



Lab Quality Confab

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Using Data Analytics to Prove How the Popular Wisdom on Automation and Staffing is Often Wrong

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Limited
Capital
Dollars



No
Additional
FTEs



Reduce
Expenses

Challenges for laboratories today



New
Revenue

Benchmarking only tells you how others are doing, it doesn't help you do things better.



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“What If” Approach

We examined *six scenarios*
utilizing a performance
improvement platform.

STEP

01

Identified and defined six different scenarios or “what if” questions including key metrics and laboratory variables



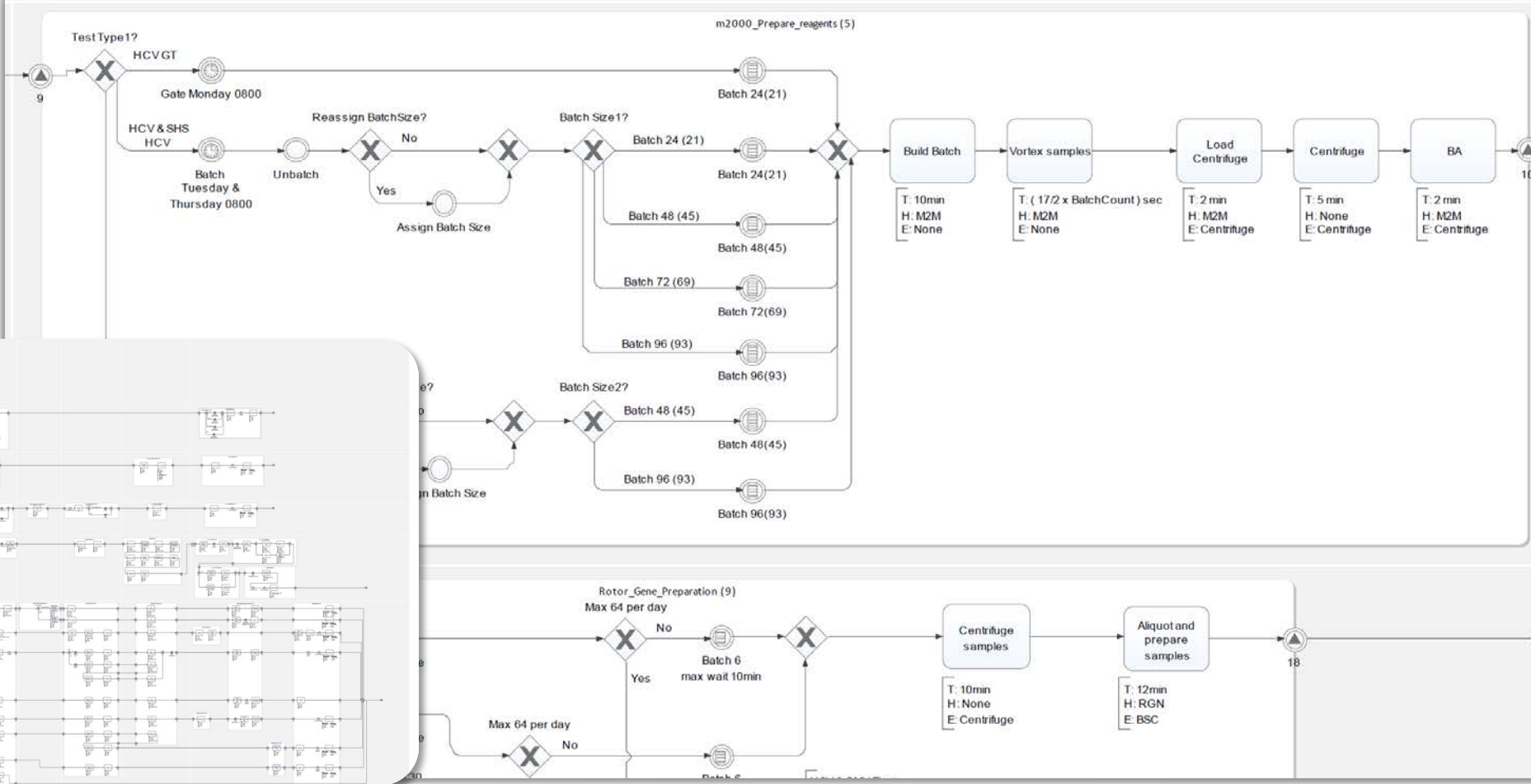
STEP

02

Documented lab processes in detail in a standardized format and acquired representative LIS data



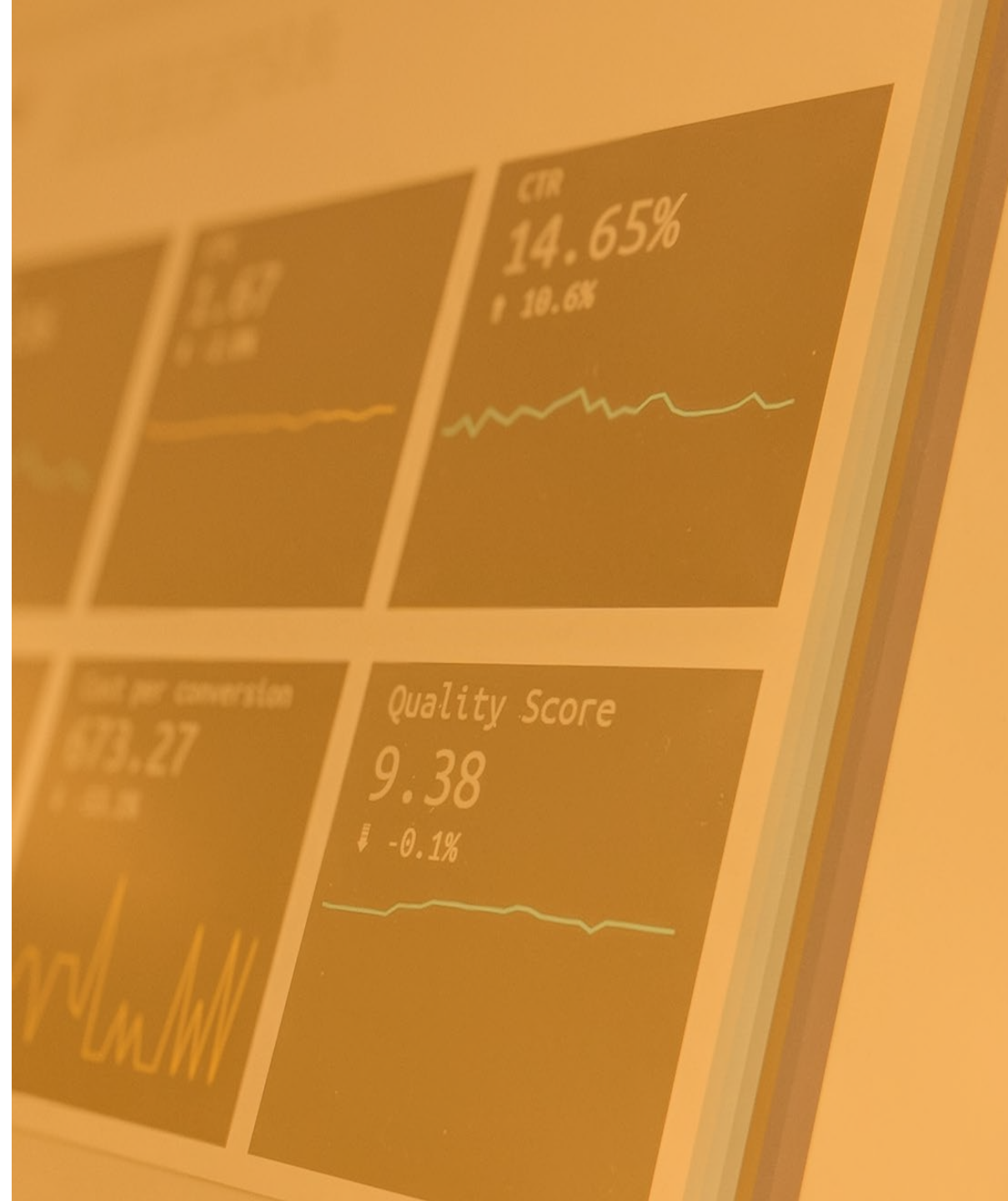
Process



STEP

03

Structured and cleansed the
LIS data and established
current-state performance
metrics



STEP

04

Created a validated, virtual model of the lab.

Investigated the impact of each defined performance scenario



STEP

05

Documented the
predicted outcomes and
performance metrics



Turnaround Time (Data Sets)

Flow Comparison (Data Sets)

Flow Comparison (POIs)

Workforce Group Utilization

Workforce Utilization (Time)

Technology Total Utilization

Technology Utilization (Time)

Print

Fullscreen

FLOW COMPARISON (POIs)

Filter by Data Set

- ☐ Sc2D - HEP Vol 200per
- ☐ Sc4A - Staffing Cons
- ☐ Sc4B - Staffing Cons minus 1
- ☐ Sc4C - Staffing Cons minus 2
- ☐ Sc5 - epMotion
- ☐ Sc6 - Interfacing

Filter by Point of Interest

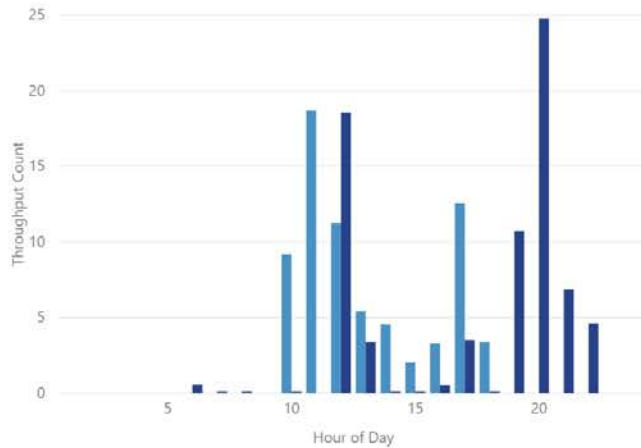
- ☒ Select All
- ☐ Panther_Prepare_Sample_IN
- ☐ Panther_Prepare_Sample_OUT
- ☐ Panther_Processing_IN
- ☒ Panther_Processing_OUT
- ☐ Panther_Sort_Sample_IN

- ☐ HLA B27 Screen
- ☒ HPV 16/18 Genotype
- ☒ HPV High Risk Screen
- ☐ Huntington's Disease Molecular Analysis
- ☐ IDH1 and IDH2 Mutation Analysis
- ☐ IGH and CCND1 t(11:14) by FISH

Filter by Day of Week

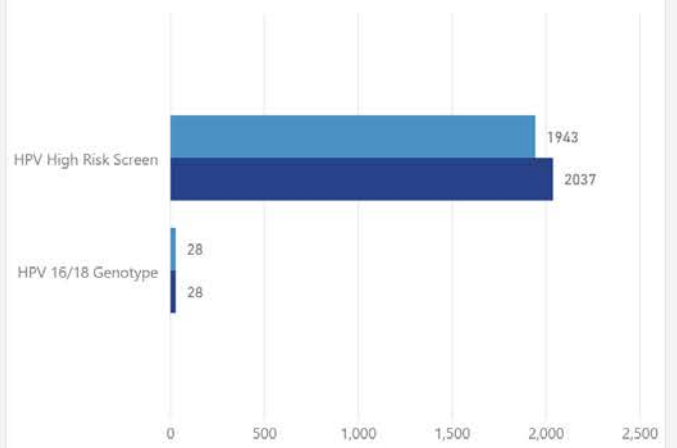
- ☐ Select All
- ☐ Sunday
- ☐ Monday
- ☐ Tuesday
- ☐ Wednesday
- ☐ Thursday

Average Daily Throughput at Points of Interest



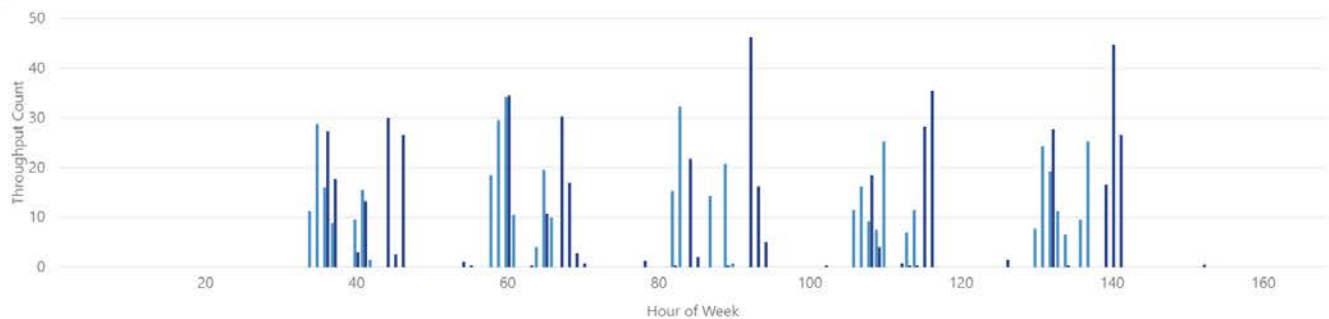
Point of Interest ● Panther_Processing_OUT ● Receiving_and_Sorting_IN

Total Throughput per Entity Group



Point of Interest ● Panther_Processing_OUT ● Receiving_and_Sorting_IN

Average Weekly Throughput at Points of Interest



Point of Interest ● Panther_Processing_OUT ● Receiving_and_Sorting_IN

STEP

06

Continuously monitor actual performance to ensure continued success or need for change



What If...we implement automation to perform sample preparation?

“This will surely have a positive impact on staff utilization” said Kim

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Outcome:



My gut was
wrong!



This process actually
took more tech time



A success for
staff buy in

Resource utilization

Turnaround Time (Data Sets)

Flow Comparison (Data Sets)

Flow Comparison (POIs)

Workforce Group Utilization

Workforce Utilization (Time)

Technology Total Utilization

Technology Utilization (Time)

Print

Fullscreen

WORKFORCE UTILIZATION (TIME)

- ☐ Sc2D - HEP Vol 200per
- ☐ Sc4A - Staffing Cons
- ☐ Sc4B - Staffing Cons minus 1
- ☐ Sc4C - Staffing Cons minus 2
- ☒ Sc5 - epMotion
- ☐ Sc6 - Interfacing

Filter by Workforce Group

- ☐ Select All
- ☐ ABI3130_Staff
- ☐ General PCR
- ☐ m2000
- ☐ NGS
- ☐ Panther

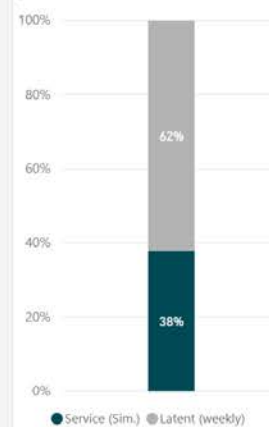
Filter by Resource

- ☐ Select All
- ☐ 1|A3130_WD_0730_1630
- ☐ 10|NGS_WD_0730_1600
- ☐ 11|Pan_MWF_0530_1700
- ☐ 12|Pan_Thu_0530_0730

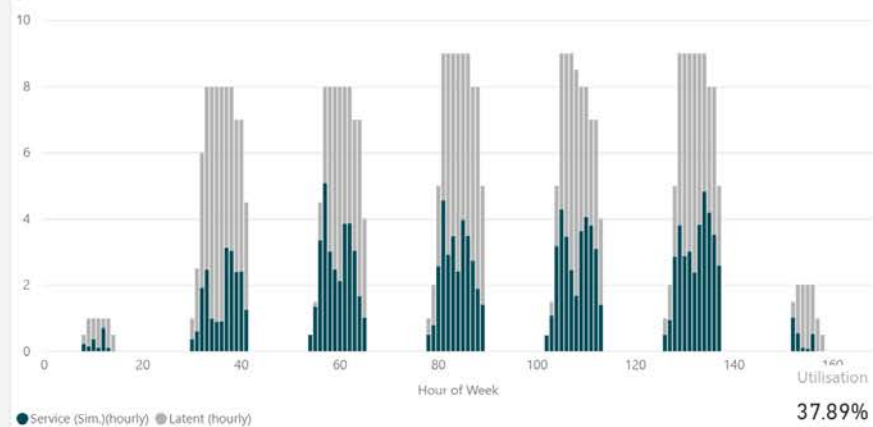
Filter by Work Areas

- ☐ Select All
- ☐ ABI3130_Extraction
- ☐ ABI3130_PCR_Setup
- ☐ ABI3130_Preparation
- ☐ ABI3130_Processing
- ☐ ABI3130_Thawing

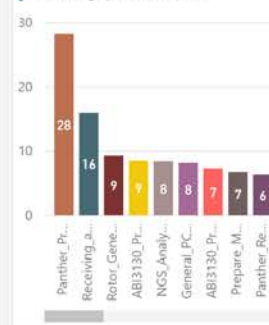
Workforce Utilization (%)



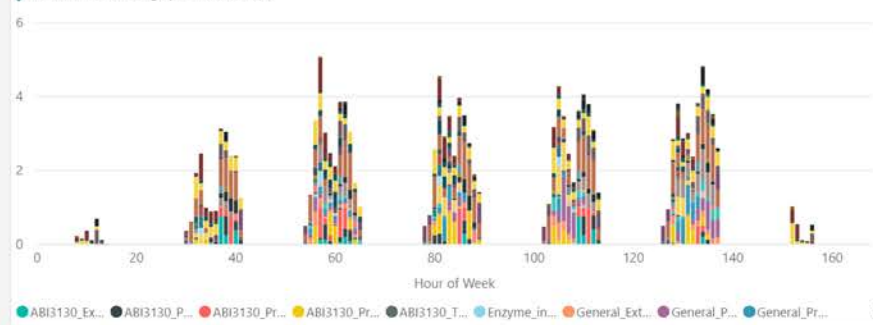
Workforce Time Usage (h)



Total Usage per Work Area (h)



Workforce Time Usage per Work Area (h)





What if...we develop HLA testing?

"We will definitely need to add staff
if we want to launch an HLA lab"
said everyone in Molecular





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A grayscale photograph of a laboratory setting. In the foreground, there is a sink and some equipment. In the background, two people in white lab coats are working at a counter with various instruments and computers. The overall scene is clean and professional.

Outcome:

Workforce utilization analysis proved **no additional staff was necessary** to begin test validation



NGS Staff Utilization

WORKFORCE UTILIZATION (TIME)

Filter by Data Set

- ☒ Model - Feb - 2016
- ☐ Sc2A - HEP Vol 125per
- ☐ Sc2B - HEP Vol 150per
- ☐ Sc2C - HEP Vol 175per
- ☐ Sc2D - HEP Vol 200per
- ☐ Sc2A - CellBio Case

Filter by Workforce Group

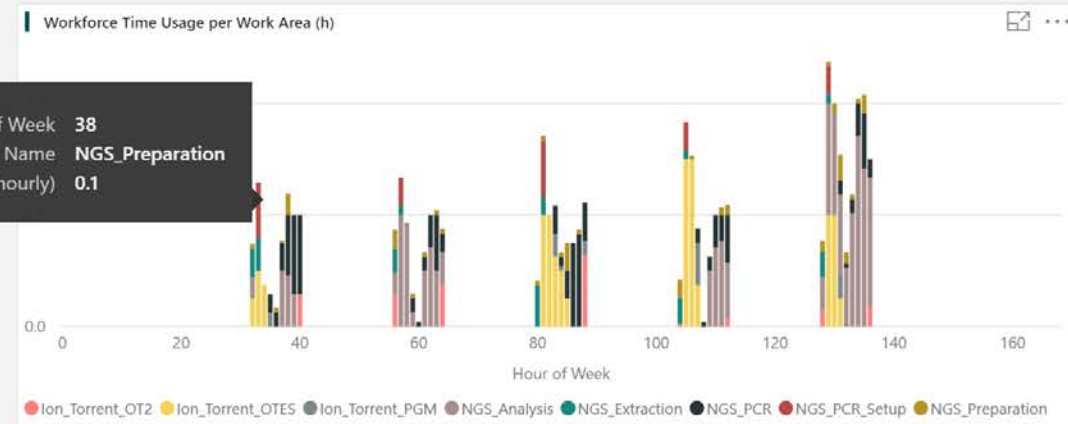
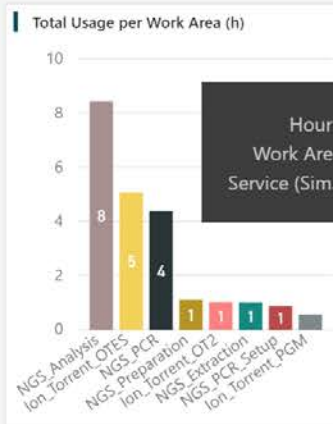
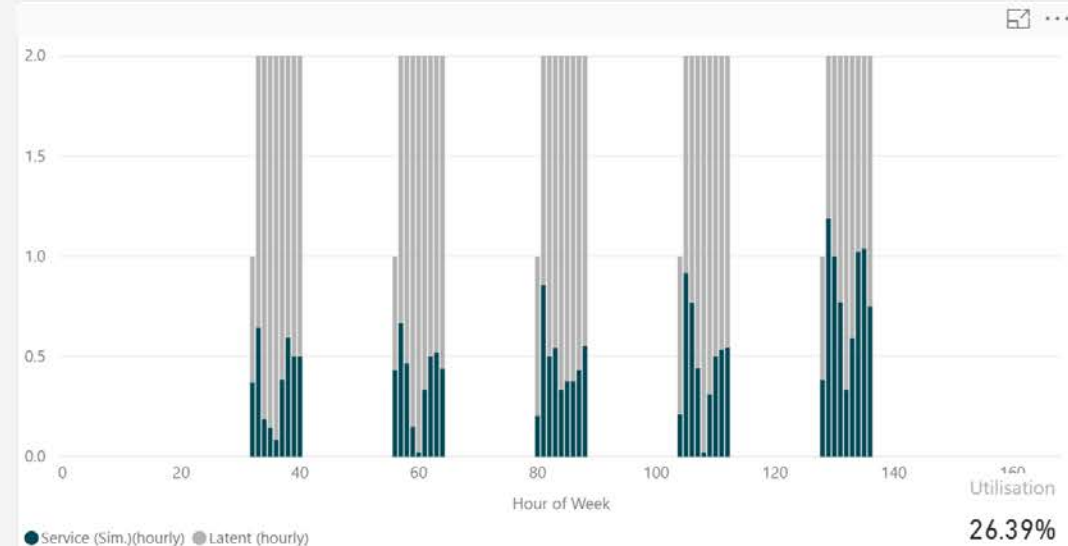
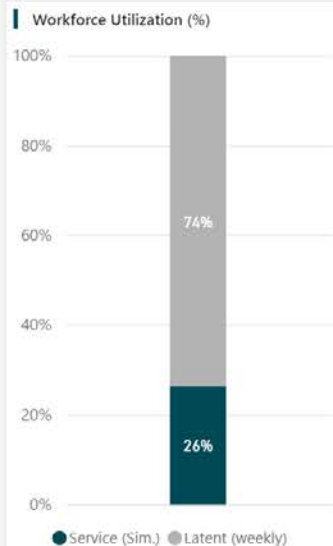
- ☒ Select All
- ☐ ABI3130_Staff
- ☐ General PCR
- ☐ m2000
- ☒ NGS
- ☐ PostProc

Filter by Resource

- ☐ Select All
- ☐ 10|NGS_WD_0730_1600

Filter by Work Areas

- ☐ Select All
- ☐ Ion_Torrent_OT2
- ☐ Ion_Torrent_OTES
- ☐ Ion_Torrent_PGM
- ☐ NGS_Analysis
- ☐ NGS_Extraction





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Impact:

HLA business case was favorable without requirement of additional FTEs.

What if...we improve the handling of HPV samples by Central Processing?

The Central Processing area is delaying the forwarding of samples to Molecular resulting in delays in resulting HPVs.



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Outcome:

Central processing was not the issue.
The lack of timestamps led to uncertainty of specimen location.



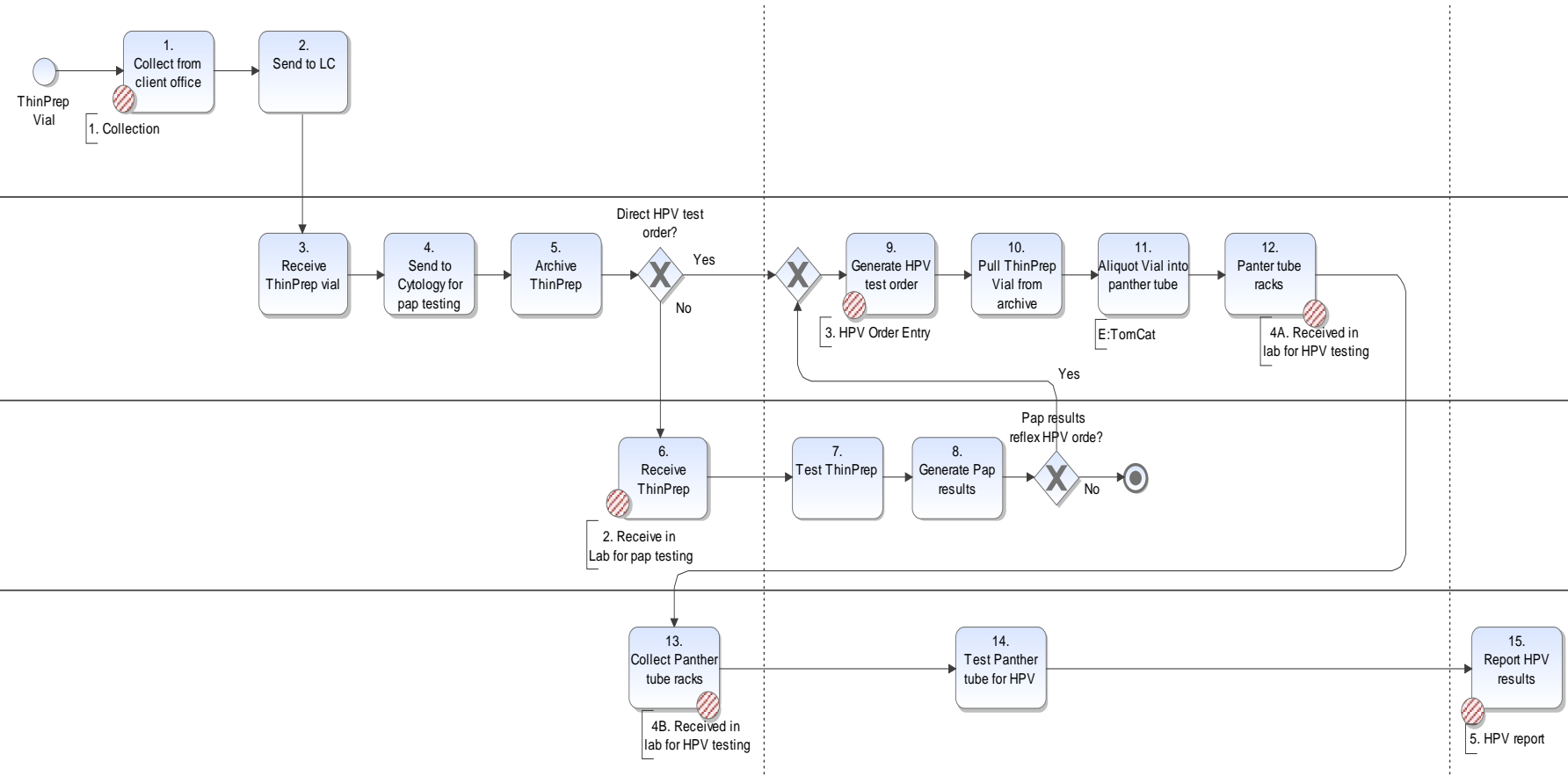
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Impact:

- ✓ Implemented a time stamp at all receiving locations
- ✓ Developed more accurate
- ✓ Reduced TAT by 1 day



Data logging



The ability to quantify and forecast the impact of change with certainty is essential to making the right decisions.

HPV TAT from Collection to Reported

HPV TAT from Collection to ATL and from ATL to Reported					
Year	Avg Monthly HVP Volume	Average Collection to Receipt at ATL		Average Receipt at ATL to Reported	
		Hours	Days	Hours	Days
2013	1103	312	13	23.8	0.99
2015	1733	174.6	7.3	21.6	0.9
2017	2088	195.5	8.1	15.2	0.6
2018	2326	128.7	5.4	10.5	0.4



What have we learned?



Many opportunities for improvement go unrecognized due to our “**gut**”



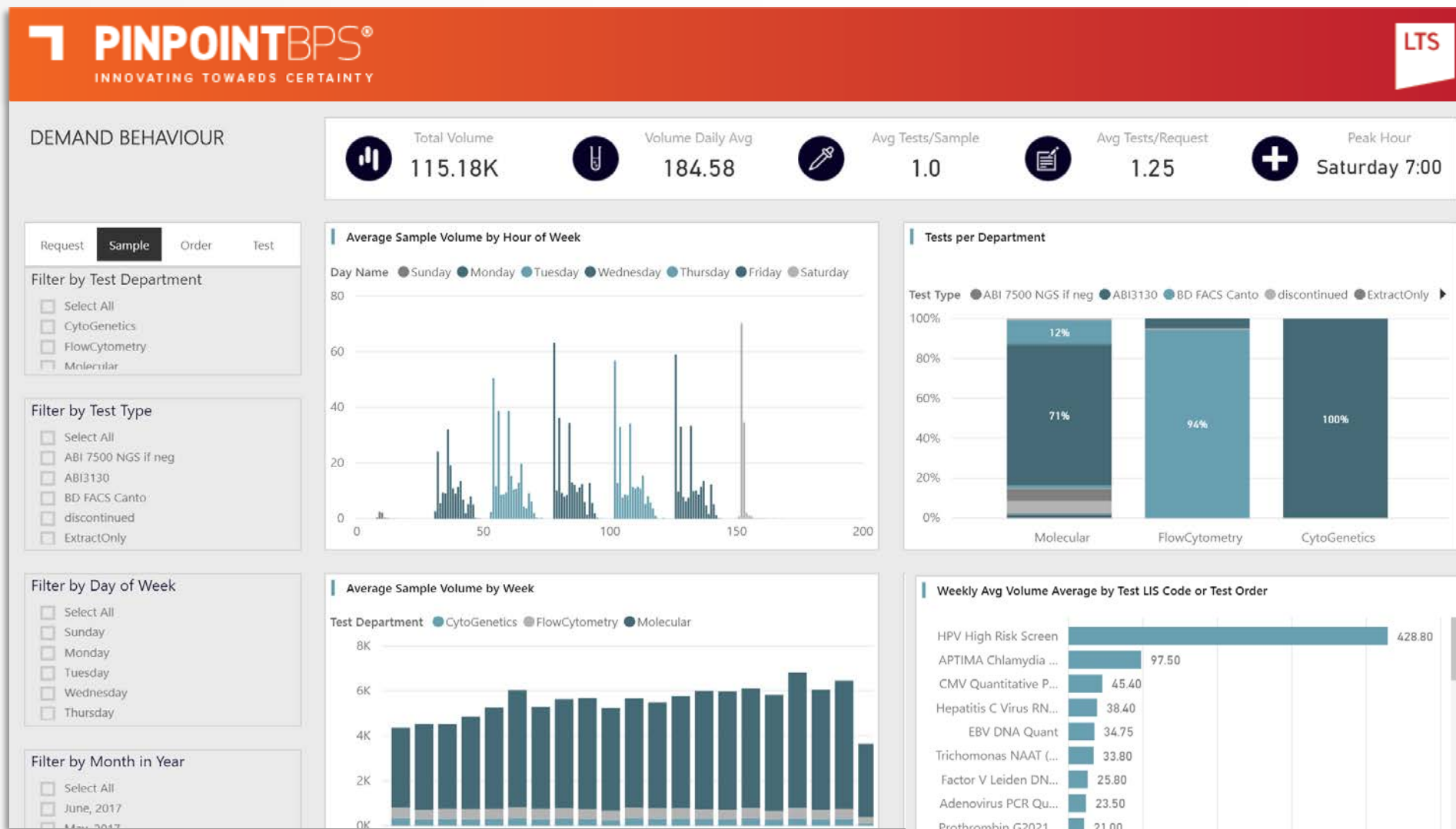
Too much **attention** is given to TAT and test volumes



Focus on workflow metrics to find opportunities for operational efficiencies

Where we are today...

Run additional
scenarios
(economical
additional
analysis)
Insights report
(LIS)





Uncertainty generates resistance to change

Using a simulation model to test possible solutions helps convince staff that proposed changes will have the desired impact without the expensive trial and error period.



Thank you!

The background of the slide is an aerial photograph of a majestic, snow-capped mountain peak. The sky is a deep blue, filled with soft, white clouds. The mountain's ridges and valleys are covered in a thick layer of snow, contrasting with the dark blue of the sky. In the lower right quadrant, the Spectrum Health logo is visible, featuring a stylized, curved arrangement of white dots.

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