



TAMING THE URINE CULTURE BEAST

How We Virtually Eliminated Second Reads While Drastically Reducing Average Turnaround Time.

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November 2011



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- We have been in operation since 1972.**



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- We operate 24/7**


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 **What was driving us to change**

- Physicians demanding quicker turn around times**

- Better outcomes and reducing length of stay**

- Increasing healthcare costs, decreasing reimbursements**

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What was driving us to change

- Laboratory consolidation
- Reduced operating budgets
- Expansion of in-house test menus
- Moving to a new facility – from 30,000 sq ft to 87,000 sq ft
- More than doubled out space



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Workflow Optimization

- An approach to reducing time between the customer request and delivery of result
- by eliminating waste and constraints to process flow.



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Workflow Optimization

- Identify where value is added in a process
- Reduce activities that do not add value
- Pursue continuous and incremental improvement

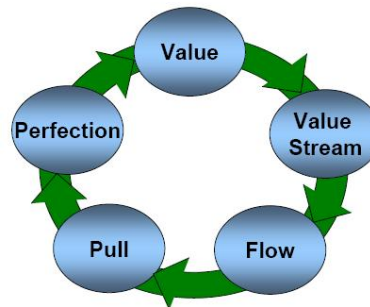


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Workflow Optimization

- Lean and
 - Six Sigma
- are methodologies that facilitate this process





How did we reduce Turn around Time

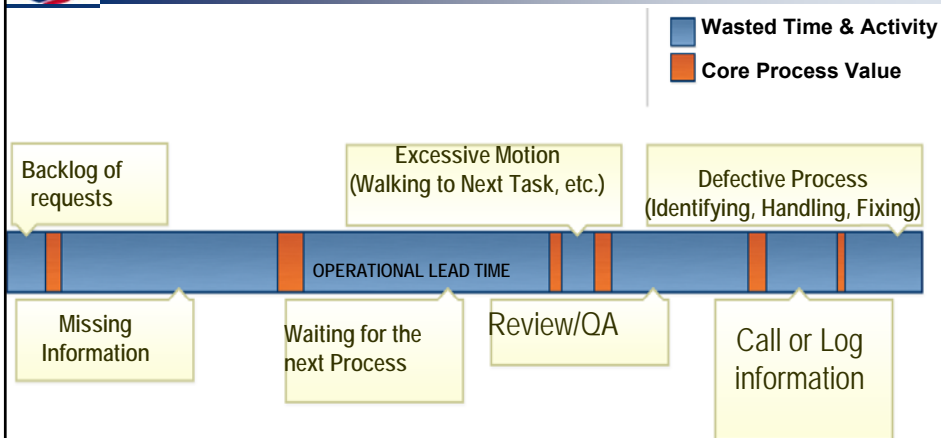
- ❑ Standardize processes
- ❑ Eliminate waste (non-value added activities)
- ❑ Re-designed our urine culture process
- ❑ Re-allocated the staff to match the urine culture receiving pattern



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What does the patient value?



The key is to reduce processes and effort to "core value" ... simultaneously improve TAT, Capacity, and result quality



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Waste... NOT in my Lab

❑ Traditionally, waste has been viewed as an object. It is very easy to envision a barrel of scrap metal or plastic and identify it as waste.



❑ In LEAN thinking, the term “waste” doesn’t refer to physical material, but rather to the relationship of the resource to the patient



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Waste in Lean thinking

❑ Waste is measured differently in Lean

7 categories

❑ In LEAN thinking, “waste” is measured as consumption of resources

- ❑ Time
- ❑ Capital



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Focus on Urine Samples

- Urine samples make up 48% of our total sample volume
- By focusing on the urine samples we would dramatically impact out TAT

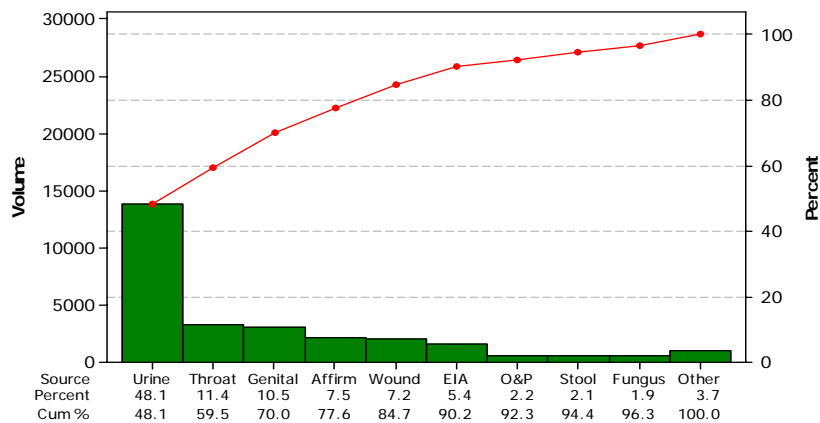


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Focus on Urine Samples

Sunrise Micro Lab Specimen Volume Pareto

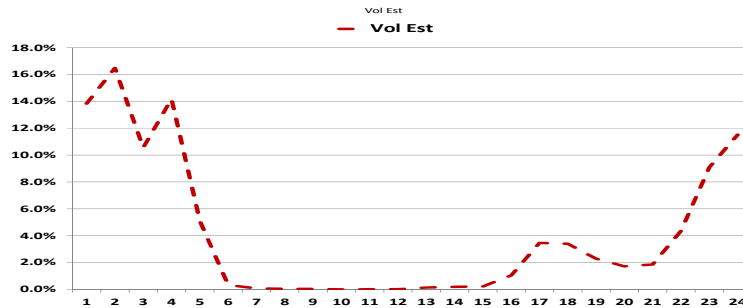


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Urines Process before

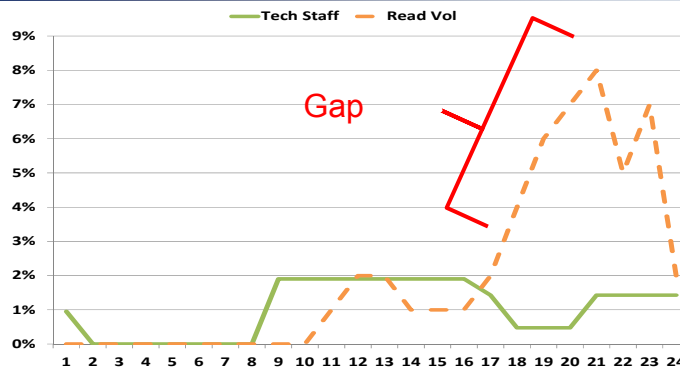
- ❑ Specimen received between 4pm and 5am
- ❑ Night shift setup urines



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Reading of cultures started at 3pm



Culture are available to read 18-24 hours after incubation
The bulk of the urine cultures were read by day shift which was several hours too soon causing many re-incubation and delays in TAT



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Urine Process-

P M Shift

- ❖ Start reading cultures at 3pm
- ❖ Positive cultures *VITEK2 ID/Sens*
- ❖ Negatives were re-incubated

Day Shift

- ❖ Negatives → reread and finalize
- ❖ Follow up result with Vitek2 ID/Sens
- ❖ Print all results from Vitek2
- ❖ Confirm all ESBL
- ❖ Confirm all Gram positives Vancomycin resistant organisms



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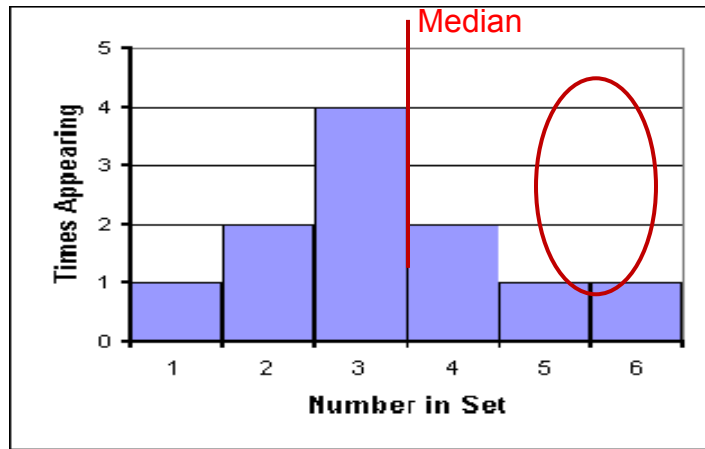


Data Analysis Background

- Histogram – a representation of the frequency of occurrences in a data set
- Median – numeric value separating the higher half of a data set
- 1-4 quartiles – 3th quartile represents 25% of the data set to the right of the median



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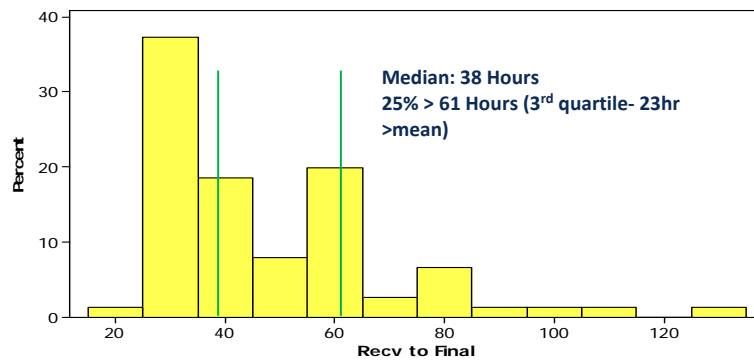


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Urine – Turn Around Time Analysis

Urine Positive TAT (hours)



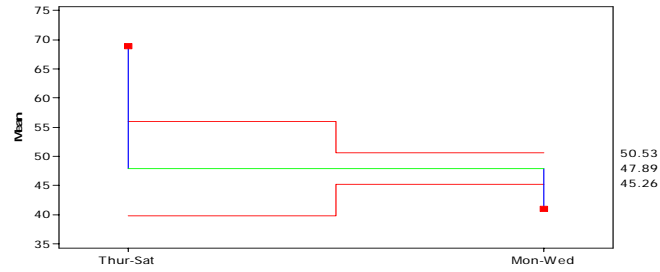
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Urine – Turn Around Time Statistical Analysis

Positive Urine TAT by Weekday

Alpha = 0.05



- ☐ Positive Urine TAT highly impacted by day of week received –
- ☐ 75% longer TAT if received Thurs-Sat over the rest of the week.

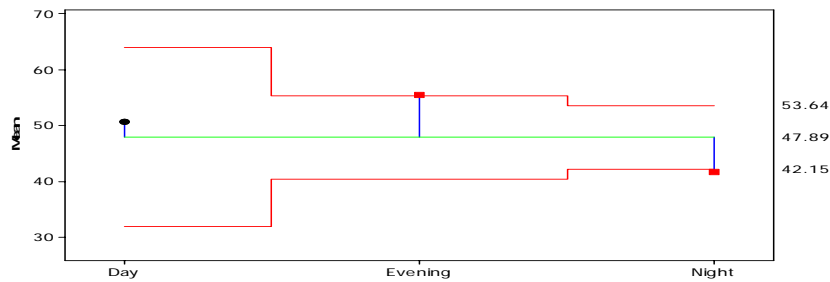


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Positive Urine TAT by Shift Received (hours)

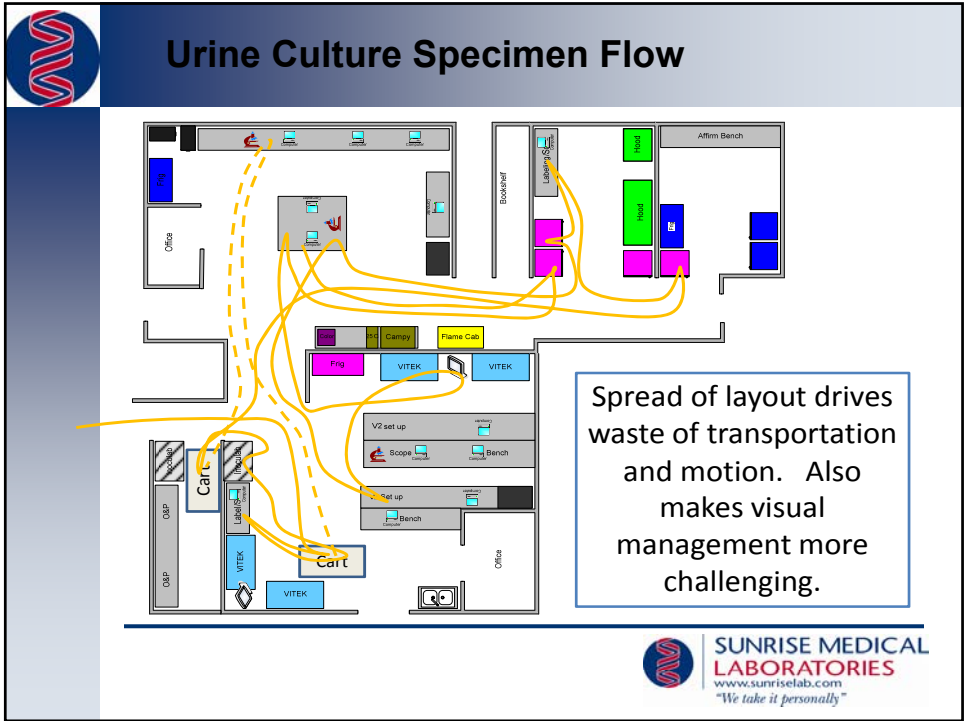
Alpha = 0.05



Shift received also impacts positive TAT – 25% longer TAT if received in the evening than those received over Night.



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What did we do?

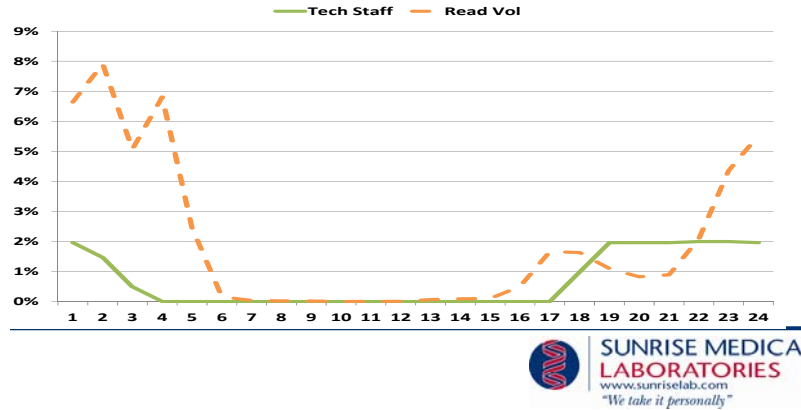
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Changed when culture are read

Night shift-

- Urines are plated earlier starting at 9 pm
- Reading starts at 7pm after 18-24 hours of incubation



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Standardized Urine Workflow

PM Shift

- ❖ Staff hours change from 3pm start time to 6pm start time
- ❖ Urines read in groups according to set up times
- ❖ Positives → Vitek 2 → ID and/or Sens
- ❖ Negatives → Finalized

Day Shift

- ❖ start times change from 6am/7am start time to 8am and later start time
- ❖ Positives are finalized
- ❖ ESBL result used from Vitek2 except for a few exceptions
- ❖ Eliminate Vanco screen agar-Va resistant enterococcus no longer verify
- ❖ Stop printing all results



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Improved processes

- Changed policy for accepting VITEK 2™ ID's to 80% confidence
- CNS if no ID -1st attempt – call it Staphylococcus coagulase negative
- Installed Observa and PC software on VITEK 2™



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- Improved workflow equals decreased TAT

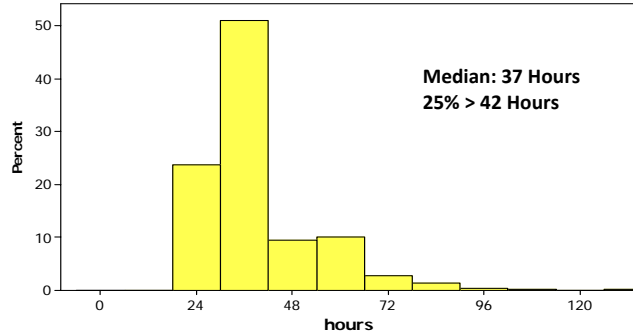


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Nov 2010 Turn Around Time Analysis

Positive Urine TAT - Receipt to Final (hours)



Reduce number of re-incubated urines
Reduce number of touches and repeats



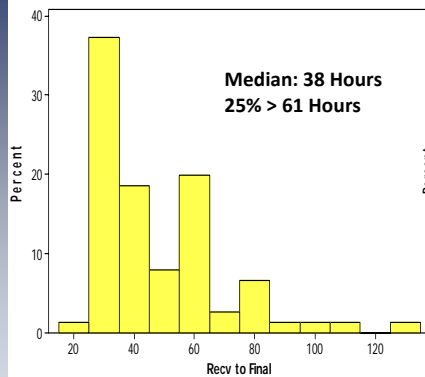
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Turn Around Time Comparison

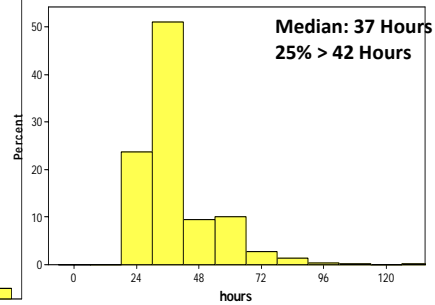
June 2010

Urine Positive TAT (hours)



Nov 2010

Positive Urine TAT - Receipt to Final (hours)



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Turn Around Time Comparison

Metric	Before (Jun '10)	After (Nov '10)
Mean TAT	49 hours	39 hours
Median TAT	38 hours	37 hours
3 rd Quartile(>75%)	61 hours	42 hours

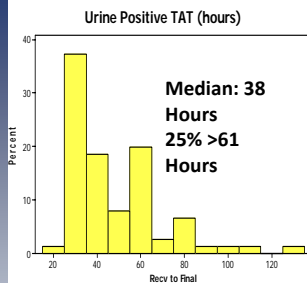


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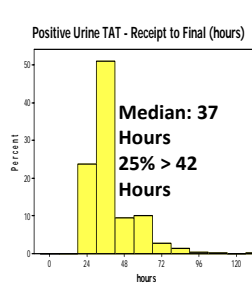


Turn Around Time Comparison

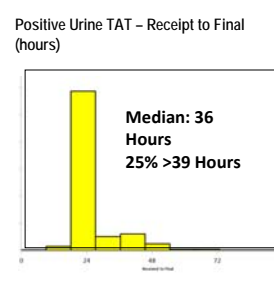
June 2010



Nov 2010



Aug 2011



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Turn Around Time Comparison

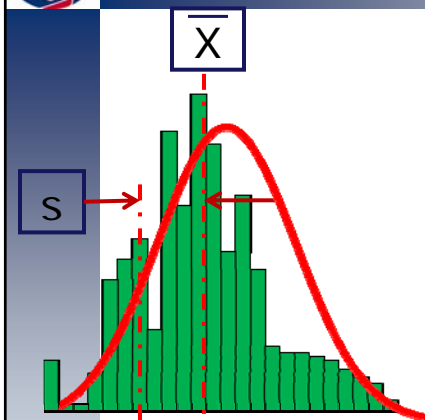
Metric	Before (Jun '10)	After (Nov '10)	After (Aug '11)
Mean TAT	49 hours	39 hours	39 hours
Median TAT	38 hours	37 hours	36 hours
3 rd Quartile (>75%)	61 hours	42 hours	39 hours



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Normal Curve (50/50)

Jan, Feb, Mar 2011



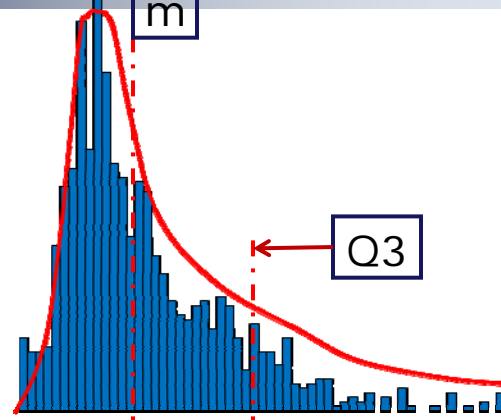
AVERAGE (MEAN)

-Sensitive to extreme values

-Standard Deviation

Non-Normal Curve

Elapsed time is normally NON NORMAL



MEDIAN

-Less sensitive to extreme values

-Q3 (Third Quartile >25%)



Conclusions

- Workflow Optimization helped us identify the opportunities for improvement in our processes
- We matched out processing staff and technical staff to the specimen arrival pattern
- We reduced the number of re-incubated cultures
- We improved our TAT for urine cultures
 - ❖ Reduce 10 hours on average TAT
 - ❖ 22 hours for cultures in the 3rd quartile



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Conclusions

- Reduce TAT without reducing Staff
- Reduce TAT without compromising quality
- Reduce operating cost by reducing re-reading of urine cultures
- Eliminate unnecessary procedures
- Choose one area to start; try not to do it all at once
- Focus on improvement- sustain it over time
- IT is a process



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QUESTIONS



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THANK YOU

SML-Micro Team



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