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PRESCRIPTION RECORD REVIEW STUDY IN NIGERIA

MAKING MEDICAL INJECTIONS SAFER PROJECT STUDY REPORT

SEPTEMBER 2009

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MMIS
Making Medical Injections Safer

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PRESCRIPTION RECORD REVIEW STUDY IN NIGERIA

MAKING MEDICAL INJECTIONS SAFER
PROJECT STUDY REPORT

Abstract: The United States President's Emergency Plan for AIDS Relief (PEPFAR), through the US Agency for International Development (USAID), has funded John Snow, Inc. (JSI) for the implementation of the Making Medical Injections Safer (MMIS) project on injection safety in Nigeria. JSI and its partners are responsible for implementing other, similar projects in 10 other countries in Africa and the Caribbean. This report compares the results from prescription records from baseline and follow-up study periods to assess the level of unnecessary injections at five sentinel site health centers.

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Making Medical Injections Safer is implemented by JSI Inc. in collaboration with the Program for Appropriate Technology in Health (PATH), the Academy for Educational Development (AED), and the Manoff Group.

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ACRONYMS

ACTs	Artemisinin-based combination therapies
AKTH	Aminu Kano Teaching Hospital
HIV	Human immunodeficiency virus
IRB	Institutional Review Board
JSI	John Snow, Inc.
LASUTH	Lagos State University Teaching Hospital
LUTH	Lagos University Teaching Hospital
MMIS	Making Medical Injections Safer
MoH	Ministry of Health
OPD	Outpatient department
OPS	Outpatient services
PEPFAR	President's Emergency Plan for AIDS Relief
PRR	Prescription Record Review
SIGN	Safe Injection Global Network
STI	Sexually transmitted infection
USAID	US Agency for International Development
WHO	World Health Organization

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EXECUTIVE SUMMARY

USAID's Making Medical Injections Safer (MMIS) project supports Nigeria's Ministry of Health to strengthen injection safety practices by replacing injections that are not medically necessary with non-injectable medications, as appropriate. The goal of this effort is to reduce the risk of accidental needle stick injuries, hence also reducing the cost of syringes and the commodity management system, eliminating the need for patients to return to the facility for follow-up injections, and reducing the amount of sharps waste to be managed.

This study was designed to collect information before and after interventions to reduce the unnecessary use of injectable medications. The main objective is to assess prescription patterns and to measure whether training and policy changes have had any effect in reducing the use of injectable medications. Relevant project interventions include training health care workers, such as doctors who prescribe medication to patients, about general injection safety principles. Training includes, but is not limited to, the risks posed to workers and community by prescribing injectable medications, compared with the benefits of prescribing oral medications when they are an equally effective treatment. An additional external factor to consider is that a major Nigerian government television and grassroots campaign to discourage unnecessary injections took place at the study sites before the follow-up study period.

The study is based on the prescription and administration of medications as recorded in five health facilities' outpatient department (OPD) registers.[1] The study collected baseline information for the period from August 2004 to January 2005 and follow-up data from August 2007 to January 2008, after MMIS health care worker training activities had taken place. Stock records were also collected for both study periods to assess the availability of injectable and non-injectable medications. These additional data were used to assess whether shortages in these commodities could be influencing the prescription patterns for injectable versus non-injectable medications. Finally, prescribers were interviewed in the follow-up assessment about their perceptions and practices related to injectable and non-injectable medications. Only OPD records in hospitals and large health centers were reviewed, to minimize the complexities inherent in analyzing cases admitted for inpatient care that might have required injectable medications for reasons that would not necessarily be fully documented in the patient registration records. This should facilitate the analysis as to which injections were likely to be medically necessary.

Initial visits were made to five study sites to collect data from one study period, and low overall injection prevalence rates were found. The MMIS team explored the feasibility of going back to collect data for an earlier baseline to measure possible reductions since then, and found that this approach was only possible in three out of the five facilities, because of non-availability of patient records. Records were reviewed for the six months of both study periods, as possible, as described in the study protocol. Records were evenly sampled from each one of the six months. The **study on records reviews** was carried out as planned, with a total overall sample of 3,165 patient records collected and used for analysis.

The strategies to reduce unnecessary use of injectable medications ranged from managerial measures to training health care providers about the use of non-injectable medications and standard treatment guidelines. The study showed a statistically significant reduction, from 9.6% (±1.81%) at baseline to 3.6% (±0.97%) at follow-up, with an odds ratio of 0.35. Therefore, a patient at baseline was 1.65 times more likely to have been prescribed an unnecessary injection than at follow-up.

This study found the age group 5–14 years to be prescribed more unnecessary injectable medications than any other. However, all age groups showed a decrease in unnecessary injections prescribed over time.

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[1] Study facilities: (1) Lagos University Teaching Hospital (LUTH), Idi-Araba, Surulere; (2) University of Benin Teaching Hospital, Benin City; (3) Aminu Kano Teaching Hospital (AKTH), Kano; (4) Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos; and (5) State House Medical Centre, Aso Villa, Abuja.

Male patient records showed a slightly higher rate of prescriptions for unnecessary injectable medications at baseline, but both genders were prescribed a lower percentage, and about the same amount, at follow-up.

The bulk of the evidence from the two study periods does not show a strong relationship between prescription of injectable medications and supply shortages. The use of injectable medication decreased slightly over time, although availability of medication stocks was generally high during both periods. Furthermore, the availability of injectable medications was higher during the follow-up study period, suggesting that the reduction in the use of injectable medicines was due to changes in treatment practices, not in supplies of medications.

Finally, the prescriber interview results show that most doctors at public government teaching hospitals believe that non-injectable medicines are as effective as injectable medications. Furthermore, patients need to be educated about risks associated with injectable medications, and counseled to choose non-injectable medicines as appropriate when they are an equally effective treatment.

1. INTRODUCTION

According to the World Health Organization (WHO), 8–16 million cases of hepatitis B, 2.3–4.7 million cases of hepatitis C, and 80,000–160,000 of HIV infections are caused each year worldwide by the use of unsafe injections. High-risk practices are the reuse of syringes, improper sterilization of needles, and improper disposal of equipment. On the other hand, overprescription of injectable medications exacerbates infection transmission because more injections mean more materials to be disposed of, more opportunities for accidental needle sticks, and a greater need for new sterile devices to ensure safe injections. Given these facts, WHO and its partners (the Safe Injection Global Network [SIGN]) developed an intervention strategy aimed at reducing injections and promoting the administration of safe injections. The SIGN core intervention areas 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; and
3. Managing waste safely and appropriately.

With the exception of vaccination programs, safe injections and waste management had not received proper attention from governments and development partners until recently. The Making Medical Injections Safer (MMIS) project, which is funded by the US President's Emergency Plan for AIDS Relief (PEPFAR) under the management of USAID and the US Centers for Disease Control and Prevention (CDC), was specifically designed to address this issue. The MMIS project under USAID supports Nigeria's Ministry of Health to strengthen injection safety practices by replacing injections with non-injectable medications (as appropriate) and hence reducing the risk of accidental needle stick injuries, reducing the number of syringes needed and hence the costs associated with their procurement and transport to facilities, eliminating the need for patients to return to the facility for follow-up injections, and reducing the amount of sharps waste to be managed.

The MMIS health care worker training and behavior change interventions aim at the reduction of unnecessary therapeutic injections. Health prescribers and providers are trained in proper prescribing procedures, stressing that non-injectable medicines are usually easier, quicker, and less expensive. On the demand side, the project aims to reduce the demand for injections among patients by explaining the availability of non-injectable medicines that are as effective as injectables.

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2. OBJECTIVES AND METHODOLOGY

This study was designed to collect information before and after interventions to reduce unnecessary injections. The main objective was to determine medicine prescription patterns and to measure whether training and policy changes have had any effect in reducing the use of injectable medication.

The study is based on the prescription and administration of medicines and injectables as recorded in the five health facilities' outpatient registers. The study collected baseline information for the period from August 2004 to January 2005 and follow-up data from August 2007 to January 2008. Stock records were also collected for both study periods to assess the availability of injectable and non-injectable medications as well as injection devices. These additional data were used to assess whether shortages in these commodities could be influencing the prescription patterns for injectable versus non-injectable medications. Finally, prescribers were interviewed in the follow-up assessment about their perceptions and practices related to injectable and non-injectable medications.

The analysis was also intended to enable Nigeria's MMIS project and Ministry of Health (MoH) to identify strengths and weaknesses in training and other project activities as they relate to prescribers, and to develop recommendations.

The study included data collection from actual prescriptions and from reviewing the information recorded in outpatient registers from the two study periods. The main objectives of the study are:

1. Compare the percentage of curative injections pre-intervention versus post-intervention across all cases and for specific illness groups that are common enough to have quantifiable results;
2. Ascertain the extent to which stockouts of non-injectable medication alternatives, injectable medications, or injection devices may affect the increase or decrease in the use of injections.

Institutional Review Board (IRB) approvals of the study protocol were secured from the local ethics review boards in Nigeria and from a certified US-based IRB as required.

2.1 METHODOLOGY

For this study, only records of OPDs in large health centers were reviewed. The purpose of this selection criterion was to minimize the complexities inherent in analyzing cases admitted for inpatient care that might have required injectable medications for reasons that would not necessarily be fully documented in the patient registration records. Only outpatient records were used because it could be assumed that the cases would be less complex (since patients with severe illness are likely to be referred for admission immediately rather than being treated in the outpatient services [OPS]). This should facilitate the analysis as to which injections were likely to be medically necessary.

2.1.1 STUDY SITES

Five health facilities were chosen at which to carry out the study: (1) Lagos University Teaching Hospital (LUTH), Idi-Araba, Surulere; (2) University of Benin Teaching Hospital, Benin City; (3) Aminu Kano Teaching Hospital (AKTH), Kano; (4) Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos; and (5) State House Medical Centre, Aso Villa, Abuja. These sites were chosen by following a convenience sampling method based on the following criteria:

1. Willingness of senior facility management staff to participate by facilitating or permitting examination of OPD records in their facility.

2. Presence of OPS with at least 400 cases over a six-month period for both baseline and follow-up studies.
3. Willingness and availability of facility staff to assist with data collection at the conclusion of each study period (baseline and follow-up). For example, pharmacy staff were asked to assist MMIS data collectors with interpreting stock register information, and OPD staff were asked to assist by transcribing patient record information from registers while eliminating identifiers from patient records.
4. Timing of interventions to improve injection safety. Interventions should start after records have been collected for the baseline study period and should be completed by the start of the follow-up study period, unless only retrospective data collection is taking place.
5. Availability of stockroom records to obtain information on stockouts of key medications and injection devices, with dates of those stockouts, if any.
6. Quality of patient records and stockroom registers sufficient for collecting necessary data. Records must be legible and include specific dates.

MMIS recognizes that use of these criteria introduced selection bias, but this was considered a reasonable limitation of this study given that each selected facility serves as its own control over time and given that the objective is to assess whether the MMIS interventions have been effective in these facilities.

2.1.2 SAMPLE DESIGN

Once health facilities had been selected, patient cases were sampled for the baseline and follow-up periods. This methodology assumed that little information is available prior to the baseline study on the prevalence of injections among prescription records at the selected facilities and that there is no specific target for the reduction of this rate.

Records were sampled evenly from each one of the six months. Data collectors reviewed the outpatient registers to count the total number of cases recorded for a given month. They divided this number by the number of cases needed per month to determine the sampling interval. Using a random-number starting point, the data collectors would then systematically select the cases to be extracted and reviewed. This process would be repeated for each month in the six-month period to complete the sample of 400 cases per facility.

The post-intervention sampling period was set during the same six calendar months as the baseline to control for seasonality variability. The same process just described for selecting the baseline records was used to select patient records for the follow-up, and in the same health facilities. In this way, each facility from the baseline is its own control for the follow-up study.

The following information was collected from the outpatient register:

- Day, month, and year of patient visit
- Gender of the patient
- Age of the patient
- Primary diagnosis
- All secondary diagnoses, up to four
- Names of all medications used for treatment/prescription (each listed separately in the data set in the order in which they appeared in the prescription register)
- Whether each medication listed was prescribed in an injectable or non-injectable preparation

- Job title of prescriber

It is important to note that the name of the patient was not included in the data set in order to maintain patients' confidentiality.

The data from the records were abstracted, noting the pattern of medications given: solely injectable medication(s), injectable medication(s) accompanied by non-injectable medication(s), or only non-injectable medication(s). It is possible, and at times appropriate, that an initial injection is given to provide immediate relief. Subsequently, the patient can be prescribed a dose of non-injectable medication as follow-up.

2.1.3 STOCK DATA COLLECTION

A component of the study involved analyzing the availability of medication at the health center's pharmacy by looking at stock records. This was done to determine whether non-injectable medications were available at the time when injections were given. If not, non-availability of the non-injectable alternative is one possible explanation for why an injection was given. This was done in both the baseline and follow-up components of the study. The following information was collected from the stock cards:

- Name of medication
- Whether medication is an injectable or non-injectable formulation
- Data on any stockouts for each medication included in a prescription record in a study month
- Data on any stockouts for disposable syringes

2.1.4 PRESCRIBER INTERVIEWS

Prescriber interviews were carried out in OPS at each selected facility at the time of data collection. The purpose of the interviews was to capture information about how and why prescribers make their choices to prescribe injectable or non-injectable formulations when treating patients. The qualitative information collected through these interviews is to complement the quantitative analysis of data from patient and stock records. This information could also be used to highlight issues and topics that need to be addressed by future intervention activities. The results of the prescriber interviews are summarized in a separate section of the study report. (See Appendix A for the interview questionnaire.)

2.1.5 DATA ENTRY AND ANALYSIS

Data entry and preliminary analysis were performed using the Microsoft Access database created by the JSI/MMIS project. The database featured separate data tables for patient records, medical stock records, and supply stock records.

The analysis of this data set was conducted from several perspectives. These included assessing the percentage of all prescribed medications that were prescribed in injectable formulations and calculating the percentage of cases that included one or more medications prescribed in injectable formulations that were not necessary, based on customary treatment standards. Data on gender, age, and prescriber type were also analyzed.

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3. RESULTS

The discussion will examine the baseline and follow-up periods. Data and comparisons were stratified and analyzed by gender and age of patients as well as by facility and type of prescriber.

3.1 CHARACTERISTICS OF THE SAMPLE OBTAINED

A total of 3,324 records were entered into the study database. Of these, 159 records were dropped because they had neither diagnoses nor medications listed, leaving a total of 3,165, or 1,198 records from baseline and 1,967 from follow-up. Table 1 details the number of recorded cases per health facility, prescriber type, age group, and gender.[2]

Examination of the prescribers' background showed that doctors were the main care providers at outpatient clinics in all of the health facilities studied. Age groups were fairly evenly distributed in both baseline and follow-up periods, with the greatest concentration (more than 50%) in the "25 years and older" (≥25) category for both study periods. Gender distribution was also even across the two study periods, with a slightly greater number of females and fewer males at baseline than at follow-up.

Table 1. Characteristics of the patients' records reviewed

Indicator	Baseline (*n* = 1,198)	Follow-up (*n* = 1,967)	Total (*n* = 3,165)
Health facility[a]			
LASUTH	—	398	398
LUTH	—	411	411
State House Medical Centre	419	389	808
University of Benin Teaching Hospital	358	365	723
AKTH	421	400	821
Prescriber type[b]			
Doctor	100.0%	100.0%	3,143
Age group (in years)			
0–4	18.1%	15.3%	517
5–14	11.5%	12.7%	388
15–24	17.4%	14.9%	502
≥25	53.0%	57.1%	1,758
Gender[c]			
Male	42.1%	47.3%	1,433
Female	57.9%	52.7%	1,730

[a] For this variable, 4 cases were not labeled, considered as missing.
[b] For this variable, 22 cases were not labeled, considered as missing.
[c] For this variable, 2 cases were not labeled, considered as missing.

Table 2 shows that half of the cases attended at the study clinics were distributed among four main disease or condition groups: (1) malaria; (2) asthma, bronchitis, and pneumonia; (3) heart conditions and hypertension; and (4) dyspepsia and gastritis/gastrointestinal conditions. Of these, only heart conditions would require injectable medication as part of standard treatment guidelines. The last row groups together diseases that had less than 0.8% each. Notably, there was a small variation in the percentage of malaria

[2] Note: The LASUTH and LUTH health facilities did not have records available for the baseline study period.

cases between baseline and follow-up, even though the data were taken during the same six-month time span to control for seasonality effects.

Table 2. Primary diagnosis given in the outpatient logbook, grouped by disease/condition for analysis and by study period

Disease/condition	Baseline (*n* = 1,198)		Follow-up (*n* = 1,967)		Total (*n* = 3,165)	
Malaria	367	30.6%	381	19.4%	748	23.6%
Asthma, bronchitis, and pneumonia	112	9.3%	204	10.4%	316	10.0%
Heart conditions and hypertension	99	8.3%	186	9.5%	285	9.0%
Dyspepsia, gastritis, and intestinal non-infectious conditions	88	7.3%	134	6.8%	222	7.0%
Pain: abdominal, back, head, and other	111	9.3%	103	5.2%	214	6.8%
Eye and ear infection/impairment	49	4.1%	153	7.8%	202	6.4%
Candidiasis, fungal infection, and skin diseases	63	5.3%	63	3.2%	126	4.0%
Pelvic inflammatory diseases and STIs	56	4.7%	61	3.1%	117	3.7%
Anxiety, depression, and neurological conditions	26	2.2%	65	3.3%	91	2.9%
Diabetes	20	1.7%	70	3.6%	90	2.8%
Amenorrhea	30	2.5%	58	2.9%	88	2.8%
Sickle cell anemia	3	0.3%	59	3.0%	62	2.0%
Diarrheal diseases	42	3.5%	19	1.0%	61	1.9%
Accidents/fractures/hematoma	16	1.3%	41	2.1%	57	1.8%
Arthritis	14	1.2%	37	1.9%	51	1.6%
Tuberculosis	6	0.5%	33	1.7%	39	1.2%
Seizures	3	0.3%	33	1.7%	36	1.1%
Viral infection/rash	16	1.3%	19	1.0%	35	1.1%
Fibroadenosis	5	0.4%	29	1.5%	34	1.1%
Hyperthyroidism/goiter	3	0.3%	29	1.5%	32	1.0%
Fever	16	1.3%	15	0.8%	31	1.0%
No diagnosis recorded	0	0.0%	31	1.6%	31	1.0%
HIV/AIDS	7	0.6%	21	1.1%	28	0.9%
Miscellaneous group[a]	46	3.8%	123	6.3%	169	5.3%

[a] Includes: abortion, allergy, anemia, appendicitis, burn, cancer/tumors, cerebral malaria, dental conditions, kidney infection/**UTI** [QU: (replace) urinary tract infection? (not defined anywhere)], malnutrition, mastitis, medical checkup, neonatal jaundice, renal failure, septicemia, and unclassified.

3.2 USE OF INJECTABLE MEDICATION

Each diagnosis has a prescribed treatment in the standard treatment guidelines used in Nigeria. To analyze the pattern of prescribing behavior reflected in these records and the extent to which this behavior is consistent with the standard guidelines, each disease classification3 was first checked to assess whether the

[3] The OPD logbooks record diagnosis by disease syndrome, like fever or STI; hence, for the purpose of this study, it is referred to as disease classification.

guidelines included the option of an injectable medication as a treatment. Because the order in which the disease classifications were recorded was arbitrary and the goal of this study was to assess whether the general pattern of prescriptions of injectable medications was rational, the analysis of prescribing patterns by disease did not attempt to assess whether a particular medication was given for a particular disease, but rather whether the overall pattern of prescriptions of injectable medications versus non-injectable medications was consistent with the treatment guidelines. Table 3 shows 2,449 total cases with diagnoses spread across 19 different diseases and/or conditions for which standard treatment does not require injectable medication. Because these cases were attended at the OPD, it is likely they were not extremely severe cases.

The overall percentage of patient cases receiving prescriptions for injectable medication when it did not appear to be medically necessary was 9.6% (±1.81%) at baseline, compared with 3.6% (±0.97%) at follow-up, with an odds ratio of 0.35. Therefore, a patient at baseline was 1.65 times more likely to have been prescribed an unnecessary injection than at follow-up. Malaria accounted for the highest number of cases with unnecessary use of injectable medications and for the most significant reduction in their use over time. Examination of the malaria cases showed that injectable artemether and chloroquine injectables constituted the majority of treatments prescribed. This reflects the recommended drug of choice for malaria at baseline, which was still chloroquine, with most prescribers giving a stat dose via injections. In 2005, however, there was a shift to non-injectable artemisinin-based combination therapies (ACTs), and by the follow-up period ACTs were the recommended treatment. The Nigeria National Malaria Control Programme now recommends oral medication and would recommend injectables only in some falciparum-resistant cases but most certainly not at the OPD level. The second-most-common use of unnecessary injectable medications was for cases diagnosed with arthritis.

Table 3. Distribution of diseases and/or conditions for which standard treatment does not require injectable medication, by study period									
Disease and/or condition	Baseline			Follow-up			Total		
	Total cases	Used injection		Total cases	Used injection		Total cases	Used injection	
Malaria	367	62	16.9%	381	26	6.8%	748	88	11.8%
Asthma/bronchitis/pneumonia	112	10	8.9%	204	9	4.4%	316	19	6.0%
Dyspepsia/gastritis/intestinal non-infectious conditions	88	3	3.4%	134	4	3.0%	222	7	3.2%
Pain: abdominal/back/head/other	111	4	3.6%	103	3	2.9%	214	7	3.3%
Eye/ear infection/impairment	49	1	2.0%	153	2	1.3%	202	3	1.5%
Candidiasis/fungal infection/skin diseases	63	5	7.9%	63	1	1.6%	126	6	4.8%
Pelvic inflammatory disease/STI	56	3	5.4%	61	0	0.0%	117	3	2.6%
Anxiety/depression/neurological conditions	26	1	3.8%	65	0	0.0%	91	1	1.1%
Amenorrhea	30	0	0.0%	58	1	1.7%	88	1	1.1%
Diarrheal diseases	42	4	9.5%	19	1	5.3%	61	5	8.2%
Arthritis	14	2	14.3%	37	2	5.4%	51	4	7.8%
Tuberculosis	6	0	0.0%	33	0	0.0%	39	0	0.0%
Viral infection/rash	16	1	6.3%	19	0	0.0%	35	1	2.9%
Fibroadenosis	5	0	0.0%	29	2	6.9%	34	2	5.9%
Fever	16	1	6.3%	15	0	0.0%	31	1	3.2%
Malnutrition	5	0	0.0%	21	0	0.0%	26	0	0.0%
Allergy	8	0	0.0%	14	1	7.1%	22	1	4.5%
Dental conditions	4	0	0.0%	13	0	0.0%	17	0	0.0%
Anemia	3	1	33.3%	6	0	0.0%	9	1	11.1%
Total	**1,021**	**98**	**9.6%**	**1,428**	**52**	**3.6%**	**2,449**	**150**	**6.1%**

Baseline		Follow-up		Odds ratio
Average	Confidence interval	Average	Confidence interval	
9.6%	**±1.81%**	**3.6%**	**±0.97%**	**0.35**

After the list of diseases or conditions for which injectable medication is not recommended was established, the next step of the analysis considered the number of injectables used for these conditions overall and by the four independent variables (health facility, prescriber type, age group, and gender).

Cross-tabulating by independent variables shows that State House Medical Centre in Abuja was the facility that prescribed the most unnecessary injectable medications at both baseline and follow-up, although a decline by half was detected between the two periods at this facility. AKTH also showed a notable decline from baseline to follow-up. Percentages for the University of Benin Teaching Hospital stayed relatively low across both study periods. The LASUTH and LUTH hospitals did not have baseline records, but follow-up data suggest that they prescribed fewer injectable medications for diagnoses that did not require any, compared with other study facilities.

In Nigeria, only doctors provide prescriptions, hence this study was not able to consider any other type of prescriber.4 The group 5–14 years of age was prescribed more unnecessary injectable medications overall, compared with the younger and older groups. However, all age groups showed a decrease in unnecessary injections prescribed over time. Finally, male patient records showed a slightly higher rate of prescriptions for unnecessary injectable medications at baseline, but both genders were prescribed a lower percentage, and about the same amount, at follow-up (Table 4).

Table 4. Distribution of diseases and/or conditions for which standard treatment does not require injectable medication, by independent variable and by study period

Independent variable	Baseline (*n* = 1,021)	Follow-up (*n* = 1,428)	Total (*n* = 2,449)
Health facility			
LASUTH	—	2.2%	2.2%
LUTH	—	2.5%	2.5%
State House Medical Centre	14.1%	6.7%	10.5%
University of Benin Teaching Hospital	4.2%	3.4%	3.8%
AKTH	10.1%	3.1%	6.8%
Prescriber type			
Doctor	9.6%	3.7%	6.2%
Age group (in years)			
0–4	9.7%	3.4%	6.3%
5–14	17.1%	7.3%	11.2%
15–24	6.7%	2.4%	4.3%
≥25	8.9%	3.3%	5.5%
Gender			
Male	11.4%	3.7%	6.8%
Female	8.2%	3.7%	5.7%

3.3 PHARMACEUTICAL STOCK DATA RESULTS

One of the objectives of this study was to ascertain the extent to which stockouts of non-injectable medication alternatives, injectable medications, or injection devices may affect the increase or decrease in the prescription of injectable medications. The consultant collected information from the pharmacy to establish the availability of all medications that had been prescribed in the sample cases. Records were taken from the pharmacy register books and/or stock cards.

Records showed whether specific medications were available during each month of the study periods. If a medication had not been available on any one day in a given month, it was considered to be out of stock for that month.

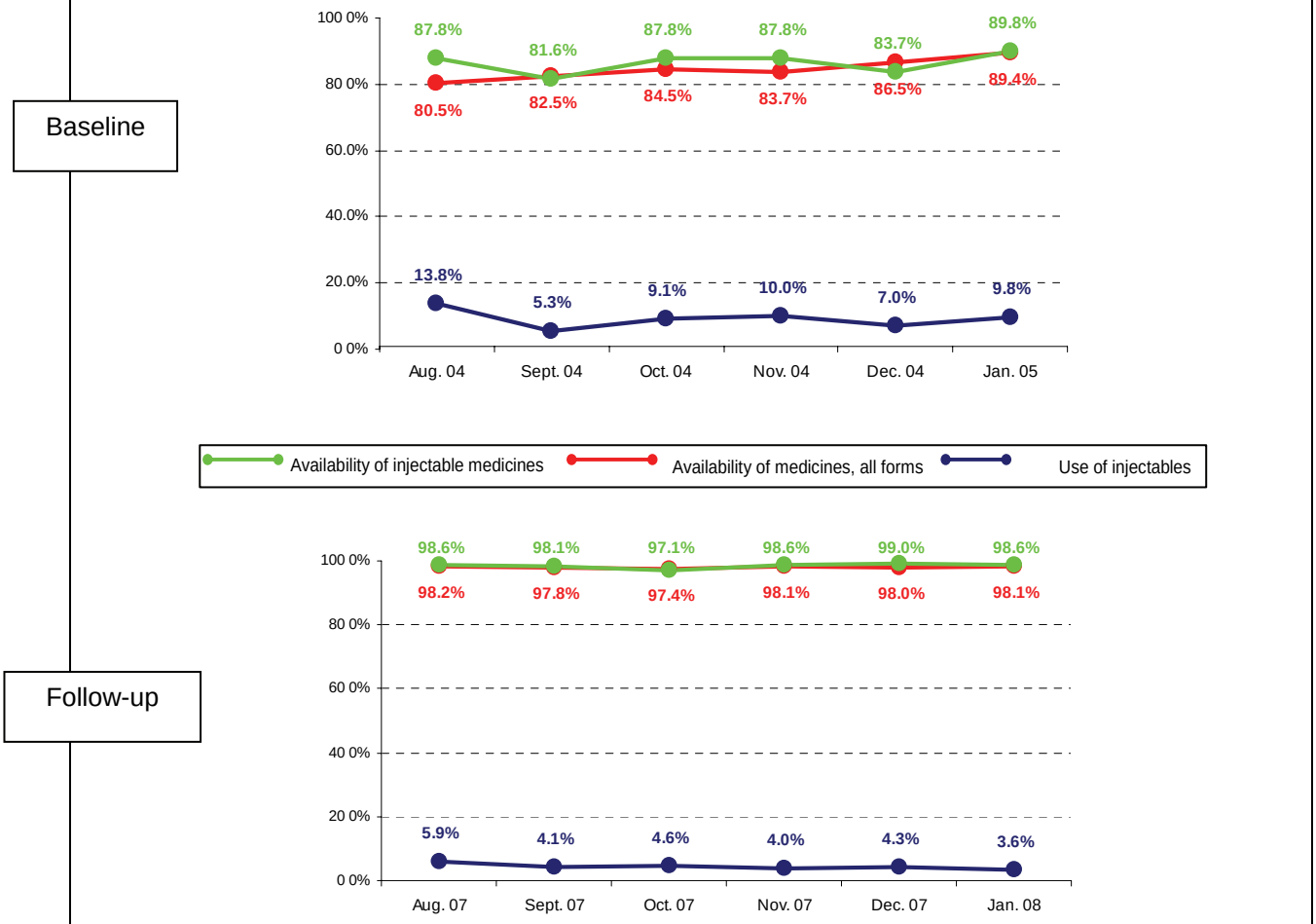
Figure 1 depicts the overall availability of all forms of medicines (red lines), the availability of injectable medication (green lines), and the use of injectable medication (blue lines) for the two study periods.

The bulk of the evidence from the two study periods does not show a strong relationship between prescription of injectable medications and supply shortages. The use of injectable medication decreased slightly over time, although availability of medication stocks was generally high during both periods. During the baseline study period, the average use of injectable medications was about 10%; the lowest was 5.3% and the highest 13.8%. During the follow-up study period, all these percentages were below 6%. However, the bulk of the evidence from the two study periods does not show a strong relationship. Furthermore, the availability of injectable medications was higher during the follow-up study period,

[4] This applies to teaching hospitals, state and local-government-area-level public facilities, private facilities, and the informal sector in Nigeria.

suggesting that the reduction in the use of injectable medicines was due to changes in treatment practices, not in supplies of medications.

Figure 1. General comparison of patterns of availability (of medicines in all forms and of injectables) and use of injectable medication, by study period



3.4 PRESCRIBER INTERVIEW RESULTS

Qualitative interviews were conducted with prescribers as part of the data collection process during the follow-up study only. All of the prescribers interviewed were medical doctors. A total of 41 prescribers were interviewed across the five health centers (8 at the University of Benin Teaching Hospital, 9 at State House Medical Centre, 7 at AKTH, 9 at LASUTH, and 8 at LUTH).

A small number, only 2 out of the 41, reported that they thought non-injectable medication was more effective than injectables, but all others reported that they think the two are at least equally effective.

In terms of prescribing medication to the patients they see, 15 doctors reported that they prescribe at least one medication at every visit, 13 respondents said they do this at least 9 out of 10 times, 5 respondents said 6 or 7 times out of 10, and 2 respondents prescribe medication to 5 out of 10 patients. Overall, doctors interviewed generally do feel it is necessary to prescribe medications to patients they see in an outpatient setting.

When asked how many patients out of 10 are likely to receive a prescription with at least one injectable medication, 22 prescribers said at least 1 out of 10 patients, 13 respondents said none, and the remaining minority (6 providers) would prescribe injections to more than 3 patients out of 10. Many prescribers also mentioned that the decision whether to prescribe injectable medications to patients depends on their ability to take medications by mouth (28 out of 41); the majority mentioned they would prefer prescribing injectable medication when the patients are not able to swallow or their state of consciousness is compromised (i.e., septicemia, meningitis, severe dehydration). Also mentioned was the severity of a condition that requires fast action, like asthma or allergy.

Most prescribers (90%) stated that the suggestion they have for making it easier to prescribe non-injectables is to have better supplies of non-injectable medicines and rectal forms for small children, and more time for proper patient counseling. Clearly, prescribers perceive stock levels as playing a role in their decision whether to prescribe medication in injectable or other formulations, even though a true relationship cannot be seen through examination of stock records in this study.

The majority of doctors (21) reported that at least 1 or 2 patients out of 10 request an injection, whereas 12 reported that 3 or more patients out of 10 normally request one. Eight out of 41 prescribers reported that patients rarely or never request an injection. Overall, patient demand for injections exists but does not seem to be very widespread. However, the majority of the prescribers (27 out of 41) stated that they were unlikely to give the patient an injection, even if they asked for it, when they originally planned to prescribe another formulation. The remaining 14 providers said the decision would depend on the patients' condition and their willingness to comply with the prescribed treatment.

Prescribers were asked what they would say if a patient with fever requested an injection when they had previously prescribed a non-injectable medication. The range of responses included: advising the patient about risks associated with having injections, such as abscess; asking the patient why they prefer an injection and discussing the issue with them; or complying with the patient's wishes in cases where the doctor believed the patient would not comply. One doctor also mentioned complying with the patient's wishes if they were working from a private office.

Of 41 respondents, 16 stated that they had participated in training workshops related to injection safety, 10 reported they received no training, and the rest mentioned medical literature and the Internet as sources of information about injection safety.

Half of prescribers interviewed were already working in the health facilities during the baseline study period, hence 17 out of 41 were trained within 3–6 months before the follow-up study period, 10 reported that they had never received any training, and the rest had received training more than 6 months before the follow-up study.

Of the 41 prescribers, 31 found the injection safety posters useful, 7 also mentioned pocket guides, and the rest mentioned other useful behavior change communication materials like calendars and newsletters.

3.5 STUDY LIMITATIONS

The PRR study was carried out as planned. Follow-up information was collected first, and then the study teams continued reviewing records for the baseline period. In the case of the hospitals LASUTH and LUTH, the records for the baseline period did not exist, but the team decided to retain those hospitals anyway and examine the trends in the results.

The study only considered the diagnoses or disease classifications recorded on the OPD logbooks, as well as treatment provided. The logbooks did not contain any additional information about the onset of symptoms, lab results, existing conditions, severity of the illness, patient demand for injections, cultural beliefs, or access to services. Nevertheless, the purpose of the study was not to assess the quality of care received or the accuracy of the diagnosis, only the use of injectable medications. In that regard, the study

focused only on the number of injections provided, comparing baseline and follow-up study periods. Hence, the conclusions and recommendations address only that specific issue.

It was possible to interview 41 prescribers at the time of data collection; however, there were no comparison responses because prescribers were not interviewed about their perceptions and practices during the baseline period.

This study was conducted solely in teaching hospital centers where the MMIS project is being implemented. There were no controls, in other words, other hospitals and levels of the health care system that may have higher or lower numbers of injections.

Some interventions started at State House Medical Centre and LUTH before the end of the PRR baseline study period to August 2004 to January 2005 However, these interventions were mainly training for waste handlers and nurses, and included no targeted training of doctors/prescribers.

Perhaps the most significant limitation of the study is the lack of control over the quality of data contained in the patient records, a limitation that frequently accompanies the use of a secondary data source. Because this study was designed to draw from hospital records, sometimes it was not possible to avoid sampling records that were incomplete, hard to read, damaged, or not available for a relevant portion of the study periods.

4. CONCLUSIONS AND RECOMMENDATIONS

The main objective of this study was to assess prescription patterns and to measure whether training and policy changes have had any effect in reducing the use of injectable medications. Relevant project interventions include training health care workers, such as doctors who prescribe medication to patients, about general injection safety principles. An additional external factor to consider is that a major Nigerian government television and grassroots campaign to discourage unnecessary injections took place at the study sites before the follow-up study period.

The study did show a statistically significant decline in the use of injectables when baseline and follow-up study results were compared. This overall finding points in large part to the change in treatment for malaria cases, for which the standard first-line treatment changed from injectable to non-injectable medication between the two study periods. When baseline and follow-up study results were compared, there was a significant reduction in the use of unnecessary injections to treat malaria cases, which reflects this change in treatment policy. However, it should be noted that 7% of malaria cases sampled at follow-up were still prescribed injectable medication for treatment in the OPD, one of the highest rates of all sampled diagnoses that do not normally require an injection. Given that the malaria treatment protocol in Nigeria calls for non-injectable treatment unless there are clear signs of falciparum resistance or treatment failure with ACTs, malaria cases may still receive more injectable medications than necessary. The second-most-common diagnosis for which injectables were prescribed unnecessarily was arthritis, mostly with painkillers and steroids.

Another interesting result was that the age group 5–14 years was the one with the most unnecessary use of injectables, particularly at baseline. Further examination is still needed to understand that trend of unnecessary injections among children over 5. Perhaps treatment adherence is in question for this age group and injections are used in order to be sure that the correct treatment is given.

When availability of injectable and non-injectable medications was observed, there were some small variations when baseline was compared with follow-up. In general the trend of use for injectable medications shows a clear decline, but this does not seem to be related to the availability of medicines, which remained high in all study facilities during both study periods. It is interesting to note that prescribers believe that prescription of non-injectables is related to stock (even though evidence does not show that).

Finally, the prescriber interview results show that doctors are firm believers that non-injectable medicines are equally effective, that patients need to be educated and counseled to choose non-injectable medicines, and that the risk of using injectables needs to be explained if there are alternative non-injectable forms.

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APPENDIX A: PRESCRIBER QUESTIONNAIRE

Date_____ Name of Health Facility _____

1. In your opinion, when treating a patient with a simple case of fever, is medicine taken by mouth MORE effective, JUST AS effective, or LESS effective than medicine taken by injection?
    1. Oral MORE Effective
    2. JUST AS Effective
    3. Oral LESS Effective
    4. Don't know
    5. Other (specify) _____

    Instructions: One response only.

2. When you prescribe treatment for your patients, do you tell them anything related to medicine taken by mouth and/or injections? If yes, what?
    A. Oral medication is just as good
    B. Injections act faster than oral medications
    C. How to follow-up – next steps
    D. Side effects
    E. How to treat side effects
    F. What to do if have adverse reaction
    G. Other, specify_____
    H. None

    Instructions: If the prescriber responds "no", mark option H "none." Multiple responses are possible. Mark all that are mentioned spontaneously by the respondent. ***Do not read.***

3. Out of every 10 outpatients you see, for about how many (on average) do you prescribe any medication?

    _____

    Instructions: Record the number mentioned. It must be between 0 and 10. Use the number cited here to ask the next question.

4. Of those _____ how many get a prescription that includes at least one injection?

    _____

5. How do you decide whether a patient should get a prescription with an injectable medication as opposed to oral medications only?

    _____

    _____

    Instructions: Record the response in the prescriber's own words.

6. For which specific conditions, if any, do you believe injectable medicine is most necessary?

    _____

    _____

7. What factors, if any, encourage doctors or other health workers to prescribe treatments that include injections rather than oral medicine? (*Probe: what else?)*
    A. Shortage of oral medicine
    B. Patients want injections
    C. No guidelines
    D. No time/too many patients
    E. Patient will not complete (adhere to) treatment regimen of orals
    F. Injections bring more income
    G. Injections are more effective
    H. Other, specify _____
    I. Nothing/Don't know

    Instructions: Multiple responses are possible. Mark all that are mentioned spontaneously by the respondent. ***Do not read.***

8. What suggestions do you have for making it easier to prescribe medication in oral form instead of injectable form?
    A. Better supplies of oral medicine
    B. Patients who accept your decision for type of prescription
    C. More training/supervision
    D. More time to counsel
    E. Patients who complete (adhere to) treatment regimen
    F. Fewer needles/syringes/injectable medications
    G. Reminders/job aids/guidelines
    H. Other, specify _____
    I. Nothing/Don't know

    Instructions: Multiple responses are possible. Mark all that are mentioned spontaneously by the respondent. ***Do not read.***

9. Out of every 10 patients to whom you do NOT prescribe an injection, about how many of them then request an injection? _____

10. How likely would you be to give the client an injection, if they asked for it, when you originally were going to prescribe another formulation?
    _____

    _____

11. Imagine that I am a patient with a fever. You prescribed an oral to me but I asked for an injection. What would you say or do in response?
    _____

    _____

12. From what sources did you receive information about injections or the benefits of oral medicine in the last 6 months?
    A. Training workshop
    B. Supervisor
    C. Colleagues
    D. Poster
    E. Brochure
    F. Pocket Guide
    G. Newsletter
    H. Video
    I. Calendar
    J. Journals/publications
    K. Professional Association (specify) _____
    L. Other (specify) _____
    M. None

    Instructions: Multiple answers are possible. Mark all that are mentioned spontaneously by the respondent. ***Do not read.*** *Probe asking "Anything else?"*

13. When did you start working at this facility?

    Month: _____ Year : _____
    99 Do not remember

    Instructions: If the person does not remember the exact date, ask him/her to estimate. Is this date before the beginning of interventions _____
    1. Yes
    2. No

14. When did you last receive training about prescribing different medicines to treat your patients (including deciding between injections and other routes of administration)?
    1. Less than 3 months
    2. 3- 6 months
    3. > 6 and <12 months
    4. Between 1 and 2 years
    5. More than 2 years
    6. Never
    7. Don't know/don't remember

    Instructions: Read the options aloud and mark the one that most closely fits the respondent's experience.

15. Which of these materials do you have around here? *(SHOW IMAGES OF PRESCRIBER-RELATED MATERIALS OR THE ACTUAL MATERIALS)*
    A. Poster
    B. Brochure
    C. Pocket Guide
    D. Newsletter
    E. Video
    F. Calendar
    G. None → *End interview*
    H. Don't know → *End interview*

    Instructions: Multiple answers are possible. Mark all that are mentioned spontaneously by the respondent. ***Do not read.*** *Probe asking "Anything else?"*

16. Which of these materials do you find useful for you and/or your patients?
    A. Poster
    B. Brochure
    C. Pocket Guide
    D. Newsletter
    E. Video
    F. Calendar
    G. None

    Instructions: Multiple answers are possible. Mark all that are mentioned spontaneously by the respondent. ***Do not read.*** *Probe asking "Anything else?"*

Thank you for your time. Your input has been valuable.

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

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