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Mahidol University
Wisdom of the Land

Thai Medical Informatics Association

The Digital Health Paradox in Thai Nursing

A Framework for Digital Health Development in Hospitals: Thailand's Experience

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Concurrent Special Topic 3: Nursing Research and Innovations on Digital Health Technology in Nursing Practice

The 2nd International Nursing Research Conference on
"Future Nursing Research and Innovation for Sustainable Global Health"
2-4 December 2025, Miracle Grand Convention Hotel, BKK, THAILAND

Presentation Materials

https://tinyurl.com/3upcu5mb

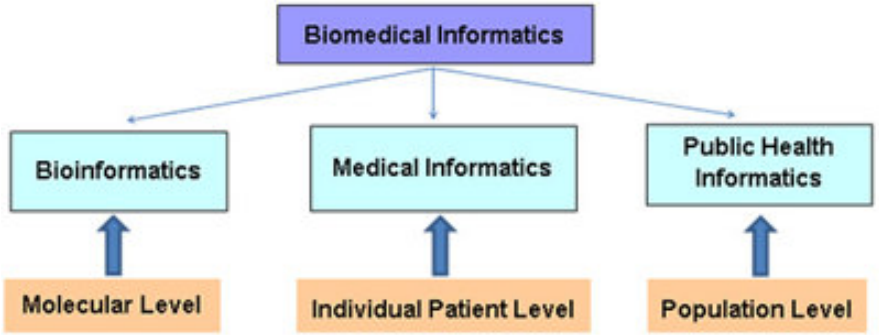
Overview

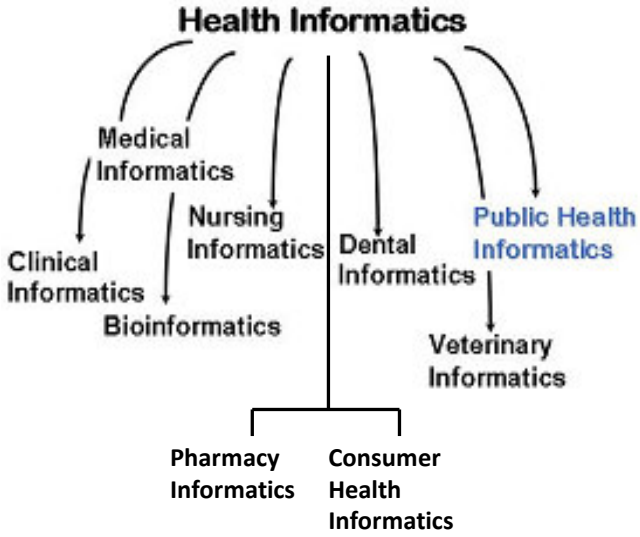
- Informatics & Health Systems Science
- Digital Health 101 : Basic Concepts
- Real Word : Evolution & Disruption
- Digital Nurses Revisited by Deep Research
- A Holistic Framework For Driving Digital Health In Hospitals : HAIT

THE “MISSING PARTS“

INFORMATICS & HEALTH SYSTEMS SCIENCE

History of Health Informatics – the ’80s
Health Informatics Defined





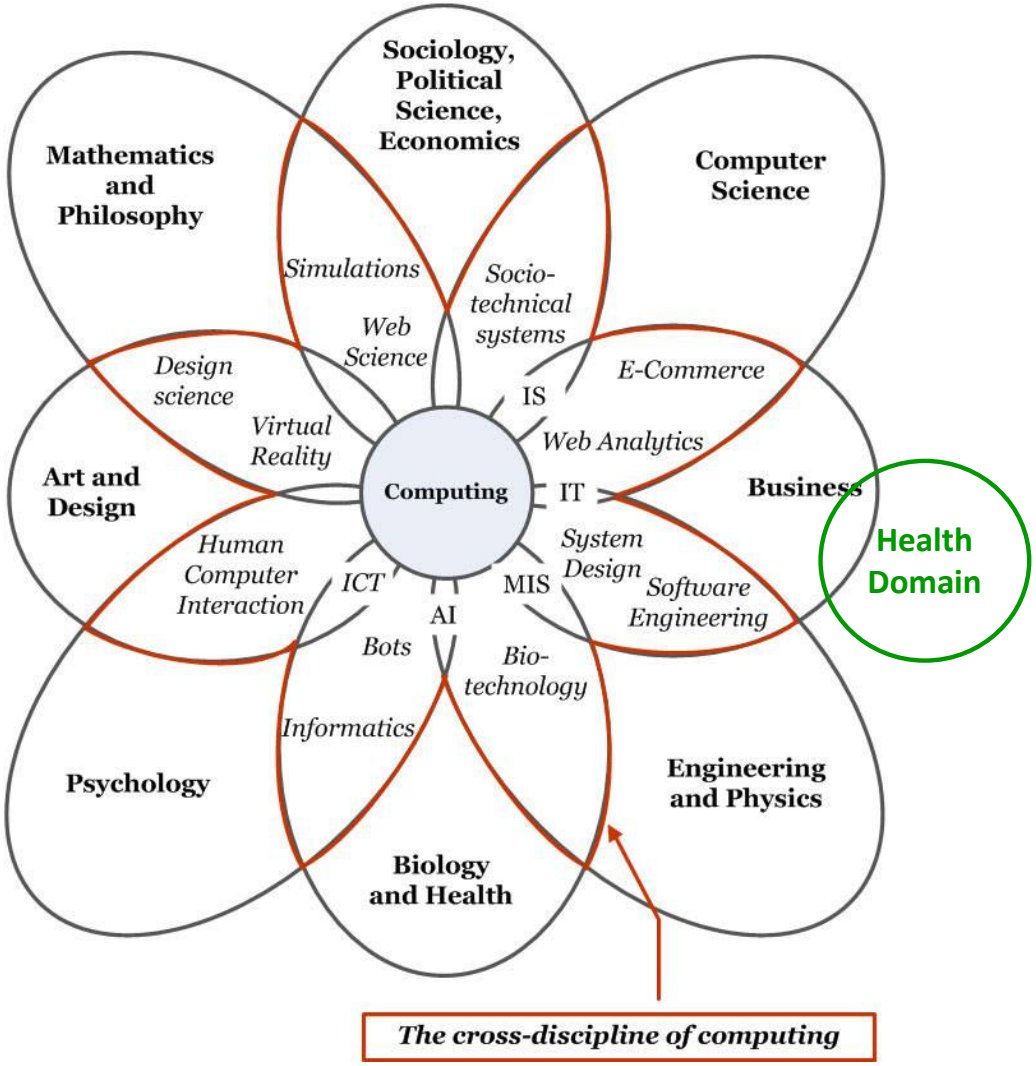
A simple operational definition:
“Computer Applications in Medical Care”

https://ehealth4nija.com/2019/08/12/role-of-health-informatician-in-public-health/
https://www.healthworkscollective.com/long-road-digitization-history-healthcare-informatics/
https://onlinedegrees.kent.edu/ischool/health-informatics/community/history-of-health-informatics

https://medium.com/@bankai_ux/history-of-ux-timeline-infographic-4a2035b5014a
https://osteopathic.nova.edu/msbi/evolution.html
https://hitm.fandom.com/wiki/Health_Informatics

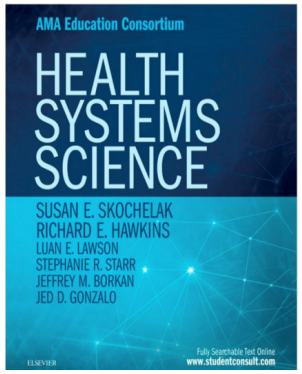
Multi-discipline

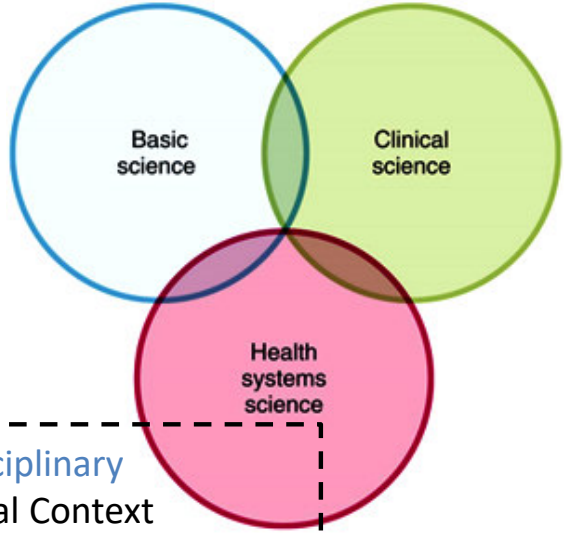
- Socio-technical Discipline
- Information Science
- Informatics
- Health / Bio Informatics
- Nursing Informatics
- Applied Engineering



The Future of Medical Education and the Solution to Improving Health Care : HSS

Health Systems Science. Elsevier, 2017.





Multi-disciplinary

Health System / Social Context

Healthcare Quality / Value-based Care

Digital Health

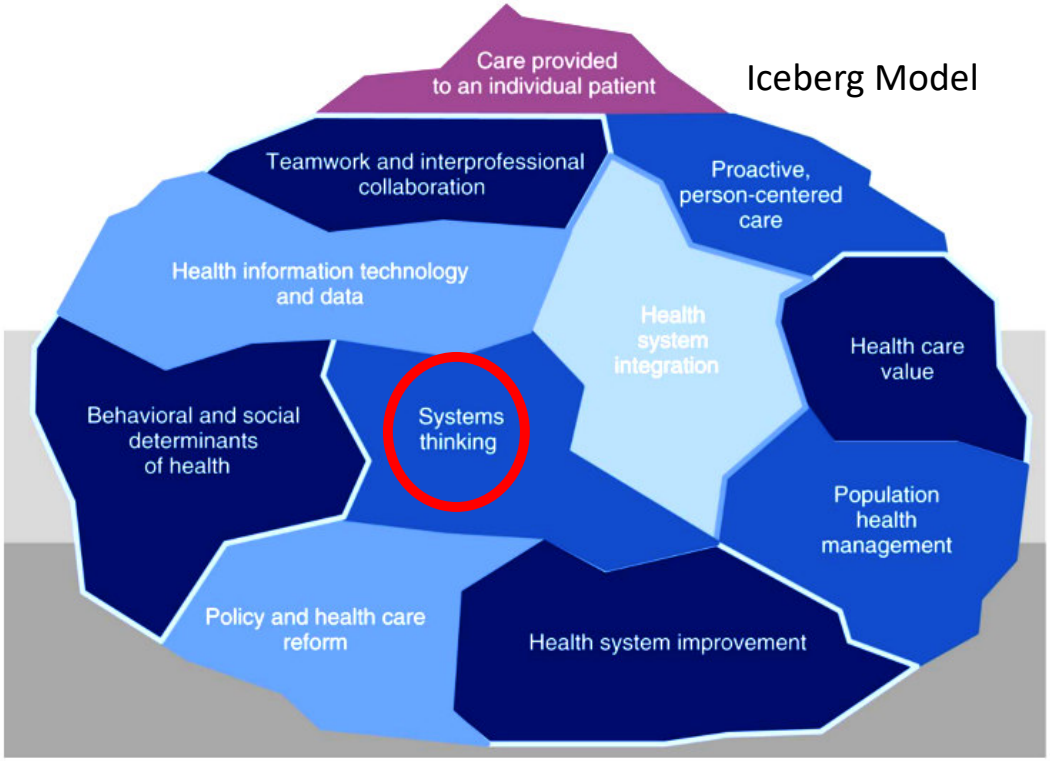
Clinical Informatics

Health Policy & Economics

Population Health

Leadership & Teamwork

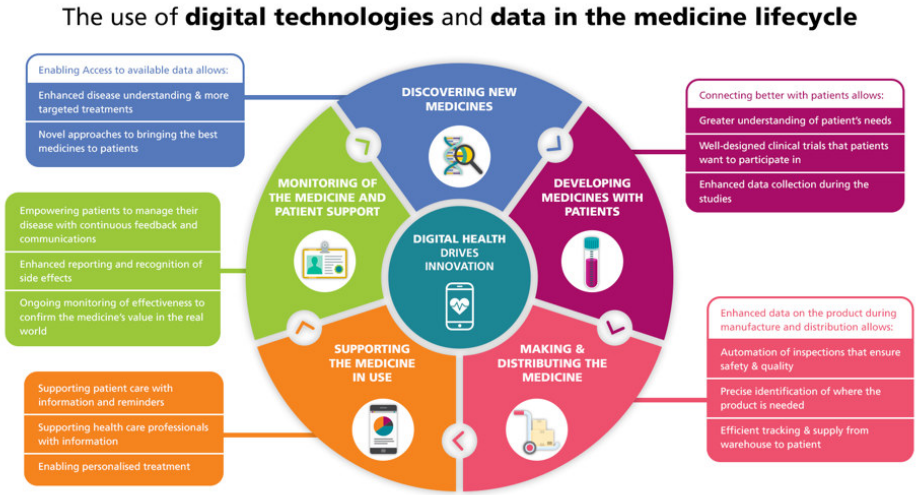
Iceberg Model

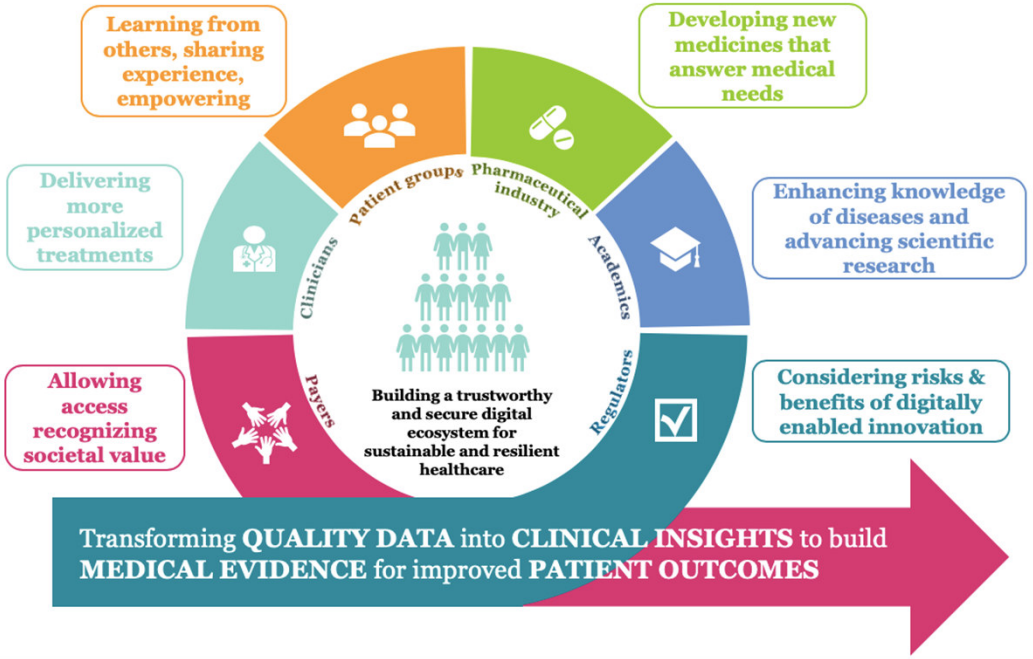


https://www.harvardmacy.org/index.php/hmi/health-systems-science
https://www.ama-assn.org/system/files/2018-10/hss-med-ed-ppt.pdf
https://www.acoi.org/sites/default/files/uploads/Kierstein.pdf

DIGITAL HEALTH 101 : BASIC CONCEPTS

What is Digital Health ?





https://www.efpia.eu/about-medicines/development-of-medicines/digital-health/

Digital Transformation (*for Digital Health)*

- Digital transformation is the process of using **digital technologies** to **fundamentally change** a company's business processes, culture, and customer experiences to meet new market demands. It's not merely about implementing new technology but requires rethinking the business model, becoming **data-driven**, and ensuring **cultural alignment and employee skills** are in place to support the changes.

By Google AI Search

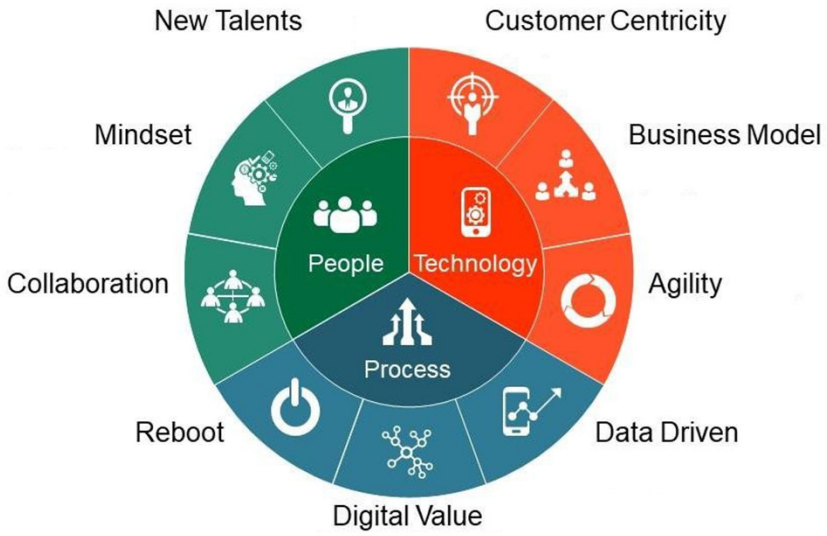
Common Mistakes to Avoid

- **Assuming technology alone is the answer:** Simply buying new technology without changing processes, culture, or strategy will not result in transformation.
- **Underestimating the process:** Digital transformation involves many stages, and underestimating these can lead to failure.
- **Lack of clear strategy:** Without a clear understanding of goals, resources, and the right key performance indicators (KPIs), a digital transformation project is likely to fail.

3 Barriers of Digital Transformation

- **People:** Organizational digital transformation often has to contend with resistance from people to the change required to adopt digital tools/systems.
- **Process:** Organizations must overcome the bottlenecks that arise when transitioning workflows from manual operations to digital and automated processes.
- **Technology:** Given the high complexity of technology today, many organizations face the challenging and complex task of integrating various systems.

3P Golden Triangle
People-Process-Technology



https://techsauce.co/tech-and-biz/digital-transformation-cloud-ntt-communications
https://www.ats-global.com/resources/blogs/people-process-technology-how-the-golden-triangle-drives-digital-transformation/

Digital Skills for Nurses (2025)

- **Problem:** “The digital transformation of healthcare systems and institutions changes the everyday working life of nurses.”
- **Solution:** To ensure contemporary, high-quality technology-assisted healthcare, skilled nurses are required:

1. Education of patients and relatives,
2. Technical skills in the use of new technologies, e.g. to maintain care at a distance,
3. Coordination, communication and participation with all stakeholders,
4. Soft skills (new communication skills, adaptability and problem solving skills),
5. Self-development and information about new technical solutions,
6. Handling of data and media and
7. Participation in the development and introduction of technologies in care

Skills required by bachelor nursing students to meet the challenges of digitalisation in healthcare – results of qualitative expert interviews GMS J Med Educ. 2025 Jun 16;42(3)

Digital Skills for Nurses (2025)

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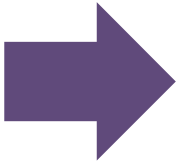
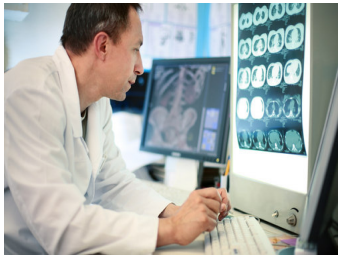
Sarah Palmdorf et al. (2025)

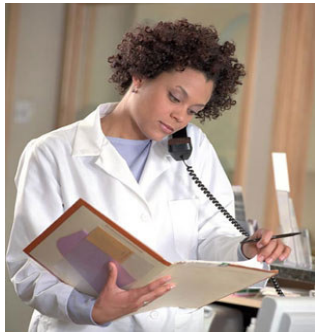
REAL WORD : EVOLUTION & DISRUPTION

Healthcare Technology : Penetration

EMR & Digital Health Services



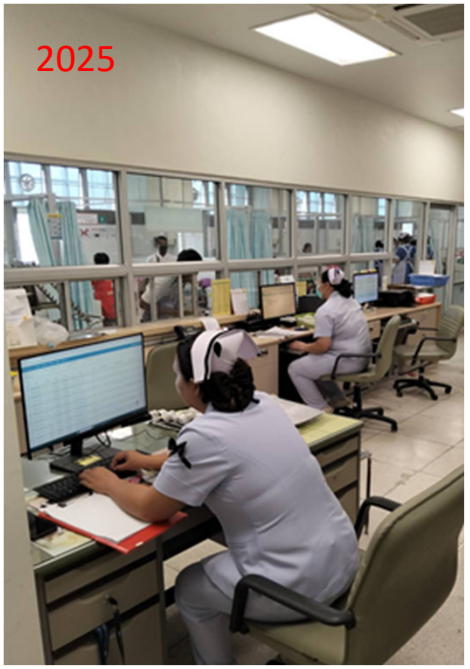




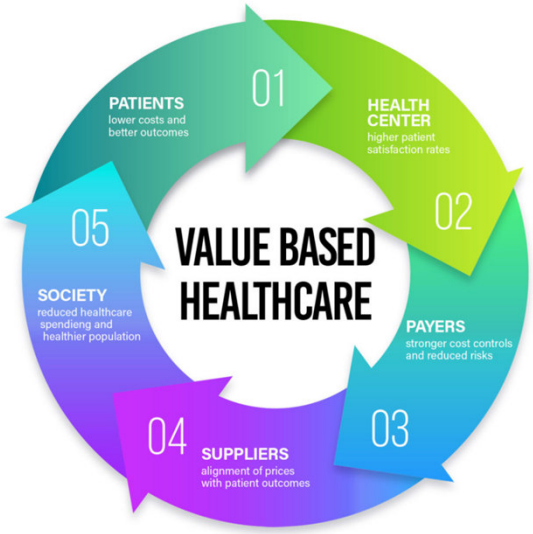
Infrastructure

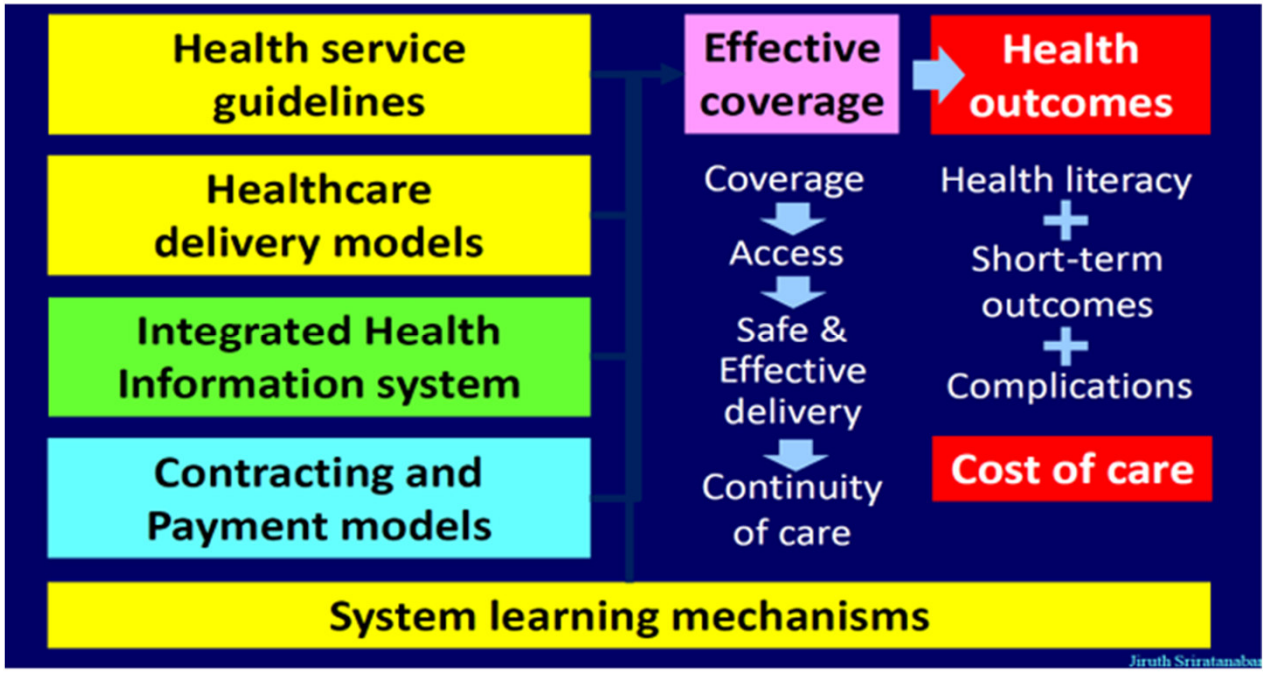
Thailand Public Hospital Settings

Digital Nurses & Doctors



Thailand's Initiative : Value-base Healthcare (2016)



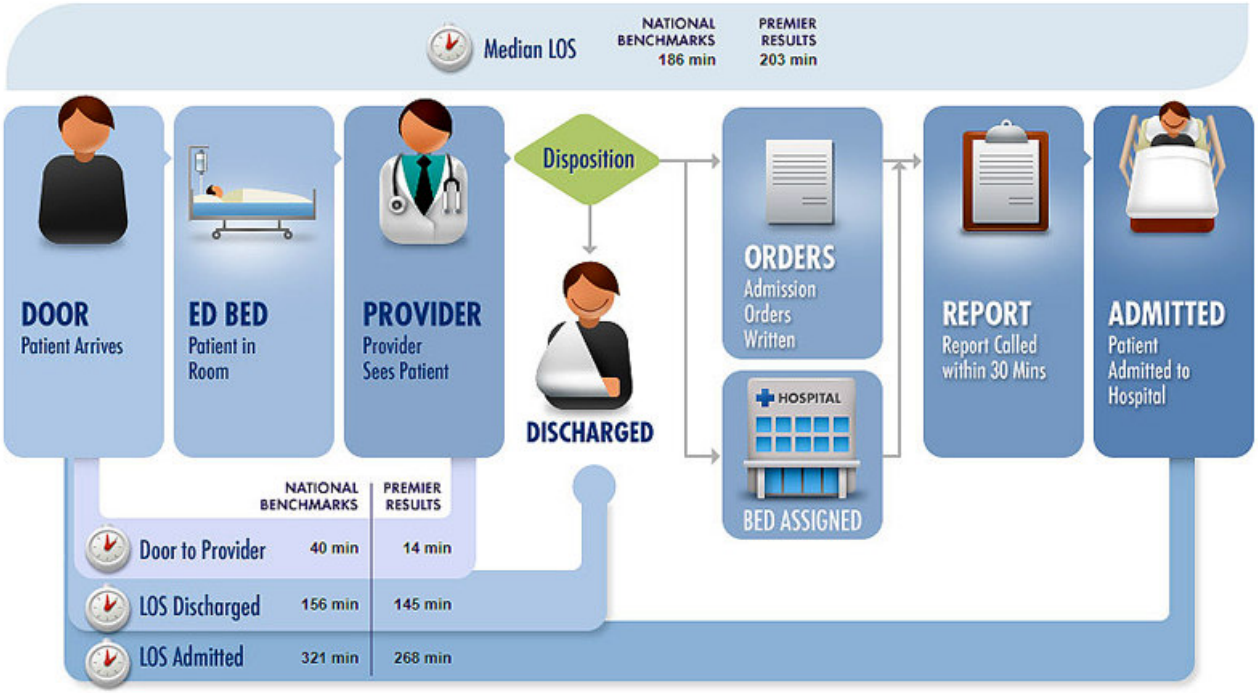


https://www.etkho.com/

HA Forum Thailand 2016

Patient Experience

Patient Journey Map & Touchpoints



What is "the patient experience?" From a patient's perspective, excellent medical care is the least a hospital can provide. To create a great patient experience, healthcare systems must address the entire experience - efficiency, clinical quality and safety, and the human connection. Following is an example of throughput efficiency. See how your hospital measures up to national standards, and even better, Premier standards.

Contact us today to find out how we can help improve your scores.

http://www.premierdocs.com/hospital-services/ed-management-staffing/clinical-operations

Patient Engagement

https://walkerxm.com/blog/a-seet-at-the-table-managing-the-four-drivers-of-patient-experience

COVID-19's "New Normal" & Smart Hospital Goal

The Thai Reality: Operational Collisions

Digital Health
Virtual Workplace

Field Hospitals

Crowded Hospitals

Challenges

- Workforce shortages
- Limited digital literacy
- Insufficient resources
- Etc.

Ransomware & Cyber Attack

Hospitals Become Crime Scenes

EMR Outage Announcement

Delayed Disaster Recovery

A “Can of Worms” in Digital Health Reality

- **Privacy:** Protecting patient data from breaches and misuse is a major concern; many distrust big tech with health information.
- **Trust:** Building trust is difficult due to concerns about data accuracy, risk, and the lack of human interaction in automated systems.
- **Equity:** Digital health benefits may not be shared equally, potentially worsening health disparities across different demographics.
- **Regulation:** The fast-paced digital sector often lacks the rigorous safety and validation standards of traditional healthcare, raising risk concerns.
- **Environment:** The massive data storage required by digital health consumes significant energy, creating worries about its environmental impact.
- **Patient Care:** Over-reliance on technology could reduce personalized care, or technology may be seen as a cure-all rather than a specific tool.

Digital health offers compelling possibilities

but is associated with many unresolved & complex issues.

Benefits of Digital Systems / Digital Health
Digital nursing technologies

- For Patients
  - Increased Access: via telemedicine
  - Better Engagement: tools like mHealth apps
  - Improved Outcomes
  - Cost Savings
- For Providers and Organizations
  - Data-Driven Decisions
  - Operational Efficiency
  - Enhanced Coordination
  - Reduced Errors

Google AI Search Summary

Digital nursing technologies encompass a broad spectrum of tools designed to support nursing practice.

- We identified 213 reviews on digital technologies' uses in the nursing sector. Mainly focused on information and communication technologies.
- the execution of nursing tasks, information management and job control.
- Adverse effects related to mental and physical strain, such as increased frustration, fatigue, and burnout.

Digital technologies in nursing: An umbrella review. Int J Nurs Stud (Jan 2025)

https://www.sciencedirect.com/science/article/pii/S0020748924002633

DIGITAL NURSES REVISITED
BY DEEP (AI-ASSISTED) RESEARCH

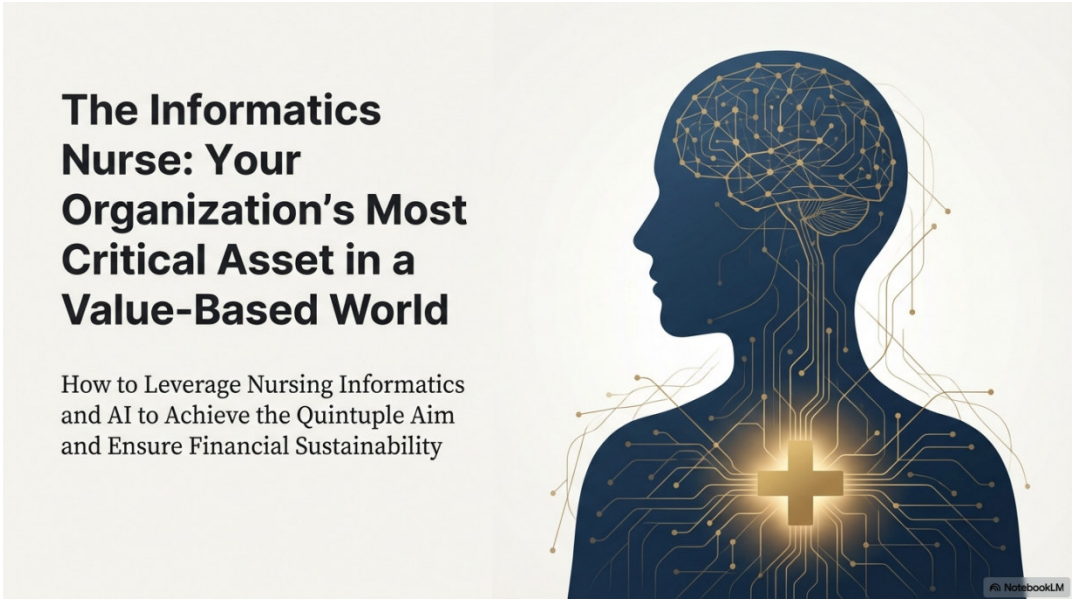
Gemini's Deep Research & NotebookLM

Prompts & Outputs

Digital health and AI in healthcare has been proliferated worldwide. Does this include the-state-of-the-art in nursing informatics ? How does this affect professional nurses and skills development in value-based healthcare ?

Including data governance and electronic medical records.

Adding nursing curriculum re-design and perhaps recruitment of nursing students.



1. Presentation (pdf) [Link to Google Drive]
2. Video overview (mp4)
3. Audio overview EN/TH (mp3)
4. Research report (20-page pdf)

Nursing Informatics, AI, and Value-Based Healthcare
Gemini's Deep Research Plan

(1) Define the core principles of Value-Based Healthcare (VBHC) and analyze the foundational role of nursing informatics and AI in measuring and achieving desired patient outcomes and cost efficiency.
(2) Investigate the specific responsibilities of professional nurses in data governance and ensuring Electronic Medical Record (EMR) data quality, and how these directly enable the financial and clinical success of VBHC programs.
(3) Determine the advanced competencies and skills development pathways required for nurses to effectively leverage AI tools and lead initiatives under a VBHC model, focusing on performance metric interpretation and predictive analytics.
(4) Analyze strategies for nursing curriculum re-design to proactively embed core informatics, AI literacy, and VBHC principles into professional education
(5) Research the impact of digital health proliferation on the recruitment pipeline for nursing students and identify effective strategies to attract and retain informatics-competent candidates.
(6) Collect global examples and case studies demonstrating successful alignment between nursing informatics implementation and improved VBHC outcomes.
(7) Explore the challenges and opportunities of applying VBHC concepts, supported by nursing informatics, in resource-constrained environments or developing countries.

[Deep Research] The Informatics Imperative: Navigating Digital Transformation, AI, and Value-Based Care in Professional Nursing

- The Confluence of Digital Health, AI, and Value-Based Care (VBHC)
  - Patient Satisfaction and Experience (PREMs)
- The Centrality of Nursing Informatics (NI)
- Nursing Informatics as a Financial and Strategic Asset

The State-of-the-Art in Nursing Informatics and Value-Based Care

A. Defining Value and Outcomes in the Digital Age
B. NI Applications for Optimized Outcomes and Efficiency
C. AI's Role in Augmenting Value
D. The Transition from Task-Based to Data-Driven Practice

[Deep Research] Nursing Informaticist or Digital Nurse

Data Governance, EMR Optimization, and the Nurse as Data Steward

- Data Quality as the Foundation of VBHC Financial Success
- Clinical Documentation Integrity (CDI) and the Nurse
- Nurse Leadership in Data Governance (DG)
- Documentation as Value Creation

Curriculum Redesign: Future Nursing Workforce (for Nursing Practice)

- Nursing Informatics (NI) Literacy
- Digital Literacy (DL) i.e. Digital Skills
- Health Information Literacy (HIL)
- AI Literacy

21st Century Skills Requirement

A “SILVER BULLET” FOR DIGITAL TRANSFORMATION WITH LIMITED RESOURCES

A HOLISTIC FRAMEWORK FOR DRIVING DIGITAL HEALTH IN HOSPITALS : HAIT

Hospital IT & Healthcare Quality : “Advocacy”

1991 Self owned http://www.tmi.or.th

1999 State owned http://www.ha.or.th

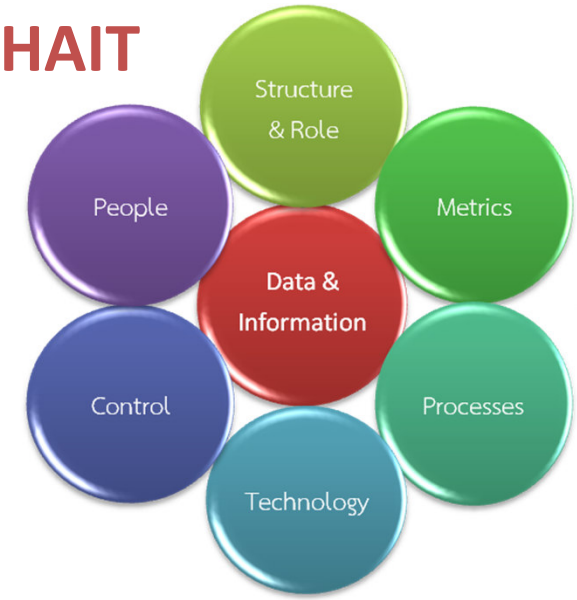
TMI Hospital IT Quality Improvement Framework (HITQIF) 2010

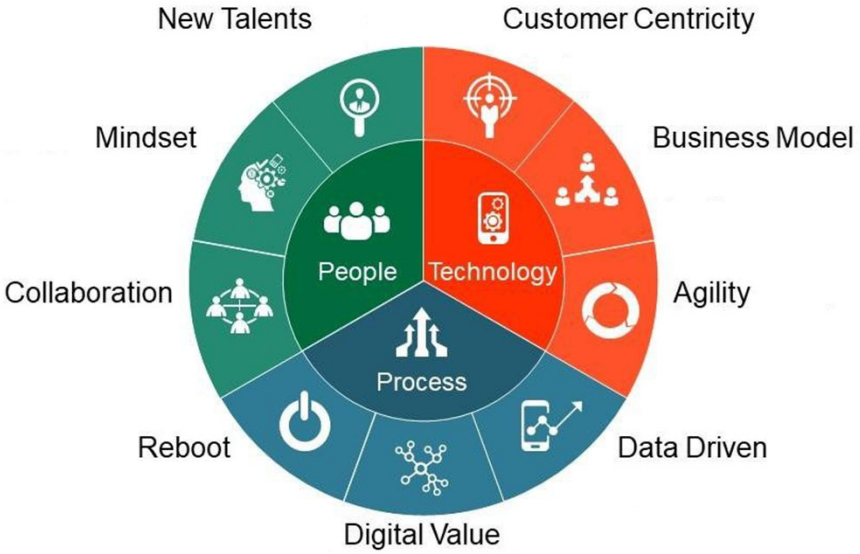
สถาบันรับรองคุณภาพสถานพยาบาล (องค์การมหาชน)
The Healthcare Accreditation Institute (Public Organization)
http://www.ha.or.th

Thai Medical Informatics Association
http://www.tmi.or.th

- Health-IT Standards, Best Practices & Frameworks
  - ITIL, ISO, COBIT 5, NIST, WHO's Toolkits

HAIT





3P Golden Triangle

Maturity Model

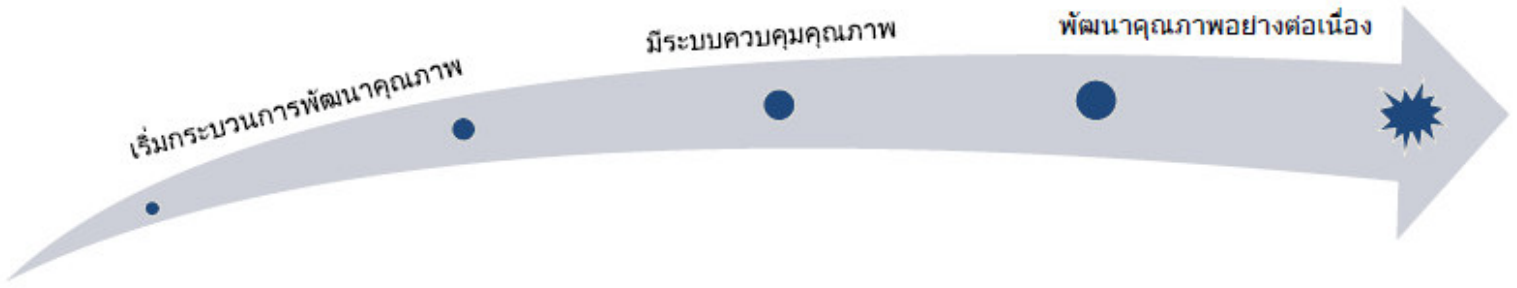
Enablers

Document HAIT http://tmi.or.th/download/
Introduction HAIT (Thai) https://youtu.be/6VefJowSu5o

THE THAI MEDICAL INFORMATICS ASSOCIATION 2013

Hospital IT Maturity Model : Executive Summary

บทสรุปสำหรับผู้บริหาร การพัฒนาคุณภาพเทคโนโลยีสารสนเทศโรงพยาบาล จะเริ่มจากการสร้างความตระหนักและประเมินคุณภาพตามกรอบการพัฒนาเทคโนโลยีสารสนเทศโรงพยาบาล โดยในระยะเริ่มต้น สมาคมเวชสารสนเทศไทยสามารถส่งผู้เชี่ยวชาญร่วมสนับสนุนโรงพยาบาลในการดำเนินการพัฒนาคุณภาพ ค้นหาและจัดการความเสี่ยงในระบบสารสนเทศ ปรับแผนยุทธศาสตร์เทคโนโลยีสารสนเทศให้ตอบสนองต่อวิสัยทัศน์และพันธกิจทุกๆด้านของโรงพยาบาล ดำเนินกิจกรรมต่างๆ เพื่อ ยกระดับคุณภาพระบบสารสนเทศโรงพยาบาล ให้ผ่านระยะต่างๆจนไปถึงระดับที่ 4 เพื่อให้โรงพยาบาลมั่นใจว่าระบบสารสนเทศมีการดำเนินการเป็นเลิศใน ระดับต้นของประเทศ ระบบสารสนเทศเป็นกลไกสำคัญในขับเคลื่อนโรงพยาบาลให้เจริญก้าวหน้าตามวิสัยทัศน์ที่วางไว้



Level 0	Level 1	Level 2	Level 3	Level 4
• โรงพยาบาลยังไม่มีกระบวนการพัฒนาคุณภาพระบบสารสนเทศ	• โรงพยาบาลเริ่มกระบวนการพัฒนาระบบสารสนเทศ มีการค้นหาและจัดการความเสี่ยงจนมั่นใจว่าระบบมีความมั่นคงปลอดภัย และใช้งานระบบให้ตอบสนองต่อวิสัยทัศน์และพันธกิจทุกด้าน	• โรงพยาบาลมั่นใจว่าระบบสารสนเทศดำเนินการได้ตรงตาม Service Level Agreement (SLA) มีการจัดการให้ระบบดำเนินการได้อย่างต่อเนื่อง และกู้คืนระบบได้เมื่อเกิดเหตุฉุกเฉิน	• โรงพยาบาลมั่นใจว่ามีการควบคุมและติดตามการดำเนินการของระบบสารสนเทศสม่ำเสมอตลอดเวลา สามารถค้นพบและแก้ไขความผิดพลาดได้ตลอดเวลา และมีการพัฒนาคุณภาพต่อเนื่อง	• โรงพยาบาลมั่นใจว่าระบบสารสนเทศมีการดำเนินการเป็นเลิศในระดับต้นของประเทศ ระบบสารสนเทศเป็นกลไกสำคัญในขับเคลื่อนโรงพยาบาลให้เจริญก้าวหน้าตามวิสัยทัศน์

Download Document

Document: Hospital Information Technology Quality Improvement (HITQIF/ HAIT)

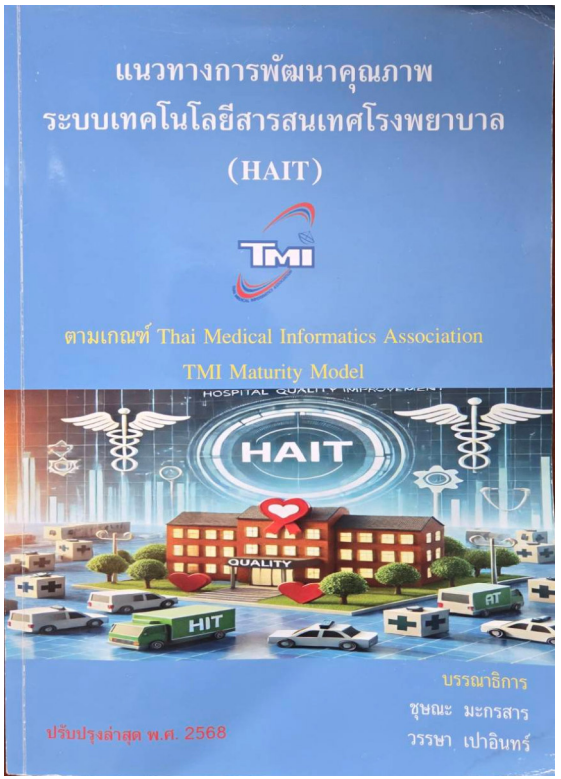
- HAIT Plus
  - HAIT Plus Performance Survey Report Document : 2024
  - Guidelines for Cybersecurity Operations for Government Hospitals (HAIT Plus) : 2024

Free Download

- Hospital IT Quality Improvement Framework (HITQIF)
  - Version 2
  - Version 1.20
- TMI Hospital IT Maturity Model
  - Version 1.1 Update
  - Version 1
- Self-assessment form on hospital information technology system quality (HAIT)
- Documents related to the application for certification of "Information Technology System Quality Development in Hospitals" and guidelines for presentation for certification Link
- Order form for the book "Guidelines for Quality Development of Hospital Information Technology Systems" revised edition 2022. If interested in ordering in large quantities, please contact official@tmi.or.th or inquire for more details at Khun Naphaphat 085-2233631.
- Hospital Digital Transformation Concept Framework 2021

- **Learning & Growing**
- **Networking (peers)**
- **Self Assessment**
- **Accreditation (2-yr span)**

HAIT Manual in Thai
2025 Edition
($13 purchase)



TMI Download http://tmi.or.th/download/

7+1 Systems of HAIT Framework : Level 1-3

0. General Status (governance, team, culture)
1. IT Master Plan (aligned with Hospital Strategic Plan)
2. IT Risk Management System (proactive risk management)
3. Information Security Management (cybersecurity law & regulation)
4. Service Desk, Service Level Agreement, Incident and Problem Management (IT service management)
5. Clinical Data Quality Control (as a basis of information-driven goals)
6. Software Development Quality Control (if available)
7. Capacity, Competency and Change Management (infrastructure & skills)

TMI Hospital IT Maturity Model (Jan 2025)

System	Level 1	Level 2	Level 3
0. General Status	Teams and management processes for quality are starting to form, with some initial results visible.	Teams from various departments (management, operations, and IT) collaborate on continuous development linked across different branches, creating an IT quality development system.	Quality development is widespread throughout the organization. Continuous and interconnected quality development occurs. Key issues have responsible parties, and specifically, an IT quality culture is beginning to emerge.
1. IT Master Plan	The IT plan aligns with the hospital plan, responding to the hospital's main strategies. There is a standard plan development process.	Implementation follows the IT plan aligned with the hospital's plan, achieving success in some projects.	Implementation follows the IT plan aligned with the hospital's plan, achieving success where IT serves as a primary tool to drive the hospital's key strategies.
2. IT Risk Management System	IT system risks are assessed. Risk management is conducted until it is assessed that risks have decreased.	Results from the past year's risk management are used to adjust the risk management plan for the following year, allowing for continuous risk reduction.	There is a risk management mechanism operating a full PDCA cycle continuously. No significant risks remain unmanaged, covering risks affecting patient care.
3. Information Security Management	There are policies and regulations regarding IT system security. Relevant parties acknowledge, understand, and strictly follow regulations. The Data Center is managed to be secure in all aspects.	Patient data access is managed so only those responsible for care during that specific time can access it. No insecure channels are used to transmit patient data that do not comply with relevant regulations or laws.	There is a security management mechanism operating a full PDCA cycle continuously. There is the capability to detect security breaches, fix, and recover damaged systems rapidly.

TMI Hospital IT Maturity Model (continue)

System	Level 1	Level 2	Level 3
4. Service Desk, Service Level Agreement, Incident and Problem Management	A service desk is established. SLAs are announced for matters critical to IT users. There is a system to record IT Activity and Incident Reports and Monitoring for not less than 50% of incidents.	Critical SLAs are announced for all service aspects (Hardware, Software, Network, Data Service, New Requirement). Data in the Incident and Activity Monitoring system covers more than 95% of incidents. Incident and Problem Management has started.	SLAs align with core business operations. There is a mechanism to evaluate Service Desk performance and SLA compliance. Evaluation results are used to improve service quality through a continuous PDCA cycle. System users are highly satisfied.
5. Clinical Data Quality Control	- History taking, physical exam results, diagnosis, procedures, medication, treatment, and ICD codes are recorded for all outpatient and inpatient cases, achieving a quality score of not less than 80%.	- There is a system to check the completeness and accuracy of OPD and IPD data. - Records for all patients achieve a quality score of not less than 95%.	- Data storage in Structured Data format (not scanned records) has begun. Data analysis and data warehousing have started. - Data is available for analysis to increase Quality and Safety of Care and Improve Clinical Outcomes, especially for disease groups in the hospital's main strategic issues.
6. Software Development Quality Control (if available)	There are processes and documentation for the analysis and design of key systems in self-developed programs, not less than 80%.	There are processes and documentation for analysis and design for all self-developed programs. Software Version Control and source code comments are used. Software quality inspection and review processes have started.	There are Requirement Management, Project Management, and Software Quality Assurance mechanisms for the development of all main programs.

TMI Hospital IT Maturity Model (continue)

System	Level 1	Level 2	Level 3
7. Capacity Management and Change Management	Current situation analysis and Gap Analysis are conducted. A capacity building plan is created for Hardware, Software, Network, and Peopleware. Essential competencies for key IT personnel are defined.	- Capacity development according to the plan has achieved success in some areas. Real operational data is used to create capacity building plans. - A Change Management system has been initiated.	There is a capacity development mechanism for all aspects, operating a continuous PDCA cycle. Continuous progress is observed. There is an effective Change Management system.

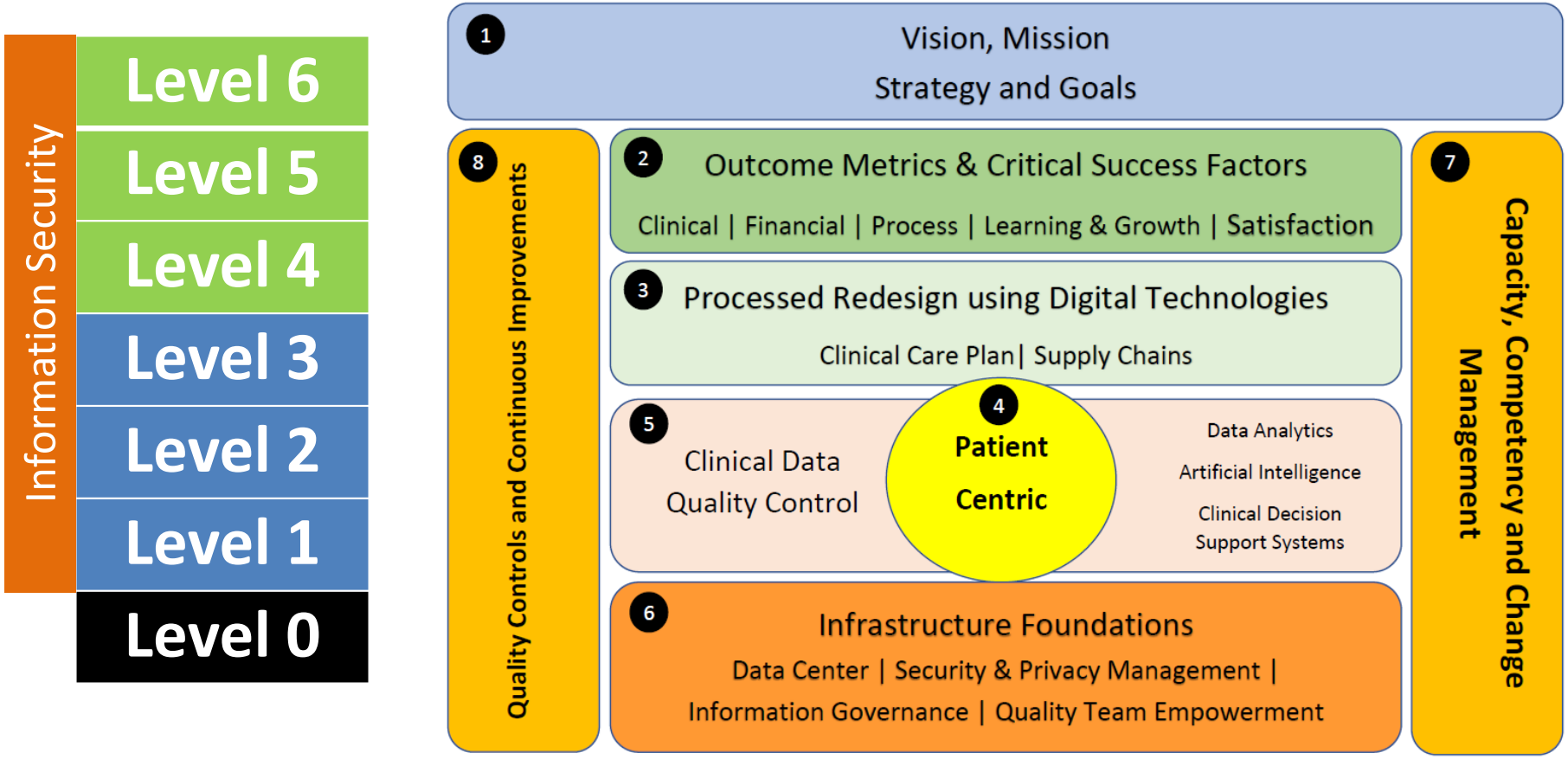
Document Revision Information

Version	Version Date	Revised By	Description
Jan 2025EN	1 Dec 2025	Dr.Bordin Sapsomboon	English translation; drafting by Gemini
Jan 2025	1 Feb 2025	Working group	Update
1.1EN	11 Jan 2025	Dr.Bordin Sapsomboon	English translation; drafting by Microsoft Copilot
1.1	6 Mar 2016	Working group	Minor update
1.0	May 2015	Working group	First edition
0.75	Oct 2014	Dr.Wansa Paoin	First draft

The TH version is available at https://www.tmi.or.th/download

Hospital Digital Transformation Framework

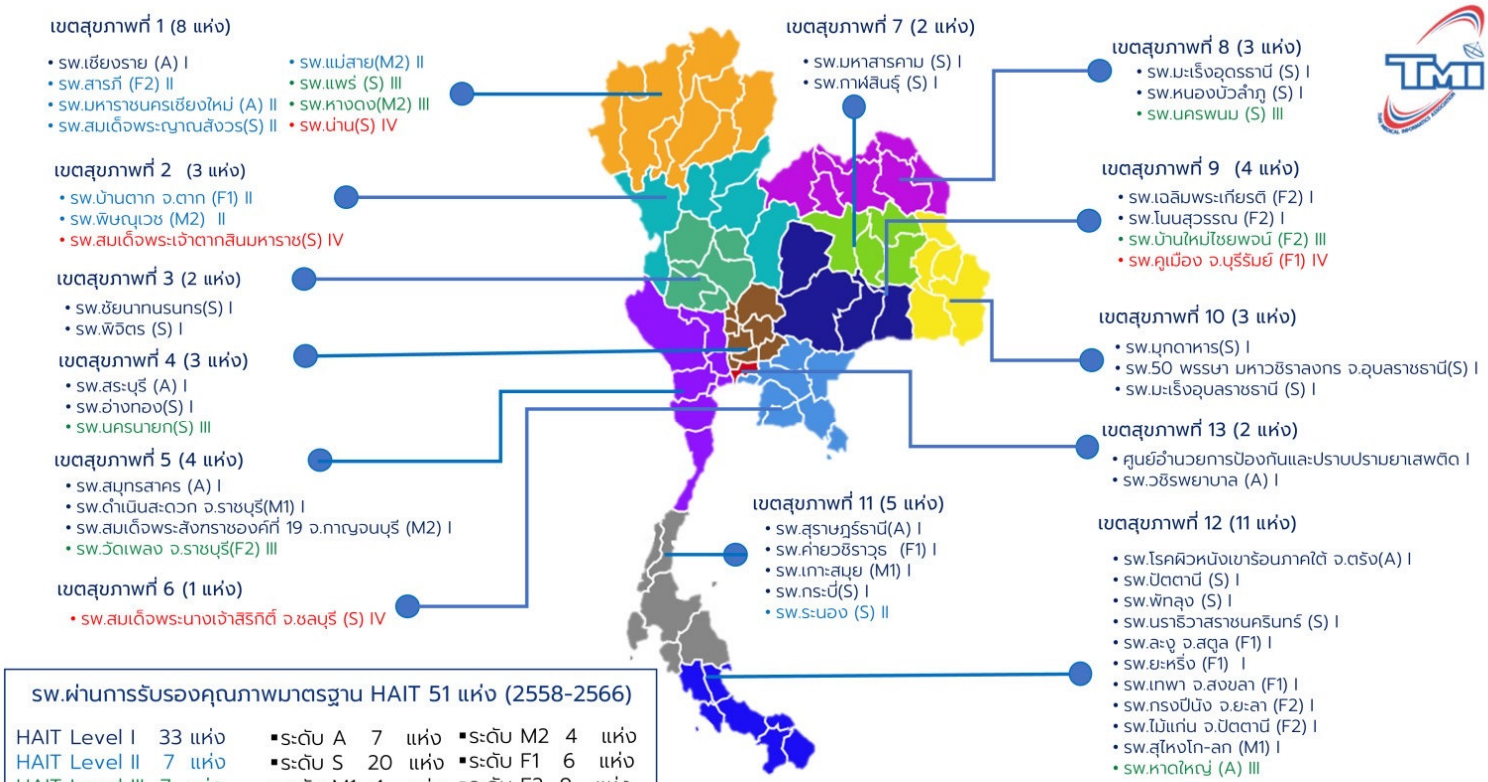
HAIT Level 4 – 6 (2021)



Total hospitals
1,100+ public (400+ large)
380+ private

HAIT Statistics (200+ visits in 5 years)

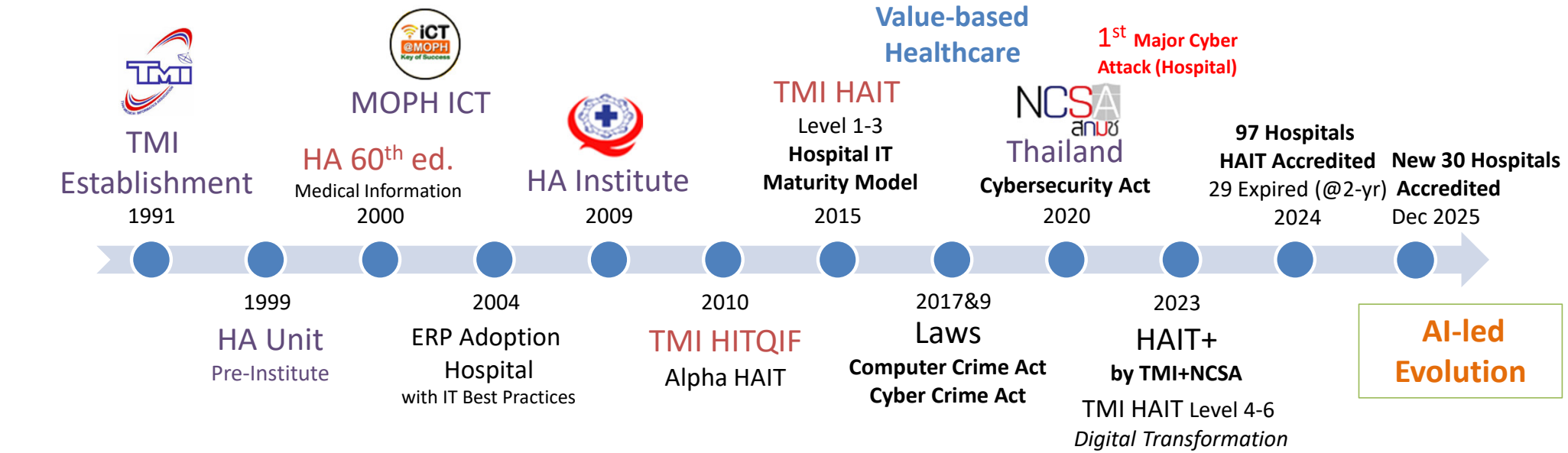
Accredited 51 Hospitals (2023) to 97 (2024) + Expired 29

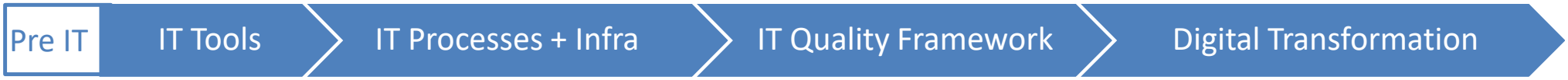


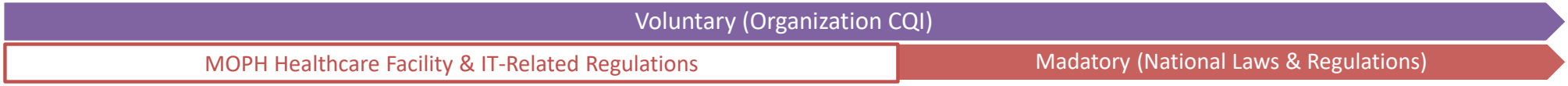
ที่มา : สมาคมเวชสารสนเทศไทย วันที่ 13 ธันวาคม 2566
Source: TMI 13 Dec 2023

Thailand's Health IT Quality Model: Timeline

An Evolutionary Model: Voluntary & Mandatory



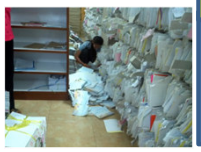


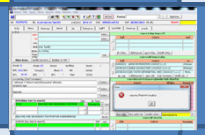


Digital Health & HAIT Journey

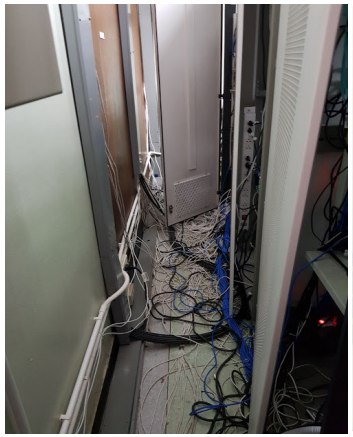
Hatyai Hospital

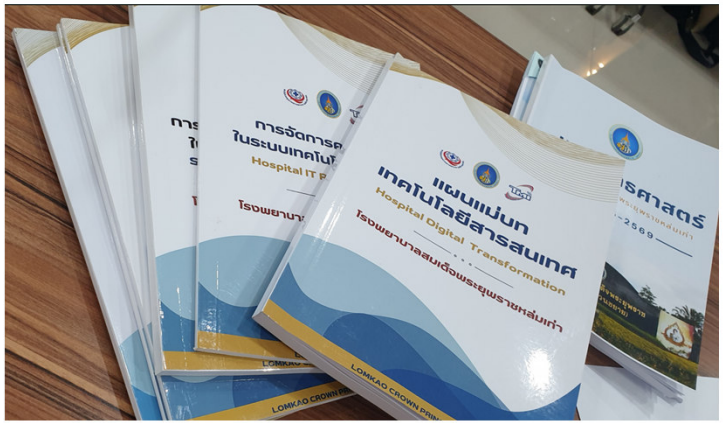
				smart Information hospital	Advance HA
	HAIT		EMR IPD	2018-2019	2021
		EMR OPD	2016	HAIT 2,3	HAIT 4 (target)
	View Scan A5/Use ID card	2017			
OPD card/ small HNcard	2016	HAIT 1			
Before 2013					





HAIT Activities & Results





HAIT			
	ปีงบประมาณ 2566		
IT Components	(P)	(I)	PxI
1. IT-Hardware			
1.1 Servers Crash or Failure	4	5	20
1.2 Network Switches Crash or Failure	3	3	9
1.3 Workstations and printers Failure	5	2	10
2. IT-System Software			
2.1 Operating System Failure	4	2	8
2.2			
3. IT-Applications			
3.1 Front Offices	1	4	4
3.2 Back Offices	1	2	2
3.4			
4. IT Communications , Connectivity			
4.1 Intranet	4	5	20
4.2 Internet	2	3	6
4.3			
5. IT-Operational (Human) Error			
5.1 Backup Error	3	5	15
5.2 Data Loss Error	4	5	20
5.3			
6. Data Loss and Privacy Breach			
6.1 Data Backup	3	5	15
6.2 Data Protection Policy and Regulations	3	1	3
6.3 PDPA Implementation	5	2	10
6.4			
7. IT-Future Development			
7.1 No Data Dictionary	5	1	5
7.2 No System Blueprint	5	1	5
7.3 No Program Document or Comments	5	1	5
7.4			
8. IT-Vender and Outsource Failure			
8.1 Vendor Stop Support	5	2	10
8.2			
9. IT-Hacking, Unauthorized Intrusions	4	5	20
10. Environment Factors			
10.1 Flooding - Internal	1	2	2
10.2 Flooding - External	1	2	2
10.3 Fire - internal	1	5	5
10.4 Fire - External	1	5	5
10.5 Utilities - Electricity	1	5	5
10.6 Criminal - Theft	1	2	2
10.7 Criminal - Break-ins	1	2	2
10.8 Civil Unrest - Protest , mob	1	2	2
10.9			
11. patient Risk due to IT Errors/Misuse	2	5	10
12. Other			

If you want to go fast, go ALONE
If you want to go far, go TOGETHER

Chombueng Crown Prince Hospital : HAIT Team (Oct 2025)

THANK YOU FOR YOUR ATTENTION