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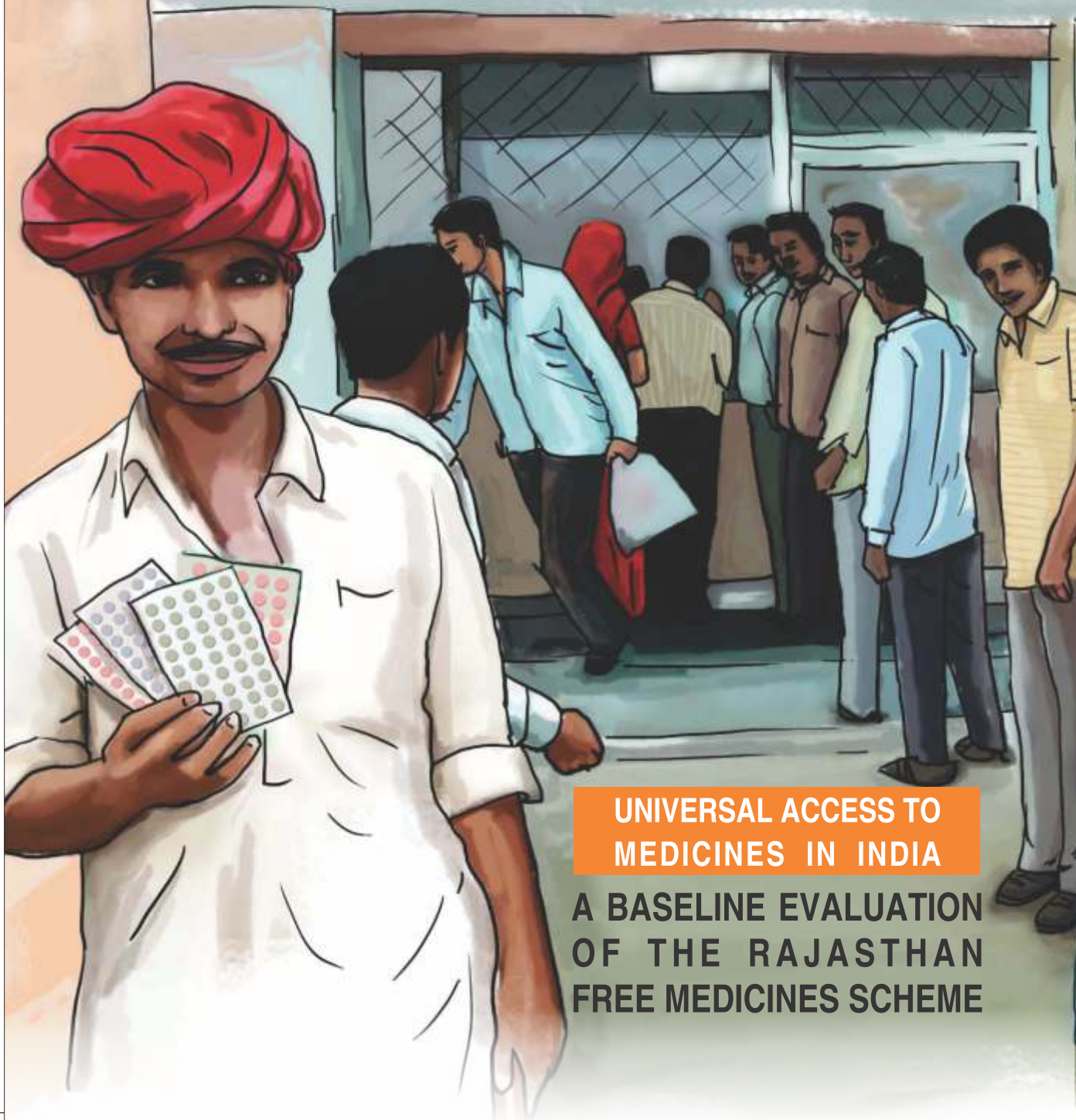
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UNIVERSAL ACCESS TO
MEDICINES IN INDIA

A BASELINE EVALUATION
OF THE RAJASTHAN
FREE MEDICINES SCHEME

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TABLE OF CONTENTS

PREFACE	i
ACKNOWLEDGEMENTS	iii
LIST OF CONTRIBUTORS	v
WHO OVERSIGHT TEAM OF EXPERTS	v
ABBREVIATIONS	vi
EXECUTIVE SUMMARY	1
CHAPTER 1 - CONTEXTUALIZING	4
1.1 INTRODUCTION	4
1.2 RAJASTHAN CHIEF MINISTER'S FREE MEDICINE SCHEME	6
1.3 OBJECTIVES OF THE STUDY	6
1.4 SCHEME OF THE REPORT	7
CHAPTER 2 - METHODOLOGY	9
2.1 INTRODUCTION	9
2.2 SAMPLING	10
2.2.1 FIRST STAGE SAMPLING: SELECTION OF DISTRICTS (30% OF TOTAL NUMBER OF DISTRICTS)	10
2.2.2 SECOND STAGE SAMPLING: SELECTION OF HEALTH FACILITIES	11
2.3 SAMPLE SIZE	12
2.4 DESCRIPTION OF SURVEY INSTRUMENTS	13
2.4.1 ASSESSMENT OF MEDICINE POLICIES	14
2.4.2 BASKET OF ESSENTIAL MEDICINES	14
2.4.3 ASSESSING AVAILABILITY AND STOCK-OUTS	14
2.4.4 PRESCRIPTION AUDITS	15
2.5 SECONDARY DATA	15
2.6 ETHICAL CLEARANCE	16
CHAPTER 3 - AN ASSESSMENT OF RAJASTHAN'S HEALTH SYSTEM	17
3.1 INTRODUCTION	17
3.2 DEMOGRAPHIC AND SOCIOECONOMIC BACKGROUND OF RAJASTHAN	17
3.3 PUBLIC HEALTH SYSTEM IN RAJASTHAN	19

3.3.1	AVAILABILITY OF HEALTH-CARE INSTITUTIONS	19
3.3.2	HEALTH WORKFORCE IN RAJASTHAN PUBLIC HEALTH SYSTEM	20
3.4	CONDITION OF MEDICINE STORAGE ACROSS FACILITIES SURVEYED	22
3.5	RECENT TRENDS IN OUTPATIENT AND INPATIENT EPISODES	24
3.6	STATUS OF PRIVATE PHARMACIES	27
3.7	CONCLUSION	30
CHAPTER 4 - FINANCING MEDICINES IN RAJASTHAN		31
4.1	INTRODUCTION	31
4.2	SPENDING ON MEDICINES: AN INTERSTATE COMPARISON	31
4.3	TRENDS IN PUBLIC SPENDING ON MEDICINES IN RAJASTHAN	38
4.4	CONCLUDING REMARKS	44
CHAPTER 5 - MEDICINE PROCUREMENT AND DISTRIBUTION SYSTEMS IN RAJASTHAN		45
5.1	DESCRIPTION OF DIFFERENT PROCUREMENT MODELS IN INDIA	45
5.1.1	GOVERNANCE IN MEDICINE PROCUREMENT	46
5.1.2	GOVERNANCE IN MEDICINE PROCUREMENT IN RAJASTHAN	47
5.2	PREPARATION OF EML AND ITS QUANTIFICATION	48
5.3	TENDERING OF MEDICINES	49
5.4	QUALITY ASSURANCE MECHANISM OF RMSC	55
5.5	SUPPLY CHAIN MANAGEMENT AT RMSC	56
5.6	DISCUSSION ON RMSC PROCUREMENT PROCESSES	59
CHAPTER 6 - UTILIZATION, AVAILABILITY AND STOCK-OUTS OF MEDICINES IN RAJASTHAN FACILITIES		61
6.1.	INTRODUCTION	61
6.2.	ABC ANALYSIS OF DISBURSEMENT OF MEDICINES	62
6.2.1	ANALYSIS OF CATEGORY "A" MEDICINES BY THERAPEUTIC CLASSIFICATIONS	65
6.2.2	DECOMPOSITION OF THERAPEUTIC CATEGORY J (ANTI-INFECTIVE FOR SYSTEMIC USE)	67
6.3	AVAILABILITY AND STOCKOUT	99
6.3.1	AVAILABILITY AND STOCK-OUT ACROSS DISTRICTS	70
6.3.2	AVAILABILITY AND STOCK-OUT OF MEDICINES BY THERAPEUTIC CATEGORIES	72
6.3.3.	STOCK-OUTS BY FACILITIES AND THERAPEUTIC CATEGORIES	74
6.4	KEY OBSERVATIONS	75

CHAPTER 7 - RATIONAL USE OF MEDICINES	76
7.1 INTRODUCTION	76
7.2 METHOD	77
7.3 ANALYSIS	78
7.4 CONCLUSION	82
CHAPTER 8 - MEDICINE PROCUREMENT PRICE AND UTILIZATION	83
8.1 PUBLIC PROCUREMENT PRICES	84
8.2 PROCUREMENT VERSUS MARKET PRICES	85
8.3 ANALYSIS OF UTILIZATION PATTERNS	87
8.4 PRELIMINARY FINDINGS ON PRIVATE SECTOR TRENDS	87
CHAPTER 9 - CONCLUSIONS AND WAY FORWARD	95
9.1 CONCLUDING OBSERVATIONS	95
9.2 SURVEY CONCLUSIONS WITH REGARD TO UNIVERSAL HEALTH COVERAGE IN INDIA	98
ANNEXES	102
ANNEX 1 - LIST OF HEALTH FACILITIES SURVEYED	102
ANNEX 2 - SURVEY INSTRUMENT FOR HEALTH SYSTEM PREPAREDNESS ON ACCESS TO MEDICINE	103
ANNEX 3 - SURVEY INSTRUMENT FOR PUBLIC HEALTH FACILITIES	109
ANNEX 4 - SURVEY INSTRUMENT FOR PRIVATE PHARMACIES	112
ANNEX 5 - SURVEY INSTRUMENT FOR MEDICINE AVAILABILITY AND STOCK-OUT	114
ANNEX 6 - COMPARISON OF RMSC RATES TO TNMSC RATES	122
ANNEX 7 - COMPARISON OF RMSC RATES TO MARKET PRICES	124
ANNEX 8 - TOP THERAPEUTIC SEGMENTS ACCOUNTING FOR ~ 80% OF SALES IN 2012 (TOTAL MARKET ESTIMATED AT 710 MILLION INDIAN RUPEES)	129
ANNEX 9 - DDD FOR THIRD LEVEL OF ATC CLASSIFICATION	131
ANNEX 10 - COST OF PROCURING A SINGLE DAILY DOSE AT CURRENT PROCUREMENT RATES	132
REFERENCES	135

PREFACE

I am pleased to introduce this report of the baseline evaluation of the *Mukhyamantri Nishulk Dave Yojana*, also called the Chief Minister's Free Medicines Initiative. This initiative was launched by the Government of Rajasthan in October 2011 and was developed in compliance with the state government's commitment to provide essential medicines free of cost to all patients visiting public healthcare facilities in Rajasthan. The scheme initially began with 240 medicines and at present provides more than 600 medicines that are on the essential medicines list.

This initiative also contributes to the vision and direction of WHO's efforts in the South-East Asia Region of improving access to pharmaceuticals, a key component for advancing universal health coverage and robust health systems.

The baseline evaluation was conducted two years after the commencement of the Free Medicines Initiative. It involves an evaluation of the Rajasthan Medical Services Corporation using scientific and robust research methodology, with evidence drawn from facility surveys in addition to available secondary data. The primary objective of the study was to document evidence that could point to improved access to medicines and reduced out-of-pocket expenditure in 150 facilities included in the study. Several crucial aspects of the scheme were analyzed, such as procurement processes and patterns, trends in public investments on medicines, quality assurance processes, supply chain management processes, storage systems and processes, impact on private spending on drugs, availability and stock-out of drugs, procurement price variations and prescription patterns.

The major achievements of the scheme include: significant increase in government expenditure on medicines; establishment of the Rajasthan Medical Services Corporation to procure essential medicines and coordinate supply chain systems; procurements based on a two-bid system involving technical and financial tenders; and setting up of the *e-Aushadi* platform, an electronic management information system to facilitate smooth functioning of the entire value chain from procurement to distribution and dispensing of medicines.

The study highlighted that during the period 2013-14, ₹ 3200 million was allocated towards the scheme as against ₹ 1020 million in 2011-12. Out-of-pocket payments of households declined from 85% in 2004-05 to nearly 75% in 2011-12. There were less shortages and stock-outs and an increased availability of medicines at the primary health centre and community health centre levels. As much as 97.3% of the medicines were prescribed using their generic names.

Some of the key recommendations generated by the study were: ensuring government commitment to adequately and sustainably fund the national health system for reliable supply of essential medicines; assuring quality control mechanisms for enhanced safety and efficacy of medicines; continuous supply of high quality generic drugs; streamlining the national and state procurement and supply chain management systems; enforcing rational use of medicines, including the use of essential drug lists and standard treatment guidelines; and continued advocacy and engagement with prescribers at state and district levels.

The two-year experience of the scheme points to an overall improvement in utilization of government health services, availability of medicines at facilities, some turnaround in financial risk protection and health system expansion. We welcome and applaud the leadership of the Rajasthan government for investing more in health in the form of the Chief Minister's Free Medicines Initiative. We also trust that Rajasthan will continue to provide this leadership in ensuring the sustainability of the scheme.

We received cooperation for this study at every level and from every government functionary. Special mention should be made of the Government of Rajasthan and the Rajasthan Medical Services Corporation for their support.

The experience and evidence generated from this study clearly suggests that replication and rapid scale up of such a model in other states is both feasible and desirable. This would help progress towards a more efficient medicine procurement and distribution system and thus ensure access to medicines as a pre-condition to universal health coverage in India as well as in neighbouring countries.



Dr Nata Menabde
WHO Representative to India

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This piece owes its origin to the High Level Expert Group (HLEG) on Universal Health Coverage (UHC) (2011) report and is essentially a follow-up on the strategies and recommendations of the HLEG report. This report was expected to serve as a baseline for further evaluation in the coming years to understand the implications of scaling up funds and improving the efficiency of the procurement systems and effectiveness of supply chain systems in Rajasthan. Rajasthan took a bold and innovative step in 2011 to provide its people free medicines in public health facilities. In a sense, this is a first and critical step towards achieving universal health coverage in Rajasthan.

Two main actors and their role deserve mention at the outset, without which this report would not have been possible. The Government of Rajasthan, especially Dr Samit Sharma, the Executive Director of the Rajasthan Medical Services Corporation (RMSC) and the driving force behind the Free Medicine Initiative needs applause for providing us the necessary official clearance in time and for the transparent manner in which RMSC shared data for the analysis. Though we received cooperation at every level and from every government functionary, special mention should be made of ED Finance, ED Logistics Management, ED Procurement, ED Quality Assurance and AGM, IT of RMSC.

We thank the World Health Organization, India Country Office (WHO India) for sharing our conviction and for providing generous support for the study, in addition to the technical support and oversight provided. We would particularly like to thank Dr Madhur Gupta and Dr A Gunasekar for their continuous support, technical inputs and oversight provided during the course of the study. We are grateful to Robert Yates and Frans Stobbelaar for making very insightful comments which have helped us immensely in sharpening our findings and deepening our analysis. We are deeply indebted to them. We also express our sincere gratitude to the WHO Representative to India, Dr Nata Menabde, for her support and guidance.

The study was done in partnership with Prayas, who have shown exceptional efficiency in taking up the field work at a short time and analyzing the data. From the very beginning this partnership has evolved through mutual learning and we treasure this partnership immensely. We would like to place on record our special appreciation for Dr Narendra Gupta, not only for his guidance for the study but also for the important contribution he and his team at Prayas is making to ensure access to medicines among one of the poorest settings of the country. The survey team from Prayas including Dhruv, Sandeep and others deserve special appreciation for their meticulous efforts to collect data and information in a systematic manner.

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ABBREVIATIONS

ANM	auxiliary nurse midwife
ATC (Classification System)	Anatomical Therapeutic Chemical (Classification System)
BIMARU	Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh
CES	consumer expenditure survey
CHC	community health centre
DDC	drug dispensing centre
DDD	defined daily dose
DDW	district drug warehouse
DSPRUD	Delhi Society for the Promotion of Rational Use of Drugs
EDL	essential drugs list
EMD	earnest money deposit
EML	essential medicines list
FDC	fixed drug combination
FEFO	first expiry first out
FIFO	first-in, first-out
GDP	gross domestic product
GMP	good manufacturing practices
GoI	Government of India
HLEG	high level expert group
HR	human resources
ICT	information and communications technology
IEC	institute ethics committee
IMS	information management system
IPHS	Indian Public Health Standards

KMSCL	Kerala Medical Services Corporation Ltd.
LMIC	low- and middle-income country
MDGs	Millennium Development Goals
MNDY	Mukhyamantri Nishulk Dava Yojana
MoHFW	Ministry of Health and Family Welfare
NDDP	net district domestic product
NHA	National Health Accounts
NIT	notices inviting tender
NLEM	National List of Essential Medicines
NRHM	NATIONAL RURAL HEALTH MISSION
NSSO	National Sample Survey Office
OOP	out-of-pocket
PHC	primary health centre
PHFI	Public Health Foundation of India
PSU	public sector undertaking
RCH	reproductive and child health
RDPL	Rajasthan Drugs and Pharmaceuticals Ltd.
RHS	Rural Health Statistics
RMSC	Rajasthan Medical Services Corporation
SEARO	Regional Office for South-East Asia
SMP	state medicines policy
SSI	small scale industry
STG	standard treatment guidelines
TAC	technical advisory committee
TNMSC	Tamil Nadu Medical Services Corporation Ltd.
UHC	universal health coverage
WHO India	World Health Organization, India Country Office
WHOCC	WHO Collaborative Centre for Drug Statistics Methodology

EXECUTIVE SUMMARY

The issue of access to medicines assumes critical importance in low- and middle-income countries, as it has larger implications for health outcomes and financial risk protection in such countries. Despite India being referred to as the “pharmacy of the global south”, access to essential medicines is still elusive to a large segment of its population. Some of the key barriers that act as impediments to access include gross inadequacy of government spending on health care in general and on medicines and vaccines in particular, resulting in high out-of-pocket (OOP) payments by households; inefficient procurement systems and ineffective medicine distribution mechanisms; unaffordable market prices; and irrational prescription, dispensing and use of medicines.

Realizing the importance of access to medicines, the Rajasthan government initiated the *Mukhyamantri Nishulk Dava Yojana (MNDY)* (Chief Minister's Free Medicines Initiative) in October 2011. Some of the key features of the scheme are: significant scaling up in public spending on medicines; setting up of the Rajasthan Medical Services Corporation to procure essential medicines and coordinate supply chain systems; establishing medicine storage and transparent distribution warehouses in each of the districts; procurement based on a two-bid system involving technical and financial tenders; distribution of medicines based on a two-passbook system to ensure uninterrupted supply of medicines and supplies to the frontline health facilities from district medicine warehouses; setting up an 'e-Aushadi' platform, an advanced electronic inventory management information system, to facilitate smooth functioning of the entire value chain from procurement to distribution of medicines; and multiple layers of quality control mechanisms to promote efficacy and safety of medicines dispensed in the system.

Since the MNDY scheme is expected to have significant implications on several outcome measures, a robust evaluation of the scheme was considered necessary. Utilizing both primary and secondary data and information, the scheme was evaluated by examining the process and outcome indicators. Adopting a two-stage stratified sampling method, a survey of a large sample of 112 public health facilities in Rajasthan was carried out. Besides, the passbook database was used to understand several facets of the scheme. The Rajasthan Government's commitment is already visible with a substantial step up in allocation of funds. During 2013–14, a sum of 3200 million Indian rupees was allocated towards the scheme as against a much lower 760 million Indian rupees in 2011–12. The per capita health expenditure before the MNDY scheme was estimated to be ₹5.70 which now stands close to ₹50. 50. This has had a salutary effect on OOP reduction in the State. Early trends suggest that households' OOP payments have declined from 85% in 2004–05 to nearly 75% in 2011–12. Impoverishment caused due to high households' OOP expenditure on medicines have reduced from 3.2% to 2.1%, even though given that these results are at an early stage, we may not be able to conclusively attribute these solely to the MNDY. Allocation of funds to districts has improved dramatically, while inequality in distribution of funds across different levels of care has reduced considerably.

One of the immediate and positive spin-offs from this initiative is the rapid increase in outpatient visits and considerable increase in inpatient admissions. The combined outpatient and inpatient care visits rose quickly from 3.5 million in July 2010 to 7.8 million in July 2013. This unprecedented upsurge in patient visits could be partly due to an 'explosion' in the pent-up demand. As medicines are now available free of cost, absenteeism appears to have reduced considerably, putting pressure on the health system infrastructure to improve further. As a result, frontline public health facilities are experiencing exuberance. Acute shortages and chronic stock-outs, the hallmark of the pre-MNDY regime, have given way to far greater availability and accessibility of medicines. The survey found that the average availability of essential medicines has improved significantly, with an average of 100 essential medicines being available at the primary health centre on the survey day. The numbers for community health centres and district hospitals are around 180 and over 300, respectively.

The MNDY is also expected to influence prescription and dispensing patterns. The survey finds that on an average, 3.34 medicines are prescribed across different facilities. Of all prescribed medicines, 97.3% of the medicines were prescribed using generic names, while 86.3% of the medicines that were prescribed were of single formulations medicine as against fixed-dose medicine combinations. Antibiotics formed 30% of all the prescribed medicines. Injectables constituted 6%, liquid preparations including syrups constituted 8% and vitamins constituted 3.6% of the total preparations dispensed in public health facilities.

In general, RMSC prices did not differ by large margins from Tamil Nadu Medical Services Corporation Ltd. (TNMSC) rates; the majority of RMSC rates were within a 25% range of TNMSC rates. In fact, TNMSC rates were higher than RMSC rates for 19 medicines. As far as RMSC prices are concerned, weighted mean market prices are on average 300% higher than RMSC prices. In a few cases, RMSC rates are higher than the market price such as for anti-snake venom, factor fraction VIII, sodium chloride and dextrose injection. However, the relatively small number of suppliers for these formulations in the open market may be indicative of less competition in the specific medicine markets and somewhat limited scope for improving the public procurement rate.

The two-year experience of MNDY points to an overall improvement in utilization of government health services, availability of medicines at facilities, some turnaround in financial risk protection and health system expansion. The efficiency of the procurement process has significantly improved, while delivery of medicines and supplies has been made very effective. While the underlying reforms associated with accelerated investment are a bold and innovative step, there is need to emphasize its sustenance. Rather than treating it as a one-off project-based initiative, the Government of Rajasthan must endeavour to institutionalize these reforms. The experience and evidence generated from this study clearly suggests a replication and rapid scale up of such a model in other states, aimed at progressing towards more efficient medicine procurement and distribution.

CHAPTER 1

CONTEXTUALIZING

1.1 INTRODUCTION

The issue of medicines and vaccines is of critical importance as they are an important building block of the health system. They assume an extremely vital role in low- and middle- income countries (LMICs), as lack of access to essential medicines and vaccines leads to poor financial risk protection and substantial impoverishment. Firstly, health care financing and provision is largely a private affair in many LMICs. India perhaps leads the chart with nearly 70% of all health-care financing derived from households.^{1,2} Due to persistent underinvestment in public sector units, the private medicine market has flourished. The result is catastrophic payments on medicines being incurred by households, leaving them vulnerable to impoverishment. Expenditure on medicines accounts for a large share of the households' OOP expenditure and is a dominant reason for impoverishment. Of 100 million globally impoverished due to OOP expenditure of households,³ over 40 million reside in India.⁴ Thus, in the context of developing countries like India, ensuring availability and distribution of medicines becomes a crucial starting point to attract people towards government health services.

Poor financial risk protection of households in India due to gross underinvestment in the health sector, especially on medicines, has led to a scenario where access to essential medicines has become extremely difficult. According to several national household surveys, during the mid-1980s, approximately a third of the medicines prescribed during hospitalization in public facilities were supplied free of cost. However, during 2004, the mean availability declined sharply to roughly 9%.⁵ As far as outpatient care is concerned, free medicine supply declined from 18% to about 5 % over the same period. During the same period, the number of hospitalization episodes in which the ailing population paid OOP rose dramatically from about 41% to 72%. Since essential medicines supplies had started dwindling, in over one fourth of outpatient episodes in 2004, patients did not receive medicines because they could not afford them.

While the evidence is limited, available data from several Indian states demonstrates significant variations in the availability and stock-outs of essential medicines. For example, a recent survey in Tamil Nadu and Bihar showed that the mean availability of the selected basket of essential medicines for Bihar was about 43% as compared to 88% for Tamil Nadu,⁶ while a study by Cameron et al. (2008) noted that the median availability of critical medicines in the public health system was about 10% in Haryana, 12.5% in Karnataka, 3.3% in 12 districts of Maharashtra and 0% in West Bengal. In the city of Chennai, the figure was 30%.⁷

Several factors can influence the provision and use of essential medicines via the public health system such as poor and incomplete stocking of essential medicines due to inadequate budgetary support; poor supply chain management leading to frequent stock-outs; prevailing prescription practices leading to inessential and costlier prescriptions for medicines from outside the public health system and a lack of confidence in the quality of medicines supplied through the public system.

Health systems in several LMICs are in disarray due to persistent underinvestment. Procurement and supply chain systems involving public health-care institutions are weak and poorly governed. On the one hand, an inefficient medicine procurement system leads to sub optimal use of resources with poor value for money. A decentralised procurement system fails to optimise monopsony power, thereby leading to a bloated government budget for procuring medicines. On the other hand, an unreliable distribution system results in chronic shortages and acute stock-outs of essential medicines. However, pooled procurement models in some states of India (Tamil Nadu and Kerala) have demonstrated the effectiveness of such models in ensuring timely availability of free essential medicines and avoiding stock-outs (Sakthivel et al. 2011).⁶ To revamp the entire medicine procurement and distribution systems, the Indian Government has envisaged channelling additional funds to states to replicate the success of these pooled procurement models. Despite commitments from the Prime Minister in this regard, things have hardly progressed meaningfully.

Moreover, with the provision of free medicines, utilization of public health services is predicted to rise as a major proportion of the population will be able to access public health care when the financial barriers are removed. Success will be predicated on reforms to the drug supply systems and by regulation of the prescribing and dispensing practices. The current study is a comprehensive effort to assess the situation of access to medicines in the state of Rajasthan using standard processes and outcome measures.

1.2 RAJASTHAN CHIEF MINISTER'S FREE MEDICINE SCHEME

In an effort to address the issues outlined above, the Government of Rajasthan established the Rajasthan Medical Services Corporation (RMSC) in May 2011. The Free Medicine Initiative was launched on 02 October 2011 with the primary objective of procurement and distribution of generic medicines, surgical and diagnostic equipment for the Department of Health and Family Welfare, Department of Medical Education, Department of Ayurveda and other medical relief societies to cater for all patients visiting public health-care facilities. RMSC is a public endeavour owned by the Government of Rajasthan and was constituted in compliance with the Government's commitment to provide the most commonly used essential medicines free of cost to all patients visiting public health-care facilities. Essential medicines were initially identified by aligning with the National List of Essential Medicines (NLEM) but modified and expanded subsequently to add more medicines as per the need of the population. While the RMSC began with about 240 medicines initially, at present there are more than 600 medicines on the essential medicines list (EML) of RMSC. RMSC procures medicines and surgical items through an open tender (two-bid) system and also procures high-end medicines for cancer and other complex diseases directly from importers. RMSC procures medicines only from manufacturers or importers, which assure them of getting the best prices by eliminating intermediaries and the associated profit margins from the supply chain. Supply chain management is carried out through *e-Aushadhi*, a web based software developed for continuous monitoring and smooth functioning of the organization (medicine management system) and by establishing one medicine warehouse in each district, which is linked to public health facilities.

1.3 OBJECTIVES OF THE STUDY

As the MNDY completes two years of its existence, this study primarily intends to examine various aspects of the scheme and their implications on outcome measures. This exercise can also be considered as a mid-line evaluation of the RMSC involving scientific and robust research methodology, with evidence drawn from facility surveys in addition to available secondary data. The specific goals of the study are:

- to examine budgetary allocation for medicines at the Central and state government levels, especially in the state of Rajasthan;
- to study the availability and stock-outs of essential medicines at frontline service providers in both public facilities and private pharmacies;

- to examine the current procurement and distribution practices/systems of essential medicines in public health facilities;
- to analyse prescription and dispensing practices in public health facilities;
- to identify and document gaps and challenges in policies and institutional structures that impede access to medicines;
- to analyse procurement prices obtained by RMSC vis-à-vis market prices and the effectiveness of purchasing;
- to identify and provide policy-level inputs that could address the current challenges, and solutions to mitigate them.

1.4 SCHEME OF THE REPORT

The report is broadly classified into nine chapters outlining different dimensions of access to medicines in the context of the MNDY.

The first chapter presents the contextualization of the problem and the rationale behind the study. The second chapter focuses on the detailed scientific methodology adopted in the evaluation process along with the sampling strategy. It also discusses the study tools used to evaluate the health system at the state level and at the facility level. The third chapter highlights the health system in the State involving the aspects of public health infrastructure, health workforce and governance in a broader perspective.

The fourth chapter discusses financing for medicines in India through a detailed analysis of public expenditure on health at state and national levels, with special focus on expenditure on medicines in the state of Rajasthan. The chapter also highlights inter-district and inter-facility allocation of budget for procuring medicines. The fifth chapter gives out various procurement and distribution models adopted by several states in India. In addition, this chapter also analyses governance issues involving procurement, tendering process, quality control, procurement cycle and supply chain management in the state of Rajasthan.

The sixth chapter analyses the scenario of availability and stock-outs of essential medicines at different levels of care and across Anatomical Therapeutic Categories (ATCs) through primary data collected from 157 sample facilities and secondary data collected from *e-Aushadhi*.

The seventh chapter deals with rational use of medicine in public health facilities, based on prescription analysis of more than 2000 prescriptions collected from sampled public health facilities. The eighth chapter analyses medicine procurement prices in various public procurement systems in India. The prices of public procurement in Rajasthan were compared with market prices along with capturing variation in pricing within the public tendering processes. The ninth chapter summarizes the report with key recommendations. These are intended as inputs for addressing current challenges in Rajasthan and other states aspiring to replicate the centralized procurement model for medicines.

CHAPTER 2

METHODOLOGY

2.1 INTRODUCTION

In order to meet the objectives outlined above, the study utilized primary and secondary data sources from different levels in the supply chain. An in depth literature review was conducted of the national as well as international published literature to identify the general level of availability of medicines in public health facilities under different health-care systems. Primary data was collected from various levels of service delivery as well as from state-level policy makers through structured questionnaires and semi-structured interviews, respectively by a team of pharmacists and health system specialists during June–August 2013. A list of 160 medicines was identified from the NLEM for the purpose of this study in technical discussion with subject experts. The list included medicines that were identified by levels of care (primary, secondary and tertiary). A robust sampling methodology was developed during discussion in a technical workshop with clinicians, health economists, statisticians and epidemiologists to derive the adequate sample size and distribution of the same among health facilities.

Three tools were developed to capture the structured interviews at facility level and semi-structured interviews with policy makers. The data captured through the interviews were entered in the data entry interface developed using MS Access 2010 with necessary check points to limit typographical errors. Ten per cent of the total records which were randomly selected and verified for errors were found to contain 1% typographical errors. These were corrected by a review process.

Apart from the above, the team also collected various financial and procurement data from the RMSC information database *e-Aushadhi* (passbook data). The same was analysed to derive policy implications and outcomes in terms of the health system and policy indicators. Our study adopted scientific techniques and statistical tools to analyse collected data from the facility surveys. Use of statistical software (STATA) and MS Excel 2010 helped analyse the large dataset collected from the RMSC database related to medicine procurement and availability including ABC analysis, which fed into several analyses in our report.

2.2 SAMPLING

The state of Rajasthan is not only large but is also characterized by heterogeneity in the State's profile of its population. In view of its social, economic, demographic and cultural diversity, the selection of the representative number of facilities at the appropriate levels of care is very vital while conducting such a large-scale study. We used statistical software N-Master to determine the minimum sample size required to evaluate availability of medicines and stock-outs at each level of health-care facility. Once a representative number of facilities were chosen, we adopted a two-stage cluster sampling: (i) selection of districts in the state of Rajasthan, and (ii) selection of health facilities (both public and private) within the identified districts. The criteria for selection at each level of facility are outlined in the succeeding paragraphs. The primary objective of the survey of health facilities was to evaluate the availability of essential medicines in health facilities, stock-outs, as well as prescribing and dispensing practices at each level of the health-care delivery system.

2.2.1 FIRST STAGE SAMPLING: SELECTION OF DISTRICTS (30% OF TOTAL NUMBER OF DISTRICTS)

In order to capture the socioeconomic diversity of the state, we selected 30% of the total districts based on economic and geographical indicators. In sum, we selected 10 districts from a total of 33 districts in the State. The economic criteria identified per capita net district domestic product (NDDP)^a for ranking the districts and then selected districts using systematic sampling including highest ranked district, lowest ranked district and the districts at equal intervals of economic ranking. We then adjusted this selection to geographical criteria by mapping the districts on the political map to incorporate the maximum geographical representation from the State to essentially take care of the spread of districts (Fig. 2.1).

^aPer capita net district domestic product used for the study is estimation for the year 2004–05 at current prices obtained from the Directorate of Economics and Statistics, Rajasthan.

2.3 SAMPLE SIZE

We selected one specialty tertiary care hospital – a government medical college in the State capital Jaipur which ideally represents one of the largest public sector hospitals in the State. At the district level, we selected one district hospital from each selected district, which works out to a total of 10 district hospitals.

Subsequently, 30% of community health centres (CHCs) were selected from each selected district using the following formula:

$$N = A * D * 30\%$$

where N is the number of CHCs selected; A is the average number of CHCs per district; D is the total number of districts chosen

In all, 34 CHCs were selected from 10 sample districts. Four CHCs were chosen from larger districts such as Udaipur, Barmer, Bharatpur and Jhalawar, whereas three CHCs were considered from Karauli, Chittorgarh, Jaipur, Churu, Bikaner and Baran. The CHC selection was done on the basis of accessibility, distance from district headquarters and geographical location of the CHC, to make it best representative of the district population.

Finally, we chose 64 PHCs on the basis of two PHCs reporting to each selected CHC using random sampling (Table 2.1). An equally proportionate number (in the ratio of 1:1) of private sector retail outlets near the medical colleges, district hospitals and CHCs in each of the selected districts were also surveyed to obtain data on availability and stock-outs along with market conditions and procurement practices in the private sector (for a detailed list of sample facilities selected, see Annex 1).

Table 2. Summary of samples selected

	Sample size districts/facilities	Total	% of total
Sample districts @ 30%	10	34	30.30
Sample district hospitals @ 1 each	10	34	29.41
Sample CHCs @ 30%	34	376	9.04
Sample PHCs (CHCs x 2)	68	1517	4.48
Sample medical college	1	7	14.29
Total public facilities sampled	112	1935	5.79
Total private facilities sampled	45	NA	NA
Total sample size	157	NA	NA
PHC – primary health centre; NA – not available			
<i>Source:</i> Rural Health Statistics 2011, Ministry of Health and Family Welfare, Government of India (GoI), accessed 15 January 2013			

2.4 DESCRIPTION OF SURVEY INSTRUMENTS

For the purpose of this study, we developed three study tools to capture various dimensions of access to medicine in Rajasthan. Form 1 was designed to capture policy-level evidence on health system preparedness in the State (Annex 2). Forms 2 and 3 (Annexes 3 and 4) were designed to capture facility-level information on various issues relating to infrastructure, human resources (HR), prescription and dispensing practices, workload at facility level, availability of essential medicines and stock-out of the same in both public and private facilities.

A team of three researchers visited each sample facility with survey tools in order to capture as much information as available through structured interviews with the medical officer/store in charge/pharmacist/any other person handling medicine procurement and dispensing at facility level. The availability of medicines on the day of the survey and stock-out scenario for the previous six months were captured from stock registers and passbooks available in each facility. This was corroborated by manually checking randomly for the presence of essential medicines in the dispensing counters.

2.4.1 ASSESSMENT OF MEDICINE POLICIES

A case-study approach was adopted for the state level policy analysis through semi-structured interviews with various stakeholders including the MD RMSC, Principal Secretary Health and Family Welfare, state programme managers of the Department of Health And Family Welfare, procurement officers such as procurement officials from the National Rural Health Mission (NRHM) and other officials involved in procurement and distribution of medicines in Rajasthan.

The Medicine Policy Assessment Tool (Annex 2) was used to collect data on all aspects of the medicine supply system including State medicine policies, supply chain management, selection of essential medicines, contracting, inventory management and distribution.

2.4.2 BASKET OF ESSENTIAL MEDICINES

For the purpose of this study, a basket of medicines was identified from the NLEM and the State EML. A total of 160 medicines under different therapeutic categories were identified and segregated based on availability of such medicines at different levels of care as suggested by national public health guidelines. We identified 92 medicines at PHC level, 132 medicines at CHC level and 160 medicines at tertiary care level, i.e. super specialty hospital attached with a medical college. However, not all of these medicines were procured by RMSC. RMSC allocates 10% of its facility budget for local purchases. In order to capture availability of medicines that have been procured by RMSC, we excluded medicines which were not procured by the RMSC from the list. This left 55 medicines which were relevant for the PHCs, 99 medicines for CHCs and 123 medicines for district hospitals. The tool was designed to include only generic names of essential medicines to maintain uniformity in information. The medicines were also further segregated based on dosage and type (injectable, tablets/capsules, suspension). The essential generic medicines were then segregated based on the Anatomical Therapeutic Chemical (ATC) Classification System as per WHO guidelines.

2.4.3 ASSESSING AVAILABILITY AND STOCK-OUTS

For assessing availability and stock-outs of essential medicines at the facility level, the Facility Availability and Stock-out Tool (Forms 2 and 3 given in Annexes 3 and 4) was sought to be completed directly from the facilities, to record data on the medicine availability on the day of the survey, medicine stock-out position for the previous six months from the date of the survey and the duration of stock-outs

(Annex 5). Additional data on dispensing and other relevant information was also collected. In the case of private sector retail outlets, the highest and lowest prices for each medicine and brand name were recorded, wherever possible.

The key outcome indicators of the analysis were:

- availability of essential medicines across survey districts
- availability of essential medicines across levels of care
- availability of essential medicines across therapeutic categories and levels of care.

2.4.4 PRESCRIPTION AUDITS

In order to study prescription practices in public health facilities, a prescription audit was undertaken at the public facility sites. Data from a random sample of prescription slips was captured on the day of the facility visit (roughly 20 – 30 slips per facility). Prior consent of the respective medical heads of the facilities as well as oral consent of the patients was sought. Analysis of prescription slips was carried out using WHO guidelines for prescription analysis. Data collected were tabulated and presented in a summarized format to analyse and comment on rational use of medicines. District level analysis was also performed by levels of care, i.e. PHC, CHC and district hospital for various indicators of prescription audit.

The key outcome indicators used in this analysis based on the WHO methodology were:

- average number of medicines per counter
- percentage of medicines prescribed by generic name
- percentage of antibiotics prescribed
- percentage of injections prescribed
- percentage of encounters with syrup prescribed
- percentage of encounters with vitamins prescribed
- percentage of single medicines prescribed as against combination medicines.

2.5 SECONDARY DATA

In addition to primary data obtained from facility surveys, data from various secondary data sources were also collected. Specifically, this study uses budget documents of Rajasthan and other comparable states to analyse the government financing mechanism of the Rajasthan health system. State-specific information on health facilities and facility-level information to compliment primary survey information was drawn from Rural Health Statistics, Ministry of Health and Family

Welfare for 2011 and 2012. State-specific demographic and socioeconomic figures were drawn from the Economic Review, Government of Rajasthan (2011–12, 2012–13). Information was also obtained from published tender documents of RMSC since 2011. Comparative statements of technical bids provided by RMSC and office orders and rate contracts announced from time to time were studied to understand the procurement price system and associated mechanism. The RMSC also shared relevant facility-wise, medicine-wise issue details and pass-book related data for all the public facilities, which was used for ABC analysis of medicines disbursed at different levels of health care. A parallel analysis on the private sector (private medicines market) was also undertaken using Information Management System (IMS) database. For OOP expenditure-related analysis on health financing we have used various rounds (fiftieth, sixty-first and sixty-eighth rounds) of consumer expenditure surveys of the National Sample Survey Office (NSSO). Other than these key secondary data sources, we obtained information from the Directorate of Economics and Statistics, Government of Rajasthan website.

Additionally, the other secondary data used in this study include documents related to medicines provision under national health programmes, procurement documents such as tenders, contracts, guidelines and manuals and other policy documents.

2.6 ETHICAL CLEARANCE

Before the study was initiated, clearance was obtained from the Institute Ethics Committee (IEC) of the Public Health Foundation of India (PHFI). Due ethical protocol was followed to maintain the confidentiality of respondents. The identity of persons interviewed was kept anonymous and our study does not directly identify them in records or during reporting of the data.

CHAPTER 3

AN ASSESSMENT OF RAJASTHAN'S HEALTH SYSTEM

3.1 INTRODUCTION

For a health system framework, the core pillars are health system financing, health workforce, medicines, vaccines, diagnostics and supplies, governance and health service delivery. For the system to function efficiently and deliver services effectively and equitably, all the elements outlined here are equally critical and its inter-linkages very vital. While this study primarily focuses on access to medicines, this chapter provides useful evidence on other elements of the health system, namely, health workforce, infrastructure and other service delivery issues.

Ensuring access to health care has been crucial in reducing inequalities in health outcomes. Leipziger, et al. (2003)⁸ emphasized the role of infrastructure in improving the health scenario. They argued that apart from the four traditional variables (income, assets, education and direct health intervention), availability and access to health infrastructure and workforce, viz. hospitals, hospital beds, doctors, nurses, pharmacists, etc. has a direct and positive influence on health outcomes of any country. Success of any health system is predicated on three major factors, namely locally available health institutions, physical and human capital in those institutions and peoples' participation in that system. A good health system is supposed to provide a well connected and well distributed network of health institutions. Secondly, even if there are a good number of health institutions, it needs to be backed up by basic minimum infrastructure, e.g. storage place for medicines to maintain a stock of essential medicines and human capital support (doctors, pharmacists, nurses, etc.) to run a good health system.

3.2 DEMOGRAPHIC AND SOCIOECONOMIC BACKGROUND OF RAJASTHAN

Rajasthan is located in the north-western part of India. It is the largest state in India by geographical size (comprising 10% of the total land area of India) and has the

eighth largest population (6% of the total population in India). The state is largely rural in nature. More than 75% of the total population is from rural Rajasthan. More than 60% of the State is desert so there is far less population density (201 people per sq. km as against the national average of 382). Drought and scarcity conditions are common, as are food shortages and even famine. This situation is compounded by unequal land distribution, with 50% of landholdings being less than two hectares in size and covering only 10% of the total area under cultivation. Rajasthan is a net out-migrating state. Migrants from this state go to all parts of the country, especially to the big urban centres in India. Rajasthan has an unimpressive sex ratio and literacy rate as compared to the national average. The population is growing at a faster rate compared to the national level. Crude birth rate is higher but death rate is equal to the national average (Table 3.1).

Table 3.1 Demographic profile of Rajasthan

Ser. No.	Indicator	Year	Unit	Rajasthan	India
1.	Geographical area	2011	100 000 sq. km	3.42	32.87
2.	Population	2011	10 million	6.86	121.02
3.	Decadal growth rate	2011	Percentage	21.44	17.64
4.	Population density	2011	Population per sq. km	201	382
5.	Rural population to total population	2011	Percentage	75.11	68.84
6.	Sex ratio	2011	Females per 1000 males	926	940
7.	Total literacy rate	2011	Percentage	67	74
7.1	Female literacy rate	2011	Percentage	53	65
8.	Birth rate	2011	Per 1000 population	26	22
9.	Death rate	2011	Per 1000 live births	7	7
10.	Infant mortality rate	2011	Number of deaths of children less than one year of age per 1000 live births	52	44
11.	Maternal mortality ratio	2011	Number of maternal deaths per 100 000 live births in the same time period	318	212

Source: Rajasthan Economic Review 2012–13, Government of Rajasthan

Rajasthan is one of the high-focus states under the NRHM due to its poor health outcomes. The economic profile of Rajasthan is demonstrated in Table 3.2. Per capita income in Rajasthan is lower compared to the national average. During 2010–2012, nominal per capita income grew at around 14% for all-India, but only at 12% in Rajasthan. On average, 22% people are below the poverty line. Table 3.2 also shows a relatively higher dependence on agriculture compared to the national level.

Table 3.2 Economic profile of Rajasthan

Indicator	Year	Unit	Rajasthan	India
NDP (constant 2004–05 price)	2012–13	10 million Indian rupees	203 298	4 728 776
Per capita net domestic product (PCNDP)*	2012–13		29 244	38 856
Growth of PCNDP*	2011–12, 2012–13	Percentage	2.9	2.1
People below poverty line**	2004–05	Percentage	22	28
Agricultural GSDP*	2012–13	Percentage	21.15 (-0.93)	13.69 (-0.41)

NDP – Net Domestic Product GSDP – Gross State Domestic Product
Source: *www.data.gov.in **Planning Commission Data Book 2012–13

3.3 PUBLIC HEALTH SYSTEM IN RAJASTHAN

3.3.1 AVAILABILITY OF HEALTH-CARE INSTITUTIONS

The numbers of public health institutions and their functional status is critical for an effective delivery of health services. Table 3.3 depicts the current scenario of government allopathic medical institutions at the end of 2011 and 2012. There has been a 10% overall increase in the total number of allopathic medical institutions during 2011–12. Importantly, there is a significant rise in medical institutions in rural areas during this period—PHCs 5%, CHCs 13% and SCs 11%. The number of inpatient beds increased by 6.

Table 3.3. Public-health infrastructure in Rajasthan

Institution	2011	2012
Hospitals (Excluding medical colleges)	108	108
Dispensaries	196	195
PHCs – rural	1528	1612
PHCs – urban	37	37
CHCs	380	428
Maternity and child welfare centres	118	118
Aid posts (urban)	13	13
Scs	11 487	12 701
Inpatient beds	35 442	37 417

Source: Economic Review, 2011–12 and 2012–13, Government of Rajasthan

Table 3.4. Shortfall of rural health institutions in Rajasthan and other BIMARU states (as in March 2012)

States	Shortfall as % of required			
	SCs	PHCs	CHCs	All (SCs + PHCs + CHCs)
Bihar	48	40	91	48
Madhya Pradesh	28	42	33	30
Rajasthan	24	34	34	26
Uttar Pradesh	34	29	60	34

BIMARU – Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh

Source: Rural Health Statistics, 2012, Statistical Division, Ministry of Health and Family Welfare (MoHFW), Government of India (GoI)

Rajasthan reports a better rural health infrastructure in terms of availability of health institutions compared to other low income states (Table 3.4). The Rural Health Statistics (RHS) provides data on shortfall of institutions as per population norms.^b There is a 24% shortfall in SCs in Rajasthan whereas in Bihar the shortfall of SCs is 48%. Rajasthan has the second minimum shortfall in PHCs and CHCs after Uttar Pradesh and Madhya Pradesh, respectively. However, there are gaps in infrastructure in the tribal areas in Rajasthan. These areas lack the requisite numbers of PHCs, while desert and general areas lack both the requisite numbers of CHCs and PHCs. There is however, no reported gap in the number of SCs.

3.3.2 HEALTH WORKFORCE IN RAJASTHAN PUBLIC HEALTH SYSTEM

The health workforce is an integral and inalienable part of any sound health-care system. Availability of health workforce, which includes doctors, nurses, pharmacists or other frontline health workers at the field level is critical to the smooth functioning of the health system. Deploying and retaining skilled HR in rural areas has remained the most crucial challenge for the government health system in India.⁹ Even if medicines are made available in the system, access to medicines can still be hindered if the system is unable to ensure availability of prescribers and dispensers.

^bAs per Indian Public Health Standards (IPHS), for every population of 3000–5000 there should be one SC. Similarly, PHCs should cater to a population of 30 000–50 000 and CHCs should cater to roughly 100 000 people. Shortfall is the difference between the number of institutions required as per population norms and existing numbers that are functional. It has to be noted here that these shortfalls are based on previous norms. As per IPHS, the actual shortfall would be much higher.

Table 3.5 describes the shortfall in health workforce engaged in rural health care.^c Among the various health cadres we find some surplus in case of auxiliary nurse midwives (ANMs), laboratory technicians and staff nurses. Unlike many other high-focus states, we find a marginal surplus in doctors at PHCs. However, these findings are based on previous standards. If we go by the revised IPHS, which proposes to have two ANMs in SCs and two medical officers at PHCs among other HR, there would be huge shortages at every level. Like most other Indian states, Rajasthan is also challenged by a large number of vacancies of specialists posted at CHCs. The other crucial gap, especially in the context of access to medicines, is the availability of pharmacists at PHCs and CHCs. It has emerged from our study that the posts of pharmacists at CHCs have been filled in recent years and the existing vacancies are mainly at the level of PHCs. From the key informant interviews of the state level and district level officials, it emerged that permanent recruitment of pharmacists are taking place to fill vacancies at the PHCs. This is expected to improve the process of inventory management and distribution at PHCs in the days to come.

Funds were allocated for 100 new PHCs during 2012–13 along with new posts, 1500 new CHCs along with 1500 new posts for ANMs and creation of 20 medicine controller offices along with five posts for assistant medicine controllers (Economic Review 2012–13, Government of Rajasthan). However, the problem of rising shortfall of specialists and radiographers in PHCs and CHCs has not been addressed. The Government of Rajasthan is required to address the expanding shortfall of specialists and the insufficient position of pharmacists as obtaining in 2012 for smooth and efficient functioning of new initiatives. There is also a need to scale up facility-level infrastructure to meet actual medical and health needs of the people. Despite several infrastructural and manpower shortages at facility level which limit the efficacy of the health system, the Free Medicines Initiative introduced in 2011 has increased utilization across all levels of facilities surveyed. The Rajasthan Government has also come up with a “Free Diagnostics Initiative” to supplement the Free Medicines Initiative.

^cIn case of HR, shortfall is calculated on the basis of number of people required as per RHS and no of people in position. These are also based on previous norms. As per the IPHS, the shortfall would be much greater.

Table 3.5. Shortfall of the health workforce in the rural health system in Rajasthan

(as % of required health workforce)		
	2005	2012
Health worker (female)/ANM	6.5	Surplus
Doctors at PHCs	12.1	Surplus
Specialists at CHCs	55.4	90.3
Radiographers at CHCs	17.5	31.9
Pharmacists at PHCs and CHCs	Surplus	71.2
Laboratory technicians at PHCs and CHCs	Surplus	Surplus
Nursing staff At PHC and CHCs	Surplus	Surplus

Source: Authors' calculation based on the RHS data

3.4 CONDITION OF MEDICINES STORAGE ACROSS FACILITIES SURVEYED

Information was collected on several key indicators of storage condition of drug sub-stores across the survey for various facilities (Table 3.6). On an average, more than 90% of PHCs, CHCs, district hospitals and medical colleges have dedicated storage space and cold storage facilities. However, half of the total number of PHCs and CHCs surveyed do not maintain a temperature chart on a regular basis. Medicines are not racked in two fifth of the health facilities surveyed. Medicines were found to be stored directly on the floor in 41% of PHCs and 42% of CHCs surveyed. Medicines were found to be stored systematically in only 29% of the facilities surveyed. Only 13% of PHCs and 18% of CHCs have storage with temperature control, proper ventilation and systemic processes for storage of medicines. On the other hand, 70% of district hospitals and all medical colleges have medicine storage with temperature control, proper ventilation and systemic processes to store medicines. Table 3.6 shows that lower level health facilities are lagging in terms of basic infrastructure and there is a room to improve the current situation.

Table 3.6. Storage facilities across various levels of care

Percent of facilities with	PHC	CHC	DH	MC	All
Dedicated storage space	97	94	90	100	96
Temperature control	58	88	90	100	71
Ventilation	63	68	90	100	75
Cold storage	97	97	100	100	97
Regular maintenance of temperature chart	49	47	60	100	50
Medicines stored directly on the floor	41	42	20	100	40
Medicines stored systematically	22	26	70	100	29
Evidence of pest control	88	85	90	100	88
Pharmacist available during visit	3	79	100	100	35
Temperature control + ventilation + systematic storage	13	18	70	100	21
Number of facilities surveyed (N)	68	34	10	1	113

DH – district hospital MC – medical college

Source: Authors' calculation based on the primary survey

Through the primary survey we have tried to capture the inventory management scenario in Rajasthan (Table 3.7). On an average, 95% of public health facilities were found to maintain a scientific and practical inventory management method, i.e. first expiry first out (FEFO). It is interesting to note that while 96% of PHCs are following the FEFO method for medicine warehouse management, lesser percentages (94% of CHCs and 90% of district hospitals) are following this method. The medical colleges surveyed use FEFO method for medicine inventory management. Flow of medicines at the PHC level is much less compared to the CHC and district hospital levels. The average interval of indenting at the PHC level is 56 days whereas it is 32 days at CHC level and 13 days at district hospital level. It may be the case that at the CHC and district hospital level, they follow the first-in, first-out (FIFO) method of inventory management. Quite expectedly, more type of medicines are indented at district hospitals and medical colleges as compared to PHCs and CHCs. On average, 73 types of medicines are indented at district hospitals and 180 types of medicines at medical colleges. On average, public health facilities get 72% of medicines per indent, clearly showing that medicines are fairly well available in the public health system in Rajasthan, but that there is scope for improvement.

Table 3. 7. Inventory management

Process	PHCs	CHCs	Dhs	Mcs	All
Method of inventory management (% following FEFO)	96	94	90	100	95
Average interval of indenting (days)	56	32	13	7	45
Average types of medicines indented (No.)	55	59	73	180	59
Average number of medicines received per indent (%)	71	71	77	98	72
Number of facilities surveyed (N)	68	34	10	1	113

Source: Primary survey data

3.5 RECENT TRENDS IN OUTPATIENT AND INPATIENT EPISODES

Utilization of health facilities is predicated upon several factors, the chief among them being the availability of health workforce and infrastructure, besides availability of medicines and supplies. Chronic absenteeism of health workforce has often been the bane of the health system, aggravating the genuine shortfall of this workforce. Poor availability of essential medicines, vaccines and supplies was cited as one of the reason by physicians, nurses and pharmacists for poor utilization of health facilities. Earlier, we had observed that despite Rajasthan being one of the BIMARU states, the state of functional health-care infrastructure is not as weak as that in other states. One of the key objectives of MNDY is to increase utilization of government health facilities. In this section we have studied the trends in outpatient and inpatient visits from two data sources. From our facility survey we have captured the trends for three years – 2011, 2012 and 2013. Data for 2013 has been taken till the day of survey. We have analysed aggregated data for outpatients and inpatients from the government MIS. To start with, we present the results based on the survey data.

We have captured the outpatient and inpatient trends over three years since 2010 from the records of the institutions (Table 3.8). The surveyors mostly scrutinized the hospital register along with concerned hospital staff to gather information on outpatient and inpatient trends. Data are presented here for three complete years – 2010, 2011 and 2012. Data for 2013 is till the month before the survey. Between 2011 and 2012, outpatient and inpatient load increased by 17% in PHCs, 23% in CHCs and 18% in medical colleges. There was notable growth in outpatient load in district hospitals only during the first year after the implementation of MNDY, after which no growth was observed. Inpatient load went up in all levels of public health care. Inpatient department load registered an 11% growth at PHC level, 15% growth at CHC level, 11% growth at district hospital level and 0.39% growth in medical colleges sampled for our survey.

Table 3. 8. Increasing utilization in public facilities (thousands)

	Year	PHC	CHC	DH	MC
OPD	2010	7.34	42.8	262	1116
	2011	6.97	38.24	265.00	1328.00
	2012	8.16	47.06	372.00	1300.00
	2013*	10.06	61.77	370.00	1112.3
IPD	2010	0.25	3.77	31.49	
	2011	0.27	3.8	35.00	1600.00
	2012	0.33	3.9	31.34	1606.31
	2013*	0.32	3.56	35	1500.00

Source: Authors' calculation based on the primary survey

*Data for 2013 is till month before survey

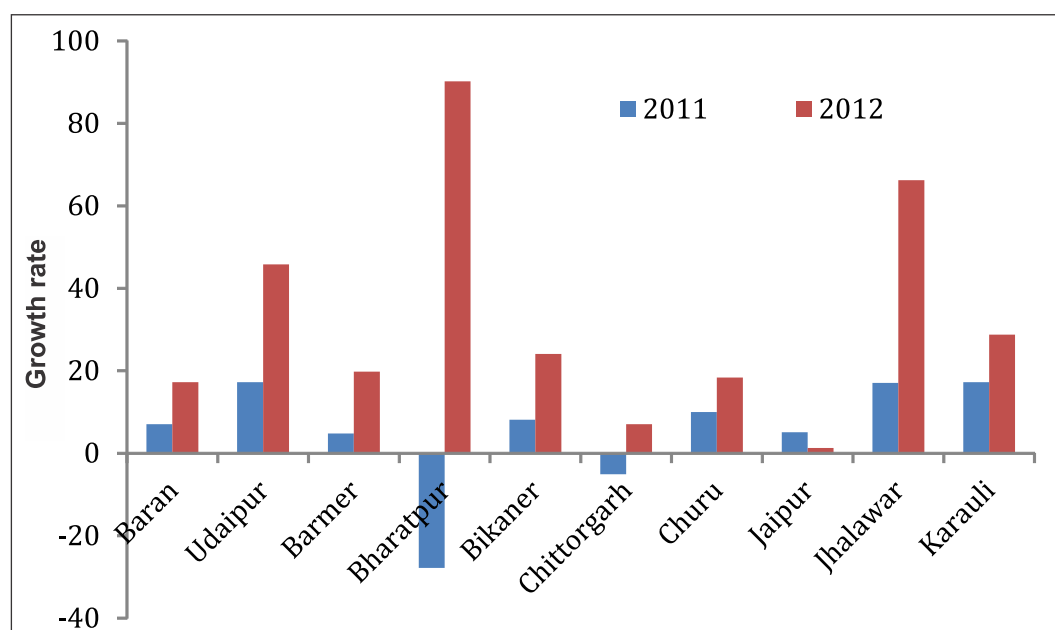
When we compute the district level mean of outpatients and inpatients for 2010, 2011 and 2012, we find a general increase over the years across districts (Table 3.9). The more encouraging trend is the increased growth rate between 2011 and 2012 compared to 2010 and 2011. This clearly depicts the impact of MNDY on outpatient and inpatient visits (Fig 3.1). This is true for all the districts except Jaipur. This is may be due to the reduced role of Jaipur as a state capital which caters to a large number of people coming from various districts. Since medicines are being made available at other districts, people may not need to visit the state capital directly.

Table 3.9. District-wise average outpatient and inpatient trends in 2010, 2011 and 2012 (000 patients per year)

		OPD trends (mean)			IPD trends (mean)		
District	Number of facilities visited	2010	2011	2012	2010	2011	2012
Baran	9	32.1	34.4	40.3	1.6	1.5	1.7
Udaipur	13	21.2	24.8	36.2	1.1	1.2	1.3
Barmer	13	35.8	37.6	45.0	2.8	2.7	3.9
Bharatpur	14	61.1	44.1	83.8	9.3	9.4	4.1
Bikaner	10	39.8	43.0	53.3	1.3	1.4	1.8
Chittorgarh	10	51.7	49.1	52.5	5.5	6.7	7.0
Churu	10	34.2	37.6	44.5	2.3	2.2	2.3
Jaipur	11	183.4	192.7	195.1			
Jhalawar	12	40.0	46.9	77.9	5.2	5.7	7.3
Karauli	10	40.9	47.9	61.7	7.1	7.8	8.8

Source. Authors' calculation based on the primary survey

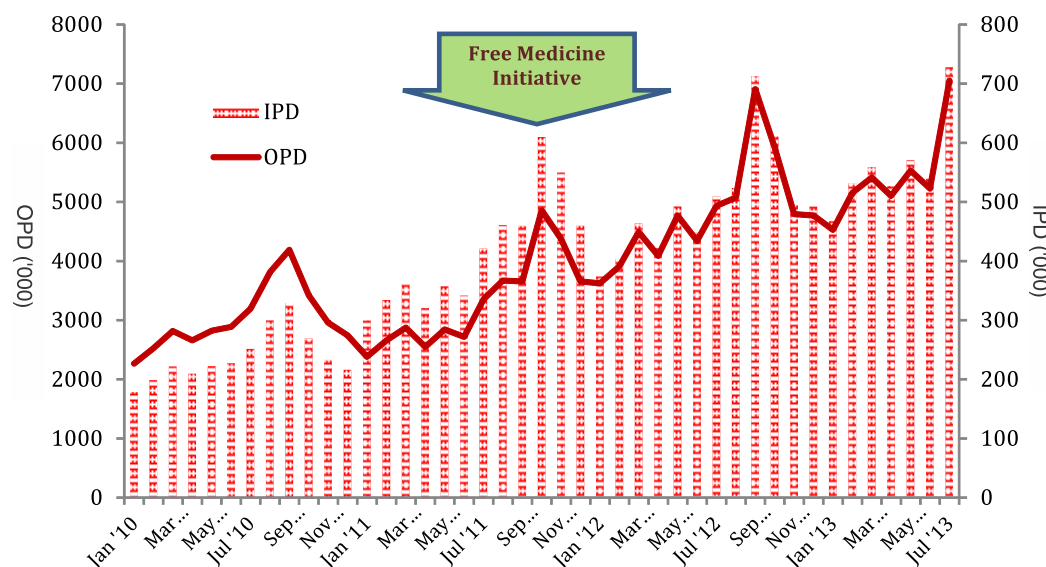
Fig. 3.1. Annual growth in outpatient and inpatient visits across survey districts (%)



Source: Authors calculation based on the primary survey

The findings from our survey clearly depict that utilization has increased in public facilities since the introduction of MNDY. We tried to triangulate the survey findings with the government MIS data source. The results are quite encouraging. During October 2010–October 2011, patient load rose by more than 48% (during September 2010–September 2011 it was -8.9%). During 2011–12, the growth in patient load was to the extent of 42.6% (as compared to 13.8% during 2010–11). While it is too early to predict the growth during 2012–13, it is expected to be significantly higher than in the previous years, as the overall visits (including outpatient and outpatient load) stood at a whopping 7.7 million in July 2013 as against 5.4 million in July 2012. We have analyzed the month-wise trend of outpatient and inpatient load (Fig 3.2). Rajasthan MIS does not capture outpatient and inpatient break-up since 2012. Hence this study calculated outpatient and inpatient ratio using survey data and thereafter using that ratio to compute the outpatient and inpatient month-wise trend from the MIS combined data. Though the number of facilities has increased over this period, utilization has increased much faster, indicating increased visits per facility.

Figure 3.2. Monthly trends in outpatient and inpatient visits: pre and post-FMI



Source: HMIS data provided by RMSC.

Note: For 2010 and 2011, outpatient and inpatient break-ups were available. We have applied outpatient–inpatient ratios prevailing during 2010 and 2011 to disaggregate outpatient and inpatient trends for January 2012 onwards.

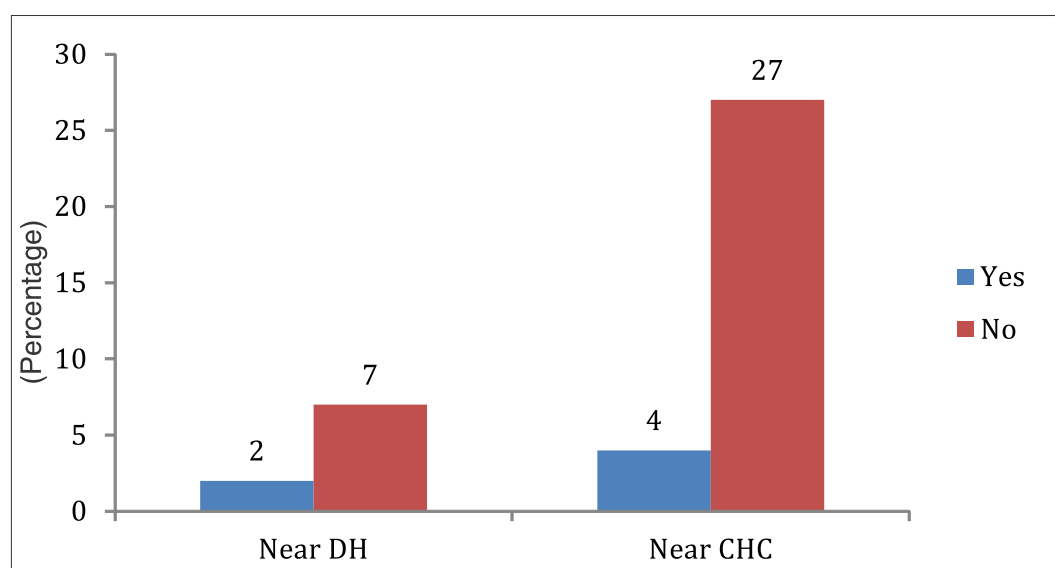
3.6 STATUS OF PRIVATE PHARMACIES

Apart from the public health facilities where the assessment of drug availability and storage conditions was carried out, the study also took into account drug availability and storage at private chemist shops close to the vicinity of district hospitals and CHCs. One private pharmacy was randomly selected from the vicinity of each district hospital and CHC which was surveyed during the study and the pharmacies were assessed for availability and storage of medicines. A total of 40 private pharmacies were assessed out of which nine were those in the vicinity of district hospitals and 31 in the vicinity of CHCs.

Interviews were conducted with these nine private pharmacies near district hospitals and 31 private pharmacies near CHCs. Of the nine private pharmacies near district hospitals, seven respondents were proprietors of the pharmacies, one was a pharmacist and one other. Of the 31 private pharmacies near CHCs, 16 respondents were proprietors, 11 were pharmacists and four were others. With regard to other places to store medicines, only two out of nine near district hospitals and four out of 31 near CHCs had such facilities. Similarly, for temperature control, seven out of nine near district hospitals and 23 near CHCs had the systems

installed. Windows and air vents were available with four pharmacies near district hospitals and 13 near CHCs. Cold storage facility was available with all the private pharmacies near district hospitals and in all barring one near CHCs. However, none of these pharmacies maintain any kind of register to record the temperature at certain intervals. Only four pharmacies near district hospitals and five near CHCs store medicines systematically and in alphabetical order. In two private pharmacies near district hospitals and in 10 near CHCs, medicines were found stored on the floor. At one pharmacy near a district hospital there was evidence of pests. It was observed that 22% of the private pharmacies near district hospitals had an additional drug storage space, while it was 13% for private pharmacies near CHCs (Fig.3.3).

Fig 3.3. Pharmacies having separate drug storage space other than the shop (%)



DH – district hospital

Source: Author's calculations based on primary survey

Among the stores surveyed, 74% of the private pharmacies near CHCs had a method for controlling room temperature. The figure for pharmacies near district hospitals was 78%. Private pharmacies near 30 CHCs had provision for cold storage or a refrigerator with only one private pharmacy defaulting. This possession of refrigerators at private pharmacies is a positive indicator. All private pharmacies outside of district hospitals had cold storage facilities.

The number of pharmacists responsible for ordering medicines at private pharmacies outside of CHCs and district hospitals was far lesser as compared to the owners. Here, the owner himself is not a pharmacist and the pharmacist is hired separately by the owner. FEFO was the method used to manage inventory at the private pharmacies near all district hospitals visited (Table 3.10). The same method was also predominant in case of private pharmacies near CHCs with some of them being unaware of the method/concept.

Table 3.10. Method of inventory management

	FEFO	FIFO	Unaware of inventory management methods	Total
Near district hospitals	9	0	0	9
Near CHCs	21	2	8	31
Total	30	2	8	40

Source: Authors' calculation based on the primary survey

It was observed that 30% of the private pharmacies had medicines stored on the floor (Table 3.11). Medicines were stored in a systematic (alphabetical) manner in only 22.5% of cases. Of the private pharmacies, 77.5 % order/indent medicines based on promotional schemes. Seventy-five per cent of the respondents at private pharmacies knew the meaning of essential medicines. Sixty-five per cent of the private pharmacies had a pharmacist during the visit. Though there have been complaints from the pharmacies about decreased sales over the last two years, we could not substantiate the claim with data, since most of the pharmacies refused to divulge their financial data.

Table 3.11. Some key indicators of storage conditions and inventory management in private pharmacies

Indicator	Private pharmacy near public health facility	Yes	No	Total
Are medicines stored directly on the floor?	Near district hospital	2	7	40
	Near CHC	10	21	
Are medicines stored in a systematic way?	Near district hospital	4	5	40
	Near CHC	5	26	
Is indenting/ordering medicines based on promotional schemes?	Near district hospital	7	2	40
	Near CHC	24	7	
Understand what essential medicines mean?	Near district hospital	5	4	40
	Near CHC	25	6	
Was pharmacist available during the time of visit?	Near district hospital	7	2	40
	Near CHC	19	12	

Source: Authors' calculation based on the primary survey

3.7 CONCLUSION

The health system in Rajasthan has undergone tremendous changes over the last three years, especially since the introduction of MNDY. Evidence from the survey as well as Government MIS data point out that utilization has increased significantly since 2011. This is true for all the survey districts as well as for the entire State. Our survey data clearly shows that average visits in facilities have increased considerably over the last three years. This will create new challenges to the health system and increase the work burden on the existing HR. Rajasthan government has taken several measures to further strengthen the health system so that it can effectively deal with the upcoming challenges. The efforts to introduce a Free Diagnostics Initiative in line with the MNDY will lead to further improvement in the continuum of care provision. The efforts to recruit pharmacists and deploy them at PHCs are also laudable. This will help contribute to the inventory management and medicine distribution system at lower levels of care. However, one significant challenge that the system faces is the lack of the specialists across CHCs. Though the chapter on health system does not attempt to provide answers to all questions, it does try to analyse some of the broad trends and throws open questions for discussions, some of which would be dealt with in the coming chapters.

CHAPTER 4

FINANCING MEDICINES IN RAJASTHAN

4.1 INTRODUCTION

Health care in India is overwhelmingly financed through individual OOP payments. Current estimates from National Health Accounts (NHA) suggest that the total health expenditure in India is roughly 4% of the gross domestic product (GDP), with government contribution accounting for only 20% of the total health expenditure. More than 70% of the total health expenditure is OOP, which is one of the highest in the world.¹⁰ OOP spending is considered highly inefficient and iniquitous. The absence of any prepayment or risk-pooling mechanism only adds to the misery of households. Only up to 2% of the total health expenditure is financed by non-household private sectors such as companies, private industrial houses, NGOs and other private sources. Further evidence from the National Sample Survey (2011–12) suggests that on average, OOP constitutes approximately 6%–7% of the total household consumption expenditure. This proportion is significantly higher in India as compared to a few developed and many developing countries.^{11,12&13}

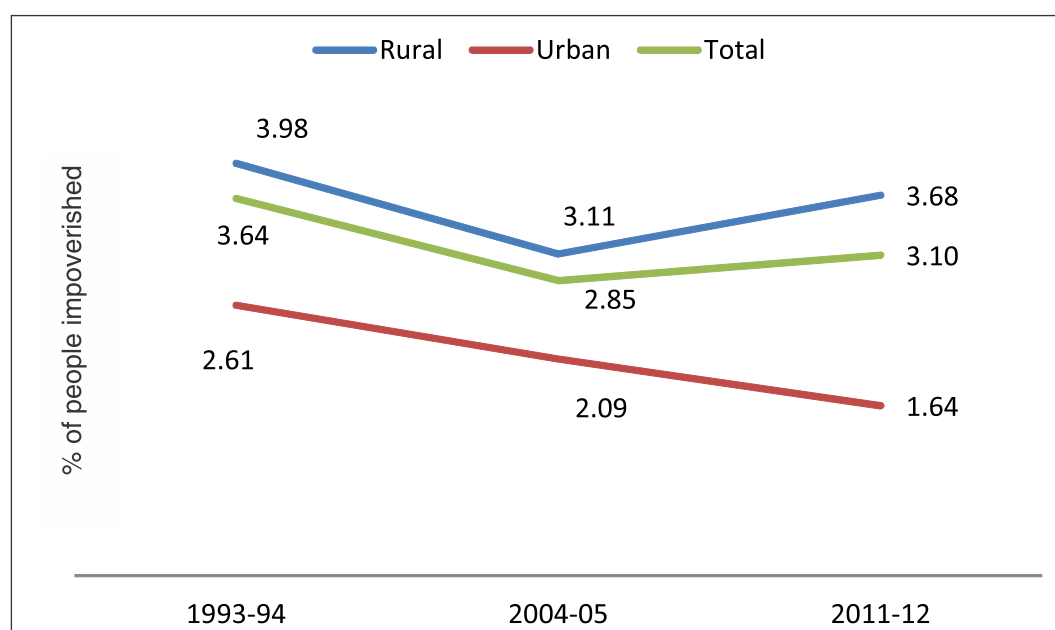
4.2 SPENDING ON MEDICINES: AN INTERSTATE COMPARISON

Such regressive form of financing that is based essentially on OOP spending leads to inequality in access, untreated ailments and preventable deaths; and pushes people towards poverty and indebtedness. Existing studies have indicated that the poor in India are quite often required to borrow and sell off household assets to finance their health-care needs.^{14&15} There is also adequate evidence to indicate that because of the unpredictable nature of expenses on health care, many non-poor households are plunged into poverty and those who are already poor are pushed further down (known as poverty deepening).¹³ Using the nationally representative data from the consumer expenditure survey (CES) of the NSSO, Doorslaer et al. (2006)¹³ and Garg and Karan (2009) report that OOP caused approximately a 3.2%

increase in the poverty ratio in the year 2000. Shahrawat and Rao (2011)¹⁶ report similar findings with additional information on higher increase in poverty among lower expenditure quintiles of households. Using the health and morbidity survey data of the NSSO, Berman et al. (2010)¹⁷ decomposed the poverty impacts of OOP into inpatient and outpatient expenses separately and reported that increase in poverty due to outpatient expenditure is significantly higher than what is due to inpatient expenditure. Analyzing the long-term trend for the period 1993–94 to 2004–05, Ghosh (2011)¹⁸ provides estimates by states of catastrophic impacts leading to impoverishment arising out of households spending at disaggregated levels. Between 2004–05 and 2011–12, the percentage of people falling below the poverty line due to health-care spending increased to 3.1% from 2.9%, with a significant increase in rural areas and some decline in urban areas (Fig 4.1). However, in Rajasthan, we observe a considerable decline in poverty during the same period. It is interesting to observe that impoverishment in urban areas decreased from 4.3% in 2004–05 to a meagre 0.9% in 2011–12.

It is observed that cutback in public spending, sustained neglect of public health services and above all, gradual withdrawal of medicine supplies in the government

Fig. 4.1. Percentage of people impoverished due to OOP expenditure on medicines



health system have driven people away from public services. They have been forced to either access the private retail market for purchasing medicines or to opt out due to financial barriers.^{19,20} Medicine budgets shrank across the states since the early 1990s with the exception of Tamil Nadu, which recognized the importance of enhancing medicine supplies through the public health system. The Tamil Nadu model of centralized procurement and decentralized distribution led to a remarkable fall in medicine related OOP as well as overall OOP (NSSO sixtieth round). The TNMSC thus became a model for many states, though its replication was beset with hesitation in several states, hampering its full potential. Some state governments, and recently the Union Government, have recognized the need to ensure availability of medicines through the public system. Kerala was among the few states that has been able to successfully replicate the Tamil Nadu model in the past three years. Among the high-focus states, Rajasthan was the first one to be able to put in place a system of centralized procurement and decentralized distribution with the creation of the RMSC.

When we compare Rajasthan with other high-focus states, we do not observe any significant difference in levels of per capita public spending on health. In fact, its level of per capita public spending is slightly higher than states such as Madhya Pradesh and Uttar Pradesh and much higher than Bihar (Table 4.1). However, its public spending is significantly lower compared to states such as Himachal Pradesh, Tamil Nadu and Kerala. Moreover, before the introduction of RMSC, per capita public spending on medicines remained particularly low in Rajasthan. Since the introduction of NRHM, public spending had grown considerably across the states. However, over the last two years there seems to be considerable slowdown in spending. In fact, some states have experienced negative growth in spending since 2011–12. On the other hand, Rajasthan is among the few states, including Tamil Nadu and Himachal Pradesh, which has been able to increase spending on medicines steadily.

Table 4.1. Interstate comparison of public spending on health: high-focus states vis-à-vis benchmark states

	State	Public spending on health (average 2010 to 2013) (10 million ₹)	Per capita public spending on health (₹)	Per capita public spending on medicines (₹)	Growth of public spending (2005–06 to 2010–11) (%)	Growth rate of public spending (2011–12 to 2012–13) (%)
High-focus (non-NE) states	Bihar	3107	299	12.9	20.5	-17.3
	Himachal Pradesh	965	1408	16.4	18.8	11.2
	J and K	1415	1127	36.3	14.6	-7.4
	Jharkhand	1565	475	8.2	6.5	-13.5
	Madhya Pradesh	3369	464	16.8	19.9	-0.2
	Rajasthan	3476	507	11.1	23.5	7.1
Bench-mark states	Uttar Pradesh	8850	443	15.8	20.1	9.5
	Kerala	2977	892	74.5	17.8	7.0
	Tamil Nadu	5033	698	60.5	24.9	2.6

Sources: RBI state finances: a study of budgets, various years; NRHM-MIS

Persistent inadequacy in public spending results in high OOP payments. This has been amply demonstrated in the past, as India is one among the worst performers in OOP expenditure. OOP expenditure as a share of households' overall spending has risen significantly from around 3% in the mid-1990s to close to 7% in 2011–12. A significant part of this increase is associated with a rise in households' spending on medicines. Table 4.2 demonstrates several interesting patterns on households' OOP payments in 2011–12.

Although overall OOP expenditure and households' spending on medicines do not provide a clear picture and show wide variation between states, this is primarily due to variation in overall expenditure of households. However, households' spending on medicines as a percentage of overall OOP suggests that almost all states reported a higher share of over 70% on medicines as against 62% in Kerala and a mere 56% in Tamil Nadu.

Table 4.2. Interstate comparison of household OOP expenditure on health care and medicines: 2011–12

State	pcPubDrug	poverty post drug
JAMMU & KASHMIR	39.2	1.5
HIMACHAL PRADESH	6.6	2.1
PUNJAB	5.6	1.9
HARYANA	24.2	1.1
RAJASTHAN	30	2.2
UTTAR PRADESH	15.9	5.8
BIHAR	13.8	4.6
ASSAM	28.5	1.9
WEST BENGAL	24.1	2.3
JHARKHAND	8.7	2.4
MADHYA PRADESH	17.1	3.8
GUJARAT	26.4	1.8
MAHARASTRA	18.7	2.1
ANDHRA PRADESH	27.9	1.9
KARNATAKA	25.1	1.8
KERALA	72.3	3.4
TAMIL NADU	65	2.0
All INDIA	43	3.1

MPCE – monthly per capita consumer expenditure; OOP – out-of-pocket

Source: Authors' calculation based on NSSO, CES sixty-eighth round

As far as Rajasthan is concerned, during 2011–12, three quarters of households' OOP was on medicines. At the same time, impoverishment due to medicines is much lower than in most other high-focus states as well as the national average (Table 4.3). During the same period, the national average shows that 3.1% of people fall below the poverty line due to medicines. The comparable figure for Rajasthan is 2.2%, which is comparable to Tamil Nadu at 2.1%. Most significant is the low level of impoverishment in urban areas. Compared to 1.64% of people falling below the poverty line due to spending on medicines at the national level, in Rajasthan only 0.94% of urban residents were impoverished. Though it might be little too early to attribute this to RMSC since the NSSO survey was conducted between July 2011 and June 2012, this could be taken as an early trend suggesting a marginal decline.

Table 4.3. Impoverishment due to medicines (percentage of total population)

		Rural	Urban	Total
1993–94	Rajasthan	5.1	4.2	4.9
	All-India	4.0	2.6	3.6
2004–05	Rajasthan	3.1	4.3	3.4
	All-India	3.1	2.1	2.9
2011–12	Rajasthan	2.6	0.9	2.2
	All-India	3.68	1.64	3.10

Source: Authors' calculation based on NSSO, CES unit records

Per capita OOP has increased significantly between 1993–94 and 2011–12 (Table 4.4). However, compared to the all-India average, spending in Rajasthan has not increased as significantly. In Rajasthan, per capita OOP was low in urban areas compared to rural areas in 1993–94. However, OOP increase was much sharper in urban areas in the following rounds. In 2011–12, OOP in urban areas for all-India was ₹ 151 as compared to ₹ 95 in rural areas. The gap between urban and rural areas is much less in Rajasthan compared to the all-India average. What is further noteworthy about Rajasthan is that per capita OOP on medicines is low in urban areas compared to rural areas.

Table 4.4. Per capita out of pocket expenditure on health care and medicines (₹)

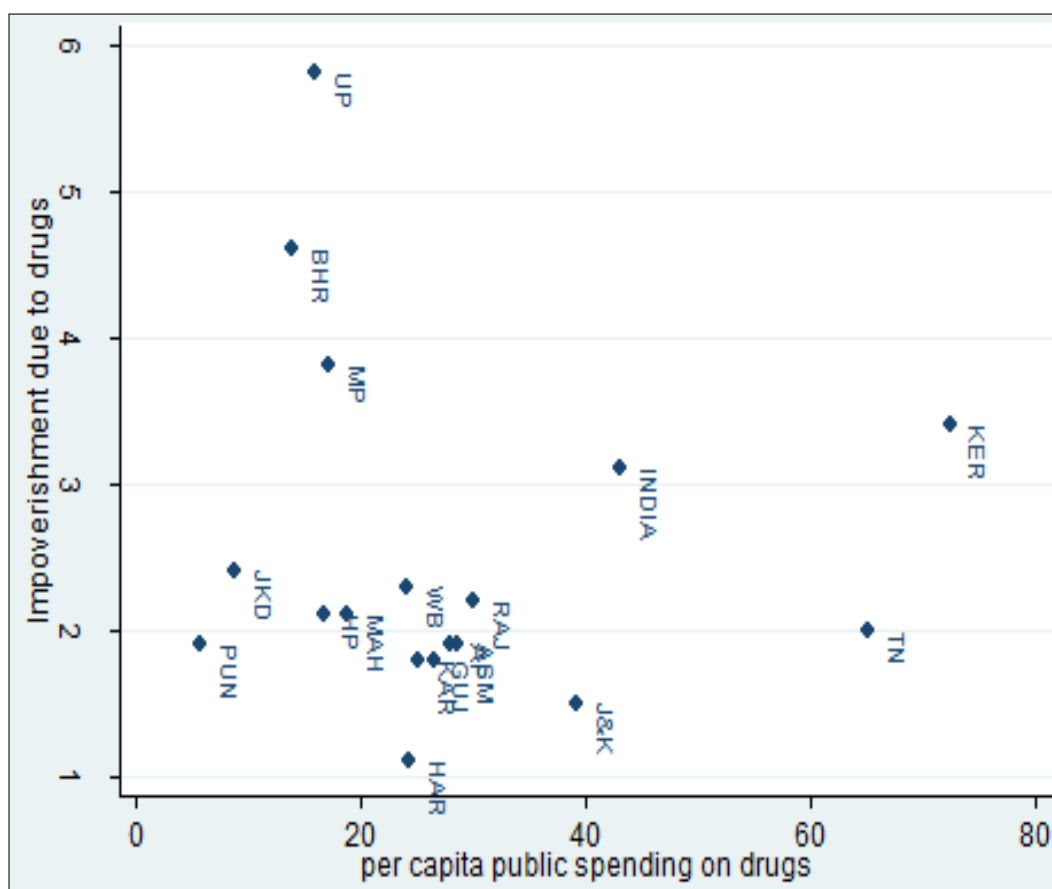
		Per capita OOP expenditure on health care			Per capita OOP expenditure on medicines		
		Rural	Urban	Total	Rural	Urban	Total
1993–94	Rajasthan	12.5	18.0	13.75	12.2	17.6	13.4
	All-India	18.6	18.3	18.5	14.2	13.6	14.0
2004–05	Rajasthan	31.2	47.9	34.9	25.9	40.0	29.0
	All-India	36.5	57.6	41.8	26.9	38.1	29.8
2011–12	Rajasthan	91.5	107.4	95.2	772.0	70.4	71.6
	All-India	95.3	151.2	111.2	65.4	95.2	73.9

Source: Authors' calculation based on NSSO consumer expenditure survey, various rounds

As per the latest estimates based on consumer expenditure data of NSSO in 2011–12, more than two third of the overall OOP expenditure was due to medicines. During 1993–94, share of medicines was more than three fourth of the total OOP. Though there is a decline in the share of medicines in total spending in 2011–12 compared to 1993–94, its impoverishing potential has intensified. In 2011–12, as many as 34.3 million people, constituting 3.1% of the population fell below the poverty line because they had to bear expenses on medicines. This is a significant jump from 2004–05 (Table 4.3).

When we study per capita public spending on medicines vis-à-vis impoverishment due to medicines, a negative relationship emerges (Fig. 4.2). States like UP, Bihar and Madhya Pradesh have a high incidence of poverty, whereas Tamil Nadu shows high public spending as well as low impoverishment. Kerala remains an exception among the states with high public spending coupled with high impoverishment. Kerala is among the most developed states and the people display a high health seeking behavior. They rely on the private sector despite having the best government primary healthcare infrastructure. Higher reliance on the private sector has led to higher OOP and related impoverishment.

Fig. 4.2. Public spending on medicines (₹) and poverty due to OOP on medicines (%)



Source: Authors' calculation; public spending from state budgets; poverty OOP based on NSSO

Table 4.5. No. of people impoverished due to OOP and spending on medicines (million)

States		OOP			Medicines		
		Rural	Urban	Total	Rural	Urban	Total
High focus states	Bihar	6.48	0.32	6.88	4.65	0.23	4.93
	Chhattisgarh	0.93	0.30	1.23	0.62	0.25	0.87
	Himachal Pradesh	0.17	0.02	0.19	0.14	0.00	0.14
	J & K	0.18	0.06	0.24	0.16	0.03	0.19
	Jharkhand	0.88	0.19	1.09	0.64	0.15	0.80
	Madhya Pradesh	3.08	0.48	3.61	2.40	0.35	2.79
	Odisha	2.14	0.21	2.37	1.66	0.18	1.86
	Rajasthan	1.77	0.33		1.37	0.16	1.55
	Uttar Pradesh	13.11	2.02	15.21	10.47	1.35	11.89
	Uttarakhand	0.15	0.11	0.25	0.13	0.11	0.23
Benchmark states	Kerala	1.18	0.48	1.93	0.71	0.26	1.15
	Tamil Nadu	1.51	0.71	2.27	1.09	0.32	1.47

Source: Authors' calculation based on NSSO, CES sixty-eighth round

4.3 TRENDS IN PUBLIC SPENDING ON MEDICINES IN RAJASTHAN

Per capita public spending in Rajasthan was very low before the introduction of the Chief Minister's Free Medicine Scheme in 2011. For instance, in 2010–11, the total spending on medicines was as low as ₹ 6 (Fig. 4.3). Between 2006–07 and 2010–11, per capita spending decreased at a rate of 20% per annum. As against this, between 2010–11 and 2013–14, the annual average growth rate is 105%, i.e. expenditure has been doubling every year. For the year 2012–13, the latest year for which expenditure data is available, per capita spending on medicines increased to ₹ 30. A significant step up in expenditure on medicines of around 2088 million Indian rupees in 2012–13 and a further increase in allocation for 2013–14 are expected to bring in a significant change in peoples' health-seeking behavior and a greater flow of resources towards the public sector; and at the same time ensure that the public system delivers better quality of care.

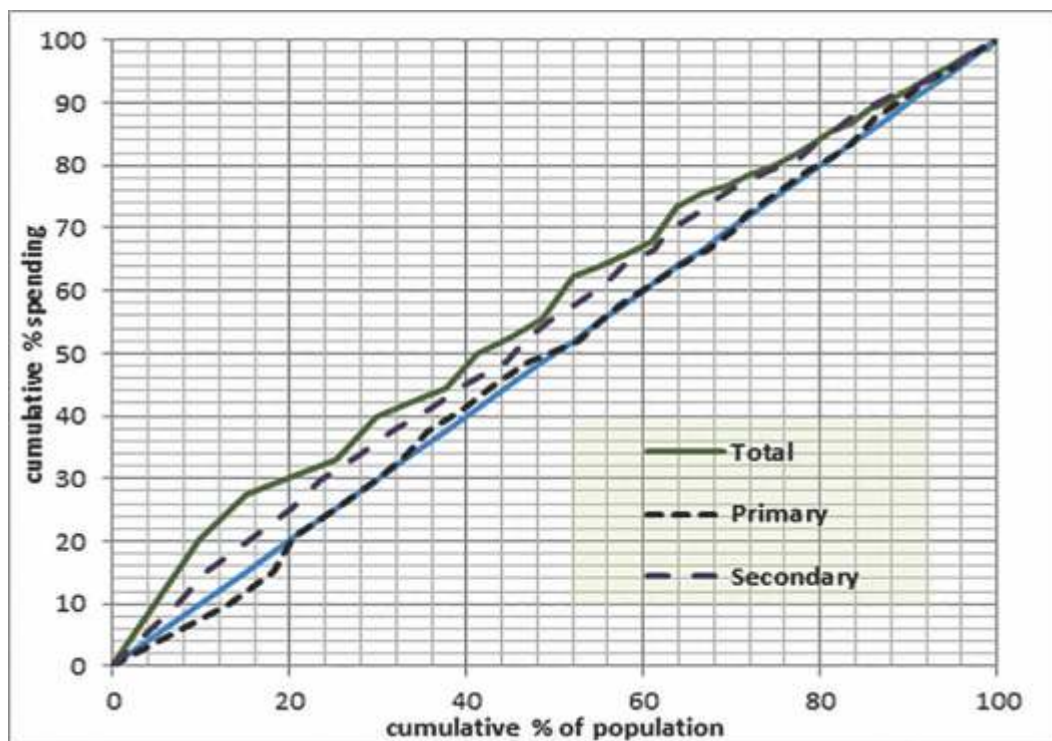
Fig. 4.3. Per capita public spending on medicines in Rajasthan



Fig. 4.3. Per capita public spending on medicines in Rajasthan

While the overall spending on medicines in Rajasthan has increased in the last three years, it is encouraging to observe that the rise in expenditure is accompanied by an across the board step up on medicine spending at all levels of care and a proportionate increase across districts. Among 34 districts in Rajasthan, we observe that Jaipur, being the state capital, appears to be accounting for more than a fifth of the total expenditure. Six districts, namely Jaipur, Jodhpur, Bikaner, Udaipur, Kota and Ajmer actually account for more than half of the total spending (52.3%) while having less than 30% of the total population. However, this is to be expected due to the fact that these are the districts with major medical colleges which cater to large sections of the population from other districts as well. Additionally, medical colleges end up utilizing a large share of the available funds as unlike in lower levels of care, medicines consumed in tertiary-care settings are not only expensive but also consumed in high volumes. Medical colleges not only receive outpatient load several times per day but also treat inpatients in large numbers. However, it is expected that as MNDY increases its reach, this distortion would be reduced as lower levels of facilities would be attending to a larger share of patients.

Fig. 4.4. Variations in district level spending across levels of care



Source: Authors' calculation based on pass book data of RMSC

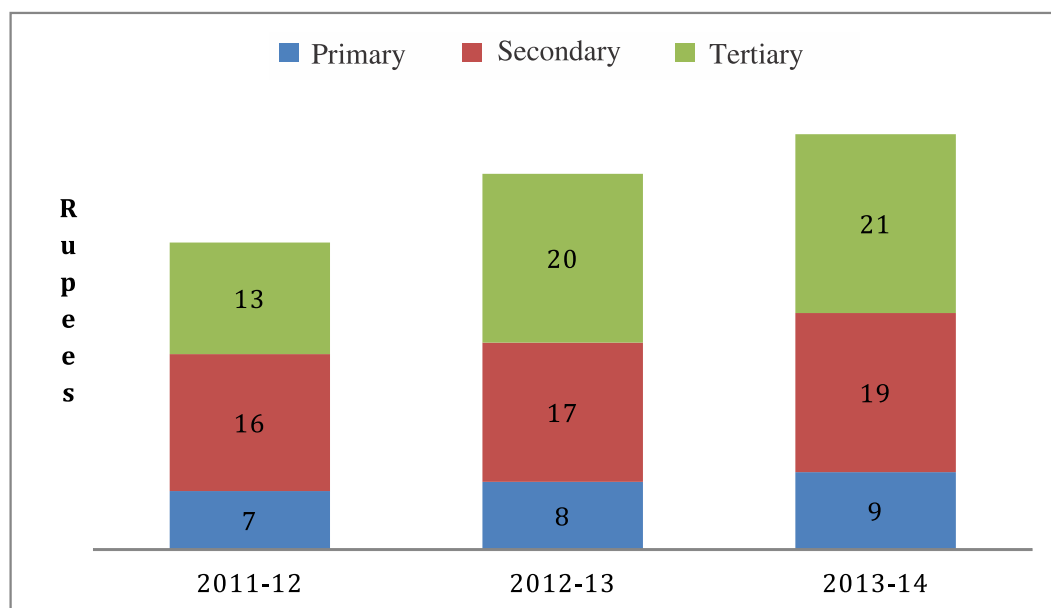
In Fig. 4.4, we have plotted the cumulative share of population of districts on the X-axis. On the Y-axis, the cumulative shares of expenditure are represented. Districts have been ordered in terms of their share of population. The district with the highest population is placed at the extreme left and the district with the lowest population is at the extreme right. Thus, Jaipur is at the extreme left and Jaisalmer is at the extreme right. The straight line (blue) starting from origin represents the line of equality. Any deviation from the equality line would represent inequality in spending across districts. Evidence in this graph goes to suggest that district-level variation is limited; the presence of variation can be explained because districts with medical colleges tend to consume and spend relatively more than other comparable districts. At the aggregated level, we observe significant inequalities as the total line goes farthest from the line of equality (Table 4.6). The extent of deviation reduces at the secondary level and eventually at the primary level there seems to be not much of inequality in spending. This clearly supports our previous argument that districts with medical colleges draw plenty of resources and hence the inequalities exist at the tertiary level rather than at primary and secondary levels.

Table 4.6. Inequalities in district level allocations

	Primary	Secondary	Total
Coefficient of variation	0.33	0.40	0.46
Gini coefficient	0.19	0.22	0.26

Source: Authors' calculation based on the pass-book data

Allocation of budgets across various levels of care represents the priorities accorded to various levels. It is often the case that the tertiary level attracts most of the resources while lower levels of care, especially primary level care, get neglected. In our categorization we have categorized PHCs, SCs, dispensaries and mobile medical units as primary level; CHCs and sub-division hospitals as secondary level; and medical colleges and satellite hospitals as tertiary level. When we compared per capita allocation across various levels of care over the three years of RMSC, we observe that there is significant increase in allocations over the years. However, most of this increase is at the tertiary level (Fig. 4.5). Per capita spending at tertiary level was ₹ 13 in 2011-12 which increased to ₹ 21 in 2013-14. At the district and sub-district level, where the major load of primary and secondary care is delivered, per capita spending has increased from ₹ 25 to ₹ 28 during the same period.

Fig. 4.5. Budget allocation on medicines by levels of care

Source: Extracted from passbook details of e-Aushadi database of RMSC

Though allocation is an important prerequisite for spending, effective utilization of these resources remains a major challenge. In the year 2012–13, we find significant variations across districts and levels of care in utilization rates. For instance, among the various levels of care, secondary care has the highest utilization rates. Of the total funds devolved, almost 80% was spent at the secondary level, while as much as 44% of funds allocated at the tertiary level remained unutilized. In some districts, more than 90% of funds were spent at the secondary level. Examples of this are Ganganagar (97.1 %), Bharatpur (94.9%), Sikar (92.7%), Alwar (92.6%) and Pratapgarh (92.3%) (Table 4.7). Achieving such high levels of utilization within a short span of implementation of a scheme is a remarkable achievement in itself. Though primary level care utilization remained low in most districts compared to the secondary level, Karauli, Dausa and Ganganagar utilized more than four fifth of the total funds available to them during that financial year.

Table 4.7. Inter-district comparison of public spending on medicines (2012–13)

District	Per capita allocation (₹)			Per capita expenditure (₹)			Utilization (%)		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
Ajmer	8	19	49	6	15	24	75.0	78.0	48.5
Alwar	4	14	0	2	13	0	56.7	92.6	
Banswara	5	20	0	3	16	0	61.0	80.6	
Baran	9	24	0	6	20	0	72.7	83.3	
Barmer	6	15	0	4	13	0	60.0	90.0	
Bharatpur	7	15	1	5	14	0	73.7	94.9	92.9
Bhilwara	10	19	2	6	17	1	58.3	89.4	76.6
Bikaner	12	19	74	9	8	41	72.4	44.4	55.6
Bundi	11	25	0	7	18	0	60.0	71.4	
Chittorgarh	8	24	0	6	20	0	73.8	86.5	
Churu	9	17	0	5	14	0	55.6	82.9	
Dausa	6	17	0	5	15	0	81.0	89.3	
Dholpur	5	34	0	4	21	0	70.3	61.9	
Dungarpur	7	19	0	3	12	0	49.0	63.0	
Ganganagar	8	17	0	6	17	0	80.0	97.1	
Hanumangarh	7	16	0	5	12	0	78.3	75.9	
Jaipur	11	12	63	7	10	45	66.7	82.7	72.1
Jaisalmer	11	27	0	7	25	0	68.9	89.5	
Jalore	8	11	0	6	7	0	73.3	61.9	
Jhalawar	6	16	41	4	13	19	56.0	82.6	45.8
Jhunjhunu	9	24	0	5	12	0	50.0	51.0	
Jodhpur	7	9	48	5	8	26	73.1	85.3	55.6
Karauli	7	27	0	6	19	0	87.3	72.5	
Kota	8	11	80	6	9	45	75.0	85.7	56.3
Nagaur	8	14	0	6	12	0	67.9	87.0	
Pali	9	19	0	6	14	0	66.7	72.5	
Pratapgarh	9	15	0	7	14	0	74.7	92.3	
Rajsamand	11	24	0	7	17	0	66.9	71.4	
Sawai Madhopur	7	17	0	6	15	0	84.0	91.3	
Sikar	7	15	0	5	14	0	72.2	92.9	
Sirohi	9	16	0	5	11	0	57.4	70.6	
Tonk	9	14	0	6	12	0	62.3	85.0	
Udaipur	8	12	83	5	9	30	65.4	74.4	35.8
Rajasthan	8	17	20	5	13	11	67.7	79.3	56.1

Source: Author's calculation based on RMSC passbook data

It will be an important task to identify the institutions and levels of care across districts which have very low levels of utilization (less than 50%) and understand the reasons for underutilization. Several factors may lead to underutilization; gap in HR availability is one of the most critical factors. In the previous chapter we observed that there are a significant number of unfilled vacancies, especially pharmacist positions, at the primary care level. The recent drive to appoint pharmacists permanently at various levels including at the primary level will go a long way to ensuring effective delivery and management of medicines at various levels. In the next section, we provide evidence on the utilization of funds across various medicines, which will help us throw light on the nature and quality of services delivered with respect to the morbidity patterns.

4.4 CONCLUDING REMARKS

Like most other states in India, expenses on medicines are borne by people from their pocket in Rajasthan, leading to impoverishment. The inverse relationship between public investment and impoverishment related to medicines was clear from the interstate variations observed. Introduction of MNDY in Rajasthan has brought about considerable changes in public investment on medicines. Over the last three years, per capita allocation and expenditure has increased multiple times. The scheme had started in October 2011 and the latest OOP data we have is for the year 2011–12. The reach of the scheme is likely to be less during the time of survey and correspondingly the impact on OOP is likely to be less. However, the scheme seems to have shown considerable promise with increased utilization of public facilities. When we corroborate this with findings related to availability, a better picture would emerge.

CHAPTER 5

MEDICINE PROCUREMENT AND DISTRIBUTION SYSTEMS IN RAJASTHAN

5.1 DESCRIPTION OF DIFFERENT PROCUREMENT MODELS IN INDIA

One of the key components of access to medicine is reliable and sustainable supply chain management to procure and distribute required medicines and vaccines in a timely manner. Different models of procurement and distribution of medicines and other medical supplies are followed in different states of India. The model followed depends on institutional capacity, priority, demography and other factors. The efficiency of the procurement model can be estimated on the basis of level of decentralization/centralization, selection of medicines and medical supplies, tendering process (to include scope of competition, timeline, bidding process, evaluation and selection process, quality checks and penalty clause for supply default and quality default) and payment mechanism. Inefficiency in any component of supply chain management may lead to sub-optimum performance of the health system in relation to access to medicines and can be observed through inadequate supply of medicines resulting in frequent stock-outs.

Procurement of medicines and medical supplies takes place at various levels, viz. at the level of the national government, state government, local government and autonomous bodies of national and state governments. In India, the management and control of communicable diseases and preventive services for these is under the purview of the national government and is implemented through various vertical programmes called the national disease control programmes. The procurement of medicines for the same is primarily carried out at a national level but we find that in some states funds are also routed through state procurement agencies for procurement of necessary medicines. While states such as Tamil Nadu, Kerala and now Rajasthan follow a centralized procurement and decentralized distribution system, several other states follow a decentralized procurement and distribution process with annual rate contracts. We outline different models of procurement across states below.

5.1.1 GOVERNANCE IN MEDICINE PROCUREMENT

Governance in the procurement process plays a critical role for optimum utilization of resources in the public health system. Given the technical complexity of procurement for pharmaceutical products where high variation in quality may result in serious adverse events with patients, a transparent, high quality, efficient and cost-effective procurement process is desirable. The national and state governments adopt different models of procurement based on their priority, needs and administrative convenience.

At the state level, procurement systems vary in terms of autonomy of the procurement agency, level of decentralization, transparency and efficiency. Traditionally, procurement for medicines is done by the central medical stores department through annual rate contracts (quantity based) by most of the states in India. In this system of procurement, bidders are invited to quote for lowest rate for the list of medicines through an open tender process. Tenders are scrutinized and the lowest eligible bidders are asked to submit necessary security deposits and sign the agreement with the respective departments for regular supply of medicines based on need from health facilities. The CMO at the district level or medical superintendent at the district hospital is empowered to place orders for the required medicines with the contracted supplier and is responsible for maintaining stocks at all the public health facilities. They are also empowered to make payments through the general treasury within the limit of their budget. Most often, budget for medicines is also prepared on a pro-rata basis rather than a need basis. This often leads to scarce funding for medicines. Coupled with irregular supplies by weaker suppliers, the overall result is unavailability of medicines at public health facilities. Bidders also quote the lowest rate (sometimes below cost) to get empanelled with government supplies departments to increase their credibility in the private market. Many states such as Uttar Pradesh, Bihar and Gujarat among others have such central medical stores departments under the department of health and family welfare responsible for procurement of medicines and other medical supplies.

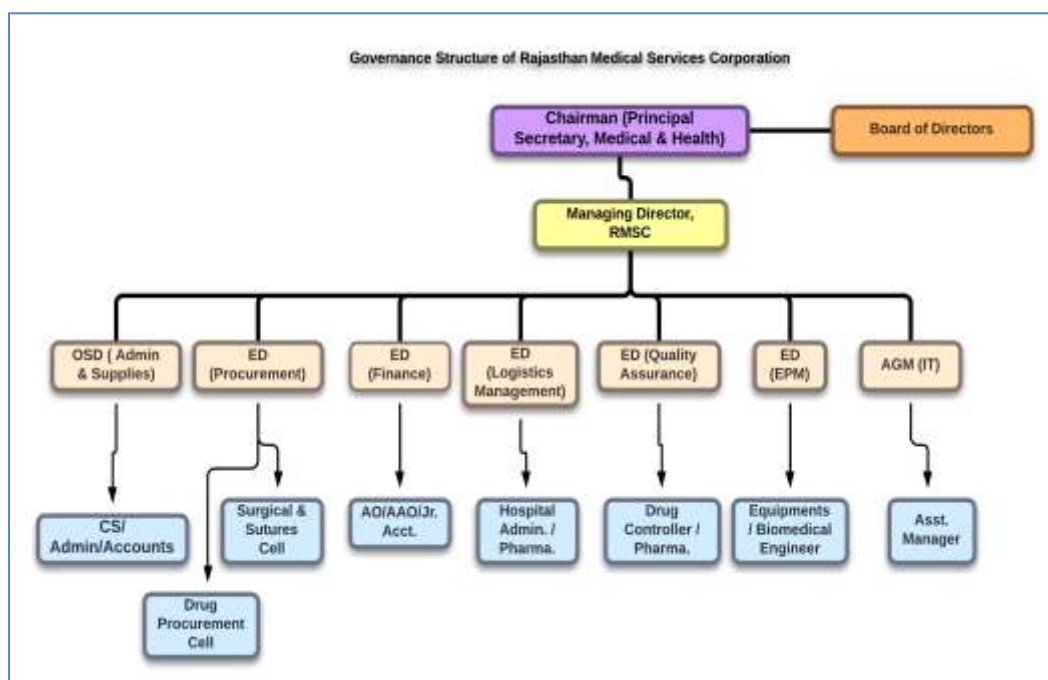
States such as Haryana and Madhya Pradesh have empowered the health facilities at lower levels of care to procure medicines from the open market within certain limits from the revenue generated from user charges. The management of the fund generated through nominal user charges is monitored through the *Rogi Kalyan Samiti*, a board with members from the hospital, civil society and elected members of the local government.

States such as Tamil Nadu, Kerala and recently Rajasthan have set up an autonomous corporation for procurement and distribution of medicines and other medical supplies for all public health facilities to achieve economies of scale using its monopsony purchasing power, and in the process negotiate better with suppliers. States such as Punjab and Haryana are in transition to adopt the centralized procurement and decentralized distribution model.

5.1.2 GOVERNANCE IN MEDICINE PROCUREMENT IN RAJASTHAN

The Government of Rajasthan had set up the RMSC under the Companies Act, 1956. It has the Principal Secretary, Medical and Health as the ex-officio chairperson with other directors from the Department of Finance (Expenditure), NRHM, Medical Education, Ayurveda, Public Health, Reproductive and Child Health (RCH), Drugs Controller and a full time Managing Director. Prior to the establishment of RMSC, procurement was done by state procurement officials; this procedure faced numerous challenges. The governance structure of RMSC is shown in Fig. 5.1.

Fig. 5.1. Governance structure of Rajasthan Medical Services Corporation



The governance structure above indicates that Rajasthan has created a centralized organization with a high level of autonomy with the Board of Directors in the procurement process. The final decisions for procurement are approved by the Board of Directors; however, the day-to-day operations related to it lie with the Managing Director of RMSC, who is also the Secretary of the Board of Directors. Within RMSC, there are different functional department structures, each headed by a director, supported by colleagues in that department responsible for procurement, finance, administration, logistics, quality, equipment and IT, undertaking day to day operations. It is worth noting here that RMSC has separate departments for procurement of medicine, equipment and quality assurance for maintaining high quality standards of medicines. An in-house IT department has been setup to maintain the supply chain and inventory management of this mega project, which manages supplies of more than 600 medicines across 2000 health facilities.

5.2 PREPARATION OF EML AND ITS QUANTIFICATION

The RMSC has developed its own list of medicines to be procured. The list of medicines and their specifications are decided in consultation with the Technical Advisory Committee (TAC) of RMSC. The Committee is chaired by the Managing Director and is represented by various stakeholders from medical colleges, Department of Medical and Health (Public Health, RCH, Health Administration), Medical Superintendent, Department of Finance, Rajasthan Drugs and Pharmaceuticals Ltd. (RDPL), Shakri Upbhokta Wholesale Bhandar Ltd. (Medical Branch), subject experts and other nominated members. Although the list of medicines is prepared by the TAC after taking into consideration the needs of the State, the NLEM and EML of WHO are also considered. In addition, the EMLs of Tamil Nadu, Kerala, Delhi and Karnataka are also considered during the preparation of the list of medicines to be procured by RMSC.

The EML of RMSC is prepared based on the principles of efficacy, safety, suitability and cost effectiveness. The list is revised from time to time by RMSC in consultation with its TAC and end users. The list is also a guiding basis for medical officers at the state health facilities for prescription of medicines using their pharmacopoeial/generic names. The list of essential medicines for RMSC comprised 477 medicines in 2012–13 and gradually reached 607 medicines in 2013–14.

Quantification of the medicines that are required by the state health-care facilities in the state of Rajasthan is based on the requirements as ascertained from all state-controlled health facilities based on previous consumption patterns of the items by the medical institutions. The annual demand is provided to RMSC by the respective departments of Medical and Health and Medical Education.

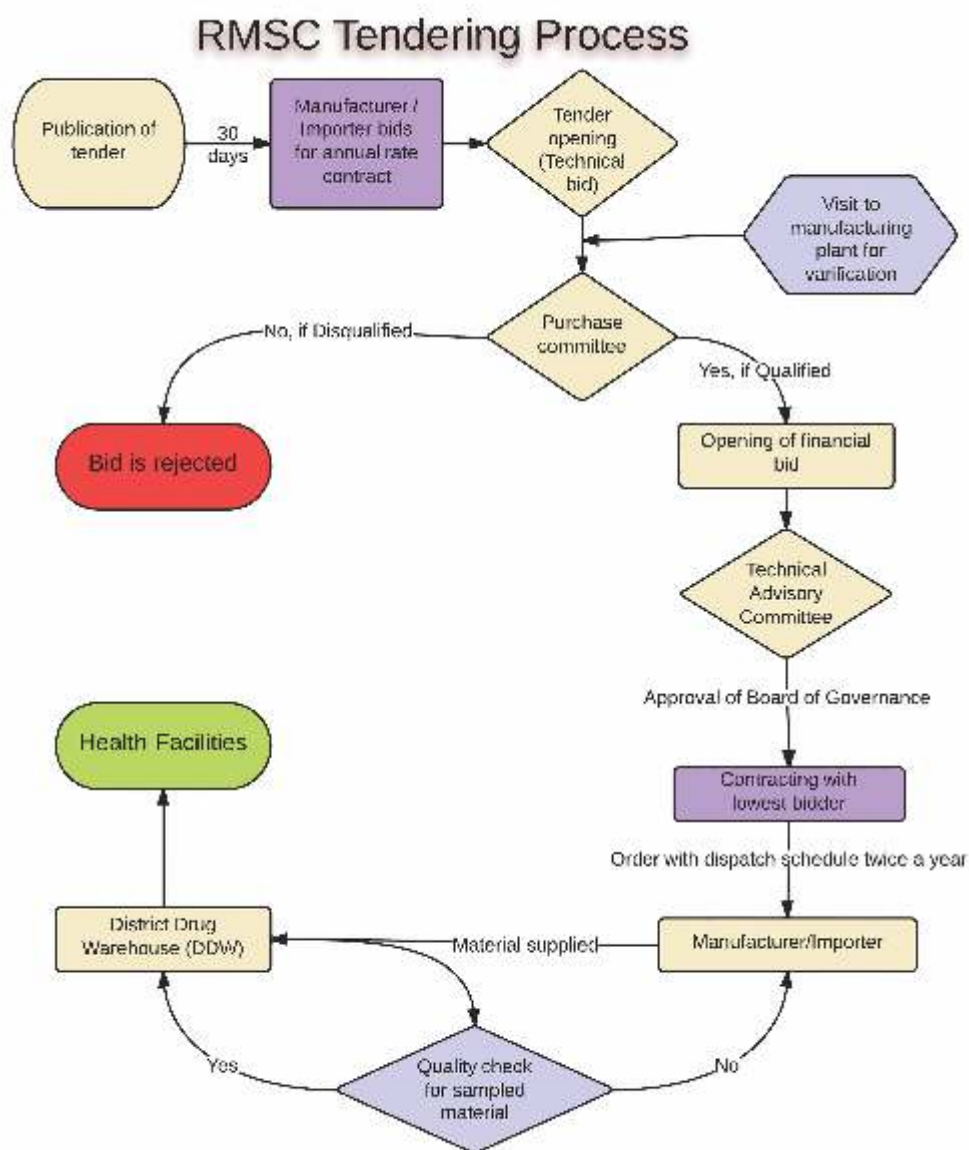
5.3 TENDERING OF MEDICINES

The RMSC follows a two-bid tendering process, inviting suppliers to submit separate technical bids and financial bids. The tender announcement is made through state and national level newspapers and by displaying all notices inviting tender (NITs) on the official website of the medical department of the State. If required, the information regarding tenders is also circulated through state medicines controllers, pharmaceutical manufacturing associations and pharmaceutical publications to encourage better participation in the tender.

The basic eligibility criteria in technical bids remains the same as for many other states following similar procurement mechanisms such as Tamil Nadu, Kerala, Andhra Pradesh and Madhya Pradesh. This includes market standing, valid manufacturing license, good manufacturing practices (GMP) certificates, production capacity, technical competencies, financial capacity, non-conviction certificate, earnest money deposit (EMD) and tender fees. In addition, the annual turnover is required to be 20 million Indian rupees for a small scale unit and 200 million Indian rupees for a large scale unit, the logic being that this stipulation will attract only those bidders who have the ability to supply quality medicines. However, the turnover clause and the EMD deposit clause is relaxed for state-owned public sector undertakings.

As per the new procurement policy, the Rajasthan Government has reduced purchase preference from state pharmaceutical public sector undertakings (PSUs) from 100% to 10% and for small scale industries (SSIs) from 80% to 15% with a condition to match L1 price through competitive bidding. The overall tendering process is as shown in Fig. 5.2.

Fig. 5.2. Tendering process of RMSC



Source: RMSC Guidelines

The tender document of RMSC provides information on the penalty clause to be levied in event of failure of the sample of performance, along with information on the manner that the price needs to be quoted inclusive of packing cost, tax and transportation. The tender document requires the RMSC logo to be mandatorily labelled for the medicines that are supplied to RMSC, even for branded medicines.

The list of technically successful bidders is published on the website of the RMSC and the financial bids of such bidders are opened in the presence of all technically qualified bidders in order to maintain transparency. The policy initiative of announcing the successful bidder on the website reflects the good governance practices followed in Rajasthan. Publishing the list of blacklisted/debarred parties on the website also shows the high level of commitment towards transparency in governance. As in the case of TNMSC, the RMSC also provides leverage for local purchase up to 10% of the total medicines expenditure of the facilities for medicines which are not procured by RMSC. However, it was interesting to observe that RMSC floats multiple tenders each year for different sets of medicines. The comparison of tenders floated for annual rate contract since inception of RMSC is described in Table 5.1.

Table 5.1. Key procurement outcomes

Tender opening date	2011			2012			2013		
	Jul 2011	Aug 2011	Nov 2011	Feb 2012	Jul 2012	Dec 2012	Apr 2013	Jun 2013	Oct 2013
No. of medicines tendered	402	222	129	298	204	116	210	215	230*
No. of medicines added to original tender	Nil	47	20	32	Nil	Nil	Nil	Nil	NA
Medicines not finalized	202	129	NA	93	47	22	39	46	NA
% of medicines not finalized	50.25	47.96	NA	28.18	23.04	18.97	18.57	21.40	NA
No. of technically qualified bidders	38	NA	65	NA	107	80	93	78	NA
No. of rate contracts	NA	37	15						

* Tender under process

Note: No. of medicines in Rajasthan EML was increased from 477 in 2011/2012 to 607 in 2013

Source: Extracted from tender documents and data provided by RMSC

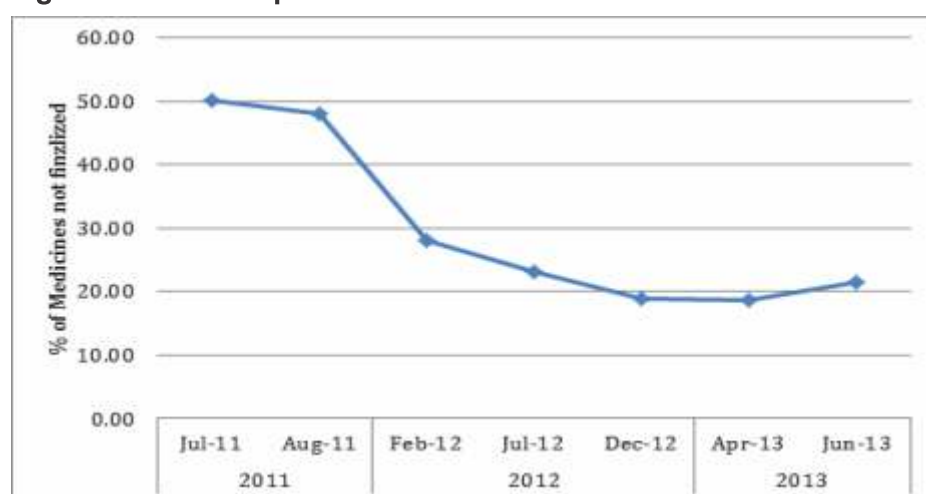
We observed that RMSC floats three to four tenders annually for procurement of medicines. However, there were as many as 37 rate contracts during 2012–13 and 15 rate contracts in 2013–14 to date, with different dates of ending. This has an implication on management of the supply chain due to the frequent follow up required. It is also observed that the first tender was for 402 medicines, of which only

49% medicines were approved/finalized from among 38 technically qualified bidders, for which subsequent tenders were floated. Even then, finding suppliers for all the medicines has been difficult, as in many other procurement models.

In 2011, RMSC found it difficult to find bidders for many of the medicines on their essential drug list (EDL). However, over a period of three years, manufacturers and importers have shown increased interest in participating in competitive bidding, and as a result the number of technically qualified bidders increased significantly from only 38 bidders for the first tender to 107 in 2012. The impact of the same can be seen on the percentage of medicines procured from the tendered medicines list. Apart from these tenders, it was observed that RMSC also floats single medicine tenders for iron, folic acid and other medicines such as primaquine tablets, vitamin K injection, ofloxacin, calcium carbonate and albendazole oral suspension, based on the demand from various individual programmes.

On detailed analysis of two tender documents (December 2012 and April 2013), the bidding pattern indicates that 22% of medicines are procured from a single technically qualified bidder (Fig 5.3). More than 43% and 47% medicines received attention from less than three bidders in 2012 and 2013, respectively. This can be interpreted to mean that there is still scope for increasing competition in these medicines. The variance in prices quoted is also observed in more medicines in the April 2013 tender as compared to the December 2012 tender. The coefficient of variance is greater than 0.5 in 22 medicines as compared to only nine medicines with high variability in the December 2012 tender (Table 5.3, Fig 5.4).

Fig. 5.3. Market response to RMSC tenders



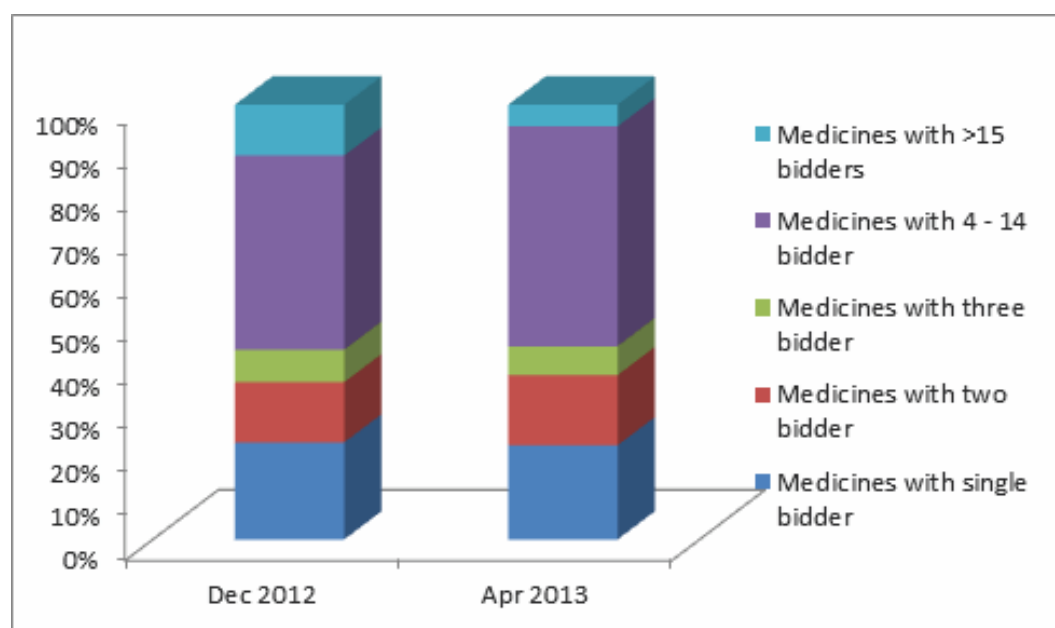
Source: Author's calculation based on tender data provided by RMSC and information published in archive section of RMSC website

Table 5.3. Analysis of competitiveness

	Tender date Dec 2012	Apr 2013
Total No. of medicines tendered	116	210
Total No. of medicines finalized	94	171
Total No. of qualified bidderst	80	93
% of medicines not finalized	18.97	18.57
Average No. of bidders per drug	6.67	5.32
SD in No. of bidders per drug	7.52	5.31
Median bidders per drug	4	4
No. of medicines with single bidder	21	39
No. of medicines with two bidders	13	29
No. of medicines with three bidders	7	12
No. of medicines with 4 –14 bidders	42	91
No. of medicines with >15 bidders	11	9
No. of medicines with higher variability in price (coefficient of variance >0.5)	9	22

Source: Author's calculation based on tender data provided by RMSC and information published in the archive section of RMSC website

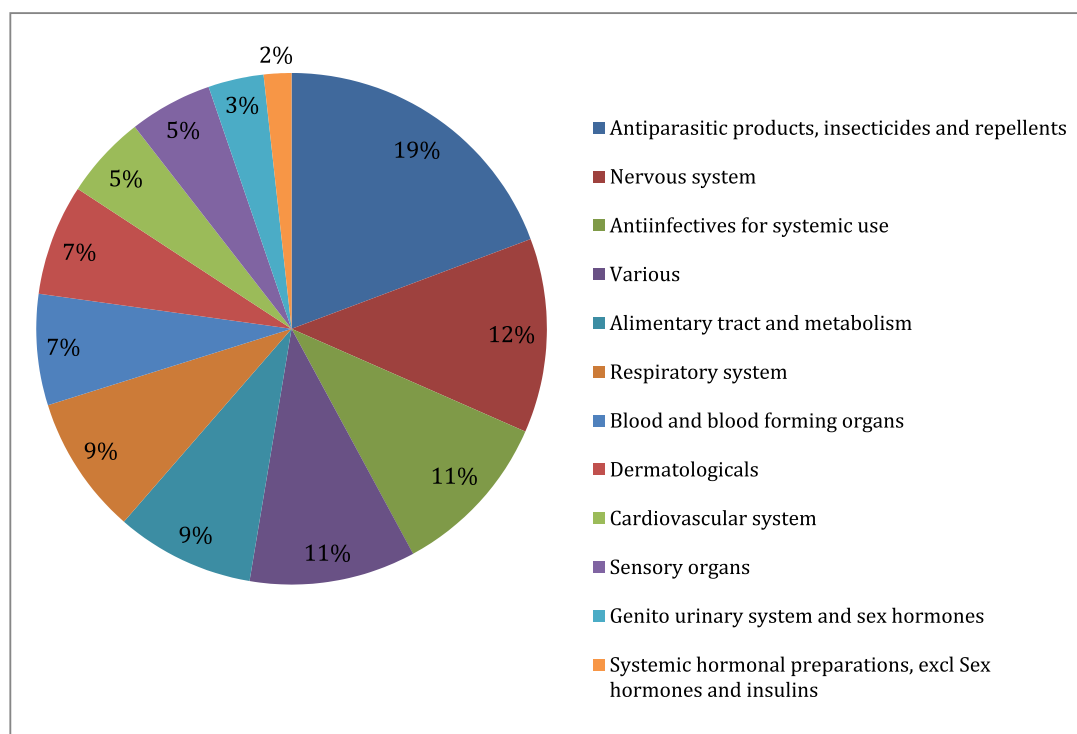
Fig. 5.4. Competitiveness in bidding for RMSC



Source: RMSC tender documents

Further analysis of medicines with single bidders from these two tenders covering more than 400 medicines reveals that medicines in the ATC group “anti-parasitic, nervous system and anti-infective” forms 42% of the total medicines that were bid for by a single bidder, i.e. these medicines are attracting poor competition. Other related medicines forming part of ATC group “alimentary tract and metabolism; antineoplastic and immunomodulation agents” and other medicines for obstructive airway disease and inhalants are also attracting comparatively lesser bidders, pointing to scope for improvement. The majority of medicines are from other sections which may be specialized in nature and patented products being procured from a single bidder (Fig. 5.5).

Fig.5.5. Distribution of single bidder medicines ATC-wise (%)



Source: Author's calculations based on tender data supplied by RMSC for two major tenders for medicines

5.4 QUALITY ASSURANCE MECHANISM OF RMSC

Several layers of quality checking mechanisms are in place under RMSC. The first procedure is detailed in the tender document, wherein the technical bid conditions ensure that the medicines supplied by the manufacturer are of good quality and supplied on time. The penalty clauses are clearly defined by the tender document; this acts as a guiding principle for the manufacturer. It also clearly lays conditions for shelf life of the medicines purchased.

In compliance with the quality policy, RMSC has blacklisted 12 companies for all procurements and 17 other companies for specific products, mainly because of substandard quality (Table 5.4). Publishing the list of blacklisted parties on the website of the organization indicates the level of transparency in the procurement process and concerns of RMSC for getting quality medicines. Such practices also keep suppliers alert about maintaining quality and timely supply of medicines to maintain their market standing.

Table 5.4. Reasons for blacklisting at RMSC

Reason	No. of bidders
Company blacklisting	
Non-execution of agreement and failure to deposit security deposit amount	7
Submission of forged documents (GMP, GPL, market standing certificate)	3
Quality failure	1
Product blacklisting	
Not of standard quality	14
Non-submission of agreement	1
Modified order ²	

Source: RMSC website <http://rmsc.nic.in> accessed on 07 October 2013

The second and most important process of quality assurance is undertaken once the medicines are received at the warehouse. Samples from supplies are drawn randomly from each batch and sent to the head office in Jaipur. The quality control department then mixes the entire sample and undertakes the process of removing/hiding the identity of the manufacturer and encoding the formulations by assigning secret codes. These are then sent to empanelled laboratories for analysis. The empanelled laboratories analyse the medicines using pharmacopeia specifications and suitable test protocols. Upon receipt of reports, generally via

electronic media, the medicines are released into the health system. Failure of a sample is tested by another empanelled laboratory or government laboratory before a final decision is taken. Actions that can be taken include return of stock, penalty of 2% per week levied on the supplier in case of non-uptake of failed stock after 30 days and its destruction after 90 days.

For each batch, samples for testing are drawn three times, so that in case of failure the sample can be sent to another laboratory for re-confirmation. Stipulated time periods within which each sample is to be sent to empanelled laboratories are:

- within 10 days of receipt of the sample for tablets, capsules, ointments, powder and liquid oral preparations
- within 21 days of receipt of the sample for IV fluids and injections.

Samples drawn from the health facilities are also tested. Failure to do so results in the same procedure as above and can result in blacklisting based on provision of substandard medicines or order failure. The stability of medicines is checked through periodic sample analysis within warehouses as well.

From the above discussion and observations at the field level we conclude that the quality check process is well developed and there is hardly any delay in the supply chain/logistics.

5.5 SUPPLY CHAIN MANAGEMENT AT RMSC

The supply chain management or inventory management at RMSC is managed by a web based application of *e-Aushadhi*. Each and every warehouse and public health facility to which RMSC provides medicines is connected through this interface. This interface can

- store, maintain, update, search and display information related to medicines
- define the items into groups, sub groups, categories, codification of medicines
- maintain expiry date/shelf life for an item wherever applicable
- generate alerts with different colour codes for items due to reach date of expiry/expired items
- generate indents automatically, based on re-orders and stock balance
- transfer medicines through identification of surpluses and stock-outs
- generate alerts on the number of medicines not dispensed at facility level

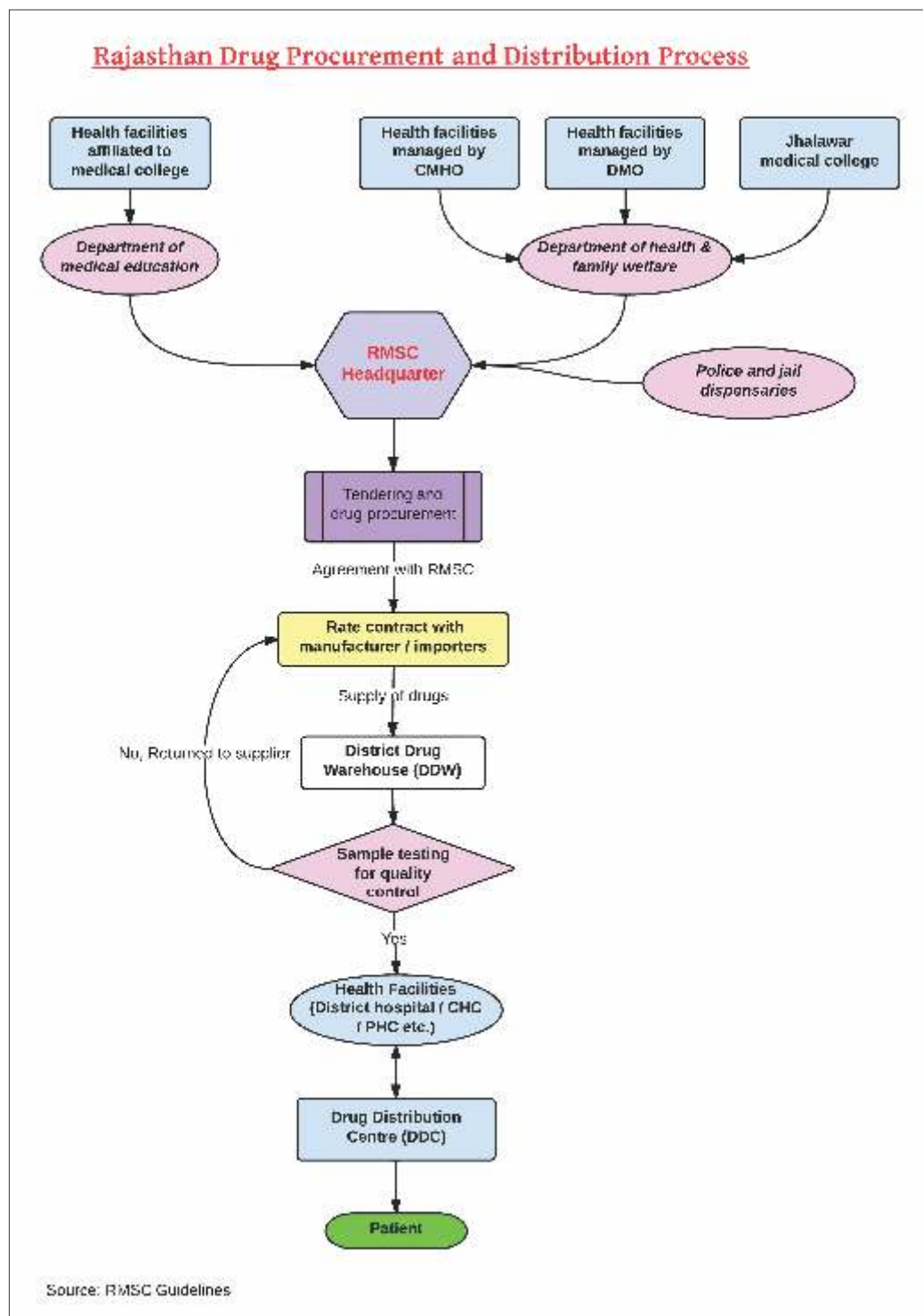
- collect information on the value and volume of medicines dispensed at each health facility in Rajasthan.

It is no wonder that this application has increased the efficiency of the RMSC supply chain system by decreasing the wastage of medicines and decreasing the time taken for indenting and tracking the availability of medicines in the State.

e-Aushadhi provides connectivity between the 34 warehouses in the states and real time information on the availability of medicines. The medicines are ordered by RMSC twice a year. At any given point of time, RMSC has four months of physical stocks in the warehouse and two months in the pipeline. *e-Aushadhi* also supports placing orders online, which need to be acknowledged by the supplier within three days and the supply schedule provided in seven days online.

Once the medicines arrive at the warehouse with expiry date, the warehouse in charge records these in a register in accordance with the Drugs and Cosmetics Act. Later on, these records are computerized to make them available online. The new medicines are kept in a quarantine area till the time the testing report arrives, which is also done through this platform. The overall supply chain management system of RMSC is as shown in Fig. 5.6.

Fig. 5.6. Drug procurement and distribution process for Rajasthan



The platform also provides an opportunity to undertake prescription audits. All the prescriptions at each facility can be extracted and uploaded for undertaking the analysis.

At facility level, there is provision of a computer operator to maintain the online inventory management interface of RMSC right up to the PHC level. The Rajasthan government has outsourced IT services by contracting for computer operators with computers so that the Government does not need to invest on computers in the initial phase. The pharmacist at the sub-store of the health facility is responsible for maintaining the stocks at the drug dispensing centre (DDC) with the help of the computer operator who also helps in placing orders online, monitoring stocks and updating the pharmacist store in-charge about availability of medicines in any warehouse across the State. The drug distribution system from the warehouse to health facilities varies from district to district depending on availability of resources and distance from the warehouse. Many districts contract with local transporters to operate on a monthly basis using small goods carriers to supply medicines to health facilities as per a pre-defined schedule based on orders received from the facility.

5.6 DISCUSSION ON RMSC PROCUREMENT PROCESSES

The RMSC has put in place elaborate processes for identification, quantification, procurement and quality assurance of medicines that are supplied to the public health system in Rajasthan. The core component of the entire process has been the electronic platform *e-Aushadhi*, which is crucial and the key success factor in enhancing the efficiency of the public procurement system. It is also worth noting here that online ordering has penetrated deep into the system and is being followed down to the PHC level. The governance structure seems to be well defined and transparent in proactive disclosure on the website of RMSC about the rate contracts, tenders and list of blacklisted parties, showing their commitment to quality. Of the 607 medicines under the 2013 medicines list, 299 medicines (~50%) overlap with the NLEM. There are 233 medicines for the primary level and 82 medicines for medical colleges. Many of these medicines are combinations; for instance, there are at least five instances of oral diabetics and anti-hypertensives. There are no combinations of oral diabetics and anti-hypertensives in the EML. This shows that the Rajasthan EML is driven by pragmatic concerns of availability, prescription practices and trends in the private sector. It is expected that over time, RMSC would overcome the irrational elements and pave the way for rational use.

The philosophy of the Corporation has been to be user-sensitive and stock a large number of medicines. Brands and need for imports are being reviewed periodically, to minimise expenditure. At the same time, the system also floats multiple tenders every year. To increase the efficiency of the system, the possibility of having a single annual tender or a maximum of two (one for fast-moving medicines and the other for expensive, slow-moving medicines) can be looked into. Also, there is a need to be rational in addition and deletion of medicines, prioritizing choices of consumers and prescribers versus the financing implications it has on the health system as a whole. Currently, even with the limited number of tenders, the rate contract numbers are high, resulting in different contractual periods and supply schedules. This needs to be consolidated, as it can create issues related to availability and stock-outs. Lowering annual tender rates, with strict quality parameters, can also be explored to further increase the competition.