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Rethinking the last mile of medicine supply

Jagjit Singh Srai investigates the intricacies behind the provision of our medication and how elevated expectations are shaping the future of these deliveries.

Imagine a familiar scenario: you make an appointment with your GP, you are given a prescription, and you go straight into the nearest pharmacy to collect the medication. Is your medicine available for you to pick up immediately? If not, will it be ready to collect in a day or two?

Increasingly, we expect the things we need to be readily available to us. Online retailers, following the path cut by e-commerce players such as Amazon, have transformed consumer expectations, with delivery in hours becoming standard practice. This revolution places a vastly expanded range of product choices, prices and delivery options within easier grasp of consumers. Such possibilities are enabled by advances in digitisation and co-ordination across supply chains.

When it comes to getting our medication, as consumers (or patients), we carry the same elevated expectations about how easy it should be to get what we want, where and when we want it. We are not so very far away from a future in which medicines are routinely shipped straight to our homes, with more personalised healthcare delivery through digital online platforms.

Last mile conundrum

Last mile logistics is critical from a customer service perspective, yet at an item level is often the most expensive part of the supply chain. Our research into last mile logistics in UK online retail has revealed insights into the economics of offering a universal home delivery service. The cost of last mile delivery to sparsely populated or remote areas is a major challenge for these firms. We used computer modelling to look at the impact of this final step in more mature e-commerce sectors, such as fast-moving goods, analysing how consumers choose to get their weekly shop.

Perhaps unsurprisingly, the results suggest that the cost-effectiveness of serving low population densities can be ameliorated by winning market share in places where competitors are not delivering, or by high levels of market penetration of e-commerce sales in a particular location. Companies have other levers to pull to make last mile delivery more economical; influencing the location, time and pricing options chosen by customers can make a significant difference to the cost.

Remedies and improvements

How much of this can be extrapolated to the complex pharmaceutical sector? With rigorous clinical trials and through a multifaceted manufacturing and distribution process, the sector requires a sophisticated supply chain and wider ecosystem, including tight regulation.

ReMediES (RE-configuring MEDIcines End-to-end Supply), a four-year, £23 million project jointly funded by industry and the UK Government, has provided the data and expertise to probe these issues where the impact across a complex supply chain can be evaluated. It has involved unprecedented opportunities to analyse the pharmaceutical supply chain, due to collaboration from pharmaceutical giants GlaxoSmithKline and AstraZeneca alongside 22 specialist organisations and research expertise from the Universities of Cambridge and Strathclyde.

The project has looked at multiple aspects of how medicines are manufactured and supplied. New technology offers many different opportunities to rethink how we manage and operate across the supply chain, including what happens to medicines after they leave the factory and in the last mile of distribution to deliver them into the hands of the patient.

Questions were also asked that are fundamental to the efficiency of downstream supply. Can we make our manufacturing processes more efficient and capable of responding to changing demand? Can we put the medicines in packs that reduce wastage and also help with patient compliance? Can we find the most efficient ways of getting drugs to the people who need them, when they need them and how they need them?

Making sense of complexity

Making good decisions about supply chain design depends on a deep understanding of each product, and the ability to adapt processes according to product requirements – for example, a flu vaccine administered at GP surgeries during an epidemic will be responding to a different set of drivers from paracetamol sold off the shelf in supermarkets. We analysed the data in the context of the manufacturers' individual product strategies, identifying those products where innovation and responsiveness is critical, and prioritising developments in the appropriate parts of the supply chain to maximise impact.

The aim has been to develop a more integrated, efficient and inventory-light pharmaceutical supply chain, using analytics, design and segmentation tools. To do this, pharmaceutical companies are increasingly taking a strategic supply chain approach to how they implement technological developments. We are seeing in all industries the need to think deeply about how to develop digital supply chains effectively, including which technologies to focus on and invest in first.

New technology offers many different opportunities to rethink how we manage and operate across the pharmaceutical supply chain

The pharmaceutical sector is no exception, so what does this mean in practice, for improving the cost-effectiveness of downstream distribution of medicines? It could involve a variety of developments, including the deployment of modelling techniques for the last mile. As part of ReMediES, we have also tested smart packaging technologies to enable product tracking, monitoring and to support patient engagement. This has included transit trials with flexible labels that measure environmental conditions to which shipments are subjected, including temperature and humidity, with data time logged.

These trials have highlighted the usefulness of smart labels in the supply chain, providing real-time data, as well as a historical view of a product's journey. Smart packaging can improve efficiency by ensuring more shipments reach their destination in the required condition and that early action is taken where storage anomalies arise, as well as ensuring distributors and retailers have reliable information to improve customer service.

Beyond the last mile

The ReMediES project also considered another huge challenge faced by the healthcare sector: the lack of patient compliance with their drug regimes. The team developed a mobile phone app that can be used in addition to the printed patient leaflet that accompanies all medicines. The app was developed as a working demonstrator, with input from multiple stakeholders, including regulators. It includes the potential for patients to access information electronically in the language of their choice, for example, or at a font size they can read comfortably.

Imagine if smartphones could remind patients to take their medicine, capture use and track activity, and link up with other diagnostic devices and wearables that might track blood pressure, sugar level, and so on. What if, at the same time, this data could be shared in a controlled way with relevant healthcare professionals? This would suggest a more interactive relationship between patients and their carers.

Upwards of 30% of prescribed drugs are not taken by patients and, in the case of respiratory drugs, where application is more intricate, 70% are not taken as directed. The numbers vary depending on the type of condition being treated, but they are alarmingly high across the board. This has consequences, and not only for the patient. The cost to the taxpayer of drugs that are not being used is considerable and reduces the pot of money available for patient care. In a world of scarce resources this in itself seems incredibly wasteful, but if we can harness technology to improve distribution of medicines, there are opportunities to make significant improvements.

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