Laboratory Information System L.I.S.

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Simulation Background

- Michener introduced a specific focus on the use of simulation in education in the Medical Laboratory Sciences in 2006.

- Some simulation activities are incorporated into most laboratory courses; however, the major impact is seen in the "Simulated Clinical" semester immediately prior to students attending their clinical placements.

Simulation Background

- During the Simulated Clinical semester, students rotate through each of the 5 disciplines for 2-week blocks.

- We convert our laboratories into as realistic models of hospital laboratories as possible.

- Synthesis and application: there are no lectures, new material or graded evaluations.

- Students are assessed on competencies and must be "signed-off" on all by the end of the semester to progress to clinical placements.
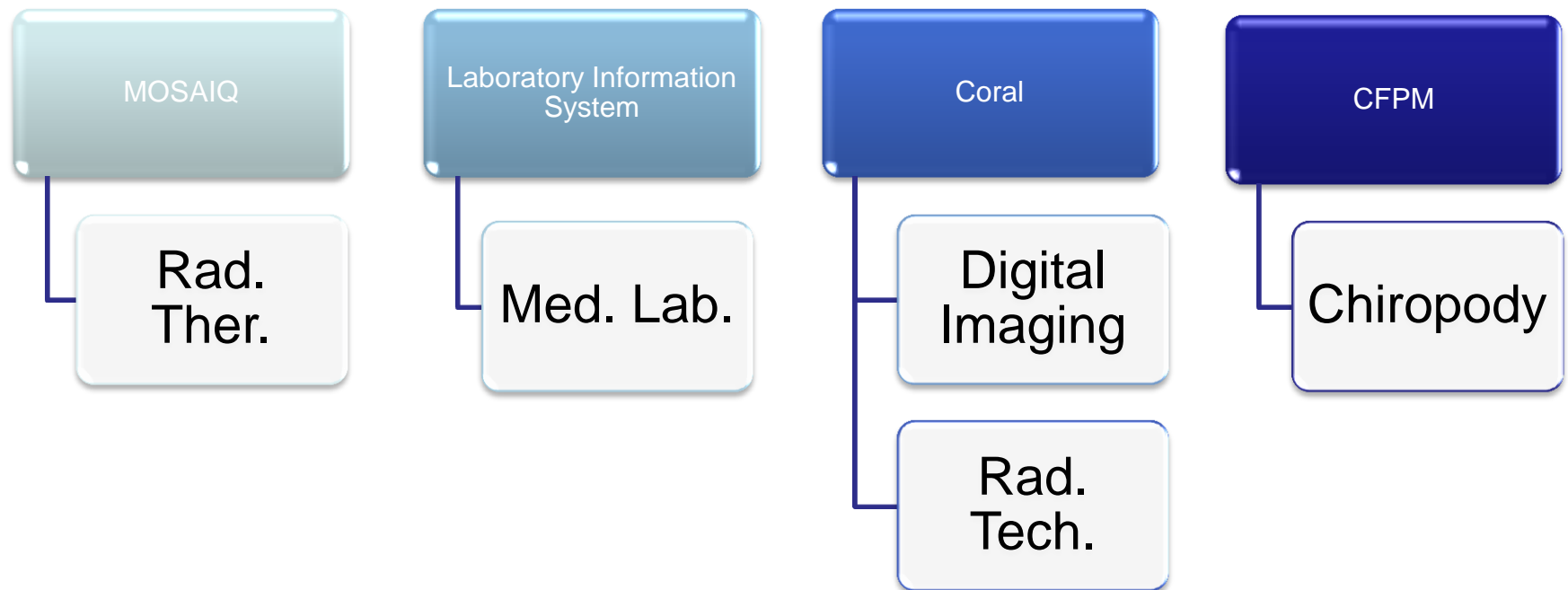
Educational purpose of an L.I.S.

Enable the simulation of best practices and the development of digital clinical judgement through the use of integrated electronic systems within a simulated environment.

Goals

- To support the education of future Laboratory Professionals by creating an integrated digital environment that would simulate a true working clinical laboratory with an emphasis on work flow, patient care and privacy.

- To better prepare students for entry into the Clinical environment.

Michener – Current State

The L.I.S. is one example within Michener of electronic systems utilized to enhance the simulation of true clinical environments.

MOSAIQ — Rad. Ther.

Laboratory Information System — Med. Lab.

Coral — Digital Imaging, Rad. Tech.

CFPM — Chiropody

Michener and RVH

- A legal partnership agreement is in place between the Royal Victoria Hospital (Barrie, ON) and Michener to allow access to RVH Meditech <u>Test Environment</u>

- Provides a true mirror image of a fully-functional Hospital Lab Information System for use at Michener

- Access is provided through VPN tunnels to the RVH L.I.S. Servers (in Barrie)

Michener and RVH

Michener
LIS Module
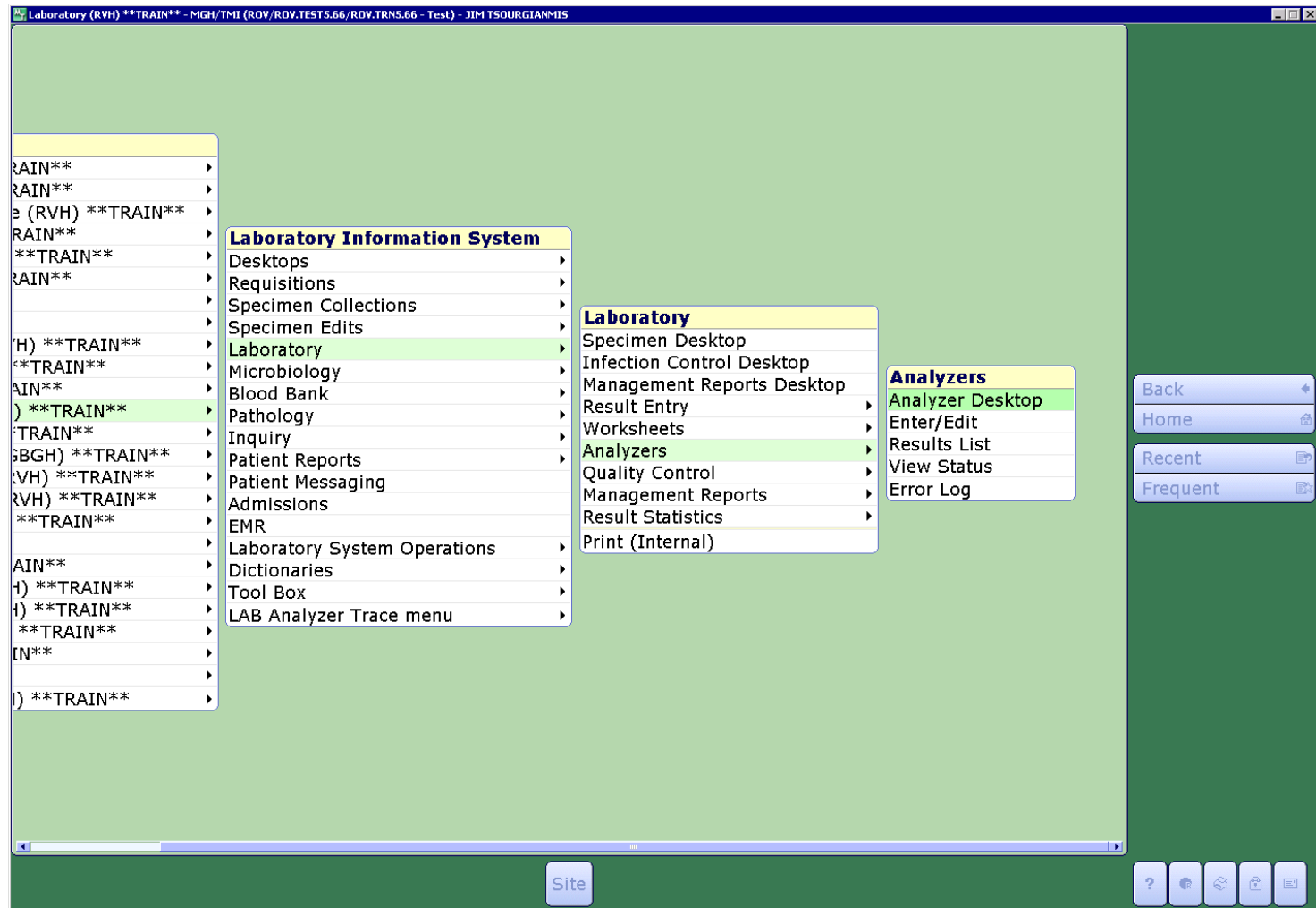
Logical VPN
Tunnel

Analyzers

Lantronix Box

Ethernet Cable

Lab Information System

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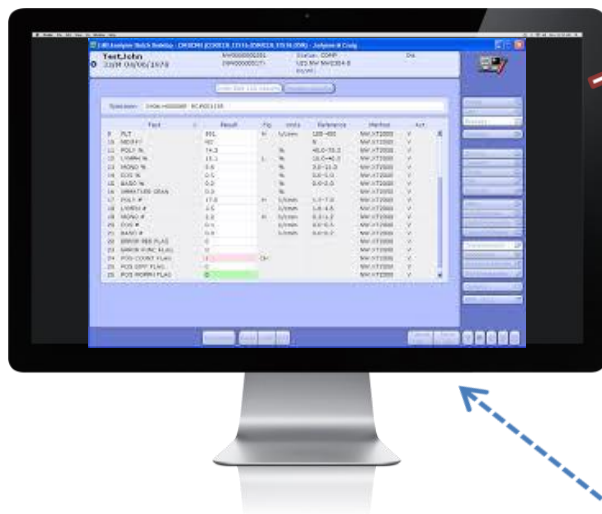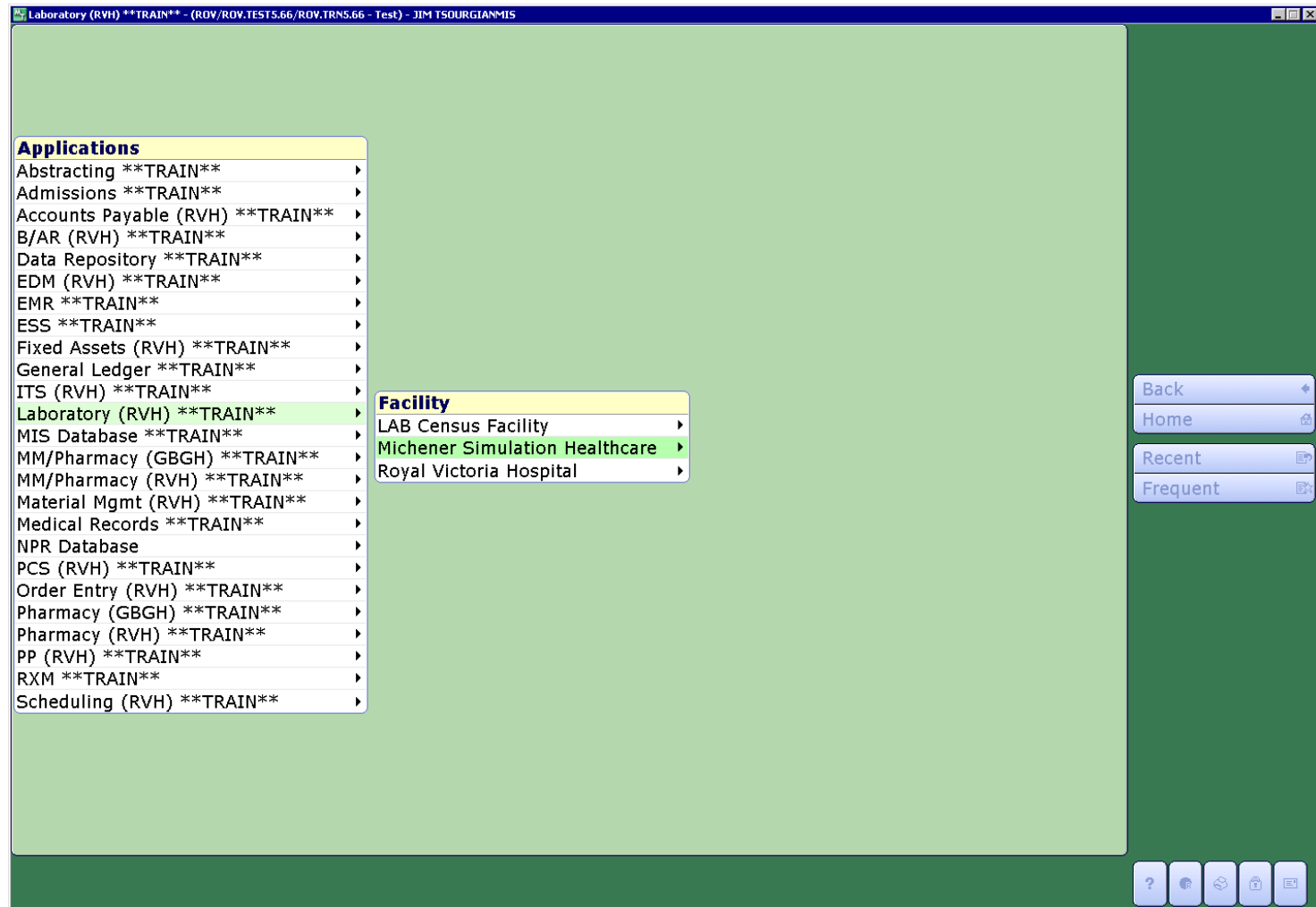
Lab Information System

Lab Information System
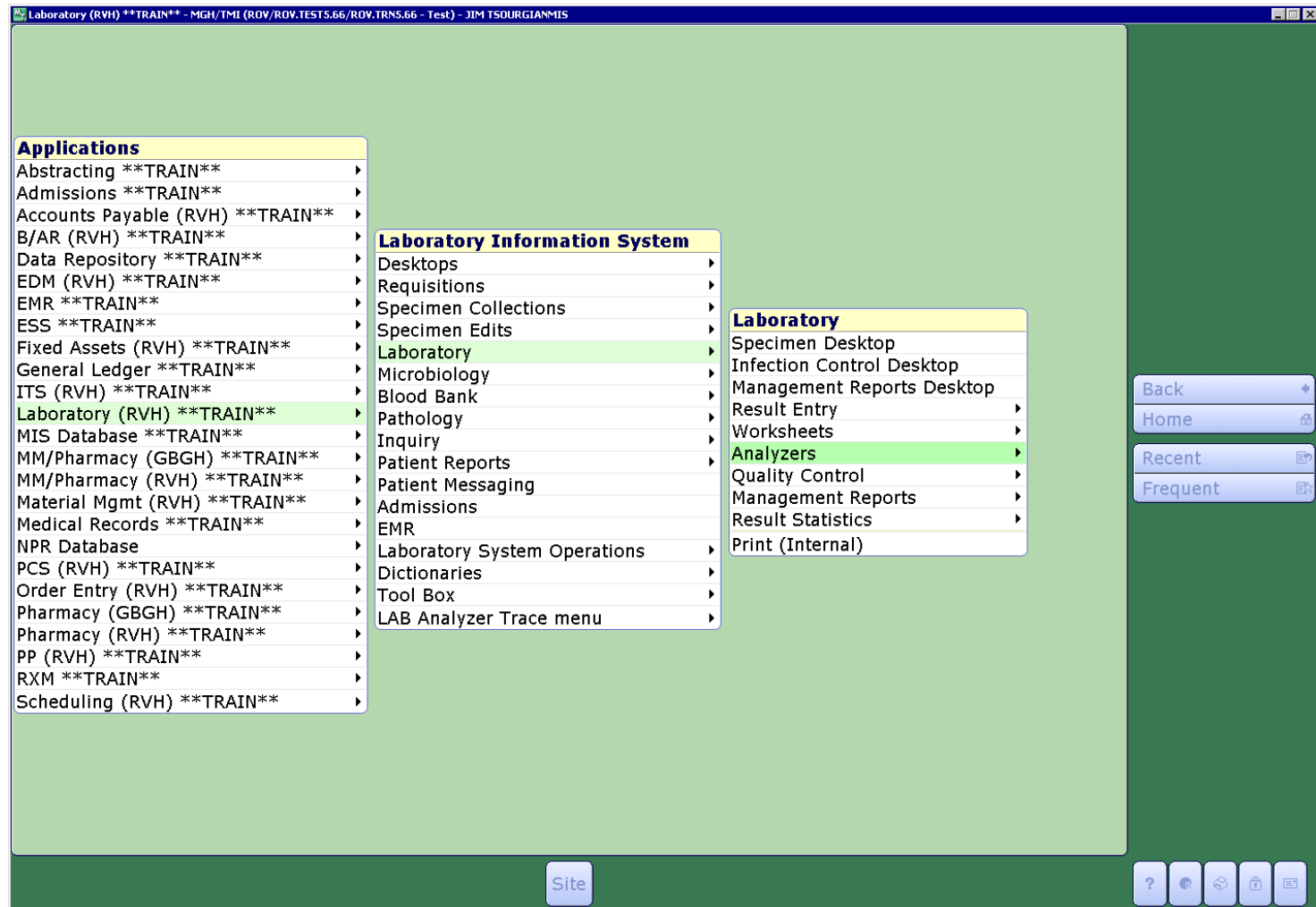
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L.I.S. Instrument Interfaces

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L.I.S. Instrument Interfaces

Microbiology Vitek Interface located on separate portal

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Current State

- L.I.S. incorporated within Simulation Semesters for Clinical Chemistry, Microbiology, Hematology

- Eleven Lab Analyzers are currently interfaced with Meditech allowing electronic result verification:
  - 2x Beckman Coulter AU480 (Chemistry)
  - 2x Beckman Coulter Access (Immunochemistry)
  - 2x Biomerieux Vitek (Microbiology)
  - 2x Beckman Coulter AcT 5 (Hematology)
  - 3x Siemens Rapid Point (Blood Gas Instruments)

Simulation Process

- Over 500 fictitious patients are registered within Meditech for use with Lab Orders

- Registrations include:
  - Patient Demographic
  - Account Number
  - Location
  - Medical Record Number
  - Ordering Physician/ Clinician

Simulation Process – Patient Registry

Simulation Process – Order Entry

- Lab order created corresponding to Faculty teaching objectives per specific lab

- L.I.S. Labels printed and affixed to Patient sample accordingly

- Several thousand true patient samples are obtained from clinical partner labs over the course of the simulation semester
  - Patient samples obtained in accordance with clinical lab retention and privacy policy

Simulation Process – Order Entry

Simulation Process – L.I.S. Labels

L.I.S. Labels are affixed to <u>true</u> patient samples ready for student testing

Students electronically "Receive" samples and commence testing accordingly

Sample testing and L.I.S. verification

- Samples for Analyzer use are loaded for testing

- Upon test completion, students examine results for accuracy prior to Verifying and Broadcasting to the L.I.S. patient account

Sample Testing and L.I.S. verification

Sample Testing and L.I.S. verification

Sample Testing and L.I.S. verification

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Sample Testing and L.I.S. verification

Students are responsible for confirming accuracy of results prior to electronic Verification and Broadcast

Student usernames will be tagged to verified results for audit purposes

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L.I.S. Patient Reports

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L.I.S. Patient Reports

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DATE: 17/02/17 @ 1217     Royal Victoria Laboratory **TRAIN5.66**                    PAGE 1
USER: TSOJ                    MIC SPECIMEN INTERNAL INQUIRY

PATIENT: LA,MARY-ANN                      ACCT : OM000180/16   LOC:  M.SIMLAB   U : M000000181
                                          AGE/SX: 69/F         ROOM:            REG: 15/04/16
REG DR:  DUNDAS,PARKER                    DOB:     15/10/1946  BED:             DIS:
                                          STATUS: REG RCR      TLOC:

SPEC :   16:M0000885R       ORD FOR: 04/05/16-0918    STATUS:  COMP          REQ : 00010369
                              COLL: 04/05/16-0918      SUBM DR: DUNDAS,PARKER
                              RECV: 04/05/16-0918      PT AGE AT COLL: 69


SOURCE:    URINE          SP DESC: Mid-stream
ENTERED:   04/05/16-0920  ENT BY:  PINGI          OTHR DR:
COLL BY:   CBN            RCV BY:  PINGI
LAST RPTD: 05/05/16-1442  WKLD FN:
LAST ACT:  05/05/16-1442   BAR CD: 014585


ORDERED:   Urine culture
SETUP:     Urine culture:  04/05/16 0918 PINGI
COL CATEG:
ORD SITE:  TMI                                TRANSIT SITE:
RECV SITE: TMI
PERFORM SITE: TMI 04/05/16-0918 GP            AT SITE: TMI 04/05/16-0918 GP



  Procedure                    Result

> Urine culture   Final
     Method: MAN        Perf Site: TMI
     Ent: 05/05-1442 GIBLI, Ver: 05/05-1442 GIBLI
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L.I.S. Patient Reports

File   Help

Procedure	Result

> Urine culture | Final
    Method: *MAN*   Perf Site: *TMI*
    Ent: *05/05-1442 GIBLI*, Ver: *05/05-1442 GIBLI*

    Organism 1   Pseudomonas aeruginosa
        Colony count: >=100 X E6 cfu/L
    Organism 2   Mix: colonizing / contam flora
        Colony count: 10-100 X E6 cfu/L

    1. Pseudomonas aeruginosa   AST-N213   Ent: *05/05-1442 GIBLI*
        Method: *VIT*   *Perf Site: TMI*

Target Route Dose	RX	AB	Cost	M.I.C.	IQ	NP
AMPICILLIN	R			>=32		
CEFAZOLIN	R			>=64		NP
CEFOXITIN	R			>=64		NP
CEFTAZIDIME	S			2		
CEFTRIAXONE	R			32		NP
CIPROFLOXACIN	S			<=0.25		NP
GENTAMICIN	S			<=1		
MEROPENEM	S			0.5		NP
NITROFURANTOIN	R			>=512		NP
TOBRAMYCIN	S			<=1		
AMIKACIN	S			<=2		NP
PIPERA/TAZOBACT	S			<=4		
CEFPODOXIME	R			>=8		NP

*** End of Report ***

1/1   120%

Simulation and L.I.S.

- All simulated semester samples are registered within L.I.S. (Patient account and orders created)
  - Results from Interfaced Analyzers file directly to the L.I.S. for student electronic verification
  - Results from non-interfaced instruments (Special Hematology: PT/PTT) are manually entered by students into associated patient accounts within the Meditech L.I.S.
  - In addition, students are taught L.I.S. Downtime Procedures

Student Benefits

Education

- Supports a patient-driven model of care

- Provides an environment that promotes continuous and adaptive learning

- Creates a comprehensive learning environment to practice the use of electronic health systems risk-free

- Supports development of clinical reasoning, judgement, and digital literacy

Student Benefits

Clinical Preparedness

- Replicates the patient's journey via system-wide integration of information systems (Registration, Order Entry, Result Verification, and Broadcast)

- Facilitates greater awareness of clinical privacy, ethical standards, and cyber security

- Enhances appreciation for the work, roles, responsibilities, and accountabilities of other health care professionals
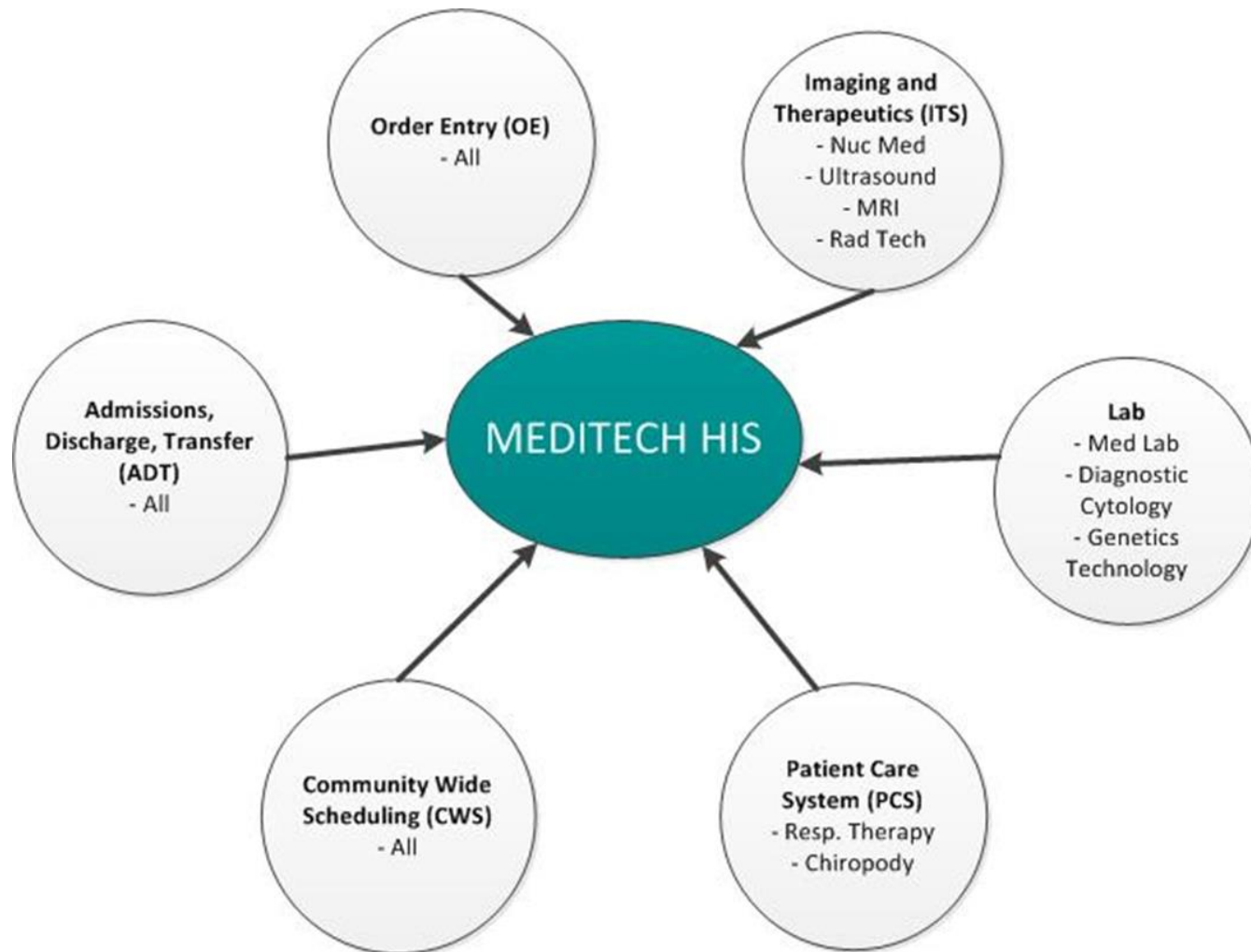
Future Enhancements of L.I.S.

Integration of L.I.S. with an organization-wide Hospital Information System (H.I.S.) for use across multiple Academic Programs: Chiropody, Respiratory Therapy, Genetics Technology, Diagnostic Imaging, etc.

Michener General Hospital

The Future at Michener

The Future at Michener

A common digital space benefiting all learners across all

Michener Academic programs

First in Canada

- Fully Simulated Environment
- Inter-Professional Real Life Case Studies
- Builds on Current L.I.S. Investments
- Digitally Integrated Training Curriculum
- Leading Clinical Education Nationally and Internationally

Michener L.I.S.

Questions ?

Thank you