DEVELOPING A DRUG SUPPLY CHAIN

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Abstract:
Medicinal drugs play a very important role in public health care programmes of countries. It helps save lives and draws people to health facilities where they can receive treatment. Medicinal drugs also help keep health care costs down. Patients would prefer treatment to surgical operations. Also corporates as well as insurance companies would prefer to pay for drug treatment rather than pay for potentially risky and more expensive surgery. Moreover the cost of complications by not treating illness with medicines in the early stages could further increase the expense.

The high cost of medicines puts increasing pressure on health care budgets. In many industrialized nations of the world the elderly population (those older than 65 years of age) is expected to double in the next 50 years. This section of the population usually has a high health care expenditure. In many developing economies, including India, the epidemiological profile is changing. It is evolving from infectious and less expensive diseases, to chronic degenerative diseases such as cancer, diabetes, and cardiovascular diseases. Tobacco use, prolonged and unhealthy physical inactivity and excessive alcohol use are major causes and risk factors for these diseases. Also, trends in tobacco use are expected to increase in the developing countries. (WHO, fact sheet, Jan 1, 2000) Nutritional transition by increase in intake of high fat and fast food products, and a sedentary life style, and also pressure to perform promotes cardiac diseases. These diseases are more expensive to treat. In fact, in India, the highest growth in coronary artery diseases (CAD) is among young executives. Studies confirm that cardiac aliments start taking root in people with high stress jobs and irregular lifestyles even in their 20s and 30s. Prevelence of CAD has increased from 15-20% to 30-40% in the last 10 years affecting almost 10% of the population while it is only 7% in the US and Europe and 4% in China. (Young Executives have to keep tabs on heart, The Economic Times, Oct. 31, 2006, p.8)

Most public health programmes supply drugs through old and outdated and complex supply chains. As a result critical drugs many a time are not available to people as and when he needs them and very often counterfeit drugs are supplied. Drug counterfeiting is a very common problem that exists in India. Organisations and individuals peddling fake medicine is a common instance. They put a large number of unsuspecting patients at risk by exposing them to unknown contaminants and denying them medicine known to be safe and effective at treating medical ailments. This paper proposes a model to develop a drug supply chain for India and offers suggestions to make the right drugs available in the right quantity, at the right place, at the right time, in the right condition, to the right customer, and at the right cost.

Introduction:
Public health programmes cover the health care costs of the population worldwide. Most of the time, these funds are not sufficient to meet the needs of the growing population. The Human Development Report (HDR) 2006 released by UNDP, shows that in most countries including India improvement in HDI has slowed down in the period 1990-2004. (Refer Table-1). India may be among the fastest growing economies in the world, but the UNDP report suggests that this growth has not translated into better public healthcare for the citizens. For instance there are only seven countries of the 177 included in HDR report, which has a lower share of public expenditure in total health expenditure. These are very small nations like Guinea, Congo, Myanmar, Cambodia, Armenia, Tajiskistan, and Brundi. These countries account for less than a quarter of total health expenditure. In India, the share of public expenditure in the total is exactly 25%. (Refer Table-2)

India spends1.2% of GDP in health sector with 82% of health spending being private. Even neighbouring countries like Srilanka spends 3% of GDP on healthcare, and caters to 60% of the country's health needs and meets 95% of demand for in-patient care. In India, for the first time, the Union Budget 2003-04 accorded the health care sectors a position of priority. It got the importance it deserved and was placed at par with the IT sector. (The Hindu Business line, March 5, 2003)
Yet a radical change is needed in the way health delivery in the public sector occurs. India till date spends a low percentage of GDP on public health than almost any other country having similar income levels. This has led to a substandard delivery of public health and the emergence of a parallel private enterprise in healthcare, which is highly exploitative. This survives and thrives on the deficiency of the public healthcare system.

The Prachi trust, for instance, conducted a survey in West Bengal and Jharkhand revealed that public health care centers in rural areas are conspicuous by the absence of doctors. This compels the patients to take refuge in private healthcare facilities. Further, the medical system in the public sector, offers no diagnostics even for basic illnesses like malaria or tuberculosis or provision of x-ray.

As such the share of private health care system is gradually but surely increasing.
The public health policy should be framed around major these objectives:

- *There should be adequate investment so that public resources committed to providing health care services and facilities are sufficient.*
- *Monitor services and performance of public health centers.*
- *Ensure availability of drugs and diagnostics.*

Natonal Drug Strategy:
Further, each country should also have a national drug strategy. The goals of a national drug strategy could revolve around: affordability, availability and quality.
Goals and strategies will vary from one country to another due to structural differences in the healthcare systems of different countries. For example one

goal may be to make the essential medicines available and affordable to those who need them. In the developing countries, where total spending on pharmaceutical products is low, the goals may revolve around increasing government spending, on coverage of medical services and on controlling costs. In India when one out of every four Indian or around 250 million people live below the poverty line and half the population earns an income worth $ 2 or less a day, a major issue would be to reduce the cost of drugs for the common man. (BBC News, Feb 28, 2006)

In such a country, control of cost to make it affordable to the common man is a major concern. While developing a national drug policy, it is important therefore to ensure that all members like the government agencies, pharmaceutical firms, C & F Agents, distributors and stockists and all members of the supply chain ensure that the product reaches the consumer. All the participants must be committed to achieve the results. In India the government is planning to institute a special fund, which will support 'drug banks' across the country for this purpose. The center would also rely on the state governments and corporate for the creation of this fund. In this scheme, the poor would get medicines free of cost and the better off would get the drugs at a subsidized price. The chemicals ministry will also seek funds available for procurement of medicines under the health minister's rural health mission. The corporate will also stand to benefit in the form of income tax relief on their contribution to the drug banks. This is a step to ease health care costs by some measure. The chemical Ministry forced drug companies to agree to cut margins by up to 70% on chemist promoted drugs. (Drug Bank Fund For Subsidized Medicines Likely, ET, Oct 30, 2006, p.6).

An extension of this strategy would be to create an essential drug list. The government has released a list of 886 drugs whose prices have been slashed by reducing margins to wholesalers and retailers. So far, 36 companies including the likes of Cipla and Nicholas Piramal, that are not a part of any pharma industry bodies, have given their lists. More than three-fourth of these medicines are from top nine companies. (Drug Bank Fund For Subsidized Medicines Likely, ET, Oct 30, 2006, p.6). Under the new guide lines, the wholesalers will get 15% margin while the retailers will get 35% over the cost of manufacturing of generic medicines. The medicines covered are anti-diabetic drugs, antibiotics, cough syrups, painkillers as well as those used during surgical operations for the cure of infectious diseases and for the treatment of hypertension. Also doctors should be advocated to prescribe these drugs in order to succeed with the national drug policy.

The National Pharmaceutical Pricing Policy (NPPA), in order to tighten control over the industry, has suggested that the industry be allowed be allowed a price increase of 7% in a year and 15% in a three year period. At present, prices of control free (non scheduled) drugs are allowed to rise by 20% during a 12-month period, and 60% in a year. Further, NPPA advocated that prices of drugs that are at present in combination with National List of Essential Medicines (NLEM) be allowed to increase by 4% a year and 10% in three years. The NLEM includes popular medicines like Paracetamol, Pennicilin, Amoxicillin,

Ampicillin, Diazepam, Ibuprofen, Quinine, Omeprazol, Dicolofen Calcium and Folic Acid.

Cadila Healthcare has fixed margins on 391 formulations bringing down prices in the range of 2.07-74.53%, while Wockhardt and Alembic Ltd agreed to cut on 101 and 109 formulations respectively. (Nearly 900 vital drugs to cost less, TOI, Nov.1, 2006).
In September 2006, the industry has agreed to cap margin on generic medicine and would have resulted in a 70% reduction in price. Further, as a move to control cost, the government should encourage pharmaceutical companies to set up manufacturing facility in excise free zones. Pharma companies like Cadila, Lupin, Unichem to namea few have re-located manufacturing formulation and processing and operation to tax free districts of Himachal Pradesh, Uttaranchal and Jammu and Kashmir.

Consolidate the drug procurement process:
Simple consolidated and transparent drug procurement can yield significant benefits for a country both in reducing costs and improving services. In such cases the focus should be on centralizing purchases, simplifying procedures and processes, on increasing transparency and reducing costs. E-procurement could be initiated. E-procurement is a process by which a manufacturer procures products from its suppliers using the electronic mode. The volume of products exchanged in the procurement process is enormous and the internet helps reduce the complexity of the procurement process. Many companies offer web based procurement tools that link the purchasing party with the suppliers, party into real time product exchange communities-virtual dynamic markets. This automates all steps of the procurement process from acquisition to order as well as the payment transactions. Application of this process to the drug supply chain, healthcare centers can electronically place orders directly to the manufacturer. An order receipt initiate the entire delivery process-procurement promotes paperless transactions, automatic updating, reduces cost and time involved in the entire procurement process.

Managing Demand and Inventory:
Further, to ensure availability of the right drugs at the health centers, it is necessary to adopt a demand planning and inventory management techniques and diligently manage the supplies they have. A major problem with estimating demand is that demand are caused by inconsistent methodologies and a lack of understanding of the real demand for each hospital and health center. This is particularly true for developing countries. Private hospitals, however, are able to do so well. There can be two methods for estimating demand for medicines: The Consumption Method and The Morbidity Method.

The Consumption Method: In this method, historical data is used to predict future needs. Although, it is the most accurate method, it can only be used if health organizations have reliable database of information on past demand. Most health centers do not have a database at all. A database needs to be created and the demand needs identified based on this database.

The Morbidity Method: Morbidity method is yet another option. This method forecasts demand for medicines based on the expected number of diseases and their treatments. For this reliable morbidity data would be required; knowledge of the expected number of patient visits per morbidity, and planned guidelines for each treatment. This serves as a good method for estimating demand particularly for developing countries that have limited historical data to base their forecasts on. Under this method, health centers need to classify the causes of morbidity. Then an agreement can be reached on the drugs prescribed for this purpose and the expected number of patient visits for each disease is calculated. This data can be analysed and converted into a forecast for the annual demand for medicine.

There exist two methods for managing inventory-the pull and the push system. In a push based system, the production decisions are based on long-term forecasts. Typically, the manufacturer uses orders received from retailers' warehouses to forecast customer demand, thereby taking a much longer time to react to the changing marketplace. This system often leads to overstocking of products, which are not needed, and under stocking some others. A more responsive system is the pull-based system for inventory replenishment. In this system, inventory is replenished by supplier, based on movement of product on the shelves and the amount of inventory remaining. Each entity in the chain uses a formula that considers demand pattern, distribution frequencies, costs inventory levels and other factors. The management of drug should move from a push based to a pull based system. Under this method therefore orders are send based on real time data. (Refer Chart-1) In a push-based system, a higher level makes an estimate of the drug requirements. This is found to be more suitable in relief situations like a flood or famine.

Drug delivery channel:
India has a multi layered and complex drug distribution channel. Drugs move through various levels of intermediaries. The manufacturer supplies to the Clearing and Forwarding agents, who supply to company depots, who in turn give to stockists who forward to the wholesaler and finally it reaches the health center and retail outlets. (Refer chart-2) Eliminating intermediaries would go along way in reducing cost and bringing efficiency in the system. (Refer chart-3)

Development of a cold chain:
Cold chain is a logistic system that provides a series of facilities for maintaining ideal
storage conditions for perishables from the point of origin to the point of consumption in
the food or perishable product supply chain. The chain needs to start at the manufacturer level, and move through all the intermediary levels and finally to the to the retail level. Therefore a cold chain has to be present at all the channel intermediaries. A well organised cold chain would guarantee retention of the quality which is of paramount importance when dealing with drugs. The main feature of the chain is that if any of the links is missing or is weak, the whole system would fail. The old chain logistics infrastructure generally consists of pre-cooling facilities, cold storages, and refrigerated carriers. Therefore

installing AC becomes a must for all distributors, stockist and health centers too. (Recommendations of Mashelkar comm.)

Collaboration:
Collaboration is the need of the hour. The government needs to collaborate with the corporate to manage the drug channel efficiently. To manage communicable diseases collaborative strategy can be adopted. For instance, it is estimated that India has a population of 4.6 million inflicted with aids or HIV positive, currently, the second largest in the world. To manage aids majority funding is from grants of the World Banks well as donations from that of Bill and Melinda Gates foundation. By the creation of such fund, it could go a long way to control the spread of the disease as well as the cost of drugs and its treatment.

Collaboration with private parties also helps in ensuring uninterrupted supply and also reduces risks of diversion, theft and counterfeits. Partnership of air express delivery from DHL with MSD illustrates this. DHL procures antiretroviral drugs from MSDs manufacturing facility and delivers them to the remotest parts of developing countries. Such models can be replicated for control of select diseases and also cost associated with its delivery mechanism. Corporate participation therefore promotes efficiency as well as ensures that the healthcare infrastructure is taken care of.

Third Party Logistic Service Providers:

Third Party Logistic Service Providers are companies similar to channel intermediaries that provide linkage between the shipper and the carrier. They may or may not own transport equipment themselves. For instance, transport brokers are one kind of third party logistic service providers, who arrange and coordinate transportation of products between shipper and carrier. Freight forwarders purchase transport services various carriers and often own transport equipment themselves. third party logistic service providers provide combined storage, transportation as well as management functions. Such transporters are specialized carries-some carry books, some carry special electronics equipments, some carry hazardous products while some develop cold chain for delivery of perishable products and drugs too. These carries carrying drugs and perishable products have separate chambers with different temperature condition. Employing the services of such third party logistic providers will help improve responsiveness and reduce cost of the supply change.

Use of Information Technology:
Information technology with its application galore can enhance the performance of the supply chain. It can be used to automate transaction (e-procurement, inventory management) for rationalizing procedures and also for re-engineering processors.

Information Technology is also an enabler to efficiently manage the supply chain. For instance, RFID enables tracking of products thus reducing chances of counterfeit products entering the drug chain. RFID is an automatic data

collection technology that uses tiny computer chips attached to objects that track products as RFID tagged items move through a supply chain. It uses electronic labeling and data collection system using radio frequency signals to identify and count closely spaced items, such as stacked boxes without separating or scanning individually tagged items. An EPC (electronic product code) is embedded onto pallets, cases, or units of memory chips known as smart tags that connect objects to the Internet. These smart tags provide real time visibility in inventory and help track product through the supply chain. Therefore it increases the safety of medications that consumers receive by creating capacity to track a drug from the manufacturer all the way to the pharmacy. This therefore could control chances of counterfeiting and fake products entering the supply chain. It has been quoted that 7% of all drugs in the international supply chain may be counterfeit. So this could be effectively used as a strategy for controlling counterfeiting of drugs. Further, retail and pharmaceutical markets absorb more than $ 2 billion in product return each year, as a result of overstocking and outdated products. The pharmaceutical industry faced 1300 recalls in 2001 alone and therefore it is seeking better ways to monitor and manage international drug supply from manufacturer to patients by use of RFID technology.

Use of RFID technology leads to better supply chain management spanning everything from lot and batch tracking to expiration date management to curbing spurious drugs. Since cost is a major issue, it could be used for select products only. Pfizer and Glaxo SmithKline are already using it on specific drugs.

Conclusion:

Public Healthcare service providers, who struggle to supply medicine to its population it serves, are often unable to do so efficiently. It is imperative therefore to transform and restructure the drug supply chain.

Often government attempt to achieve supply change excellence but err by following a piece meal approach. That is they focus on only one or two building blocks of the supply chain. Performance of the supply chain can be enhanced and excellence can be achieved by an integrated approach of adopting the right strategy, processes, infrastructure, organization and technology. To manage the drug supply chain, the need of the hour is therefore to adopt the right strategy, method of assessing demand, shift from a push to a pull system for managing inveteracy, eliminate channel intermediaries, adopt electronic procurement practices, develop cold chain, use third party logistic service providers, collaborate with corporate, and use informing technology to make the *drug supply chain responsive and cost effective. Only then will it be able to deliver the right drug, at the right place, at the right time, in the right quantity, in the right condition, to the right costumer and at the right cost.*

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Yours sincerely

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