

Need to Know: OpenBoxes and Supply Chain

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Photo by Andrew Jones / Build Health International

A warehouse worker with Zanmi Lasante, as PIH is known in Haiti, moves stock in Port-au-Prince, Haiti.

The 2010 Haiti earthquake hit, and offers of in-kind donations came pouring in overnight. The need was unthinkable, and as charitable response grew, PIH staff quickly set up space in Miami and Port-au-Prince to stage shipments and manage stock of orthopedic equipment, IV fluid, wound care supplies, and many other donations and purchases.

Supply chain staff in Boston and at Zanmi Lasante, as PIH is known in Haiti, would need more than a simple spreadsheet and paper forms to track this new volume of supplies, medications, and equipment; they needed a comprehensive electronic system to manage the increasingly complex supply chain. This need became all the more apparent as a growing number of patients began arriving at PIH-supported facilities from the damaged capital of Port-au-Prince in search of open clinics and hospitals. Soon, planning began for a reimagined University Hospital in Mirebalais, the state-of-the-art, 205,000-square-foot, 300-bed teaching hospital in the Central Plateau that would need to be stocked for referral-level care.



University Hospital in Mirebalais, Haiti, opened in March 2013, three years after the devastating earthquake in Port-au-Prince. Photo by Cecille Joan Avila / Partners In Health

So PIH set out in search of a new inventory software system to manage the massive volume of supplies required to maintain a high-quality healthcare system in Haiti. When it became clear that existing software solutions did not align with needs, PIH turned to its Medical Informatics team to develop OpenBoxes, an open source software used to manage and track the movement, consumption, and storage of supplies.

Today, OpenBoxes helps PIH staff track orders and donations not only heading to health facilities in Haiti, but also to Malawi, Liberia, Sierra Leone, Rwanda, and to PIH's transit locations across the United States. Inventory, requests, and deliveries are updated by the minute, and supply chain, pharmacy, and clinical personnel can view the status of supplies in real time.

"Having more accurate forecasts and fewer stock outs saves lives every day by making sure clinicians have the supplies and medications they need to treat or diagnose each patient," says Jesse Greenspan, PIH director of supply chain and logistics.



Inside a pharmacy at Neno District Hospital in Malawi. Photo by Zack DeClerck / Partners In Health

Below, Greenspan, Kelsey Nagel, supply chain manager for systems and reporting, and Remy Pacifique Ntirenganya, pharmacy department lead in PIH Liberia, explain the basics about OpenBoxes and how it makes a difference in day-to-day work around the world.

How exactly does OpenBoxes work?

OpenBoxes provides PIH staff all over the world with a detailed snapshot of the entire global supply chain. Our team uses the software to track stock from initial purchase, to arrival at a warehouse, to delivery inside a hospital, pharmacy, or laboratory. Users can adjust inventory and generate reports of what comes and goes. By recording requests, we can see the difference between what we sent to a facility and what that facility truly needed and adjust for those gaps in the future.

How has OpenBoxes made PIH operations more efficient?

The major challenge for any supply chain system is getting information to the right people at the right time. Before OpenBoxes, inventory and shipment information were largely stored on paper or simple spreadsheets, and remained inaccessible to staff outside the warehouse. Now, anyone can access information about shipments and utilization to help with decision making every day. We've also linked OpenBoxes to our financial data to have one streamlined system. The results are fewer stock outs, data-informed decisions, less waste, and big savings overall.

What are the financial benefits of OpenBoxes?

Before OpenBoxes, we didn't have an accurate read on the number of supplies we consumed globally. With better forecasting, not only can we prepare more accurate budgets, we can now negotiate lower prices with vendors based on our estimated global volumes. The software's automation ensures we are using resources as efficiently as possible. This year, for example, on insulin alone we saved PIH \$150,000. We used the difference to purchase lifesaving drugs we would not have otherwise been able to afford.

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Having visibility into our inventory as well as automations in the system related to inventory management also help us save money. For example, when a program needs a new piece of equipment, staff can quickly check OpenBoxes to see what we already have in stock before placing a new order for an item we may not need. Before we had an electronic system, it was very difficult to verify this information among the thousands of items in our multiple warehouses. Now, we can notify the requestor right away if the item they need is already in the warehouse.

OpenBoxes also tracks where each item is located in the warehouse, making it easier for staff to quickly find the item and send it out. In addition to warehouse location, the software tracks expiration date, so as staff prepare shipments, OpenBoxes automatically prioritizes the delivery of medications and supplies with the soonest expiration dates to prevent waste.

How has a software program saved lives?

We can now proactively work to make supplies available at the right time and in the right place, so patients are more likely to receive lifesaving medications and supplies right away. OpenBoxes has this amazing feature, called stock lists, that enables those in the warehouse or a hospital ward, laboratory, or pharmacy to keep an electronic list of all the items they need to keep in stock. Staff use these lists to make requests to replenish their stock on a regular basis, ensuring that staff get the supplies they need.

In Liberia, for example, improvements resulting from OpenBoxes are visible on a daily basis. One of our main goals is to ensure uninterrupted, timely delivery of medications and supplies to patients. OpenBoxes makes this work easier. We can track our use of all items to anticipate and replenish our stock in a timely manner, including at J.J. Dossen, a public district hospital that PIH Liberia supports. Moreover, we can anticipate expiration dates and avoid stock outs to ensure availability and accessibility of medicines and supplies that improve the quality of care and clinical outcomes for patients.

Does PIH hold a patent for OpenBoxes?

OpenBoxes, like all software designed by PIH, is open source. This means we make the software publicly accessible to anyone who is interested in using or modifying it, free of charge. From the start of the project, our Medical Informatics team came in with expertise they gained from building another open source software program for electronic medical records, called OpenMRS. The organization is a strong supporter of making resources available to anyone who needs them, and is now consulting to help other organizations implement OpenBoxes.