

# Innovating Hyperacute Stroke Workflow with Smart App Application

**Mr. LEUNG Wai-man, Raymond**

Associate Nurse Consultant (M&G/ Stroke)  
New Territories West Cluster / Tuen Mun Hospital



# Current Stroke Workflow

## Hyperacute Stroke Screening



Stroke patient



Stroke Nurse



Paper record



HA chat messaging



Phone call

Clinical detail & treatment decision



Neurologist



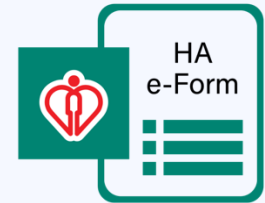
Radiologist



## Data management

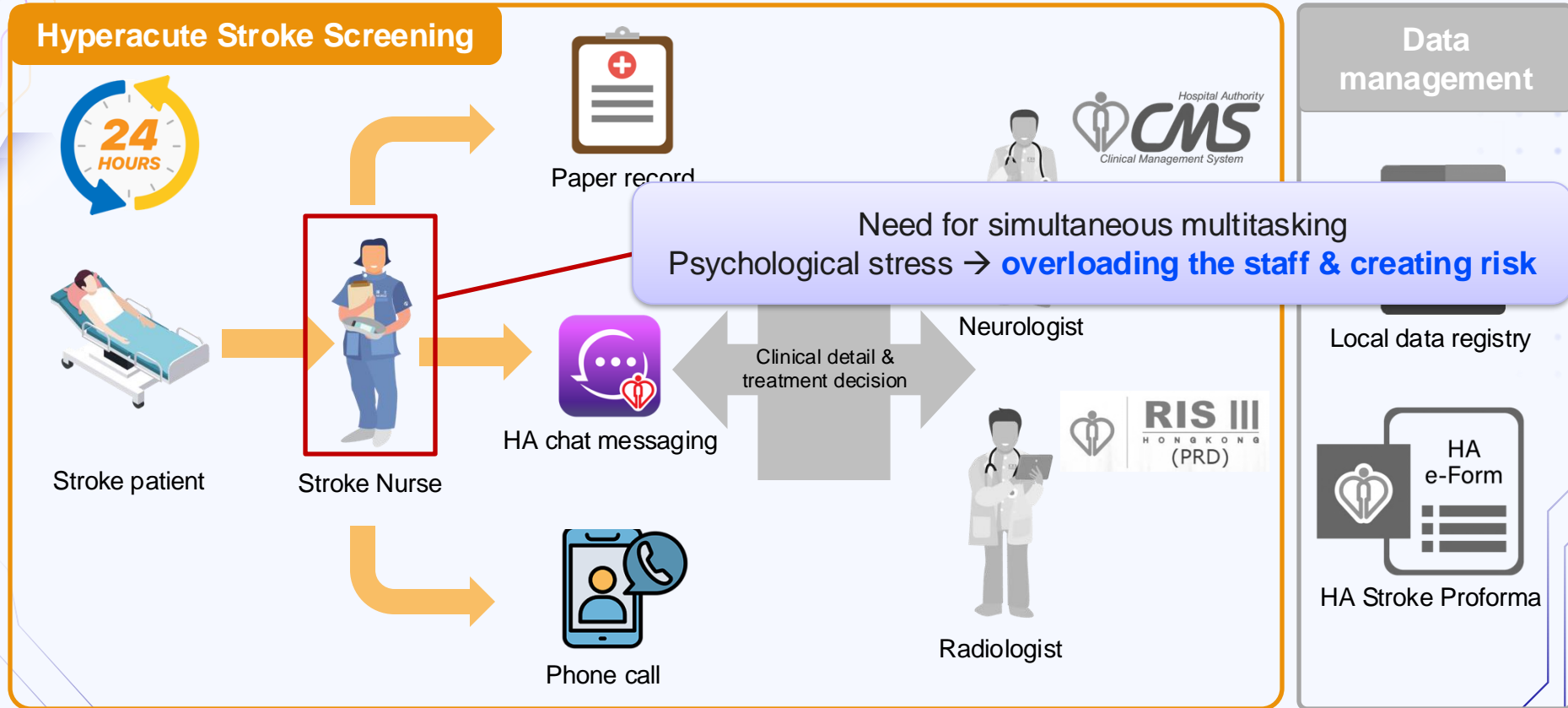


Local data registry



HA Stroke Proforma

# Multi-tasking Stress

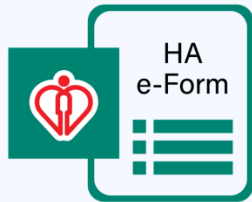


# Data management issues

## Data management



Local data registry



HA Stroke Proforma

## Fragmented data system

Local tPA call log

Stroke Proforma

Thrombolysis Proforma

## Variance in input format

e.g. date & time format  
 hh:mm  
 DD/MM/YY hh:mm  
 DD/MM hh:mm

Transcription error from  
 paper record to  
 electronic system



**1.5** man-hour per day

Need of transcribing & verifying data to electronic record

# Time for New Solution

中風中心 | 國家認證中風中心選址屯門醫院 院方：去年起已開始籌組

港聞

發布時間：2025/01/20 00:00

關注文章 儲存文章

分享：f 微博 邮件 链接

熱門 緬甸地震 啟德七樓2025 DSE2025 啟德體育園 超市大搜查 結業潮 金像獎2025 名校專區 會員有獎



▲ 屯門醫院新手術大樓。(醫管局圖片)

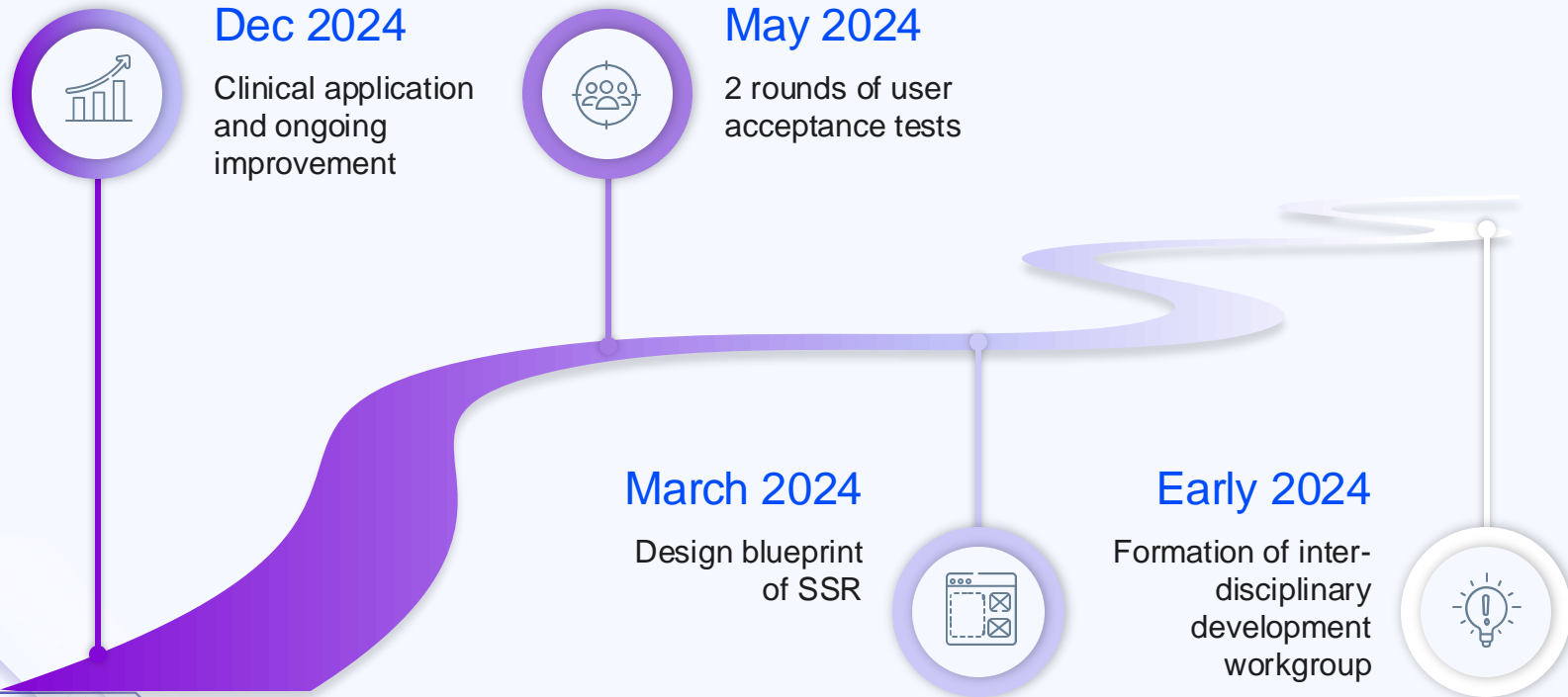
## 中国卒中急救APP

- 优秀的卒中救治流程管理工具
- 基于移动信息的院前院内一体化协同救治、分级诊疗示范工程

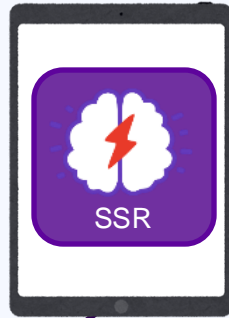


Developing localized version of smart stroke app

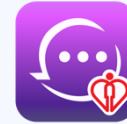
# Timeline of Development



# Goal for Our Stroke App



Paper record



HA chat messaging



Phone call



## 1 App for All

From Pre-hospital to Post treatment



## Smart time Capture

Reduce hurdle in manual recording



## Automate Database

Facilitate service review analysis

# One App for All



AED Nurses

One-click  
activation of stroke  
Green Channel

Smart Stroke Registry (PRD)

HKID / AE No. / HN No.

SCAN

< TMH Stroke Alert  
28 Members

Fri, 14 Feb

NTWC Smart Stroke Registry  
\*\*\* [AED Initiate Case] \*\*\*

Rank / Hospital: tmhaedmo/TMH  
Site of Stroke call: TMH AED  
Pre-hospital notification: Yes  
\* Pre-Case ID: SSR0000782  
HKID: [REDACTED]  
Sex / Age: M/81

Case Acknowledge

9:54 AM

NTWC Smart Stroke Registry  
\*\*\* [AED Initiate Case] \*\*\*  
Case Acknowledge

9:55 AM ✓



# One App for All



AED Nurses



Stroke Team

Smart Stroke Registry [UAT] Raymond LEUNG, NTWC/TMH ANC(M&G)/TMH [Name] [Logout]

By Activation: 00:02:00 By Onset: 00:02:07

Activation Triage IA Disposal

TMH IA Screening HKID A1234563

Age 54 Gender M F Weight Body Weight (kg)

Start Procedure Ask by [button]

IA Screening [SCAN QR CODE]

[-] CHECK IN CT [ACKNOWLEDGED]

Neurologist: [button] Radiologist: Raymond LEUNG, NTWC/TMH ANC(M&G)

CTB Show ICH No

CTB REQ. CTA REQ. CTB DONE CTA DONE

1ST MO ARRIVAL

RADIOLOGIST REPLY NOT FOR IA LVO DETECTED, FOR IA

< [UAT] NTWC IA Thrombectomy 57 Members [Moon Icon]

Mon, 20 Jan

NTWC Smart Stroke Registry

\*\*\* [Triage Screening IV+IA] \*\*\*

Rank / Hospital: Raymond LEUNG, NTWC/TMH ANC(M&G)/TMH  
 Site of Stroke call: TMH AED  
 Pre-hospital notification: Yes  
 \* Pre-Case ID: SSR0000387  
 HKID: [REDACTED]  
 Sex / Age: M/54  
 Found onset time: -  
 Last seen normal: -  
 Stroke onset time: 2025-01-20 10:34:34  
 Premorbid mRS: 0  
 GCS: E4 V5 M6  
 NIHSS: 11  
 Right side(U/ L): 5/5  
 Left side(U/ L): 5/5  
 V / A / N: Vision, Aphasia, Neglect  
 Any Chest/Back Pain: No  
 Any Fall: No  
 Any Head Injury: No

Booked CT brain + CTA

Case acknowledge by Radiologist

10:43 AM

# One App for All



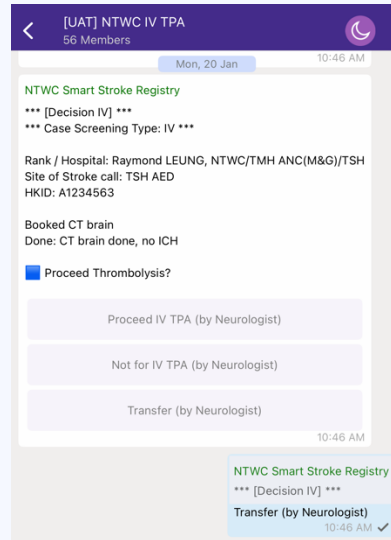
AED Nurses



Stroke Team



Neurologist / Neuro-interventionist



Confirm treatment  
decision on HA  
Chat

# One App for NTWC

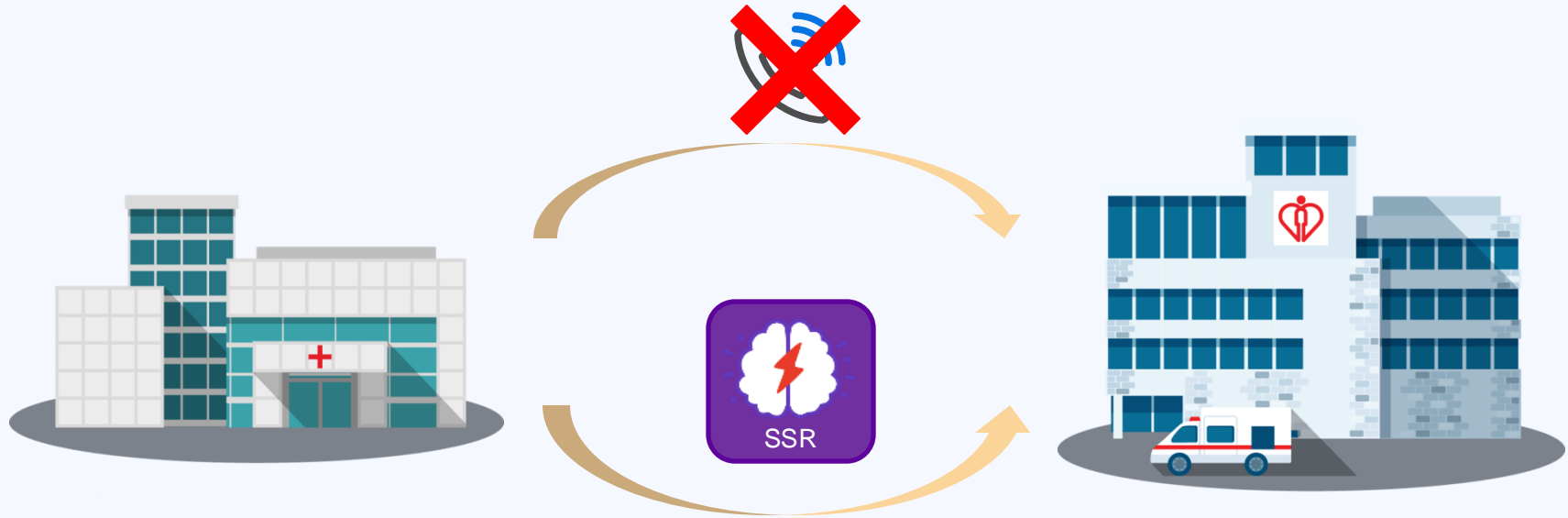


**Centralizing data registry**  
for cluster management

**Unified cluster workflow**

Facilitating **interhospital**  
communication

# Inter-hospital Transfer Support



All transfer details recorded and alerted whole team  
**Saved up to 2-3 phone calls per cases**

# Seamless Database Entry



- ✓ All predefined timestamps captured
- ✓ Database building at same time for clinical management
- ✓ Well formatted data for immediate analysis

Stroke Nurse

Stroke Case							
Only Admin can delete *Non-Init* case.							
Rows per page: 50 rows 1-50 of 719 < 1-50 of 719 >							
Actions	Hospital	HKID	AE / HN No. / Pre-Case Id	Status	Progress	IV Only	IA Only
<span>TMH</span>				Finished	Disposal		
<span>POH</span>				Finished	Disposal		
<span>TSH</span>				Finished	Disposal		
<span>POH</span>				Finished	Disposal		

ALL	TMH	POH	TSH				
Date of TPA call	Weekday	HN (NO AE number, please update when a/c)	AE number of case	Sex	Age	Pre Hospital Notification (For AED Cases)	Source of referral (the 1st site - TMH/POH/TSH/AED or ward)
16/12/2024	Monday			F	70	NA	TMH AED
16/12/2024	Monday			F	86	NA	POH BCAG in-pt
16/12/2024	Monday			M	75	NA	TSH AED
16/12/2024	Monday			M	86	NA	POH AED
16/12/2024	Monday			F	59	NA	TSH AED
17/12/2024	Tuesday			M	74	NA	POH AED
17/12/2024	Tuesday			M	74	NA	POH SN in-pt
17/12/2024	Tuesday			M	72	NA	TMH AED
17/12/2024	Tuesday			F	86	NA	TSH 6A in-pt
17/12/2024	Tuesday			F	73	NA	POH AED
17/12/2024	Tuesday			F	73	NA	POH AED/TMH AED

# Facilitate Interventional Reporting



Radiologist



- ✓ Clinical details input to SSR
- ✓ Database & intervention reporting in one-go

**Smart Stroke Registry (SSR)**

By Registration: 01:27:27 By Onset: 03:40:27

Activation Triggers: By Onset, By Registration, By Disposal

Please click here to Review this application

Please click here to Enter IA Report Data

TMH: [Name] Disposal: [Status] HKID: E403229

Age: 73 Gender: M Weight: 65.0 kg (Body Weight) BMI: 24.5

Transfer from ED: [Status] Transfer to ICU: [Status] A&E: [Status] Admission Time: 2024-12-17 15:30:00

**IA Peri-Procedure**

Groin Puncture Time: [Status] CLEAR 2024-12-17 15:46

Time of 1st DSA: [Status] CLEAR 2024-12-19 17:45

Time of 1st recanalization: [Status] CLEAR 2024-12-17 16:20

DSA Site of occlusion: [Status] CLEAR MCA M1

ASITN collateral grade: [Status] CLEAR 1

Other DSA finding: TANDEM LESION INTRACRANIAL STENOSIS PROCEDURE COMPLICATION N/A

mTICI score: [Status] CLEAR 1

Number of thrombectomy pass: 1

1st pass: Technique of thrombectomy: STENT RETRIEVER DIRECT ASPIRATION COMBINED TECHNIQUE N/A

Plain CT brain:

- ASPECTS: 6
- Presence of haemorrhage:

CT angiogram of brain and neck:

- Site of large vessel occlusion: Yes (Left MCA M1, Left MCA Proximal M2)

Other significant findings:

Local anaesthesia

IV-tPA before the endovascular procedure: N/A

CT brain perfusion:

- CBF<30% volume: 0.0 mL
- Tmax>6.0s volume: 82.0 mL
- Mismatch volume: N/A
- Mismatch ratio: Infinite

ASITN collateral grade: 1

Total number of thrombectomy passes: 1

1st pass: Combined technique

Other intervention: N/A

Final mTICI score: 3

Associated tandem lesion: No

Associated intracranial atherosclerotic disease: No

Angiosuite entry time: 15:46

Femoral puncture time: 15:46

1st DSA run time: 17:45

1st persistent mTICI 2b (or above) reperfusion time: 16:20

Intra-arterial blood pressure: 182/95 mmHg (highest); 124/86 mmHg (lowest)

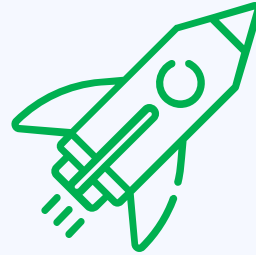


# Impacts of SSR Implementation



**>800**

Clinical cases  
handled via SSR



**~7.5**

Nursing man-hours  
saved per week



**>100**

Reperfusion treatments  
ordered

# Road to Broader Horizon



***Leveraging experience of SSR to benefit **ALL** stroke patients in HA***



# Acknowledgement

The project can be successfully implemented with the support of the following parties

- TMH Neuroscience Centre Management Committee
- NTWC Comprehensive Stroke Management Coordinating Subcommittee
- NTWC Information Technology Service
- HA HOIT
- Dr. Michael FU, TMH Consultant Neurologist
- Dr. Jimmy SIU, TMH Consultant Radiologist
- Dr. Kelvin TSOI, TMH Associate Consultant Neurologist
- Dr. Justin LAM, TMH Associate Consultant Radiologist
- NTWC Neurologists, Radiologists, and Stroke Nurses

