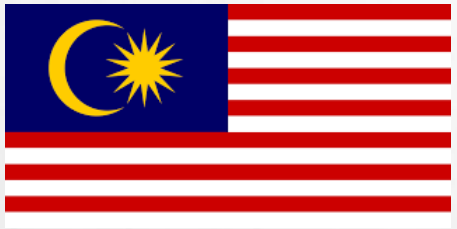
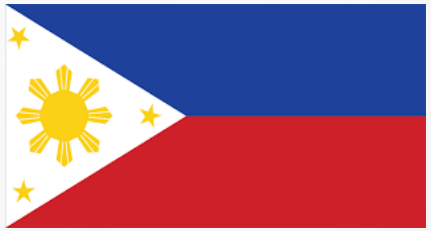
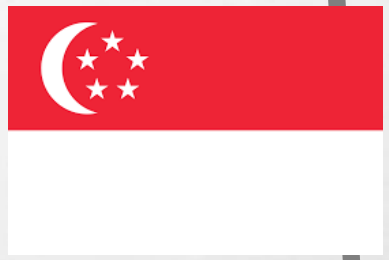
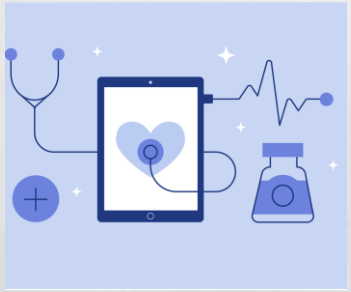






GROUP 6: Digitisation of Healthcare- A Multinational Perspective



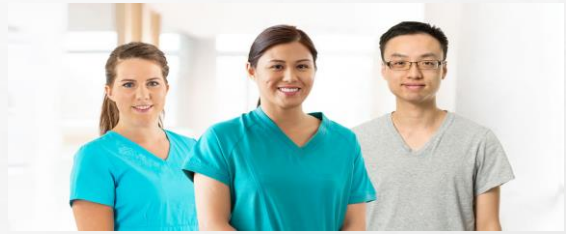
SHEENA, ELTON, SUONG, PAULA, MIN TUN

Digitisation of Healthcare: Our Focus

1. **Electronic Health Record** versus traditional Paper Health Record Documentation

2. **Online/ Hybrid Education for Healthcare Professionals** versus Traditional Face to Face Classes

Objectives



Part 1: EHR (Electronic Health Records)

1. Background
1. Application of EHR in Asia
1. Utility of EHR in decision making
1. Challenges
1. Multinational ASEAN perspectives: Critical Analysis
1. Recommendations and strategies

Part 2: Education Modes for Health Professionals [Online/Hybrid]

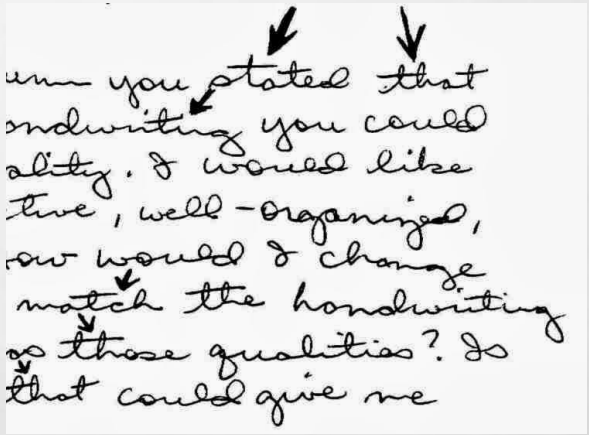
1. Background
1. Application of Education Modes
1. Utility of Education Modes [Online/ Hybrid]
1. Challenges
1. Multinational ASEAN perspectives: Critical Analysis
1. Recommendations and strategies

Video

Background

EHR

- **Digital version of patient's health records**
- **Efficient data sharing**
- **Moves away from the traditional handwritten notes** (Mantas, 2002)



Education for Healthcare Professionals:

- Adapting to changes with unprecedented COVID 19
- **Online education:** Conducted via Zoom, E- Learning
- **Hybrid:** 15-20 students in Class, another 15 students attend by Zoom

Research question to ponder: How does EHR impact care? How effective is online and hybrid mode of education for health care professions?

Digital Health Ecosystem

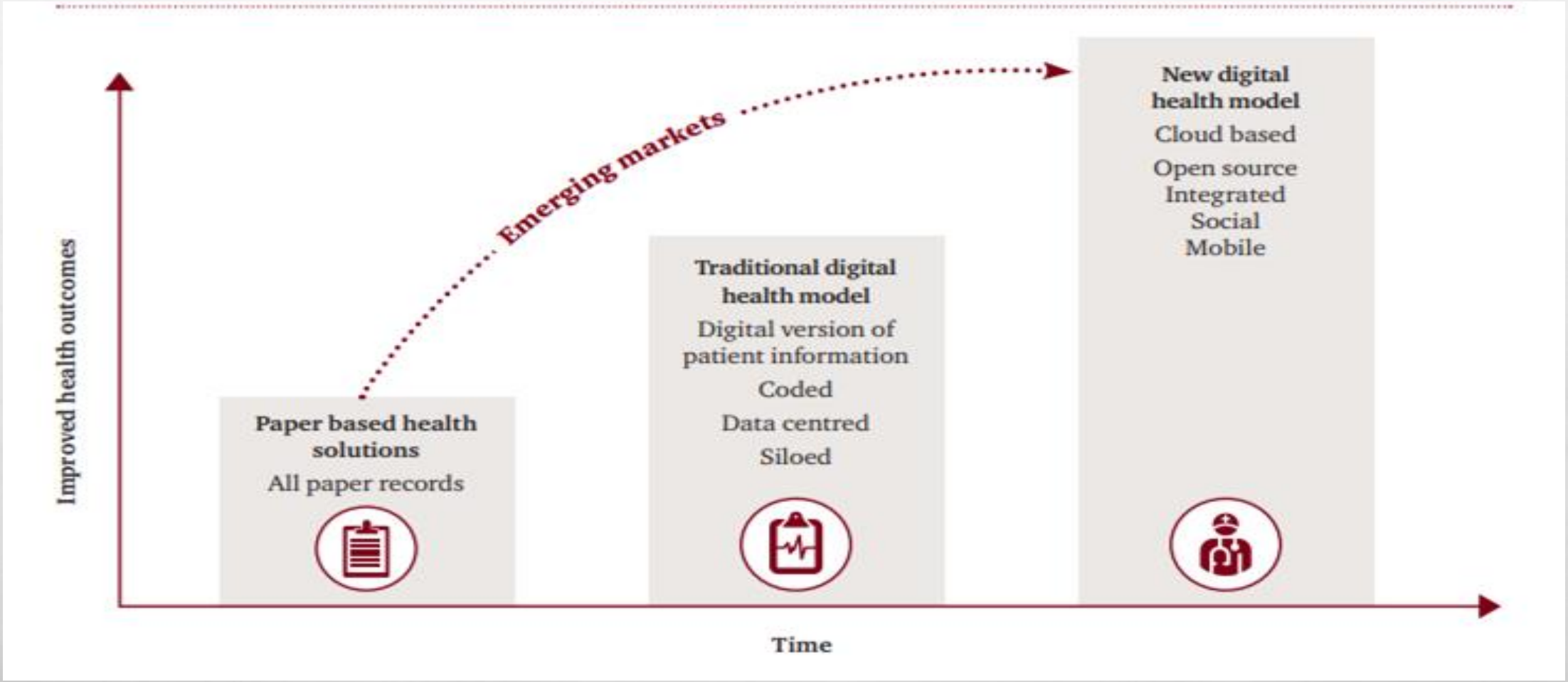


Image Source: PWC Healthcare Report

EHR Digital Adoption

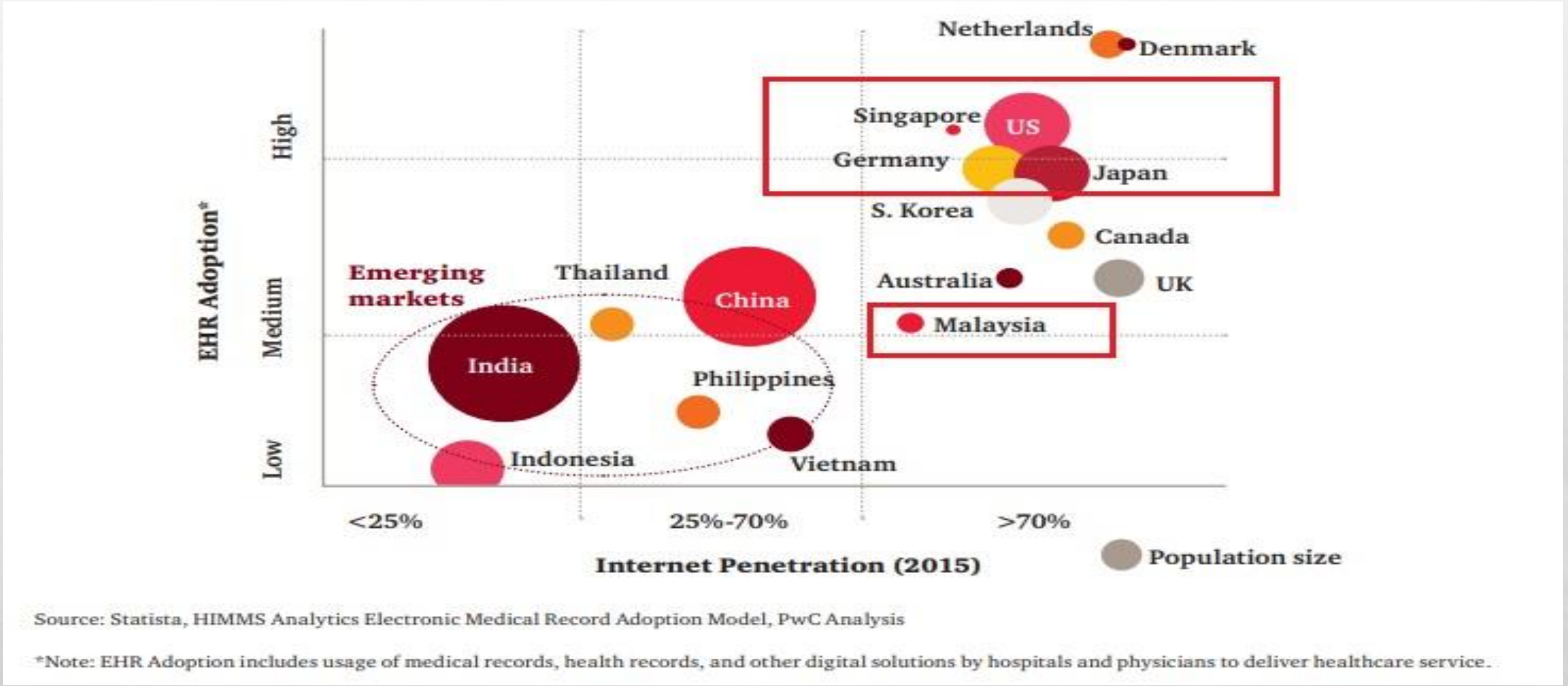


Image Source: EHR Digital Adoption in PWC Healthcare

APPLICATION OF EHR & OUTCOMES in Asia

Review Article

Utilisation of Electronic Health Records for Public Health in Asia: A Review of Success Factors and Potential Challenges

Lesley Dornan, Kanokporn Pinyopornpanish, Wichuda Jiraporncharoen, Ahmar Hashmi, Nisachol Dejkriengkraikul, and Chaisiri Angkurawaranon

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Academic Editor: Lucia Lopalco

Introduction. Electronic health records offer a valuable resource to improve health surveillance and evaluation as well as informing clinical decision making. They have been introduced in many different settings, including low- and middle-income countries, yet little is known of the progress and effectiveness of similar information systems within Asia. This study examines the implementation of EHR systems for use at a population health level in Asia and to identify their current role within public health, key success factors, and potential barriers in implementation. *Material and Methods*. A systematic search process was implemented. Five databases were searched with MeSH key terms and Boolean phrases. Articles selected for this review were based on hospital provider electronic records with a component of implementation, utilisation, or evaluation for health systems or at least beyond direct patient care. A proposed analytic framework considered three interactive components: the content, the process, and the context. *Results*. Thirty-two articles were included in the review. Evidence suggests that benefits are significant but identifying and addressing potential challenges are critical for success. A comprehensive preparation process is necessary to implement an effective and flexible system. *Discussion*. Electronic health records implemented for public health can allow the identification of disease patterns, seasonality, and global trends as well as risks to vulnerable populations. Addressing implementation challenges will facilitate the development and efficacy of public health initiatives in Asia to identify current health needs and mitigate future risks.

Key Reading (Dornan et al., 2019) & Main Points

- **Latest evidence** related to the utilisation of electronic health record (EHR) in developed versus developing countries were appraised to shed light on the benefits and challenges of EHR implementation in Asia (Dornan et al., 2019).
- Though there were some foreseeable challenges in **adopting EHR in Asia, its benefits outweigh the challenges.**
- Dornan et al. (2019) highlighted that ***EHR enabled the systematic identification of disease patterns, global trends and diseases risks among vulnerable persons living in Asia,*** that includes low- and middle-income countries.

UTILITY OF EHR IN GUIDING DECISION MAKING in ASIA

NEHR could save your life

I'm on the NEHR. I have asthma and I can't imagine what would have happened had my records not been in the healthcare system. The NEHR saved my life in a medical emergency!

I remember being admitted to the A&E department. My heartbeat was irregular. I couldn't breathe properly and I felt a terrible pain in my stomach. I was also delirious and could not remember the name of my asthma medication. Thankfully, my doctor found the information in the NEHR and discovered I was suffering the side effects of my medication. Because of the NEHR, I was diagnosed correctly, treated in time and survived the health scare!

NEHR enables seamless care for you

I'm on the NEHR. Thanks to the NEHR I received seamless care even though I had to move from one care provider to another. Only possible because important healthcare information is available in one place online.

Better health outcomes for you

I'm on the NEHR. To keep track of so many medications is challenging. With the NEHR, I am assured that no matter where I go, the doctor is able to prescribe the right medication for my conditions!

I used to visit the polyclinic regularly for follow ups on my diabetes and high blood pressure. With the Pioneer Generation card, I now visit a GP clinic near my house. Luckily, I didn't need to remember names of my pink and white and various other pills to tell my GP. The information from the polyclinic was available in the NEHR and the GP was able to prescribe the right medication for my conditions!

Personalised care for you

I'm on the NEHR. All the necessary information is on the NEHR. This allows doctors to make a more accurate diagnosis. My child is also able to receive earlier treatment!

My 6 month old baby was running a fever and showed symptoms of upper respiratory tract infections. Thankfully his admission record three months ago was documented in the NEHR. All the scans of the kidneys, blood tests and results of the chest x-ray. With the reports, the doctor was able to avoid ordering duplicate tests and quickly treat his fever and the infection!

Retrieved from: IHIS, SIngapore (2021). Patients' Stories (ihis.com.sg)

CHALLENGES OF EHR in Healthcare Context: Data Security Perspectives

- **Data can be hacked, manipulated**, or destroyed by internal or external users.
- **Healthcare systems need security measures** and ongoing educational programs for all users.
- There are **limited digital capabilities** of healthcare professionals and patients and outdated technology in hospitals. Eg. The IT Departments at public hospitals are mainly responsible for operation and maintenance of hardware and software system rather than long-term digital adoption;
- The r**egulation on digital healthcare is quite ambiguous** and requirement on administration procedures is complicated and time-consuming to implement in practice.
  - Eg. In Vietnam, in order to claim health insurance reimbursement, digital signatures must be registered by all doctors and nurses involving in the medical process and got approval from two different departments, the Electronic Health Administration under Ministry of Health and Vietnam Social Security
- **Data security concerns** cause healthcare providers to be **reluctant in storing patient information on the cloud** or sharing their network with outsiders.
- **Preventive Measures:** Firewalls, antivirus software, frequent password changes, and intrusion detection software.

EHR RISK ASSESSMENT

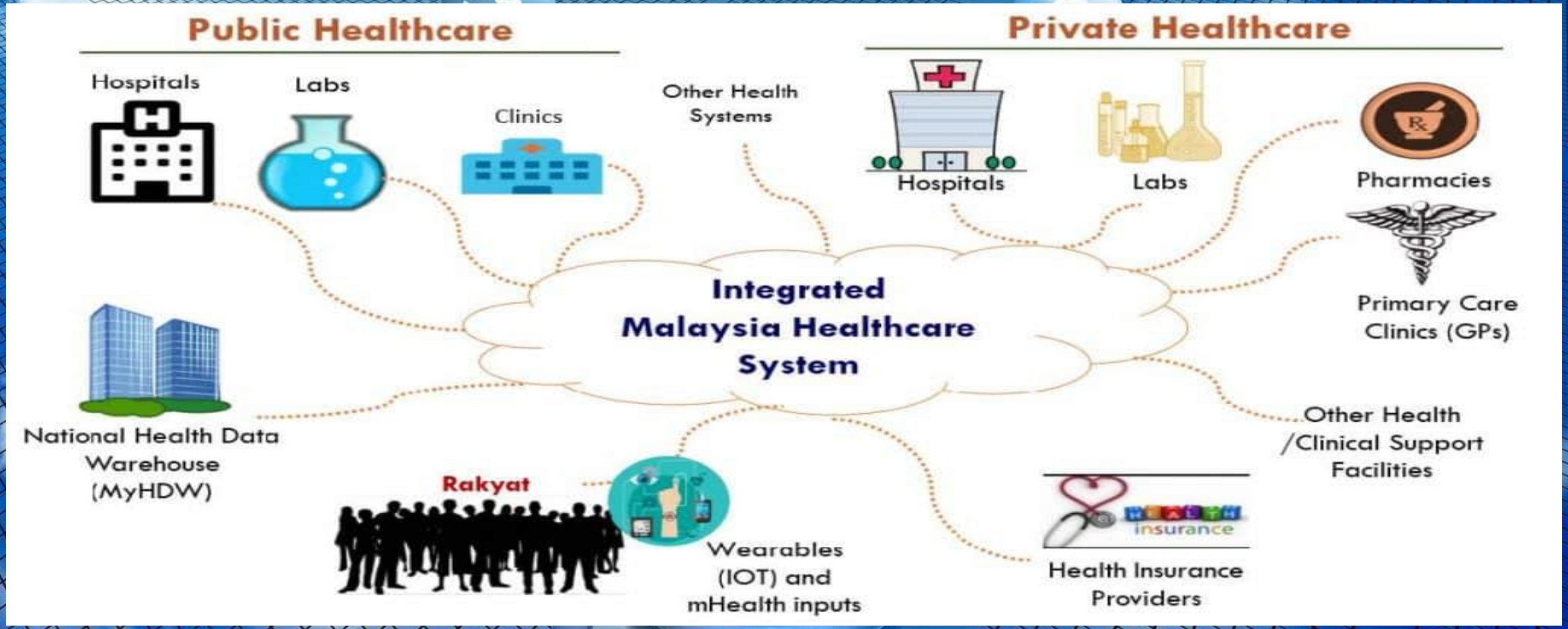
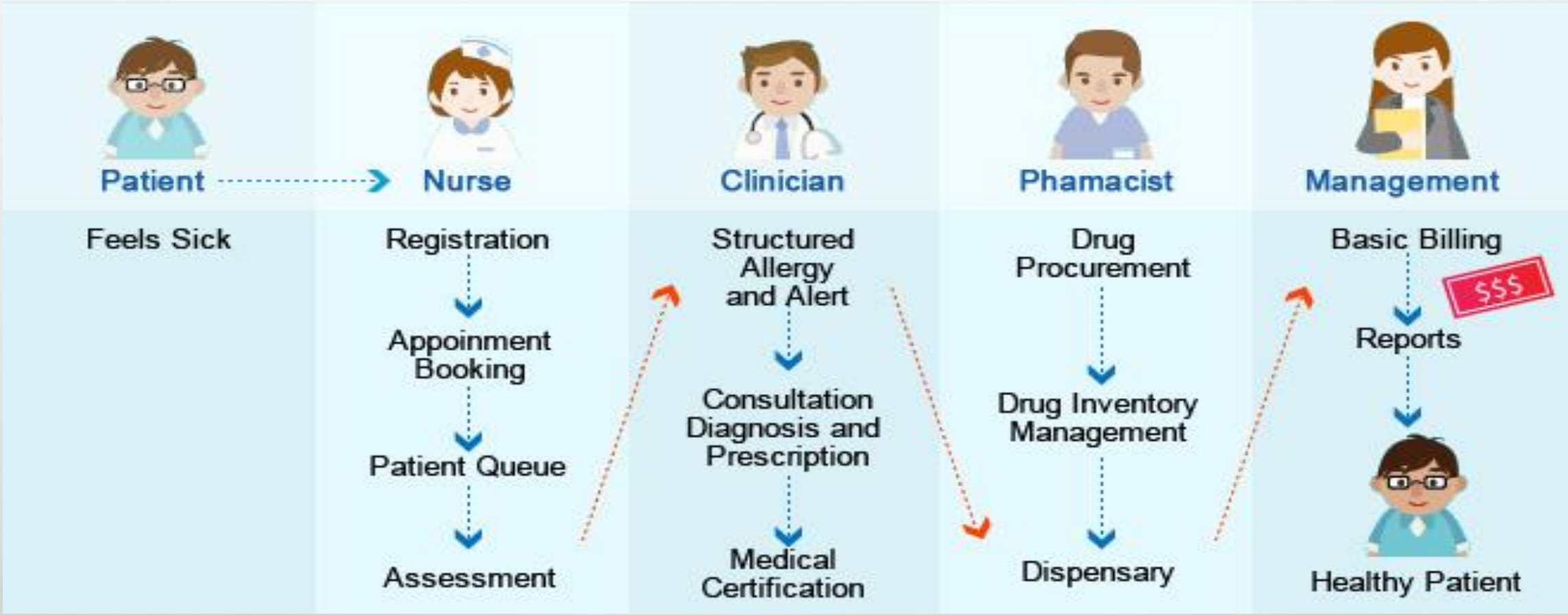


Image Source: Malaysia Healthcare Proposed Roadmap

GENERIC PATIENT MANAGEMENT DATA MANAGEMENT FLOW



Note: Inter-operability to exchange healthcare information seamlessly between different units (e.g. pharmacy, clinician (clinic laboratory) etc.) and data consent sharing between patient, clinician and pharmacist are the key success factors for EHR

Image Source: eHealthHK

EHR RISK ASSESSMENT

a) **EHR Risk Assessment in General**
- We are assessing it in perspective from health professional (doctor/nurse/clinician) and IT providers mainly as the predominant user of the EHR system.
- Factors such as the challenges of data sharing and interoperability defied by Health Level 7-Fast Healthcare Interoperability Resources (HL7 FHIR or HL7 "fire") has not yet been considered yet for this presentation.
- Ongoing discussion of HL7 FHIR implementation in countries such as Viet Nam, Thailand, Indonesia, and Philippines, and it will be important factor to be assessed moving forward with clearer details.

a) **For the current rating, the assessment is based on current country usage of EHR System such as below:**
- National Electronic Health Record (NEHR) - Singapore
- Community Health Information Tracking System (CHITS) Philippines
- MY Health Data Warehouse - Malaysia
- Vietnam and Myanmar are midst of integrating or adopting EHR System infrastructure

a) **Assessment Matrix Rating**
- Priority is from rating point from 1 to 3 where 1 is most important, 2 is important, 3 is neutral and 5 is least important.
- N/A status is defined is not applicable at this time with not much info have been obtained at the point of presentation and TBC is To be Confirmed

3 CRITICAL RISK RELATED TO EHR (HEALTHCARE PROFESSIONAL)

Item	Risk Identified / Perspective	Malaysia	Myanmar	Vietnam	Singapore	Philippines
1.	**Privacy Data Consent and Sharing:** **Level of patient consent to gave away depth of information.** **How much information of a patient should be accessed for the eHR to work?**	1	**N/A**	**1**	1	**1**
2.	**Expertise knowledge:** **Number of professionals who have knowledge to utilize and maintain EMR information systems effectively**	**3**	**N/A**	**2**	**3**	**2**
3.	**Productivity cost:** **Doctors may spend more time attending to data entry than they do their core duties interacting with patients**	**2**	**N/A**	**3**	**2**	**3**

Assessment Matrix Rating

- 1 is most important,
- 2 = important,
- 3 is least important

Insights extracted from PWC Healthcare Report and discussed among Fellows

RISK RELATED TO EHR (EHR IT SYSTEM PROVIDER)

Item	Risk Identified / Perspective	Malaysia	Myanmar	Vietnam	Singapore	Philippines
1.	**Interoperability—ie, the respective computer systems' between different vendors is complex, thus increasing cost**	1	N/A	TBC	2	**1**
2.	**Health information exchanges inaccuracies between different department of healthcare (due to doctor handwriting).**	3	N/A	TBC	3	2
3.	**Cybersecurity attack in various forms (ransomware, malware etc)**	4	N/A	TBC	4	4
4	**Compliance to variety of regulation requirements between patient, government etc**	2	1	TBC	1	3

Assessment Matrix Rating

- 1 is most important,
- 2 = important,
- 3 is neutral and 5 is least important

Insights extracted from PWC Healthcare Report and discussed among Fellows

DATA PRIVACY RISK MANAGEMENT RECOMMENDATION

Item	Recommendation	Public	Healthcare Professional	Healthcare IT Provider	Government
1.	Centralized amount of shareable data to be agreed by healthcare providers and patient level	X	X	X	
2.	Patient to fully understand the consent of data depth provided by healthcare provider and approval from their end	X (to be done yearly bases)	X		
3.	Amendment of privacy data act by respective countries to see if can fit HIPAA benchmark (an US cybersecurity standard compliant equivalent) and security infrastructure				X

x = TO BE DONE BY RESPECTIVE PARTIES

MULTINATIONAL CRITICAL ANALYSIS- EHR

Country	Focus 1: EHR use in healthcare (extent of utility)	Mitigating problems with EHR utility	Recommendations
Malaysia	Planning to deploy a centralized electronic system that can share patient information in 145 hospitals nationwide. Currently only 20% of the EHR is being adopted in Malaysia hospitals	Healthcare deals with security issue from a data privacy and defensive stance.	Reference to US Standard Health Insurance Portability and Accountability Act of 1996 (HIPAA) would be key
Philippines	All healthcare service providers and insurers are required to maintain a health information system on electronic health records under the Implementing Rules and Regulations of the Universal Health Care Act (2019).	Requires a substantial initial investment in both hardware and software, and connectivity with other hospitals. In 1 private hospital, St. Luke's Mandaluyong, the digital transformation took 14 months! other problems include complexity, weak infrastructure and poor interface design, resistance to change, lack of adequate skills, and medical school orientation.	-Ensure stronger cooperation between healthcare providers and the vendor. -Managements need proper training of their IT and hospital personnel. -Increase funding and awareness about the benefits of EHR.
Myanmar	As part of Health Management Information System in PHC. A few private hospitals using own platform	-Poor electricity and ICT infrastructures, Lack of written health information policy A lack of hardware and software standardization, Inconsistencies in data-entry have led to poor data quality, Lack of updated digital related policy: data privacy, online consumer protection, cybersecurity law, etc	Draft Health Information Policy, public-private investment on ICT, and update digital related policies.
Vietnam	Until mid-2019, 14 public hospitals have implemented to EHR system. Target 100% usage in 2028	Limited digital capabilities of healthcare professors	Have a national standards/training or build up technical team to support in time
Singapore	All private and public hospital utilise EHR, ensure connected healthcare (100% usage)	Downtime (server down) and delays in timely care to patients; needing reliance on paper record	Current standard practise: We have *down time training*- prepares professionals on ways to manage when server is down, no safety compromisation in care

PART 2: Application of Online Education for Health Professionals in Asia and Outcomes

Cochrane Library

Cochrane Database of Systematic Reviews

Published in year 2018

E-learning for health professionals (Review)

Vaona A, Banzi R, Kwag KH, Rigon G, Cereda D, Pecoraro V, Tramacere I, Moja L

Main Outcomes & Implications:

- E-learning has no difference with traditional teaching
- However, skills sets and practices are necessary as we are dealing with human lives, not machines in the clinical context

Background

The use of e-learning, defined as any educational intervention mediated electronically via the Internet, has steadily increased among health professionals worldwide. Several studies have attempted to measure the effects of e-learning in medical practice, which has often been associated with large positive effects when compared to no intervention and with small positive effects when compared with traditional learning (without access to e-learning). However, results are not conclusive.

Objectives

To assess the effects of e-learning programmes versus traditional learning in licensed health professionals for improving patient outcomes or health professionals' behaviours, skills and knowledge.

Search methods

We searched CENTRAL, MEDLINE, Embase, five other databases and three trial registers up to July 2016, without any restrictions based on language or status of publication. We examined the reference lists of the included studies and other relevant reviews. If necessary, we contacted the study authors to collect additional information on studies.

Selection criteria

Randomised trials assessing the effectiveness of e-learning versus traditional learning for health professionals. We excluded non-randomised trials and trials involving undergraduate health professionals.

Data collection and analysis

Two authors independently selected studies, extracted data and assessed risk of bias. We graded the certainty of evidence for each outcome using the GRADE approach and standardised the outcome effects using relative risks (risk ratio (RR) or odds ratio (OR)) or standardised mean difference (SMD) when possible.

Main results

We included 16 randomised trials involving 5679 licensed health professionals (4759 mixed health professionals, 587 nurses, 300 doctors and 33 childcare health consultants).

When compared with traditional learning at 12-month follow-up, low-certainty evidence suggests that e-learning may make little or no difference for the following patient outcomes: the proportion of patients with low-density lipoprotein (LDL) cholesterol of less than 100

CHALLENGES OF Online/Hybrid Education in Health Setting

Faculty Perceptions of Teaching Nursing Content Online in Prelicensure Baccalaureate Nursing Programs

Micki M. Puksa, PhD, RN and Katharine Janzen, EdD, BScN

Published Online: November 18, 2020 · https://doi.org/10.3928/01484834-20201118-05

View Full Text | PDF 350.3 KB | Tools | Share

Abstract

BACKGROUND: The purpose of this study was to explore the perceptions of nursing faculty regarding the nature, challenges, and strengths of teaching course content online in prelicensure collaborative baccalaureate nursing programs and the implications for online course delivery.

METHOD: This was an exploratory–descriptive, mixed-methods design based on document analysis, an online survey completed by 32 faculty, and interviews with 16 faculty in a representative sample of 13 English speaking colleges in Ontario.

RESULTS: Participants perceived content containing complex cognitive concepts, experiential learning as in relational practice, and psychomotor skill mastery as better suited for traditional classroom delivery. Faculty identified challenges with developing higher level online discussions and having students collaborate.

CONCLUSION: Online teaching took much more time and should be acknowledged in workload assignments. A hybrid teaching environment was preferred. Online education was useful when the content and the semesters/years were appropriate, and necessary supports were in place. [*J Nurs Educ.* 2020;59(12):683–691.]

Activity Time: An Ethical Question to the Class?

- **Would you prefer to be taken care by a doctor or nurse**
  would had done online training or face to face training with hospital practical skills training with patients? Why?

EHR E-Learning Adoption in Education

Ideal Roadmap: E-Health Hong Kong e-learning as a reference on how the system can increase the EHR adoption

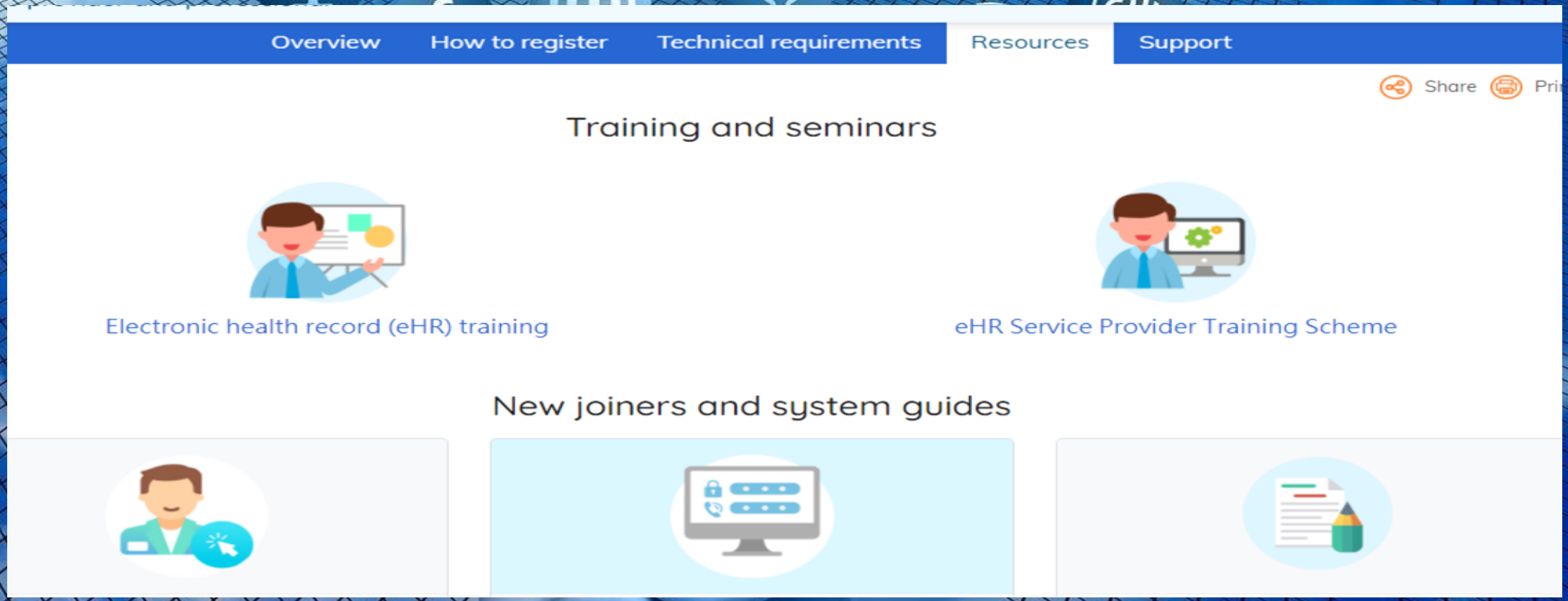


Image Source: eHealthHK

MULTINATIONAL ANALYSIS- Education of Healthcare Professionals

Country	Focus 1: Education for Healthcare Professionals Modes	Mitigating problems with education modes	Recommendations
Malaysia	Offline prior to Covid	Currently learning practices of EHR e-learning best practises from advanced countries	Study on EHealth HK adoption as reference if e-learning works
Philippines	Offline prior to COVID	Difficulty adjusting to learning styles, having to perform responsibilities at home, and poor communication between educators and learners. Lack of school guidelines, haphazard class schedules,, low quality of teaching materials, ineffective teaching strategies, and excessive class requirements.	Improve communication between students and school administrators. Adopt asynchronous lectures, develop wellness and psychosocial support programs, give discounts on tuition and school activities to cushion the economic impact, adopt more interactive programs.
Myanmar	Offline before Covid19, now online stage	Interruptions to internet and disruptions to learning	E-learning platform with interactive tools for all health professional staff
Vietnam	Online and/ or Offline	Easy to get distracted during learning	Planning and Standardize training procedure to get optimal outcome
Singapore	Online and Hybrid Modes	Lack of personal interactions with students, Practical Skills training- not always achievable by online training mode	To constantly evaluate from a multiple stakeholder perspective: students, educators, security, IT professionals on how to maximise teaching and learning outcomes for healthcare professionals

Novel Approach: Integrating EHR with Online/ Hybrid Teaching modes for Healthcare Professionals Across Nations

Integrating EHR in Online Education of Healthcare professionals:

- To infuse EHR in online/ hybrid education curriculum: learn and overcome potential challenges from the experiences of cross-nations
- Organise virtual trips to observe examples and learn from a collaborative learning perspectives
- **Recommendations:** Organise seminars/webinars on pressing topics- eg. cybersecurity to prevent Health Data Breach, effective education for healthcare professionals in COVID times and ways forward in Asia

SUMMARY

1. Government to be proactive to revise cumbersome policy act regarding data to be ensure public trust in EHR
2. Education for Public and healthcare provider on data privacy consent and ethics would be key adoption driver
3. For the Healthcare IT Provider, the main principle will be able to work together shareable data and infrastructure integration for seamless digital experience

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Explanation of EHR Systems in each Region

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https://www.nature.com/articles/d41586-019-02876-y