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Digital Governance and Healthcare Logistics: Driving Efficiency with eLMIS in Nepal

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Abstract

An Electronics Logistics Management Information System eLMIS in revolutionizing healthcare supply chains in Nepal. By leveraging real-time data analytics and distribution of health commodities across the nation's diverse topography. The study evaluates eLMIS's implementation, highlighting its benefits in improving decision-making, inventory management, and supply chain visibility. Key findings, challenges, and strategic recommendations are discussed to optimize eLMIS operations, ultimately aiming to enhance healthcare delivery and support e-government initiatives in Nepal.

Keywords: eLMIS, SCM, LMIS, DoHS,

Introduction

Nepal's healthcare system faces unique challenges, especially in ensuring that crucial health commodities reach every corner of the country, from bustling urban centers to the most remote villages. The journey of health commodities supplies from central medical store to provincial medical store and provincial medical store to the health facilities at the end users.

In this backdrop, the proposal to implement an Electronics Logistics Management Information System eLMIS holds immense significance. An electronic logistics management information system eLMIS is a system of records and reports used to aggregate, analyze, validate, and display data (from all levels of the logistics system) that can be used to make logistics decisions and manage the supply chain. eLMIS, a modern technology solution, has the potential to revolutionize the way health commodities are managed and distributed across Nepal.

The overall objective of eLMIS is to ensure that there is one Supply Chain Management system for all health commodities' inventory management and reporting on a consolidated single platform to ensure countrywide data visibility, availability, accuracy, and ownership.

In Nepal, the effective management of health commodities is a critical imperative, given the diverse topography and logistical challenges faced by the country. The integration of Supply Chain Management (SCM) with an Electronics Logistics Information Management System eLMIS emerges as a transformative solution. SCM, at its core, involves the seamless coordination of processes from procurement to distribution.

With eLMIS, this coordination takes on a technologically advanced dimension. eLMIS leverages electronic tools to provide real-time visibility, accurate data analytics, and automated inventory management. In the context of health commodities in Nepal, this means overcoming geographical challenges, reducing delays, and minimizing errors in the supply chain. eLMIS not only ensures the efficient flow of medical supplies but also facilitates collaboration among stakeholders, offering a centralized system adaptable to Nepal's unique healthcare landscape. This integration enhances compliance, traceability, and overall transparency, contributing to the reliable and timely delivery of health commodities across the country. In essence, the marriage of SCM and eLMIS in Nepal's healthcare sector represents a progressive step towards a more resilient and technology-driven supply chain for essential health resources.

Background and Context

Nepal, known for its diverse landscapes and challenging terrains, faces significant obstacles in managing an efficient healthcare supply chain. The country's logistics infrastructure struggles with delays, errors, and complexities, especially in the healthcare sector where timely delivery of medical supplies is crucial. These difficulties are particularly apparent in remote regions, where the lack of proper transportation and distribution channels leads to uneven access to essential health commodities.

The Management Division (MD) of Nepal, which oversees various health-related information systems, plays a key role in addressing these logistical challenges. The MD is responsible for managing multiple health systems, including the Logistics Management Information System (LMIS), the Health Management Information System (HMIS), and the Health Infrastructure Information System (HIIS). These systems are designed to manage and coordinate the procurement, distribution, and storage of health commodities across the country.

Historically, Nepal relied on paper-based reporting for health supply chain management, with over 6,000 health facilities submitting quarterly LMIS reports. However, the system

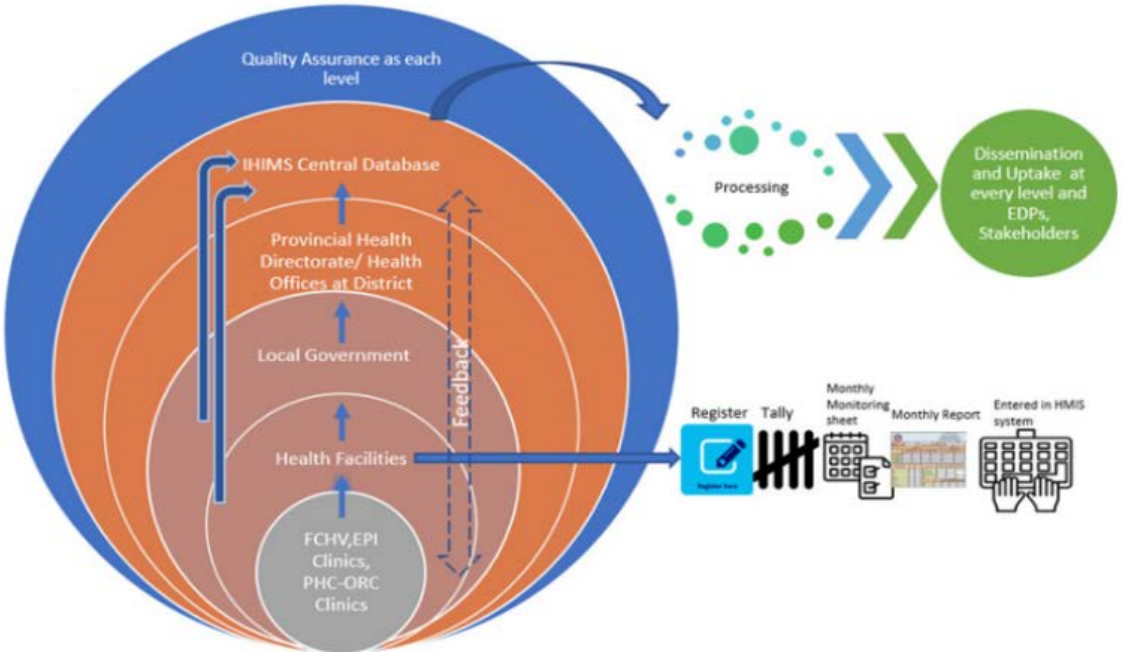
evolved over the years, transitioning to a web-based LMIS in 2008 and then to a real-time, online Inventory Management System (IMS) by 2013. More recently, LMIS has been updated to a monthly reporting cycle, which ensures more up-to-date data for decision-making.

To further enhance efficiency and reduce logistical challenges, Nepal has introduced the electronic Logistics Management Information System eLMIS. Implemented in 2018 with support from USAID (United States Agency for International Development) and utilizing the "Entution Vesta" platform from Bileeta Pvt Ltd, eLMIS aims to streamline inventory management and provide real-time data access across the supply chain. By 2024, the eLMIS system covered over 4000+ health facilities, including service delivery points, local level governments, and provincial and federal stores.

The shift to eLMIS represents a transformative approach to health supply chain management, utilizing electronic tools and data-driven strategies to improve visibility, accuracy, and coordination. This system not only reduces manual workload but also ensures the safety and security of data, providing a more reliable platform for health commodity distribution and inventory management.

In summary, eLMIS aims to address the logistical hurdles posed by Nepal's topography and improve the efficiency of the healthcare supply chain. By integrating electronic solutions, eLMIS has the potential to enhance the timely availability of health commodities, reduce stockouts, and ultimately improve public health outcomes, particularly in remote and underserved areas of Nepal.

The Management Division (MD) is responsible for overseeing a wide range of management functions within the Department of Health Services (DoHS), serving as the secretary to the Director General of DoHS. It plays a critical role as the central hub for health-related information management. The MD successfully implements three key systems: the Health Management Information System (HMIS), the Logistics Management Information System (LMIS), and the Health Infrastructure Information System (HIIS). The division is tasked with diverse responsibilities, including planning, coordination, supervision, forecasting, quantification, procurement, and distribution of health commodities to healthcare facilities. Additionally, it supports infrastructure development, equipment maintenance, waste management, and water sanitation and hygiene initiatives.



Health Information Management Program:

The Integrated Health Information Management System (IHIMS) section plays an essential role in managing routine health data and information from community health workers to the federal level. This system forms the foundation for monitoring, evaluation, and planning across all levels of government: federal, provincial, and local. IHIMS ensures coordination among these government tiers, providing an integrated platform for the collection, analysis, visualization, and dissemination of health information.

A primary responsibility of IHIMS is to oversee the creation of periodic and annual health reports, which are then shared with relevant stakeholders. These reports are crucial for monitoring and evaluating the health sector's progress and contribute to the formulation of evidence-based Annual Work Plans and Budgets (AWPB) and Water, Sanitation, and Hygiene (WASH) initiatives. The MD also ensures the functionality and quality of all information systems, supporting the Ministry of Health and Population (MoHP) in health program evaluation, and the development of policies, guidelines, and standards. Moreover, the MD oversees the construction and maintenance of public health infrastructure, medical equipment upkeep, and the management of biomedical inventories and transportation vehicles.

Logistics Management Information System (LMIS):

The Logistics Management Information System (LMIS) unit was initially established within the Logistics Management Division (LMD) in 1994 (fiscal year 2050/51) and is now under the Management Division. LMIS introduced a web-based system in 2008 and later implemented an online Inventory Management System (IMS) in 2017 (fiscal year 2073/74) to streamline store management. In 2018, the MD transitioned to an electronic Logistics Management Information System (eLMIS) to further enhance supply chain management, improving data entry, visualization, and decision-making. eLMIS is currently implemented at all local-level, with plans for expansion to all service delivery points (SDPs) based on operational needs. As of December 2024, eLMIS covers a total of 4000+ live sites, including 3,539 SDPs, 753 local level governments (LLGs), 77 health offices, and provincial and federal stores. In areas where SDPs have not yet adopted eLMIS, LMIS forms are submitted to LLGs for data entry.

Since the fiscal year 2079/80 (2023), LMIS reporting has shifted from a quarterly to a monthly cycle. eLMIS provides a dashboard that visualizes stock status, health commodity consumption, and reporting status. The digitalization of inventory management tasks, such as handover forms, entries in supply registration books, and stock records, has significantly reduced the paper-based workload for healthcare providers. Additionally, eLMIS ensures secure data management, providing a reliable platform for inventory tracking and management.

Logistics Management Program:

The procurement of health commodities within Nepal is governed by the Public Procurement Act (2063) and its regulations (4th revision, 2073). Since fiscal year 2018/19 (2075/76), the Logistics Management Section (LMS) has been responsible for overseeing federal-level procurement, focusing on acquiring and distributing essential pharmaceuticals and medical equipment. The consolidation of the Annual Procurement Plan (CAPP) has been standard practice at the DoHS (Department of Health Services) since fiscal year 2014/15 (2071/72).

Objectives

1. Assess eLMIS's influence on decision-making and supply chain timeliness.
2. Evaluate data utilization for forecasting and planning.
3. Measure improvements in communication and collaboration among stakeholders.
4. Determine user satisfaction with eLMIS.
5. Identify barriers to effective eLMIS adoption.

Methodology

1. Research Design

This mixed-method study incorporates quantitative surveys among healthcare practitioners and qualitative interviews with stakeholders to assess eLMIS's effectiveness.

2. Data Collection

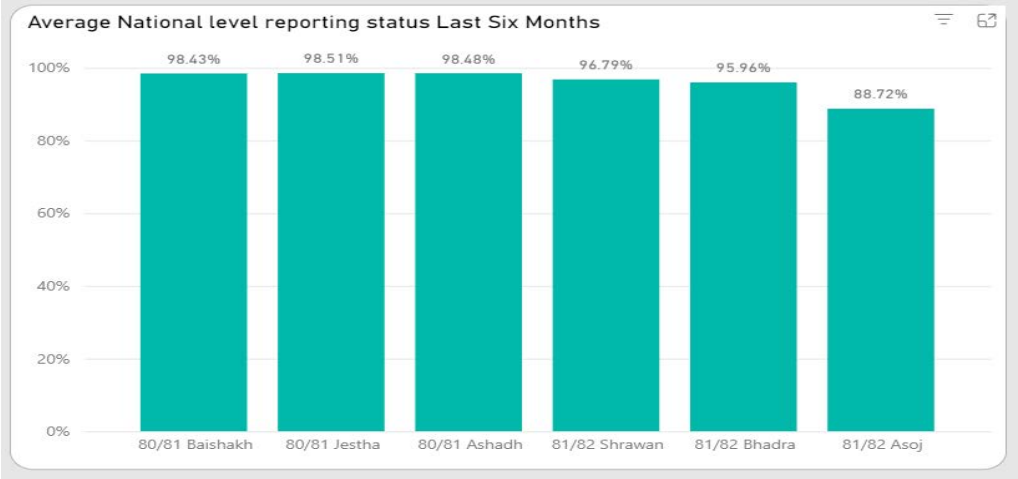
Primary data includes surveys and interviews, while secondary data derives from reports, government databases, and the eLMIS portal.

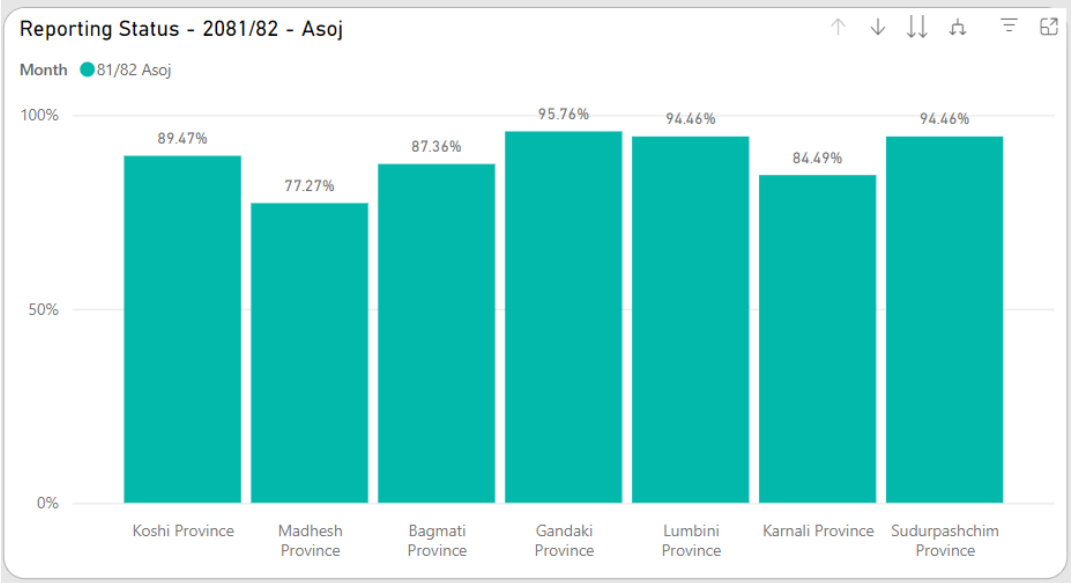
3. Data Analysis

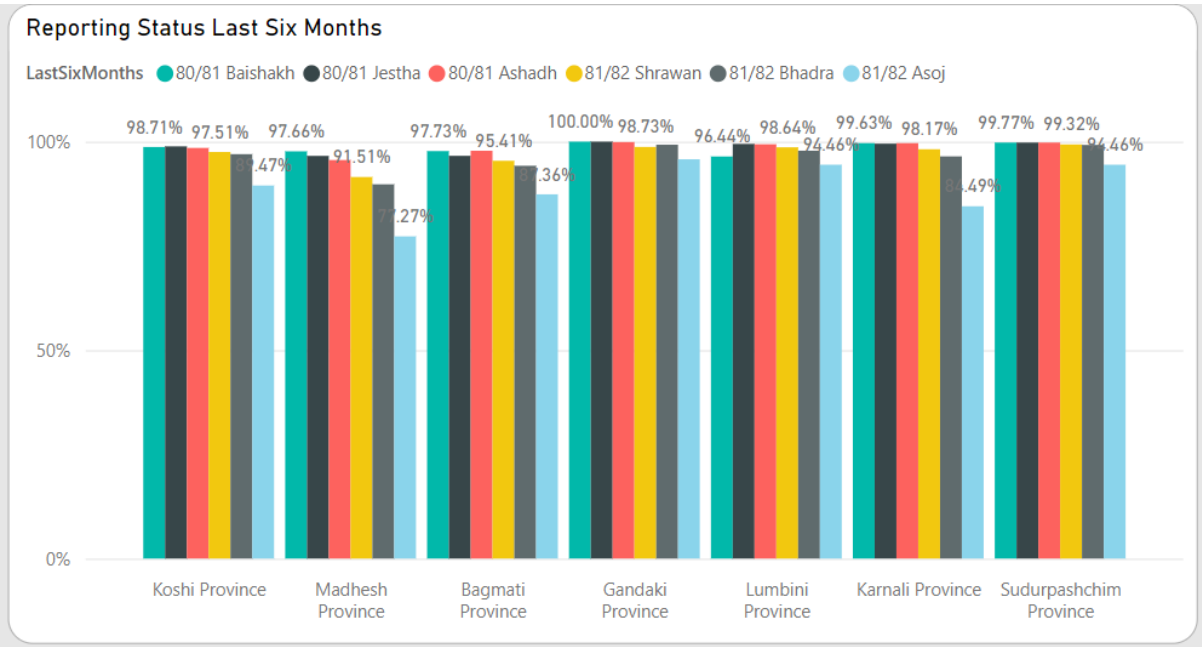
Quantitative data will be analyzed using statistical tools, including regression and ANOVA. Qualitative data will undergo thematic analysis to identify patterns and insights.

4. eLMIS Dashboard for Data Analysis:

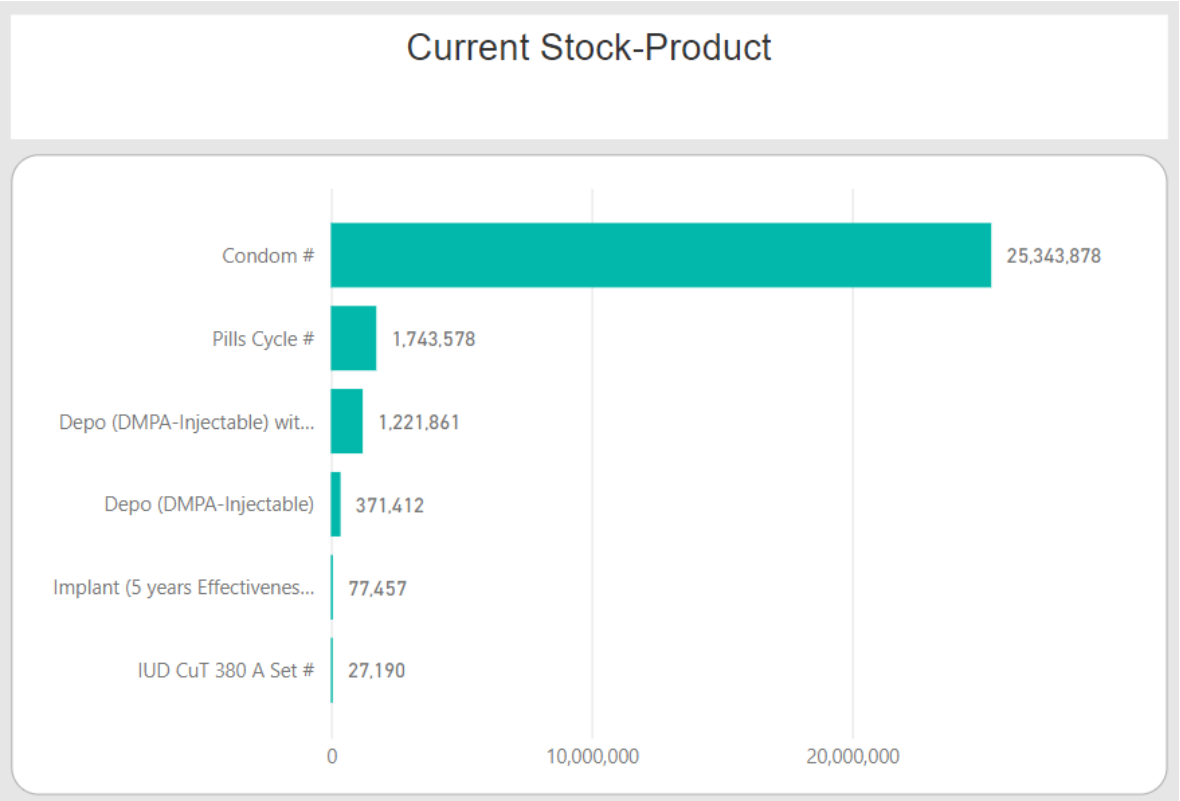
eLMIS used at all 77 Districts of 753 LLGs of 7606 Health Facilities in Nepal. Reporting percentage of LMIS/eLMIS sites in last six month is above than 95%.

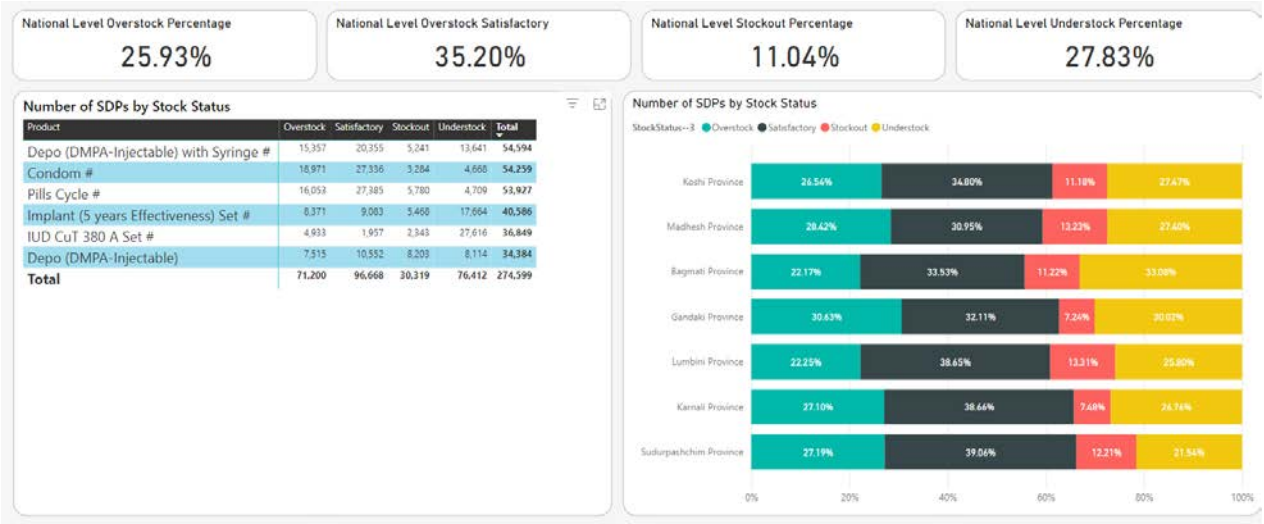






National Stock Status of FP (Family Planning Products) from eLMIS data sources on date 12-01-2024

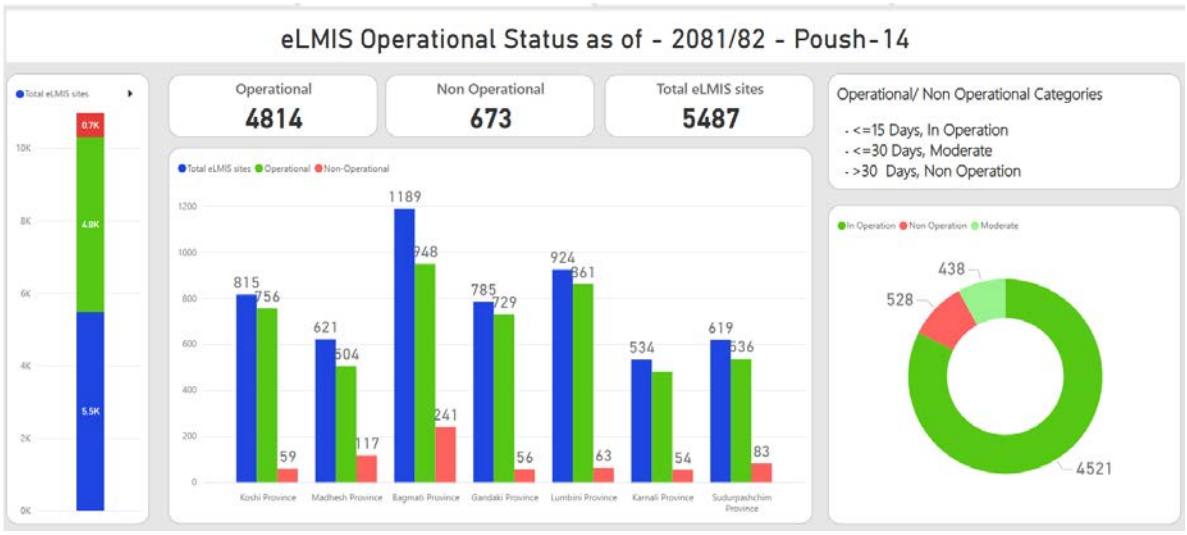




Findings and Discussion

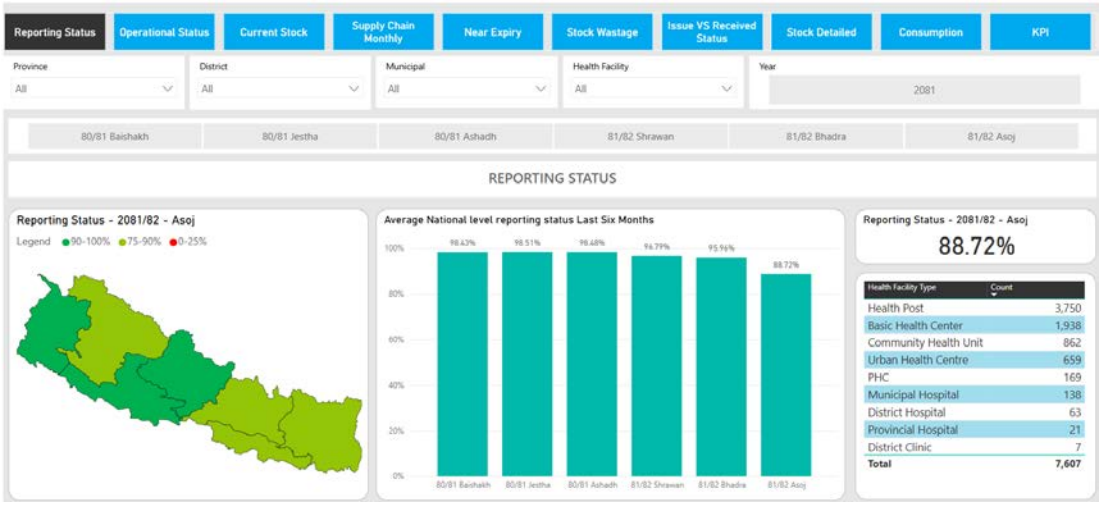
1. Current Status of eLMIS

As of December 2024, eLMIS has been implemented in 4000+ live sites across Nepal, covering 753 local levels and 3,539 service delivery points. Reporting rates exceed 90%, demonstrating significant adoption and operational efficiency.



2. Impact on Supply Chain Management

eLMIS enhances visibility, reduces stock outs, and improves inventory accuracy. Real-time dashboards support decision-making and allow better planning and quantification of health commodities.



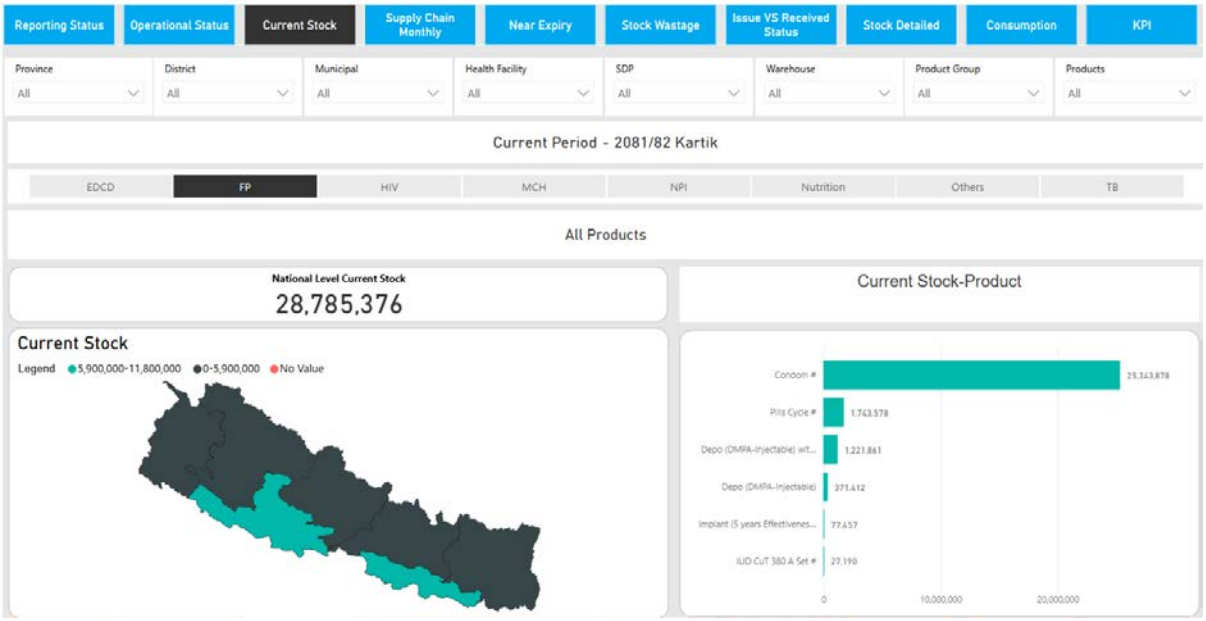
3. Stakeholder Insights

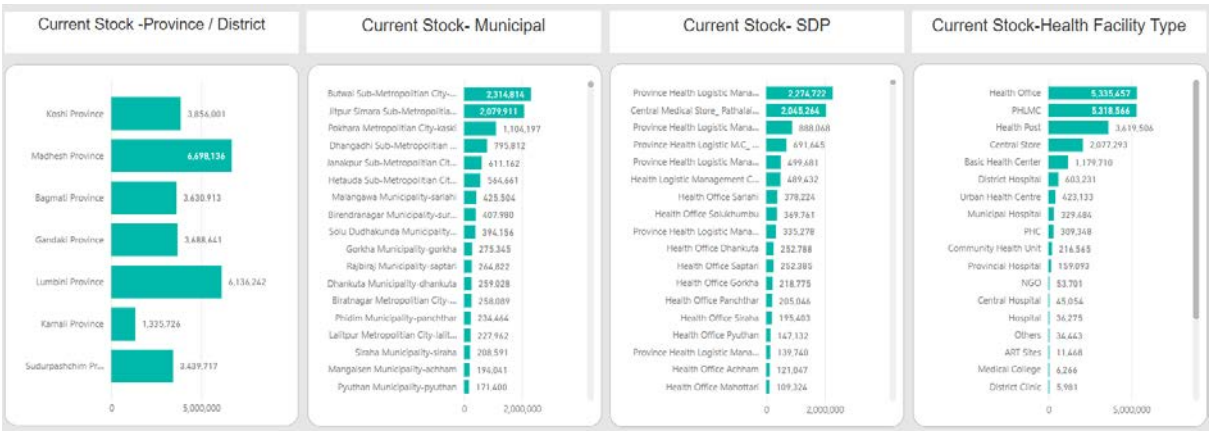
Users appreciate the system's efficiency but cite challenges such as technical glitches and limited training. Rural facilities face unique barriers to adoption.

HealthFacility	Operational Status Total	Operational	Non-Operational	Operation Status %
District Clinic	3	3		100%
Health Office	77	77		100%
NGO	3	3		100%
PHLMC	8	8		100%
PHLMC Cold Chain	8	8		100%
PHC	123	118	5	96%
Health Office Cold Chain	70	67	3	96%
Municipal Hospital	121	115	6	95%
Local Levels	753	696	57	92%
District Hospital	62	55	7	89%
Urban Health Centre	372	330	42	89%
Laboratory	8	7	1	88%
Basic Health Center	979	853	126	87%
Health Post	2498	2168	330	87%
Provincial Hospital	21	18	3	86%
Central Store	11	9	2	82%
Community Health Unit	228	186	42	82%
Others	9	7	2	78%
Medical College	8	6	2	75%
ART Sites	78	58	20	74%
Hospital	13	9	4	69%
Ayurvedic Health Center	6	4	2	67%
Local Level Cold Chain	4	2	2	50%
Central Hospital	20	7	13	35%
Total	**5487**	**4814**	**673**	**88%**

4. Statistical Analysis Results

Initial results show significant correlations between eLMIS usage and improvements in supply chain performance metrics, including timeliness and accuracy. Current stock status of Family Planning (FP) commodities as shown below through PBI Dashboard.





Challenges and Limitations

- Delayed data synchronization in remote areas.
- Limited technical capacity and resistance to change among users.
- Data entry errors and lack of quality control.
- Geographic and resource constraints impacting rural facilities.

Recommendations

1. Provide targeted training and capacity building for end-users.
2. Develop offline functionality to address connectivity issues in remote areas.
3. Integrate advanced technologies such as AI for predictive analytics and blockchain for transparency.
4. Foster stakeholder engagement to enhance system adoption.

Conclusion and Future Directions

The implementation of eLMIS represents a pivotal step in addressing Nepal's healthcare supply chain challenges. While significant progress has been made, targeted interventions are required to address barriers and optimize system performance. Future research should explore longitudinal impacts of eLMIS and its integration with emerging technologies to sustain healthcare logistics improvements.

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