

Enhancing Timeliness in Reviewing CXR and Avoiding Oversight Through Targeted Interventions

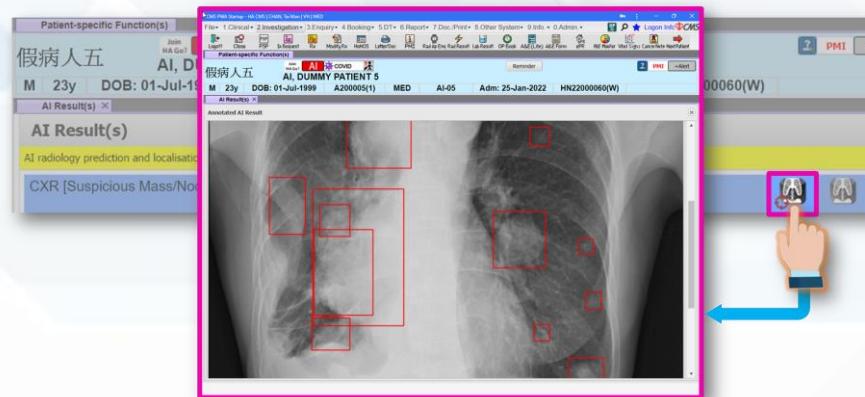
Quality & Safety Division, NTWC
Information Technology and Health Informatics Division, HAHO

HA Convention

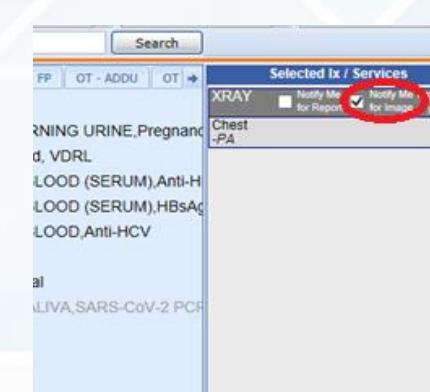


Background

- In clinical practice, **hundreds of chest X-rays (CXRs)** were taken everyday.
- Several incidents in the past revealed that clinicians may
 - **Inadvertently overlook CXRs**
 - **Miss significant findings of CXRs**
- Resulting in missed critical pathologies, including malignant lung masses
- **Potential harm to patients, our staff and the hospital**
- To tackle the potential risks, HA has developed and rolled out **AI tools and notification system** to
 - Provide real-time decision support to clinicians and
 - Remind clinicians to review the unread CXRs



Chest X-ray AI support



Notify Image Alert System



Chest X-ray AI support

HA has developed and rollout Chest X-ray AI support

- Prioritize CXR cases
- Providing real-time decision support to clinicians
- Detecting/localizing abnormalities on CXR images.
- Mainly include the following
 - Suspicious Mass / Nodule with localization
 - Suspicious Pleural Effusion
 - NG tube recognized to be above diaphragm



- Provide valuable insights
- Flag potential abnormalities
- Help streamline the diagnostic process

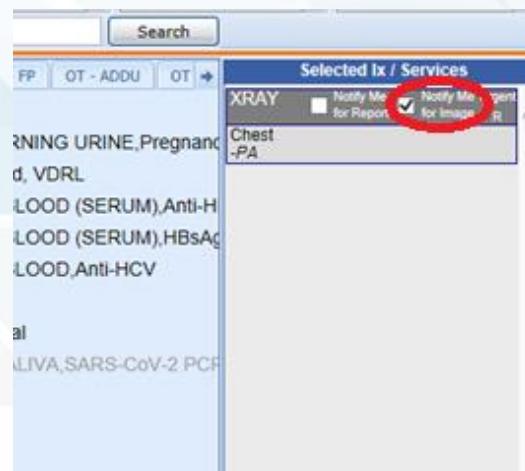


But it has **its limitations** and **false –ve occurs**.
It still requires clinicians to timely review and provide professional judgements

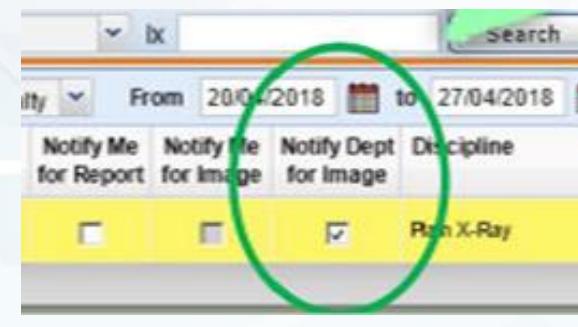
Notify Image Alert System

- HA rolled out the enhancement programme on plain x-ray image notification
- To ensure timely and safe handling of radiological results
- **“Notify me” function in CMS was launched.**
- Notify clinicians when the image is ready for review

“Notify Me for Image” checkbox was activated by default during request investigation



“Notify Department for Image” checkbox activated by default during request investigation



X-rays not reviewed by the requestor within 14 days would show in the **“Departmental Folder”** under **“Image Ready”** in **“clinical in box”** and **“viewable by other users in the same department”**

Number of new messages in specified period: 4									
Message ID	Date	Patient Name	Sex	Modality	Exam Name	Ward / Clinic	Urgent	Exam Date	Status
Requesting Hospital: VH (Total number of messages: 4)									
19721736	26/06/2018 17:19	LAM CHING YEE	F	XRAY	Cephalometry	AN	26/06/2018 17:18	Unread	
19721734	26/06/2018 17:18	LAM CHING YEE	F	XRAY	Cephalometry	AN	26/06/2018 17:17	Unread	
19721722	26/06/2018 16:58	LAM CHING YEE	F	XRAY	Cephalometry	AN	26/06/2018 14:19	Unread	
19721721	26/06/2018 16:58	LAM CHING YEE	F	XRAY	Cephalometry	AN	26/06/2018 14:15	Unread	

The loophole of CXRs management

Before
2021

Several incidents revealed that clinicians may

- Inadvertently overlook CXRs
- Miss significant findings of CXRs

2022

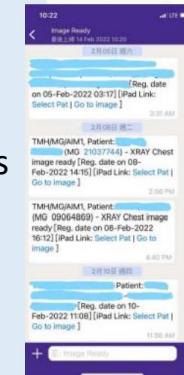


Chest X-ray AI support

- Real time decision support
- Detecting / localizing abnormalities on CXR images

Notify Image Alert System

- Notify clinicians when the image is ready for review



2023



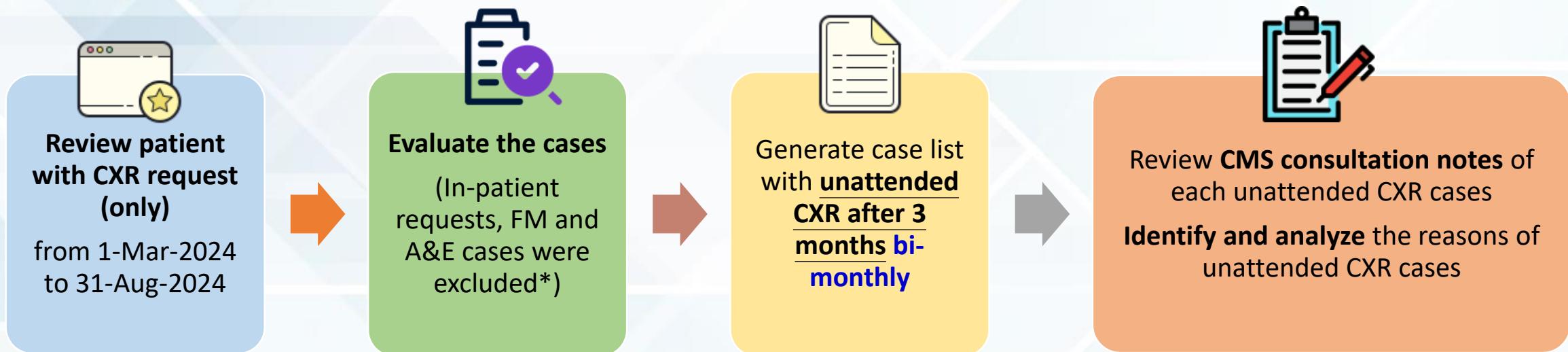
**But still...
there were lesions missed
due to unseen CXRs**

We need an ultimate solution to cover the gap!!!

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What have we done?

The Quality & Safety Division of the New Territories West Cluster (NTWC) collaborated with the Head Office Information Technology and Health Informatics



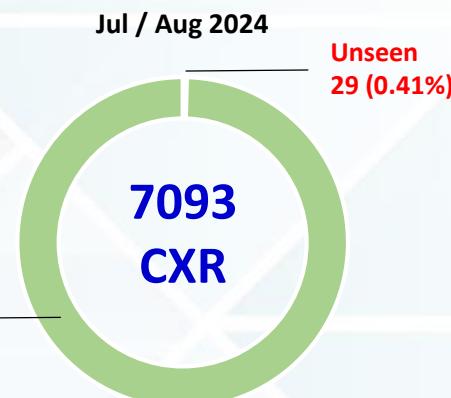
NTWC Unattended CXR List

ATTD_HOSP_CD	CASE_NO	REF_DOCTOR_CD	REF_DOCTOR_NAME	ATTD_SPEC_CD	EXAM_TAKEN_DTM	IMG_READY_DTM	EXAM_DESC	STD_MODALITY_GROUP
POH		DRHE	2024-07-04 10:35:59.000000000	2024-07-04 10:43:06.636000000	Chest	S1		
TMH		HEON	2024-07-05 16:22:59.000000000	2024-07-05 16:46:49.306000000	Chest	S1		
TMH		THO	2024-07-08 09:01:19.000000000	2024-07-08 09:12:14.420000000	Chest	S1		
TMH		THO	2024-07-12 14:58:33.000000000	2024-07-12 15:01:32.756000000	Chest	S1		
POH		ORT	2024-07-15 14:04:42.000000000	2024-07-15 14:25:02.676000000	Chest	S1		
TMH		THO	2024-07-15 11:00:50.000000000	2024-07-15 11:09:52.883000000	Chest	S1		
TMH		HCTS	2024-07-22 15:50:08.000000000	2024-07-22 16:13:28.333000000	Chest	S1		
TMH		HCTS	2024-07-22 11:27:55.000000000	2024-07-22 11:52:46.410000000	Chest	S1		
TMH		GYN	2024-07-25 14:59:08.000000000	2024-07-25 15:06:04.640000000	Chest	S1		
TMH		PED	2024-07-25 15:37:52.000000000	2024-07-25 15:58:05.650000000	Chest	S1		
TMH		THO	2024-07-29 11:06:38.000000000	2024-07-29 11:12:27.846000000	Chest	S1		
TMH		THO	2024-08-01 14:20:08.000000000	2024-08-01 14:48:20.080000000	Chest	S1		
TMH		PED	2024-08-02 12:24:00.000000000	2024-08-02 12:24:47.933000000	Chest	S1		
TMH		THO	2024-08-05 14:40:08.000000000	2024-08-05 14:47:29.610000000	Chest	S1		
POH		MG	2024-08-06 10:31:01.000000000	2024-08-06 10:32:33.960000000	Chest	S1		
TMH		SUR	2024-08-06 16:25:51.000000000	2024-08-06 16:25:44.300000000	Chest	S1		
TMH		THO	2024-08-08 14:13:22.000000000	2024-08-08 14:20:25.203000000	Chest	S1		
TMH		THO	2024-08-12 14:38:31.000000000	2024-08-12 14:45:37.816000000	Chest	S1		
TMH		THO	2024-08-12 10:16:44.000000000	2024-08-12 10:26:38.626000000	Chest	S1		
POH		MG	2024-08-16 11:34:17.000000000	2024-08-16 11:36:55.703000000	Chest	S1		
TMH		SUR	2024-08-16 14:48:12.000000000	2024-08-16 15:02:41.993000000	Chest	S1		
TMH		THO	2024-08-19 11:38:37.000000000	2024-08-19 12:03:27.426000000	Chest	S1		
POH		MRHE	2024-08-20 16:04:07.000000000	2024-08-20 16:28:28.206000000	Chest	S1		
TMH		GYN	2024-08-22 14:18:39.000000000	2024-08-22 14:22:36.433000000	Chest	S1		
POH		SUR	2024-08-23 12:47:17.000000000	2024-08-23 12:49:16.463000000	Chest	S1		
TMH		THO	2024-08-26 15:05:08.000000000	2024-08-26 15:22:12.200000000	Chest	S1		

Results and outcome

From 1 March 2024 to 31 August 2024,

20,767 CXR were performed



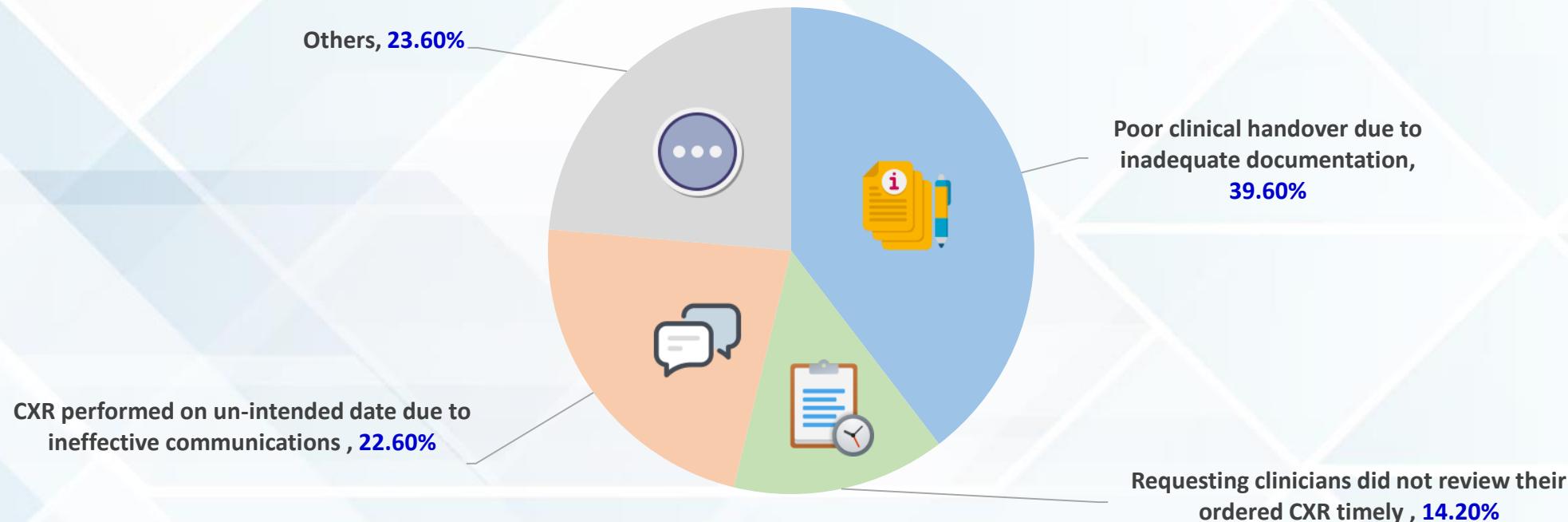
< 1% were unread after three months



It still poses **significant risk** to **delay in clinical management** and **medico-legal consequences**

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Major factors for CXR being unseen



- In response, we have implemented targeted **strategies to mitigate the risk of oversights**:
 - **Reminders** were sent regularly to clinicians to review their ordered CXR.
 - **Bi-monthly reports** on unread CXR were sent to their respective department heads to follow.
 - **Booking process** was enhanced
 - **Training** that focused on effective clinical-handover and accurate documentation were on-going.
- Unseen CXRs decreased from 0.7% to 0.4%

Case sharing

20 Nov 2024



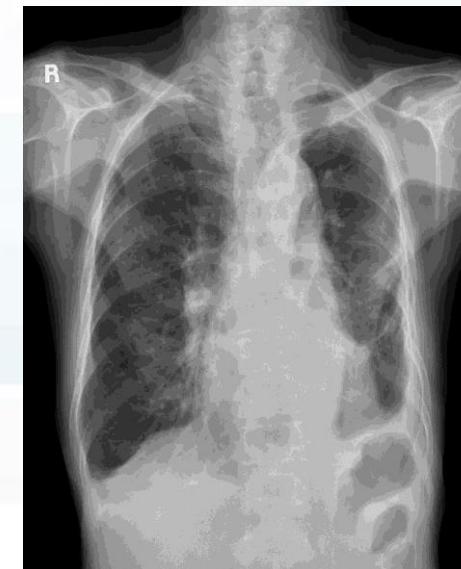
- M/89, history of chronic lung disease and pulmonary fibrosis
- Follow up medical clinic



Following the consultation:

- Planned to follow up the patient **4 months later with a CXR prior**
- However, a scheduled follow-up appointment set for **30 June 2025**
- Outside the recommended 4-month interval
- CXR taken, Notify Image System alerted the clinician that the CXR was ready for review

15 Jan 2025



Jul 2024

Sep 2024

15 Jan 2025

Case sharing

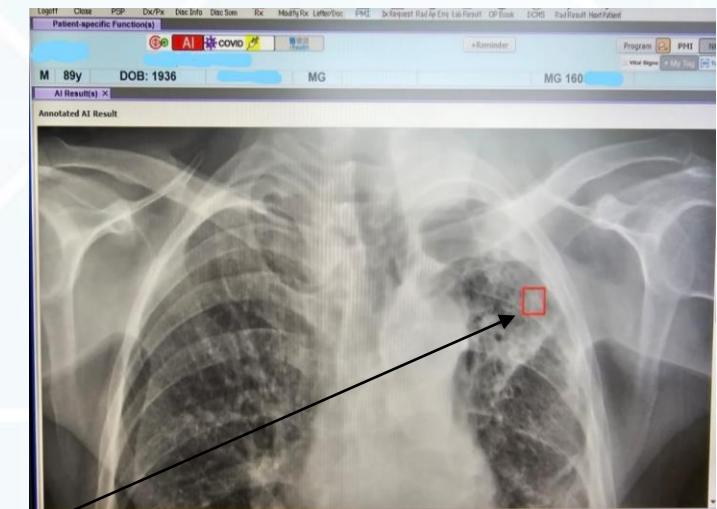
31 Mar 2025



- Found that the CXR **was not acknowledged as "Read"**
- Not reviewed for more than 2 months, **appear in the NTWC Unattended CXR List**



- Q&S reviewed the NTWC Unattended CXR List for patient safety and hospital safety purpose
- CXR revealed significant findings
- Increasing opacities indicative of possible infective changes (PTB)**
- Medical team & Rad Dept were informed
- Radiological formal report was received
- Pt was called back for further evaluation on 7 Apr



The role of AI: Clinical Decision Support
Alert for lung mass/nodule at the moment
***AI will not alert for TB infections**

Benefits of Enhancing Timeliness in Reviewing CXR

Patients

- Improve patient survival rates and outcomes by timely diagnosis and earlier treatments
- Increase patient satisfactions

Staff

- Provide medicolegal protection for our staff
- Reduce anxiety of missing review CXR
- Reinforce a culture of accountability

Corporate

- Promote a culture of accountability and continuous improvement
- Minimize delayed treatment for patients due to missed lesions on unseen CXRs

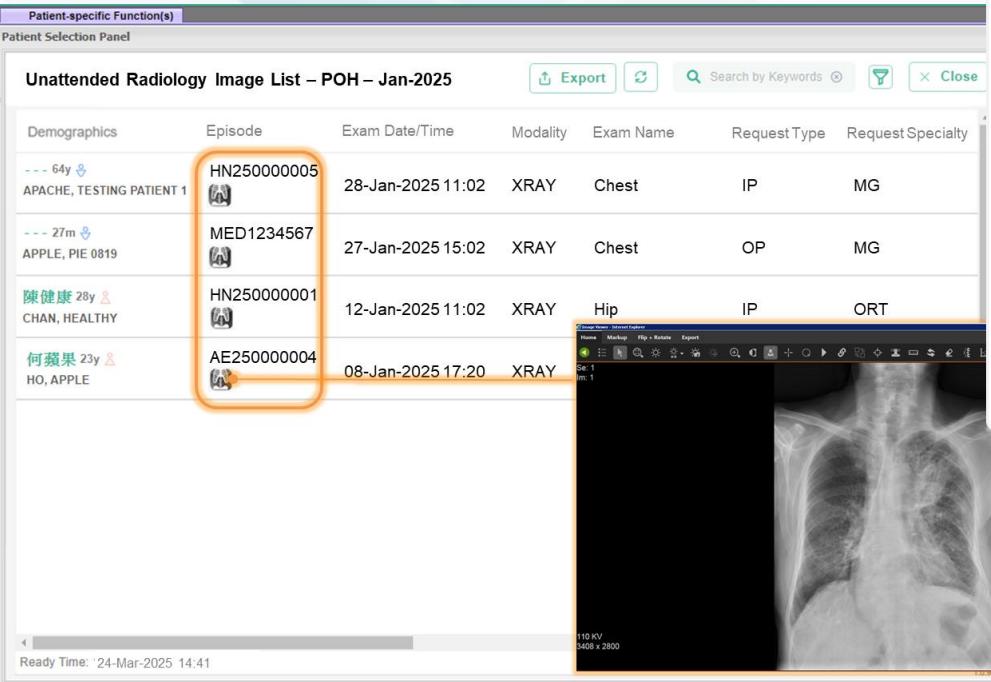


NO extra costs was added for this project

Conclusions and Way forward

All CXR should be read timely !

Unattended Radiology Image List on CMS



Filter

Clear all
Apply

Exam Period

Start: dd-MMM-yyyy End: dd-MMM-yyyy

Modality

CT MRI XRAY

Exam Name

Brain Chest Hip Wrist

Request Type

A&E IP OP

Request Specialty

A&E MCAR MG ORT

Smart Patient List

List Title Unattended Radiology Image List – POH – Jan-2025

Filter

Modality XRAY

Exam Name Chest

Request Type OP

List Retrieval Time: 24-Mar-2025 14:41

No. of Records: 1

Exported By: CHAN, Siu Ming (Medical Officer) on 24-Mar-2025 14:41

Disclaimer
Patient list should be accessed on "Patient-under-care" and "Need-to-know" basis. Your access is subject to audit check. Unauthorized access will lead to disciplinary action.

English Name	Chinese Name	Age	Sex	Episode	Exam Date/Time	Modality	Exam Name	Request Type	Request Specialty	Requested By
APPLE, PIE 0819	-	27m	M	MED1234567	27-Jan-2025 15:02	XRAY	Chest	OP	MG	CHAN, TAI MAN

Acknowledgement

- DR. YC Wong, CCE, NTWC
- Quality & Safety Division, NTWC
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- Information Technology and Health Informatics Division, HAHO
 - DR. Joyce Chan
 - Ms. Sena Sze

Thank you!

