Administrative errors may also play a part in product discard rates. If the product delivery is delayed because the notification was miscommunicated or not communicated at all, the likelihood of error may increase, because the delayed delivery may be assumed to belong to another patient. If hand delivery and pneumatic tube delivery are used in combination, a hand-delivered unit may be perceived to have arrived earlier than a unit that was released previously but remained in the tube delivery station before being noticed. Patient identification and time-of-delivery issues can combine to create an atmosphere in which errors occur. Facility policies and procedures should consider and address these factors.

In some cases, the pneumatic tube system itself can cause concerns. Older or overtaxed systems may have long launch times that can delay product delivery. If system use exceeds its capability, this may result in blood components being outside of their prescribed delivery or storage time limits. In addition, failure to update the system’s computer software could result in misdirected or lost carriers.

Packaging

Improper packaging may also result in blood product wastage. Failure to keep blood components from shifting in the carrier can cause product breakage and contamination of the pneumatic tube system. Contamination, in turn, would require the facility to shut down the system to decontaminate the affected areas. This is especially true if blood components are not shipped in a secondary leakproof container (eg, Ziploc bag, SC Johnson). Facilities should give special consideration to shipping components stored in syringes with needles or other sharps still attached. These items can expose health-care workers to unnecessary risks. Moreover, pneumatic tube carriers should be properly sealed and packed. Unlatched or overweight carriers may create blockages and could shut down the entire facility’s tube network.

Improper or ineffective installation may also limit a pneumatic tube system’s use for transporting blood components. If the system is routed through inadequately insulated locations in a building,
extremes of cold or heat may affect the quality of the blood components and render them unsuitable for transfusion. In some older systems, motors used to control diverters generate heat that can raise the temperature of carrier holding bins and affect product quality. This does not mean that older systems are inadequate—rather, that some older systems may have limitations and that they should be examined carefully, as with temperature loggers. For this reason, facilities may benefit from evaluating an older pneumatic tube system’s design and suitability for transporting blood components before undertaking the validation process. Conversely, some older pneumatic tube systems may be validated successfully to deliver blood components with little or no additional modification.

System Workload

Depending on the extent of the pneumatic tube network in relation to the demands on the system, the transport time for a given route can be highly variable. The queuing of carriers to be sent is often priority based, but the time of day can cause carriers to be held at the launching station or at a diverter for several minutes. To test each system’s sensitivity to workload and time of the day, the validation protocol should test the system against developed criteria during the highest-traffic times of day. Doing so would provide the greatest confidence in the system’s ability to conform with standards at the busiest and all other times of day.

ADMINISTRATIVE ASPECTS

Internal Coordination

Validation and implementation of a pneumatic tube system for transportation of blood components requires the cooperation of all departments involved. Transfusion services, nursing services, transport services, and facility management all have information
and expertise that may assist a pneumatic tube validation project. For example, tube system vendors know the maximum amount of weight a system carrier can hold or move between locations. Similarly, hospital engineering may know about the building's construction and insulation properties along the path of the tubing system. They may also have the ability to project hospital expansions or changing service locations. Being able to determine projected facility expansions at the outset will help avoid traffic and system upgrade expenses later.

The installation of a new system or the upgrading of an existing system are both costly courses of action. Before taking specific action, facilities should consider the following questions:

- How will implementation improve turnaround time?
- How will patients receive blood components faster?
- How will quality of care improve?
- How and what types of risks will increase by issuing blood components through the tube system?
- Should the institution invest in a point-to-point system to improve tube travel to critical areas like operating rooms or the emergency room?
- Will the system be connected to emergency power sources?

In a multiple-building facility, the transfusion service may be centralized if there is an expanded tube system. This allows for the pooling of resources while still meeting the needs of physically distant locations. In such situations, features such as tube delivery areas that are in close proximity to nursing stations, audible and visual alarms, and an upgraded computerized tracking system may be wise investments.

Maintenance and housekeeping personnel should be included in discussions about the use of a pneumatic tube system for delivering blood components. Staff from these areas will need to respond quickly to system shutdowns or leak containment and cleanup. Facilities should train all involved personnel in biohazardous material cleanup. Transportation staff should also receive training on backup procedures, in the event of an extended pneumatic tube system shutdown.