



## Plenary lecture II

### Application and Utility of Digital Twin in Emergency Department

時間：2025 年 6 月 27 日(五) 11:00~11:30

會議室：101 會議廳

座長：紀志賢醫師(成大醫院)、黃建華局長(臺北市政府衛生局)

主講人：Lee Shu Woan (Changi General Hospital, Singhealth)

#### 課程簡介

- Background: Emergency Departments (EDs) face perennial challenges including overcrowding, operational inefficiencies, and staff fatigue. Although the issues are multi-factorial with many proposed solutions, the problem persists. In 2021, Changi General Hospital ED was undergoing remodeling and we saw an opportunity to explore beyond traditional planning tools to understand the complexity of ED systems, workflow and operations.
- Objective: In this presentation, the speaker will share how the team develop, validate and use a digital twin (DT) model of the ambulatory area, enabling simulation of patient flow, staff allocation, to improve operational efficiency and staff well-being.
- Methods: A design-thinking approach was deployed, which included multi-level stakeholder meetings and workshops, iterative workflow mapping, time motion studies and a staff well-being survey. A DT model was built on an open-source game engine and computer-aided design drawings to simulate real-time patient and staff activities. This was followed by validation of the model using historical data. Further tweaks were made before the model was put to run various simulation scenarios.
- Results: The DT model of ambulatory area of CGH ED accurately replicated historical patient throughput and revealed operational bottlenecks during peak hours. Multiple used cases were raised, and scenario testing was able to demonstrate improved efficiency with tweaks in triage staffing, timing and pharmacy relocation. Staff survey results highlighted insufficient break time, frequent interruptions, and role ambiguity, reinforcing the need for human-centred planning.
- Conclusion: The DT offers a visual, dynamic and data-informed platform for testing care models, spatial designs and promising solutions for enhancing patient care.

# 2025 韌性急診 智能決策

Resilient Emergency Care and Intelligent Decision-Making



Name	Lee Shu Woan
Organization	Changi General Hospital, Singhealth
Title	Associate Professor
Current Positions	Senior Consultant, Emergency Department
Educational and Career Experiences	<ul style="list-style-type: none"> <li>● MBBS NUS</li> <li>● FRCS A &amp; E (Edin)</li> <li>● Fellow, Academy of Medicine Singapore</li> <li>● Member, MOH-ABMS Exams Committee</li> <li>● Clinical Advisor, Office of Innovation, CGH</li> <li>● Adjunct Associate Professor, SUTD</li> <li>● Adjunct Associate Professor, Duke NUS</li> <li>● Clinical Assistant Professor, YLL School of Medicine</li> <li>● Clinical Faculty, LKC School of Medicine</li> </ul>