



# A Novel System To Digitalise The Process of Chemotherapy Ordering and Treatment Records



Presenter: Dr CHAN Ka Lok Luke

Associate Consultant

Department of Medicine and Geriatrics

Princess Margaret Hospital

CHAN KLL(1), TSEUNG S(1), TANG PKK(2), POON PLP(3),

CHAN WLF(1), LAM PKQ(3), YIP YTE(2), MAK WMV(1)

(1) Division of Haematology and Haematological Oncology, Department of Medicine and Geriatrics, Princess Margaret Hospital

(2) Pharmacy, Princess Margaret Hospital

(3) Information Technology Division, Princess Margaret Hospital





# Background

- IPMOE has been launched for more than one decade in HA hospitals
- Challenges to develop IPMOE chemotherapy module:
  - complexity of multi-agent regimens
  - frequent needs for dose and time adjustments to address for the change in patients' condition
- Paper-based MARs are still widely used for chemotherapy centres, and treatment records were filed as folders

SHOSPITAL AUTHORITY PRINCESS MARGARET HOSPITAL		(Please affix gum label if available)				
CHEMOTHERAPY PRESCRIPTION SHEET (HAEMATOLOGY)		Name:	Sex/Age:			
		ID No.:	Ward/Bed:			
		HN:	Dept:			
( <input type="checkbox"/> Please ✓ where appropriate )						
<b>ALL HALL-S (Standard Induction, age&lt;50) (Page 1 of 2)</b>						
Cycle:	Diagnosis:	Prescription Date:	Starting Date:			
<input type="checkbox"/> G6PD def   HBsAg: <input type="checkbox"/> +ve <input type="checkbox"/> -ve   anti-HBc: <input type="checkbox"/> +ve <input type="checkbox"/> -ve   HBV DNA: <input type="checkbox"/> +ve <input type="checkbox"/> -ve   Ht _____ cm   Wt _____ kg   SA _____ m <sup>2</sup>						
Known Drug Allergies:						
Doctor Sign:	Day 2	Day 9	Day 16	Day 23	Day 30	For Pharm. Use
Code:	Date:	Date:	Date:	Date:	Date:	
Name:						
<b>Antiemetic &amp; Others:</b>						
<b>Granisetron</b> 1mg IV daily before chemotherapy	Given by	Given by	Given by	Given by	Given by	
	Check by	Check by	Check by	Check by	Check by	
	Time	Time	Time	Time	Time	
<b>Chemo Regimen:</b>						
<b>Daunorubicin</b> _____ mg (25mg/m <sup>2</sup> ) in 100ml NS IV over 1hr daily on D2, 9, 16 & 23	Given by	Given by	Given by	Given by	Given by	
	Check by	Check by	Check by	Check by	Check by	
	Time	Time	Time	Time	Time	
<b>Vincristine</b> 2mg in 100ml NS IV over 1hr daily on D2, 9, 16, 23 & 30	Given by	Given by	Given by	Given by	Given by	
	Check by	Check by	Check by	Check by	Check by	
	Time	Time	Time	Time	Time	
<b>Dexamethasone</b> _____ mg (3mg/m <sup>2</sup> /dose, max. 5mg/dose) PO BD on D1 to D28 (then taper over the next 7 days)						Refer to IPMOE
<b>Mercaptopurine</b> _____ mg (60mg/m <sup>2</sup> ) PO nocte on D29 of induction to D28 of consolidation						Refer to IPMOE

Chemotherapy Prescription Sheet (Haematology)

Sample of chemo MAR



# Workflow In The Past

1. Prescription by doctor in clinic
2. Chemo chart sent to day ward

In clinic

Pre-  
chemo  
day

Chemo  
day

1. Fax MAR to pharmacy
2. Collect invoice from pharmacy if involve SFI items

Fax

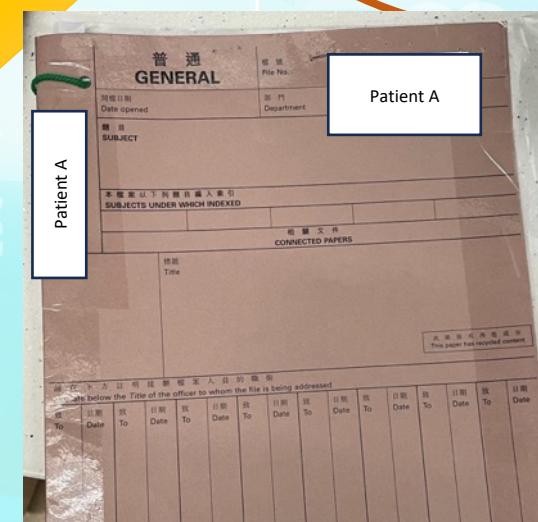
Phone

Day ward:  
Fax updated MAR  
(with gum label) &  
payment receipt to  
pharmacy

Communication  
between day  
ward and  
pharmacy

Pharmacy: After vetting, inform  
day ward to collect chemo

Copy MAR and file  
after administration





No acknowledgement of order receipt (unless by phone call)

Chemo order status of individual patient not known to the team

Chance of missing order



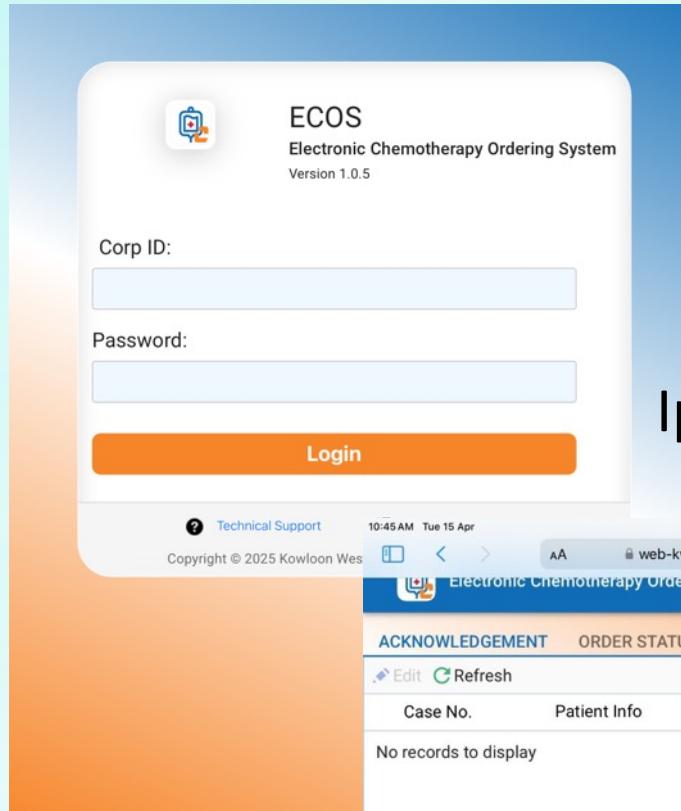
Wastage of paper and storage space

Always need to take hard copies to clinic

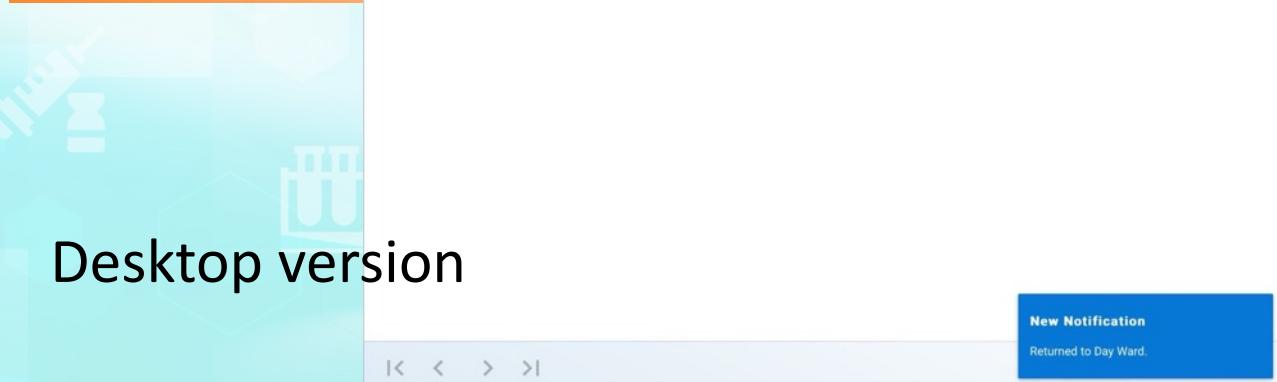


# Objectives

- Electronic chemotherapy ordering system (ECOS) was developed as a KWC initiative project, by haematology unit, pharmacy and IT department of PMH in Mar 2023
- An interface to digitalise the chemo ordering process and record storage
- To evaluate the implementation of ECOS from Jan to Dec 2024



Ipad version



Desktop version



# Features of ECOS

**PATIENT / CYCLE LIST**

Case No. / HKID: MED 123 x Search / Refresh **+ Add** Edit Patient Info Patient A >

Location Chemo Date Status Download Upload MAR

▼ Chemo Cycle Info: #01. Velcade-based treatment DaraVTD, Cycle 1 - 4 items

22-Apr-2025	New	<b>MAR</b> <b>Invoice</b> <b>Receipt</b> <b>Upload</b>
15-Apr-2025	New	<b>MAR</b> <b>Invoice</b> <b>Receipt</b> <b>Upload</b>
08-Apr-2025	Withheld (Condition changed)	<b>MAR</b> <b>Invoice</b> <b>Receipt</b> <b>Upload</b>
01-Apr-2025	Picked up	<b>MAR</b> <b>Invoice</b> <b>Receipt</b> <b>Upload</b>

▼ Chemo Cycle Info: #02. Velcade-based treatment , Cycle 1 - 4 items

## Patient specific profile

“**+ Add**” function to initiate a new chemo order

Review of past treatment record

- Past chemo cycle
- Past chemo MAR

Download invoice to patient issued by pharmacy

- 👍 Remote access of past chemo history
- 👍 Unconfined location to make chemo order (no need to stay near the fax machine)



# Features of ECOS

Electronic Chemotherapy Ordering System (Day Ward)

ADMISSION ORDER STATUS

Refresh

Patient Info Location View Cycle

Chan, Tai Man (陳大文) PID: A1234xxx	<a href="#">View</a>	<a href="#">Actions</a>
Ng, Chi Man (吳至文) PID: B5678xxx	<a href="#">View</a>	<a href="#">Actions</a>
Pang, Yan Sam (病人三) PID: C7890xxx	<a href="#">View</a>	<a href="#">Actions</a>

**MAR and receipt scanning replaced by iPad**

Print/Download



Document: MAR

Patient: Chan, Tai Man (陳大文)

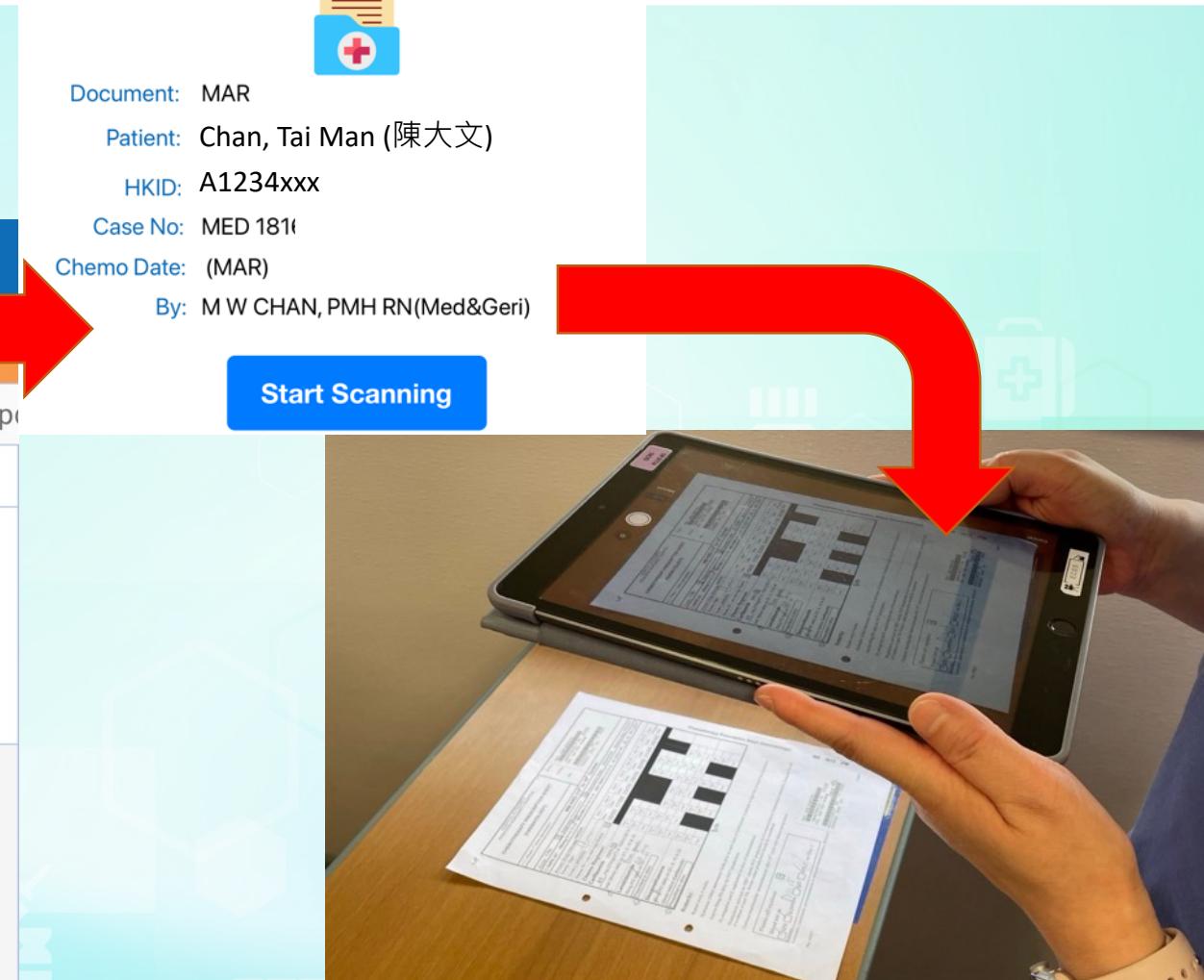
HKID: A1234xxx

Case No: MED 1816

Chemo Date: (MAR)

By: M W CHAN, PMH RN(Med&Ger)

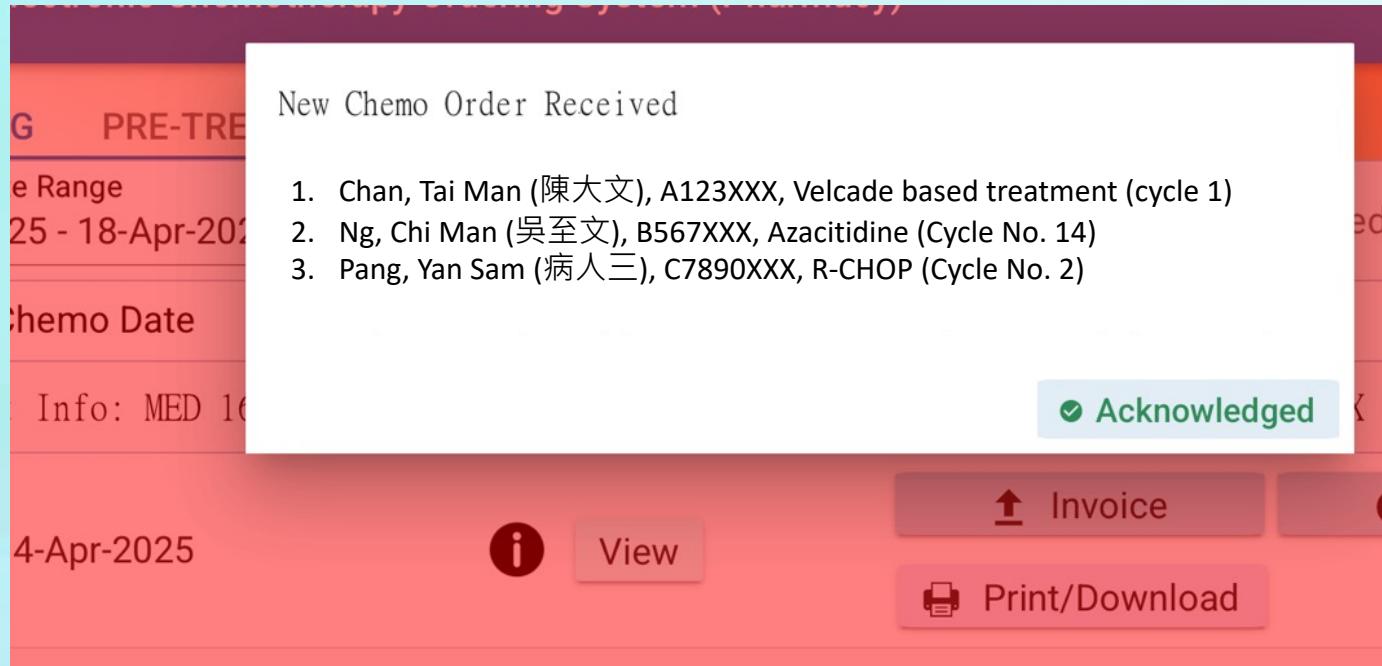
Start Scanning



👍 Document scanning function of iPad to maintain the quality of images; Cf. distortion by fax machine



# Features of ECOS



## Pharmacy interface –

New chemotherapy request will pop up in pharmacy for acknowledgement, and shown in the system

👍 No missing of order cf. fax MAR/ receipt in the past

👍 Every staff can log in to see the progress of a chemo order. Encourage teamwork!

ADMISSION		ORDER STATUS	Actions
Patient Info	Location	Status	
Chan, Tai Man (陳大文) A1234xxx		Vetting	<span>Hand</span> Picked Up MAR
Ng, Chi Man (吳至文) B5678xxx		Acknowledged	<span>Hand</span> Picked Up MAR
Pang, Yan Sam (病人三) C7890XXX		Pending Admission	<span>Hand</span> Picked Up MAR

## Day ward interface –

The status of each order is clearly shown  
Notification pop up when ready for pick up



# Features of ECOS

The screenshot shows the ECOS software interface. On the left, a confirmation dialog box is open, asking 'Are you sure to Release this treatment?' with a date of 'Chemo Date: 2025-04-15'. The dialog lists the patient as 'Chan, Tai Man (陳大文)' with 'PID: A123XXX'. At the bottom of the dialog are two buttons: 'No' (red) and 'Yes' (green). On the right, a larger window displays 'Details of MED 2311' for the same patient. It shows 'Patient Info' with 'MED 2311' and 'Chan, Tai Man (陳大文), A123XXX'. Below this is 'Chemo Date' with '2025-04-15'. A section for 'Release Request for:' includes 'MAR Re-Upload' (green button) and 'Invoice Re-Upload' (gray button). At the bottom right of the main window is a 'Cancel' button. A red box highlights the 'Request for order release and amendment' text at the bottom left, and a white box highlights the 'Reupload amended MAR' text at the bottom right.

- 👍 Communication between day ward and pharmacy by ECOS to replace fax + call
- 👍 Enhanced traceability



# Implementation of ECOS

- In the evaluation period (Jan to Dec 2024)
  - >4800 chemotherapy orders processed by ECOS
  - Document scanning failure on 2 days, fax used as contingency
  - No report of missing chemotherapy order
- Challenges in implementation and limitations of our evaluation
  - Time to adapt to and optimise the novel system
  - Efficiency not accessed, but expected to be enhanced with familiarity to the system



# Limitations, future role and prospect of ECOS

- ECOS only digitalise the chemo ordering process but the steps are still manual
  - ?Scanning multiple MARs with OCR function to recognise patient's identifiers
  - Now we use PDF to prescribe and then print whilst IPMOE chemo module is still under development
  - Extension to inpatients, other chemo site at KWC (PMH clinical oncology/ YCH haematology)

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Name:										
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				Check by	Check by	Check by	Check by	Check by		
				Time	Time	Time	Time	Time		
<b>Mercaptopurine</b> _____ mg (60mg/m <sup>2</sup> ) PO nocte on D29 of induction to D28 of consolidation				Given by	Given by	Given by	Given by	Given by		
				Check by	Check by	Check by	Check by	Check by		
				Time	Time	Time	Time	Time		

Current layout of chemo MAR is optimised for treatment planning



## Acknowledgement

Haematology Unit, Dept of M&G, PMH  
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KWC IT Team

