



LEGACY
HEALTH

Pre-Analytic Tracking of Endoscopy Specimens with RFID

EMANUEL Medical Center

GOOD SAMARITAN Medical Center

MERIDIAN PARK Medical Center

MOUNT HOOD Medical Center

SALMON CREEK Medical Center

RANDALL CHILDREN'S HOSPITAL Legacy Emanuel

LEGACY MEDICAL GROUP

LEGACY LABORATORY

LEGACY RESEARCH

LEGACY HOSPICE

The Legacy RFID Team:

- Bryan Desimone, MT(ASCP)
 - > Senior System Analyst
- Dani Sensenig, HT(ASCP)
 - > Anatomic Pathology Supervisor
- Andréa Stacy, HT(ASCP)
 - > Anatomic Pathology Manager
- Kevin Verdon, MT(ASCP)
 - > Senior Technical Analyst

Legacy Health – Legacy Laboratory Services

Respect, Service, Quality, Excellence, Responsibility, Innovation, Leadership



- Multi-facility healthcare system servicing Southwest Washington and Oregon
- 8 Hospitals
- Legacy Hospice
- Legacy Medical Group
- Legacy Research
- Legacy Laboratory Services
 - > Over 5 million specimens processed per year

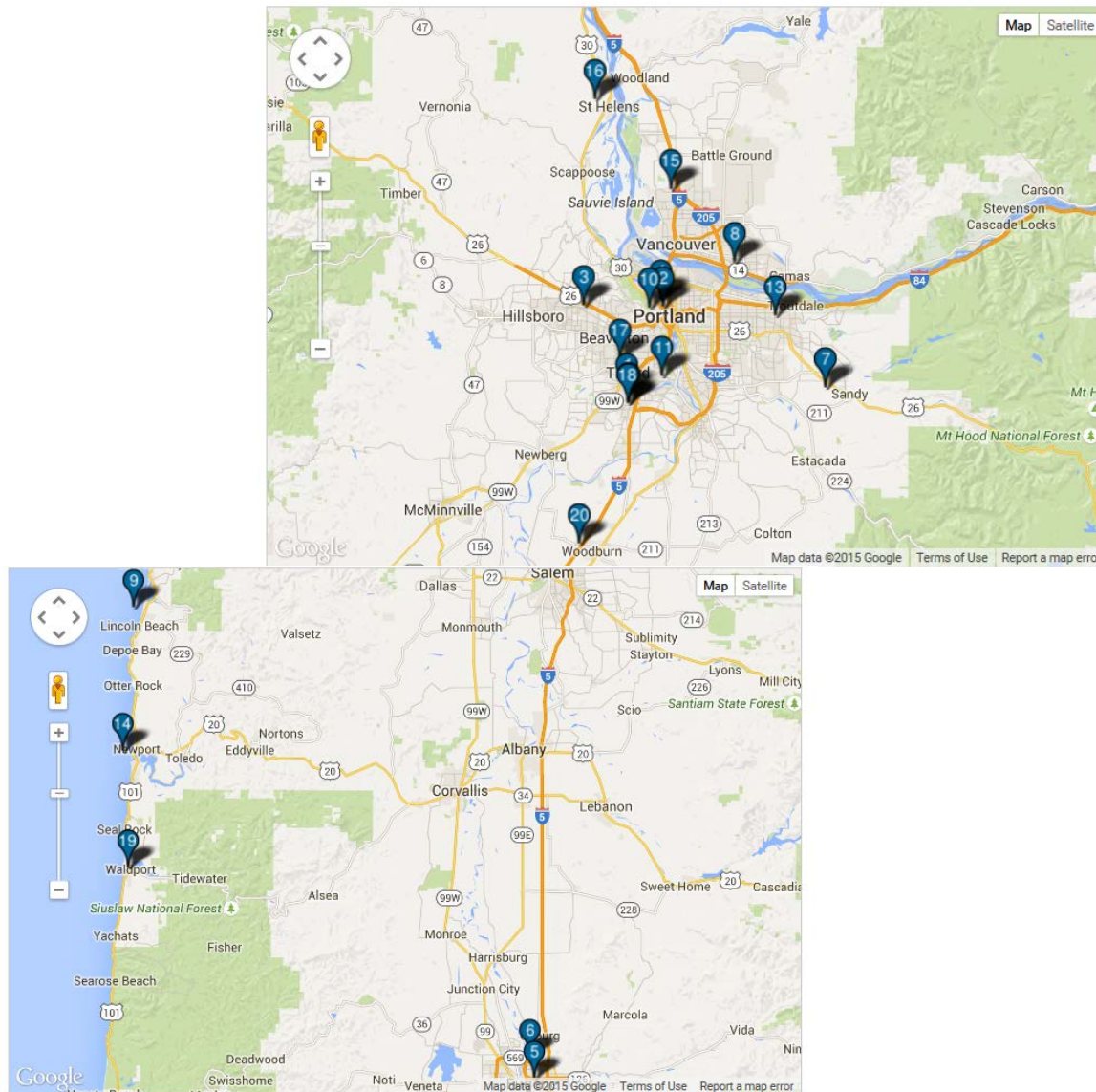
Legacy Laboratory Services

Innovative, Dedicated, Integrated, Preferred



- 20 laboratories and patient service centers combined
- 5 million tests per year overall
- >50,000 pathology cases per year
- Over 640 staff members
- CAP, CLIA, ISO 15189 accreditation

Legacy Laboratory Locations



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What is RFID?



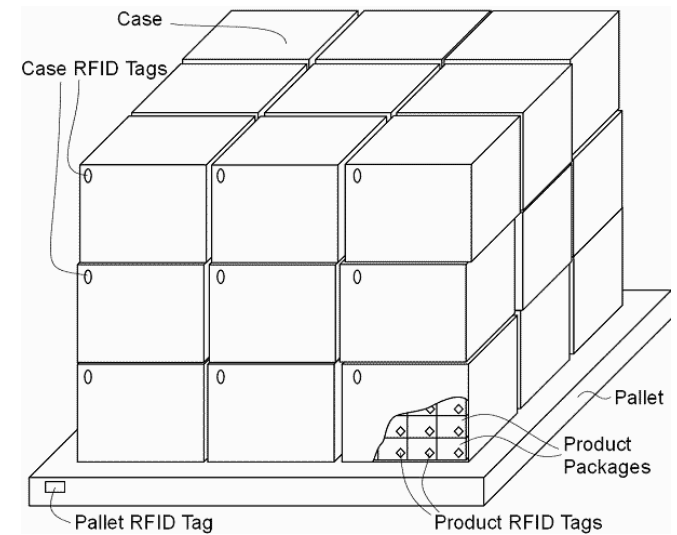
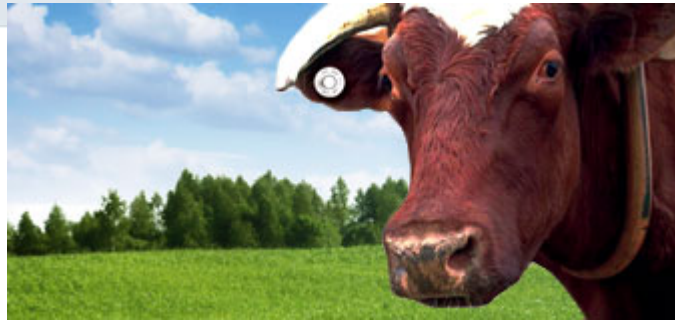
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What is RFID?

- Radio Frequency Identification
- Technology that uses radio waves to automatically detect objects
- Active RFID
 - > Used more in real-time location (RTLS) systems and large assets like beds, infusion pumps, etc.
 - > Uses a battery-powered tag
- **Passive RFID**
 - > Works by storing a unique serial number on a RFID tag (label), which consists of a microchip and antenna embedded inside the tag.
 - > The RFID reader sends out an electromagnetic signal, which energizes the chip in the tag, which then uses the antenna to transmit the serial number back to the reader.
 - > The serial number is assigned at the time of tag printing.



Where is RFID used?



Our legacy is yours.



RFID Components

- RFID Label/Tag
- RFID Printer
- RFID Reader
 - > Perch
 - > Pad



RFID Labels (Tags)

Label/Tag (front side)



Dog Bone

- We chose the dog bone because it performed the best in our environment.



"Puppy" Dog Bone



X-Wing



Bullet



RFID Printer

- Zebra ZD500R



RFID Pad Reader

- Odin Check It Pad

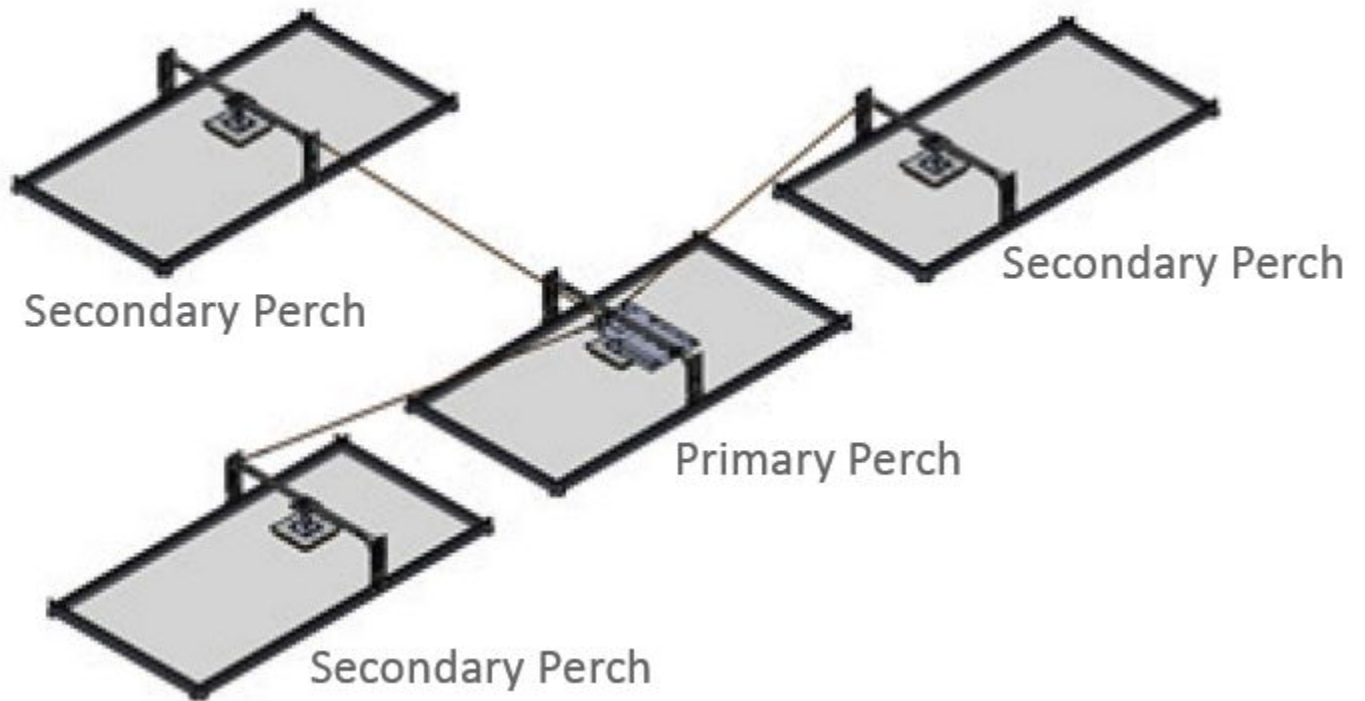


Perch



RFID Perch

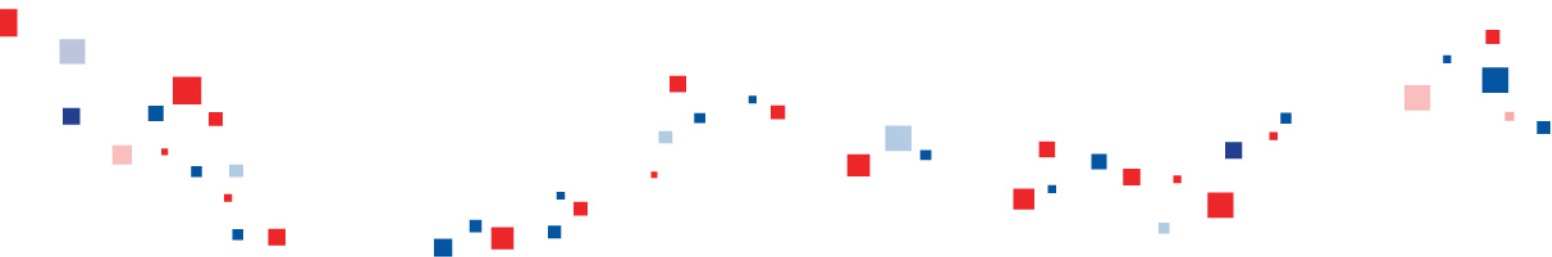
- Odin Perch



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RFID Pre-Planning



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Why Endoscopy Specimens?

- Consistent and manageable quantity of specimens
 - > 5-10 specimens per day
- Proximity to the Pathology Department
 - > Endoscopy is directly above the Pathology Department
 - > A single, simple courier route
- Immediate buy-in from Endoscopy management and staff



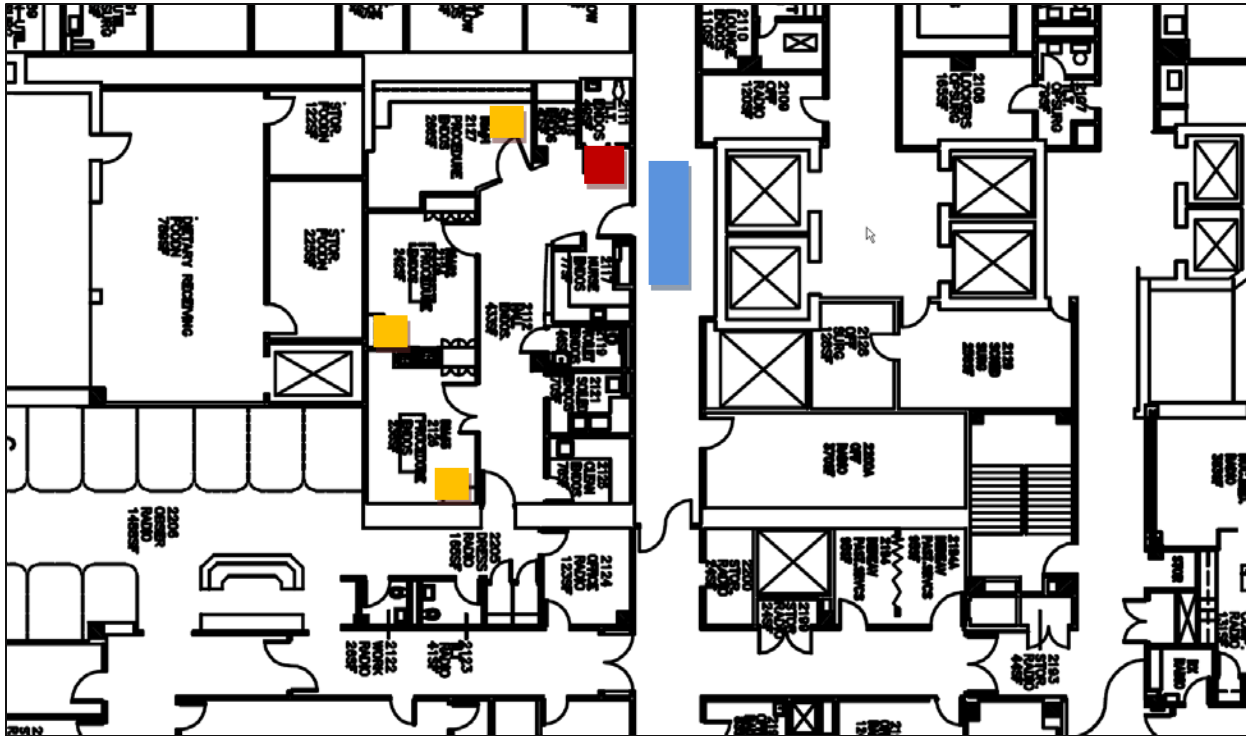
Background Test

- Ambient Electromagnetic Noise Test
 - > Check for possible radio frequency interference from other systems




Hardware Placement

- 2nd Floor, Endoscopy
 - > Perch placement with ceiling obstructions (pipes, drains, conduits, ventilation)



Legend

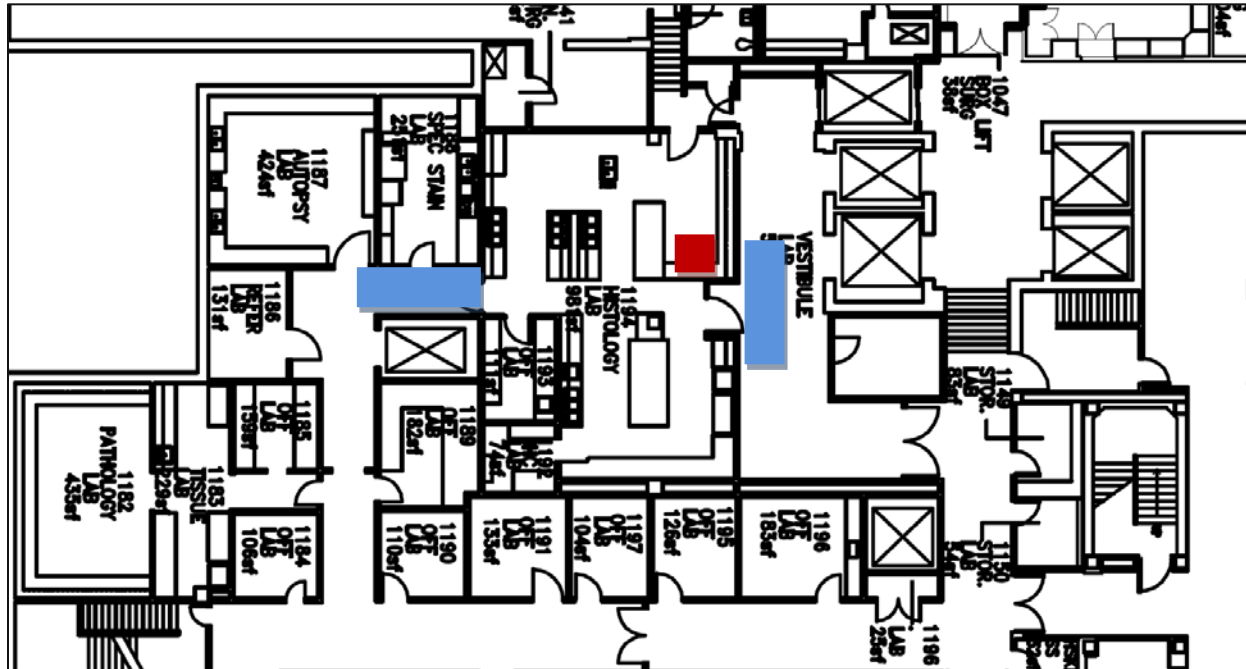
 = Perch

 = Pad


 = Printer

Hardware Placement

- 1st Floor, Pathology

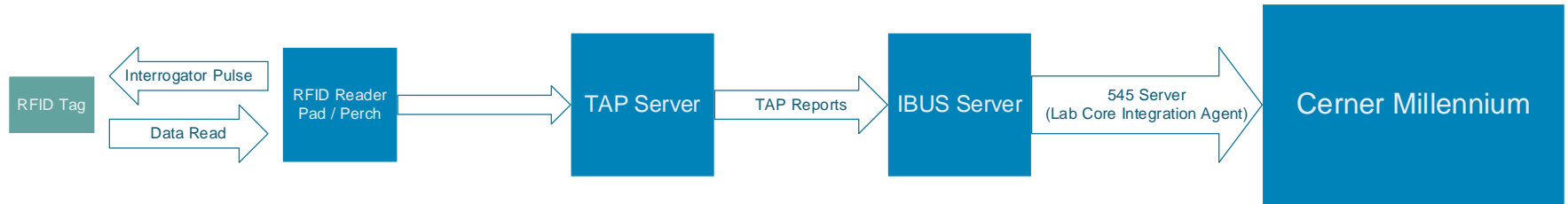


Legend

 = Perch

 = Pad

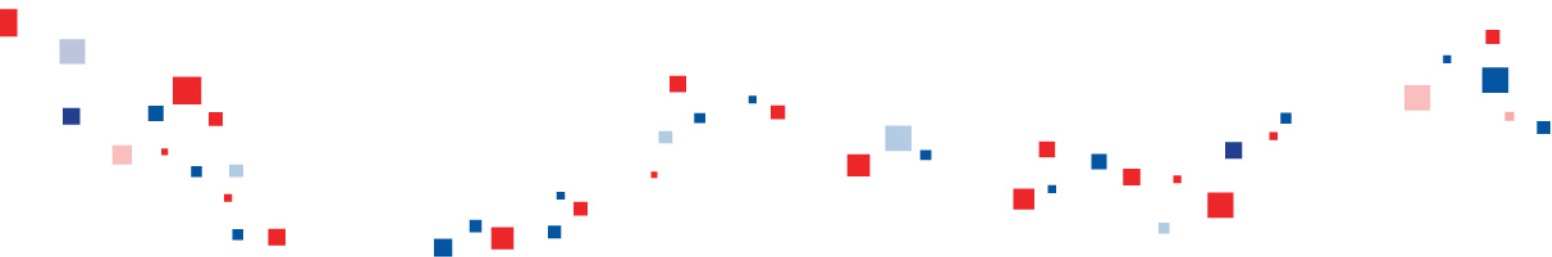
Data Flow Diagram



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Why RFID?



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Chris the Sheep



Why Implement RFID in Pathology?

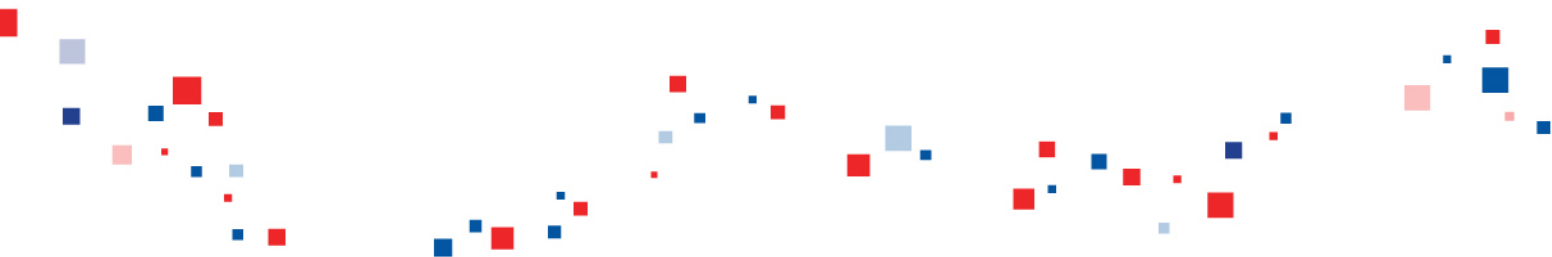
- Bedside specimen labeling
 - > Extension of laboratory barcode and tracking to the bedside
- Patient safety
 - > Mitigate the risk of mislabeled or lost specimens
- Improve workflow
- Lean principles
- Affordable RFID components
 - > Labels
 - > Printers
 - > Readers



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Laboratory Information System (LIS) Build



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LIS Build

- New interface drivers
- Tracking locations
- Status board build
- Changes to orders-inbound/results-outbound interface to the electronic medical record (EMR)
- New lab integration server



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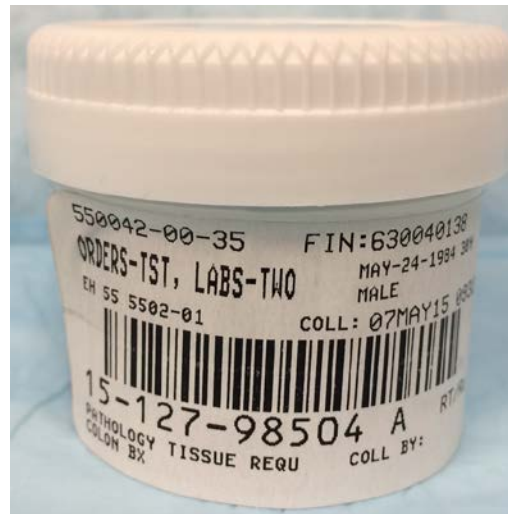
RFID Workflow



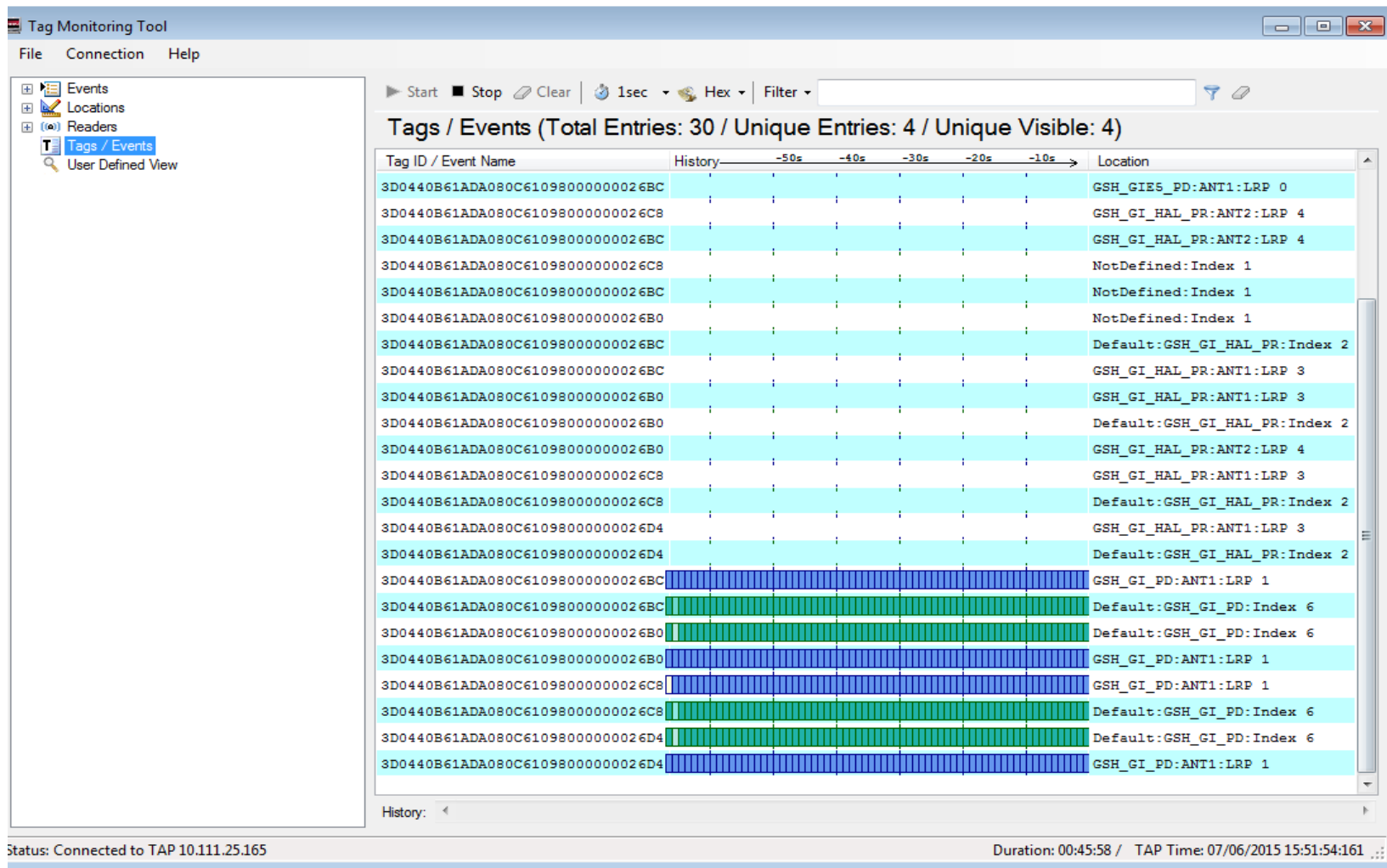
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RFID Workflow

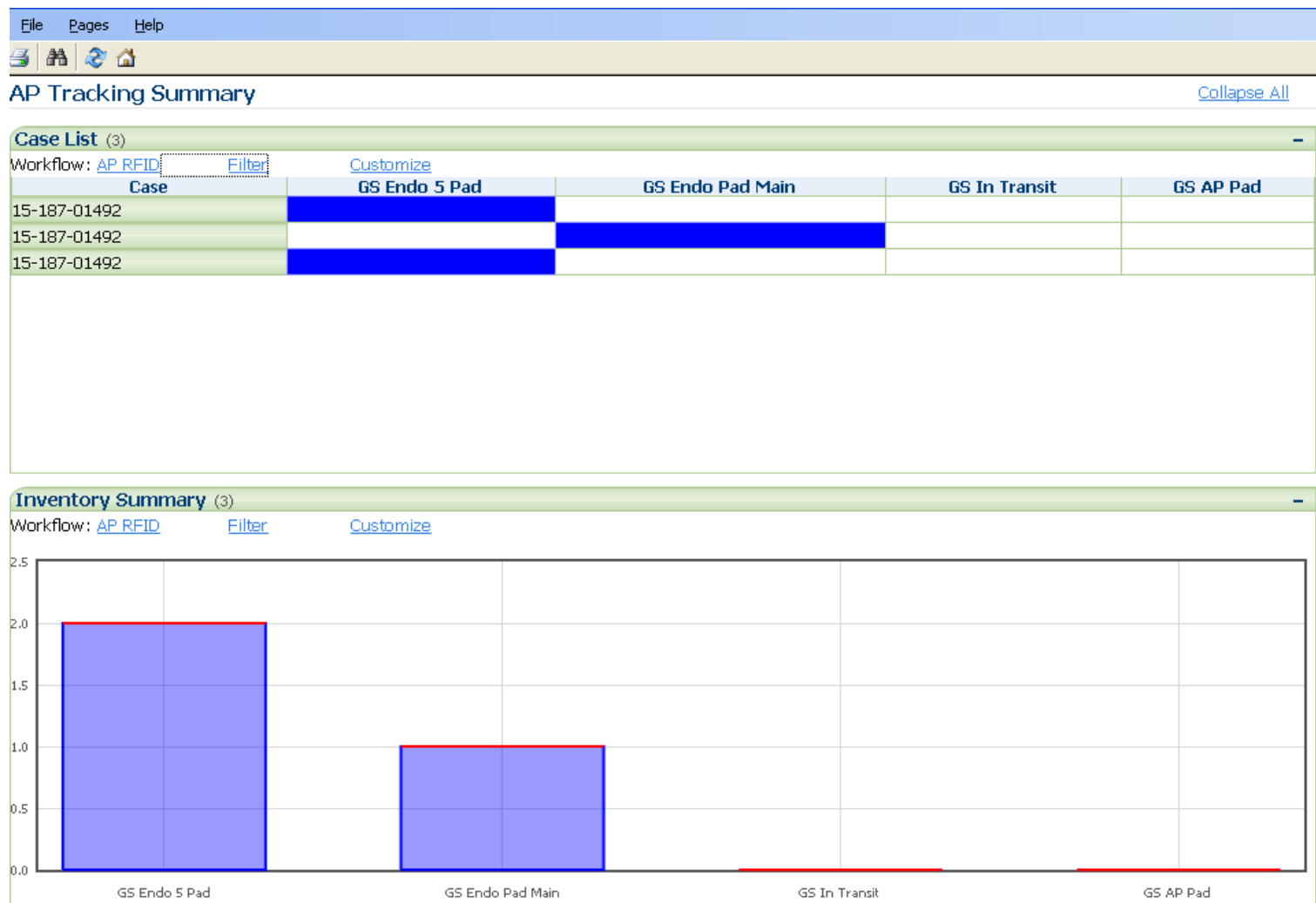
- Origination of the order
- Label prints on-demand in the room based on what is chosen in the hospital EMR
- Specimen description prints on the labels
- Each label is specific to the specimen container







RFID Workflow – Odin Tag Monitoring Tool



RFID Workflow – Status Board







RFID Workflow – Container Tracking

Container List							
C.	Container	Orders		Orders Not Collected		Lab Handling	
	A 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					
	B 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					
	C 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					
	D 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					





Event List							
Event	Date/Time	User	Location	Detail	Update Date/Time	Update User	
Collected	7/6/2015 7:44	(3037588)	GS 2SW DCU		7/6/2015 8:05	SYSTEM	0
Received	7/6/2015 8:05	(0)	GS 2SW DCU		7/6/2015 8:05	SYSTEM	0
RFID Tracked	7/6/2015 8:07	SYSTEM	GSH-Entry-GI5Pad		7/6/2015 8:07	SYSTEM	0

RFID Workflow – Container Tracking

Container List							
C.	Container	Orders	Orders Not Collected	Lab Handling			
	A 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					
	B 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					
	C 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					
	D 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					

Event List							
Event	Date/Time	User	Location	Detail	Update Date/Time	Update User	Ev
Collected	7/6/2015 7:44	(3037588)	GS 2S'W DCU		7/6/2015 8:05	SYSTEM	000
Received	7/6/2015 8:05	(0)	GS 2S'W DCU		7/6/2015 8:05	SYSTEM	000
RFID Tracked	7/6/2015 8:07	SYSTEM	GSH-Entry-GI5Pad		7/6/2015 8:07	SYSTEM	000
RFID Tracked	7/6/2015 10:37	SYSTEM	GSH-Entry-GIHallway		7/6/2015 10:37	SYSTEM	000

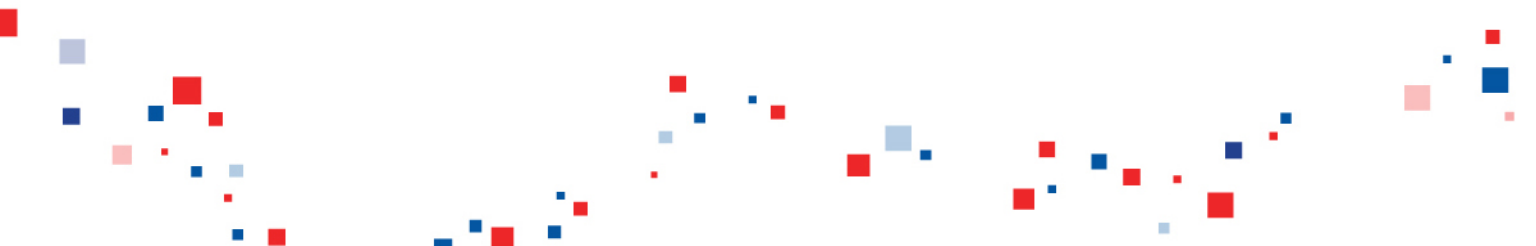
RFID Workflow – Container Tracking

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	A 6 mL AP Tissue Specimen	Pathology Tissue Request (RT)					
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Event List							
Event	Date/Time	User	Location	Detail	Update Date/Time	Update User	Ev
Collected	7/6/2015 7:44	(3037588)	GS 2S'W DCU		7/6/2015 8:05	SYSTEM	00
Received	7/6/2015 8:05	(0)	GS 2S'W DCU		7/6/2015 8:05	SYSTEM	00
RFID Tracked	7/6/2015 8:06	SYSTEM	GSH-Entry-GI5Pad		7/6/2015 8:06	SYSTEM	00
RFID Tracked	7/6/2015 12:03	SYSTEM	GSH-Entry-GIHallway		7/6/2015 12:03	SYSTEM	00
RFID Tracked	7/6/2015 12:03	SYSTEM	GSH-Entry-PathLabFE		7/6/2015 12:03	SYSTEM	00
RFID Tracked	7/6/2015 12:05	SYSTEM	GSH-Entry-PathLabPad		7/6/2015 12:05	SYSTEM	00

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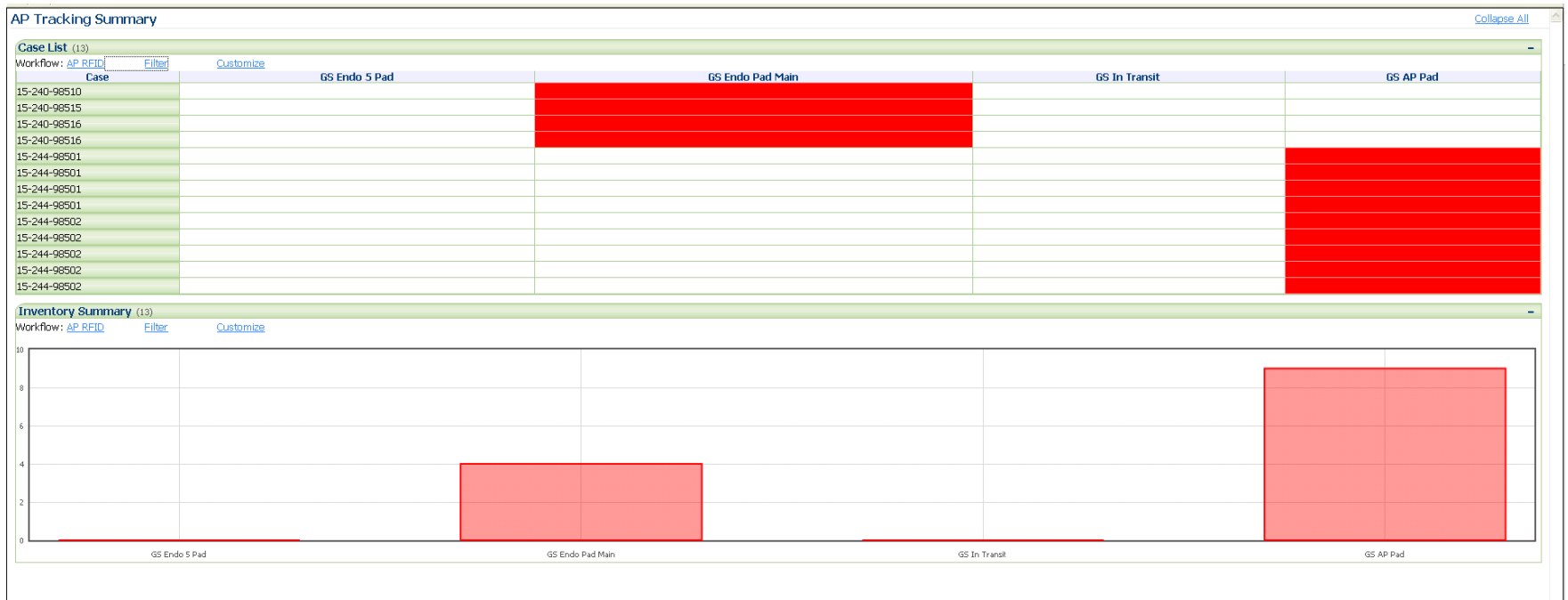
Anatomic Pathology Workflow



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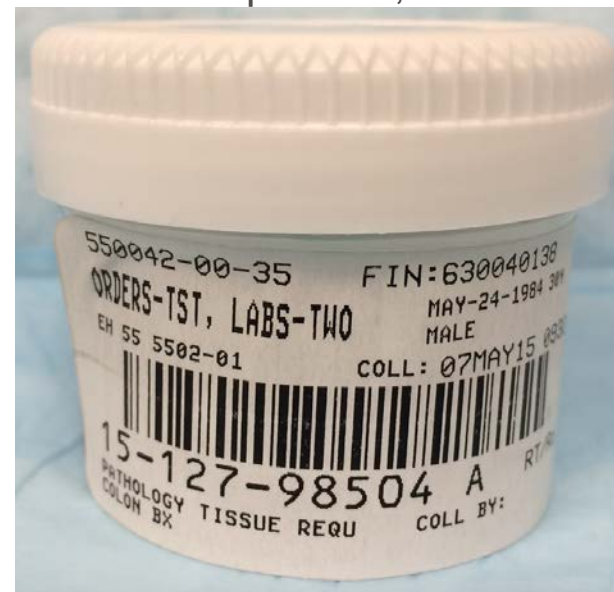
AP Workflow – Status Board

- Status board allows monitoring of specimen location
- Status changes from blue to red when the “expiration” is reached
 - This can be customized for each workflow step



AP Workflow – Specimens to Pathology

- Specimens dropped on RFID pad reader in the pathology department
- Specimens arrive labeled with specimen source and patient information
 - > Improves AP workflow
 - The specimen source entered on order is the source printed on the specimen label.
 - > Improves Endo workflow
 - Do not have to hand-write source, which could result in discrepancies, and was difficult to do on small specimen labels.
 - Fewer labels required
- Label fits on all sizes of specimen containers



AP Workflow – Accessioning

- Endoscopy orders were built in the AP module instead of the Gen Lab module
 - A single accession number is used for all specimens (+ A, B, C, D)
 - Specimens are auto-verified once logged in
 - *Formerly, lab assistants used three separate applications in the LIS to generate a surgical accession number*

The screenshot displays the 'PathNet Anatomic Pathology: Maintain Case' application window. A 'Log in Specimens' dialog box is open, showing options to log in 'By accession' or 'By patient'. The 'By accession' option is selected. Below this, there is a table with columns: 'Include', 'Priority', 'Specimen', 'Collected', 'Requested', and 'Ordering Location'. The table is currently empty. To the right of the table are 'Move Up' and 'Move Down' buttons. Below the table is a checkbox labeled 'Display selected specimens only'. At the bottom of the dialog, there are 'OK' and 'Cancel' buttons. The background application window shows fields for 'FIN NBR:', 'SSN:', 'MRN:', 'Admitting:', 'Referring:', and 'Admitted:'. It also has tabs for 'Specimen', 'Report', and 'Outside Case No.'. At the bottom of the main window, there are fields for 'Case', 'Priority:', 'Physician:', 'Pathologist:', 'Resident:', 'Location:', 'Copy to:', 'Diagnosis:', and a checkbox for 'Print specimen labels'. The status bar at the bottom indicates 'Ready' and 'C31 DSENSENG 13:17'.

AP Workflow – Accessioning

- When accession number is entered, all specimens associated populate for review before logging in
- Prefix is chosen

Maintain Case

Task View Alerts Help

FIN NBR:
SSN:
MRN:

Admitting:
Referring:
Admitted:

Specimen Report Outside Case N

ID Status Source D

Log in Specimens

Log in
☒ By accession 15-244-98504
☐ By patient

Specimens

Include	Priority	Specimen	Collected	Requested	Ordering Loca
<input checked="" type="checkbox"/>	Routine	Biopsy	9/1/2015 00:00	Zzztest, Md	
<input checked="" type="checkbox"/>	Routine	Descending Colon	9/1/2015 00:00	Zzztest, Md	
<input checked="" type="checkbox"/>	Routine	Ascending Colon	9/1/2015 00:00	Zzztest, Md	
<input checked="" type="checkbox"/>	Routine	Transverse Colon	9/1/2015 00:00	Zzztest, Md	
<input checked="" type="checkbox"/>	Routine	Polyp	9/1/2015 00:00	Zzztest, Md	

☐ Display selected specimens only

Pathology Case
☒ By prefix SG | GS-Surgical Pathology
☐ By case

OK Cancel

Case
Priority: Location: None specified
Physician: Copy to: None specified
Pathologist: Diagnosis: None specified
Resident: ☒ Print specimen labels

Ready C31 DSENSENG 13:29

AP Workflow – Accessioning

- Specimen description auto-populates
- Date and time of collection auto-populate

TEST-PATIENT-9, BELLE-ANNE T [SG] - Maintain Case

Task View Alerts Help

TEST-PATIENT-9, BELLE-ANNE T FIN NBR: 390004948 LMG Salmon Creek Clinic 6285
6/6/1951 SSN: 333-22-1234 Admitting: Zzztest, Md
64 years MRN: 850000-00-68 Referring:
Female Admitted: 7/10/2015 00:00

Specimen | Report | Outside Case Numbers

ID	Status	Source	Description	Specimen Comment	Order Comment	Collected	Collected Time	Received	Received Time	Adequacy	Fixative	Priority	Resourc
1	New		Biopsy			9/1/2015	00:00	9/1/2015	13:30			Routine	GS Gross B
2	New		Descending Colon			9/1/2015	00:00	9/1/2015	13:30			Routine	GS Gross B
3	New		Ascending Colon			9/1/2015	00:00	9/1/2015	13:30			Routine	GS Gross B
4	New		Transverse Colon			9/1/2015	00:00	9/1/2015	13:30			Routine	GS Gross B
5	New		Polyp			9/1/2015	00:00	9/1/2015	13:30			Routine	GS Gross B

Add... Modify... Cancel...

Case
Priority: Routine Location: SC Clinic 6285 SC Clinic 6285 6285
Physician: Zzztest, Md Copy to: None specified
Pathologist: (none) Diagnosis: None specified
Resident: (none) ☒ Print specimen labels

Ready C31 DSENSENG 13:30

AP Workflow – Accessioning

- Specimen sources are chosen by pathology staff

TEST-PATIENT-9, BELLE-ANNE T [SG] - Maintain Case

Task View Alerts Help

TEST-PATIENT-9, BELLE-ANNE T
6/6/1951
64 years
Female

FIN NBR: 390004948
SSN: 333-22-1234
MRN: 850000-00-68

LMG Salmon Creek Clinic 6285
Admitting: Zzztest, Md
Referring:
Admitted: 7/10/2015 00:00

Specimen Report

Modify Specimen

ID: 1 OK Cancel Comment...

Source: COLON BIOPSY

Description: Colon Biopsy

Collected: 09/01/2015 0000

Received: 09/01/2015 1330

Adequacy:

Fixative:

Priority: Routine

Resource: GS Gross Bay

Collected Time	Received	Received Time	Adequacy	Fixative	Priority
00:00	9/1/2015	13:30			Routine
00:00	9/1/2015	13:30			Routine
00:00	9/1/2015	13:30			Routine
00:00	9/1/2015	13:30			Routine
00:00	9/1/2015	13:30			Routine

Add... Modify... Cancel...

Case

Priority: Routine Location: SC Clinic 6285 SC Clinic 6285 6285

Physician: Zzztest, Md Copy to: None specified

Pathologist: (none) Diagnosis: None specified

Resident: (none) ☒ Print specimen labels

Ready C31 DSENSENG 13:31

AP Workflow – Accessioning

- The final product

TEST-PATIENT-9, BELLE-ANNE T [SG] - Maintain Case

Task View Alerts Help

TEST-PATIENT-9, BELLE-ANNE T
6/6/1951
64 years
Female

FIN NBR: 390004948
SSN: 333-22-1234
MRN: 850000-00-68

LMG Salmon Creek Clinic 6285
Admitting: Zzztest, Md
Referring:
Admitted: 7/10/2015 00:00

Specimen Report Outside Case Numbers

ID	Status	Source	Description	Specimen Comment	Order Comment	Collected	Collected Time	Received	Received Time	Adequacy	Fixative	Priority
1	New	COLON BIOPSY	Biopsy			9/1/2015	00:00	9/1/2015	13:30			Routine
2	New	DES COLON BX	Descending Colon			9/1/2015	00:00	9/1/2015	13:30			Routine
3	New	ASC COLON BX	Ascending Colon			9/1/2015	00:00	9/1/2015	13:30			Routine
4	New	TRANS COLON BX	Transverse Colon			9/1/2015	00:00	9/1/2015	13:30			Routine
5	New	COLON POLYP	Polyp			9/1/2015	00:00	9/1/2015	13:30			Routine

Add... Modify... Cancel...

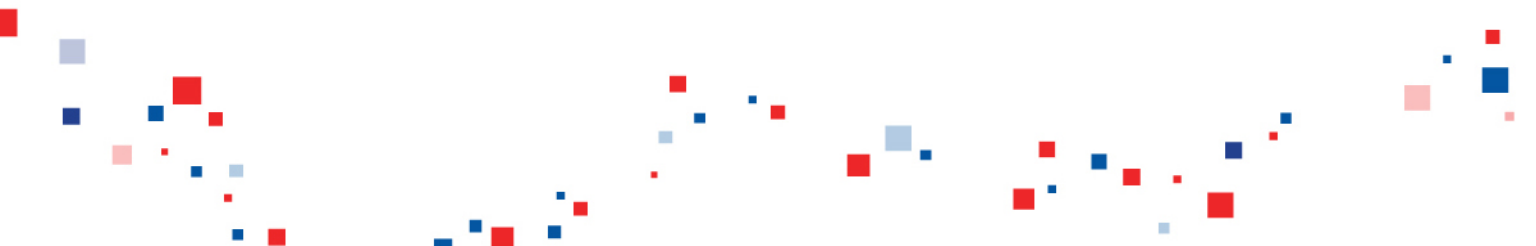
Case
Priority: Routine Location: SC Clinic 6285 SC Clinic 6285 6285
Physician: Zzztest, Md Copy to: None specified
Pathologist: (none) Diagnosis: None specified
Resident: (none) ☒ Print specimen labels

Ready C31 DSENSENG 13:30

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Expansion of RFID



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Expansion of RFID

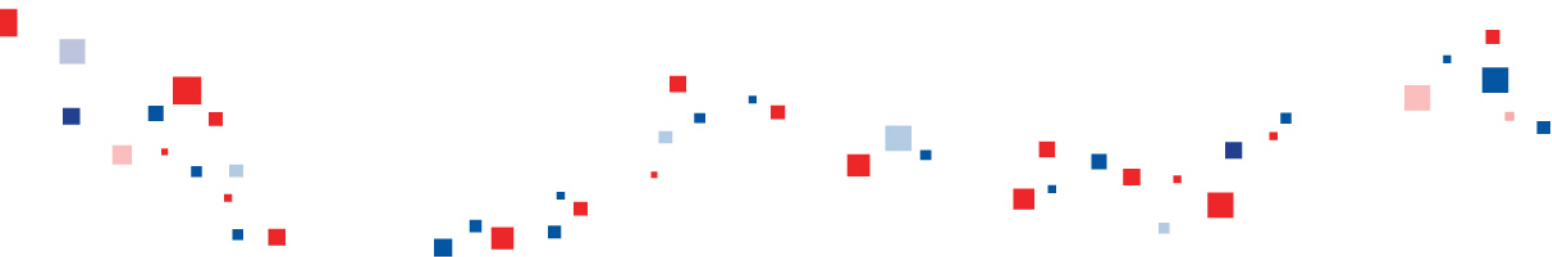
- Additional hospital departments
 - > Surgical Services, Breast Centers, Legacy Clinics
- Central Laboratory
 - > Tracking from floor-to-floor within the Central Laboratory
- Outreach Clients
 - > Tracking from client to Central Laboratory
 - *Future enhancement



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Keys to Making RFID Successful



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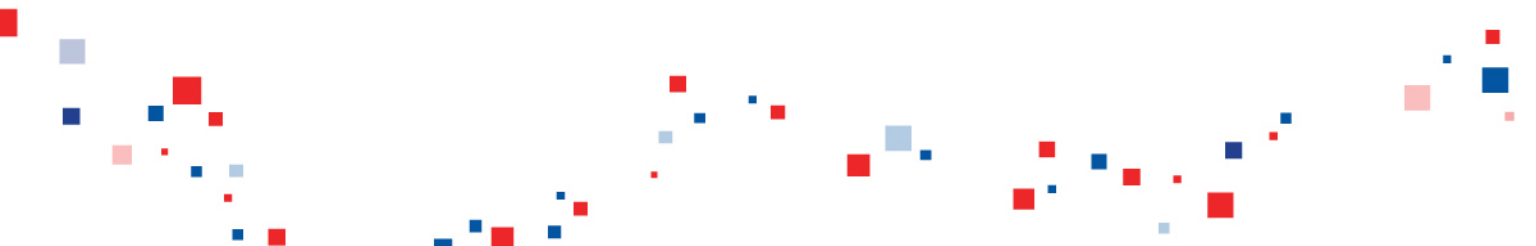
- Have patience with the development of new technology
 - > Avoid impacting other projects
- Fine-tune RFID
 - > Pay attention to the location of perches and readers
 - Proximity of perches and pad readers to one another
 - The location of perches vs. specimen disposal or storage areas
 - Mirrors
 - > Adjust the sensitivity of perches and pad readers
- Communicate with clinical staff and laboratory staff
 - > Get input from clinical staff regarding their workflow
 - > Be aware of the impact on users



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Benefits of RFID Specimen Tracking



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Benefits of RFID Specimen Tracking

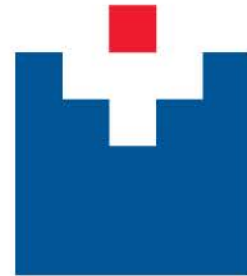
- Preventive action
 - > Additional patient safety mechanism
 - Inherent reduction in labeling errors
 - Prevention of specimen loss
 - > ISO requirements
- “Closing the loop”
 - > A natural extension of laboratory barcode and tracking process to allow real-time tracking of irreplaceable specimens from collection to pathologist.
- Developing relationships with hospital departments
 - > Integration of Endoscopy and Anatomic Pathology processes (Lean).



One Year Later...

- Staff and client satisfaction with RFID
 - > Now everyone wants it!
- Differences between non-RFID and RFID tracking processes
 - > Manual “tracking” of specimens with transfer lists vs. true tracking with RFID
- Ease of adding additional units now that the build has been completed





LEGACY
H E A L T H

Thank you!

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SALMON CREEK Medical Center

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Questions?



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