

2018 WORKSHOP ON ARTIFICIAL INTELLIGENCE AND  
DIGITAL HEALTHCARE

# Will Artificial Intelligence Augment Patient Safety?

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# Quality and Safety in Healthcare – 6 aims for improvement

- Safety
- Effectiveness
- Patient-centredness
- Timeliness
- Efficiency
- Equity

Institute of Medicine (2001). *Envisioning the National Health Care Quality Report*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/10073>.

# Patient Safety and Clinical Risk Management in the Public Hospitals in Hong Kong

- Identify risk and mitigate
- Report incidents and learn
- Consider system and human factors
- IT is a part of risk-reduction strategy

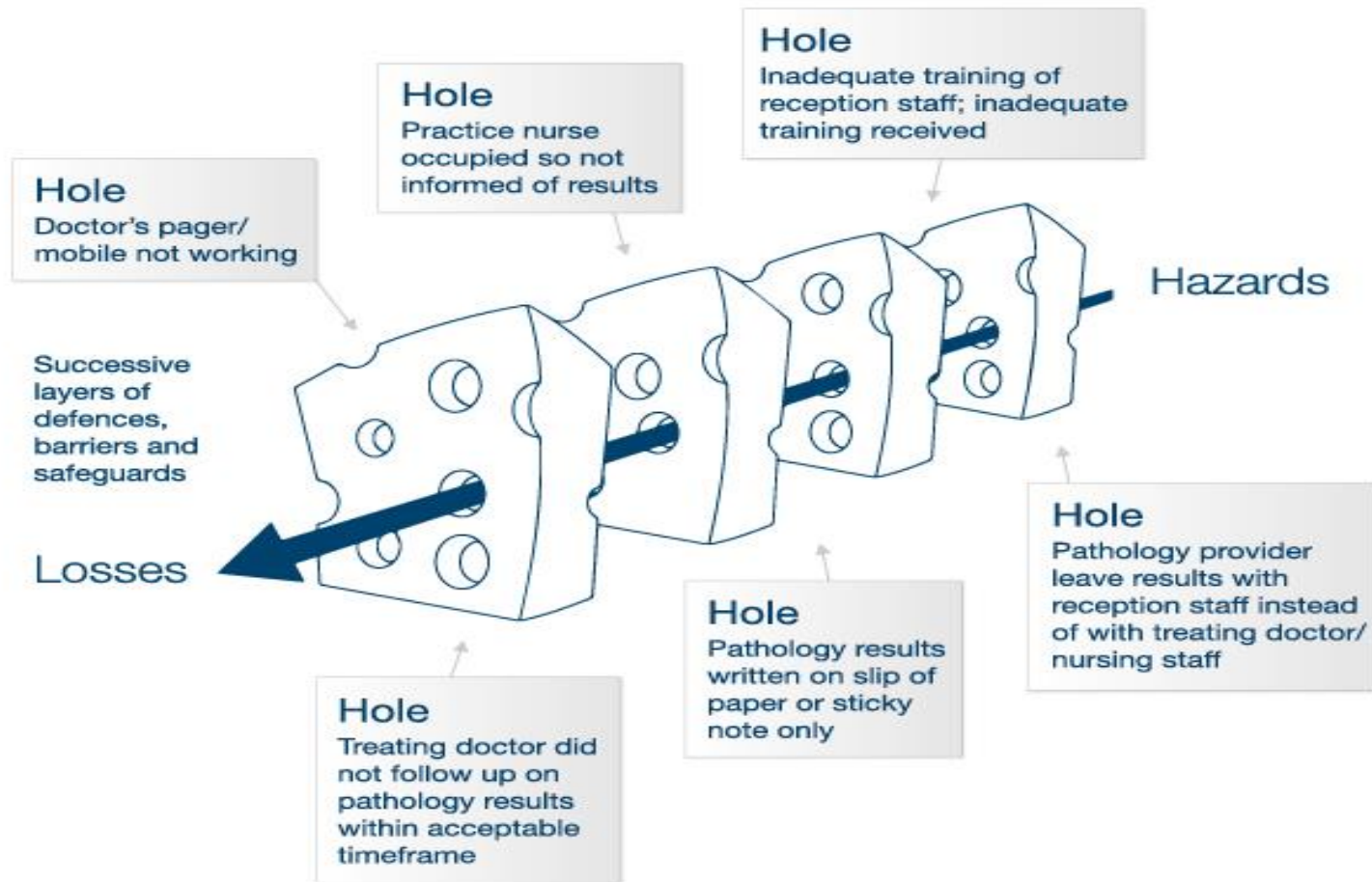
# Patient Safety and Clinical Risk Management in the Public Hospitals in Hong Kong

- Identify risk and mitigate
- Report incidents and learn
- Consider system and human factors
- IT is a part of risk-reduction strategy
- Some identified clinical risk do not have easy solutions

# Look-alike sound-alike drugs (LASAD)



# Cheese holes and the problem of critical lab result not reaching the case doctor



Some holes due to active failure. Other holes due to latent conditions (resident "pathogens").

# AMA Passes First Policy Statement on Augmented Intelligence on Jun 14, 2018

“Combining AI methods and systems with an irreplaceable human clinician can advance the delivery of care in a way that outperforms what either can do alone. But we must forthrightly address challenges in the design, evaluation and implementation as this technology is increasingly integrated into physicians’ delivery of care to patients.”

## AMA Urges “Thoughtfully Designed” Artificial Intelligence for Healthcare

A policy statement from the American Medical Association encourages the industry to keep user-centered design in mind as it explores artificial intelligence.



*By Jennifer Bresnick on June 14, 2018*

The American Medical Association (AMA) **has released a policy statement** that takes a favorable view towards artificial intelligence in healthcare – as long as the emerging category of tools and solutions can be carefully designed, user-friendly, and safe for patient care.

**Artificial intelligence**, or “augmented intelligence,” as the AMA chooses to call it, brings both promises and concerns as it filters into the patient care environment.

# Augmented Decision Making for Physicians

“It’s really about **selecting narrower tasks** that computers can do better than humans...”

The potential uses of AI have major implications for patient safety, operational efficiency and resource prioritization—and may even alleviate some of the causes of physician burnout. But Khoury emphasized, we shouldn’t rush to adopt the technology until it has been proven.

“There needs to be a good evidence base, first and foremost, and that’s **an understandable adoption barrier**. Physicians want to know that there’s clinical and analytical validity to any kind of new tool or platform they might be adopting.”

Christopher Khoury, vice president of the AMA’s environmental intelligence and strategic analytics unit.  
Expert Panel Meeting: At the Intersection of AI and Human Intelligence: The Future of Health Care Delivery,  
2017 Health Datapalooza conference, Washington



# AI, or IA?

- AMA: ‘Augmented Intelligence’ - not ‘Artificial Intelligence’
- AI should be integrated into clinical work, to augment the diagnostic and treatment power of physicians and surgeons, not replace them
- Some authors now make a distinction between ‘Artificial Intelligence (AI)’ and ‘Intelligence Augmentation (IA)’
- Others consider it to be different stages of AI development – IA has been with us for decades; AI is moving on to AGI (Artificial Global Intelligence, with deep learning, computer vision, big data analytics)

# Robot Anesthesiologists Lose Their Jobs Because of Humans



Esther Inglis-Arkell

3/29/16 7:05pm

Filed to: MEDICINE



A robot anesthesiologist designed by Johnson & Johnson is going off the market. Only [three years after approval](#), the company has

## SEDASYS® System Indications For Use

The SEDASYS® System is indicated for:

- Administration of 1% (10 mg/mL) propofol emulsion
- Minimal-to-moderate sedation
- ASA Physical Status I and II patients
- Patients undergoing colonoscopy or esophagogastroduodenoscopy (EGD) procedures
- Patients 18 years of age or older

The SEDASYS® System must only be used in hospitals and/or healthcare facilities where an anesthesia professional is immediately available for assistance or consultation as needed.

For complete indications, contraindications, warnings, precautions, adverse events, and additional product information, see Instructions for Use and Essential Product Information.



# What if it is about patient safety rather than efficiency or technical accuracy?

- The defeat of SEDASYS is partly related to lack of appeal to the public – it could not / claim to be safer, nor providing a better patient experience.
- Reducing long waiting list (e.g. colonoscopy screening) may be an ethical justification if shortage of anaesthetist manpower is the bottleneck.

# In News..



## London hospitals to replace doctors and nurses with AI for some tasks

UCLH aims to bring 'game-changing' benefits of artificial intelligence to NHS patients, from cancer diagnosis to reducing wait times

***Hannah Devlin*** *Science correspondent*

 @hannahdev

Mon 21 May 2018 05:21 EDT

## Human-Avatar Symbiosis for the Treatment of Auditory Verbal Hallucinations in Schizophrenia through Virtual/Augmented Reality and Brain-Computer Interfaces

Antonio Fernández-Caballero, Elena Navarro, [...], and Roberto Rodriguez-Jimenez

[Additional article information](#)

### Abstract

This perspective paper faces the future of alternative treatments that take advantage of

# Possibilities

- Remote monitoring of compliance with hand hygiene practice in hospital wards by intelligent computer vision system for
  - Privacy concern?
  - Implementation issue?
  - Opportunity cost?
  - Accuracy?
- Identification and notification of critical pathology results
  - Implementation issue?
  - Algorithm issue?

# Possibilities

- Early warning of deteriorating cases and critically ill cases

- Algorithm issue?
- Legal responsibility?
- Alert fatigue?

- Patient Call Centre to perform enquiry, first-line advice, health coaching

- Replaces nurses?
- Algorithm issue?
- Human interaction missing?

# Possibilities

- Diabetes care pathway – monitors diabetic control, advice, and reminder of screening / assessment timeline
  - Implementation issue?
  - Integration of multiple data sources
  - Inter-specialty care required
- Palliative care pathway – identifying and initiating cases in need of serious illness/end of life conversations and advance care planning
  - Resource implications downstream?
  - Staff capability

# How Human Clinicians may work with AI (augmentation)

- Process design role – participate in the design process
- Adopt the human role – AI is a long way from being able to be empathetic, to exercise common sense etc.
- Colleague role – treat AI as colleagues and work together to augment judgement and be better informed
- Niche role – where no technology has been developed and is unlikely to cover in the future
- Development role – join the research

THOMAS H. DAVENPORT & WILJEANA J. GLOVER. Artificial Intelligence and the Augmentation of Health Care Decision-Making. NEJM Catalyst.





Derrick Au. Managing Incidents: System & People.  
NTW Cluster Annual Quality Conference  
8<sup>th</sup> December, 2016

**Thank you for your attention**

