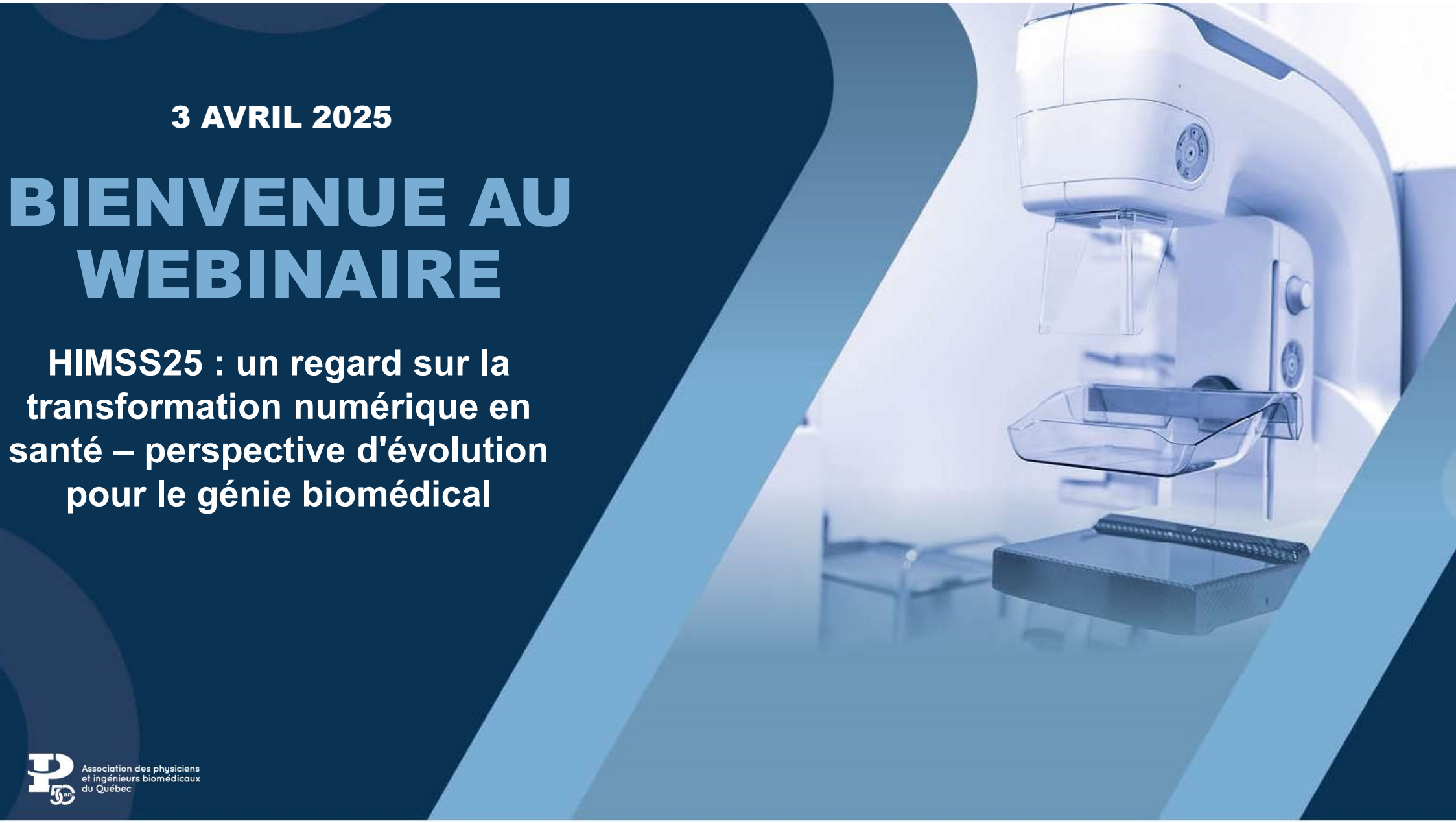
3 AVRIL 2025

BIENVENUE AU WEBINAIRE

HIMSS25 : un regard sur la transformation numérique en santé – perspective d'évolution pour le génie biomédical



Association des physiciens et ingénieurs biomédicaux du Québec

PRÉSENTÉ PAR



Michaël Lemieux

Conseiller-cadre en génie biomédical - Volet DSN

Association des physiciens et ingénieurs biomédicaux du Québec

LOGISTIQUE



L'activité débutera à 12 h 00



Merci d'éteindre votre micro lorsque vous n'intervenez pas



Merci de lever la main pour toute question ou commentaire



À la fin de l'activité, un court sondage d'appréciation vous sera transmis par courriel



Envoyez-nous vos commentaires à info@apibq.ca

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Objectifs

1. Décrire les principaux niveaux de maturité numérique selon les indices HIMSS et situer le Québec par rapport aux meilleures pratiques internationales.

2. Reconnaître les tendances actuelles en transformation numérique et évaluer leur impact potentiel sur la performance clinique et les processus hospitaliers.

3. Comprendre les avancées et identifier les défis potentiels liés à la mise en place de systèmes numériques intégrés (ex. : DSN, VIM-VNA), à partir d'exemples concrets présentés lors de la conférence HIMSS25.

4. Identifier les bénéfices cliniques et opérationnels de l'interopérabilité directe des équipements médicaux, en s'appuyant sur la preuve de concept du « soin intensif silencieux ».

5. Reconnaître le rôle stratégique et évolutif des ingénieurs biomédicaux, particulièrement dans l'encadrement de l'interopérabilité, de la cybersécurité et de l'intelligence artificielle au sein du réseau de la santé.

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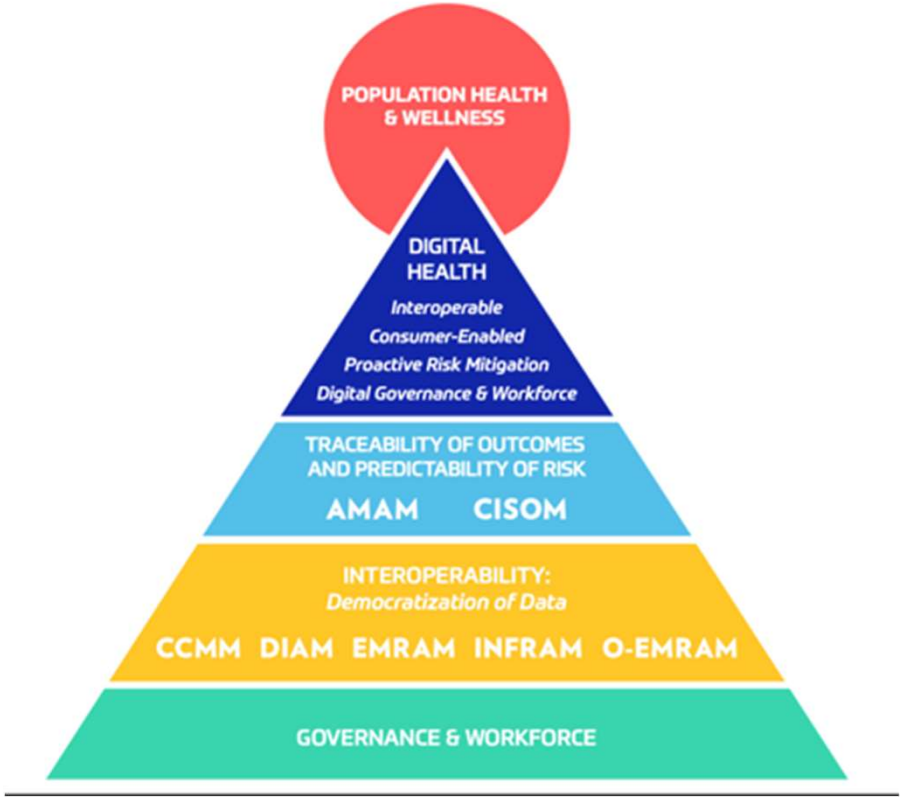
Qu’est ce que HIMSS?

Dénomination, vision et mission

Communauté

Conférences annuelles
- Par chapitre
- Europe
- **Global (US)**

Indices de maturité



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HIMSS 25
삼성서울병원
SMC
SAMSUNG
MEDICAL CENTER

NT + OO = COO !!

NT : New Technology
+
OO : Old Organisation

= COO : Costly Old Organisation

Pour réussir une transformation technologique, il est crucial de :

- Repenser les processus
- Former les personnes
- Adapter l'organisation
- Gérer le changement

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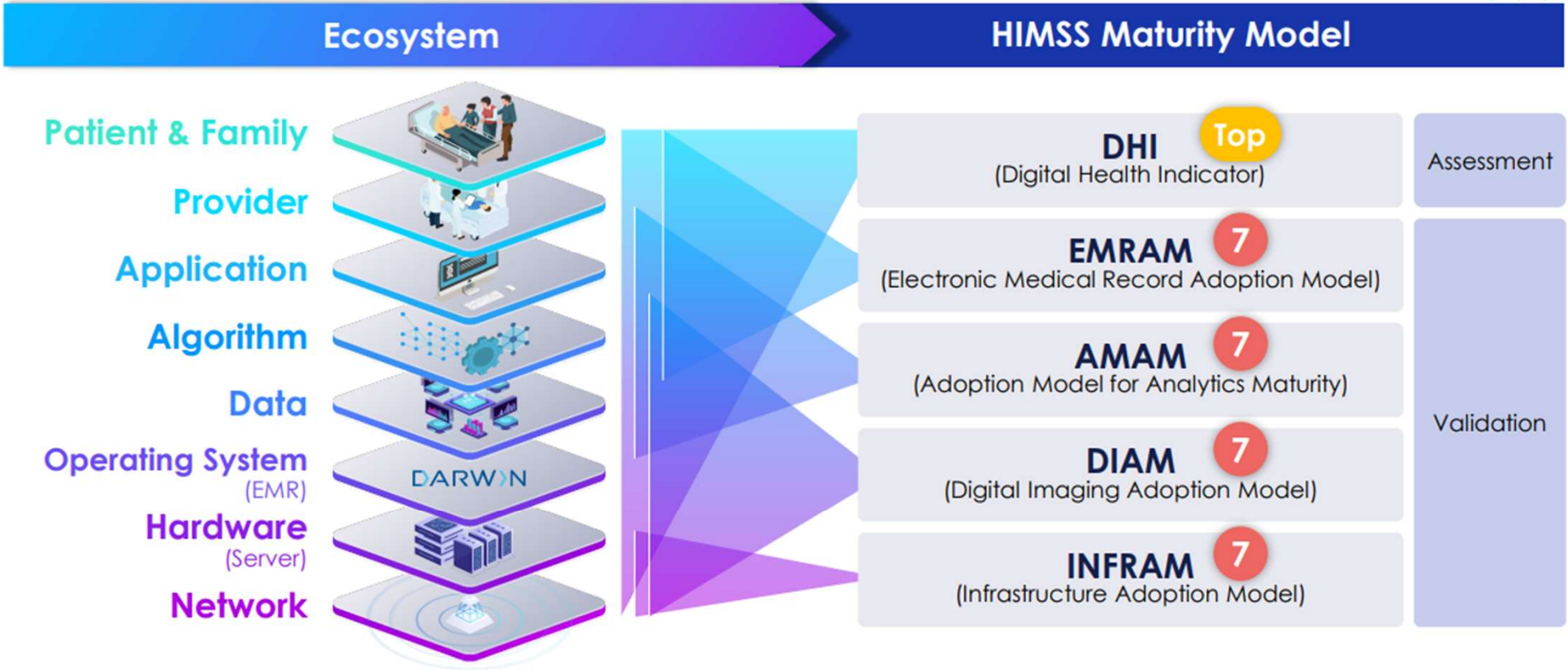
The Eight Layers of the Ecosystem for a Smart Hospital



Nos objectifs pour le Québec

MODÈLES DE MATURITÉ EN SANTÉ NUMÉRIQUE

Les modèles de maturité du *HIMSS* suggérés pour le DSN

(toutes les échelles ont 8 niveaux – de 0 à 7)

O-EMRAM

Outpatient Electronic Medical Record Adoption Model

Modèle de maturité
Cliniques externes

- **CIBLE** : **niveau 6** une fois le déploiement de l'établissement terminé / **niveau 7** un an plus tard
- Actuellement au Québec, le niveau se situe entre 1,5 et 2,5 – certains hôpitaux universitaires à 4 ou 5
- Aucun hôpital au niveau 6 ou 7

Échelle de maturité la plus utilisée au monde

EMRAM

Outpatient Electronic Medical Record Adoption Model

Modèle de maturité
Hôpital (inpatients)

- **CIBLE : niveau 6** une fois le déploiement de l'établissement terminé / **niveau 7** un an plus tard
- Actuellement au Québec, le niveau se situe entre 0,5 et 2 – certains hôpitaux à 3

AMAM

Analytics Maturity Adoption Model

Modèle de maturité
de l'analytique

- **CIBLE : niveau 7,** une fois le déploiement de l'établissement terminé
- Actuellement au Québec, le niveau se situe entre 0 (communication électronique limitée) et 1,5

CCMM

Continuity of care Maturity Model

Modèle de maturité
Continuité des soins

- **CIBLE : niveau 5** (à valider) une fois le déploiement de l'établissement terminé
- Actuellement au Québec, le niveau se situe environ à 2 (en fonction des DQEPE, des outils TI et des SI en place)

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ÉCHELLE EMRAM DU HIMSS

NIVEAUX	FONCTIONNALITÉS CUMULATIVES
NIVEAU 7	• DSN complet • Transactions pour supporter la continuité de soins et services • Entrepôt de données / Échanges et partages élargis
NIVEAU 6	• **Documentation clinique pour le médecin (gabarits structurés)** • **Support à la décision complet (compliance, variance), PACS complet**
NIVEAU 5	• Gestion complète du circuit du médicament
NIVEAU 4	• Prescription électronique, support à la décision (protocoles cliniques)
NIVEAU 3	• Documentation clinique / soins infirmiers (signes vitaux), aide à la décision (détection d'erreurs), PACS accessible hors département d'imagerie médicale
NIVEAU 2	• Répertoire de documents cliniques, vocabulaire médical normalisé, aide à la décision de base, numérisation possible, capacité à échanger / partager
NIVEAU 1	• Trois principaux systèmes de soutien diagnostique et thérapeutique (pharmacie, laboratoires, radiologie) implantés
NIVEAU 0	• Trois principaux systèmes de soutien diagnostique et thérapeutique (pharmacie, laboratoire, radiologie) non implantés

Context-aware AI & Social Robots







An Enjoyable Session with Liku at SMC
(January 2025)

" Various Robots, helping us work efficiently and effectively"

SMCs Integrated Robotic Operation Platform

Bulk Delivery Robot	eCARE Robot	Caution Delivery Robot	Service Delivery Robot	Guide & Sanitization Robot	Connected Command Center
					

Metaverse



The Adoption of the Metaverse at SMC

Keynote sur l'IA et la cybersécurité



- "We have to get beyond just talking about the problem of ransomware,"
- "A small ounce of prevention is always better than a pound of performance"
- "You don't have to be the fastest gazelle in the jungle to maintain your security in cyberspace, but you just can't be the slowest"
- "We have to be much more aggressive in investing in our talent,"
- "We have a number of different technologies that are going to dramatically impact our national security. I saw it. Whether or not it's AI, cyber security or quantum, these are things that are going to remake how we look at ourselves in the world,"

L’engagement patient



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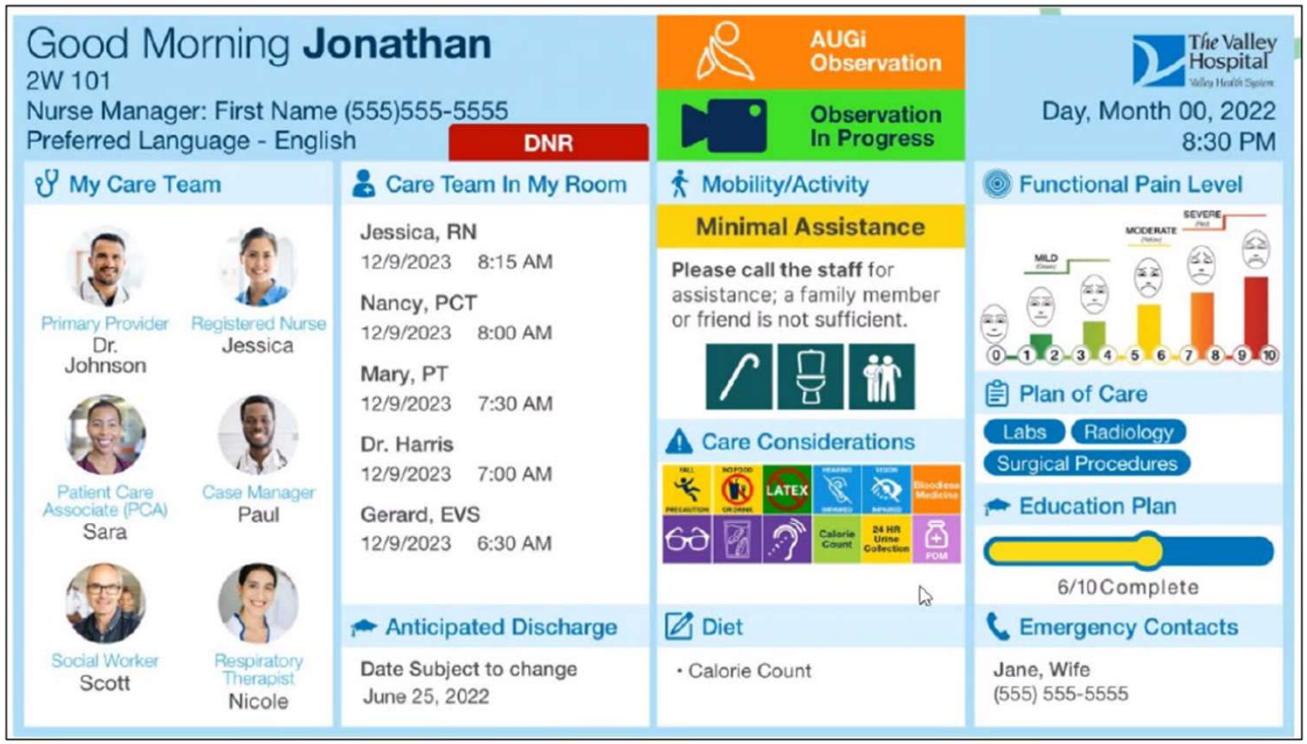
Un mot sur L'engagement patient

Objective 2: Patient Engagement (continued)

- Whiteboard allows patients to see clinical information, care team, general information, education plan, etc.
- Enhances patient engagement and participation in their care.
- Whiteboard versions vary by care area.



HIMSS 25

Empowering Surgical Excellence Through Data-Driven Insights in Robotic Surgery

Session 165, March 6, 2025

Juan Ibarra
System Robotic Program Manager

Marcelo Zottolo
V.P. Data Analytics and Performance Improvement

Odalys Corominas
Advanced Business Intelligence Developer

informa markets

LEE HEALTH

CREATING TOMORROW'S HEALTH

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Lee Health



A private, not-for-profit health system serving Fort Myers and surrounding communities.

- Established in 1916.
- Four acute care & two specialty hospitals, two OSCs, two ASCs, and > 100 practice locations.
- Over 15,000 employees, including 1,200+ physicians.
- 71 operating rooms.
- Over 51,000 surgical procedures were performed in 2024.











Strategic Drivers of Growth

1 **Enhancing Patient Outcomes with Data-Driven Insights**

Leveraging analytics to demonstrate robotic surgery value.

2 **Streamlining Operations with Data - Backed Decisions**

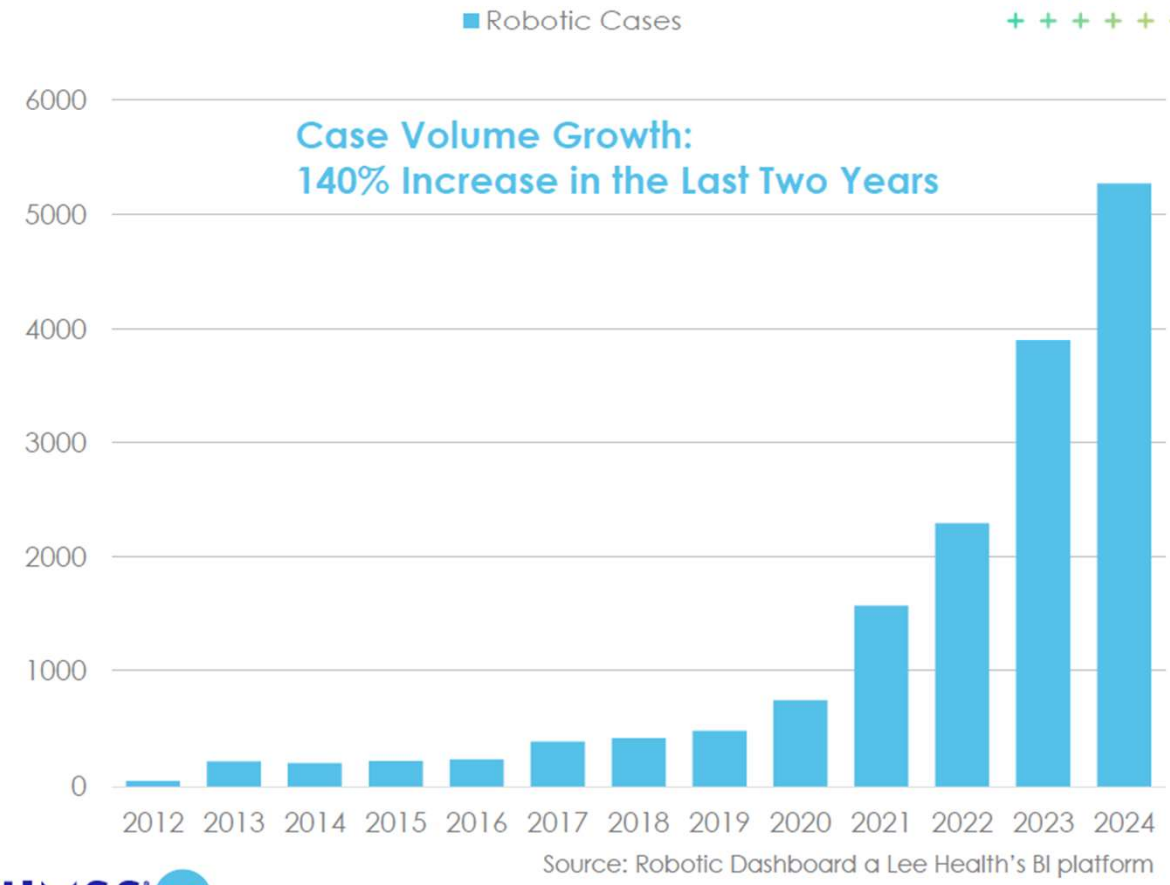
Using data insights to optimize OR utilization, staffing, and scheduling.

3 **Optimizing Physician Engagement and Experience**

Boosting buy-in and satisfaction through effective communications, improvement in operation and transparent performance metrics.

4 **Supervising Costs via the Dashboard**

Real-time monitoring of financial metrics for continuous improvement.



Source: Robotic Dashboard a Lee Health's BI platform

Key Clinical Metrics

1. *Average Length of Stay*
2. *Conversion to Open*
3. *Surgical Site Infections*
4. *30 Days Readmissions*
5. *30 Days Reoperations*
6. *90 Days Mortality*



Robotic Surgery Program



29 robotic devices across the System

Over 100 robotic-trained physicians
until October 2024





2012

2010
Da Vinci S

2015
dV S

2017
dV Xi



2019
2 dV Xi

2020
3 dV Xi

2021
6 dV Xi



2022
8 dV Xi
ION
dV SP
2 ROSA
Excelsius



2023
15 dV Xi
2 ION
2 dV SP
3 ROSA
2 AquaBeam



2024
16 dV Xi
4 ION
1 dV5
2 dV SP
3 ROSA
2 AquaBeam
1 Excelsius





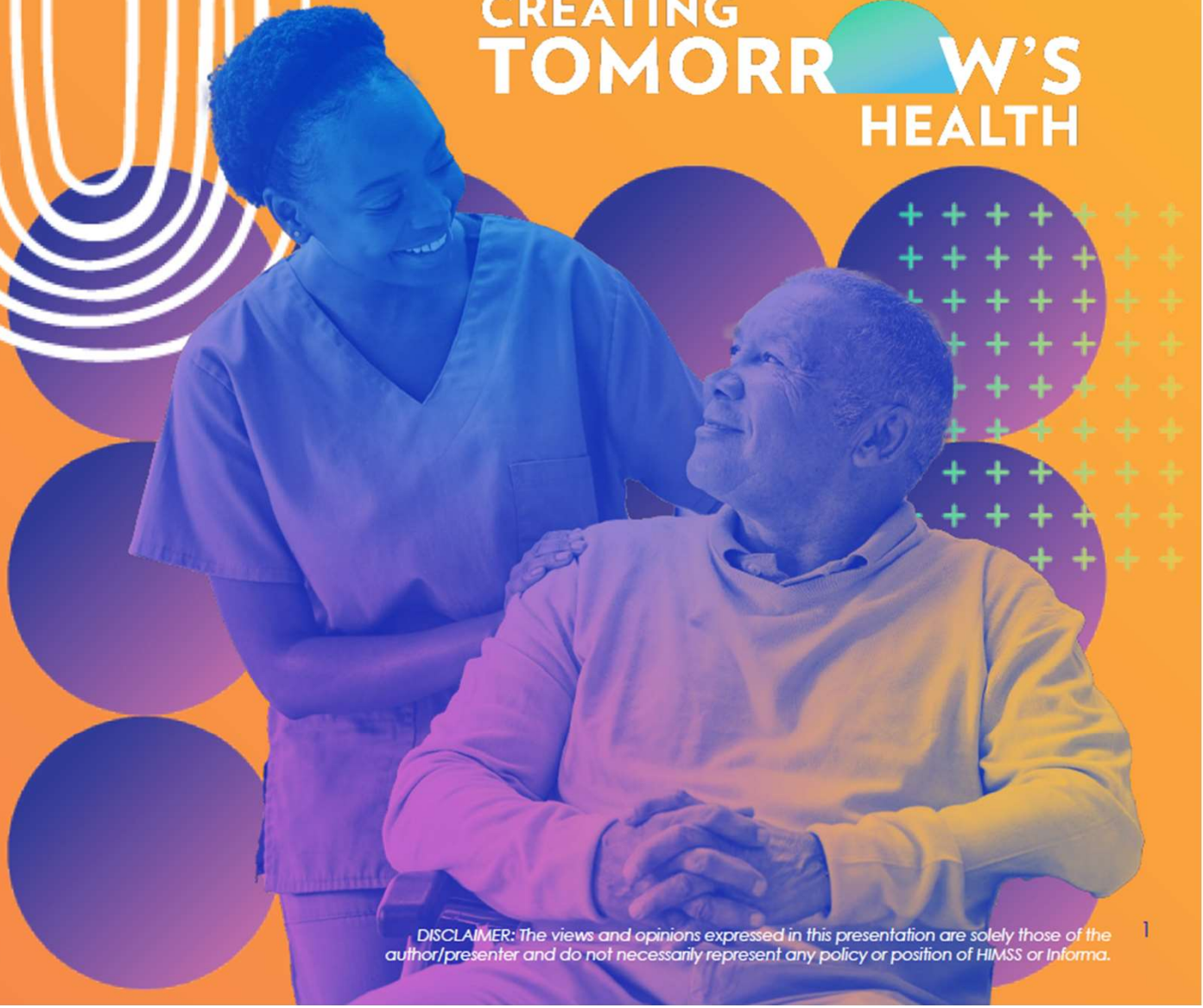


HIMSS 25

CREATING TOMORROW'S HEALTH

A High Reliability Journey: First Canadian Bi-Directional Infusion Pump Interoperability

Session 66, March 4, 2025



Mackenzie Health

Raman Rai RN, MScN, BScN
Program Director, Medicine
Mackenzie Health

Susan Simao MBA, BScPHm, RPh, ACPR
Director, Pharmacy & Medication Management
Mackenzie Health

Andrea Shum PMP, MSc, BSc
Director, Projects & Innovation, Digital Health
Mackenzie Health

informa markets

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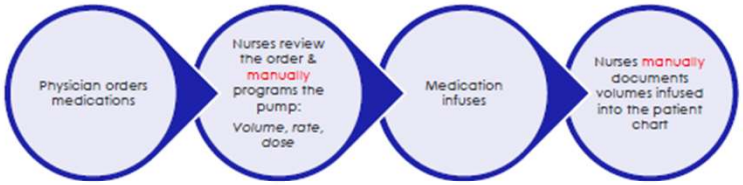
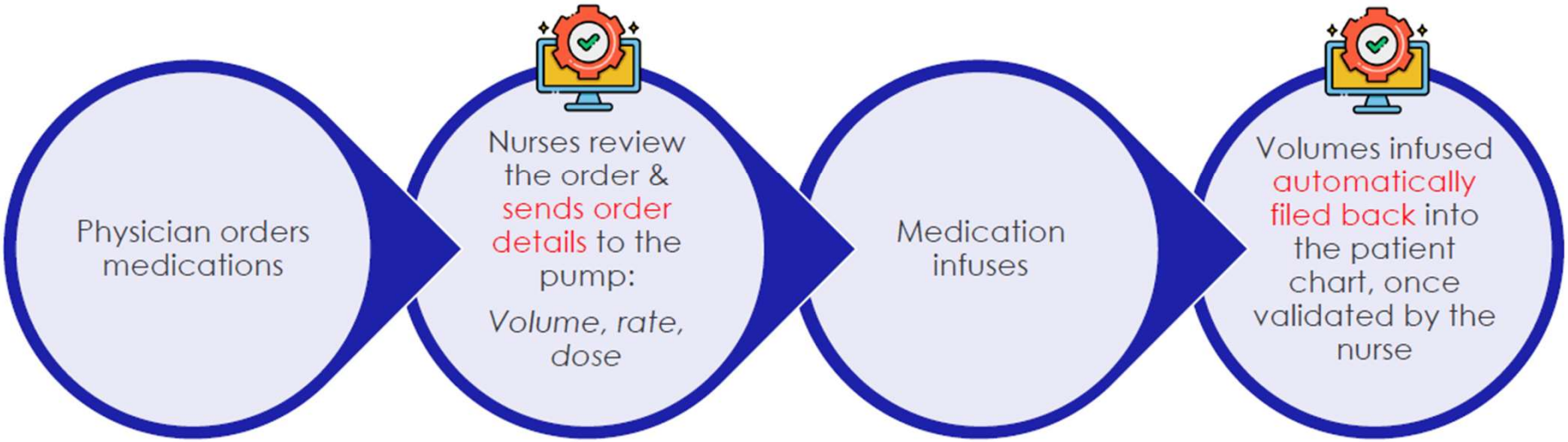
Interoperability workflow





Mackenzie Health

KEY KPI

Beds	785
Admissions	48,000+
ED Visits	207,155
Staff	5200+
Physicians	550+

HIMSS EMRAM Stage 7 since 2018

2-time HIMSS Davies Award Winner



IV-Pump Interoperability:

Sounds Simple…
'Difficult but worth the effort…'

- IV-Smart Pumps in place but not networked (2017)
  - **Stage 1A:** Wireless connectivity allowing rapid updating and editing of Dose Error Reduction System (DERS) Software (Drug Libraries) on pumps
  - **Stage 1B:** Drug library optimization in preparation for Interoperability
  - **Stage 2A:** Test Environment: Order Strings from EMR to pre-populate pumps infusion parameters for each infusion
  - **Stage 2B:** Go-live with 'scan-scan-scan…'



HIMSS 25

Enterprise Imaging: Looking Back, Looking Forward

Session 183, March 6, 2025

Chris Roth, MD
Vice Chair, Department of Radiology
Associate CMO, Imaging Service Line
Duke University

Alexander Towbin, MD
Associate Chief, Department of Radiology
Associate CMIO. Associate Chief of Staff
Cincinnati Children's

Dawn Cram
Principal Consultant, EI and AI
The Gordian Knot Group, LLC

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30% of the world's data is from healthcare

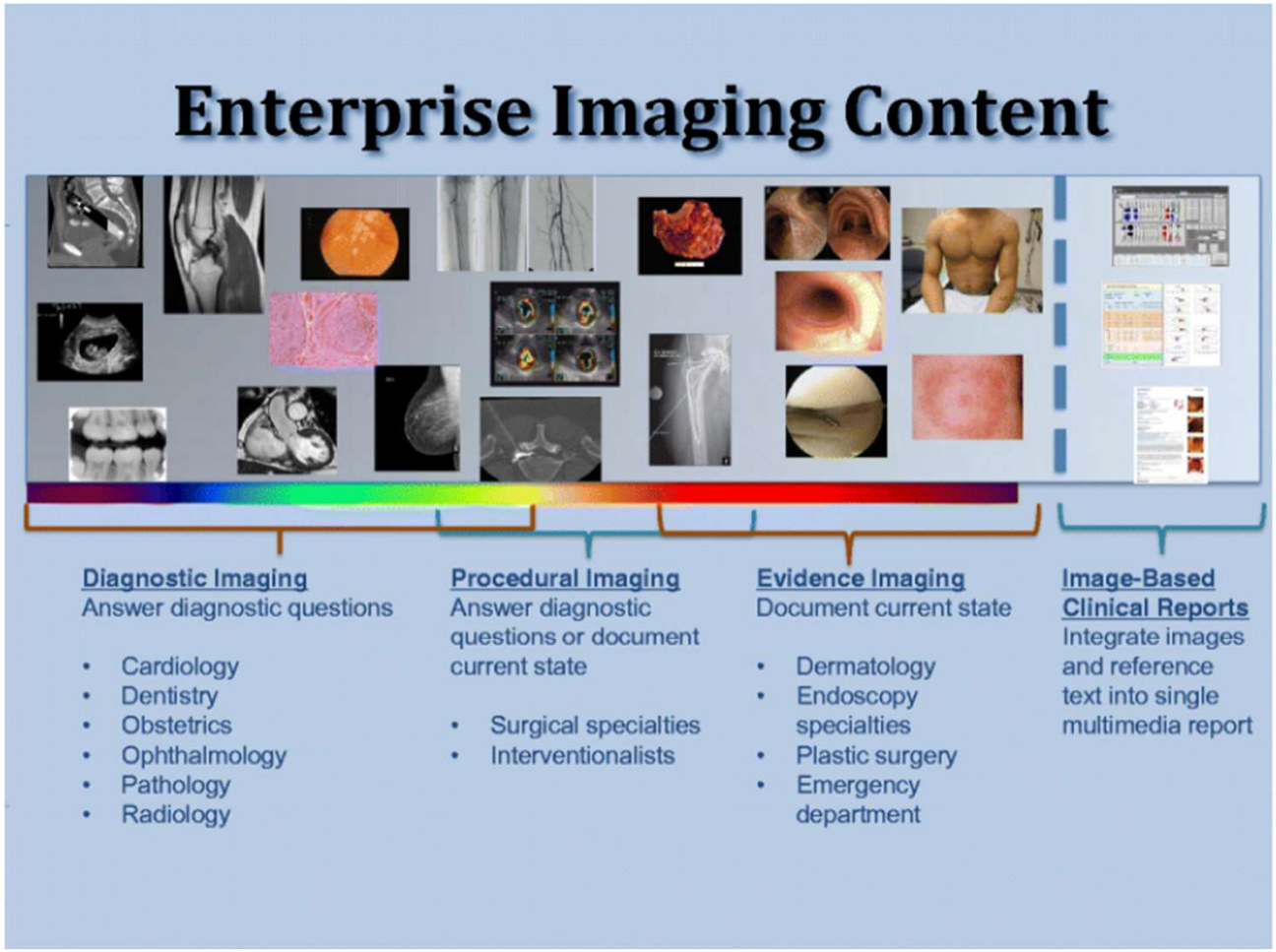
https://www.rbccm.com/en/gib/healthcare/episode/the_healthcare_data_explosion

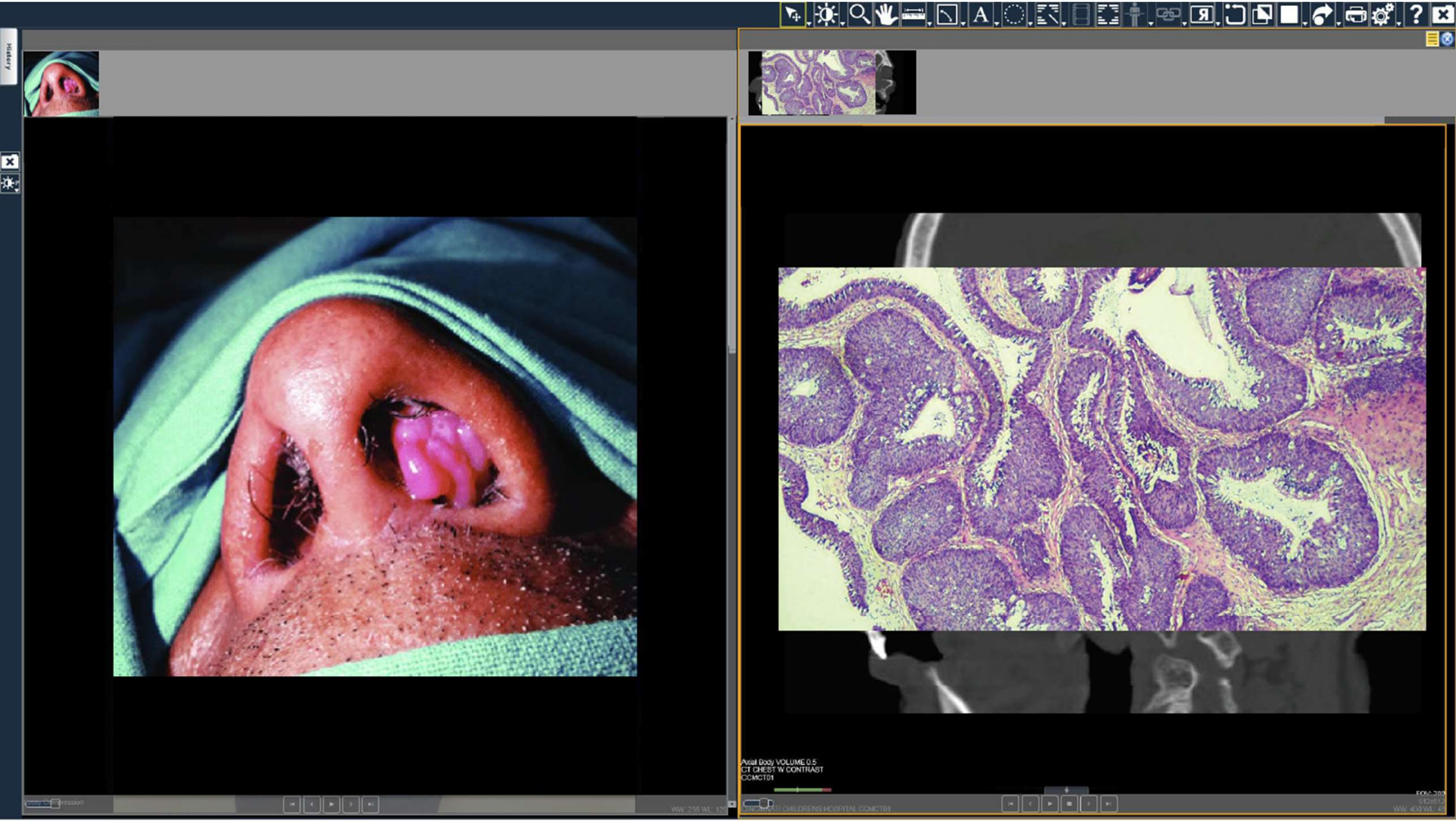


90% of healthcare data consists of medical images

https://www.forbes.com/councils/forbestechcouncil/2024/01/08/your-medical-imaging-data-is-going-to-waste-heres-how-to-unlock-its-potential/

HIMSS-SIIM EI Community 2014-2024




Axial Body VOLUME 0.5
CT CHEST W CONTRAST
CCMCT01

	Workflow step	Modality	Study Description	Institutional Department Type Code Sequence	Anatomic Region Sequence	Image Laterality	Primary Anatomic Structure Sequence
1	Emergency Medicine physician-acquired photo	XC	Photo – Nose	Emergency Medicine	Head/Neck	Left	Nose
2	Otolaryngologist physician-acquired photo	XC	Photo – Mouth	Otolaryngology	Head/Neck		Oropharynx
3	CT	CT	CT Face	Radiology	Head/Neck		
4	Nasolaryngoscopy	XC	Nasolaryngoscopy	Otolaryngology	Head/Neck	Left	Nasal cavity
5	Gross pathology	GM	Gross Specimen – Nose	Pathology	Head/Neck		
6	Histopathology	SM	Whole Slide - Nose	Histopathology	Head/Neck		
7	Wound-care photo	XC	Photo – Wound – Nose	Wound Care	Head/Neck		
8	Nasolaryngoscopy	XC	Nasolaryngoscopy	Otolaryngology	Head/Neck	Left	Nasal cavity

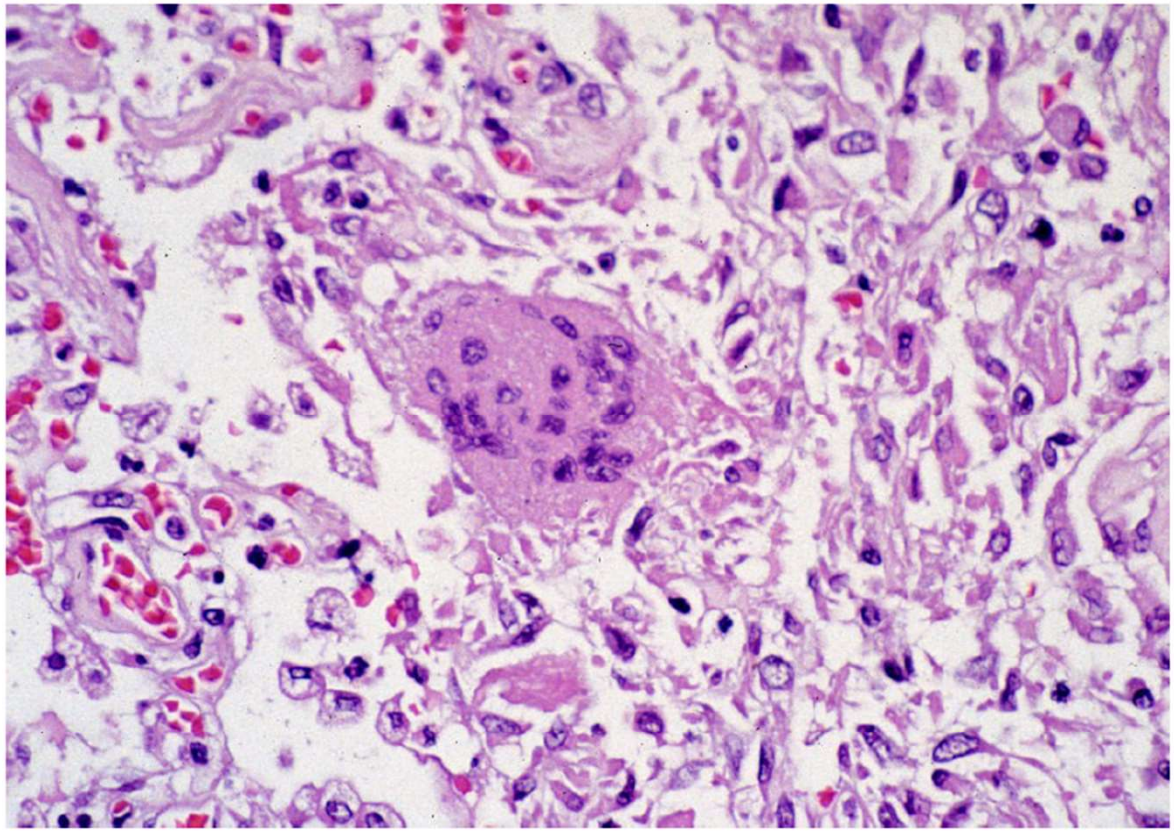
Sensitive Content

Anything that may cause offense to a reader or user, particularly in relation to religion, race, gender, politics, sexuality, disability, or vulgar language.

-Oxford Languages'

Pathology - Challenges

- Size of images / slides (1.2GB and greater)
- DICOM vs non-DICOM
- Infrastructure
- Distribution
- Interoperability
- Accessibility
- FDA clearance



EI Acquisition Workflow: Point of Care Imaging

Ultrasound

- Urology
- Surgery
- Neurology
- OBGYN
- Emergency Services
- Anesthesia
- ENT

ECGs

- Anesthesia
- Internal medicine / family medicine
- Inpatient
- Emergency Services

Clinical Photos

- Dermatology
- Otolaryngology
- Emergency Services
- Wound Care
- Internal Medicine
- Ophthalmology
- Inpatient

Future: AI

Clinical AI Use Cases

1. **AI-Assisted Radiology**: AI algorithms can help radiologists detect and classify abnormalities in medical images, such as X-rays, CT scans, and MRIs.
2. **AI in Pathology**: AI can assist in analyzing pathological slides, identifying cancerous cells, and other anomalies.
3. **AI in Ophthalmology**: AI systems can help in diagnosing eye conditions by analyzing retinal images.

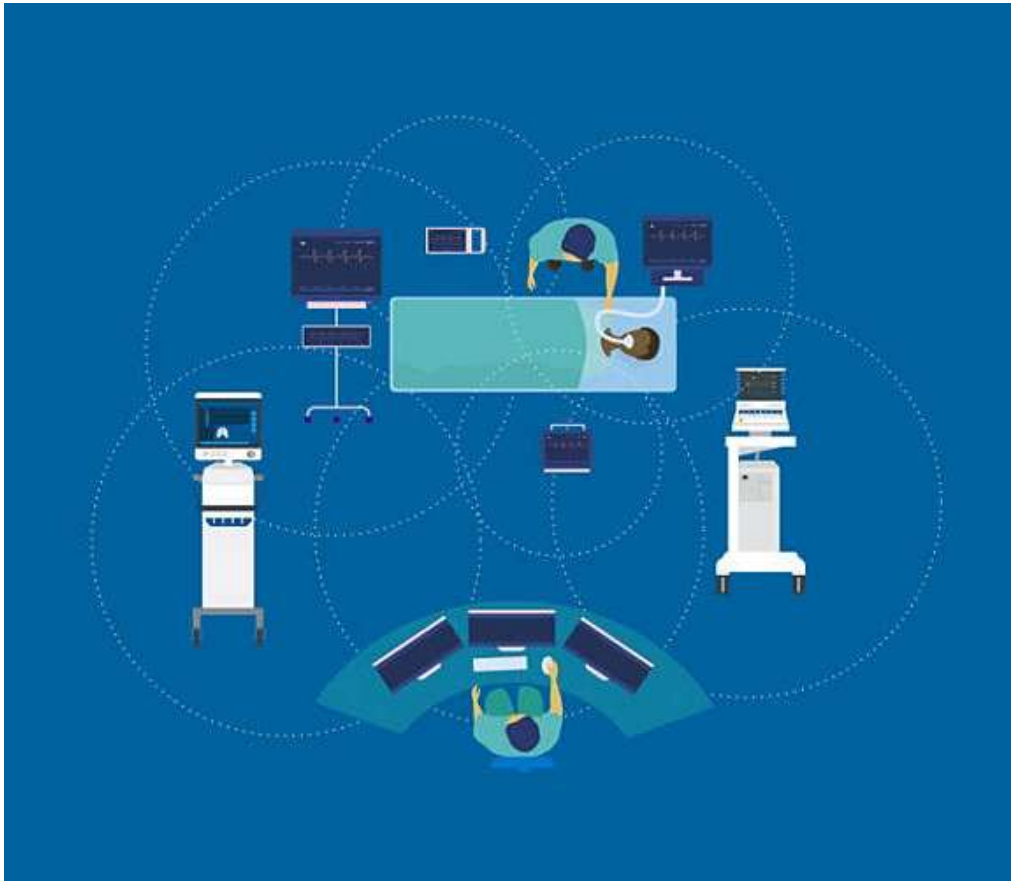






L’interopérabilité des ÉM connectés :

vers un nouveau paradigme?



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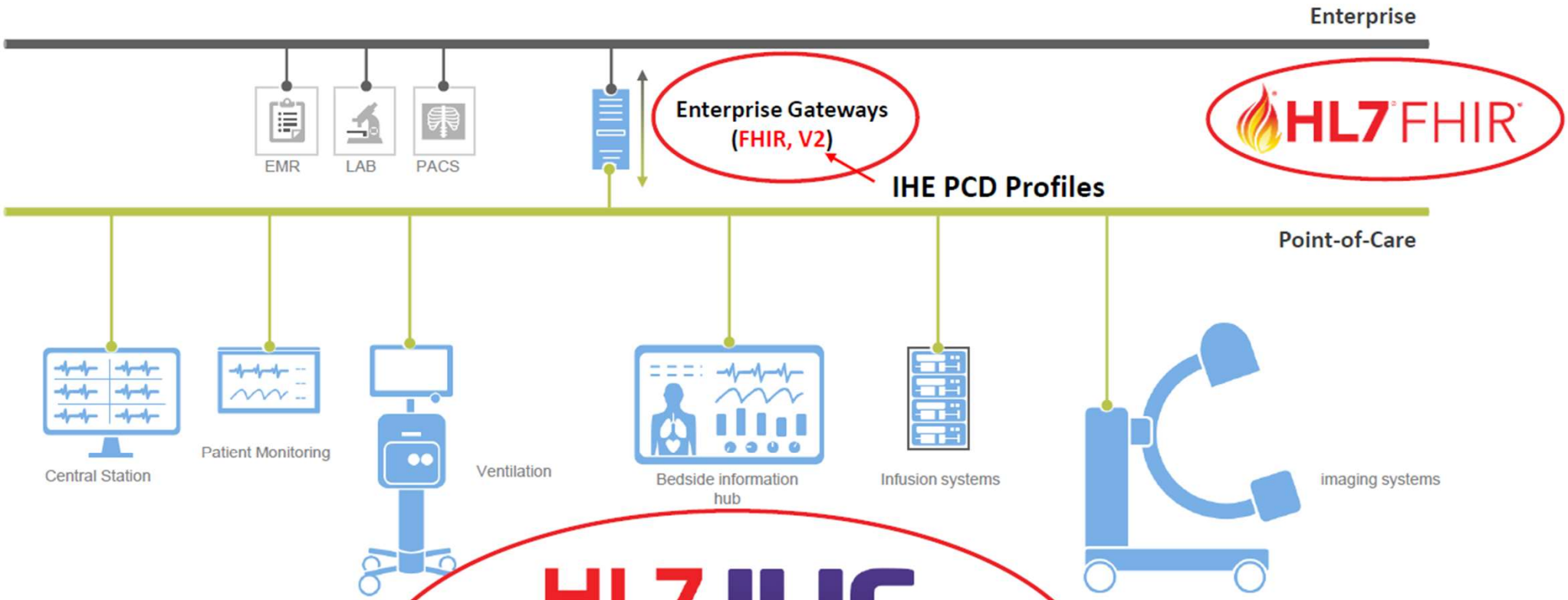
Vers une réelle interopérabilité?



TODAY - Exchange



FUTURE - Interoperability



- Plug-and-Trust D2D
- Acute Point-of-Care
- Isosemantic V2 & FHIR Bidirectional Gateways

HL7 International IHE

A Joint HL7-IHE Gemini Device Interoperability Project

Service-oriented Device Point-of-care Interoperability (SDPi) Profiles

SDC SERVICE-ORIENTED DEVICE CONNECTIVITY

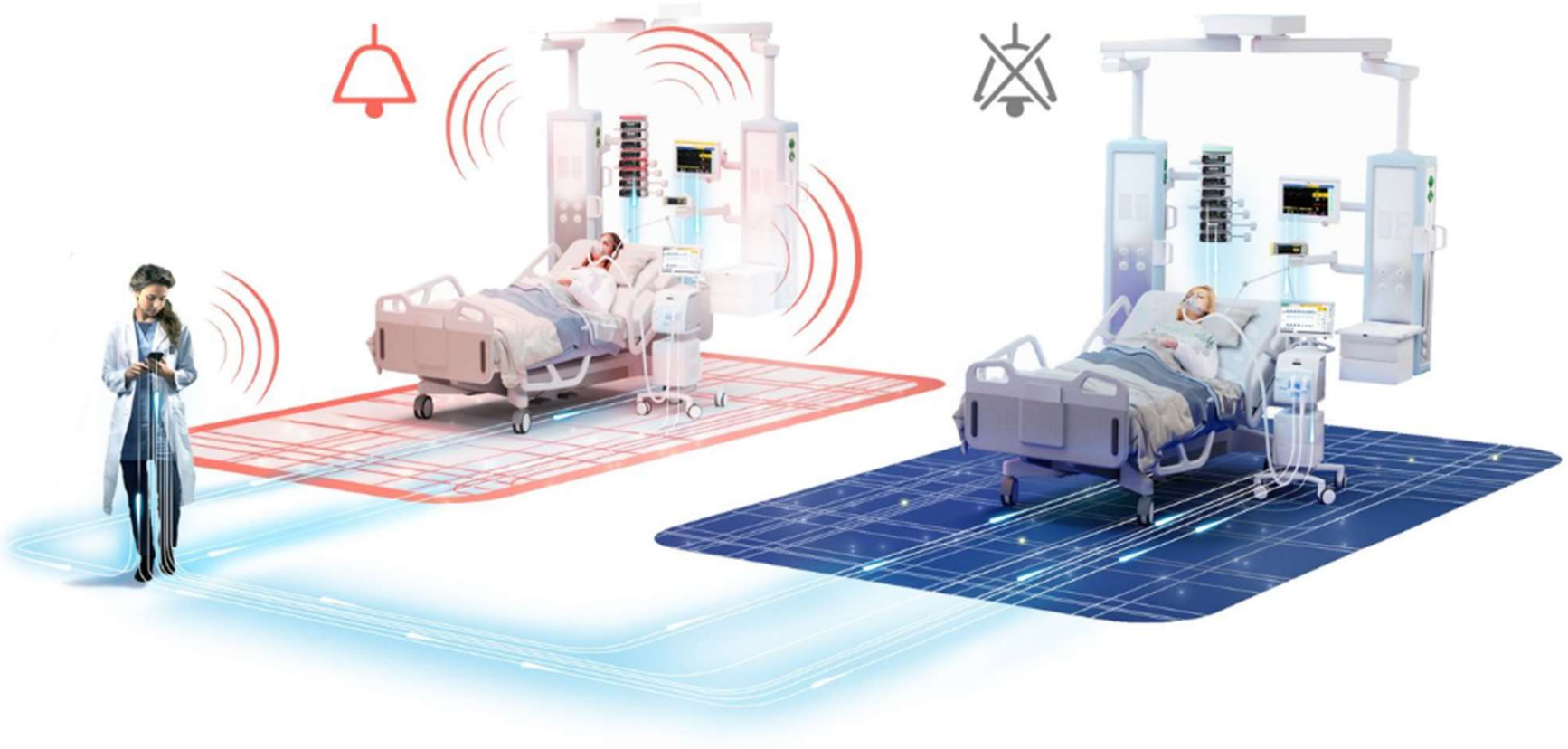
IEEE Advancing Technology for Humanity

ISO HEALTH INFORMATICS TC 215

cen

ACCE

Le soin intensif silencieux



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Quel est l'impact pour nous ?

Comment allons nous gérer les risques liés à l'émergence de ces « écosystèmes » d'équipements médicaux connectés?

Qui est responsable de cette intégration et de son maintien au fil du temps?

- Manufacturiers VS Hôpitaux?
- GBM VS TI?

Qu'en pense les différents législateurs?

Interopérabilité, cybersécurité, ML/AI : mêmes solutions?

Medical Device Interoperability:

The surprising relevance of the Clinical Engineer

Todd Cooper

Todd.Cooper@devices.HL7.org

What about Safety, Effectiveness & Security?

2007 Question (to FDA):

Have you seen any issues with medical devices connected to IT networks?

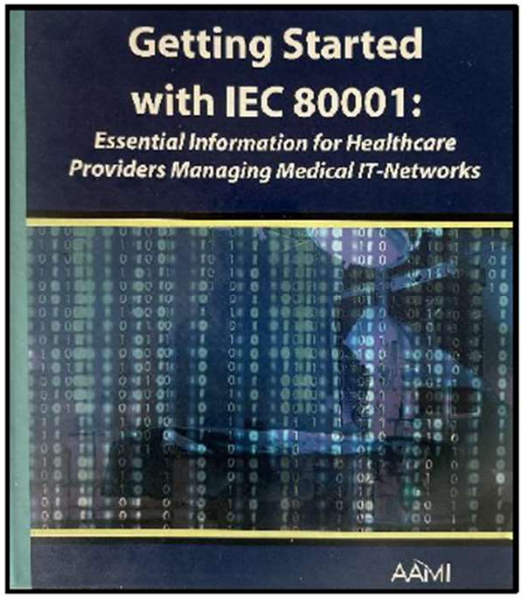
Response:

"Oh, yeah! …"

Introduced 3 Key Properties:

Safety
Effectiveness
Security
} **SES**



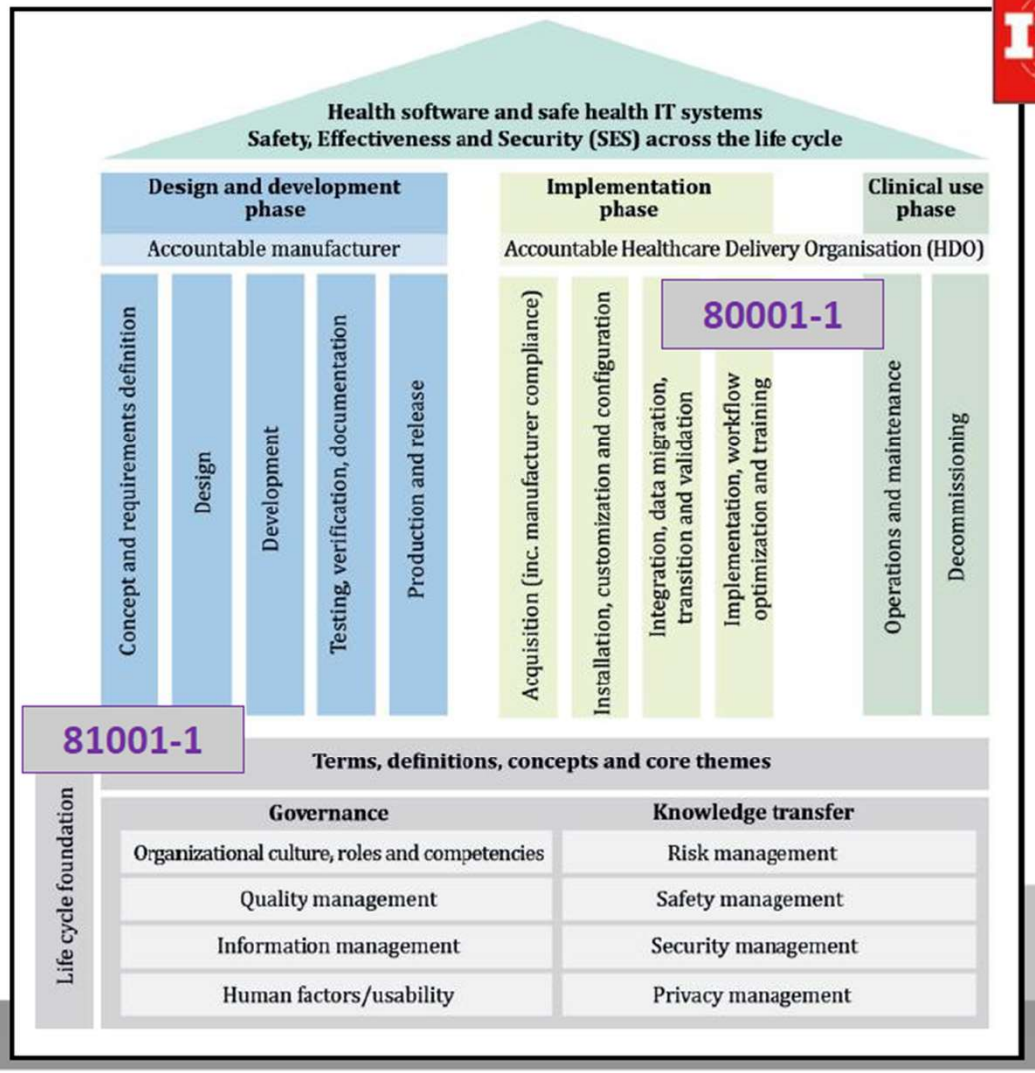


Authors: *Todd Cooper, Sherman Eagles, Yadin David*

ISO/IEC 80001 → 81001-1 …

Broadened 80001 Scope:

- ✓ *Lifecycle (toward TPLC)*
- ✓ *Manufacturers & HDO Responsibilities*
- ✓ *Broaden from Risk Management*
- ✓ *Standardized core set of definitions*
- ✓ *Framework for the application of many other standards*



SDC Checklist & CE-IT “Relevance”

IG·NB

Questionnaire “Interoperability of Medical Devices”

3 Design and development verification

	Source	Requirements	Questions / Comments
1.	ISO 13485, 7.3.6	- design and development verification shall be performed in accordance with planned and documented arrangements to ensure that the design and development outputs have met the design and development input requirements	
		- document verification plans that include methods, acceptance criteria and, as appropriate, statistical techniques with rationale for sample size	Are solid activities in place for interoperability verification?
		- verification shall include confirmation that the design outputs meet design inputs when so connected or interfaced (if the intended use requires that the medical device be connected to, or have an interface with, other medical device(s))	Are for a given SDC system realization documented test results available? Standalone Device Tests - functionality in non-network mode SDC Integration Tests - peer/simulated communication partners Are those complemented by reference system tests including SDC devices from other manufacturers under worst case conditions? Has the manufacturer specified the extent the HDO has to perform system integration verification and confirmation? Has the HDO performed an integration analysis acc. to ISO 80001 standard series? Have further validation activities been carried out?

“Has the HDO performed an integration analysis acc. to ISO 80001 standard series? Have further validation activities been carried out?”

ACCE

2025 : UN POINT TOURNANT?

- Arrivée du DSN comme fondation de notre écosystème numérique
- L'interopérabilité directe entre équipements médicaux devient tangible
- L'intelligence artificielle en santé est à nos portes
- Des défis croissants en cybersécurité

L'expérience, c'est savoir juger de l'importance réelle de chaque information dans la prise de décision

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Merci!

Des questions?



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