

Supplementary data

Tables of audit responses – Pneumatic tube system audit

Which statement best describes your laboratory or organisation?	Responses
Stand-alone laboratory	7
Laboratory within a network of laboratories/pathology service	35
Laboratory that is part of a larger non-laboratory organisation	3

Please indicate whether your laboratory or organisation primarily services (multiple answers)	Responses
Community patients	40
Hospital patients	7
Specific patient groups (<i>i.e.</i> IVF)	1
Other	1

How old is your organization's pneumatic tube system?	Responses
<5 years	5
6 - 10 years	10
11 - 20 years	14
>21 years	7
Unsure	7
Systems of multiple parts/different ages	2

How many non-laboratory stations does your organisation's pneumatic tube system have?	Responses
1	2
2 to 5	6
>5	33
Unsure	4

What areas are covered by the pneumatic tube system? (multiple answers)	Responses
ED	39
Operating theatres	28
Birthing suite	25
Outpatient clinics	19
Day care centre/cancer centre	22
General wards	39
Specimen collection centre	20
Co-located facilities (<i>i.e.</i> private hospitals)	8
Central Specimen Reception	27
Anatomical Pathology	2

Biochemistry/Chemical Pathology	1
Cytology	0
Haematology	1
Immunology	3
Microbiology	3
Molecular infectious diseases	0
Molecular Genetics	0
Serology	2
Transfusion	7
Other	8

What type of samples are transported in your organization's pneumatic tube system? (multiple answers)	Responses
Blood components and products	14
Blood cultures	41
Blood gas samples	24
Blood samples (anticoagulated and clotted)	44
CSF	23
Faeces	37
Paperwork	43
Pharmacy items	20
Slides	8
Swabs	41
Tissue	15
Urine	42
Other	5

What is the diameter of the canisters used in your organization's pneumatic tube system?	Responses
120 mm	12
160 mm	4
Unknown	6
Other (80, 85, 90, 95, 100, 105, 110 mm)	21

How are canisters tracked while transporting samples in the pneumatic tube system?	Responses
Barcodes	0
RFID chips	18
Not tracked	10
Software	4
Unsure	4
Other	3

Who owns or is responsible for your organisation's pneumatic tube system?	Responses
Hospital	33
Pathology	10
Both	2

Who is the supplier of your organization's pneumatic tube system?	Responses
Aerocom	3
Aircom Group	1
Airlink Systems	2
Benchmark Systems	4
Lamson	31
Telecom	3
Swisslog	2

How often is the pneumatic tube system serviced?	Responses
Weekly	0
Monthly	6
Quarterly	6
6 monthly	2
Yearly	6
Never	2
Unsure	23

Is there a service agreement for the pneumatic tube system?	Responses
Yes	16
No	7
Unsure	22

Was your organization's pneumatic tube system been validated as part of installation? e.g. tested before use to ensure its specifications were being met.	Responses
Yes	14
No	2
Unsure	29

If the pneumatic tube system has been validated, what was tested? (multiple answers)	Responses
Time for delivery	10
Reliability	8
Sample damage	11
Blood component and products	9
Other	1

How was your system tested? Please provide a brief outline of the testing protocol and laboratory parameters measured.

By Lamson maintenance team
Suitability and impact on specimen integrity tested. Formal evaluation reports available in QMS.
Most recent validation was done in Blood bank. Test canisters were sent to different zones/wards containing blood products. Canisters were timed to different destinations. Data captured on software program. Any faults or delays were also monitored.
Pneumatic Tube System Validation procedure. Time and weight validation, temperature and visual inspection validation
Tested by ALS. Sending canister to/from pathology to other sites.
Temperature, time, specimen appearance (leaking, overfrothing, haemolysis - Referenced AABB guidelines for pneumatic tube system 2004 and ANZSBT guideline for Transfusion and immunology lab practices Nov 2016
Verification of results for non-lamson vs lamson samples
timing of travel from lab to highest station, temperature of canister during travel from lab to highest stations, carrying capacity and damage to contents (saline ballast used to simulate blood units) to highest station
Undertaken by Bendigo Hospital upon install
Checked by Engineering
Time, Temperature, leaks, overfrothing, haemolysis, swirl test. USB style data logger. Validation plan and procedure developed referencing AABB guidelines for pneumatic tube systems 2004 and ANZSBT guidelines for transfusion and immunohaematology laboratory practices Nov 2016
Three trials were performed before the opening of the CASB when there was no traffic within the PTS between CHW and CASB. The 4th trial was performed 4 months after CHW ED relocated to the CASB when there is PTS traffic between the 2 buildings.
Timing of delivery from clinical areas to Pathology. Visual inspection of blood / blood products on arrival, testing / comparison of critical Biochemistry and Hematology analytes for PTS vs non PTS samples.
Measured - time taken & air temperature, for return trip of canister from pathology to Ward destination. Chosen to replicate the time a unit of blood may be out of the fridge & in transit. The study was performed during the busy part of the day to replicate typical wait times encountered. Checked that canisters reached their intended destination and whether the blood products sent showed any signs of deterioration.

Has your system been verified since installation, i.e., is it tested to ensure it is still meeting requirements?	Responses
Yes	5
No	1
Unsure	8

Are incidents involving the pneumatic tube system(s) reported?	Responses
Yes	37
No	4
Unsure	1
Other response (Jobs are lodged when requires fixing, plus non-conformances are periodically lodged. The older system has also been on the hospital's risk register for > 8 years)	
Other response (Lab reports to Property Services, Hospital Ontrack system maintenance)	
Other response (When it breaks, the laboratory tag it out of use and call the hospital engineering department)	

How does your organization record/quantify pneumatic tube incidents?	Responses
Clinical Incident reporting	14
Pneumatic tube system software	2
Laboratory Information Management software	0
Quality Management System (QMS) software	12
Unsure	5
Other	10

How many times has the pneumatic tube system failed in the past 6 months?	Responses
< 5	19
5 to 10	9
> 10	8
Unsure	5
Other (42, 40, never)	3

How many times have specimens been lost, misdirected or delayed when transported by the pneumatic tube system in the past 6 months	Responses
< 5	26
5 to 10	2
> 10	5
Unsure	10
Other	0

Are you able to breakdown the information in Q21?	Responses
Yes	14
No	29

How many times has specimen transport been delayed through the pneumatic tube system, causing them to be too old to test? (in the past 6 months) **Responses**

< 5	13
5 to 10	1
> 10	0
Unsure	1
Other	0

How many times have samples gone to the wrong place in the past 6 months? **Responses**

< 5	9
5 to 10	2
> 10	1
Unsure	1
Other	2

How many times have samples been damaged in the system in the past 6 months? (i.e. hemolyzed, clotted) **Responses**

< 5	12
5 to 10	0
> 10	1
Unsure	11
Other	1

How many time have samples leaked in the system in the past 6 months? **Responses**

< 5	14
5 to 10	3
> 10	2
Unsure	5
Other	1