



# The Cost of Doing Nothing

Assessing the value of upgrading pneumatic tube systems



# Introduction

Hospitals and health systems are changing the way they work to address shrinking reimbursements that impact bottom lines. This transformation has put a spotlight on clinical outcomes and quality measures, leading facilities to invest in technology that directly correlates to patient satisfaction.

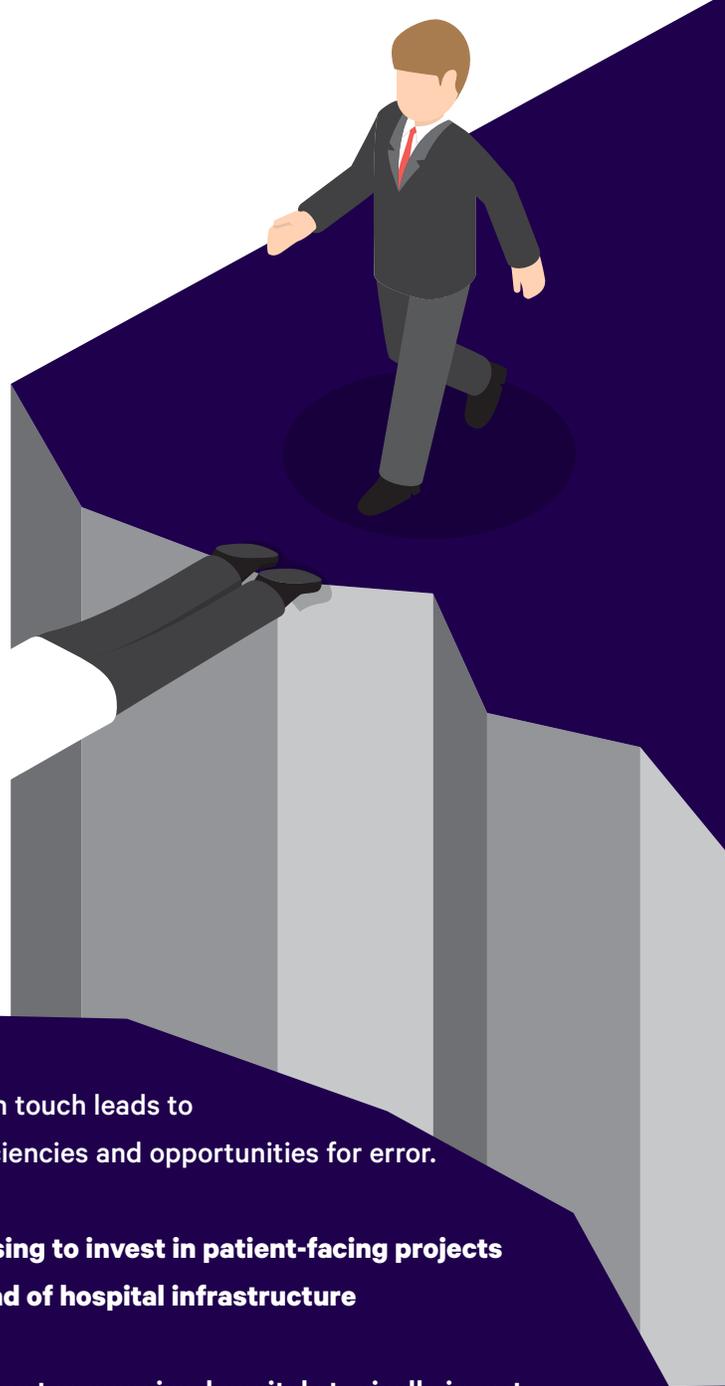
However, many of the critical systems managed by facilities departments are mistakenly overlooked during these initiatives. This is often the case for pneumatic tube systems (PTS), which may go unconsidered when evaluating how to improve the patient experience.

**By overlooking the impact of not upgrading a PTS, hospitals risk system downtime, delayed medication deliveries, slowed diagnoses from laboratory tests, distracted nursing staff and even complete system failure. Scrutinizing the real, and often hidden, expenses and the opportunity costs of maintaining the status quo is critical to building a business case for pneumatic tube system upgrades.**



# Where You'll Find the Costs

Hospital systems of all sizes struggle with the cost to update legacy infrastructure that isn't "broken." With facilities managers who respond quickly to alerts or downtime, the effects of poor system performance can go unnoticed by executive leadership, and therefore, are not a priority during budgeting.



Instead of optimizing and upgrading a PTS to improve throughput, security and turnaround times, hospitals often fall into these two categories:

## **Creating transportation workarounds to maintain the status quo**

If an organization does not want to invest in upgrades to their pneumatic tube system hardware and software, they will continue to experience degradation to productivity over time. This creates distrust from the users who depend on the system for delivery of medications and lab samples.

An increase in downtime also causes a need for additional courier staff, or worse, manual transport by skilled clinical or nursing professionals. This creates a slow, error-prone process that is full of waste, and therefore, added costs. Every additional

human touch leads to inefficiencies and opportunities for error.

## **Choosing to invest in patient-facing projects instead of hospital infrastructure**

Like most companies, hospitals typically invest in the front end of their business before the back end. Clinical areas often receive most of the money available for capital investment while facilities and materials management are viewed purely as expenses. To improve service to patients and clinical staff, hospitals should consider investing in upgrades to key infrastructure, such as pneumatic tube systems, to ensure efficient delivery of clinical and support services.



# Three Approaches for Evaluating PTS Optimization

There are three approaches for organizations to thoroughly evaluate before deciding whether or how to modernize a pneumatic tube system. To select the best option for your organization, it's wise to weigh the costs and benefits of optimizing the automation against the likely results of doing nothing. Here's what you should consider:

## Approach One: Do nothing, but end up spending more

This is the true do-nothing scenario. No upgrades to intuitive touchscreen panels, no security or tracking improvements, no enhancements to communication lines or vintage hardware. Hospital leadership expects facilities managers to make do with what they have.

Executives do not always see the relative costs of doing nothing. Among them are incremental costs, which can rise when doing nothing, due to these reasons:

- There is an increased need for spare parts so that replacements can be made quickly in a time of failure and the system can return to operation.
- Additional staffing is required to deliver medications and lab samples when the pneumatic tube system is down. Often this

means nurses and pharmacy technicians are doing manual labor instead of focusing on patient-facing activities, such as medication reconciliation and administration.

- Without PTS delivery available, nurses spend extra time searching for missing medications and calling the pharmacy. This time away from patients can have costly implications for quality scores.
- Calls from nursing to pharmacy cause interruptions and distractions. Research shows that distractions contribute to 45% of medication errors in hospitals and health systems.<sup>1</sup> The safety, financial and reputation implications of these errors pose a major risk for hospitals.

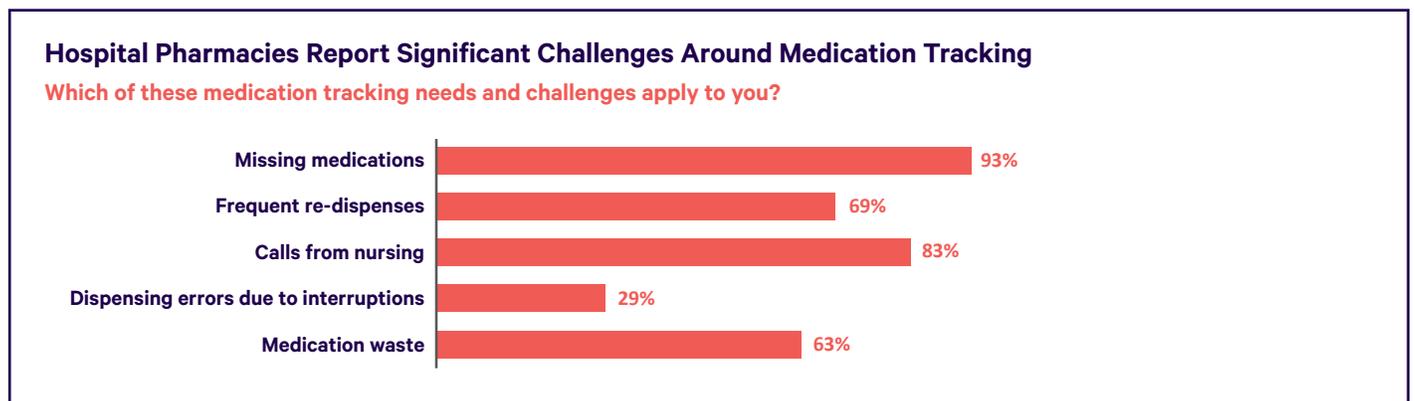


Figure 1

Source: TechValidate survey of 52 hospitals, April 2017



## Approach Two: **Partially upgrade, minimize greatest risks**

Upgrading a pneumatic tube system can mean a wide range of improvements, with varying investments. When considering a modernization project, it's important to begin with a system health audit. Engage your PTS vendor for a consultation to determine your most urgent needs based on current system performance. By benchmarking your system against other high-performing facilities, you can develop a roadmap to achieving your goals. To accommodate budget constraints, this can be accomplished with a phased approach of upgrading small portions of the system at a time.

For those facilities who choose to partially upgrade their PTS, we most commonly see the following approaches:

### **1. Upgrade obsolete technology**

Evolving market needs, including increasing legislative pressures, have led to innovations in automated delivery, such as improved traceability and security. With the development of new hardware and software, older systems become out-of-date and unable to support the features needed by end users. As your PTS vendor communicates plans to sunset these parts, take the opportunity to evaluate your current state. Does it make sense to upgrade immediately, or should you invest in extra safety stock of replacement parts and budget for a future upgrade? Your vendor can help guide you in determining the best course of action.

By beginning your PTS modernization initiative with addressing obsolete technology, you can avoid significant downtime. Replacement parts for current versions are always available and your upgraded technology will be fully supported by your vendor partner.

### **2. Upgrade the software backbone of the system**

At the heart of every pneumatic tube system is the software that orchestrates material movement, ensuring intuitive routing, traffic management, security and traceability. Today's rapidly evolving technology landscape demands that your PTS software meet enhanced IT and security requirements. As these change frequently, forward-thinking vendors are moving to a software subscription model that ensures your system is always running on the current version. In the new model, bug fixes and feature developments are pushed proactively, helping you avoid downtime and provide security against cyber-attacks.

By beginning your PTS modernization initiative with an upgrade to the latest software, you set yourself up for success with additional projects. Whether you plan to upgrade panels or add on chain-of-custody tracking for medication deliveries, you'll need, and want, the reliability of the most current software.



When evaluating a partial upgrade to your pneumatic tube system, it's critical to consider your greatest risks. What is the cost of system failure and which components of your system are most likely to cause downtime? Prioritizing the most important improvements will help in realizing the impact of inaction.



**«After upgrading our pneumatic tube system communication lines to Ethernet, we experienced improved system uptime, fewer alarms and a reduction in calls from users. Our clinical staff is more satisfied with the performance, which means I spend less time maintaining the system.»**

- William Wilkie, Director of Facilities,  
Lake Charles Memorial Hospital

## Approach Three: **Completely upgrade, save money in the long term**

Many health systems are choosing to improve service to clinical staff and re-focus support services teams on more strategic initiatives by investing in optimizing their pneumatic tube system. This approach requires an investment that needs approval by hospital leadership, and therefore, you'll need to be able to answer the question, "How is this spend justified?"

1. When hospitals delay upgrades, they increase their risk for catastrophic failure. This can lead to costly repairs, such as overnighting parts and emergency technician visits during off hours, and more importantly, unscheduled interruptions to delivery of patient care, impacting their experience and satisfaction scores.
2. When hospital transport systems fail, deliveries don't arrive on time, pharmacies are distracted, lab tests are slow, nurses waste time searching for medications, medication administration is delayed and patients suffer. This can lead to costly medication errors and poor quality scores, which impact reimbursement, and ultimately, the financial health of your organization.
3. Increased medication tracking requirements are putting hospitals at risk for non-compliance. As a critical piece of medication delivery, your pneumatic tube system must be equipped with technology that supports chain-of-custody needs. The vintage of your hardware and software may prevent you from adding the track-and-trace functionality your pharmacy users need. Putting the needs of patients and clinical staff at the center of your capital request will increase the likelihood of approval. See Figure 2 for market research on the pneumatic tube system upgrades that are prioritized by hospital pharmacies.

**Highlighting the cost of doing nothing is critical to gaining approval for a complete upgrade to your tube system. Keep in mind that even if you decide to move forward with a complete upgrade, it can still be implemented in phases, to be minimally disruptive and budget-conscious.**

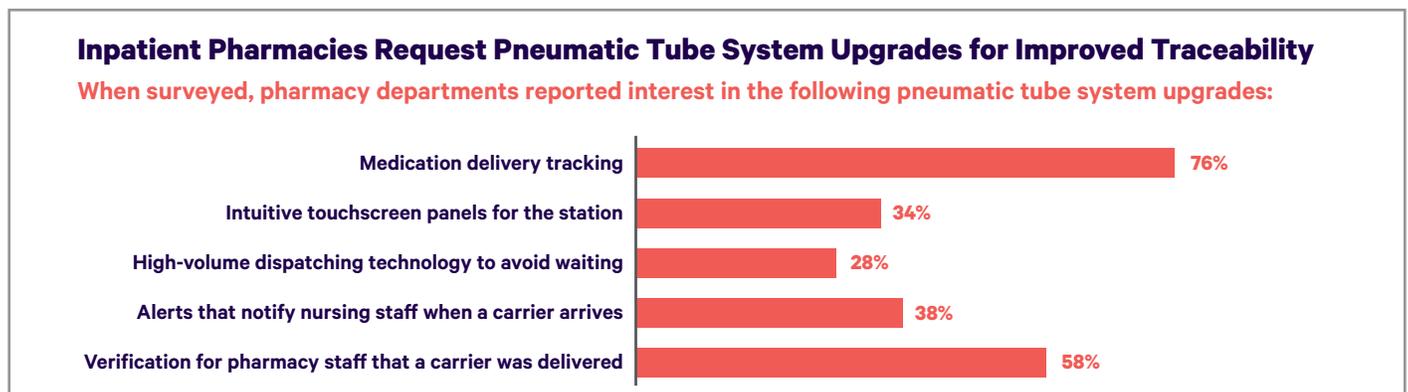


Figure 2

Source: TechValidate survey of 52 hospitals, April 2017



# Trends Impacting Medication Delivery Inside Hospitals

Changes in healthcare legislation, notably the Affordable Care Act, led to a shift from a fee-for-service model, to a fee-for-value model. Hospitals are now paid by the government based not on services rendered, but on the quality and outcomes of those services. After an inpatient stay, patients are surveyed about the care they received. Included in these questions are inquiries such as “How often was your pain well controlled?” and “After you pressed the call button, how often did you get help as soon as you wanted it?”<sup>2</sup> These correlate closely to the urgent delivery of medications from the pharmacy as well as a nurse’s ability to focus on patients instead of supply management.

A renewed focus on quality metrics requires more nursing time at the bedside to help improve patient satisfaction. However, research shows that on average, 22% of a nurse’s time is spent searching for missing medications.<sup>3</sup> Visibility to this concerning statistic is leading hospital executives to invest in point-of-care solutions that help nurses to act at the top of their license.



As patient acuity increases, so does the need for expensive specialty medications that are often not stocked in automated dispensing cabinets, and therefore need to be delivered from the pharmacy. This, in addition to a large, aging patient population, will add to the traffic going through your PTS, and outdated equipment may not be prepared to handle the throughput.

Impending medication tracking legislation, including the Drug Supply Chain Security Act (DSCSA), is leading health systems to explore new procedures, standards and technology to achieve compliance. Maintaining control of the medication distribution process in your hospital is a critical piece of ensuring chain-of-custody, and your pneumatic tube system plays an important role in this process. The Pharmacy Department will depend on Facilities Management to have the right infrastructure in place.

# Six Critical Challenges of Inaction

## System Downtime

When a pneumatic tube system experiences downtime, labor is needed to courier those deliveries. Assuming an average of eight PTS transactions per patient bed, there are 2,400 transactions a day at full census for a 300-bed hospital. Research shows that on average, couriers can make 10 deliveries an hour. At a rate of \$15 per hour, system downtime would cost \$3,600 per day. That means the PTS system is saving that facility \$1,314,000 annually in direct cost.

## Lost Opportunities

The same calculation for system downtime can be applied to lost opportunity costs. When a system is no longer seen as reliable by end users, they may stop using it. Information can be gathered by end users to determine what percentage of deliveries they are choosing not to tube. This percentage can be used to calculate labor. Distrust of the system can also impact speed to diagnosis. For example, if a phlebotomist decides they will walk all of their samples back with them to the lab instead of dispatching carriers immediately after they draw, turnaround time is greatly impacted.

## Medication Errors

Preventable medication errors injure 1,500,000 people each year, costing \$3,500,000,000 in unnecessary medical costs.<sup>4,5</sup> When nurses call the pharmacy about missing medications due to poor pneumatic tube system performance, they create distractions. The error rate for prescriptions with one or more interruptions is 6.65%.<sup>6</sup> This demonstrates how PTS reliability issues can be detrimental to patient safety.

## Drug Diversion

Drug diversion is a serious concern for many hospitals and a pneumatic tube system can play a key role in mitigating these risks. When medications are diverted, the pharmacy needs to redispense them, which creates shrinkage and labor waste. It also delays the time it takes for a medication to reach patients, which is related to the quality measurements being used to determine reimbursement to hospitals. A delay in addressing a patient's pain can have a ripple of negative effects.

## User Queuing

Slow, inefficient tube systems often lead to labor waste in the form of user queuing. Nurses line up to receive patient orders and pharmacy technicians have to wait to send carriers because the system is tied up. This is inefficient and takes staff away from patient-facing activities. Because patient satisfaction is now a driver of hospital revenue, this queuing could be impacting your bottom line.

## Obsolete technology

When a vendor is no longer able to provide replacement parts or support for the hardware or software in your facility, that creates a significant amount of risk. While most companies strive to give at least a year's notice, there's no anticipating when this will happen or when it will fall within your budget cycle. While obsolescence is a natural part of every product life cycle, it creates urgency for you to act. If you choose to wait until something goes wrong, you can end up paying more and causing disruptions for clinical staff.



# Key Considerations for Determining the Cost of Doing Nothing

Obsolete PTS hardware and software cannot keep up with increasingly complex delivery requirements, for example, track-and-trace regulations. Before these systems fail, hospitals should evaluate the cost of doing nothing, along with options to modernize.

Think of this as a guide to determining the true cost of doing nothing to improve your pneumatic tube system in comparison with competing investment options in your facility.

## What are the risks of the status quo?

- How many medication deliveries will need to be made manually?
- What does system downtime cost in labor waste?
- How will the patient floors receive urgent blood deliveries?
- How will service to patients be impacted?
- What will be the effect on patient satisfaction and outcomes?
- What if there are no replacement parts for outdated hardware?
- How will we meet DSCSA requirements with our current technology?

## What are the benefits of upgrading?

- Can we improve patient outcomes through enhanced logistics?
- How will pharmacy reallocate resources to clinical or safety tasks instead of couriering the medications?
- How can enhanced transaction visibility help meet DSCSA legislation?



# Evaluating Modernization Options for Your Facility

Whether you choose to complete a partial upgrade, or undergo a large-scale project, you will need to make decisions about what technology to include in this initiative. In addition to reliability and performance improvements, consider what user-driven features may benefit your facility.

## Ethernet Communication

As functionality has evolved to improve reliability and usability, so too has the backbone of the PTS network. Slow, problematic serial communication lines have been replaced with Ethernet as the technology of choice. One of the most common complaints about serial is that when a single device is impaired, the entire line can go down. That means significant time spent locating the source of the issue and major disruptions for clinical staff. With Ethernet, an issue is contained to only that single device.



## Station Upgrade

While there have long been a variety of station types to suit the needs of each department and facility size, recent design enhancements are changing the way people work, delivering process improvements that save time and minimize the opportunity for diversion. New turnstile technology eliminates user queuing and provides maximum security by limiting access based on user type. This design change also provides quiet deliveries, ensuring patients aren't disturbed by noisy carrier arrivals.



## Experience the Benefits of PTS Modernization

In a survey of hospital facilities departments, the following benefits were highlighted as a result of upgrading the pneumatic tube system:

- Improved system uptime
- Fewer alarms
- Less time maintaining the system
- Reduced calls from users
- Improved clinical staff satisfaction
- Reduced spend for spare parts

## Software Upgrade

As mentioned earlier, upgrading to the most recent software version is often the first place hospitals start when undergoing a PTS modernization project. The latest software is built on a platform that goes beyond simply managing transactions. Instead, it is a core technology providing connectivity and integration with other systems, such as security, messaging and delivery management software. When implementing this upgrade, hospitals transition to a subscription model that ensures you always receive the latest bug fixes and version updates, keeping your network secure and system running.

## Touchscreen Panel

The new standard in PTS station panels is intuitive touchscreens. In addition to being easy to use, they are more durable, so they can stand up to the wear and tear of busy pharmacy and nursing staffs. Because these touchscreen panels are larger, staff can easily tell the status of a station from a distance.



## Secure Content Tracking

The addition of content tracking functionality is primarily driven by inpatient pharmacies. There are a variety of PTS enhancements to consider when trying to achieve greater traceability of medication order delivery.

### — Automated Carrier Tracking and Delivery

**Verification:** Using radio frequency identification (RFID) technology within a tube system permits automatic carrier tracking, monitoring and inventory management. RFID technology gives users real-time verification that patient-critical PTS transactions have arrived at the right station at the right time.

### — Secure Badge Access: Stations equipped with secure badge access require the swipe of a valid access card to unlock the station control panel and the station access doors. Only approved users can send carriers, and the card access system ensures that only approved recipients are able to unlock the secure storage module in the receiving station. All sender and retriever information is recorded with each transaction.

### — Alert Messaging: Alert messaging is a dynamic communication tool that monitors pneumatic tube system transaction events such as carrier arrivals, secure deliveries awaiting retrieval, full bin alerts, etc. and automatically notifies departmental users. In addition, alert messaging provides hospital operations with notification



of maintenance events (alarms) for user-related situations, system interruptions, maintenance issues and equipment failures.

### — Delivery Management Software: Ninety-three percent of inpatient pharmacies are challenged with missing medications due to lack of medication tracking.<sup>7</sup> That means that content tracking with a PTS is no longer sufficient. One of the major benefits of PTS modernization projects is that they enable subscriptions to enterprise services, such as delivery management software. This application provides complete visibility of all order details, including status, location and delivery method. The PTS communicates directly to software through RFID technology—instantly updating the status of any order being sent through the system.

## Xpress™ Transport

As hospitals drive revenue increases by building out larger Emergency Departments, pneumatic tube systems are called on to support a higher number of patients. Increased throughput needs can sometimes strain a PTS system and disrupt the workflow of clinical staff who are attempting to make a high volume of transactions. Stations equipped with Xpress technology accommodate simultaneous carrier dispatches and arrivals—increasing productivity and throughput. Xpress transport can also be achieved through dual piping between zones, ensuring the system is not tied up waiting for a carrier to move through longer distances.



## Enhanced Carrier Management

In addition to secure content tracking, RFID enables a multitude of system enhancements. These include:

- **Transaction Recovery:** Automatic delivery of a carrier after a system shutdown.
- **Inventory Management:** Automated carrier inventory associates carriers with a “home” station, eliminating the need to cycle count.
- **Condition Monitoring:** The system can track how often a carrier is utilized and trigger a notification that preventive maintenance should be performed.
- **Carrier/Station Association:** Developed with end users in mind, this feature enables hospitals to assign carriers to a certain location, such as the pharmacy or the lab. This logic can, for example, prevent cross-contamination of carriers designated for specific payloads.

# Case Study: Children's Hospital of Alabama

## Improving Throughput Via Pneumatic Tube System Upgrades



### Background

Children's Hospital of Alabama is a 275-bed hospital located in Birmingham. Due to the high volume of weight- and age-based medications needed at this type of facility, the volume of patient orders sent through the pneumatic tube system is extremely high. Before upgrading, Children's was experiencing two major challenges:

- Frequent system downtime
- Calls and complaints from clinical users

### Solution

To ensure the PTS is operating at peak productivity, Swisslog Healthcare recommended the facility upgrade to the latest hardware and software. The hospital also chose to add chain-of-custody features to improve traceability and accountability of deliveries.

System enhancements included:

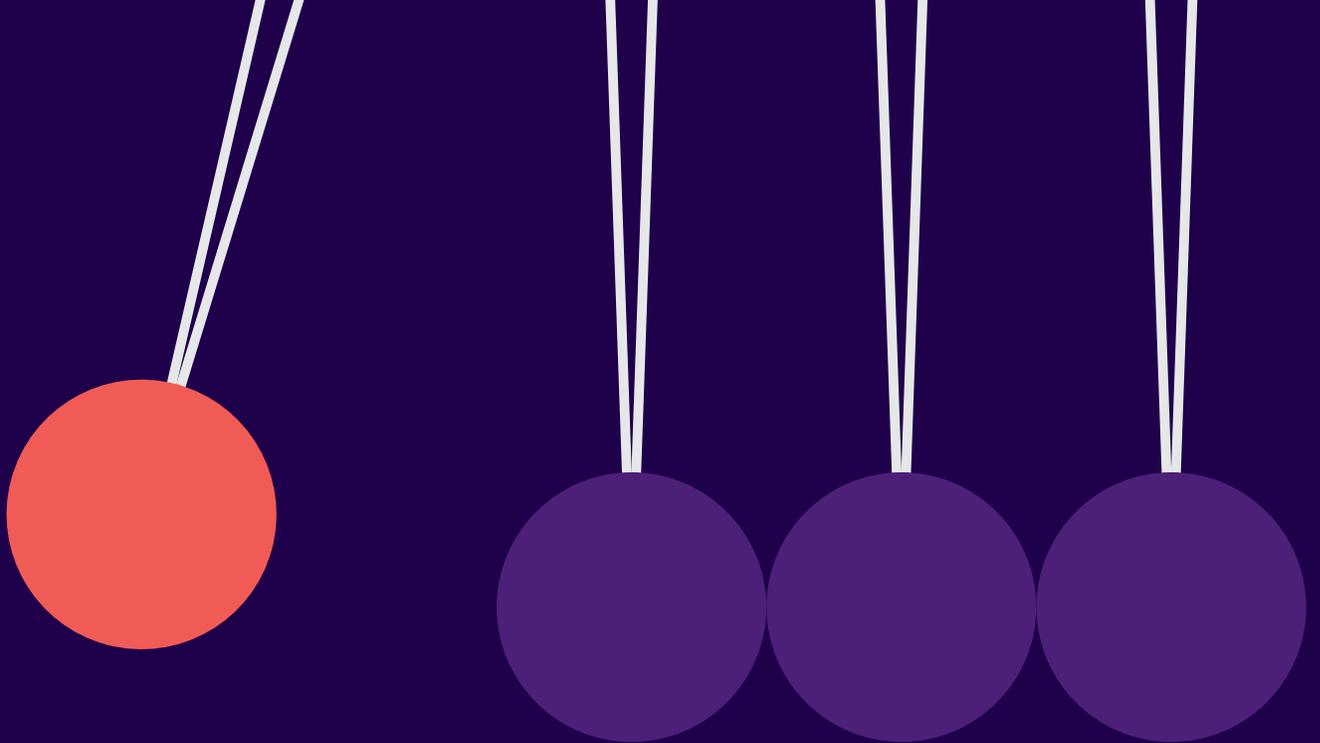
- Upgrade to new software
- Intuitive touchscreen panels
- RFID delivery tracking
- Secure badge access

### Results

After upgrading their pneumatic tube system, Children's of Alabama experienced several benefits:

- Improved system uptime
- Experienced fewer alarms
- Spent less time proactively maintaining the system
- Reduced calls from users about the system
- Satisfied their clinical staff with the system
- Spent less on spare parts





## Conclusion

Constraints on hospital capital are real, especially with the increasing cost pressures from reduced reimbursement rates. Facilities have to choose between investing in technology for patients and clinicians versus investing in the infrastructure of the facility. With an increased focus on impacting cost, quality and outcomes, the time is now to show how these options are inherently tied together.

As demonstrated in this paper, the payback from optimizing your pneumatic tube system can start to be realized soon after implementing the upgrades. And while hospital executives may view the PTS as simply another piece of infrastructure, you should now be armed with information that demonstrates how critical the system is to patient care and clinical staff effectiveness.

To design your path to PTS productivity, begin with a consultation from a system design expert who can identify your biggest areas for improvement and help you prioritize any needed upgrades.

Visit [swisslog-healthcare.com/translogic](https://swisslog-healthcare.com/translogic) to learn more.

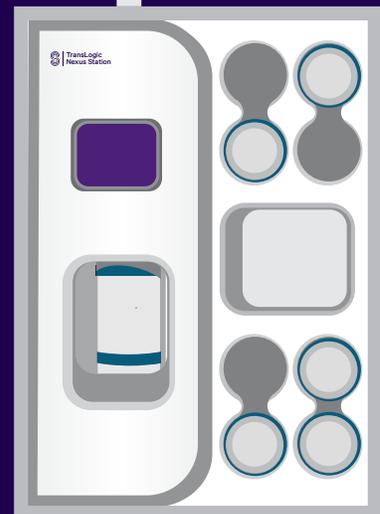


## Lead change for better care.

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Swisslog Healthcare is a leading supplier of solutions and services for medication management, combining both transport and pharmacy automation. Swisslog Healthcare has installed facility-wide transport and pharmacy automation systems in more than 3,000 healthcare institutions worldwide. The company offers integrated solutions from a single source—from consulting to design, implementation to lifetime customer service. For more information, visit [swisslog-healthcare.com](https://www.swisslog-healthcare.com).

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