

Implementation of a National Pharmacy Management Information System in Namibia

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The Strengthening Pharmaceutical Systems (SPS) Program strives to build capacity within developing countries to effectively manage all aspects of pharmaceutical systems and services. SPS focuses on improving governance in the pharmaceutical sector, strengthening pharmaceutical management systems and financing mechanisms, containing antimicrobial resistance, and enhancing access to and appropriate use of medicines.

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ACRONYMS AND ABBREVIATIONS

AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
ARV	antiretroviral (medicine)
CMS	Central Medical Stores
DCC	District Coordinating Committee
HF	Health Facility (Indicator)
HIS	health information system
HIV	human immunodeficiency virus
HMIS	health management information system
MIS	management information system
MoHSS	Ministry of Health and Social Services
MS	Medical Stores
MSH	Management Sciences for Health
M&E	monitoring and evaluation
Nemlist	Namibia Essential Medicines List
NMP	National Medicines Policy
NMPC	National Medicine Policy Coordination (subdivision)
OPD	outpatient department
PA	Pharmacist's Assistant
PHC	Primary Health Care
PMDRC	Policy Management Development and Research Committee
PMIS	Pharmacy Management Information System
RMS	Regional Medical Stores
RMT	Regional Management Team
RPM Plus	Rational Pharmaceutical Management Plus
SOP	standard operating procedures
SPS	Strengthening Pharmaceutical Systems
STG	standard treatment guideline
TC	Therapeutics Committee

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INTRODUCTION

Information is a critical resource in the operation and management of any organization. Timely availability of relevant information is vital for effective performance of managerial functions such as planning monitoring and evaluating (M&E) performance.

Management information systems (MIS) are designed to provide this information so as to support decision making at all levels of an organization. MIS and the information it generates are therefore essential components of management and help inform the formulation of an organization's short and longer term strategic goals and objectives. To serve this critical function, a MIS has to be properly planned and implemented in order to collect, process, store and disseminate data in the form of information needed to support the functions of management.

Indicators are often employed in the collection of data for a MIS and have been described as variables that help to measure changes directly or indirectly (World Health Organization [WHO], 1981). The use of indicators permits evaluation of resource utilization, processes, outputs, outcomes and many other functions and allows for measurement of changes over time. Analysis of indicator results can help highlight problem areas or specific problems within a system thus facilitating the implementation of targeted interventions.

With regard to monitoring the pharmaceutical sector, WHO has developed a guide for assessing M&E country pharmaceutical systems.¹ This is an indicator-based tool for assessing whether key pharmaceutical objectives are met. It also assesses access to essential medicines, safety, effectiveness, and quality of available medicines and rational use.

This WHO system uses a hierarchical approach with three groups of indicators: levels I, II, and III. Level I indicators can be used to assess existing structures and processes in a national pharmaceutical system and provide a method to rapidly assess the implementation of the National Medicine Policy (NMP) and its components; level II or health facility indicators provide systematic data to measure important country pharmaceutical outcomes such as access to, rational use of, and quality of medicines; whereas level III indicators are useful for in-depth assessment of specific components of the pharmaceutical sector such as pricing, drug supply management, and regulatory capacity.

WHO states that information gathered from this system can be used to develop and reassess strategies, priorities, strengthen pharmaceutical system components and to synchronize programs and policies. In addition, it enables policy-makers and managers to have a clear picture of national and institutional problems.

WHO reports that at least 40 countries have successfully made use of level II indicators in assessing components of their pharmaceutical systems and that these indicators can be used in special facility surveys as well as in routine monitoring.

In Namibia, the most widely known management information system in the Ministry of Health and Social Services (MoHSS) is the health information system (HIS). This is a routine health management information system that gathers a host of data on services, morbidity, and

¹ World Health Organization (WHO). 2007. *WHO Operational Package for Assessing, Monitoring and Evaluating Country Pharmaceutical Situations. Guide for Coordinators and Data Collectors.* WHO/TCM/2007.2

mortality from all public health facilities. However, it does not gather any data on the pharmaceutical sector. A number of other independent management information systems to support functions such as financial and human resource management are also in place.

The Namibia pharmacy management information system (PMIS) was conceived and developed to address this gap—the absence of a system that provides regular information on the country’s pharmaceutical sector and thus guide decision making in the management of the sector. It is modeled on the WHO system for monitoring the pharmaceutical sector and makes use of some of the WHO level II indicators. However, it has a wider scope and utilizes additional locally developed indicators to address the specific needs of the local public sector pharmaceutical system.

Initially, the system was designed to monitor a selected number of areas at health facility level such as the medicines supply system, rational use of medicines, human resources, and medicine financing. This will however be expanded eventually to include WHO level I and III core indicators for use in assessing other critical areas such as the implementation of the NMP and the medicine regulatory system.

A participatory process was used in developing the PMIS and the indicators were designed with input from MoHSS pharmacists, pharmacist’s assistants, and other stakeholders. Some of these indicators will be designated as essential indicators for inclusion in the National Essential Indicator Framework. These are to be used alongside other selected indicators from the various MoHSS management information systems for overall planning, M&E evaluation, and decision making within the ministry.

BACKGROUND

Medicines play a critical role in health care provision in any country and many activities are currently being carried out by the MoHSS to ensure that all Namibians have access to safe and effective medicines they require for both prevention and treatment of ill health. To manage medicines appropriately and ensure that all the supporting systems are functioning appropriately, it is essential that all management levels in the MoHSS at national, regional, and district levels have current in-depth information on availability of medicines, the functioning of the supply system, and how these medicines are being used. In addition, information on the availability of human resources required for the provision of these pharmaceutical services is essential to enable adequate planning. The above information can only be obtained if there is a functioning and responsive pharmacy management information system.

A pharmacy management information system had never been successfully implemented in Namibia. An attempt had, however, been made to implement a nationwide pharmacy management information system in 2002 but this was not successful as the system was only rolled out to a limited number of facilities. The intended goal of obtaining accurate and up-to-date information on the status of pharmaceutical services and for M&E and planning could therefore not be achieved.

The initial findings of a pharmaceutical sector assessment carried out by RPM Plus in November 2003 indicated that the M&E system was weak, with minimal supervision of the pharmaceutical sectors and no comprehensive system for managing pharmaceutical information in the MoHSS. A further in-depth examination and review of existing systems for pharmacy management information and M&E systems was therefore recommended.²

A follow-up assessment of existing MISs and M&E systems at Central Medical Stores (CMS), Regional Medical Stores (RMS), and health facilities was subsequently conducted in May 2004.³ The purpose of this assessment was to determine whether the existing systems were adequate for supporting M&E and whether they could provide required information for pharmaceutical and program-related decisions. A summary of the findings and recommendations of this assessment are shown in box 1 below. This report was used as the foundation for developing a new pharmacy management information system (PMIS). Its findings and recommendation guided the implementation process.

Following the publication of the report, a task force for PMIS was appointed by the MoHSS to oversee the implementation of a pharmacy management information system in the country. The initial assignment for the team was to develop an implementation plan and to examine the various pharmacy related functions and activities and identify suitable indicators for inclusion in the PMIS.

² Aboagye-Nyame, F., L. Akhlaghi, and V. Dias. 2003. *Assessment of the Public Sector Drug Supply System of the Republic of Namibia*. Submitted to the U.S Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health.

³ Bhattarai, H. R. 2004. *Assessment of the Pharmaceutical Management Information and Monitoring and Evaluation Systems of the Republic of Namibia*. Trip Report. Submitted to the U.S Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health.

Box 1. Assessment Recommendations on the PMIS and M&E System for the Republic of Namibia

- Form a task force to design and implement the PMIS and M&E system
- Organize a workshop to introduce pharmacists from selected hospitals, pharmaceutical services division, and staff of RMS, CMS, HMIS, and representatives from other stakeholders to the concept of M&E and MIS.
- Organize a workshop to deliberate and agree on indicators, the structure, and procedures for the PMIS through a participatory process.
- Decisions made at the workshop will guide the task force in developing and implementing the system.
- RPM Plus should work with the task force to assist in the design and implementation of the system.
- Explore the option of computerizing the system with the aim of reducing the time spent by staff on data collection, recording, and report preparation. However, the manual system should be conceptually tested before computerization.

FRAMEWORK FOR THE IMPLEMENTATION OF PMIS IN NAMIBIA

The framework that was applied in developing PMIS in Namibia can be shown schematically as follows:

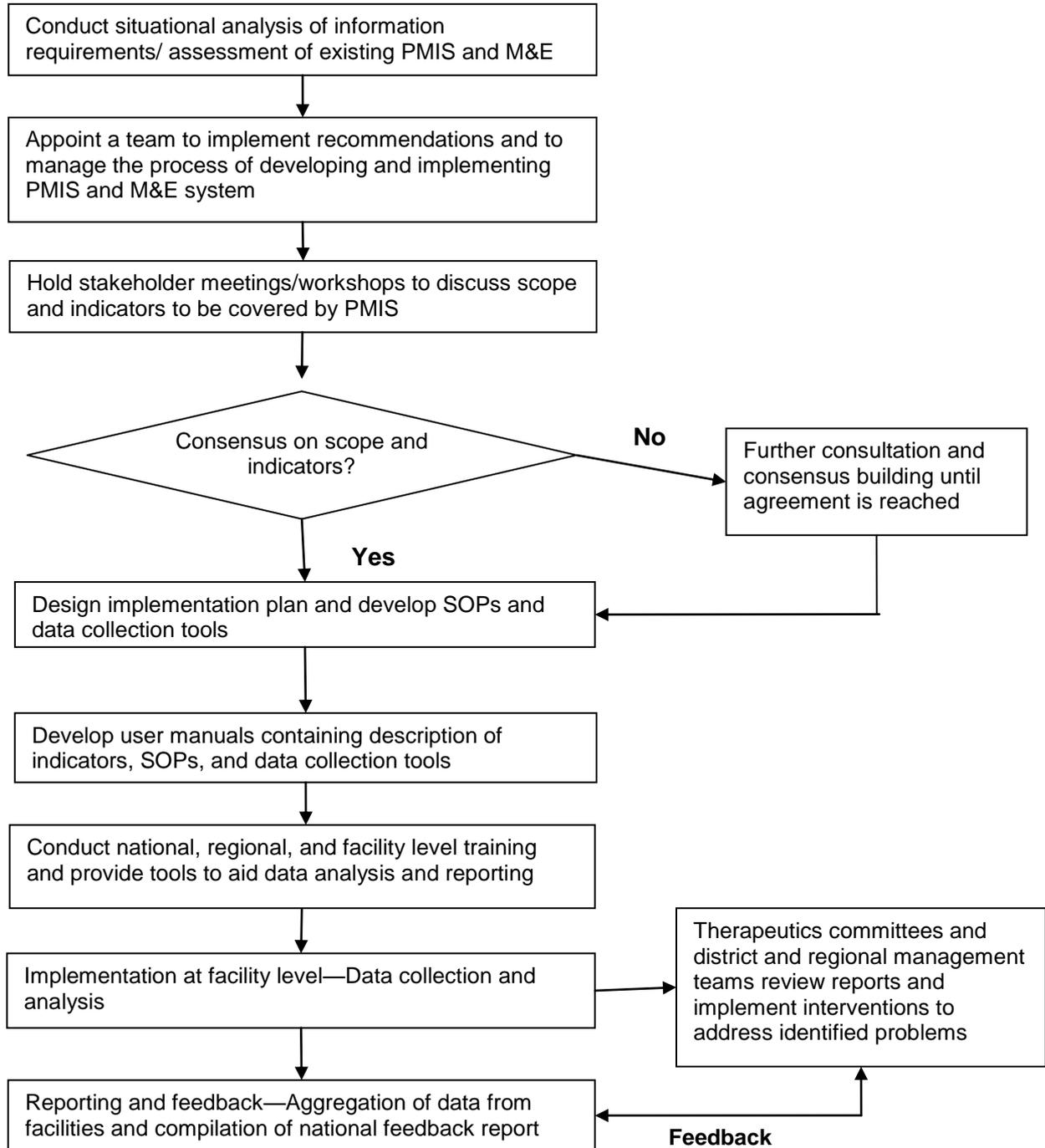


Figure 1. PMIS Implementation Framework

The various implementation procedures and activities are outlined in the next section below.

IMPLEMENTATION PROCEDURES AND ACTIVITIES

Formation of the PMIS Task Force

A team of eight members consisting of pharmacists from the facilities in the regions, national level (NMPC and Pharmaceutical Control and Inspection), Central Medical Stores (CMS), and a representative from the Policy Planning and Human Resources Development (HRD) directorate which is responsible for management information systems (MIS) within MoHSS were appointed. They were tasked with the responsibility for designing and implementing a functional PMIS that would provide information for M&E, planning, and supporting decision making at facility, regional, and national levels.

With technical support from RPM Plus, the following tasks were accomplished by this team.

- Mapping of data and information requirements: In consultation with various stakeholder, the team performed a comprehensive mapping of data and information requirements including scope of the PMIS. This was synthesized from the four main sections of the national medicine policy and the pharmaceutical master plan and covered the following areas—
 - Medicine supply
 - Rational medicine use
 - Human resource development
 - Medicine financing
- 1. Developing PMIS indicators dataset: Proposed a set of 29 indicators for measuring broad pharmaceutical outcomes and achievement of strategic pharmaceutical objectives. Improved access, quality, and rational medicine use at facility level. In addition, some of the indicators evaluate the processes, infrastructure, and systems required for the attainment of these objectives (annex 4).
- 2. Guidelines and SOPs: Developed draft guidelines specifying exactly how the indicators would be assessed/measured including information on—
 - Sources of data and level of assessment
 - Persons responsible for data collection
 - Metrics for the indicators, i.e., numerators and denominators
 - Data collection and reporting frequency
 - Standards for each indicator defined by target and acceptable value for every indicator

Box 2. Categorization of PMIS Indicators

- Stock Management and Item Availability
- Rational Use of Medicines and Quality of Care
- Human Resource Development and Workload
- Medicines Financing

National Consensus Building Workshop

A participatory approach was adopted in the further development of the PMIS. A national PMIS consensus building workshop was held to obtain input from a wide range of interested stakeholders on the suitability of the proposed indicators by the PMIS task force and to discuss and agree on the best method for implementing the PMIS.

In addition, the participants were to review the proposed sources of data, proposed computation of each indicator, frequency of reporting, and decide which indicators to be considered for inclusion in the National Essential Indicators Framework. The key criteria applied in assessing indicators for inclusion in the PMIS are listed in box 3 below.

Box 3. Criteria Used in Assessing Proposed Indicators for the PMIS

- Relevance—Indicator measures an important, useful output or activity.
- Validity—Indicator measures the result it is designed to measure conceptually and in actual terms
- Precision—Indicator can be measured accurately and is operational with clear, well specified definitions that describe what exactly is being measured. Indicator is therefore both sensitive enough to detect any changes in the situation as well as being specific.
- Independence—Indicator measures only one aspect of performance/clearly depicts a specific level of performance
- Timeliness—Indicator can be easily measured at appropriate intervals relevant to the activities or programs being implemented
- Ease—Data relating to the indicator is available and easy to collect

Of the 29 indicators proposed by the PMIS task force, eight were rejected and a number of amendments were made to some of the others. One new indicator was added—this raised the total to 22 consisting of 9 stock management and item availability indicators, 6 rational medicine use and quality of care indicators, 5 human resource development and workload indicators, and 2 medicine financing indicators. Refer to annexes 3 and 4 for a summary of the proposed PMIS indicators and the final list of indicators adopted at the workshop.

The workshop attendees also agreed on implementation plans specifying activities, responsible persons, and timelines. This was to guide subsequent activities leading to the official launch of the system and implementation at all levels.

Implementation Plans, SOPs and Data Collection Tools

The initial draft implementation plan was developed during the national consensus meeting, then further refined by the task force. The plan outlined key activities and processes leading to the launch and implementation of the system nationwide. The key steps of the implementation plan are listed in box 4 below. Refer to annex 5 for the detailed implementation plan and the time frame for activities

Box 4. PMIS Implementation Plan

1. Develop PMIS manual and tools
2. Field test tools
3. Review tools and manual
4. Develop training modules
5. Present PMIS to the MoHSS Policy and Management Development and Review Committee (PMDRC) for approval
6. Print manual and other documents
7. Officially launch PMIS and conduct training for regional representatives
8. Conduct training at regional/facility level—where regional representatives train pharmacy and other staff
9. Implement PMIS at all levels
10. Report and give feedback

Development of PMIS User Manuals and Training Modules

A comprehensive PMIS user manual for use as a reference at the facilities was developed. The manual has five sections, which are—

1. Section 1: Introduction, PMIS implementation plan, data collection, and reporting schedule and instructions on how to use the manual
2. Section 2: SOPs/detailed description of each of the indicators
3. Section 3: Sample tally sheets and user notes explaining how to use the tally sheets for data collection
4. Section 4: Training materials for use in training users at regional and facilities levels

Official Launch, Training, and Provision of Hardware/Software

The system was officially launched by the Permanent Secretary, MoHSS. The occasion was also used to distribute computers to all 13 regions to support data processing and reporting and for use in the planned computerization of the system.

The official launch was followed by a two-day training workshop for regional representatives who would help trainees develop the knowledge and skills required for the implementation of PMIS at the regions and facilities.

The training workshop's main objectives were—

- Introduce the participants (regional representatives) to MIS, PMIS, and M&E
- Explain how to use the PMIS manuals

- Introduce PMIS indicators, data collection tools (tally sheets, user notes, forms), the data collection process, reporting schedules, and implementation plan
- Conduct training on procedures for data collection, analysis and reporting
- Discuss how to use information derived from analysis of PMIS reports for M&E, planning, and decision making

PMIS manuals and additional blank tally sheets were distributed to all facilities in readiness for the regional training workshops and implementation.

A series of regional PMIS training workshops were then conducted for pharmacy staff and other potential users of the system at the facilities. The regional representatives who were trained at the national PMIS workshop were the main facilitators at these workshops with RPM Plus and MoHSS providing additional support where required.

Implementation at Facility Level—Data Collection and Reporting

Implementation of PMIS at facility level began during the third quarter of 2007/08 with data collection for quarterly indicators as per the PMIS data collection and reporting schedule. Initial challenges encountered during this period included—

- Failure of a number of facilities to begin implementation on schedule
- Failure to collect data for all the required indicators for the quarter by some facilities
- Incomplete data collection
- Inaccurate data
- Inaccurate computation of the indicators

Therefore, this initial period required enhanced support and supervision of the facilities that was provided by regional pharmacists, with funding from the RPM Plus program and subsequently continued under the SPS program, and staff from MoHSS national level. PMIS supervisory checklists and tools were developed to facilitate this process and help identify problem areas.

Information Flow and Data Management

To enhance reporting and feedback, an elaborate system for upward data collection and reporting from facility level and downward feedback from regional and national levels was developed. In addition, there was lateral sharing of information with other MoHSS divisions, directorates, and programs. The information flow can be represented schematically as follows:

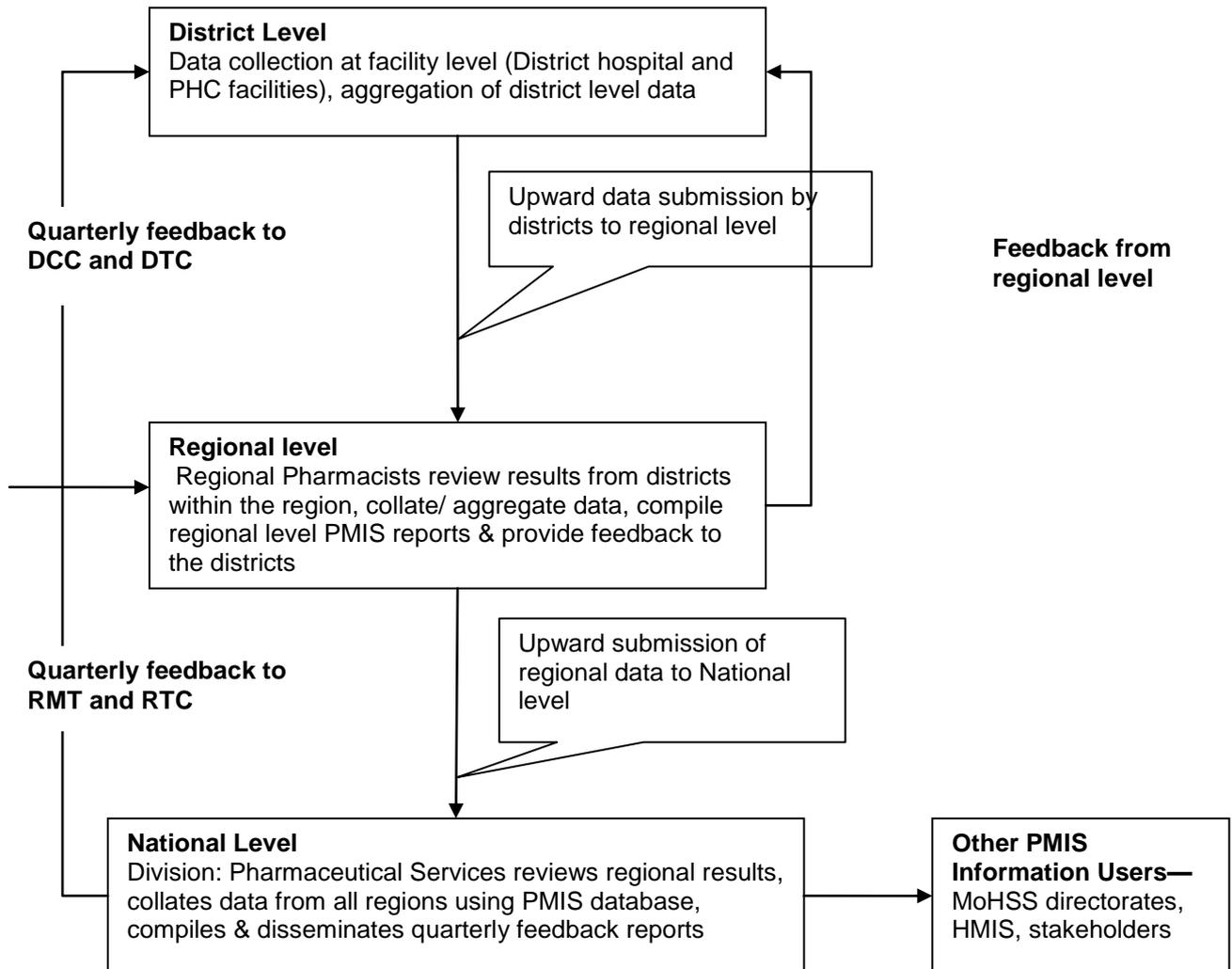


Figure 2. Data and Information Flow Scheme

Electronic Reporting System and PMIS Database

From inception in July 2007 to the third quarter of 2008/09, Excel spreadsheets were used in processing and aggregating data from the regions at national level. Data was submitted manually using a paper-based system with summary reports/tally sheets exchanged between the various levels by fax or through e-mail.

To improve efficiency in data submission and processing, an electronic system for data submission from regional level and a PMIS database at national level were implemented in April 2009. Because paper-based tally sheets were replaced with electronic tally sheets, regional pharmacists were required to input data from their districts on to these tally sheets which were then submitted electronically through an e-mail based system. The database was automatically populated once the information on the tally sheets had been verified and accepted.

A variety of reports covering different indicators could be produced from the database. Queries could also be run on the database to obtain specific information. In addition, data can be exported from the database to excel for further manipulation such as production of graphs and tables. Below is a summary of the infrastructural requirements, design, and operation of the PMIS database.

Design, Set-up, and Operation of PMIS Database

Infrastructure

- National level-division: pharmaceutical service
 - Hardware: desktop PC
 - Software: PMIS Access database to store PMIS data. This is linked to an MS InfoPath application for generating XML data entry forms and MS Outlook mail to send the data forms to the regions
 - Internet connection
- Regional level: regional pharmacists' offices
 - Hardware: desktop PC
 - Software: MS InfoPath for completing electronic data forms and MS Outlook mail to receive forms and send data to national level
 - Dial-up internet connection

Process

- Frequency
 - Seven forms sent out quarterly to capture data for indicators reported quarterly
 - Ten forms sent out semiannually to capture data on those indicators reported quarterly and every six months
 - Fourteen forms sent out at the end of the financial year to capture data on the indicators reported quarterly, semiannually, and annually.
- Procedure
 - At the end of each quarter, Division Pharmaceutical Services generates the relevant InfoPath-based electronic forms from the PMIS database and e-mails them to regional pharmacists
 - Regional pharmacists receive electronic forms and input data from each of the districts into the relevant forms

- Regional pharmacists submit forms to Division of Pharmaceutical Services using MS InfoPath/MS Outlook
- Receipt— Forms received and flagged as unchecked by the database
- Verification—Forms checked for completeness, accuracy, and duplication, and flagged as verified
- Data from forms automatically uploaded into database on change of status from unchecked to verified
- Using the reports module of the database, pre-designed queries run on database to compute values for indicators for each district and region, and nationally
- Feedback reports compiled and disseminated to districts, regions, and other stakeholder

NATIONAL PMIS FEEDBACK REPORTS

National quarterly feedback reports are produced at the end of each quarter. The structure of the feedback report is detailed below:

Introduction

This is a general overview of the report and covers issues of timeliness of submission of regional reports, data quality, and identified challenges/weaknesses. The introduction also highlights best practices that give other regions the opportunity to learn from regions which are performing well or have been innovative in either the collection or use of PMIS data.

In this section, a detailed analysis and report of timeliness and completeness of reports from the regions is made. In addition, any problems with data quality are highlighted and remedial measures recommended for the regions.

Summary of Regional Indicator Results

This is a summary of each region's performance for the indicators reported during the particular quarter, presented in a tabular form. Regional results for each of the indicators are evaluated against the standards (target and acceptable results) and scored as either having met the standards or not. An overall score for each region for the quarter is then calculated. For each indicator, results from the regions are aggregated to obtain an average value for that indicator nationally. This section is meant to be a quick reference showing performance in various areas.

Detailed Analysis of Regional Indicator Results

For each of the indicators, a detailed analysis of the results is made. Indicator results for the current quarter are compared against previous quarters to determine trends in performance. This is done for each region and for the national result, and is displayed graphically using bar charts. Best practices are highlighted and regions that have performed exceptionally well are recommended.

Possible explanations for the observed trends are advanced and various options for interventions recommended for the regions to address weaknesses or areas of poor performance.

Recommendations and the Way Forward

This section contains a summary of recommendations on various areas. This may include recommendations on particular indicators or on other issues such as report submission or data quality. It also usually contains information on the indicators to be assessed during the following quarter and specific PMIS related activities to be conducted such as training workshops or supportive supervisory visits.

Dissemination of National PMIS Feedback Reports

National PMIS reports are usually disseminated about 1 to 2 months after the end of the quarter. The 1 to 2 month period allows for upward data submission between various levels and for the compilation of the national report. The reports are disseminated both electronically via e-mail and by hard copies.

Within each region, a copy of the report is sent to the regional director (for sharing with the regional management team), regional pharmacists (to be shared with the regional therapeutic committees (TCs), principal medical officers for each district (to be shared with the district coordinating committees), and facility pharmacists/ pharmacist's assistants (to be shared with the district TCs). Copies of the report are also sent to other MoHSS directorates and departments and other stakeholders such as program managers and development partners.

EMPOWERING REGIONS/FACILITIES TO USE PMIS DATA

A key objective of implementing PMIS in the country is to provide facilities with information which can be used to guide management decisions and planning. It is therefore important that facilities are able to not only generate and analyze data but also use it for identifying weaknesses in performance or service delivery and take corrective action.

To achieve this goal, regional and district therapeutics committees have been strengthened so they can adequately address therapeutic and medicine use problems identified from PMIS data. In addition, regional management teams and district coordinating committees that are responsible for overall administration of health services at regional and district levels receive PMIS reports and are expected to work with their respective TCs in addressing highlighted problems and challenges

The PMIS is also a useful tool for regional supportive supervisory visits to the districts by regional pharmacists. It provides information for benchmarking performance for each district and allows for monitoring trends and comparison between districts. By using information derived from PMIS to measure practices and identify problem areas, regional pharmacists and district pharmaceutical staff can perform further in-depth analyses such as prescription reviews to determine the nature of problems. This makes the design of appropriate interventions possible.

Achievements

The following achievements have been attained so far.

- Production of timely reports by facilities in all regions.
- Production by national level of national quarterly feedback reports. These are circulated to all regions and districts. See figures 3 and 4 below for graphs showing trends for two of the PMIS indicators.
- Implementation by regions of interventions to address shortcomings highlighted by PMIS results. Some of the interventions include
 - Conducting regional training workshops on inventory management and rational medicines use addressing specific problems identified through PMIS.
 - Conducting further in-depth analyses to characterize and define possible medicine use problems highlighted through PMIS by carrying out medicine use evaluations and prescription reviews.
 - Enhancing supportive supervisory visits to the district facilities by regional pharmacists to address specific challenges highlighted through PMIS and using PMIS results to monitor subsequent performance
- Implementation of PMIS database and an electronic system for submission of data/reports from regional to national level.

Some key areas where PMIS data and information has been useful include—

- Monitoring key medicines availability in all facilities
- Assessing medicines use at facilities
- Monitoring supply and expenditure on medicines
- Monitoring workload at pharmacies for human resource planning for pharmaceutical services

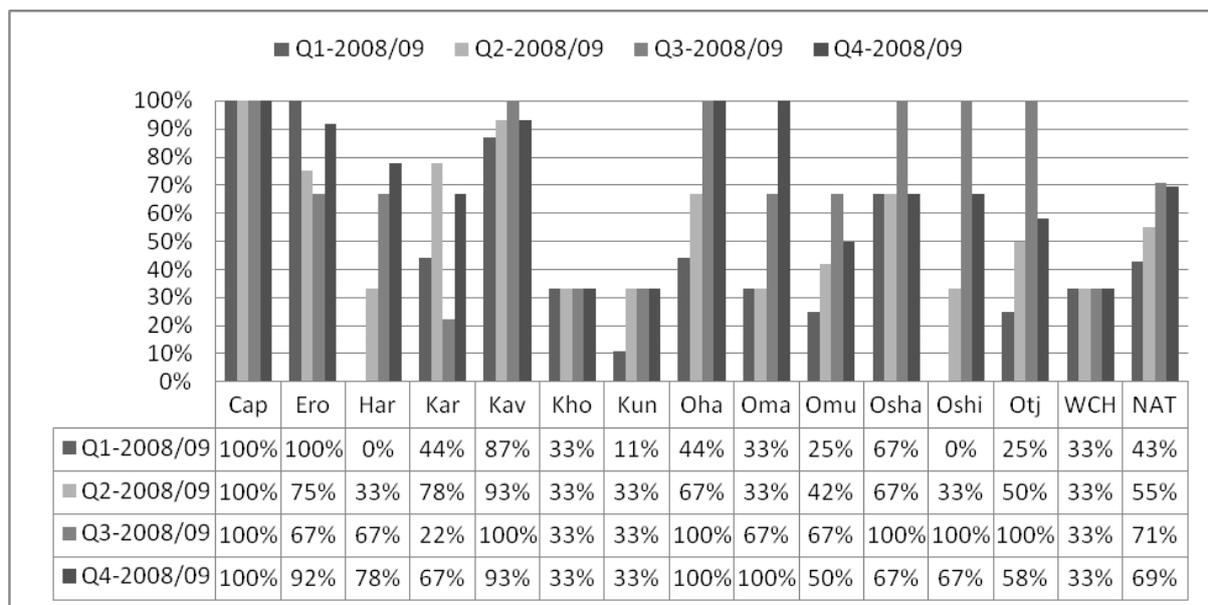


Figure 3. HF 14–Therapeutics Committee Meetings Held and Recorded Quarterly, %

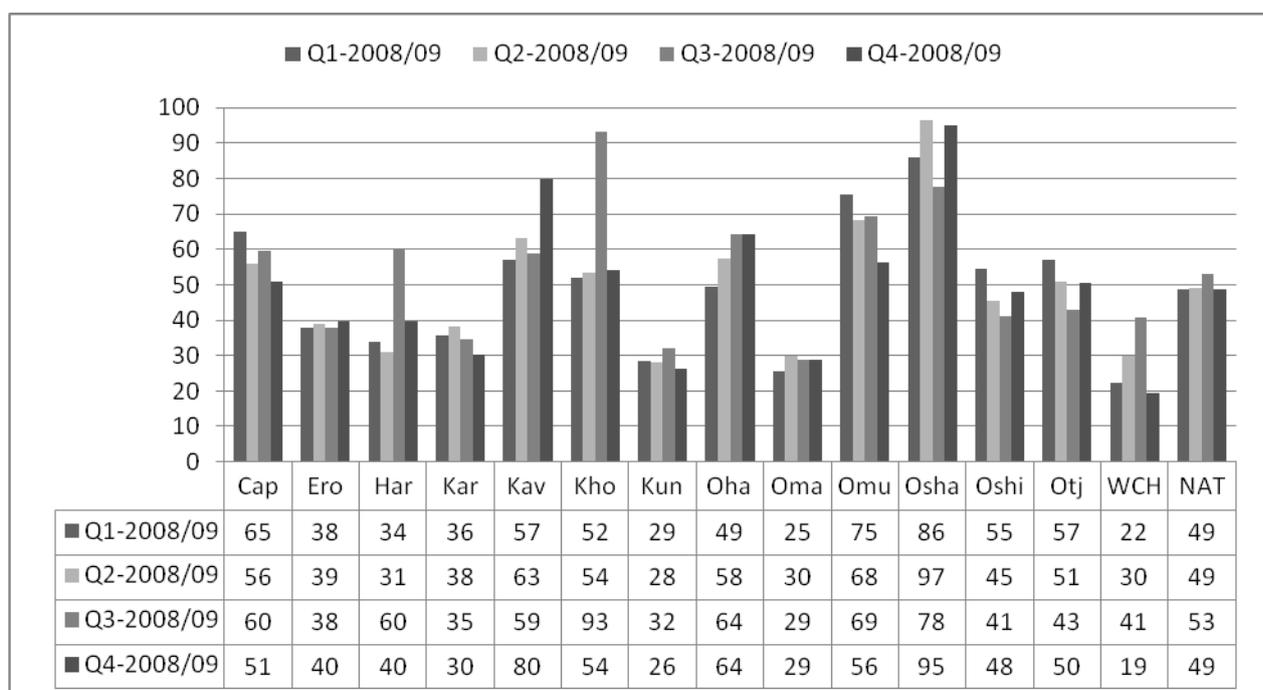


Figure 4. HF 20–Average Number of Prescriptions per Dispenser per Day

CHALLENGES

A number of challenges have been experienced in the implementation of PMIS in the country. The main ones are—

- Timeliness of report submission
- Completeness of reports
- Issues of data quality
- Limited utilization of PMIS data in some facilities/regions

These have been addressed through conducting additional training sessions for the staff at the facilities or via supportive supervisory visits carried out by regional pharmacists or national level staff. The Strengthening Pharmaceutical Systems Program in partnership with MoHSS also provides additional technical assistance to the regions and facilities to address these challenges.

Way Forward

A national PMIS review workshop is planned for June 2010 where progress in implementing PMIS at all levels will be evaluated. The workshop will also review and reassess the indicators and procedures used for data collection, processing, and reporting with the aim of incorporating feedback from the users to improve the usefulness and relevance of the system.

During the next phases of implementation, priority will be given to addressing issues of data quality especially with regard to collection, validation, aggregation, and reporting. This is aimed at ensuring the integrity, accuracy, and reliability of information derived from the system.

Finally, and as recommended in the assessment of pharmaceutical MIS and M&E systems in 2004, the issue of getting a number of key PMIS indicators incorporated into the national essential indicator framework will be also prioritized. This is aimed at having these indicators routinely reported alongside other HMIS indicators thereby increasing access to and use of these indicators by managers and other stakeholders within the health system.

ANNEX 1. SUMMARY OF THE FINDINGS OF THE ASSESSMENT OF PMIS AND M&E SYSTEMS IN NAMIBIA

Monitoring

- A structured routine drug monitoring system does not exist
- Monitoring done through irregular supervisory visits
- A feedback mechanism is not in place
- Special surveys are conducted every two years to capture the current status on implementation of the national medicine policy and assess stock availability

Evaluation

- Strategies and methods are not in place to conduct in-depth analysis on factors contributing to success and causes of indicated problems.

Management Information System

- Facilities do not record/report on medicine consumption and stock position
- Supervisory visits are irregular and do not have documented guidelines
- Regular health information system does not include medicine-related indicators except for the periodic calculation of cost and human related ratios
- Sample survey is conducted every two years to calculate drug indicators
- Service centers (hospitals and health centers) are not computerized

Use of Information at Various Levels

- Service centers do not collect data on medicine consumption and stock position on a regular basis and therefore do not have information to refer to for decision making
- Higher levels have medicine related information based on—
 - Irregular supervisory visits
 - Sample surveys (every two years)
- CMS/RMS do not produce management indicators on a regular basis
- Lack of actual consumption data from the service centers forces the belief that whatever is distributed is consumed

National Health Information System

- HIS is severely understaffed. Only 3 out of 13 regional HIS positions are filled
- There are adequate computing facilities, but more training is needed
- HIS does not include pharmacy information
- HIS under review by a team of external consultants
- HIS management advised to include a focal person from pharmaceutical sector in the HIS committee
- HIS management has asked for suggestions on one or two pharmacy indicators for inclusion in the regular HIS

ANNEX 2. RECOMMENDATIONS FROM THE ASSESSMENT OF PMIS AND M&E SYSTEMS IN NAMIBIA

A. M&E plan—Development of a M&E plan for pharmaceutical services recommended with monitoring activities divided into the following 4 categories.

I. Weekly activity monitoring

- a. Involve monitoring weekly consumption of medicines and stock position
- b. Source of data to be used in quantification and ordering of pharmaceutical supplies

II. Monthly activity monitoring

- a. Aggregate data/ information from weekly activity monitoring
- b. Problems discussed and ways to solve problems identified
- c. Report shared with HIS and RMS/CMS as appropriate

III. Supervisory/inspection visits

- a. To be carried out at the end of each quarter
- b. A standard checklist to be used
- c. Feedback reports compiled by the supervisor - based on the results on the assessment to be sent to the respective health facilities

IV. Yearly evaluation

- a. Based on the monitoring results during the past year
- b. One or two areas chosen on priority basis and an in-depth analysis conducted to find reasons leading to the problem
- c. Develop a list of recommendations for improving pharmaceutical services

B. Indicators—The report also recommended two categories of indicators to be used at facility level and at CMS/RMS.

I. Indicators related to pharmaceutical services at facilities with the primary data collected by facilities on a routine basis or through supervisory visits. These would cover the following areas.

- a. Medicine availability and stock management—
 - i. Quantity of essential medicines received consumed, expired, lost with the data sources being stock cards and dispensing registers
 - ii. Number of days that essential medicines by type was out of stock
 - iii. Number of essential medicines whose physical count did not exactly match the record in the bin
- b. Quality
 - i. Average number of prescriptions dispensed per day per dispenser
 - ii. Average number of medicines per prescription

- iii. Percentage of medicines actually dispensed
- a. Legislation and regulation
 - i. Percentage of drug outlets (both private and public) inspected
 - ii. Percentage of drug outlets (both private and public) in violation of relevant rules and regulations
- II. Indicators related to drug supply management at CMS/RMS—This covers indicators related to procurement, management, and supplies of medicines through the CMS and RMS. The following areas would be covered.
 - a. Financial
 - i. Total salary and staff benefits
 - ii. Total vehicle maintenance and repair costs
 - iii. Total CMS operating costs
 - iv. Total operating costs as a percentage of inventory value
 - b. Public sector procurement procedures
 - i. Average lead time (in months) for all complete orders delivered during the period by suppliers
 - ii. Current inventory level expressed in months of consumption
 - iii. Percentage value of medicines purchased through competitive tender out of value of medicines purchased
 - iv. Value of inventory at end of period
 - v. Percentage of number of medicines/ batches tested out of number of medicines/batches procured
 - c. Inventory Management
 - i. Number of days each medicine was out of stock
 - ii. Value of all stock losses (by reason of expiry, damage, and others) as a percentage of value of inventory at end of period
 - iii. Percentage of vital medicines out of stock
 - d. Distribution
 - i. Number of customer orders dispatched
 - ii. Percentage of customer orders dispatched on schedule out of total orders dispatched
 - iii. Number of non-scheduled (emergency) orders received from each of the customers

C. Management Information System

I. Data collection

- a. All facilities need to collect consumption and stock data
- b. Develop appropriate data collection tools
- c. Data collection in electronic form needs to be explored (e.g. use of PDA)
- d. Mechanisms and procedures for data validity check should form part of the system

II. Data processing

- a. Data processing should be automated where possible

III. Information presentation

- a. Information should be presented in a way that facilitates easy interpretation and use
- b. Use of visual mediums such as graphs and charts should be encouraged
- c. If indicators are used in the report, they should be clearly defined with data source and scope of coverage

IV. Use of information

- a. Develop tools and procedures that facilitates use of information
- b. Conduct periodic reviews, hold discussions with peers, and share information

V. Computerization

- a. Service centers to be computerized where possible
- b. Computerization to be done with careful planning
- c. Manual system must be conceptually tested before computerization
- d. Use of modern technology (e.g., web-based applications) to be explored for sharing information

ANNEX 3. PROPOSED PMIS INDICATORS

Indicator	Rationale
Stock Management and Item Availability	
% of key items available in pharmacy	To monitor how the procurement and distribution systems have achieved the objective of making medicines available at all levels at all times. Comparison of data from different facilities can show where extra attention is needed.
% of facilities with all key medicines in stock	To monitor the extent of availability of medicines in a region or the nation
% of facilities out of stock of condoms	To monitor the extent of availability of this key commodity in the fight against AIDS
% of medicines actually dispensed	To measure the ability of a health facility to meet the needs of its users. It is also linked to the availability of medicines.
No. of days per quarter any ARV medicine (normally kept) has been out of stock	To measure the ability of the procurement and distribution system to maintain a constant supply of these medicines of public health concern. The indicator differs from % availability that is measured over time.
% of stock cards whose balance is the same as physical stock (clinics, health centers and hospitals)	To monitor accuracy of usage of stock cards
% of stock cards where physical count and record count is less than 10% variation	To measure the degree of accuracy of records (degree to which the records reflect real stock levels). Inaccurate records are unreliable in monitoring the status of inventory, estimating future needs, and controlling pilferage and wastage of stock.
% of stock cards correctly completed (hospitals)	To monitor complete use of stock cards. Stock cards are an important tool of stock record keeping. They should act as a "one-stop document." Completeness and accuracy make them reliable and useful
% of items no stock from medical stores per main order	To determine the level of service from medical stores; to offer some explanation as to why % availability of key drugs may be as it is; to identify discrepancies between facilities, regions, and medical stores.
% of items received from medical stores per main order with expiry date < or = 3 months	To monitor the extent to which medical stores adhere to the requirement of not distributing stock with 3 months or less shelf life; to correlate this indicator with the wastage rate.
Annual wastage rate (% of expenditure on expired items)	To monitor the level of wastage due to expiry. May be due to poor stock management or poor distribution system
% of days that the temperature of the medicine refrigerator was within acceptable range	To monitor the extent of adherence to specified storage conditions
% of facilities that had the temperature of medicine refrigerator within acceptable range for more than 90% of days	To monitor the extent of good storage practices in a region or nation.
Rational Use of Medicines and Quality of Care	
% of vital reference material available in the pharmacy	To determine availability of basic reference materials (e.g., Nemlist, STGs). Overall availability of STGs measure the extent of availability of unbiased information—one of the conditions of promoting appropriate medicines use.
% of essential reference material available in the pharmacy	
Average number of medicines per outpatient (OP) prescription	To describe prescribers' behavior. Too high or too low an average number may indicate poor prescription practices and irrational medicine use
% of generic names per outpatient prescription	Using generic names ensures common language among health care providers. It eliminates the need for a dispenser to seek permission from the prescriber for generic substitution when brand names are used.

Indicator	Rationale
% of outpatient prescriptions with an antibiotic	To assess the extent of antibiotic use to promote their rational use. Misuse of antibiotics has resulted in treatment failures, resistance, and wastage of resources
% Therapeutic Committee meetings held and minutes taken out of number planned	To monitor the existence and functionality of TCs in facilities as they are an important mechanism for controlling medicine utilization and promoting rational medicine use.
% of patients returning on time to collect refill prescriptions (ART)	To monitor rate of default among patients on ART. Such defaulting has a potentially serious impact on public health
Human Resource Development and Workload	
Population per pharmacist	To measure access to skilled pharmacy personnel; to compare equitable distribution of skilled pharmacy personnel; where ratio of population per trained pharmacy personnel is high, to use figures to plan recruitment and training
Population per pharmacist's assistant	
Ratio of vacant to filled pharmacists posts	To measure the extent to which established pharmacists' need has been fulfilled; use data to motivate for the recruitment of more staff
Ratio of vacant to filled pharmacist's assistant posts	To measure the extent to which established pharmacist's assistants' needs have been fulfilled; use data to motivate for recruitment of more staff
Average number of prescriptions received at pharmacy per dispenser	To assess the workload of dispensers; to act as a basis for distribution of dispensers
Medicine Financing	
Annual expenditure/ capita on pharmaceuticals and clinical supplies	To measure the adequacy of financing of medicines and related supplies
Annual expenditure/capita on pharmaceuticals per district	To assess equity of distribution of pharmaceutical budget; to compare expenditure of different districts and identify problem areas
Annual expenditure/capita on clinical supplies per district	
% expenditure spent on ARVs and related supplies	To assess what percentage of the pharmaceutical budget is used for procurement of ARVs and related supplies.

ANNEX 4. FINAL LIST OF PMIS INDICATORS

No.	Indicator	Data collected by	Data collected from	Tool	Target Value, %	Acceptable value, %	Frequency
Stock Management and Item Availability							
HF1.	% of key items available in the pharmacy	Pharmacist's assistants, hospital pharmacist	Stock cards/ physical count	Tally sheet 1	100	100	Quarterly
HF 2	% of facilities with all key items in stock	Pharmacist's Assistants, hospital & regional pharmacists	Results of Indicator HF1	None	100%	100	Quarterly
HF 3	% of medicines actually dispensed	Pharmacist's Assistants, hospital pharmacists	Out-patient prescriptions	Tally sheet 7	100%	90	6 Monthly
HF 4	Number of days per quarter each ARV medicine (normally kept) has been out of stock in the pharmacy	Pharmacist's Assistants, hospital pharmacists	Stock cards	Tally sheet 2	0	0	Monthly & reporting quarterly
HF 5	% of stock cards whose balance is same as physical stock	Pharmacist's assistants, hospital/regional pharmacists					
HF 6	% of items received from medical stores per main order	Pharmacist's assistants, hospital pharmacists	Delivery notes, order books	Tally sheet 4	100%	90	Annually
HF 7	Annual wastage rate (% expenditure on expired and other wasted stock)	Pharmacist's assistants, hospital pharmacists	Expired medicines registers & invoices	Tally sheet 9 & expired medicines registers	0%	< 2	Monthly report annually
HF 8	% of days that the temperature of the medicines refrigerator was/ were within acceptable range (2-8 °C)	Pharmacist's assistants, hospital pharmacists	fridge temperature record charts	Fridge temperature charts and supervisory checklists	100%	100%	Quarterly
HF 9	% of days that the temperature of the main store was less than 30 °C	Pharmacist's assistants, hospital pharmacists	Store temperature chart	Tally sheet 5, store temp. chart	100%	95%	6 monthly
Rational Use of Medicines & Quality of Care Indicators							
HF 10	% vital reference materials available in the pharmacy	Pharmacist's assistants, hospital pharmacists	Physical check on the reference materials available in the pharmacy	Tally sheet 6	100%	90%	Annually

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No.	Indicator	Data collected by	Data collected from	Tool	Target Value, %	Acceptable value, %	Frequency
HF 11	Average number of medicines per outpatient prescription	Pharmacist's assistants, hospital pharmacists	OPD prescriptions	Tally sheet 7	2	2.5	6 monthly
HF 12	% of medicines prescribed by generic name in out-patient prescriptions	Pharmacist's assistants, hospital pharmacists	OPD prescriptions	Tally sheet 7	100%	80%	6 monthly
HF 13	% of out-patient prescriptions with an antibiotic	Pharmacist's assistants, hospital pharmacists	OPD prescriptions	Tally sheet 7	Less than 25%	Less than 35%	6 monthly
HF 14	% of therapeutics committee meetings held and minutes taken	Pharmacist's assistants, hospital pharmacist	Therapeutic committee annual plans, minutes	None	100%	50%	Quarterly
HF 15	Percent of patients who continue on ART	Pharmacist's assistants, hospital pharmacists	ART pharmacy monthly summary reports	Tally sheet 8	100%	98%	Quarterly
Human Resource Development and Workload Indicators							
HF 16	Population per pharmacist	Pharmacist's assistants, hospital pharmacists	Staff and population data	Tally sheet 9	1: 20,000	1: 20,000	Annually
HF 17	Population per pharmacist's assistant	Pharmacist's assistants, hospital pharmacists	Staff and population data	Tally sheet 9	1: 20,000	1: 20,000	Annually
HF 18	Percent of pharmacists' posts filled	Pharmacist's assistants, hospital pharmacist	Personnel files, staff establishment information/data	None	100	80%	Annually
HF 19	Percent of pharmacist's assistants' posts filled	Pharmacist's assistants, hospital pharmacists	Personnel files, staff establishment information/data	None	100	80%	Annually
HF 20	Average number of prescriptions received at pharmacy per dispenser	Pharmacist's assistants, hospital/ Regional pharmacists	Quarterly records of prescriptions processed in the pharmacy	Tally sheet 10	30 prescriptions per dispenser per day	50 prescriptions per dispenser per day	Quarterly
Medicine Financing Indicators							
HF 21	Annual expenditure per capita on pharmaceuticals and clinical supplies	Pharmacist's assistants, hospital/ Regional pharmacists	Invoices and population data	Tally sheet 9	Not set	Not set	Annually
HF 22	Percentage of total pharmaceutical expenditure spent on ARVs	Central medical stores accountant	CMS procurement invoices	None	Not set	Not set	Annually

**ANNEX 5. IMPLEMENTATION OF A NATIONAL PHARMACY MANAGEMENT
INFORMATION SYSTEM IN NAMIBIA: SUMMARY OF ACTIVITIES AND TIME
FRAMES**

Activity	Time frame
Assessment of the MIS and M&E systems in Namibia	May 2004
Formation of the PMIS task team	August 2004
Task team develops framework for PMIS <ul style="list-style-type: none"> • Review of existing MIS and reporting procedures • Determine information needs at each level of the health system • Design indicators and reporting procedures • Define roles and responsibilities of various staff and stakeholders 	October 2004–April 2005
National Consensus Building Workshop	April 2005
PMIS manual and data collection tools developed	May–August 2005
Field test tools	September–October 2005
Review and finalize PMIS manual and data collection tools	January–June 2006
PMIS training modules developed	January–June 2007
Official launch and national training workshop	July 2007
Regional training workshops	August–September 2007
Implementation of PMIS/data collection commences	October 2007
First national quarterly PMIS feedback report published	January 2008

ANNEX 6. SOP AND TALLY SHEET FOR INDICATOR HF3 (SAMPLE)

HF3: Percentage of Medicines Actually Dispensed

Explanatory note:

- For the purpose of this indicator, prescriptions to be considered should be those that have originated from a health facility being assessed.
- A medicine available as a combination of active ingredients should be counted as one, regardless of the number of active ingredients in it.
- If part of the quantity of a prescribed medicine is dispensed, then that medicine will be counted as having been dispensed.
- If a medicine is prescribed and administered, then it will be regarded as dispensed.

Purpose:

To measure the ability of a health facility to meet the needs of its users

Calculation:

- Get data from 30 randomly selected out-patient prescriptions.
- Add up the number of medicines actually dispensed.
- Add up the number of medicines prescribed.
- To get the percentage of medicines actually dispensed, take the total number of medicines actually dispensed, divide it by the total number of medicines prescribed, and multiply the result by 100.

$$\text{Percentage of medicines actually dispensed} = \frac{\text{Total number of medicines dispensed} \times 100}{\text{Total number of medicines prescribed}}$$

Source of data	Persons to collect data	Data collection tool	Frequency of collecting data	Target	Acceptable result
Outpatient prescriptions	Pharmacist's assistants, hospital pharmacists	Tally sheet 7	Every six months	100%	90%

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**TALLY SHEET 7: For Calculation of Indicators HF3, 11, 12 and 13
Data to be collected from 30 prescriptions in February and August each year**

DISTRICT:
MONTH:

REGION:
FINANCIAL YEAR:

	Column 1	Column 2	Column 3	Column 4
Case No	No. of items prescribed	No. prescribed by generic name	Antibiotic prescribed? (1 = yes; 2 = No)	No. of items dispensed
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				
	(A)	(B)	(C)	(D)

Indicator HF11: Average no. of medicines per prescription:

$$\frac{A}{30} = \underline{\hspace{2cm}}$$

Indicator HF12: % of medicines prescribed by generic name:

$$\frac{(B \times 100)}{A} = \underline{\hspace{2cm}}$$

Indicator HF13: % of prescriptions containing an antibiotic:

$$\frac{(C \times 100)}{A} = \underline{\hspace{2cm}}$$

Indicator HF3: % of items dispensed:

$$\frac{(D \times 100)}{A} = \underline{\hspace{2cm}}$$

ANNEX 7. KEY ITEMS FOR ASSESSMENT OF PMIS INDICATORS HF1 AND HF2

1. **All EPI vaccines**—BCG, DPT, DT, measles, polio
2. **All emergency trolley medicines**—adrenalin 1:1000 injection, atropine 0.5 mg injection, aminophylline 250 mg injection, calcium gluconate 10% injection, dextrose 50% injection, furosemide 20 mg injection, dihydrallazine 25 mg injection, hydrocortisone 100 mg injection, lignocaine 2% injection, naloxone 0.4 mg injection, naloxone 0.04 mg injection, promethazine 25 mg injection, sodium bicarbonate 8.5%, sodium bicarbonate 4.0%, sterile water for injection, balance electrolyte solution 1 L, plasma expander 500 mL, sodium chloride 0.9%, 200 mL, dextrose 5% 200 mL
3. Oral rehydration salts
4. Tetanus Toxoid
5. Condoms
6. Artemether/lumefantrine
7. **All STI medicines**—Doxycycline 100 mg tabs, Ciprofloxacin 500 mg tabs, Ceftriaxone 250 mg inj, Metronidazole 400 mg tabs, Clotrimazole pessaries 500 mg
8. **All first-line TB medicines**- RHZE 150/75/400/275, RHE 150/75/275, RH 150/75, RHZ 60/30/150, RH 60/30, INH
9. Soluble insulin
10. Salbutamol nebulizer solution

**ANNEX 8. NEMLIST MEDICINES CLASSIFIED AS ANTIBIOTICS (FOR USE
WHEN ASSESSING INDICATOR HF13)**

Amikacin
Amoxicillin
Ampicillin
Azithromycin
Benzathine benzylpenicillin
Benzyl + benzathine + procaine penicillin
Benzyl Penicillin
Cefalothin
Cefradine
Ceftriaxone
Cefuroxime
Chloramphenicol
Ciprofloxacin
Clindamycin
Cloxacillin
Co-trimoxazole
Doxycycline
Erythromycin
Fusidic acid
Gentamycin
Metronidazole
Nalidixic acid
Nitrofurantoin
Phenoxymethylpenicillin
Piperacillin + tazobactam
Procaine Benzyl Penicillin

