figures.