

Seminar on Clinical Information System (CIS) in Intensive Care



Comments from an ICU director's perspective

Dr. Yan Wing Wa
ICU Director

Pamela Youde Nethersole Eastern Hospital

22nd April 2009



Role of an ICU director

- Procurement
- Implementation planning
 - Before launch
 - Launch months
 - After launch
- Observed advantages & disadvantages
- Planning ahead



Procurement Phase

- Is it really necessary?
- Foresee difficulties ahead
- Know what product you want
 - Product itself
 - After-sales service
- Go through the formalities
 - Specifications
 - Tendering



Implementation Planning

- Formation of CIS work group
 - Doctors, nurses, vendor engineer and specialist
- Briefing in
 - Hospital ICU Committee
 - Hospital management
 - All other clinical department heads
- COC Intensive Care
 - Include the project into HAIT annual plan/budget



- Before Launch
 - Full support to CIS workgroup
 - Financial
 - CIS trolleys
 - Projectors, ...
 - Training sections to our ICU staff and other departments, mainly doctors
 - Liaise with other external departments
 - Pharmacy
 - Laboratory
 - Hospital ITD



- Launch month
 - Double charting (> double workload)
 - Avoid peak season
 - All or none
 - Most critical period
 - Manage frustration
 - Active participation
 - Close monitoring
 - Daily meeting
 - Quick Fix



- After launch
 - Regular review
 - Standing agenda item in weekly ICU meeting

**Minutes of the 176th ICU Meeting
held at 15:08 hour on 22 January 2009
Conference Room, Ward D10, PYNEH**

Present:	Dr. Grace LAM	Resident Specialist	Chairperson
	Dr. YAN Wing Wa	Director	
	Dr. CHAN King Chung, Kenny	AC	
	Dr. SHUM Hoi Ping	MO	
	Dr. KWAN Ming Chit	Resident	
	Ms. Christine CHAN	DOM	
	Ms. SO Hang Mui	NS	
	Ms. Candice LAW	PS	(Secretary)

ACTION BY

CONFIRMATION OF LAST MINUTES

- 1 The minutes of the previous meeting was confirmed with the following amendment:
1.1 Point 17: Signed lab results will be placed on the "**left**" hand side of the folder.

MATTERS ARISING

Time Out Auditing

- 2 After discussion, ICU proposed the following procedures for time out auditing: elective chest tapping, tracheostomy and bronchoscopy with biopsy.

Map of D10 Computer Network

- 3 Mr Jak Ho prepared the diagram of computer network in D10 conference room.

MATTERS RELATED TO HOSPITAL COMMITTEES

- 4 Dr Yan attended the Task Force on Clinical Management of Infectious Diseases that discussed the management of ICU patients during outbreaks.

STAFF ISSUES

- 5 There was no staff issue for discussion.

AVIAN FLU / INFECTION CONTROL

- 6 All staff were reminded on the rising number of flu A cases in Hong Kong and neighboring countries. Isolation upon ICU admission should be considered.

OSH/AIRS

- 7 Dr Kenny Chan attended a full RCA of AIRS case no. 4255. No root cause was found but some suggestions were made.
8 Staff were reminded to review the new issues (January 2009) of
8.1 Risk Alert (Appendix 1)
8.2 Medication Incidents Reporting Programme Bulletin (Appendix 2)
9 Ms Christine CHAN stated that AIRS Case No. 5981 was under investigation by PRO Ms May Chan.

CIS

- 10 Dr Kenny CHAN stated that ePR images can now be retrieved using CIS.
11 Locations of the new monitors for filmless implementation were discussed.
12 ICU will organize a 1-day seminar regarding the use of CIS in ICU, which will be held from 09:00-1630 on 22 April 2009 at the HKEC Training Centre.

CORE GROUP REPORT

- 13 There was no core group report.



- After launch
 - Regular review
 - Standing agenda item in weekly ICU meeting
 - e.g. Add work stations at nurse station/within cubicles
 - To minimize using other patients' CIS stations
 - especially during admission & daytime busy hours.
 - e.g. Suggestion to CIS vendor
 - to fix bugs
 - To improve design in future version
 - e.g. Further workflow change need
 - PACS

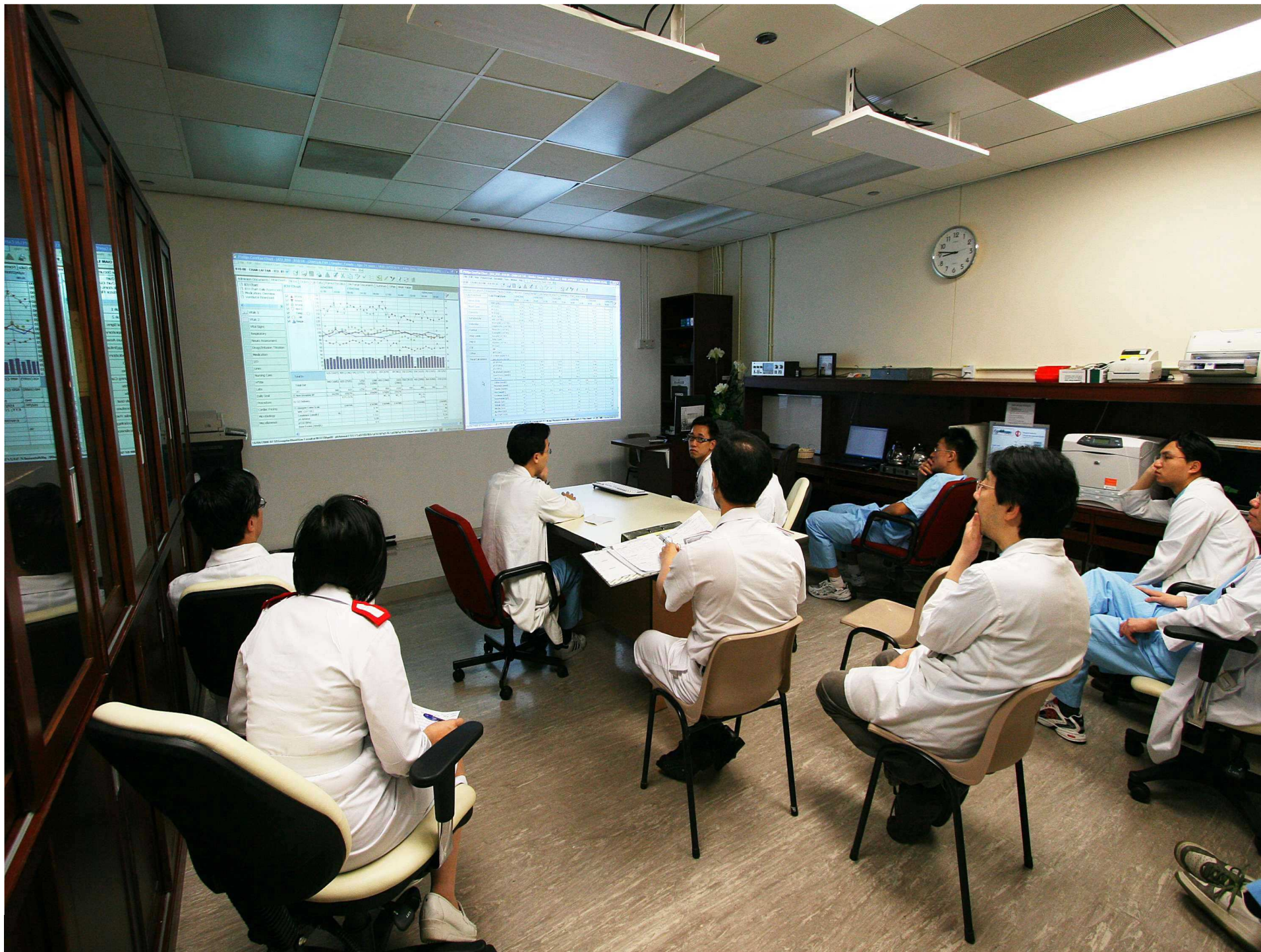


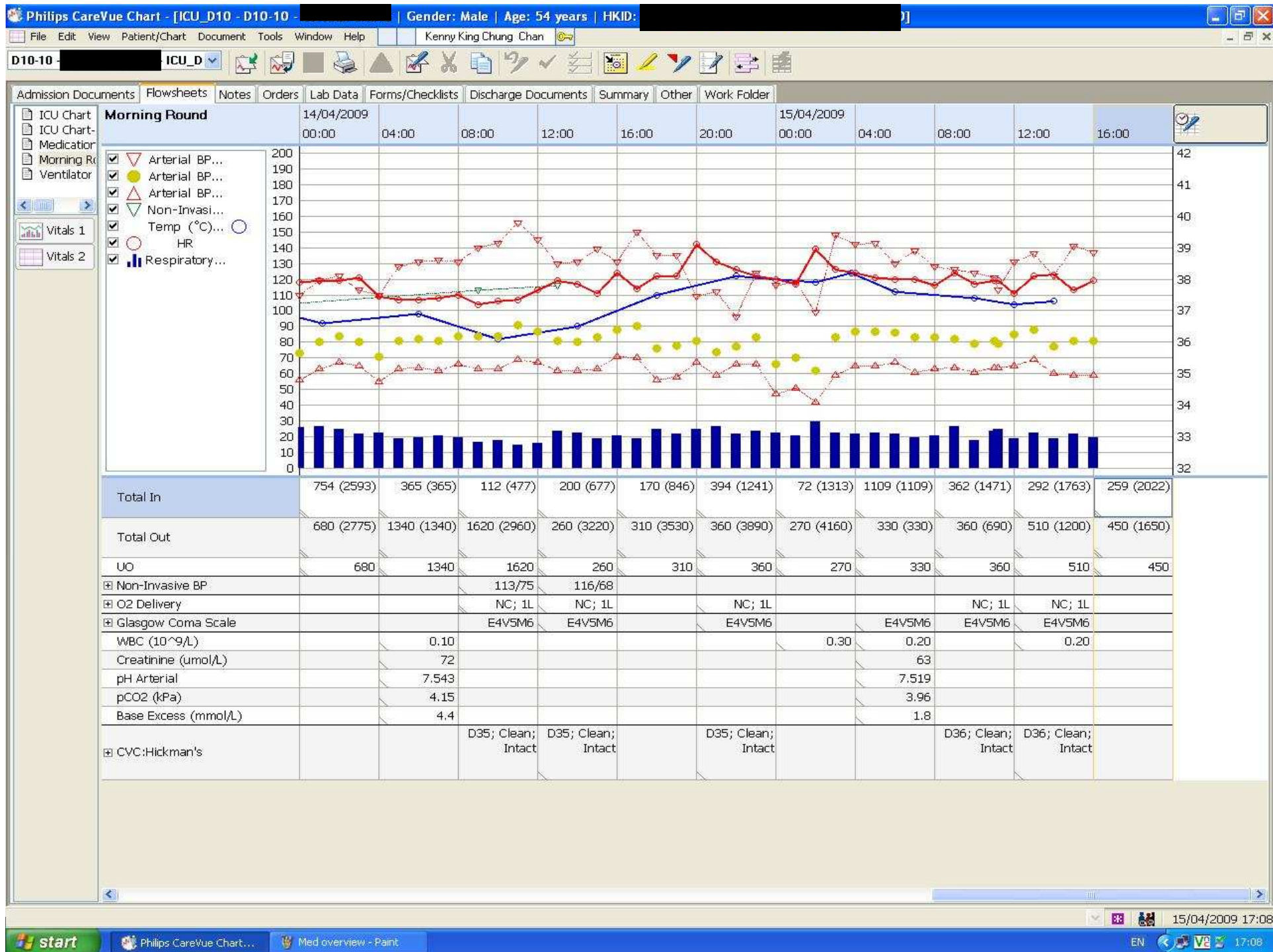
- After launch
 - Visit to other ICUs
 - Prepare for contingency
 - Plan
 - Drills
 - Change from CareVue version c to version d
 - Monitor medications incidence



Observed advantages so far

- Better communications
 - Handover round
 - Sit down round + bedside round
 - Everyone can contribute
 - Critical care physicians
 - Anaesthetist intensivists
 - Nephrologist
 - Respiratory physicians
 - Rotating A&E physicians





Philips CareVue Chart - [ICU_D10 - D10-10 -] Gender: Male | Age: 54 years | HKID:]

File Edit View Patient/Chart Document Tools Window Help Kenny King Chung Chan

D10-10 - ICU_D

Admission Documents | Flowsheets | Notes | Orders | Lab Data | Forms/Checklists | Discharge Documents | Summary | Other | Work Folder

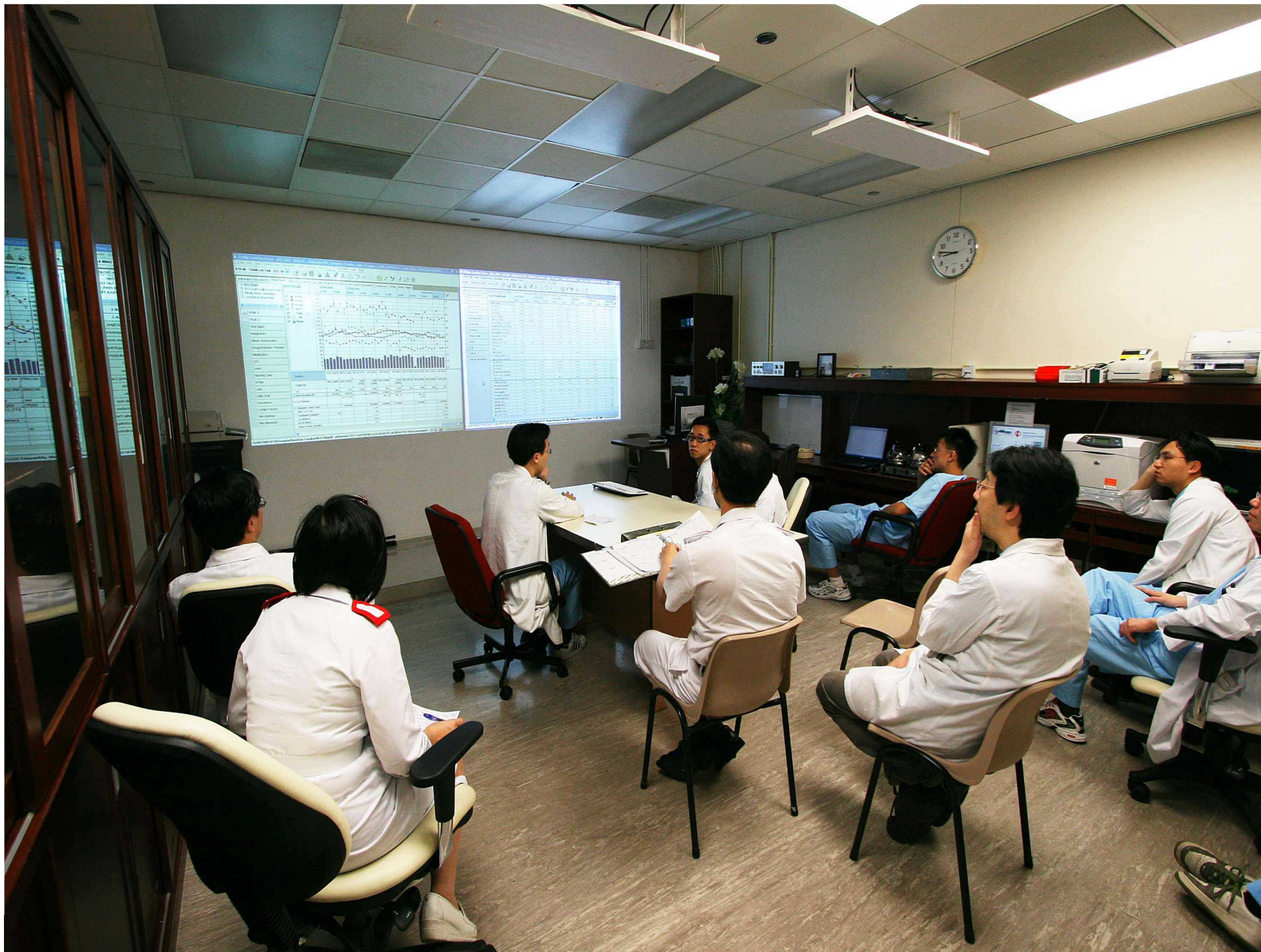
Lab Flowsheet

Hematology
Blood Gases
Chemistry
Autoimmune
Endocrine
Tumour
Drug Levels
Hep B
CSF
Other
Renal Calculations

Lab Flowsheet	11/04/2009 00:00	12:00	12/04/2009 00:00	12:00	13/04/2009 00:00	12:00	14/04/2009 00:00	12:00	15/04/2009 00:00	12:00	
HGB (g/dL)	9.7		9.1	8.5	8.5	7.9	9.8		7.9	8.3	
HCT (L/L)	0.27		0.26	0.24	0.24	0.22	0.27		0.23	0.23	
MCV (fL)	84.2		85.2	85.5	84.8	83.4	83.6		84	83.8	
MCH (pg)	30.1		30.4	30.1	29.8	30	29.9		29.8	29.9	
MCHC (g/dL)	35.7		35.7	35.2	35.2	35.9	35.7		35.4	35.7	
WBC (10 ⁹ /L)	0.20		0.20	0.10	0.10	0.20	0.10		0.20	0.20	
Neutrophils (x10 ⁹ /L)			0.1	0	0						
Lymphocytes (x10 ⁹ /L)			0.1	0.2	0.1						
Monocyte (x10 ⁹ /L)			0	0	0						
Eosinophil (x10 ⁹ /L)			0	0	0						
Basophil (10 ⁹ /L)			0	0	0						
Platelets (10 ⁹ /L)	14		34	27	4	5	6		6	15	
PT (sec)	12.9				10				12.2		
INR	1.3				1				1.3		
APTT (sec)	43.3				39.7				38.5		
Vancomycin(Trough):			12.68								
pH Arterial	7.538		7.508	7.51	7.523		7.543		7.519		
pCO2 (kPa)	3.09		3.2	3.18	3.51		4.15		3.96		
pO2 (kPa)	14.12		11	15.96	14.87		18.98		22.1		
Bicarbonate (mmol/L)	19.3		18.6	18.6	21.2		26.2		23.7		
Base Excess (mmol/L)	-1.2		-2.4	-2.4	0		4.4		1.8		
SaO2 (%)	98.5		97.2	98.7	98.5		99.1		99.3		
Sodium (mmol/L)	128		128	127	129		137	138	143		
Potassium (mmol/L)	3.6		3.7	3	3.2		2.6	3.1	3.7		
Chloride (mmol/L)											
Urea (mmol/L)	11		9.2	11.6	11.9		14.8		16.4		
Creatinine (umol/L)	90		56	73	63		72		63		
Total Protein (g/L)	40		37		33		38		32		
Albumin (g/L)	20		17		17		21		17		
Globulin (g/L)	20		20		16		17		15		
Bilirubin Total	165		227		275		395		380		
ALK Phos (U/L)	366		309		363		425		383		
ALT/SGPT (IU/L)	216		151		113		98		73		
Calcium (mmol/L)					1.82		1.81				
Phosphate (mmol/L)	0.86		0.73		0.6		1.21		0.83		
Amylase (IU/L)				189	162						

start Philips CareVue Chart... morning round 1 - Paint EN 15/04/2009 17:09





Philips CareVue Chart - [ICU_D10 - D10-02 -] Gender: Male | Age: 55 years | HKII 5]

File Edit View Patient/Chart Document Tools Window Help Kenny King Chung Chan

D10-02 - ICU_D1

Admission Documents | **Flowsheets** | Notes | Orders | Lab Data | Forms/Checklists | Discharge Documents | Summary | Other | Work Folder

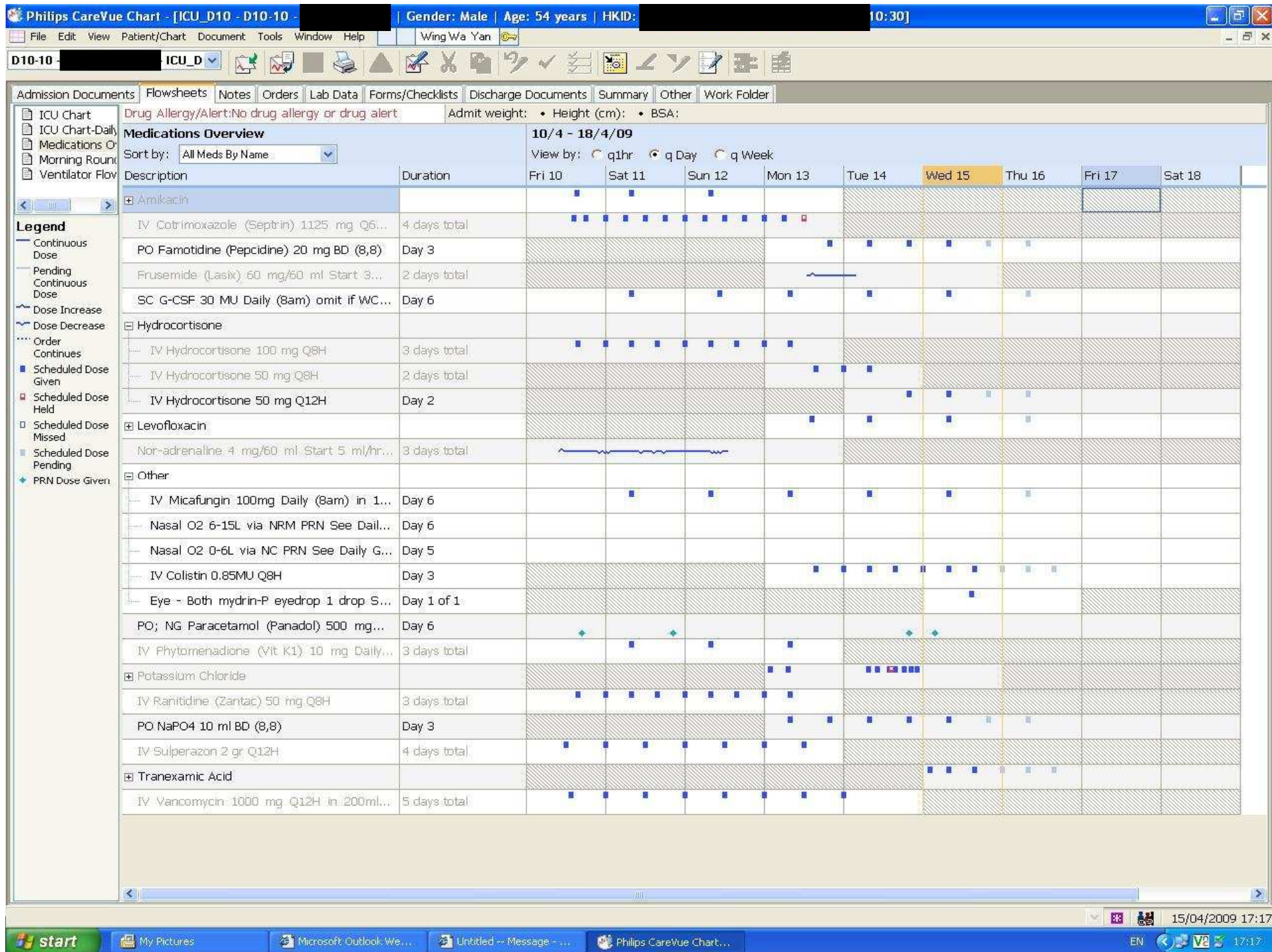
ICU Chart

ICU Chart-Daily Assessment
Medications Overview
Morning Round
Ventilator Flowsheet

Vitals 1
Vitals 2
Vital Signs
Respiratory
Neuro Assessment
Drugs/Infusion Titration
Medication
I/O
Lines
Nursing Care
H'Stix
Labs
Daily Goal
Procedure
Cardiac Pacing
Microbiology
Miscellaneous

ICU Chart	13/04/2009 16:00	20:00	14/04/2009 00:00	04:00	08:00	12:00	16:00	20:00	15/04/2009 00:00	04:00
⊕ O2 Delivery		ETT; 45%			ETT; 40%	ETT; 40%				
⊕ ETT/Trach Placement		Oral; 7.0			Oral; 7.0	Oral; 7.0				
ETT marking		23			23	23			23	
ETT/Trach Cuff Pressure		24			24	26			24	
ETT/Trach Cuff Status		Inflated			Inflated	Inflated			Inflated	
Oral ETT position		Right			Right	Left			Left	
Ventilator Mode		PS	PS	PS	PS	PS	PS	PS	PS	PS
PS (cmH2O)		10	10	10	17	22	22	22	22	22
PEEP (cmH2O)		14	14	14	8	8	8	8	8	8
FIO2		0.45	0.45	0.45	0.4	0.45	0.4	0.45	0.45	0.5
SpO2		94	95	95	91	96	91	96	89	95
Respiratory Rate (bpm)		25	24	21	26	27	26	27	31	26
Tidal Volume (ml)		394	371	327	385	401	388	400	383	417
Peak Pressure (cmH2O)		25	25	25	26	31	31	31	31	32
Minute Volume (L/min)		9.6	8.7	7	9.8	10.8	10.1	11	11.7	10.7
SBI		63	64	64	67	67	67	69	80	62
End-Tidal CO2										
⊕ ETT/Trach Suctioning	Scanty Yellow Thick	Scanty Yellow L	Scanty Yellow L	nil		Nil	nil		M Yellow L	Scanty Yellow L
⊕ Oral Suctioning	Scanty Yellow; Blood stained L	Scanty Yellow; Blood stained L	M Yellow; Blood stained L	Copious Yellow; Blood...		M Blood stained L	Scanty Blood stained L		M White; Blood stained L	M White; Blood stained L
⊕ Self cough										
pH Arterial				7.328		7.385				7.404
pCO2 (kPa)				9.71		9.19				8.67
pO2 (kPa)				12.18		18.8				13.11
Bicarbonate (mmol/L)				37.4		40.3				39.7
Base Excess (mmol/L)				8.3		11.9				11.9
SaO2 (%)				96.1		98.7				97.3

15/04/2009 17:12





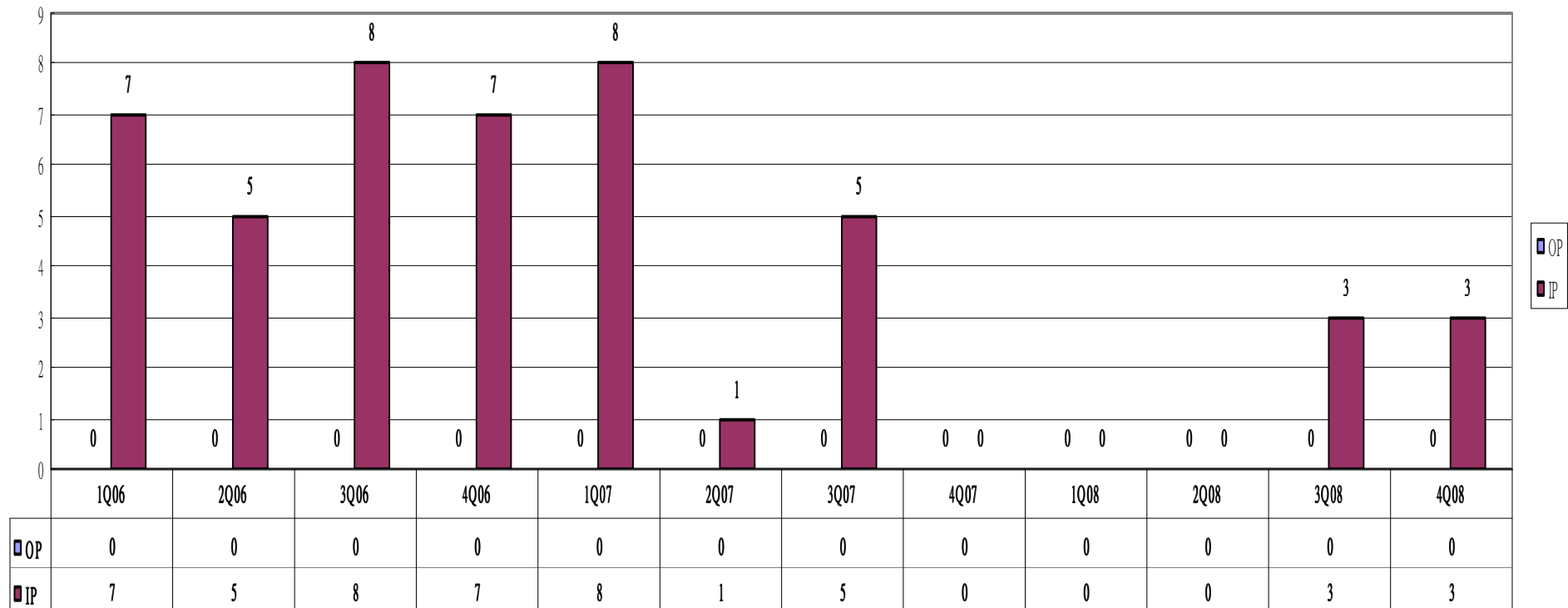
Observed advantages so far (2)

- CPOE
 - Marked decrease in medication incidence since implementation



Medication incidence chart

Medication Incidents - Inpatients
Intensive Care Department, PYNEH





Observed advantages so far (2)

- CPOE

- Marked decrease in medication incidence since implementation
- Improved in Turn around time (TAT)
- Further improvement
 - Dosage range
 - Check drugs interaction
 - Adjust with weight/height
 - Connect with CMS and check for drug allergic history
 - Adjust with changing renal & liver function



Observed advantages so far (3)

- More accurate & legible information
 - IO chart
 - Medications
 - images
- Better information display
 - Medication overview
 - Vital signs
- Easy to chart necessary information
 - CABSII project

Philips CareVue Chart - [ICU_B10 - B10-21 -] Gender: Male | Age: 71 years |]

File Edit View Patient/Chart Document Tools Window Help Wing Wa Yan

B10-21 - ICL

Admission Documents Flowsheets Notes Orders Lab Data Forms/Checklists Discharge Documents Summary Other Work Folder

ICU Chart

- ICU Chart-Daily Assessment
- Medications Overview
- Morning Round
- Ventilator Flowsheet

Vitals 1

Vitals 2

Vital Signs

Respiratory

Neuro Assessment

Drugs/Infusion Titration

Medication

I/O

Lines

Nursing Care

H'Stix

Labs

Daily Goal

Procedure

Cardiac Pacing

Microbiology

Miscellaneous

ICU Chart	08/04/2009 00:00	09/04/2009 00:00	10/04/2009 00:00	11/04/2009 00:00	12/04/2009 00:00	13/04/2009 00:00	14/04/2009 00:00	15/04/2009 00:00	16/04/2009 00:00	17/04/2009 00:00	
IV:Rt Forearm #1		D1; Clean; Intact	D2; Clean; Intact	D3; Clean; Intact	D4; Clean; Intact	D5; Clean; Intact	D6; Clean; Intact	D7; Clean; Intact	D8; Clean; Intact		
CVC:Dual Lumen (Rt Fem)	D5; Clean; Intact	D6; Clean; Intact	D7; Clean; Intact								
CVC:Dual Lumen (Rt Jug)				D1; Intact	D2; Clean; Intact	D3; Clean; Intact	D4; Clean; Intact	D5; Clean; Intact	D6; Clean; Intact		
CVC marking				16	16	16	16	16	16		
Condition				Intact	Clean; Intact	Clean; Intact	Clean; Intact	Clean; Intact	Clean; Intact		
Insert Date				11/04/2009	11/04/2009	11/04/2009	11/04/2009	11/04/2009	11/04/2009		
Line Duration				1	2	3	4	5	6		
Indication				Renal Replacemen t Therapy	Renal Replacemen t Therapy	Renal Replacemen t Therapy	Renal Replacemen t Therapy	Renal Replacemen t Therapy	Renal Replacemen t Therapy		
CVC:Lt Femoral	D8; Clean; Intact	D9; Clean; Intact	D10; Intact; Oozing	D11; Oozing	D12; Clean; Intact	D13; Clean; Intact					
CVC:Rt Femoral						D1; Clean; Intact	D2; Clean; Intact	D3; Clean; Intact	D4; Clean; Intact		
CVC marking						16	16	16	16		
Condition						Clean; Intact	Clean; Intact	Clean; Intact	Clean; Intact		
Insert Date						13/04/2009	13/04/2009	13/04/2009	13/04/2009		
Line Duration						1	2	3	4		
Indication						Inotrope / Vasopressor	Inotrope / Vasopressor	No indication, pending removal	No indication, pending removal		
Arterial:Lt radial	D18; Intact; Oozing	D19; Intact; Oozing; Redness									

start Philips CareVue Chart... EN 16/04/2009 17:20



Observed advantages so far (4)

- Easily to retrieve data
- Able to access information from bedside stations
 - ePR
 - eKG
 - Websites of our department, hospital or cluster
 - Protocols/guidelines

Electronic Patient Record - Microsoft Internet Explorer

檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

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Google G Go M S Bookmarks 1411 blocked Check AutoLink AutoFill Send to Settings



Electronic Patient Record



LOGON

User ID:

Password:

AHN Logon Reset

[Release Note v1.8](#)

If your PC have problem in showing Chinese character, please click the following link to download the fonts:-

[Chinese Character - HA MingLiu](#)

[Microsoft Hong Kong Supplementary Character Set](#)

This site is best viewed at 1024 x 768 screen resolution with Microsoft Internet Explorer 6.0 or above

IMPORTANT NOTES

1. All patient information is strictly confidential
2. Staff may only use the ePR for authorised purpose
3. All access to ePR is logged
4. Please logoff immediately after use



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e-Knowledge Gateway - Microsoft Internet Explorer

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醫啟知 e-Knowledge Gateway type your search here **eKG Alerts** **HELP** **HOME** **Personal Login**

Library Services Medline, Cochrane, etc. Specialties Diseases

Mucormycosis
information for HA staff: [DynaMed](#) | [MD Consult](#)
HFMD & EV71
HA Fact Sheet | [DynaMed](#) | [MD Consult](#) | [CHP](#) | [中國疾病控制中心](#) | [US CDC](#)

eKG Hotline: 2300 6360
Email: ekg@ha.org.hk

Core Readings - General

(For full holdings of e-journals, please see [full-text electronic journals](#))

- ▶ ACP Journal Club
- ▶ BMJ
- ▶ Clinical Evidence (HA staff only)
- ▶ **new!** DynaMed (HA staff only)
- ▶ Evidence-Based Medicine
- ▶ Hong Kong Medical Journal
- ▶ JAMA
- ▶ Lancet
- ▶ New England Journal of Medicine

Evidence-Based Practice

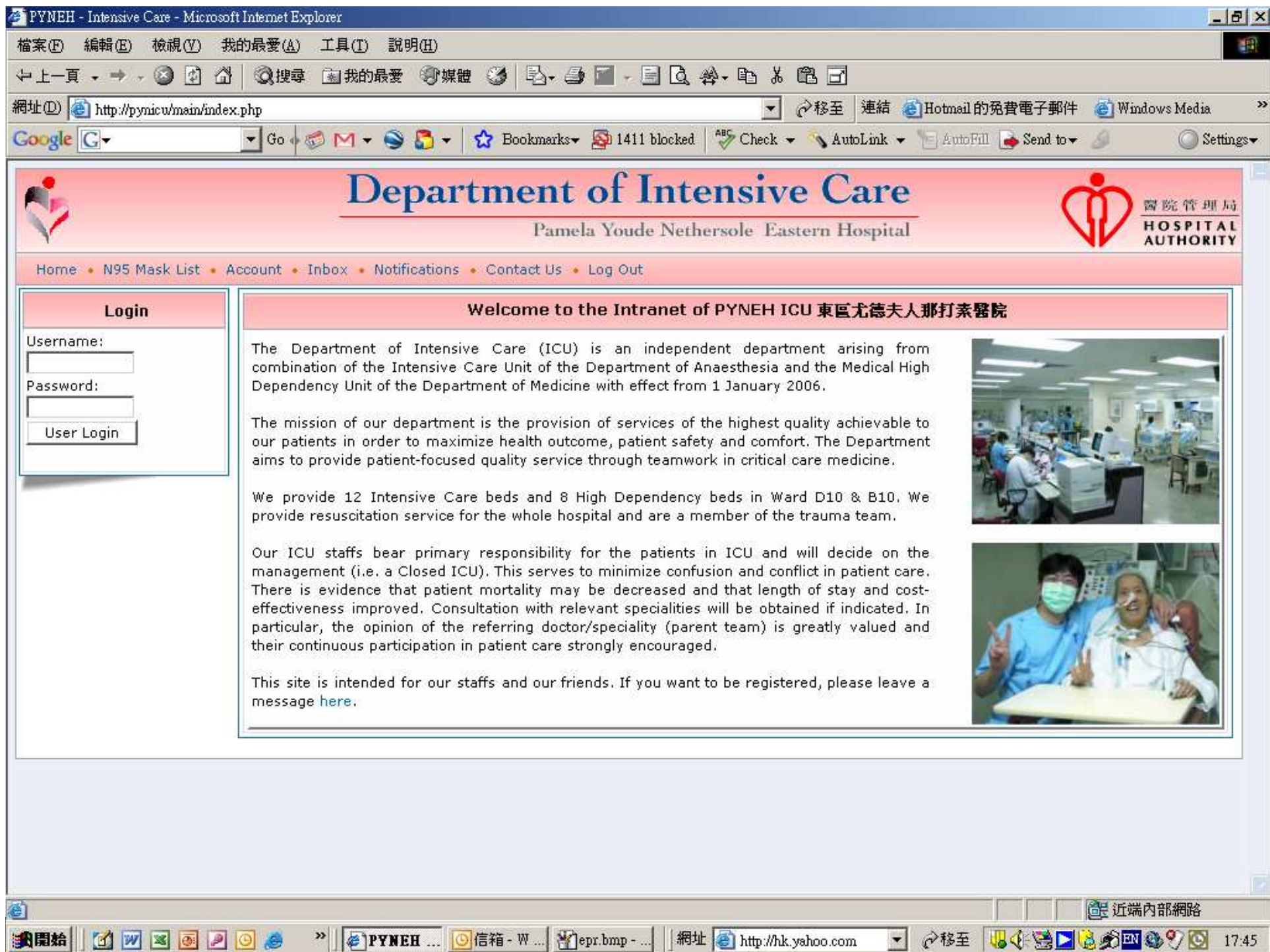
- ▶ All about Evidence-Based Practice
- ▶ Evidence-Based Health Care in HA

Research

What's New on eKG?

- ▶ **DynaMed**
Quick answers on 3000 topics at the point-of-care for HA staff
- ▶ **MD CONSULT**
>50 e-books and >90 e-journals for HA staff
- ▶ **Free eKG Alerts**
3 FREE eKG services for HA staff ... including **FREE** home access!
- ▶ Tainted Milk Products
- ▶ Hong Kong Medicine Online (new version)
- ▶ **new!** HA staff can browse and search 523, 621 & 526 Forums

完成 開始 W... 收... Sh... Mi... e-... 網址 <http://hk.yahoo.com> 移至 網際網路 14:25



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16 - April - 2009 (Thursday)

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 病人身份要確認 **國隊同心齊和應**

環境保護須持續

pyneh.home

PYNEH e-Notice Board

Administrator

⊕ ALL



- CCE Letter
- CCE's Hospital Visit 2006

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Advanced Incident Reporting System

HKEC Intranet - Microsoft Internet Explorer

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港島東聯網 Hong Kong East Cluster

對抗流感 提升預防措施 Step up precautions against seasonal influenza

Click Here

HKEC e-Notice Board

Administrator

1 - April - 2009
港島東聯網 - 瑜珈班(東區醫院上課)

News from ha.home

news from ha.home

Daily update on epidemiology of H5 infection in recent 6 months (14 Apr 2009) & triage assessment

Cluster Information

Correct Patient Identification Campaign

確認病人身份運動



病人身份要確認 團隊同心齊和應

News

1 Apr 2009	Appointment of New Cluster COS (Clinical Pathology), HKE
31 Mar 2009	Appointment of AG (Surgery)

Cluster Chief Executive

- CCE Letter
- CCE's Hospital Visit 2006

Drug Formulary/Pharmacy

- HKEC Drug Formulary
- HKEC Pharmacy
- Drug Alert
- Drug Inserts / Information

Quality & Risk Management

- AIRS
- Quality & Risk Management

E-Mail

- OWA for HKEC users
- Change Password

e-Leave

完成

近端內部網路

開始 HKEC Intranet Deleted Items - Mic... 網址 <http://hk.yahoo.com> 移至 07:55



Observed advantages so far (5)

- APACHE II & IV data entry
 - ≤ 1 minute per patient

- Successful implementation of CIS
 - ↑ staff self recognition
 - ↑ staff morale
 - ↑ department cohesiveness



Observed disadvantages so far

- Need to change workflow





Observed disadvantages so far

- Need to change workflow
- Wrong patients
 - Constant alerts and reminders to staff
 - add CIS workstations at nurse station
 - Suggest to vendor for improvement
 - E.g. hot key to reset to the default bed
- Limited display window size
 - Bigger LCD displays at the nurse stations
 - Tailor-made screen content for handover rounds
 - Two or more projectors (airplane dashboard)



Observed disadvantages so far (2)

- Discrete progress notes
 - Very inefficient to view previous clinical notes
 - Customization
 - Future version (toilet paper view)



Observed disadvantages so far (2)

- Discrete progress notes
 - Very inefficient to view previous clinical notes
 - Customization
 - Future version (toilet paper view)
- Unexpected downtime
 - Contingency plan
 - Drills
- Data security



Observed disadvantages so far (3)

- Longer data entry time
 - Prescription
 - Progress note, ...etc



Planning ahead

- Further integration with CMS
 - Users authentication
 - Allergy (CMS & Pharmacy Information System)
 - GCRS (request made by doctors will automatically go into nurses' work list)
- Satellite stations at Radiology, Operation theatres, general wards
- Clinical Decision Support System
 - E-alert

The NEW ENGLAND
JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

MARCH 10, 2005

VOL. 352 NO. 10

Electronic Alerts to Prevent Venous Thromboembolism
among Hospitalized Patients

Nils Kucher, M.D., Sophia Koo, M.D., Rene Quiroz, M.D., M.P.H., Joshua M. Cooper, M.D.,
Marilyn D. Paterno, B.S., Boris Soukonnikov, M.S., and Samuel Z. Goldhaber, M.D.



- Computer program linked to patient database to identify patients at risk (≥ 4); use of an already validated risk score with 8 parameters
 - Cancer (3); Hx of DVT (3); hypercoagulability (3); major surgery (2); <70 year-old (1); obesity (1); bed rest (1); contraceptive pills/HRT (1)

- Randomized
 - Intervention group (n = 1,255) electronic alert if
 - high risk for DVT and
 - if no prophylaxis, daily recalculate score by the software

 - Control group (n = 1,251) no computer alert



Clinical end points	Computer alert group	Control group
---------------------	----------------------	---------------

DVT or Pulmonary embolism	61 (4.9%)	103 (8.2%)
---------------------------	-----------	------------

$P < 0.001$



Daily nutrition measurements

- Total calorie intake
 - Parenteral infusion
 - Enteral intake
 - Gastric aspirate
 - Aspirate refeed
 - Intravenous fluid, e.g. D5
 - Drug vehicle, e.g. propofol
- Nitrogen/protein intake
- Lipid intake



Respiratory measurements

- Rapid-shallow breathing index
 - f/V_t
- PaO_2/FiO_2
- CROP index
 - Dynamic compliance, respiratory rate, oxygenation and negative inspiratory pressure

Real time alert based on RIFLE classification for ICU patients with AKI; Alert if status change

	GFR criteria	Urine output criteria	
Risk	Increased Serum Cr x 1.5 or GFR ↓ > 25%	UO < 0.5 ml/kg/h x 6 hr	
Injury	Increased SCr x 2 or GFR ↓ > 50%	UO < 0.5 ml/kg/h x 12 hr	
Failure	Increased SCr x 3 GFR ↓ > 75% or SCr ≥ 354 μmol/L Acute ↑ > 44 μmol/L	UO < 0.3 ml/kg/h x 24 hr or Anuria x 12 hrs	Oliguria
Loss	Persistent ARF = complete loss of kidney function > 4 weeks		
ESKD	End Stage Kidney Disease (> 3 months)		



Real time alert based on AKIN classification for ICU patients with AKI;
Alert if status change

Stage	Serum Cr Criteria	Urine Output Criteria
1	$\uparrow$ SCr $\geq 26.4 \mu\text{mol/L}$ or $\uparrow$ to 1.5 to 2-fold from baseline	$< 0.5\text{mL/Kg/hr}$ for > 6 hr
2	$\uparrow$ SCr to >2 to 3-fold from baseline	$< 0.5\text{mL/Kg/hr}$ for > 12 hr
3	$\uparrow$ SCr to > 3 -fold from baseline or SCr $\geq 354 \mu\text{mol/L}$ with an $\uparrow \geq 44 \mu\text{mol/L}$	$< 0.3\text{mL/Kg/hr}$ for > 24 hr or anuria for 12 hr



Acid base approach

- Stewart's approach

- PaCO₂

- $SID_{app} \text{ (mmol/L)} = [HCO_3^-] + 0.28[Alb] + 1.8[Pi]$

- $[Cl^- \text{ corrected}] \text{ (mmol/L)} = [Cl^-] \times 140/[Na^+]$

- $[XA \text{ corrected}] \text{ (mEq/L)} = \{[Na^+] + [K^+] + 2[Ca^{++}] + 2[Mg^{++}] - [Cl^-] - SID_{app}\} \times 140/[Na^+]$



Reference values

- Respiratory acidosis
 - $\text{PaCO}_2 > 6.0\text{kPa}$
- Respiratory alkalosis
 - $\text{PaCO}_2 < 4.7\text{kPa}$
- Metabolic acidosis
 - Dilutional acidosis $[\text{Na}^+] < 136\text{mmol/L}$
 - Hyperchloraemic acidosis $[\text{Cl}^- \text{ corrected}] > 112\text{mmol/L}$
 - Unmeasured strong anion $[\text{XA corrected}] > 14\text{mEq/L}$
 - Hyperalbuminaemic acidosis $[\text{Alb}] > 45\text{g/L}$
 - Hyperphosphataemic acidosis $[\text{Pi}] > 2.0\text{mmol/L}$
- Metabolic alkalosis
 - Concentrational alkalosis $[\text{Na}^+] > 149\text{mmol/L}$
 - Hypochloraemic alkalosis $[\text{Cl}^- \text{ corrected}] < 100\text{mmol/L}$
 - Hypoalbuminaemic alkalosis $[\text{Alb}] < 35\text{g/L}$



Thank you for your attention