Data Hidden in Plain Sight - Using Unexpected Analytics for Quality and Process Improvement in the Clinical Laboratory

Presented by:

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Learning objectives

- Understand where unexpected data sources exist in the laboratory and how they can be used for improvement efforts.

- Identify the need for data to support improvement efforts or implementing change.

- Describe a process where current data sources can be tweaked to be used in specific improvement activities.

- Define financial and operational benefits associated with utilizing unexpected sources of lab data.

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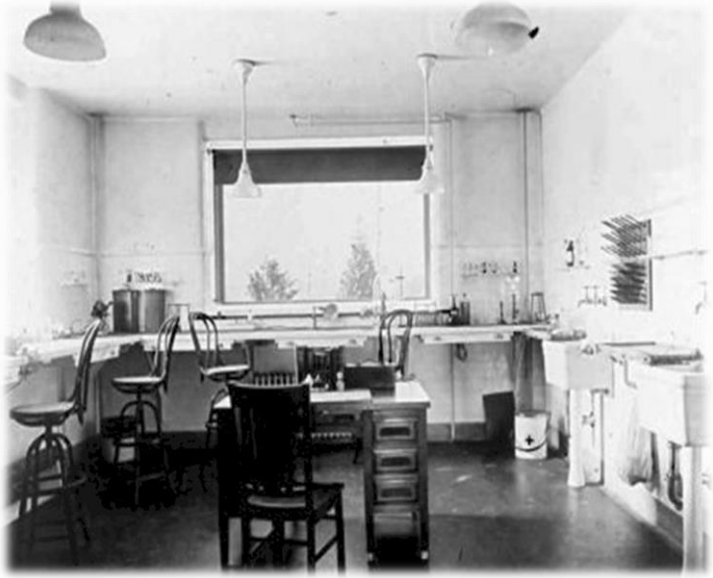
Original 1915 Laboratory



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Geisinger Medical Laboratory Core Lab

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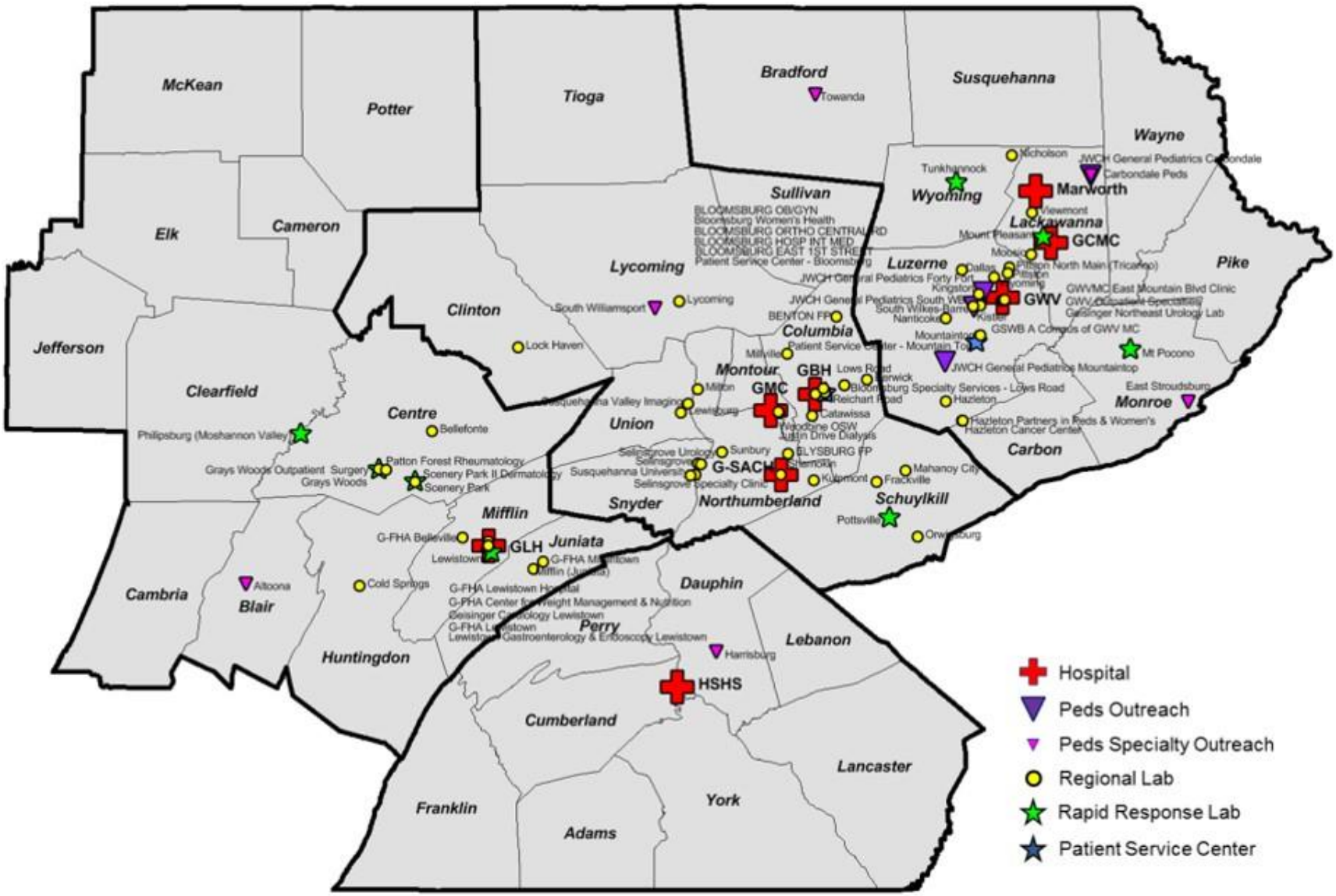
Geographic Reach



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Geisinger Medical Laboratory

- 88 CLIA certified sites
- 11 patient service centers
- 42 couriers on the road daily
  - 1.8 million miles per year
  - 20,000 site visits per month
- 1300 employees
- 9.5 million billable tests performed annually

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Pneumatic Tube Delivery of Specimens

PNEUMATIC
TUBE SYSTEMS

- Nearly ubiquitous in large hospitals
- Often under-utilized, misunderstood
- Great opportunity to demonstrate value ‘outside’ the laboratory

QUALITY

COST

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Pneumatic Tube Systems for Specimen Transport

SAFE FOR MOST ANALYTES

SOME EXCEPTIONS EXIST

- Platelet function studies, ABGs

IRRETRIEVABLE SPECIMENS

- Surgical pathology, cytology, and other “irretrievable’ specimens may require special handling

BLOOD TRANSPORT

- AABB has special guidance for the validation of pneumatic tube systems
- Logistics important

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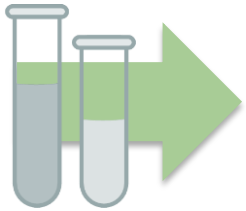
Demonstrating value with the pneumatic tube system



TRANSPORT TIMES

- Transport aid dispatch system data
  - tracked amount of time transport aid spent on job
- Pneumatic Tube data
  - taken from pneumatic tube system controller software

AVERAGE TRANSIT TIME

95% complete time

The 95th percentile of how long the transit takes (i.e., 95% all transport trips will be **shorter** than this time)

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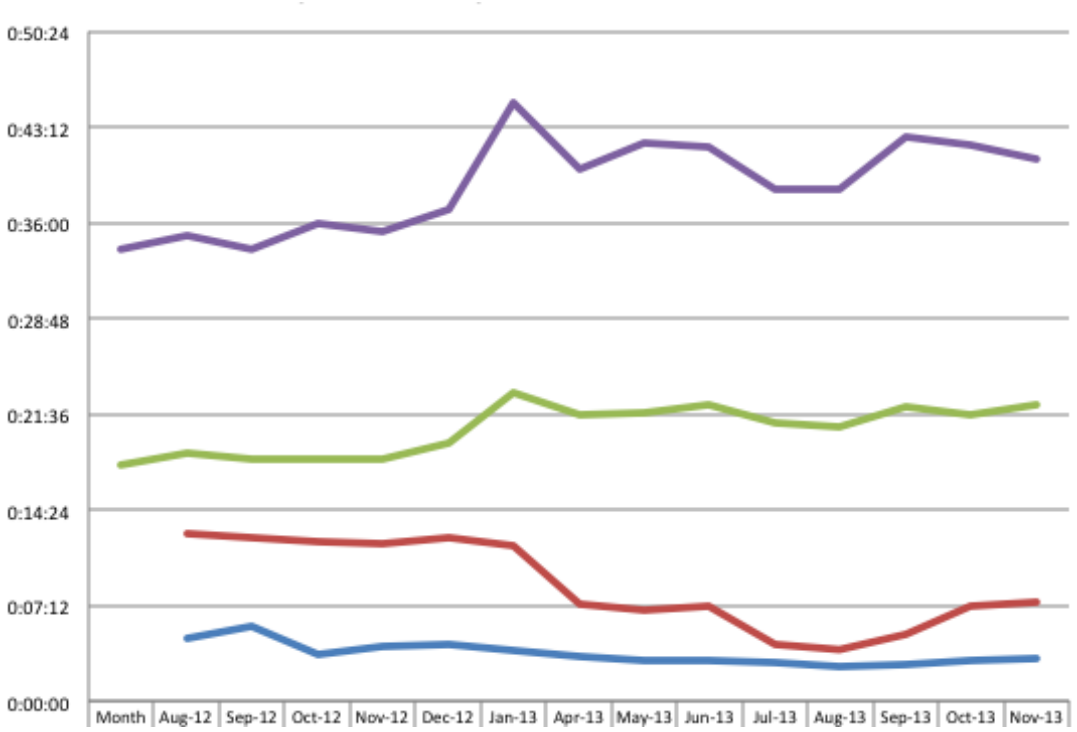
Transport Time by Method

- Average time: tube
- Time to 95% complete: tube
- Average time: transport
- Time to 95% complete: transport



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Transit Times

21:35 Average transit time for transport

2:23 Average transit time for tube

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Shift in Workload

Using the pneumatic tube system put more tasks onto the laboratory staff

74.8 SEC Average amount of additional time blood bank staff spends issuing product by tube compared to transport

6 SEC Average amount of additional time receiving staff spends receiving a specimen through the tube system vs. the drop-off window

21 MIN 35 SEC Average amount of time transport does not spend supporting the blood bank when a product is tubed

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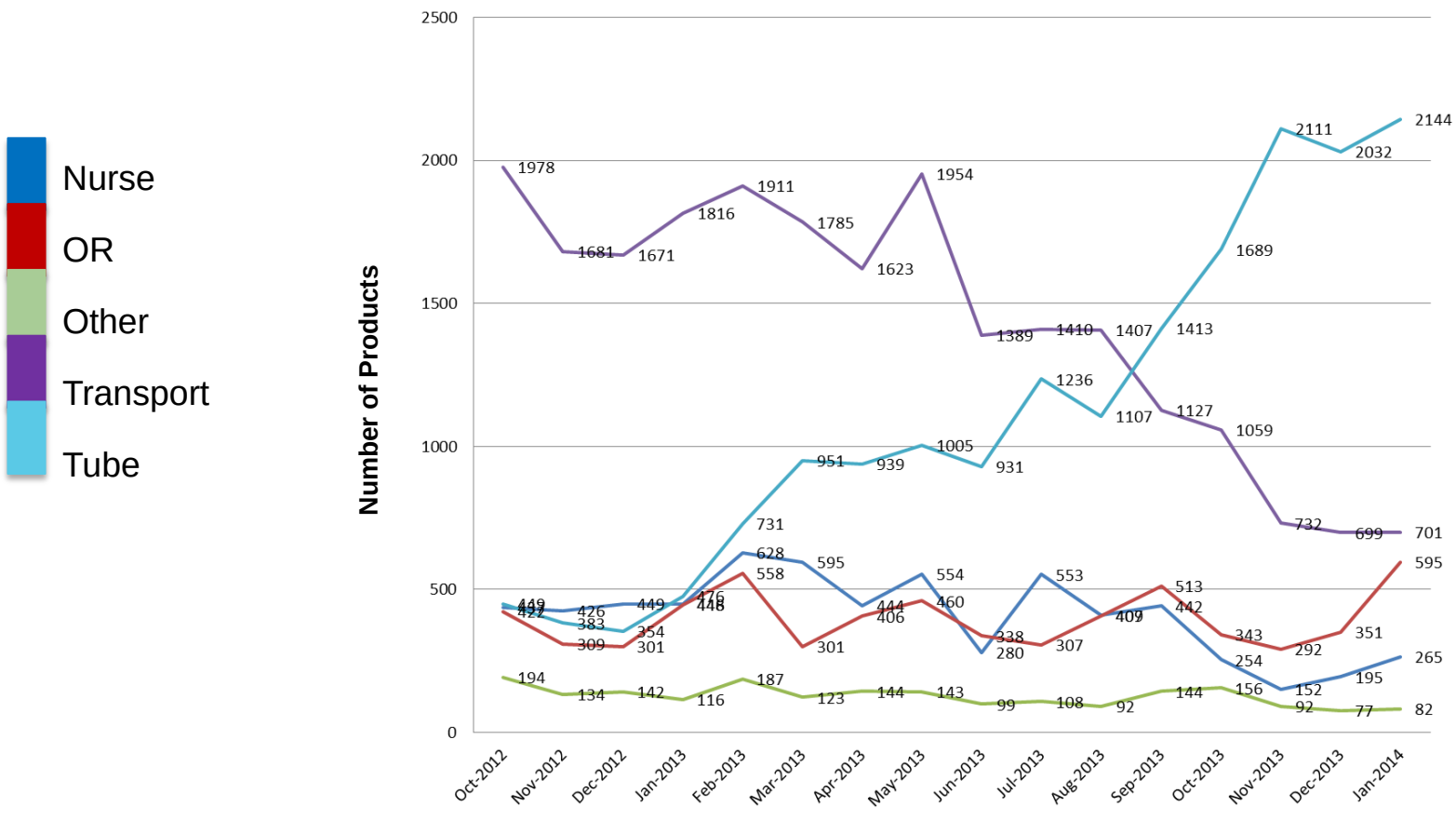
Products Issued by Transport Type



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Shift in Workload

TRANSPORT TRIPS

	Nov	Dec	Jan	Average
2012-2013	1681	1671	1816	1723
2013-2014	732	699	701	711
Change	-949	-972	-1115	-1012

TUBE TRANSACTIONS

	Nov	Dec	Jan	Average
2012-2013	732	699	701	711
2013-2014	2111	2032	2144	2096
Change	1379	1333	1443	1385

	Change in Number of Tasks (month)	Time per Task (minutes)	Change in Task Time	
			(minutes/month)	(hours/month)
Transport	-1012	21.58	-21839	-364
Blood Bank	1385	1.08	1496	+25

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Shift in Workload for Clinical Samples

Transaction in SPA	
Jan 2013	11,267
Jan 2014	29,388
Change	+18,121

TASKS		TRANSPORT (est)
18,121	**Change in Number** (month)	- 500
0.1	**Time per Each** (min)	30
1812	**Change in Time** (min/month)	15,000
+30	**Change in Time** (hours/month)	-250

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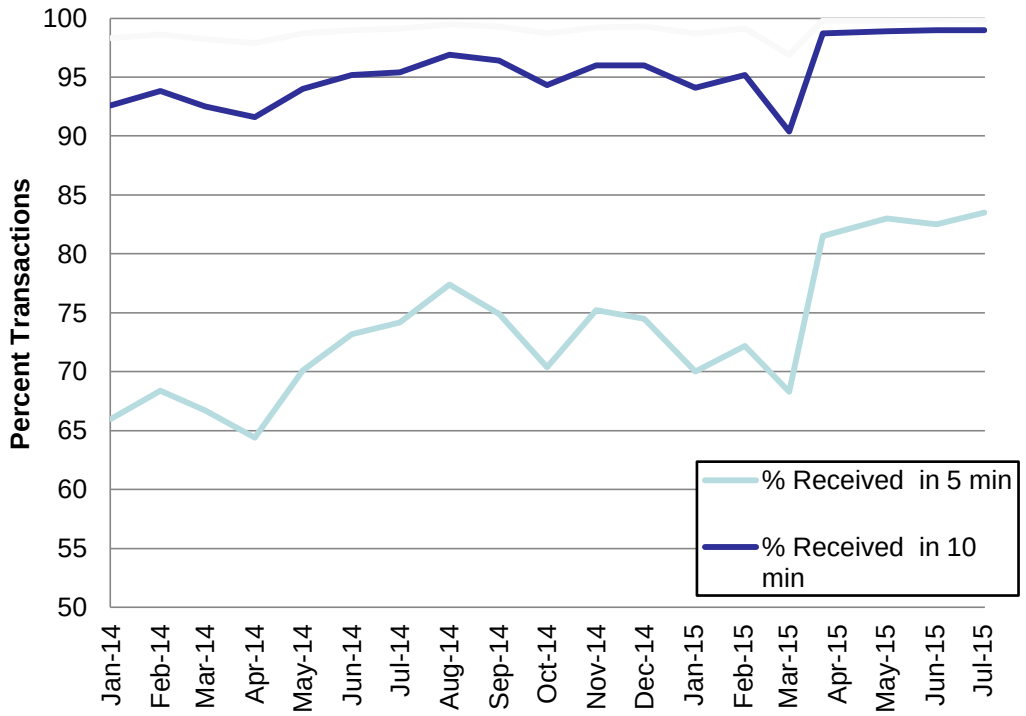
Pneumatic Tube System TAT: demonstrating value in upgrades

Percent of transactions received in a given transaction time.



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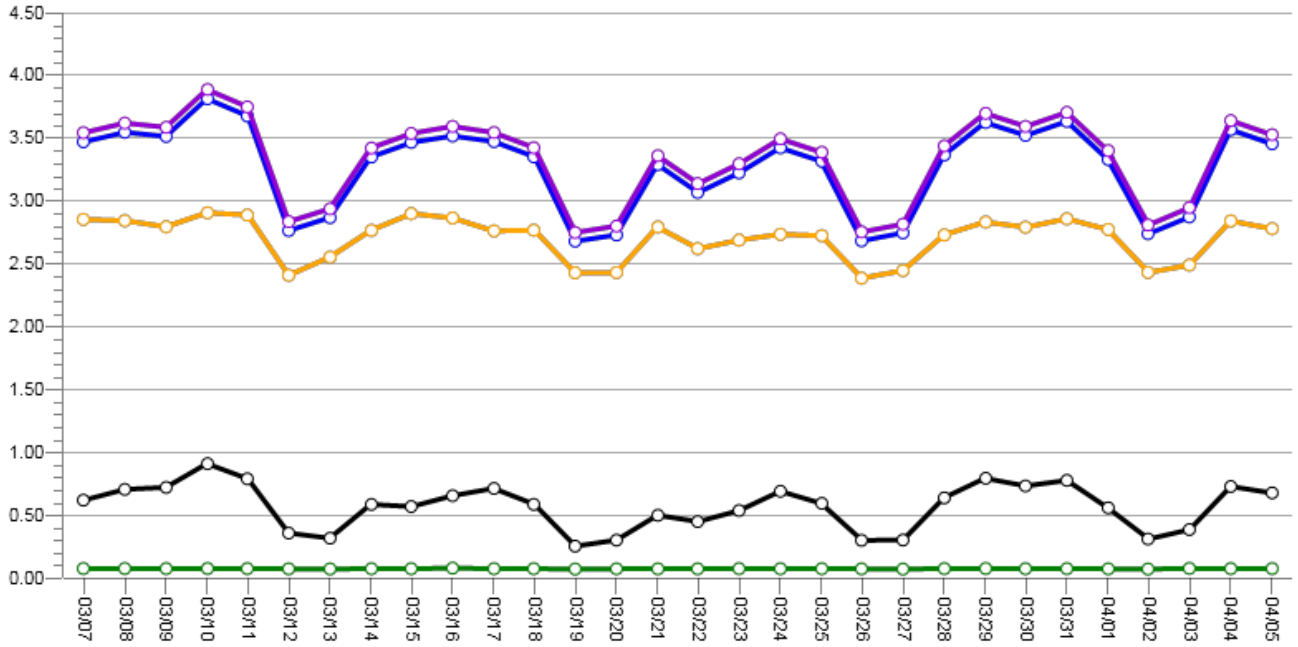
Pneumatic Tube System TAT

Average TATs

- Request > Sent
- Sent > Arrived
- Arrived > Drop
- Request > Arrive
- Request > Drop



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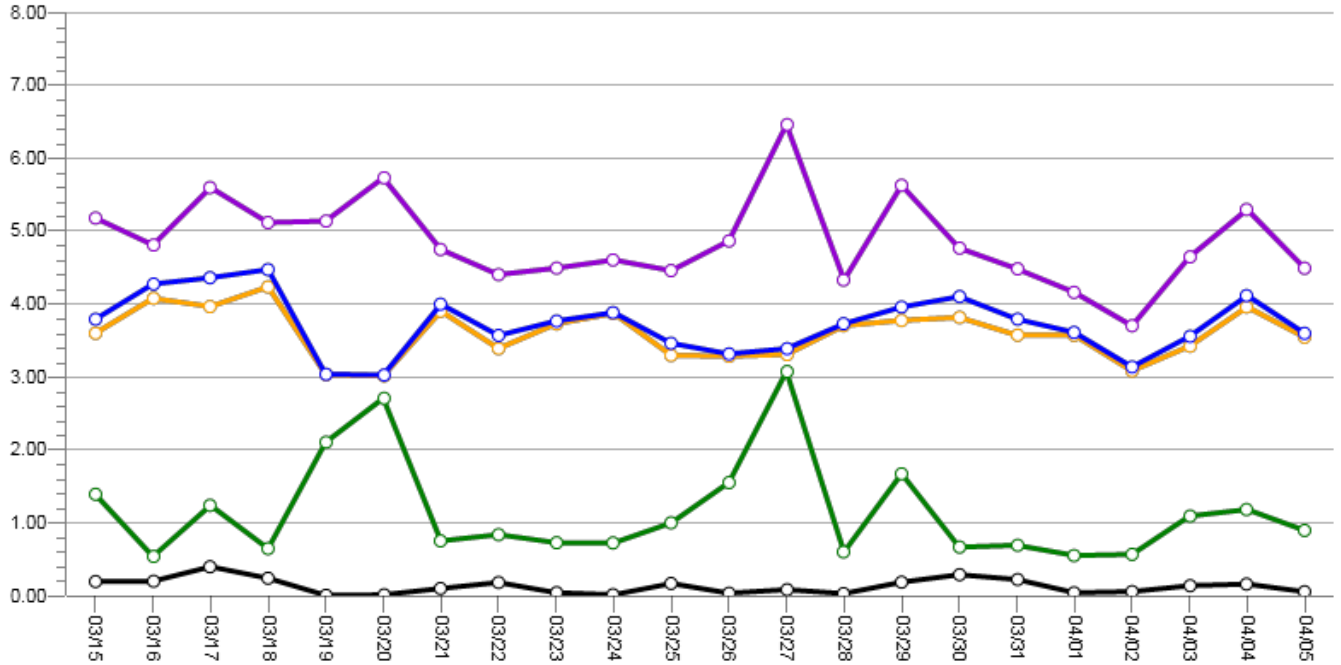
Pneumatic Tube System Blood Delivery

Average TATs

- Request > Sent
- Sent > Arrived
- Arrived > Drop
- Request > Arrive
- Request > Drop



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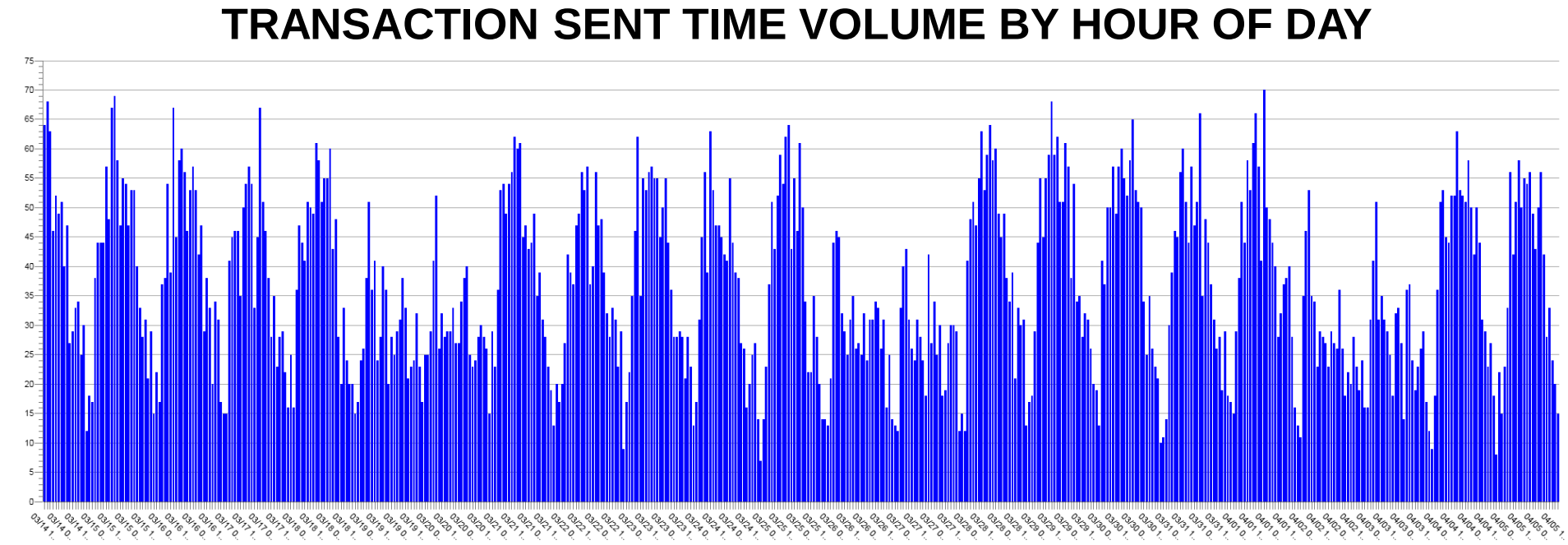
Pneumatic Tube System Hourly Workload into Laboratory



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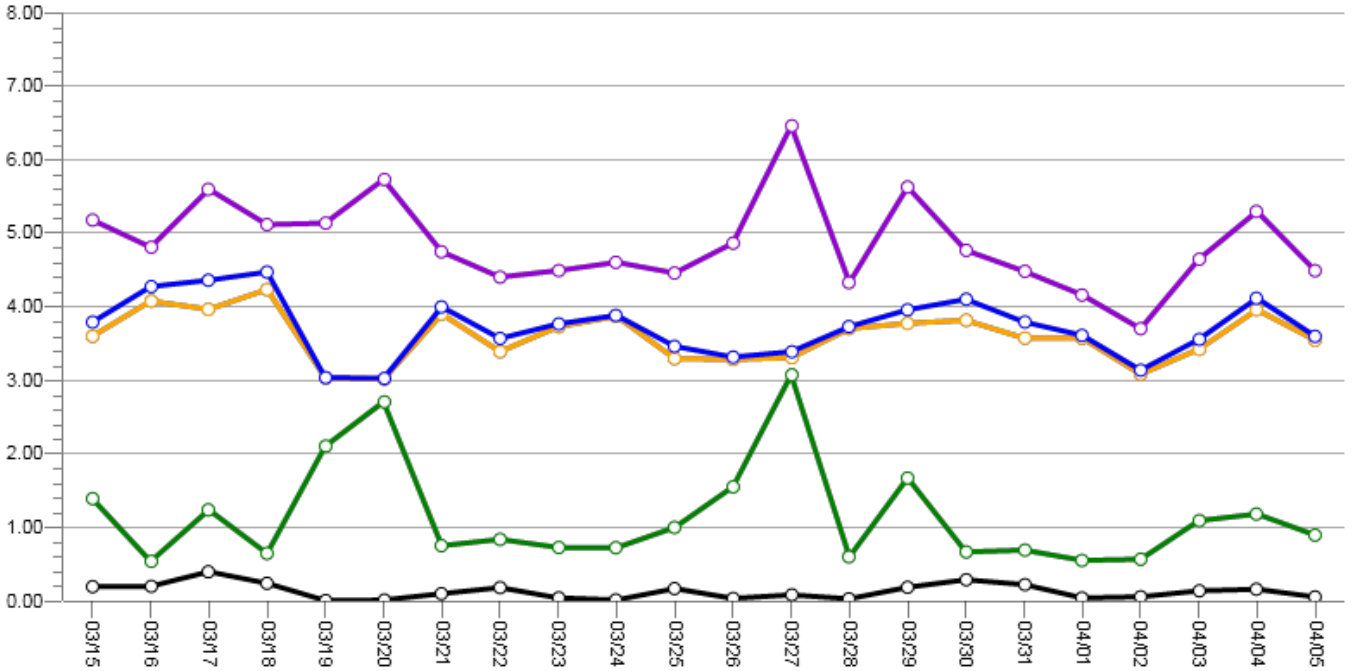
Pneumatic Tube System Blood Delivery

Average TATs

- Request > Sent
- Sent > Arrived
- Arrived > Drop
- Request > Arrive
- Request > Drop



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Pneumatic Tube Transport Systems

- Drives significant improvements for the hospital system as a whole
- Shifts workload

A LABORATORY NEEDS TO

CLAIM THESE WINS

even if the major
benefactor is outside the laboratory

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On-Instrument Data

- Modern automation generates hundreds of data points per hour
- Each sample gets multiple time stamps
- Middleware often contains this data

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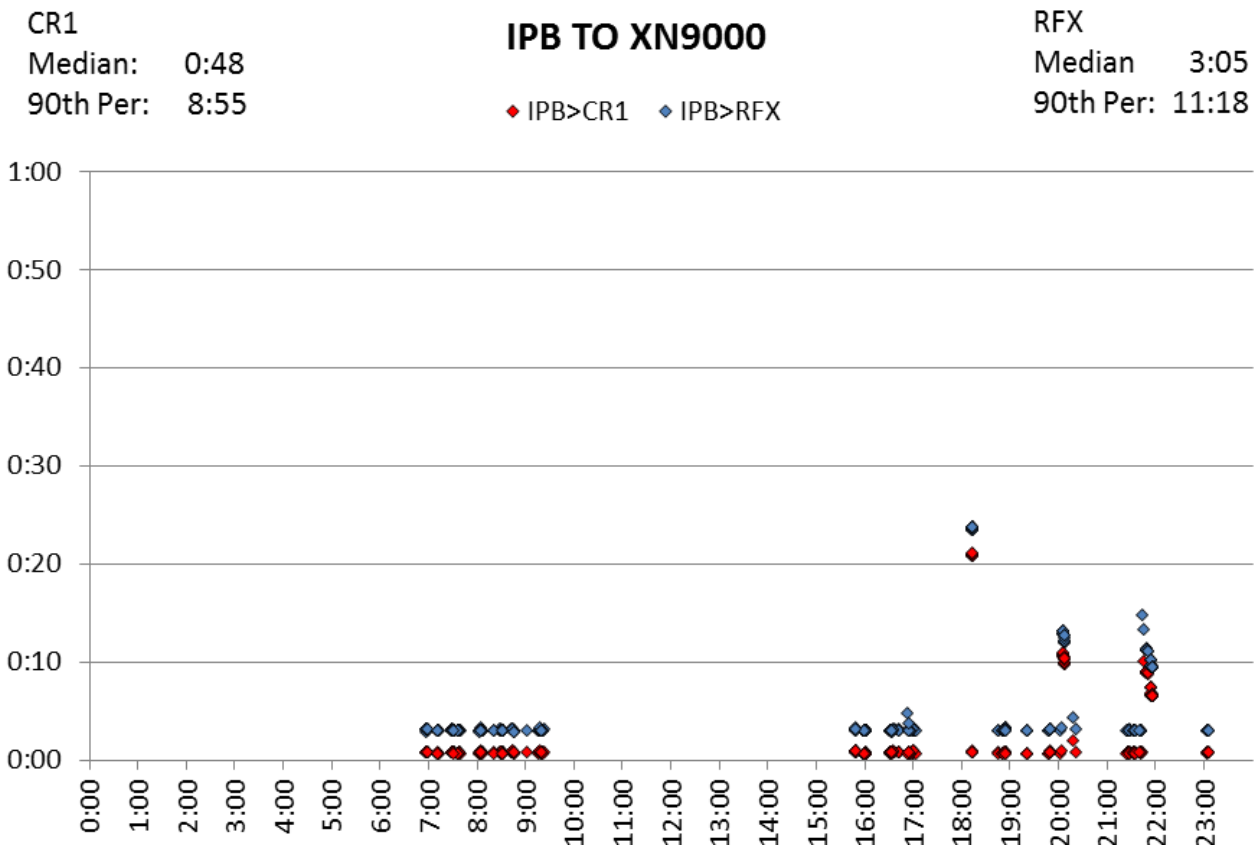
Transit Time: Lavender Tubes to XN9000



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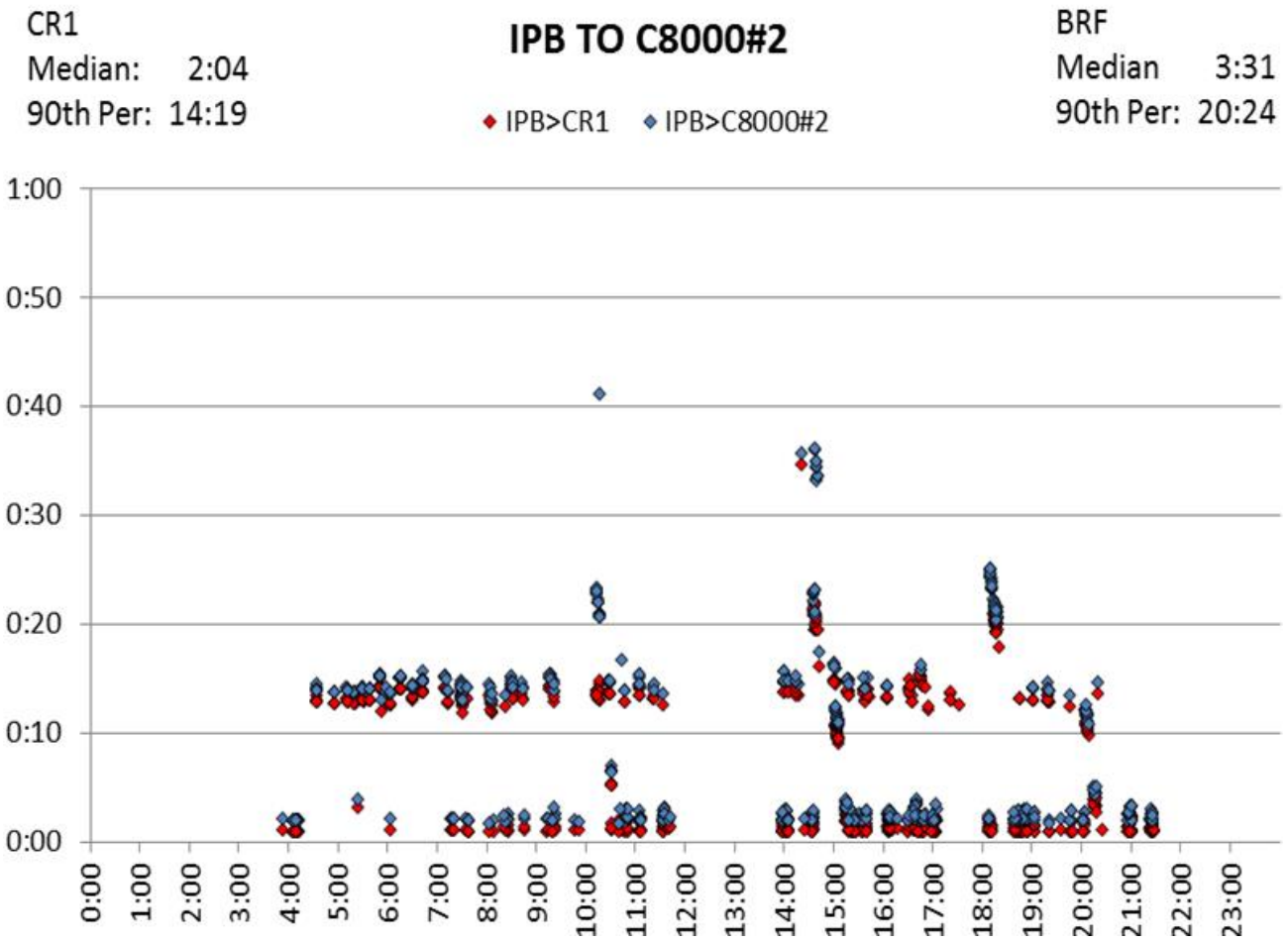
Transit Time: Input Buffer to cobas 8000 (7556)



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Test Menu Analysis

- Reagent utilization and reagent cost analysis:
  - Data available from middleware, LIS

- **Did not include:**
  - Cost of QC materials
  - Cost of calibrators
  - Labor

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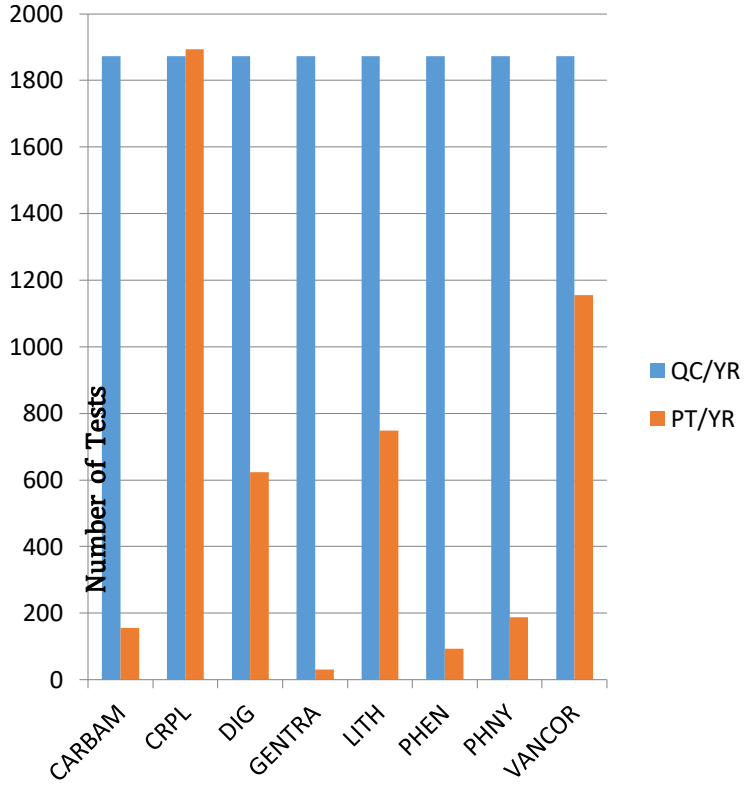
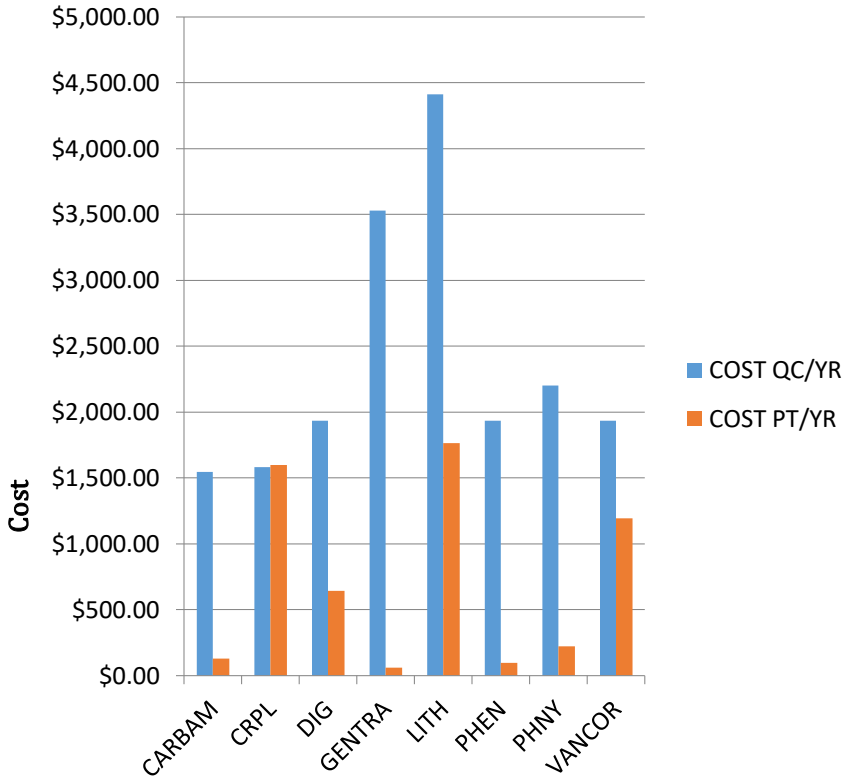
Lewistown





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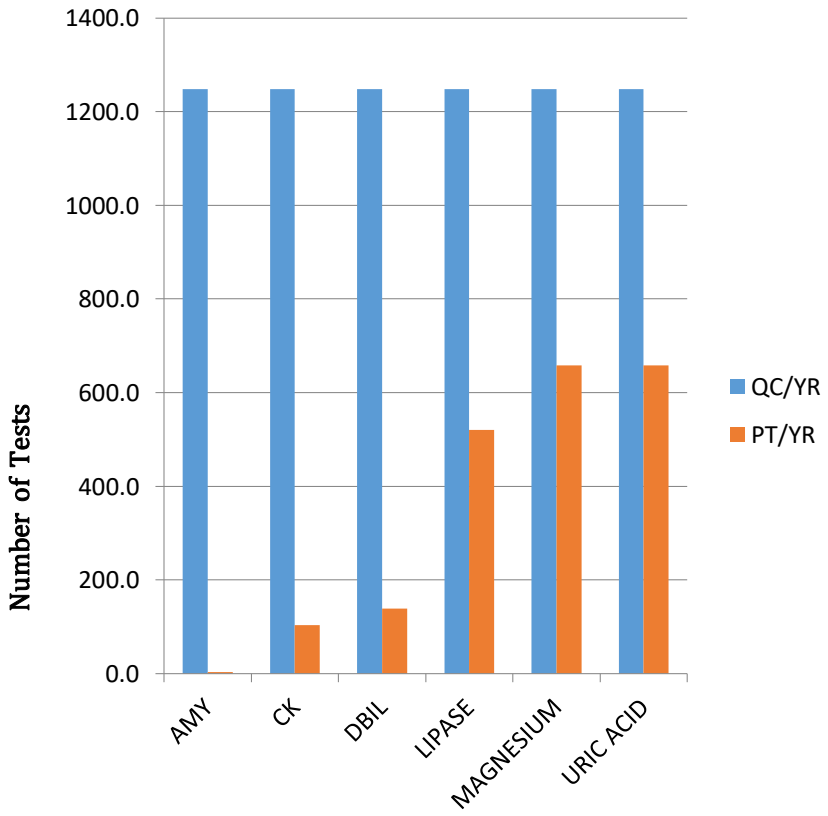
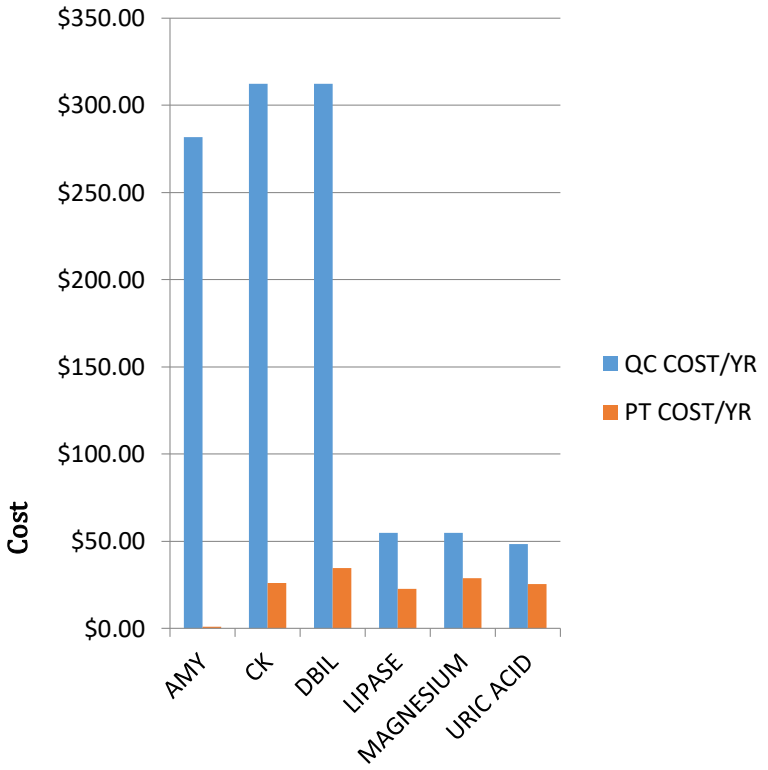
Mt. Pocono





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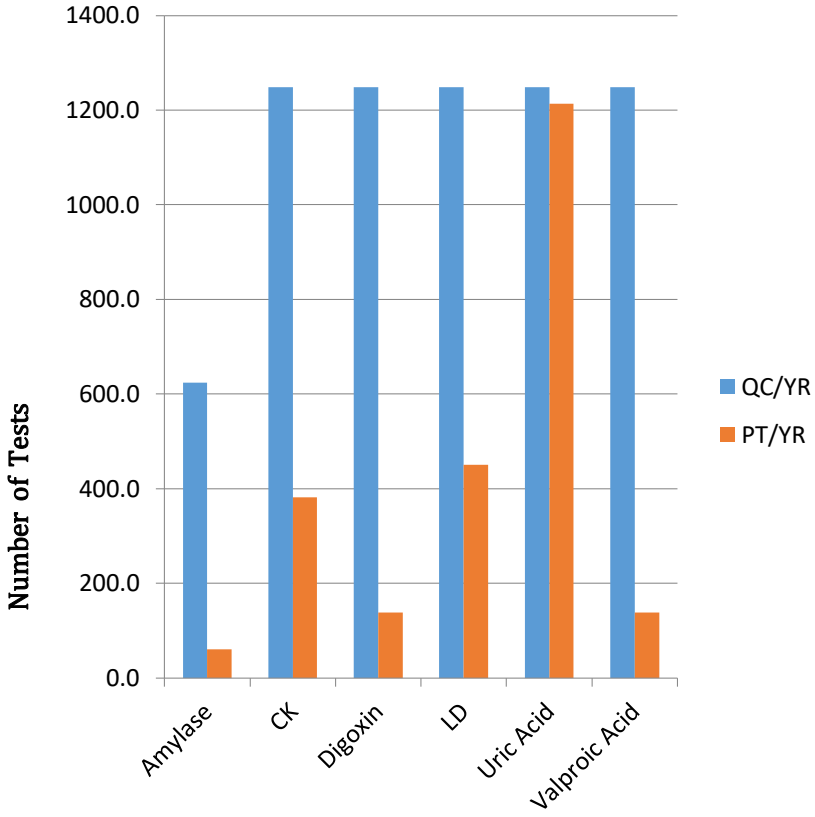
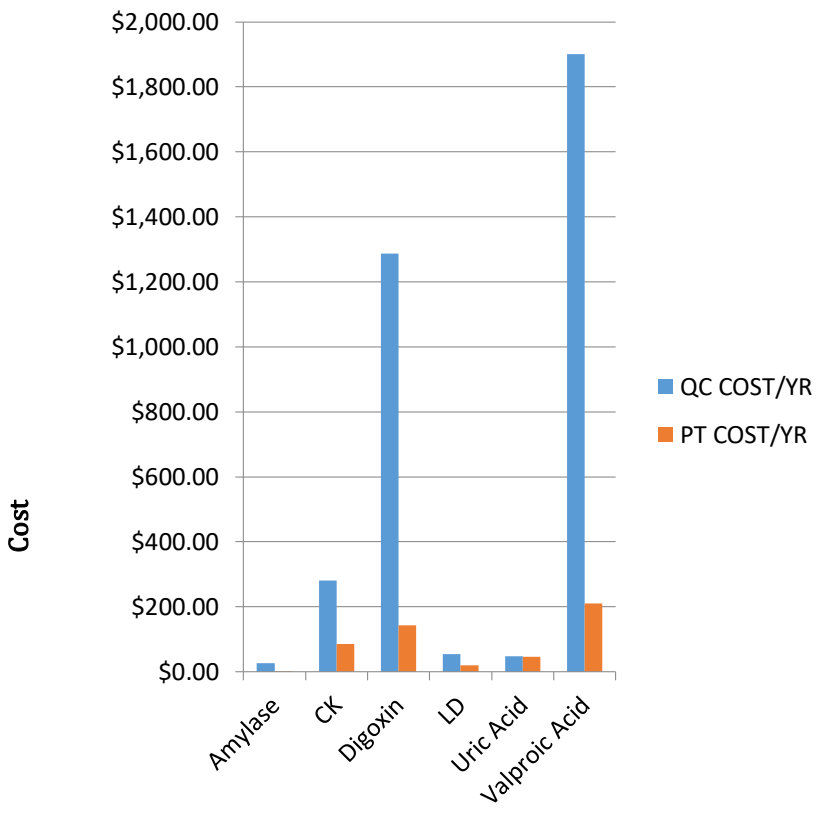
Scenery Park





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Recommendations

- **Lewistown:** Sending the tests listed to GMC could save $19,753.96 in reagent cost for Quality Control analysis per year.

- **Mt. Pocono:** Sending the tests listed to GMC could save $1,063.68 in reagent cost for Quality Control analysis per year.

- **Scenery Park:** Sending the tests listed to GMC could save $5,070.29 in reagent cost for Quality Control analysis per year.

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Extra Tubes

- Tubes Drawn without specific orders
- Often as part of a ‘rainbow’ draw in ED
- Extra tubes are logged into LIS system at time of receipt with specific test code based on specimen type

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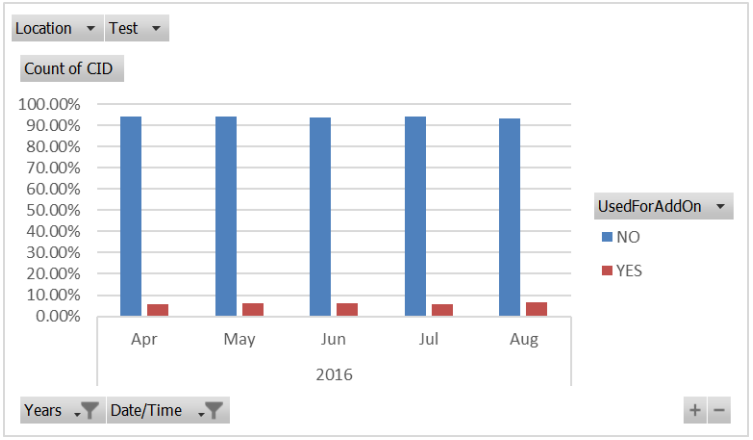
Extra Tubes are Rarely Used



- On average 6.04% of extra tubes are used for Add-on testing
- Blue, Lavender, Green tubes are used 8.59%
- All other types are used 3.16% of the time

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Policy Change based on data

- **Only in ED,** In addition to the specimens required for ordered tests, draw 1 citrated whole blood (Blue), 1 plasma separator tube (Lt Green), 1 EDTA whole blood (Lavender), if these specimens have not been obtained for the ordered tests.

- **Do not draw additional** lithium heparin (dark green), serum separator (gold), Fluoride (grey), Pink-EDTA whole blood (pink), Serum (Red).

- **All other locations**; **ONLY** draw specimens required by ordered testing.

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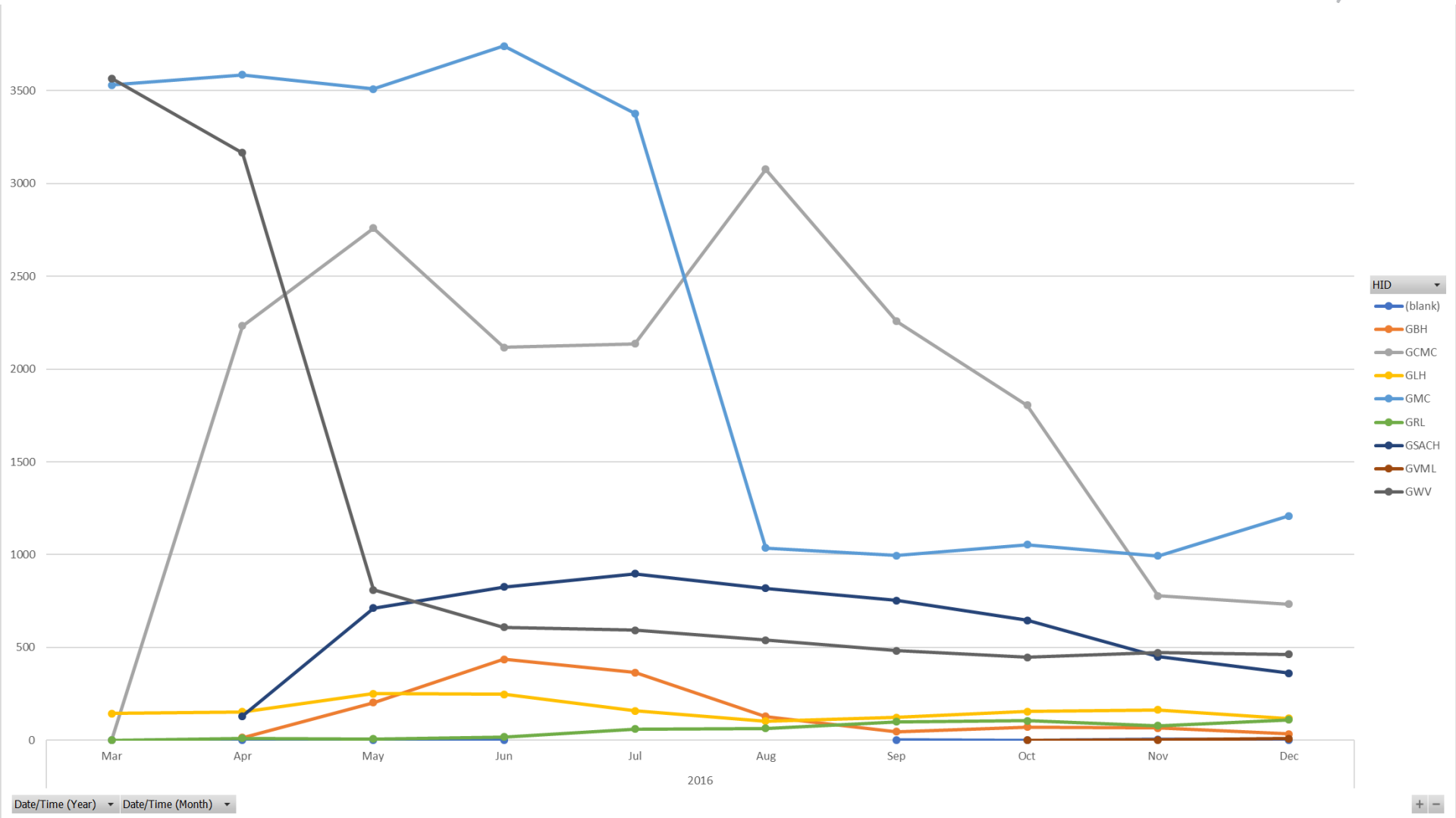
Absolute number of extra tubes received



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Savings

- Specimen Tubes approx. $16.56/100
- 5681 Tubes/Month
- $11289.28 / year in supply cost savings

- Specimens 3ml/blood per tube
- = 204 LITERS of Blood per year
- = 584 Units of blood
- = 40 ADULT BLOOD VOLUMES

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Conclusions

- Laboratory has data everywhere
- Nearly unlimited opportunities for improvement
- Look for unexpected data sources when solving problems
- Laboratory drives hospital wide value – demonstrating that value is critical

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Questions?

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