THE RIPPLE EFFECT IN CLINICAL INFORMATICS

2018 Clinical Informatics Conference

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OBJECTIVE MEASUREMENT OF INPATIENT WORKLOAD AND ACUITY SCORING FOR NURSING ASSIGNMENTS IN PEDIATRICS AND BEYOND: AN EXCURSION OR EXPEDITION?

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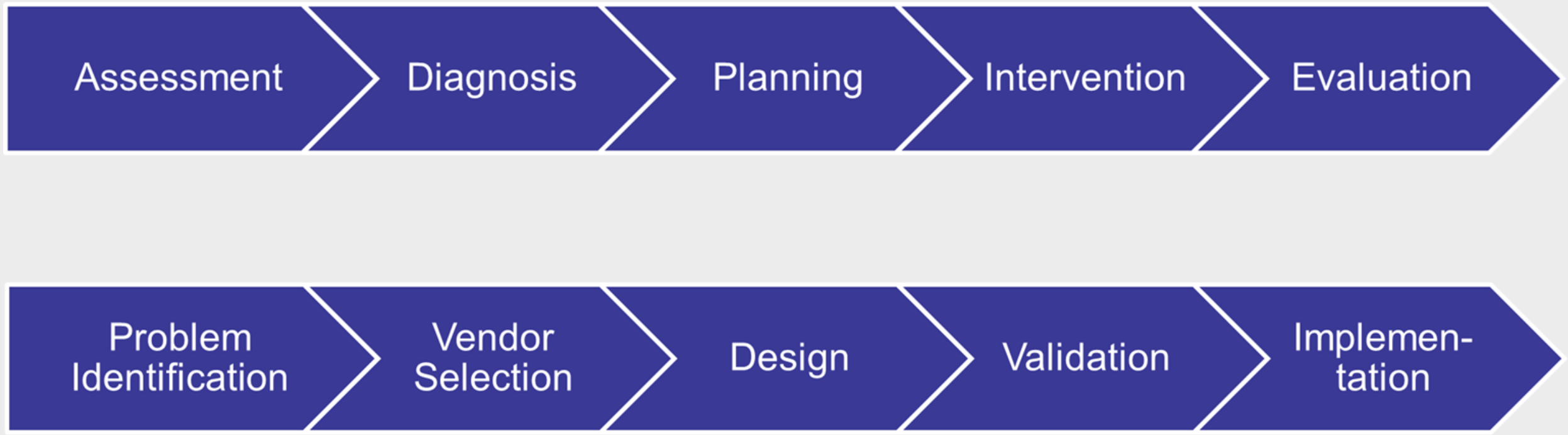
CONFLICT OF INTEREST DISCLOSURE

Debbie Schumann, Stephanie Allen, and Anthony Pearson have no real or apparent conflicts of interest to disclose.

LEARNING OBJECTIVES

1. Describe strategies and considerations for how an inpatient facility of any size may approach choosing an electronic acuity solution to fit with organizational needs, whether it is the first such system or a replacement for an existing paper, electronic, or hybrid tool.
2. Using one health system's multi-year journey as a case study, describe the challenges in developing, deploying, and displaying an objective tool to accurately measure the variety and frequency of inpatient nursing care of patients.
3. Describe how all-nurse design, build, validation, implementation, and sustainability teams organized and conducted themselves to govern and execute a new program
4. Communicate lessons learned and practical takeaways to mitigate the risks of unanticipated complications associated with any electronic acuity tool deployment.
5. Facilitate peer-to-peer professional nursing knowledge-sharing discussion to enhance awareness and stimulate critical thinking on alternate approaches to acuity systems.

THE NURSING PROCESS: 'ALIVE & WELL' IN THE DIGITAL AGE



NURSING WORKLOAD ACUITY IN THE EHR

What it IS

A scoring system:

- driven by the patient's chart
- to objectively quantify changes in a patient's care needs during hospitalization
- to understand & trend relative "busyness" / workload / clinical demand of a patient

WHAT it IS NOT

- an ED or Ambulatory tool
- a direct physiologic monitor
- a crystal ball
- a substitute for **personal knowledge, nursing judgment, or critical thinking**

METHODS

2012	• Selection Committee formed • Began investigating patient acuity systems
2013	• Narrowed the field to 4 vendors • Steering Committee formed • Epic selected as vendor: “come build with us”
2014	• Epic developers came on site for initial “immersion” visit • Design & Implementation Committee formed: 100% Nurses -- direct care Registered Nurses, Clinical Nurse Specialists (CNS), Clinical Education Nurses, Information Services Nurse Analysts, Clinical Informatics Nurses

METHODS

2015	• Maturation from implementation to full scale rollout • Validation, Validation, Validation • Reliability, Reliability, Reliability
2016	• Tweaking system, Refining reports and dashboards, teaching nursing leaders to use dashboards
2017	• Validation continues; analysis efforts mature • Epic developers came on site for follow-up "immersion" visit and to coordinate next-generation software development with an eye towards a semi-automated Nurse Assignment Wizard

METHODS

2018	• Utilization survey • WLD (Wound, Lines and Drains) rule build • Expansion to 3rd site within the Health Care System

SELECTING YOUR TRAVELING COMPANIONS: CHOOSE WISELY

- Assembly of all-RN Steering Committee
  - Including CNO / CNE
- Assembly of subsequent clinical expert groups

VENDOR SELECTION PROCESS

Vendor 1

- Commercial 3rd party system w/no prior business relationship
- Required intervention from Charge Nurses to calculate acuity scores
- Reports not available **on-demand** to clinical units

Vendor 2

Commercial 3rd party system w/no prior business relationship

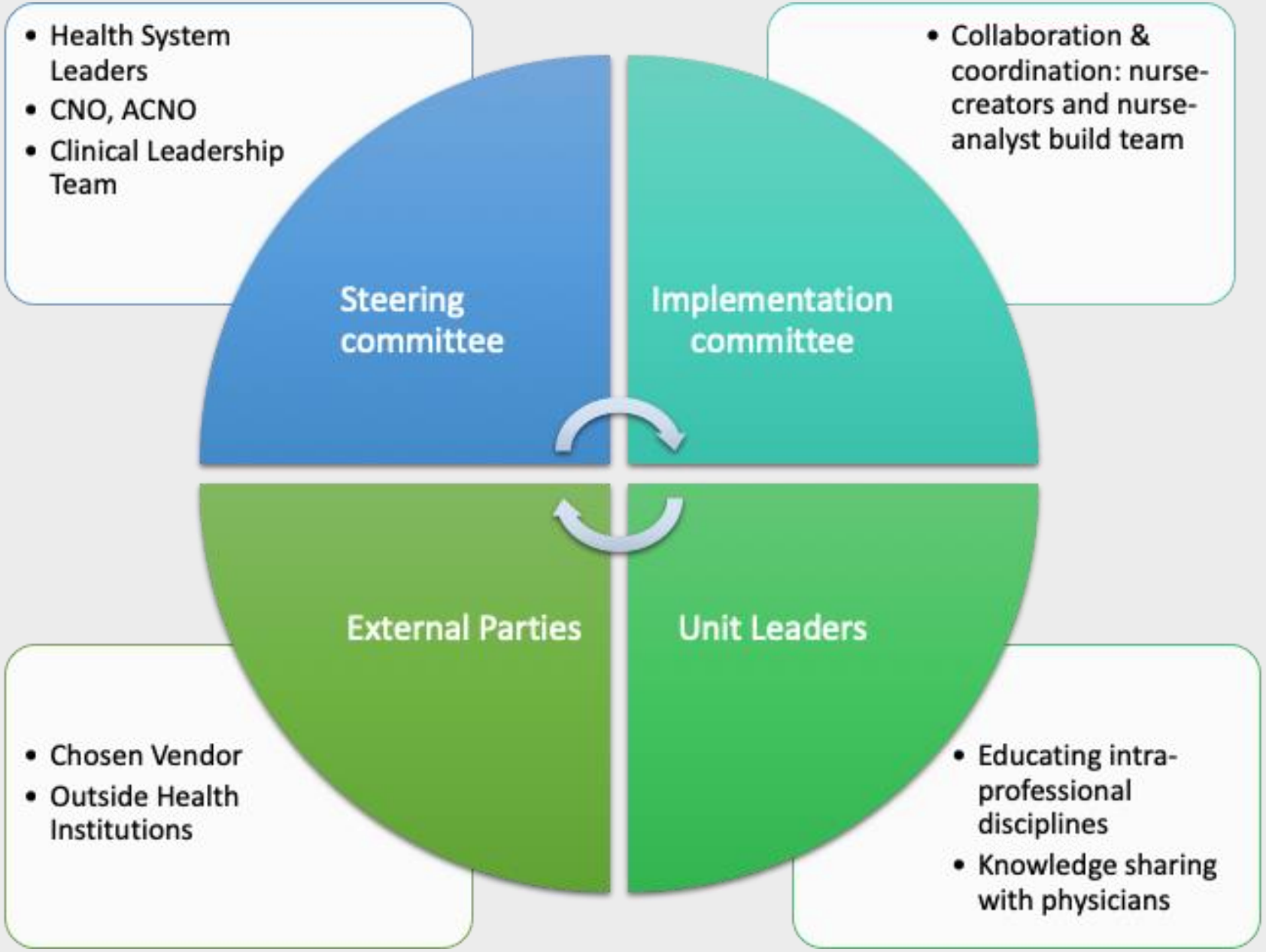
- Was leading contender after initial presentation and staged demo
- Existing site interviews **did not support vendor claims** regarding EHR integration

Vendor 3

- 3rd party system
  - Established vendor for Time & Attendance
- Integration with EHR *promised but **not demonstrated***
- Intervention documentations by clinicians required
- Reports **not available** real time

VENDOR SELECTION PROCESS

COLLABORATION FOR THE EXPEDITION



INFORMATION SERVICES RESOURCE ALLOCATION: PARTNERSHIP FOR THE JOURNEY

- Information Services supported two analysts to work on the build throughout the project
  - Weekly meetings
  - Demo of new build live at each meeting
  - Support for ‘Go Live’
- Support continues as clinical practice and regulatory changes occur

FREQUENT CONTACT WITH VENDOR

- Opportunity to view and give input on future build projects
- Representatives from other Health Care Systems are on the call providing input simultaneously
- Discuss rationale for why we need it done a specific way
- Negotiate enhancement requests & deliverable commitments from software engineers

Clinical Assessment

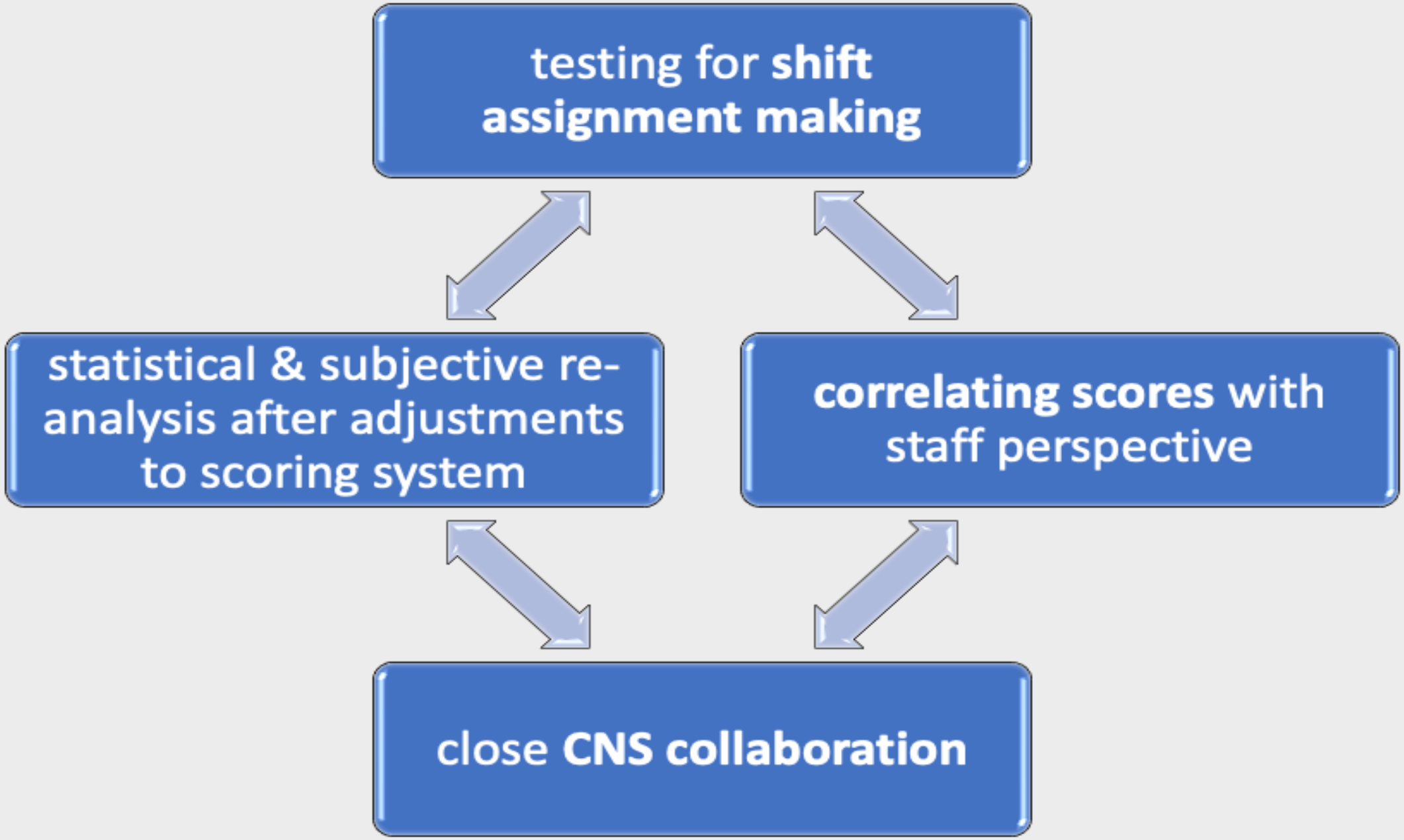
Care Delivery & Documentation

Acuity Score automatically updates

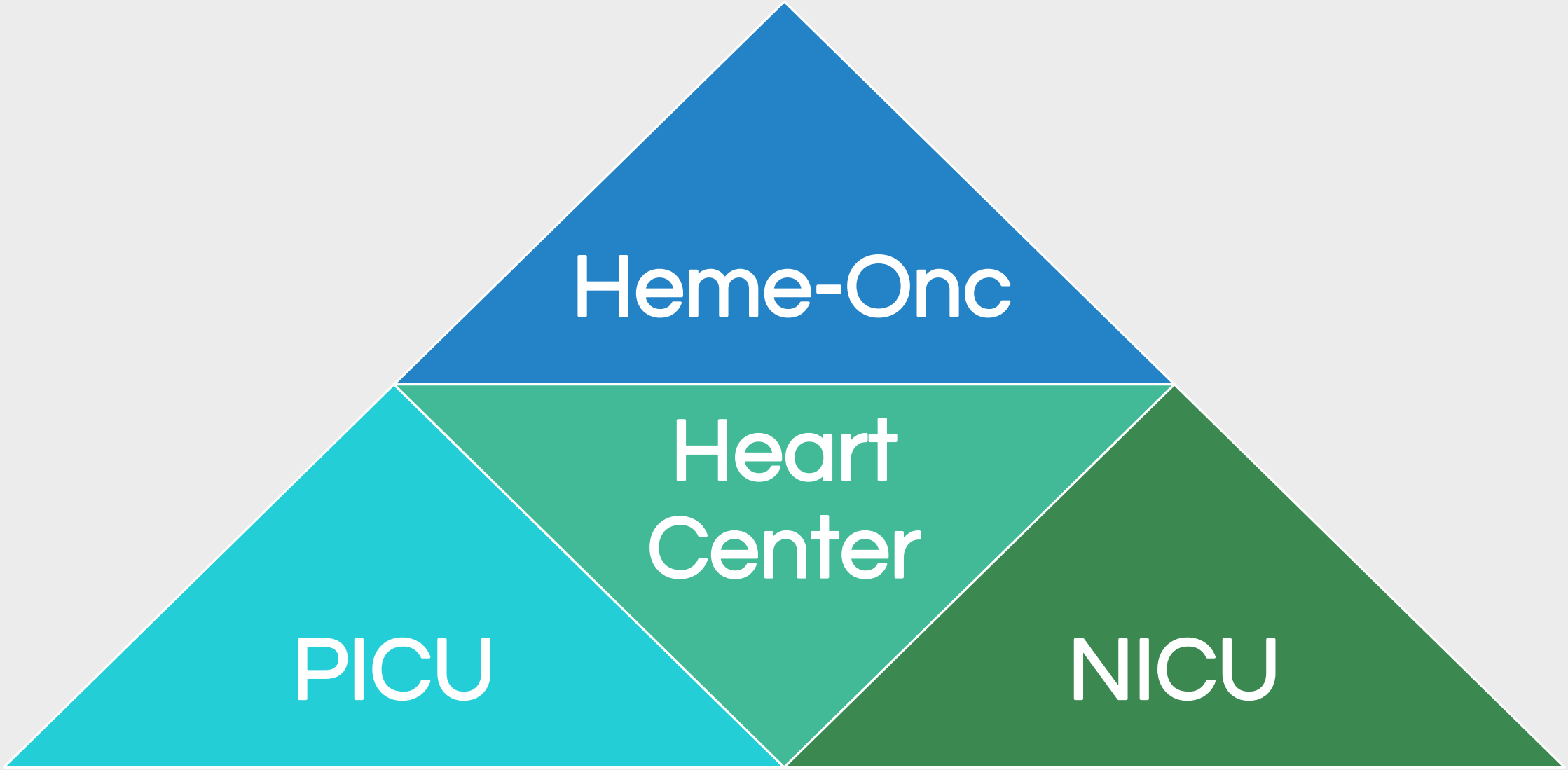
Acuity Score components viewable in EHR

Patient response

MAJOR VALIDATION MECHANISMS



BUILDING FOR SUBSPECIALTY PEDIATRIC POPULATIONS



Patient Workload Acuity Validation Tool: In the Beginning (v1.0)

Patient Workload Acuity Validation Tool v1.0

- Rank order (ex. 1 = busiest, 4 = least busy) per 4 hour block
- Use each number only once per column

Hannah

Patient Sticker	0700-1100	1100-1500	1500-1900
A	1	2	1
B	3	4	3
C	2	1	2
D	4	3	4

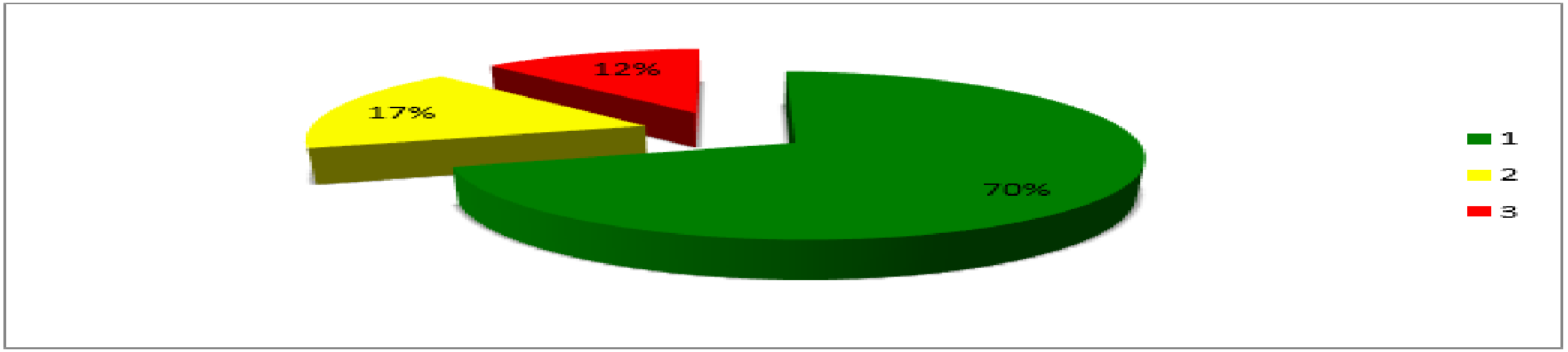
Patient Sticker	0700-1100	1100-1500	1500-1900
[redacted]	3	1	3
[redacted]	4	2	1
[redacted]	2	3	2
[redacted]	1	4	4

Patient Workload Acuity Validation Tool v2.2

Date		2014.12.02	Day Shift			RN First Name:				RN Home Unit:	D8
Unit		D8				RN LOGIN:		JUSMCA		Evaluator LOGIN:	KARFAL
			900		1100						
Room #	LOS	Patient Sticker	**3 Batch**	7-11 Ranking	**7 Batch**	11-3 Ranking	**11 Batch**	3-7 Ranking	**3 Batch**	Comments	
7			71.26	2	82.51	2					
10			81.50	3	79.00	3					
11			108.75	1	108.75	1					
		D									
		E									
		Total	261.51		270.26		0.00		0.00		

								# of pts
0700-1100	1100-1500	1500-1900	0700-1100	1100-1500	1500-1900	1900-2300		3
2	3	2	61	63	67	67		
1	1	1	99	104	101	99		
3	2	D/C	65	65	62	52		
0700-1100	1100-1500	1500-1900	0700-1100	1100-1500	1500-1900	1900-2300		3
2	2	1	83	80	98	101		
3	3	2	68	62	68	76		
1	1	3	83	87	87	86		
0700-1100	1100-1500	1500-1900	0700-1100	1100-1500	1500-1900	1900-2300		2
1	1	1	148	144	143	143		
2	2	2	95	95	90	94		
0700-1100	1100-1500	1500-1900	0700-1100	1100-1500	1500-1900	1900-2300		3
2	2	3	119	116	113	115		
3	3	1	117	125	118	121		
1	1	2	115	108	110	114		
0700-1100	1100-1500	1500-1900	0700-1100	1100-1500	1500-1900	1900-2300		3
3	2	2	111	112	103	94		
2	3	3	111	107	107	119		
1	1	1	167	166	154	151		
0700-1100	1100-1500	1500-1900	0700-1100	1100-1500	1500-1900	1900-2300		2
1	1	1	148	144	147	151		
2	2	2	105	108	109	112		

			# of patients	# of nurses
Tier 1	21		30	11
Tier 2	8			
Tier 3	4			
Tier 1	28		38	13
Tier 2	7			
Tier 3	4			
Tier 1	25		31	11
Tier 2	3			
Tier 3	5			
			Total charts reviewed	
Over 3 days			99	
Tier 1	74	70%		
Tier 2	18	17%		
Tier 3	13	12%		
Total data points	105			



VALIDATION PROCESS

Pre-Test

Patient Acuity & Patient Care Needs Tool

Post-Test

Ongoing Processes

ACUITY TOOL PRE-TEST/POST TEST FOR CHARGE NURSES: DEMOGRAPHIC DATA COLLECTION

1. I have been making assignments as a charge nurse for:

____ <6 months

____ 6 months - 2 years

____ 2-5 years

____ >5 years

2. I have worked with the current pediatric population on my assigned unit for:

____ <6 months

____ 6 months - 2 years

____ 2-5 years

____ >5 years

ACUITY TOOL PRE-TEST/POST-TEST FOR CHARGE NURSES

3. Which of the following do you consistently take into consideration when making assignments for the oncoming shift? (choose all that apply)

___ # of doses of medications-all routes
___ # of doses of high alert medications
___ Oxygen requirement and mode of delivery
___ Level of Care required (example: total care)
___ Family presence and participation in care
___ Frequency of labs
___ # of lines/tubes
___ Acuity score
___ Special staffing needs (e.g. new Dx, end of life, CPS)
___ Oncoming nurse preference
___ Required competencies
___ Other (please list)

ACUITY TOOL PRE-TEST/POST-TEST FOR CHARGE NURSES

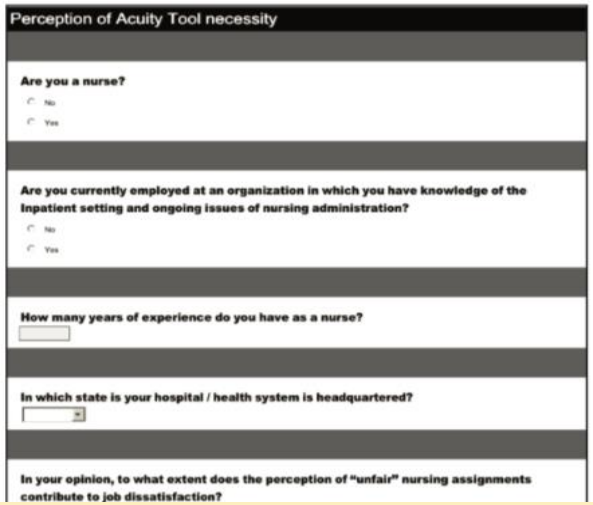
1. How do you adjust your assignment making process for float/pool/resource, traveler vs. core/unit-based RNs?
2. What current barriers do you encounter when making assignments for the oncoming shift members?
3. What about the process of making assignments for oncoming shift members do you find rewarding?

CRITICISMS OF THE VALIDATION PROCESS

- "This patient is taking a lot of nursing time but only scoring 50 Acuity Points." -High Risk Behavior (HRB)
- "This patient is scoring 300 acuity points in the PICU and when they transferred to the General Medicine unit they are only scoring 120 points." -Diabetic Ketoacidosis (DKA)
- "We have always staffed these patient's 1:1 when they require these treatments, why aren't my patient's acuity points higher?"
- "We have to close beds, our acuity is too high and we can't staff to the acuity."

Data, data everywhere

ANIA SURVEY INVITATION


Perception of Acuity Tool necessity

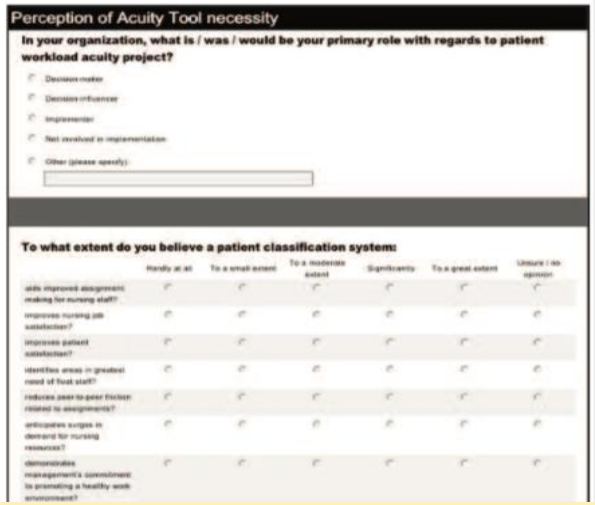
Are you a nurse?

Are you currently employed at an organization in which you have knowledge of the Inpatient setting and ongoing issues of nursing administration?

How many years of experience do you have as a nurse?

In which state is your hospital / health system is headquartered?

In your opinion, to what extent does the perception of "unfair" nursing assignments contribute to job dissatisfaction?


Perception of Acuity Tool necessity

In your organization, what is / was / would be your primary role with regards to patient workload acuity project?

To what extent do you believe a patient classification system:

Dear ANIA Member,

We are conducting a brief survey as part of a research project. Our research question: Do nursing administrators perceive that a patient acuity tool is necessary?

Synonyms for 'patient acuity tool' include 'patient workload acuity,' 'nursing workload acuity,' and 'patient classification system,' among others.

Please take a moment now to take our survey. Depending on your responses, the estimated time to complete is 2-5 minutes. Your responses are anonymous.

Thank you for taking your time to support this research project!

R. Anthony Pearson, RN-BC

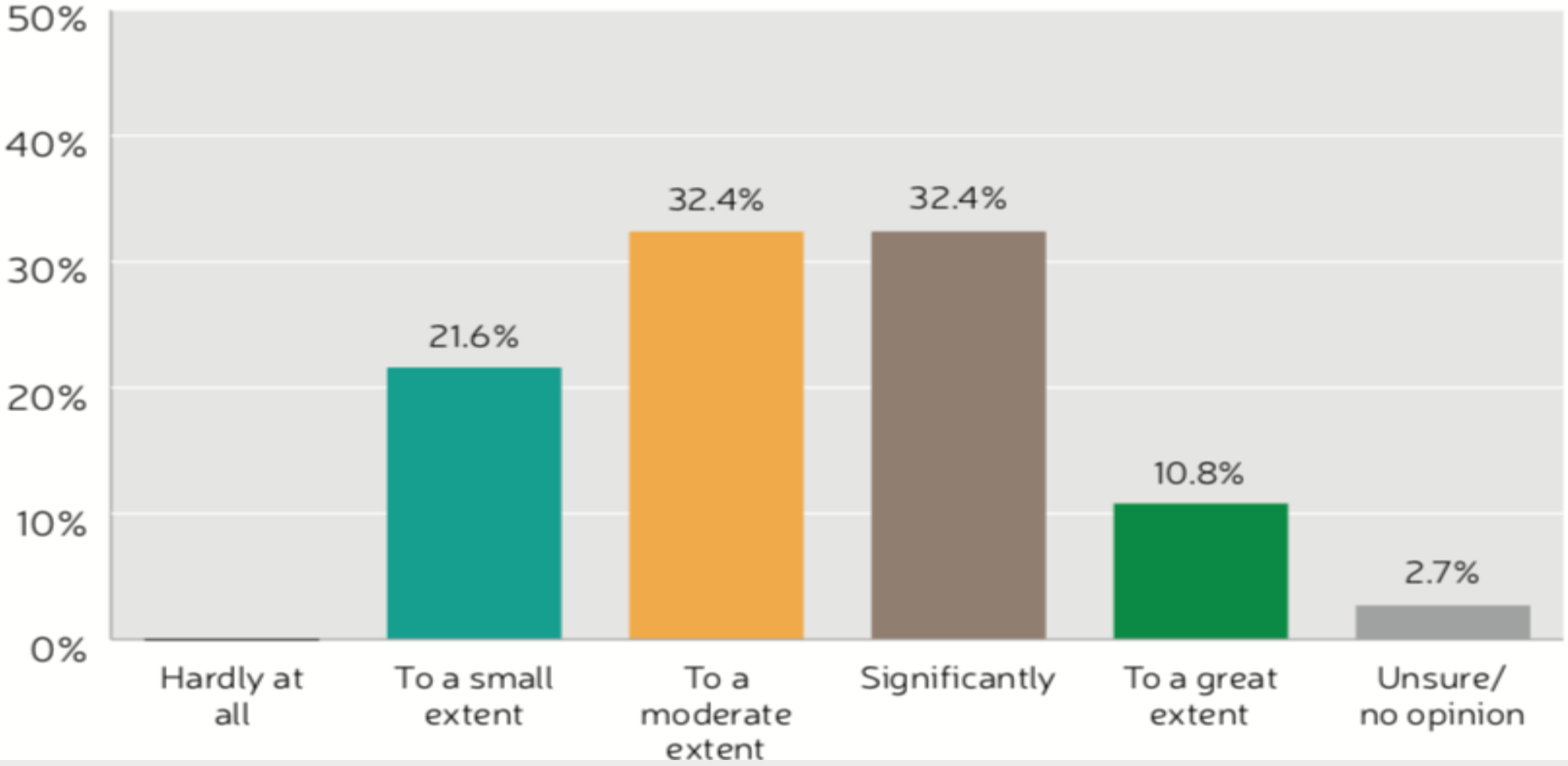
ANIA SURVEY DATA

Descriptive Statistics for Qualified Respondent Demographics

	Mean	Median	Mode	Range
Number of years' experience as nurse	31	31	30	1-50

ANIA SURVEY DATA

Response distribution to "In your opinion, to what extent does the perception of 'unfair' nursing assignments contribute to job dissatisfaction?"



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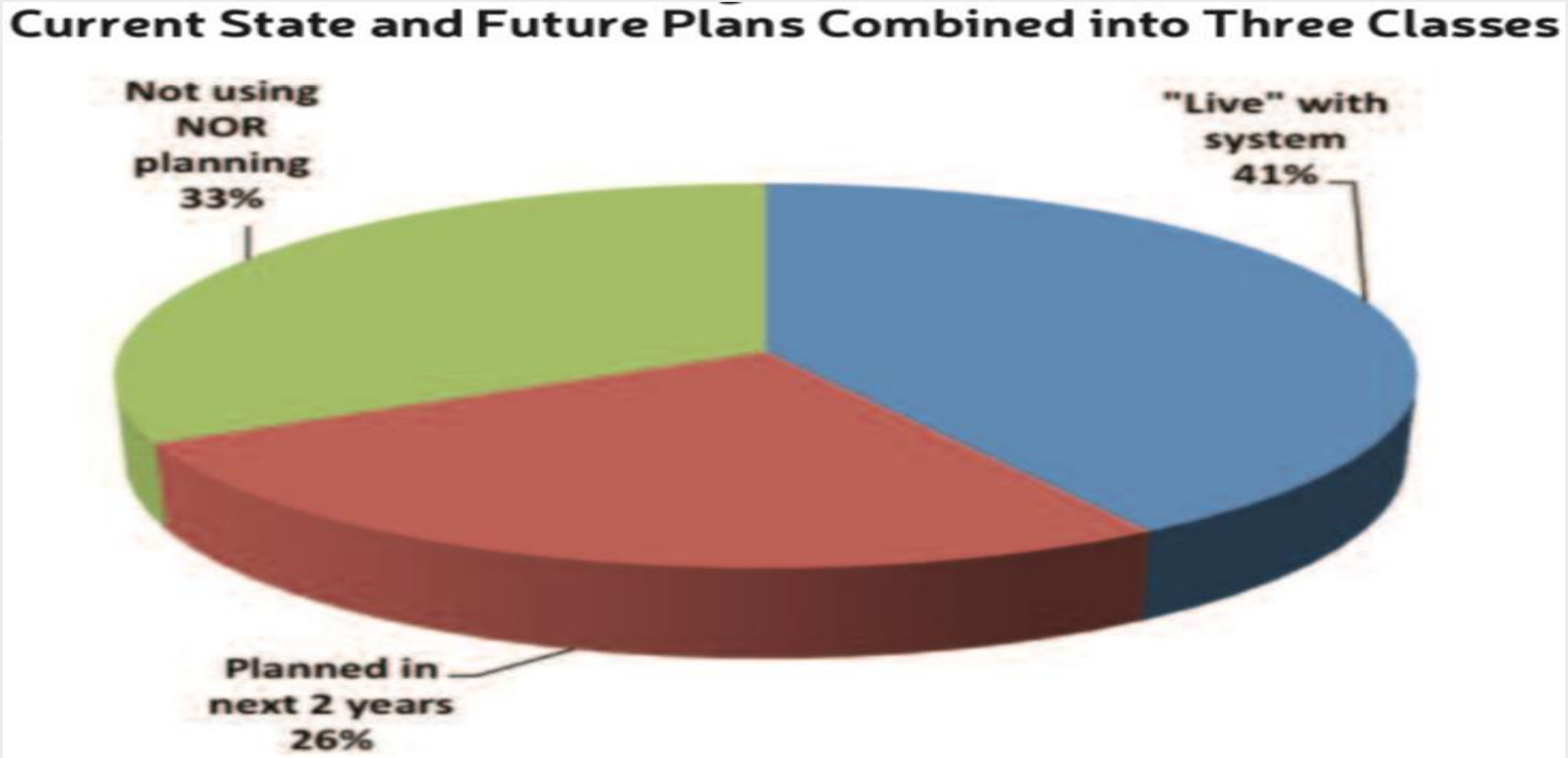
ANIA SURVEY DATA

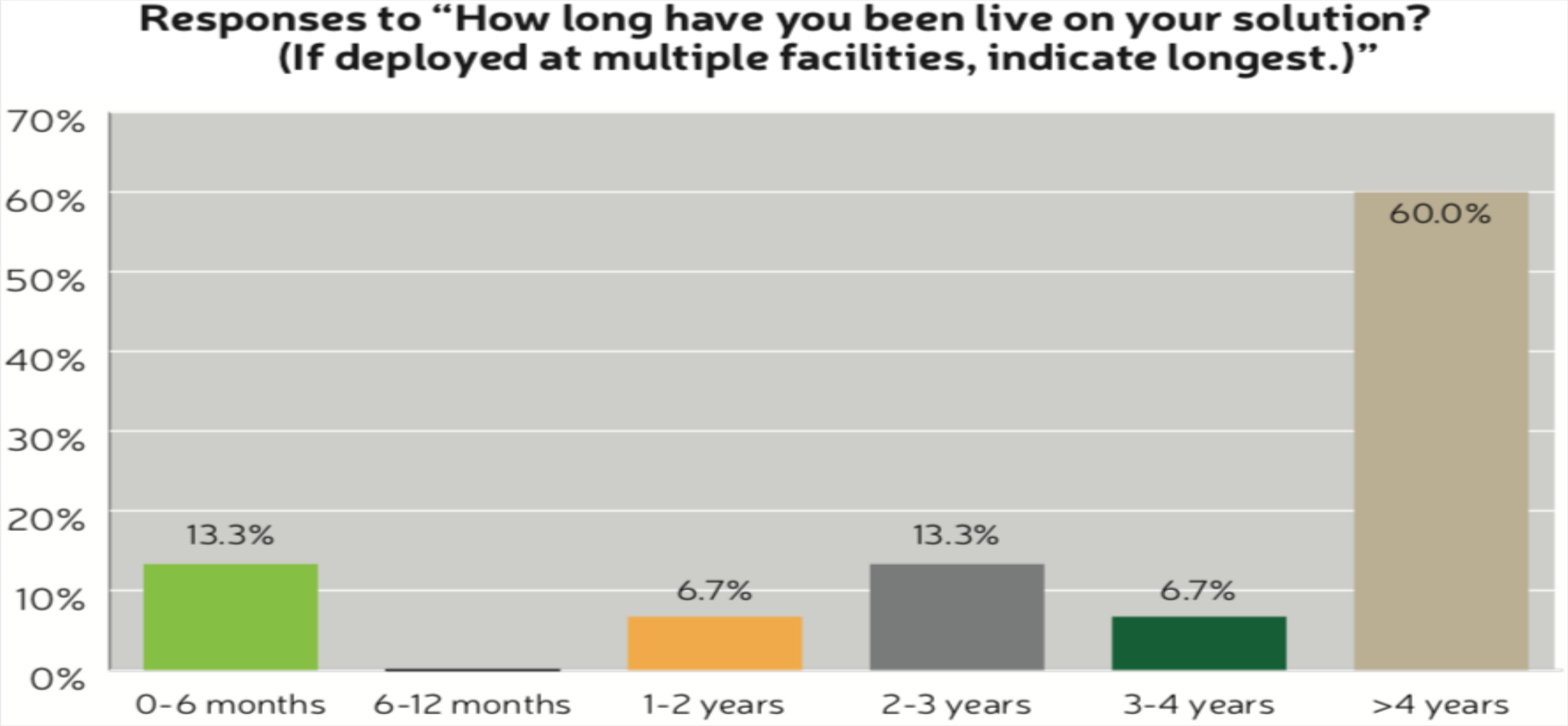
Respondent's Current Deployment State of Acuity Tool System

Response	*N*	% of total responses
I don't know	5	13.5
No, and it's not on our radar	5	13.5
No, but it has been discussed	7	18.9
No, but it's on our roadmap in the next 2 years	1	2.7
No, but we're about to start or we are in the vendor selection process	1	2.7
No, but we've selected a solution / vendor	2	5.4
Yes	16	43.2
	37	99.9

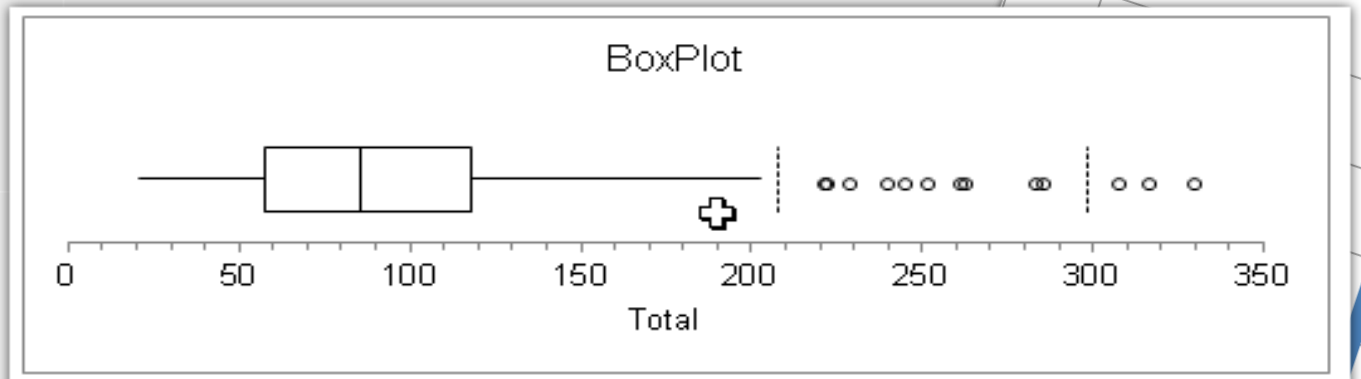
ANIA SURVEY DATA

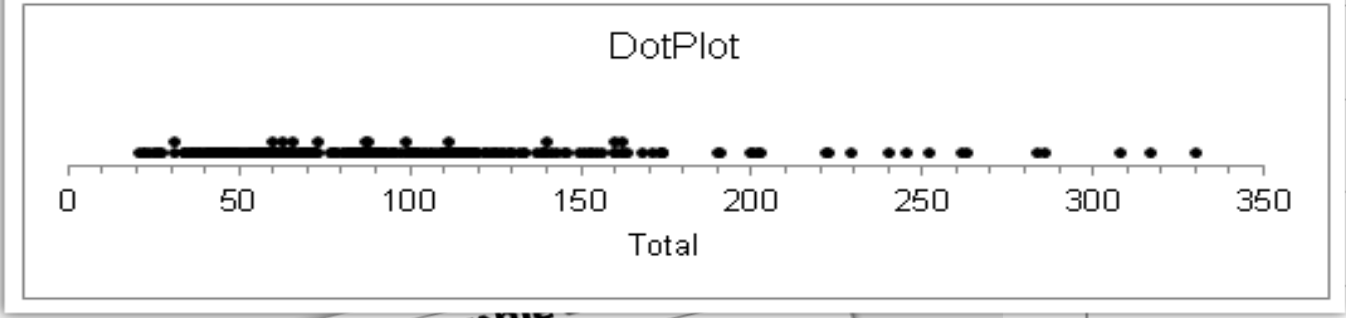


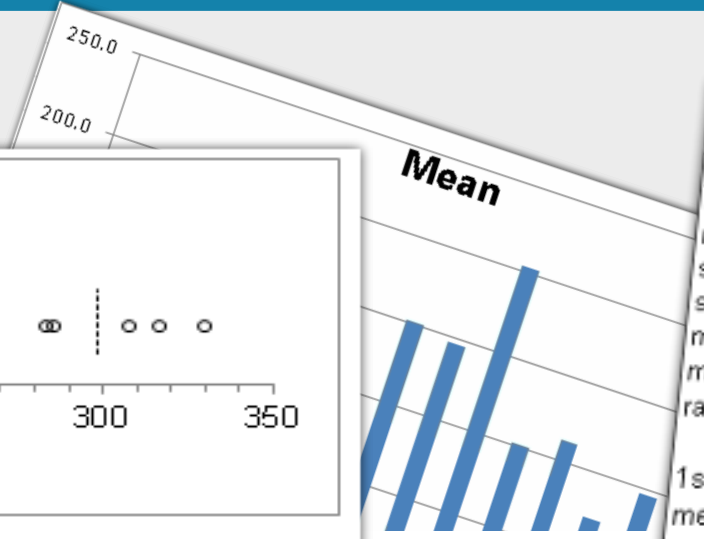
ANIA SURVEY DATA

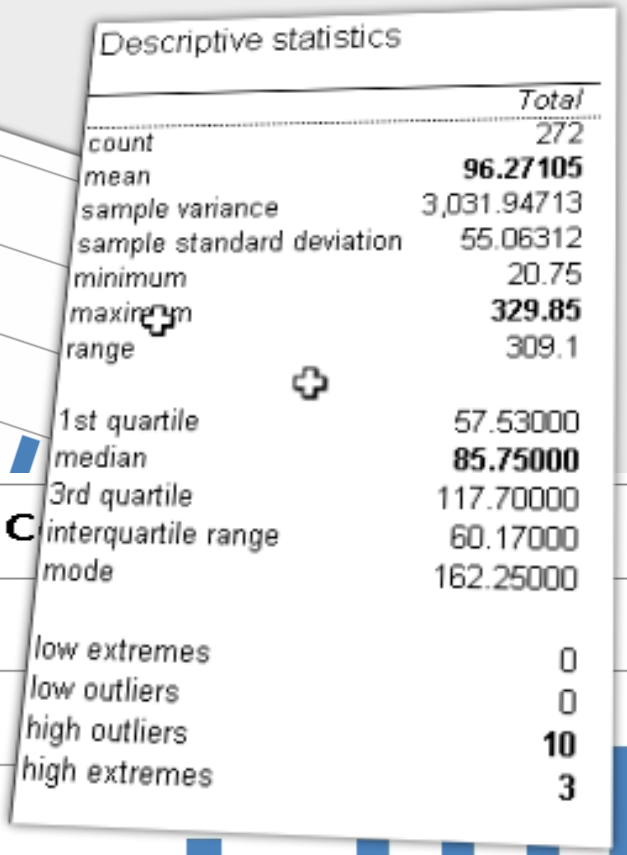


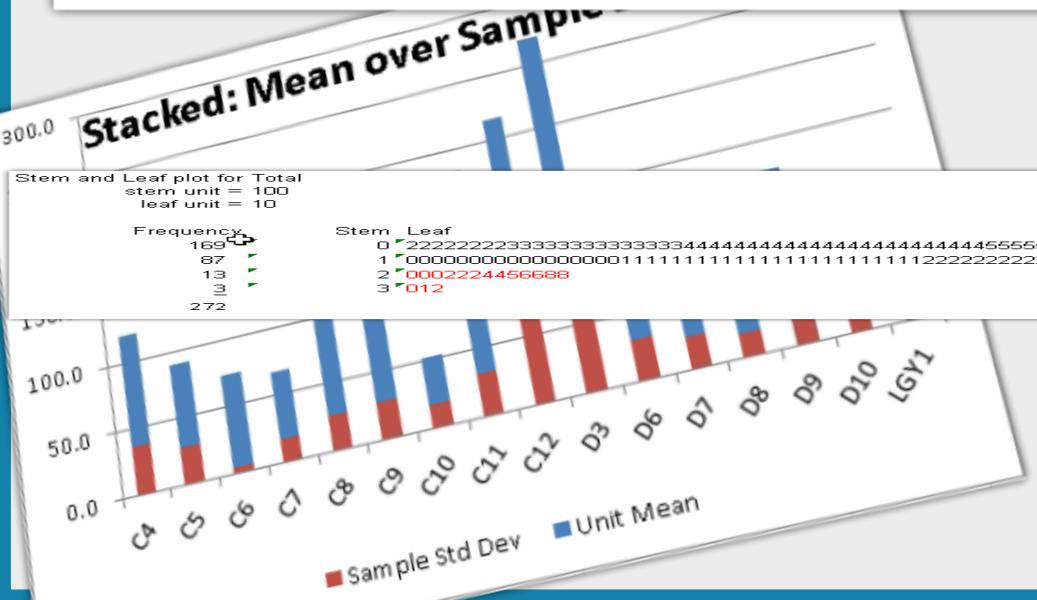
THE BIG LITTLE PICTURE

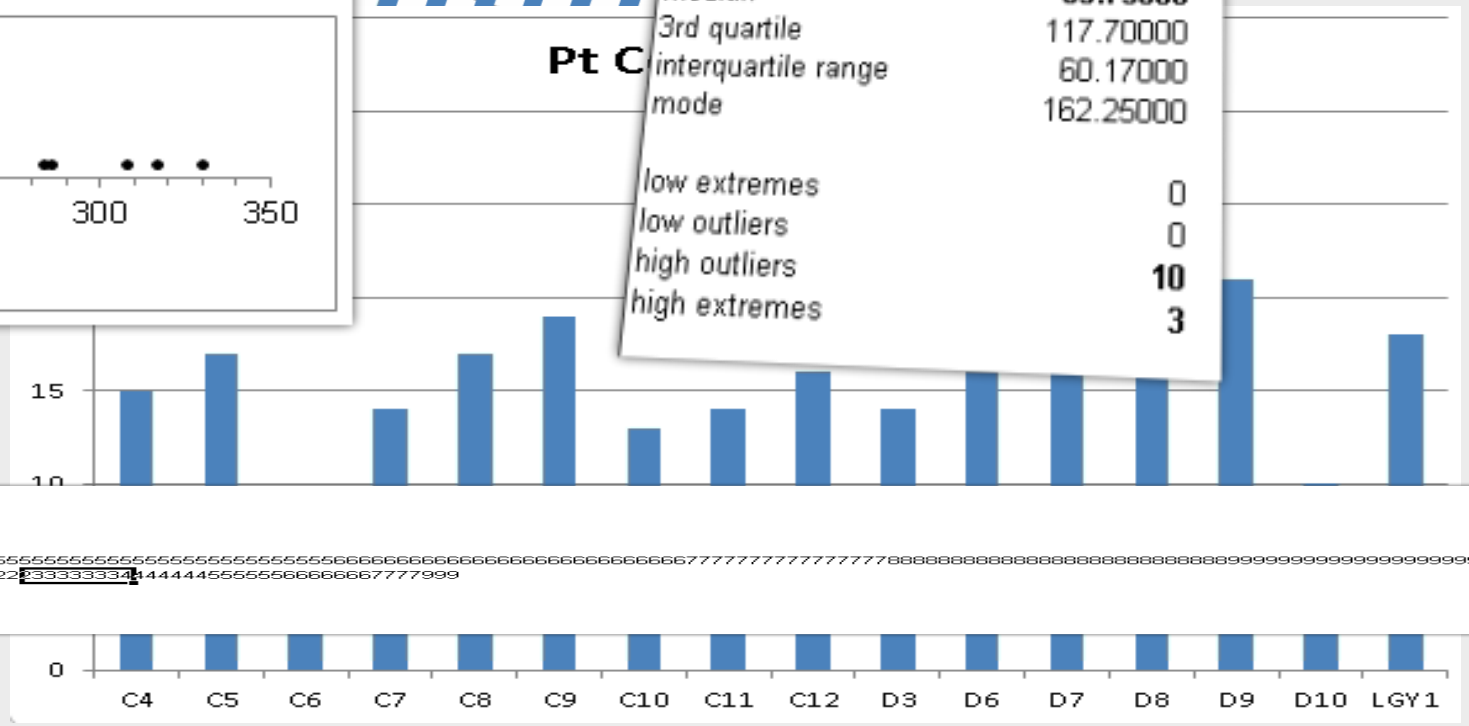






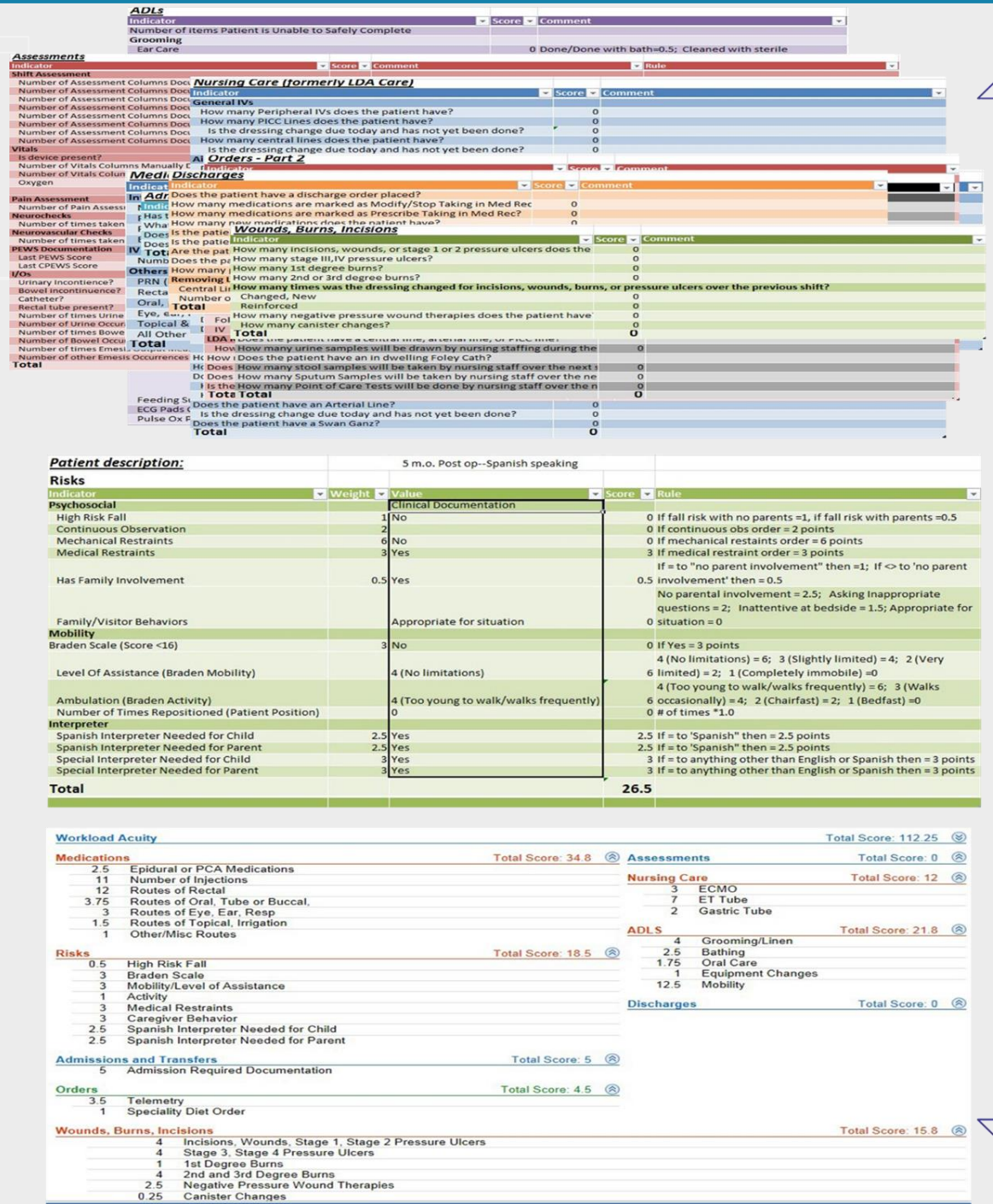






IT ALL STARTS WITH A SPREADSHEET

Patient description:	Enter a description of the patient here.			
Shift Assessment				
Number of WDL Rows Documented	8		2	A count of how many rows WDL rows were document
Vitals				
Number of Vitals Columns Manually Documented	2		0.5	
Number of Vitals Columns Data Validated	2		0.25	
Pain Assessment				
Number of Pain Assessments taken	6		6	
Neurochecks				
Number of times taken			0	
Neurovascular Checks				
Number of times taken			0	
Optical Checks				
Number of times taken			0	
Doppler Checks				
Number of times taken			0	
Other checks				
Number of times taken			0	
I/Os				
Urinary Incontience?			0	Does the patient have urinary incontinence?
Bowel incontinuence?			0	Does the patient have bowel incontinence?
Catheter?	Yes		0	Does the patient have a catheter?
Rectal tube present?	No		0	Does the patient have a rectal tube?
Number of times Urine Output Taken	3		6	
Number of Urine Occurances if not measured above			0	
Number of times Bowel Measured Output taken			0	
Number of Bowel Occurences measured if not not taken above	1		2	
Number of times Emesis Output Measured			0	
Number of other Emesis Occurrences			0	
Total			**16.75**	



Algorithm Detail View EHR view

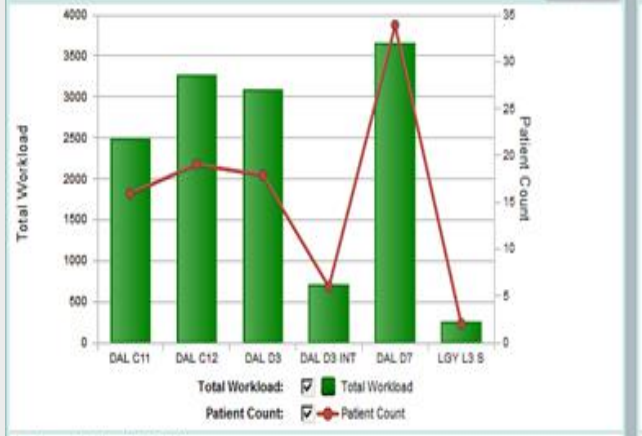
+ Nurses validated 175 scoring factors per patient… to start.

+ Expect that number to grow as specialty areas present their rationale for service line-specific scoring of routine documentation.

+ These measures drive the acuity algorithm.

AT THE FACILITY LEVEL

Nursing Workload by Unit (CCS)



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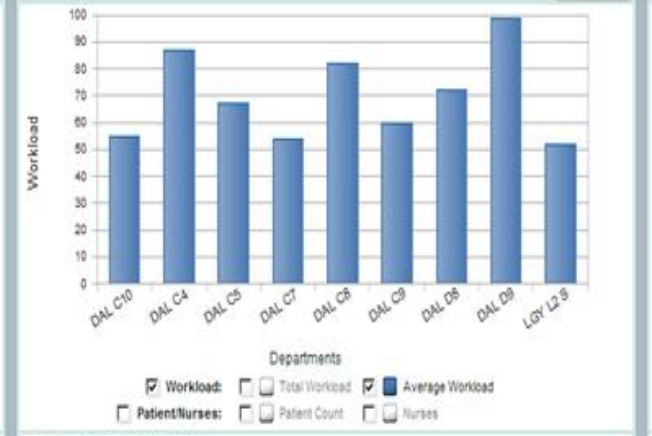
Nursing Workload by Unit (ACS) - Bar Chart



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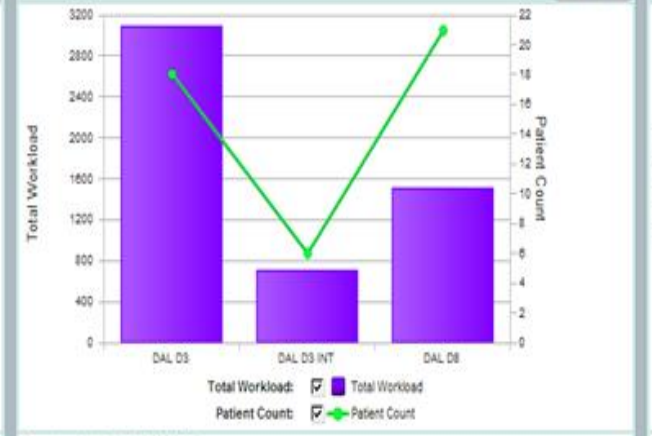
Nursing Workload by Unit (Heart Center)



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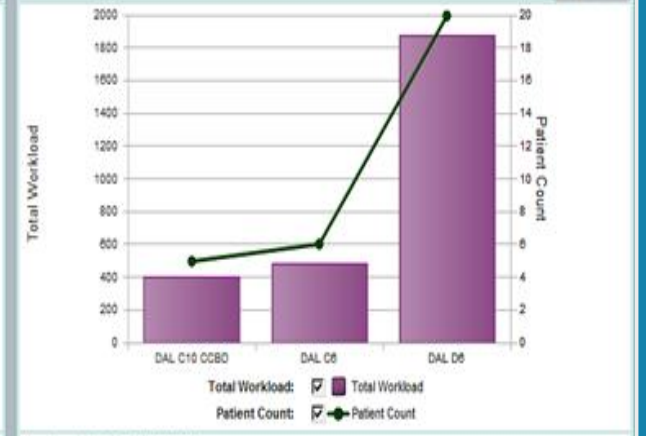
Nursing Workload by Unit (CCBD)



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Occupancy Summary (CCS)

Department	Open Beds	Occupied Beds	Unavailable Beds	Total Beds	Occupied %
DAL C11	6	16	0	22	73%
DAL C12	3	19	0	22	86%
DAL D3	3	18	0	21	86%
DAL D3 INT	7	6	0	13	46%
DAL D7	4	34	0	38	89%
LGY L3 S	10	2	0	12	17%

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Expected Discharges (CCS)

Department	Expected Discharges
DAL D7	1
Total count	1

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Expected Transfers Today (CCS)

Department	Expected Transfers
DAL C11	2
DAL C12	1
DAL D3	1
DAL D3 INT	0
DAL D7	0
LGY L3 S	0
Total count	4

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Average Workload by Unit (ACS)

Occupancy Summary (ACS)

Department	Open Beds	Occupied Beds	Unavailable Beds	Total Beds	Occupied %
DAL C10	7	7	2	16	44%
DAL C4	12	12	0	24	50%
DAL C5	6	17	1	24	71%
DAL C7	4	18	0	22	82%
DAL C9	4	18	0	22	82%
DAL D10	2	20	4	26	77%
DAL D8	2	21	1	24	88%
DAL D9	3	23	0	25	92%
LGY L2 S	1	11	0	12	92%

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Expected Discharges Today (ACS)

Department	Expected Discharges
DAL C4	2
DAL C5	3
DAL C7	3
DAL C8	1
DAL C9	1
DAL D8	1
Total count	11

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Expected Transfers Today (ACS)

Occupancy Summary (Heart Center)

Department	Open Beds	Occupied Beds	Unavailable Beds	Total Beds	Occupied %
DAL D3	3	18	0	21	86%
DAL D3 INT	7	6	0	13	46%
DAL D8	2	21	1	24	88%

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Expected Discharges (Heart Center)

Department	Expected Discharges
DAL D8	1
Total count	1

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Expected Transfers Today (Heart Center)

Department	Expected Transfers
DAL D3	1
DAL D3 INT	0
DAL D8	1
Total count	2

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Occupancy Summary (CCBD)

Department	Open Beds	Occupied Beds	Unavailable Beds	Total Beds	Occupied %
DAL C10 CCBD	1	5	0	6	83%
DAL C6	2	6	0	8	75%
DAL D6	3	20	1	24	83%

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Expected Discharges (CCBD)

Department	Expected Discharges
DAL C6	1
DAL D6	1
Total count	2

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Expected Transfers Today (CCBD)

Department	Expected Transfers
DAL C10 CCBD	0
DAL C6	0
DAL D6	0
Total count	0

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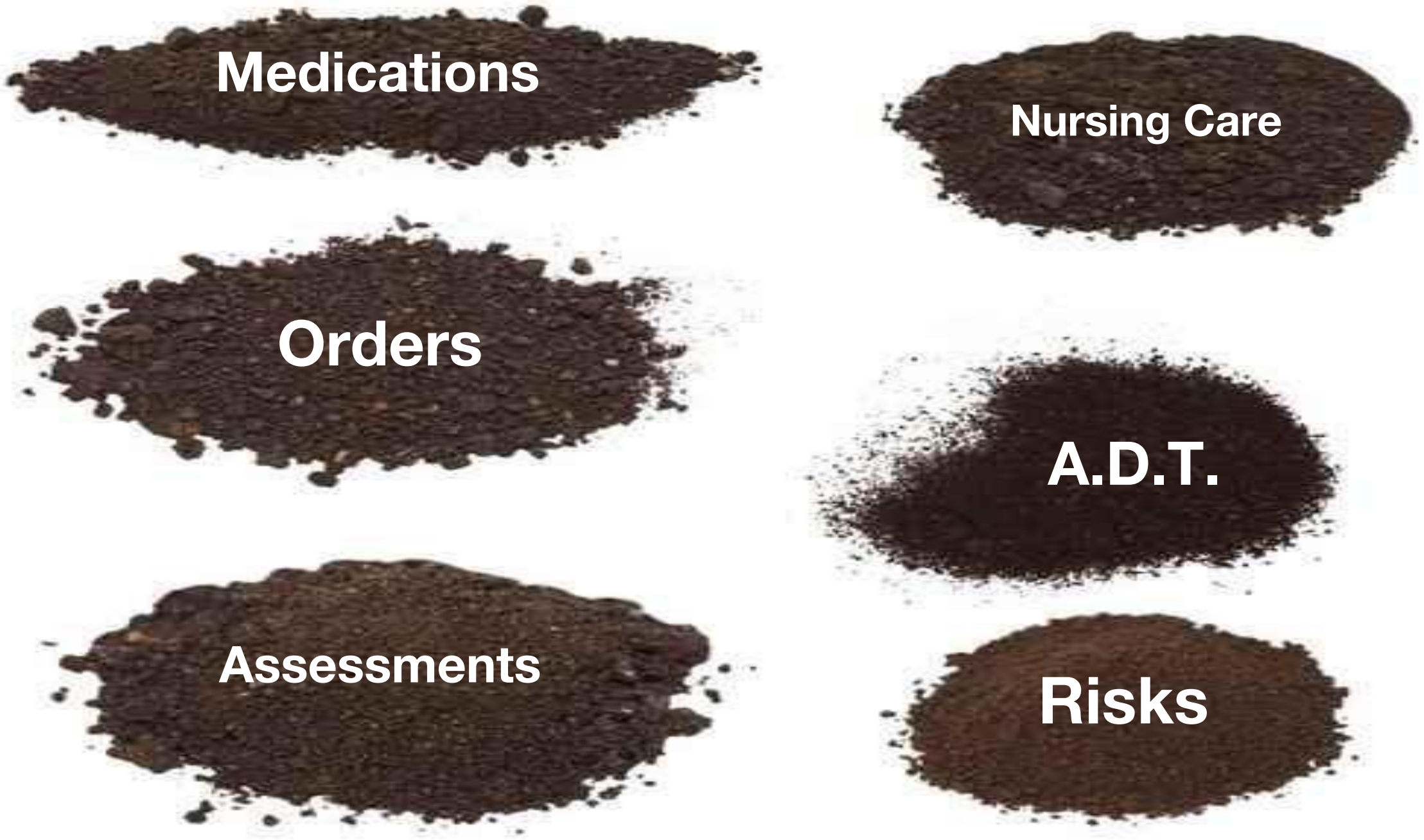
HOW MIGHT ONE “BUCKET” A SCORING SCHEMA?


Medications
Nursing Care
Orders
A.D.T.
Assessments
Risks

AT THE PATIENT LEVEL

Medications — Total Score: 27.3

4	Infusions - New Bags
2.5	Epidural or PCA Medications
17	Number of Injections
3.75	PRN Medications

Orders — Total Score: 10.5

2	DME Orders
4	Type and screen order
3.5	Cardio-Respiratory/Telemetry
1	Speciality Diet Order

Assessments — Total Score: 36.5

13.25	Assessments Documented
6.25	Vitals Documented
3.5	Pain Documented
1.5	PEWS
12	I/O Urine

Nursing Care — Total Score: 49.5

1	Peripheral IV
19	IV Assessments
2	Gastric Tube
0.5	Gastric Tube Connected to Suction
6	Gastric Output Volume
5	Gastric Tube Placement Verification
2	GI Ostomy
6	LDA - Stool Output Volume
8	Wound

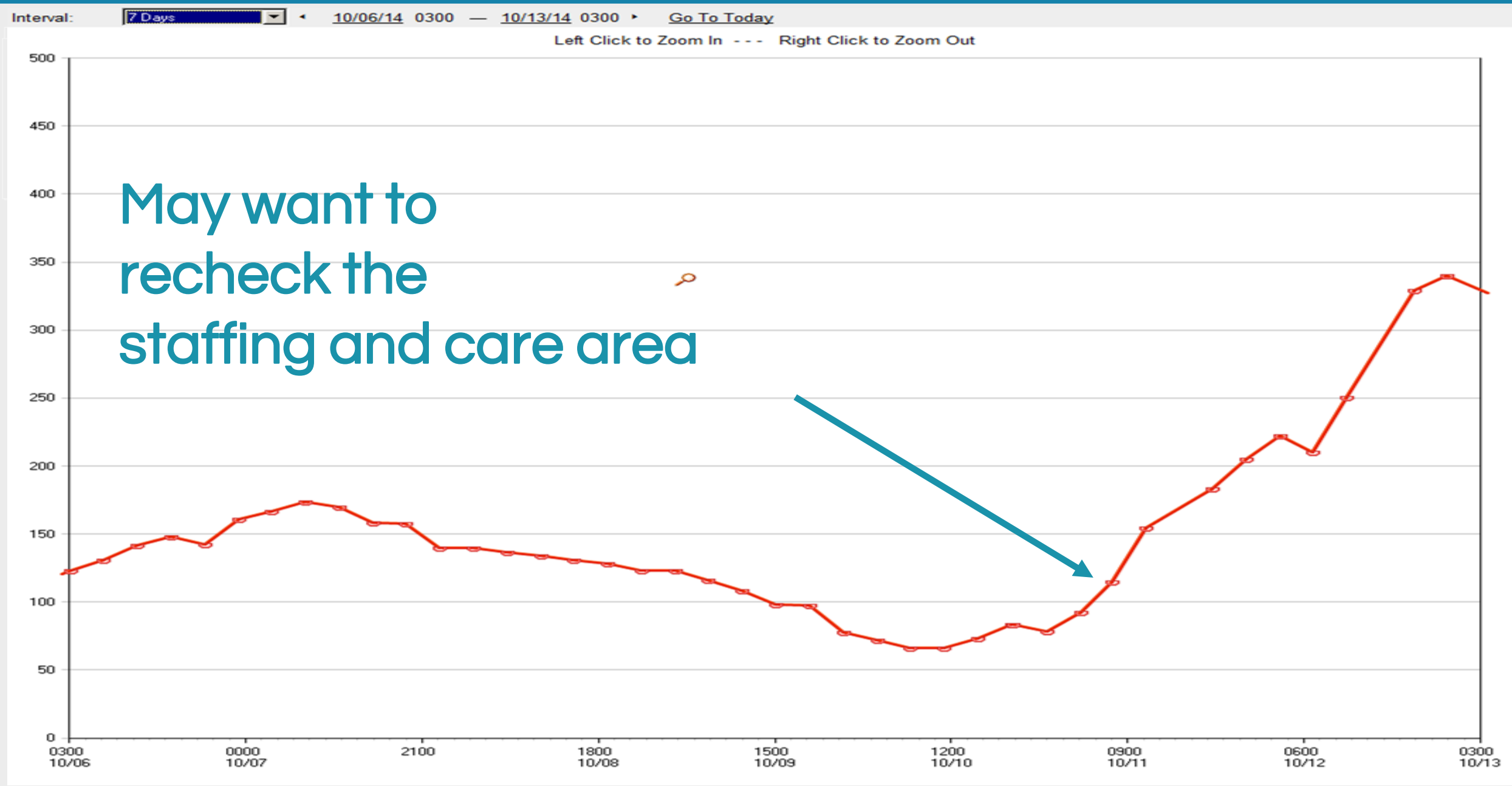
Admission/Transfer/Discharge — Total Score: 0.3

0.3	Admission Required Documentation

Risks — Total Score: 4

2	Mobility
2	Activity

Workload Acuity — Total Score: 129.05


Interval:
7 Days
10/06/14 0300 — 10/13/14 0300
Go To Today
Left Click to Zoom In - - - Right Click to Zoom Out
500
450
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300
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0300 10/06
0000 10/07
2100
1800 10/08
1500 10/09
1200 10/10
0900 10/11
0600 10/12
0300 10/13
May want to recheck the staffing and care area

AT THE NURSE LEVEL

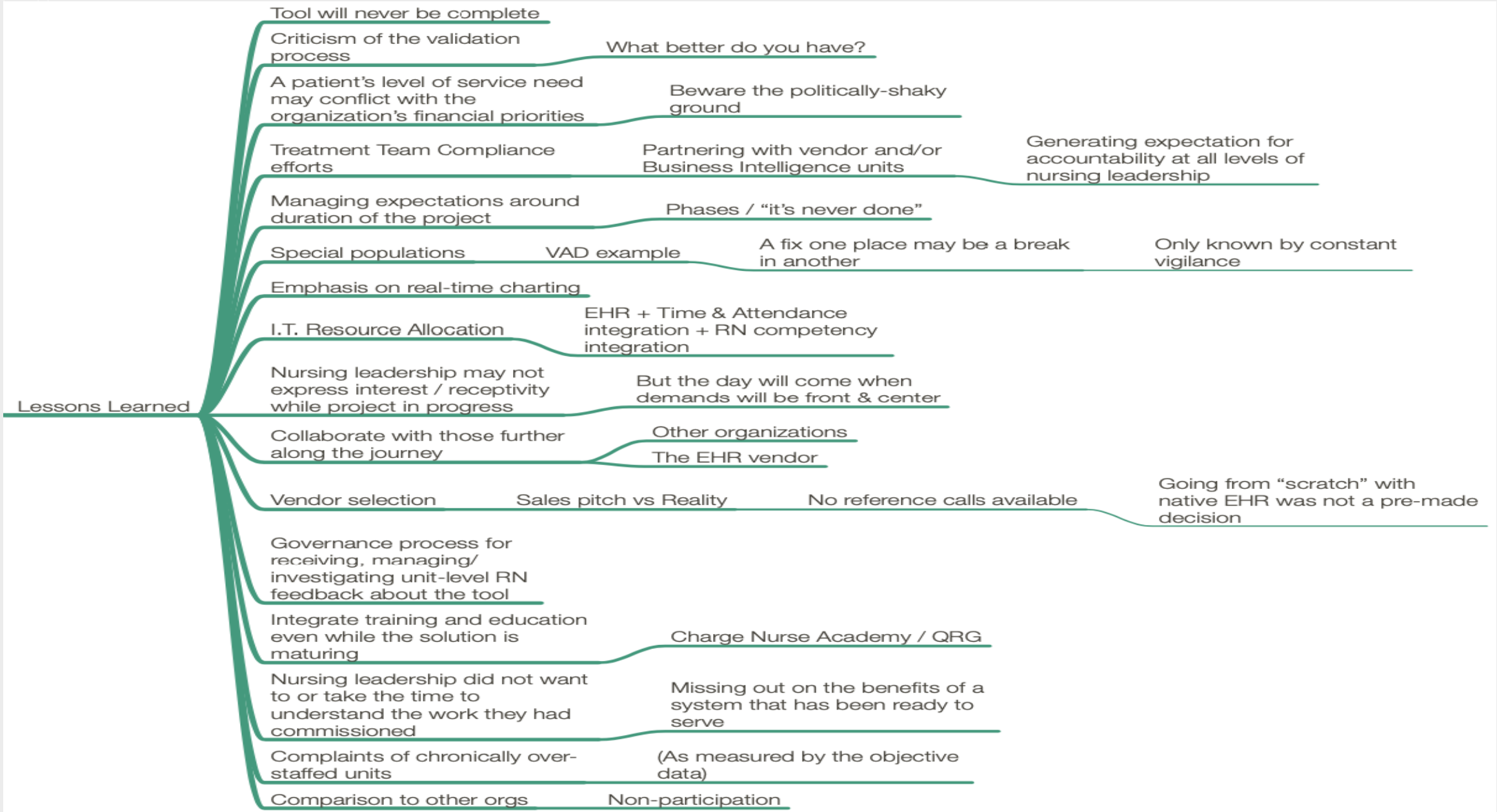
AT THE UNIT LEVEL

Department	Total Workload	Patient Count	Nurses	Average Workload
DAL C5	1,051.14	15	9	70
RN	85.05	1	1	85
RN	126.75	2	1	63
RN	107.75	1	1	108
RN	43.75	1	1	44
RN	58.80	1	1	59
RN	209.54	3	1	70
RN	68.25	1	1	68
RN	133.75	2	1	67
RN	82.25	1	1	82

THE GREATER GOOD: IN SUMMARY

- ➔ Alignment with Organizational Priorities
- ➔ Multiple research article opportunities
- ➔ Contribute to the body of nursing science
- ➔ Magnet journey: source of data
- ➔ Become recognized as a “resource site”

LESSONS LEARNED



KEY LESSONS LEARNED

1. A multi-year **EXPEDITION**
2. “Beware The Vaporware”: insist on **100%** live
3. “**Apples to Apples**” matching
4. Direct care staff **involvement from the beginning**
5. **Collect data** in the background before opening to all
6. Supporters today may be detractors tomorrow (and *vice versa*)
7. Communicate benefits of **real-time charting**
8. Document your journey **as you go**

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LEARNING OBJECTIVES - REVISITED

1. Describe strategies and considerations for how an inpatient facility of any size may approach choosing an electronic acuity solution to fit with organizational needs, whether it is the first such system or a replacement for an existing paper, electronic, or hybrid tool.
2. Using one health system's multi-year journey as a case study, describe the challenges in developing, deploying, and displaying an objective tool to accurately measure the variety and frequency of inpatient nursing care of patients.
3. Describe how all-nurse design, build, validation, implementation, and sustainability teams organized and conducted themselves to govern and execute a new program
4. Communicate lessons learned and practical takeaways to mitigate the risks of unanticipated complications associated with any electronic acuity tool deployment.
5. Facilitate peer-to-peer professional nursing knowledge-sharing discussion to enhance awareness and stimulate critical thinking on alternate approaches to acuity systems.

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