

KEY POINTS

- Strong medicine and health commodity supply chains improve health outcomes and build trust in health systems. They should be patient-centered and give access to affordable, high-quality products when and where they are needed.
- Robust supply chains provide critical vaccines, medicines, diagnostics, and other essential health supplies to support communicable disease prevention, control, and response activities. They are critical inputs to national and regional health security.
- The demand for high-quality health care services in the Asia and Pacific region continues to expand, with Asia's pharmaceutical market expected to grow 13% annually. As supply chain costs make up about 25% of pharmaceutical costs, investments to strengthen their efficiency and effectiveness should be explored.
- In many developing member countries in Asia and the Pacific, out-of-pocket (OOP) expenditures make up more than 50% of the total health expenditure, and more than half of OOP spending is generally for medicine. Improving supply chain efficiency and the quality of medicines will decrease OOP expenditure and also improve health outcomes as people can access better medicines.
- Medicines and health commodities are accessed through both private and public health sectors. Supply chain improvement and coordination efforts should harness the competitive strengths of each sector to improve cost effectiveness, reduce patient medicine expenditures, and improve health service planning.

STRONG SUPPLY CHAINS

TRANSFORM PUBLIC HEALTH

By ensuring the efficient and effective delivery of medicines and commodities, supply chains support healthy populations and regional health security

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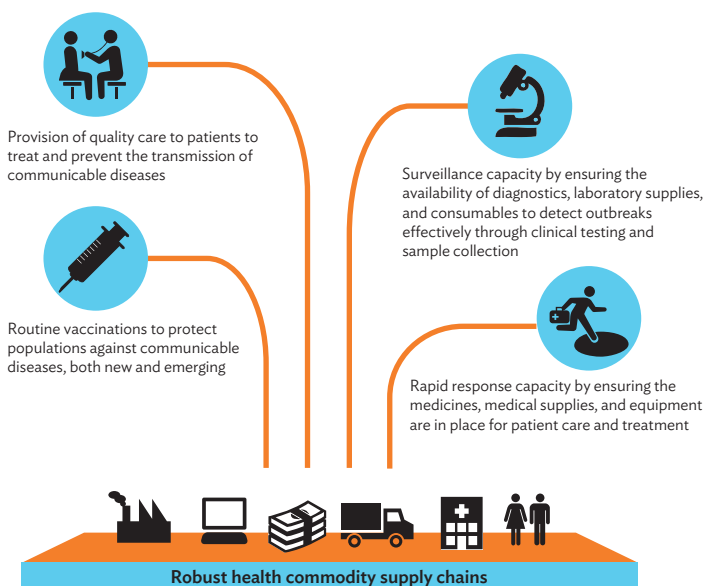
1. Effective supply chains support disease prevention, control, and response

Health commodity supply chains are a critical element of a well-functioning health system and a vital input to advancing national and regional health security goals. Health security is a key issue in Asia and the Pacific due to the region's vulnerability to the threat of emerging communicable diseases, particularly zoonoses (diseases transmitted from animals), vector-borne diseases, and drug-resistant pathogens. This vulnerability has been demonstrated in recent years by outbreaks of severe acute respiratory syndrome, avian influenza, and more recently pandemic influenza. The development of artemisinin-resistant malaria in remote areas in the Greater Mekong Subregion and the increasing spread of multi-drug-resistant tuberculosis and other drug-resistant pathogens further highlight the threats posed by infectious diseases and the need to achieve a well-functioning medicines supply chain, particularly to achieve malaria elimination.

By providing medicines, vaccines, and medical products, health commodity supply chains enable disease management and containment. "Zero stock-out situations" support communicable disease elimination efforts, such as the initiative to eliminate malaria in the Greater Mekong Subregion.

To prevent, detect, and effectively respond to disease events, supply systems must be able to quickly and reliably source and distribute diagnostics, vaccines, medicines, and other related commodities (Figure 1). As countries strive to strengthen their disease detection and epidemic response systems, health commodity procurement, warehousing, and distribution systems must be able to meet evolving public health and health security demands.

Figure 1: How Robust Health Commodity Supply Chains Support Health Security



Source: Authors.

Demand for quality health care is increasing as the Asia and Pacific region continues to become more prosperous, with its share of global health spending expected to increase from 21% in 2012 to 24% in 2017. Asia's pharmaceutical market is also expected to grow 13% a year, from \$214.2 billion¹ in 2010 to \$386 billion in 2016.² This increased demand for health care services and commodities necessitates stronger regulatory oversight to ensure the quality of this increasing volume of products, and places additional pressure on both public and private health supply chains to be more efficient and effective.

2. Patient-centered supply chains build trust in health systems

Medicine and health commodity supply chains begin and end with patients. Patient-centered supply chains ensure that patients have access to quality medicines when and where they need them, and at an affordable price. To implement supply chain processes effectively there must be an understanding of patient disease trends and product consumption patterns, as well as how and where patients seek health care services. This requires investments and capacity development in information management. As with any business, an understanding of market demands will enable users of supply chains to more effectively target their investments, reduce waste, and ultimately better serve the needs of their patients and customers.

The operational components of a health logistics system are product selection, forecasting and procurement, warehousing, and storage and distribution. These individual components are supported by financial management, supervision, and human resources. Effective coordination between the components prevents delays in supply that can affect patient access to critical life-saving vaccines, medicines, and clinical treatments. Information management is at the heart of a supply chain and drives operational decision-making, planning, and resource allocation (Figure 2).

Figure 2: The Logistics System



Source: Adapted from USAID DELIVER. 2011. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Task Order 1. Arlington, VA: US Agency for International Development.

¹ All dollars used in this report are US dollars.

² Economist Intelligence Unit. 2014. *Asia Rising: Health Care*. Industrial Dynamism Barometer. London: EIU.

By facilitating the availability of medicines and medical supplies to patients, robust supply chains save lives, strengthen health systems, and improve service delivery. Over the years, patient and household surveys have found that the availability of medicines is a major determinant of where patients go for health care, how much they spend out-of-pocket (OOP), and how satisfied they are with that care.

Product availability impacts the productivity of health workers: when medicines and other essential supplies fail to arrive at a health facility, patient volumes drop, which in turn adversely affects health care worker utilization.³ Patients also often turn to informal pharmacies and medicine distribution channels which might offer unregulated, ineffective, and unsafe medicines. Moreover, product availability contributes to improved health outcomes. For example, in Nepal year-round access to contraceptive methods and supplies increased coverage from 45% of the population in 1995 to 95% in 2011. The availability of reproductive health supplies was a key factor in the reduction of Nepal's total fertility rate from 4.6 in 1996 to 2.6 in 2011.⁴ Similarly, in western Cambodia public sector availability of artemisinin-based combination therapy and malaria rapid diagnostic tests was a critical factor in the decline of malaria morbidity and mortality.⁵

By ensuring that medicines and other medical supplies are safe and reliable, supply chains play an important role in protecting the health of patients, building trust in a health care system, and crowding out informal and unsafe supply chains. Robust supply chains—and the regulatory agents that oversee them—also protect the public from substandard or counterfeit medicines. In the Asia and Pacific region, this is particularly important, as globally 78% of counterfeit antibiotics are made in Southeast Asian countries, where 44% of those medicines are also consumed.⁶

3. Efficient and effective supply chains result in cost savings

In the absence of national health insurance or other social protection schemes (or if social health insurance exists but does not cover medicines), medicines are often the largest component of OOP medical expenditure. In some countries in the Asia and Pacific region, nearly half of all OOP payments go toward the purchase of medicines. In the Lao People's Democratic Republic (Lao PDR), for example, medicines account for 48% of OOP health care expenditure, and the figure is estimated as 54% in Myanmar.⁷ According to a recent report, supply chains now account for nearly 25% of pharmaceutical costs and more than 40% of medical device costs.⁸ Optimizing supply chain strategies and processes can produce savings, which can then be passed on to patients and used to expand health care services to more people.

The procurement function provides critical opportunities to achieve supply chain cost effectiveness. For example, it is estimated that the government of Cambodia could have saved up to \$50 million annually by more efficiency in purchasing pharmaceuticals, equipment, and medical supplies. The country was paying on average up to six times the international reference price of essential medicines.⁹ The World Health Organization has estimated that by reducing unnecessary expenditure on medicines, countries could save up to 5% of their total health expenditures.¹⁰

Critical supply chain cost savings can be achieved by implementing strategic purchasing methods, which continuously seek to improve health system performance through purchasing decisions. This is in contrast to passive purchasing—making procurement decisions based on available budgets, or simply paying bills when presented.¹¹ Procurement methods to achieve cost savings include the implementation of pooled procurements, enhancing competition through e-procurement systems, and entering into longer-term fixed-price contractual agreements. Forward procurement planning and the timely submission of medicine and commodity orders, which allow manufacturers to adjust production schedules well in advance, can also result in procurement price reductions.

³ Management Sciences for Health. 2012. Towards Sustainable Access to Medicines, Section 1.4. In *Managing Access to Medicines and Health Technologies*. Medford, MA: Management Sciences for Health, Inc.

⁴ USAID DELIVER. March 2014. *Health Logistics in Nepal. Two Decades of Investments in Public Health Supply Chain Management: How Access to Supplies Improved Health Outcomes in Nepal*. Arlington VA: US Agency for International Development.

⁵ S. E. Canavati, S. Lawpoolsri, C. E. Quintero, et al. 2016. Village Malaria Worker Performance Key to the Elimination of Artemisinin-Resistant Malaria: A Western Cambodia Health System Assessment. *Malaria Journal*. 15. p. 282.

⁶ Jae-Hoon Song. 2015. Antimicrobial Resistance Control in Asia. In *AMR Control 2015*, p. 41. <http://www.finddx.org/wp-content/uploads/2016/03/WAAR-2015-AMR-Control-2015-Overcoming-Global-AMR.pdf>

⁷ Asia Pacific Observatory on Health Systems and Policies. 2014. Republic of the Union of Myanmar Health System Review. *Health Systems in Transition*. 4(3). p. 139.

⁸ McKinsey & Co. 2013. *Strengthening Health Care's Supply Chain: A Five-step Plan*. <http://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/strengthening-health-cares-supply-chain-a-five-step-plan>

⁹ Asia Pacific Observatory on Health Systems and Policies. 2015. Kingdom of Cambodia Health System Review. *Health Systems in Transition*. 5(2). p. 50.

¹⁰ Asia Pacific Observatory on Health Systems and Policies. 2010. *Health Systems Financing: The Path to Universal Health Coverage*. Geneva: WHO. http://www.wpro.who.int/asia_pacific_observatory/hits/series/khm/en/

¹¹ Asia Pacific Observatory on Health Systems and Policies. 2016. *Strategic Purchasing in China, Indonesia and the Philippines*. Comparative Country Studies 2(1). Geneva: WHO. http://www.wpro.who.int/asia_pacific_observatory/country_comparative_studies/strategic-purchasing-china-indonesia-philippines/en/

Access to generic versions of medicines is a particularly vital area of achieving cost savings, with savings of up to 80% on selected generics of branded pharmaceuticals.¹² To strengthen strategic purchasing capacity, investments should be made in improving both the procedural knowledge of procurement staff and their subject knowledge of health commodity specifications in local and international supplier markets.

Investments should also be made in the establishment of e-procurement information and communication technology systems to incentivize supplier competition; e-catalogs to prevent procurement errors; and the review and use of reference pricing to benchmark supplier pricing. In addition, investments should be made to establish supplier performance monitoring and analysis systems, with the goal of tracking late or poor order fulfillment performance by suppliers to inform vendor selection decision-making.

On the operations side, minimizing held stocks, reducing product storage periods, and improving management of product expiry dates can bring about additional cost savings. Consistent adherence to good storage practices, particularly for heat-sensitive cold-chain items such as some vaccines, can also reduce the risk of product wastage. The outsourcing of certain supply chain functions, such as warehousing and distribution, is also a common operational strategy to reduce supply chain costs.

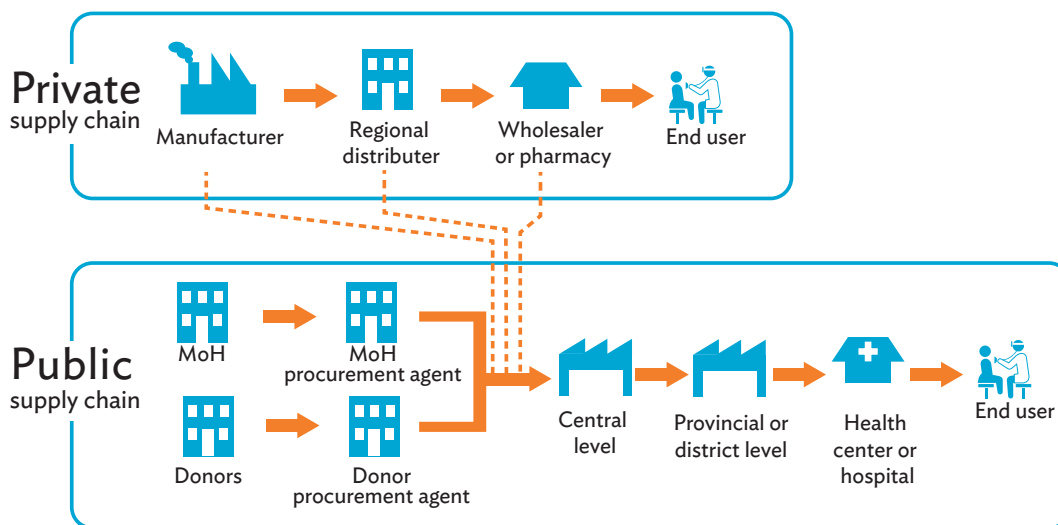
4. Both private and public supply chains contribute to advancing public health

In Asia and the Pacific, people seek health services access medicines and other health products through both private and public systems. By retail value, the private sector, which includes retail pharmacies, provides by far the majority of pharmaceuticals in many countries.¹³ In many areas private providers significantly outnumber public health care providers. In Madhya Pradesh, India (with a population of 67 million), for example, 75% of all health care providers operate in the private sector.¹⁴

Patients turn to retail medicine sellers or public sources for numerous reasons, including convenience, perceived severity of illness, their proximity to public health facilities, and the availability of medicines there. Retail medicine outlets play an important role in ensuring access to medicines, particularly in rural settings.

The benefits of sourcing medicines and other health commodities differ between private and public channels. For example, in general private supply systems have fewer administrative levels compared to public systems and so can be more responsive (Figure 3). However, these private supply channels are often loosely regulated, with the quality of their medicines often less assured in low- and middle-income countries. In principle, the benefits of government-managed medicine and health

Figure 3: Private versus Public Supply Chains



MoH = Ministry of Health.
Source: Authors.

¹² US Food and Drug Administration. 2016. *Facts about Generic Drugs*. <http://www.fda.gov/drugs/resourcesforyou/consumers/buyingusingmedicinesafely/understandinggenericdrugs/ucm167991.htm>

¹³ Management Sciences for Health. 2012. *Pharmaceutical Supply Strategies*, Section 8.15. In *Managing Access to Medicines and Health Technologies*. Medford, MA: Management Sciences for Health Inc.

¹⁴ Results for Development Institute and Rockefeller Foundation. 2009. *Public Stewardship of Private Providers in Mixed Health Systems*. Washington, DC: Results for Development Institute and Rockefeller Foundation.

Box 1: Getting the Private Sector on Board Improves Antimalarial Product Quality in Cambodia

After the identification of drug-resistant malaria on the Thai border in 2008, Cambodia transitioned from a strategy of malaria control to a goal of national malaria elimination by 2025. The elimination of oral artemisinin monotherapies (a major contributor to the rise of drug-resistant malaria) and improvements to the quality of the national antimalarial supply are key components of Cambodia's malaria elimination strategy.^a

Approximately 78% of patients in Cambodia first turn to a private health care service provider when seeking treatment.^b Since 2002, to improve the quality of antimalarial medicines accessed in the private sector the Ministry of Health has provided the sector with subsidized artemisinin-based combination therapy.^c In 2009, oral artemisinin monotherapies were banned and other regulations targeting private sector pharmaceutical sales and distribution were enacted to improve further the quality of the national antimalarial medicine supply.^d

Reinforced by dedicated efforts to strengthen private sector malaria case management and facility supervision under the government's Public Private Mix program, the Ministry of Health was able to reduce the total market share of artemisinin monotherapy from 6% in 2009 to 1% in 2011, with virtual elimination of reported sales and availability in 2015. Through a combined private sector approach of subsidized artemisinin-based combination therapy, stronger case management, and targeted regulatory efforts, the Government of Cambodia improved the quality of the national supply of antimalarial medicines, reduced the incidence of drug-resistant malaria, and ultimately strengthened efforts to achieve national malaria elimination goals.

^a Population Services International. 2016. *ACTwatch Outlet Survey Results, Cambodia 2009–2015*. Washington, DC: Population Services International.

^b World Health Organization, Western Pacific Region. 2016. *Cambodia WHO Country Cooperation Strategy, 2016–2020*. Geneva: WHO.

^c ACTwatch Group, J. Novotny, A. Singh et al. 2016. Evidence of Successful Malaria Case Management Policy Implementation in Cambodia: Results from ACTwatch Outlet Survey. *Malaria Journal*. 15. p. 194.

^d Note 3.

commodity supply systems include opportunities to implement nationally consolidated pooled procurement and increased regulatory oversight of product quality. As potentially the largest single purchaser of medicines and medical supplies in many lower- and middle-income countries, national governments also have the potential to shape local medicine and health commodity markets.

Medicines accessed from private sources generally tend to be more expensive than those provided by the public sector. In Myanmar, for example, a survey of tuberculosis medicines found those sold locally by the private sector were four times the price of those sourced through the Global Fund to Fight AIDS, Tuberculosis and Malaria and distributed via the public system.¹⁵ Free or low-cost medicines made available at public health facilities also help to ensure better access to medicines for poor and underserved populations, thereby increasing access to health care. However, constrained government budgets, protracted public procurement processes, political interference, and other governance issues can challenge and undermine the responsiveness of public supply systems.

In achieving public health goals, countries that are able to take advantage of the capacities of both public and private sectors usually have systems that are more effective, adaptable, and resistant to public health emergencies, such as disease outbreaks or epidemics.¹⁶ To take advantage of the strengths of each sector, opportunities for public-private partnerships or other collaborations should be explored. In advancing communicable disease control, for example, there are exemplary initiatives focused on improving the supply of quality medicines and dispensing practices in the private sector, particularly with respect to tuberculosis and malaria commodities (Box 1). As countries in the Asia and Pacific region strive for universal health coverage, it is key to prioritize and explore ways to harness the respective strengths of the public and private sector supply chains.

As countries in the region strive for universal health coverage, it is key to prioritize and explore ways to harness the respective strengths of the public and private sector supply chains.

¹⁵ Asia Pacific Observatory on Health Systems and Policies. 2014. The Republic of Myanmar Health System Review. *Health Systems in Transition*. 4(3).

¹⁶ Management Sciences for Health. 2012. Pharmaceutical Supply Strategies, Section 8.2. In *Managing Access to Medicines and Health Technologies*. Medford, MA: Management Sciences for Health Inc.

FIVE WAYS TO INVEST IN STRENGTHENING HEALTH COMMODITY SUPPLY CHAINS

1. Strengthen information management systems

Information management systems drive supply chain decision-making. Accurate and timely inventory data inform budgeting, procurement, inventory management, and distribution processes. There are numerous logistics and inventory management IT systems in the marketplace, including many open source, mobile, and online-based systems. Inventory tracking and reporting, invoice and delivery note generation, and restocking are among the core functionalities in many of these systems. In more advanced applications, inventory management systems are able to interface with tender management, purchasing, or patient dispensing platforms.

Inventory management systems can provide real-time information which enables health managers to understand current stock levels of vaccines, medicines, and diagnostics in national supply pipelines. This in turn better supports disease prevention,

control, and response initiatives in the timely positioning of critical supplies. Automated, accurate, and real-time inventory data strengthen resupply and distribution planning capacity. They enhance the ability of supply chains to reduce waste and manage limited resources more effectively (Box 2). By providing data and information on national patient profiles and disease trends, patient and health management information systems also support the accuracy and timeliness of product quantification, budgeting, and forecasting efforts.

2. Streamline procurement processes and implement strategic purchasing

Procurement reforms and process improvements can minimize the risk of procurement errors, improve transparency, and reduce sourcing lead times. These improve supply chain performance and yield significant cost savings. For example, the use of product e-catalogs minimizes client-supplier miscommunications and reduces the risk of purchasing an incorrect item. Product catalogs are particularly necessary for items with more complex specifications and less standardized items, such as laboratory

Box 2: Strengthened Supply Chains Improve Access to Essential Medicines in the Lao People's Democratic Republic

In 2014, when the United Nations Population Fund conducted a stock assessment of 401 health facilities in the Lao People's Democratic Republic (Lao PDR), it found that only 11% had all contraceptive methods offered available on the day of the survey and 34% lacked seven life-saving maternal and reproductive medicines. Product availability was lower in rural areas, at 44%, versus 53% in urban areas.^a This lack of product availability stemmed from poor resupply practices and delays in delivery from sources, exacerbated by uncoordinated inventory management and distribution systems.

That year, the Ministry of Health (MoH) initiated an integrated program to strengthen national health commodity supply chain management. This is being implemented by an MoH cross-departmental team, with technical assistance from international partners. The team is led and coordinated by the Medical Products Supply Center and includes technical staff from HIV, malaria, tuberculosis, and family planning centers. This initiative aims to improve stock data availability through a scaled-up electronic logistics information management system (eLMIS), stronger operational business processes, and management capacity building within the ministry.

Initially piloted in the southern region of the country, the program has shown rapid results in reducing stock-outs and expiries. For example, the value of expiring HIV products decreased by 88%, from an estimated \$230,000 at the end of 2013 to \$27,000 by the end of 2015.^b In addition, since the launch of this intervention more than 90% of facilities have achieved consistent availability of 18 key malaria, HIV, and tuberculosis products.^c Inventory management automation and staff capacity building have reduced the administrative burden on health care workers, freeing up time for other patient care and clinical duties—a particularly welcome development in a country grappling with a health workforce crisis.^d

The MoH has since adopted the eLMIS and is developing a national strategic plan to expand the program to all 18 provinces and 148 districts by 2020. The current phase of implementation will be a step toward this, with the addition of six provincial warehouses and nine central and provincial hospitals to the eLMIS system. The ultimate goal is to strengthen the Lao PDR's capacity to make data-driven supply chain decisions, reduce the risk of product expiry, and improve the availability of medicines.

^a United Nations Population Fund. 2014. *Facility Assessment for Reproductive Health Commodities and Services in Lao PDR*. New York: United Nations.

^b Expiration cost estimates are based on Lao PDR MoH data submitted to the Global Fund from December 2013 to December 2015. Unit prices are based on the original procurement costs provided by the Center of HIV/AIDS and STIs, Lao PDR MoH.

^c Calculations using mSupply eLMIS data, Lao PDR MoH PSM Strengthening Team.

^d Global Health Workforce Alliance. *List of 57 Countries Facing Human Resources for Health Crisis*. <http://www.who.int/workforcealliance/countries/57crisiscountries.pdf>

equipment and diagnostic machines. E-procurement and e-tendering systems can also increase competition between bidding suppliers, reducing costs and improving vendor selection transparency.

Procurement performance information management systems track unit price history, on-time delivery, and supplier order fill rates. This can help supply chain organizations better plan orders with suppliers, increasing the scope for cost savings. Governments and large national insurance agents which reimburse medicine costs should take advantage of their market-shaping potential in actively negotiating advantageous volume prices, so they access the lowest unit costs possible. In public sector procurements the length of processing and approval lead times should also be streamlined to expedite the procurement process. The alignment of public sector funding disbursements with Ministry of Health procurement cycles ensures that health commodity procurements are not subject to unnecessary funding delays.

3. Improve the quality and availability of medicines in the private sector

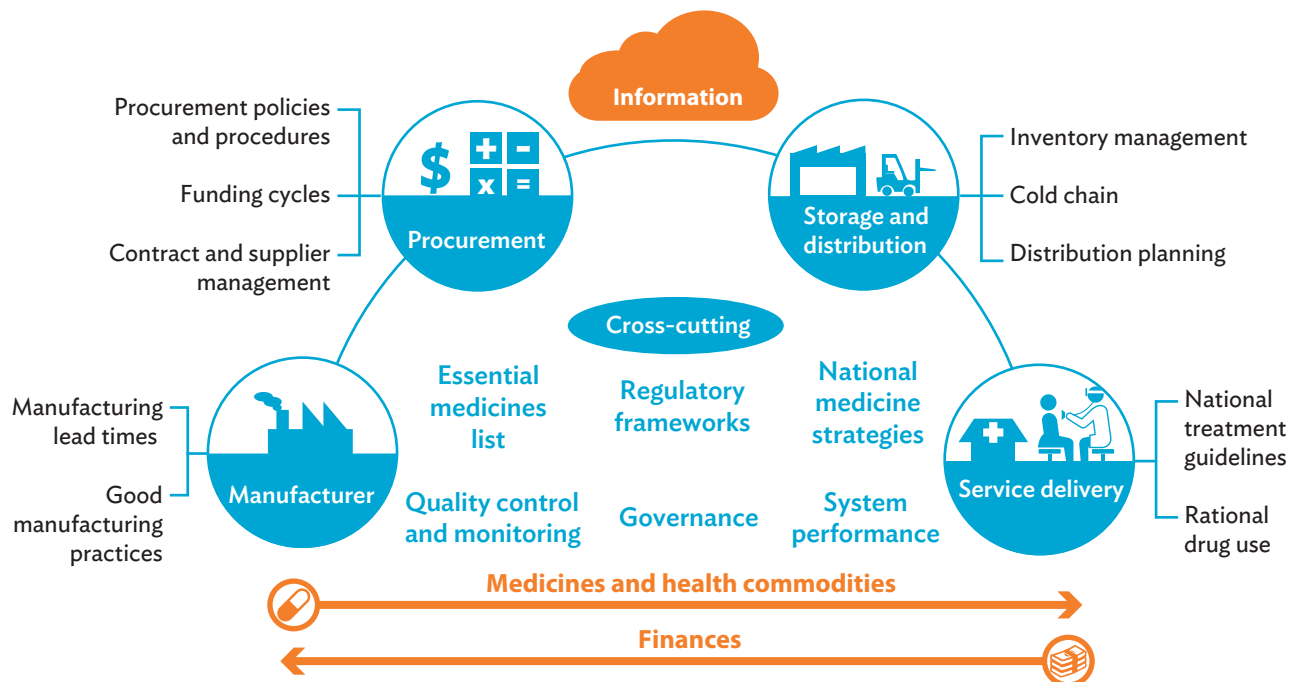
The private sector is the primary source of medicine access in most countries, and plays an important role in advancing health security and overall public health goals. In countries in Asia and the Pacific, rapid economic development in recent decades has

accelerated the number of private sector health providers entering the market. For example, in the Lao PDR there are over 2,000 private pharmacies now operating.¹⁷ The implementation of quality accreditation and licensing standards for private clinics and retail pharmacies can help to better monitor and reduce the amount of substandard medicines in the marketplace. Supply-chain-specific quality accreditation standards could include requirements regarding product quality, storage practices, waste management, and the use of reference pricing for products. In many countries such standards and regulations already exist, with enforcement being the principal challenge. As a result, in addition to investing in the development of regulation frameworks, investments should be made in building the technical, human resource, and information management capacity of national medicines regulatory authorities to improve their capacity for postmarket surveillance.

4. Improve supply chain oversight, coordination, and troubleshooting

Robust supply chains are efficiently and effectively managed. In implementing the various phases of a supply chain, many elements and factors have to be considered and coordinated (Figure 4). In some countries dedicated logistics management units have been established within the Ministry of Health to better organize, monitor, and support all public health supply chain activities.

Figure 4: Factors Affecting Supply Chain Planning and Coordination



Source: Authors.

¹⁷ Asia Pacific Observatory on Health Systems and Policies. 2014. Lao People’s Democratic Republic Health System Review. *Health Systems in Transition*. 4(1).

Their responsibilities include managing logistics data, conducting product quantifications and forecasts, and coordinating stakeholder supply chain decision-making. As the focal point for the public sector health commodity supply, they play a lead role in coordinating stakeholders to prioritize investments strengthening the supply chain. In their cross-cutting role, they can also lead efforts to troubleshoot supply chain issues as they arise. In the longer term, they can lead national or sectoral efforts to integrate public supply chain operations more effectively to improve supply chain efficiency and performance.¹⁸ In the private sector this coordination role can occur more vertically, with oversight focused on more effectively integrating upstream and downstream planning and information sharing within one supply channel.

Regardless of the oversight structure and circumstances, due to the high value of the products and the often complex nature of their operations, all supply chains require investments in robust planning, management, and coordination structures.

5. Build the competence of supply chain professionals

Efficient and effective supply chains require trained and competent staff to execute operations and meet health system demands. The skills needed to manage a supply chain include product forecasting, inventory management and analysis, and contract management and monitoring. Managing price negotiations with suppliers and local customs clearance procedures, financial management, and distribution planning are also important supply chain competencies. In light of the critical role skilled and competent staff play in managing supply chains, health systems should invest in the training and professionalization of local supply chain staff.

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¹⁸ USAID DELIVER. April 2010. *Logistics Management Units: What, Why and How of the Central Coordination of Supply Chain Management*. Arlington, VA: US Agency for International Development.

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