Experience of CIS in KWH

Seminar on Clinical Information System in ICU

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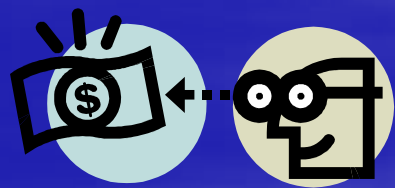
CIS Systems in HK

- Early attempt
  - PYNEH PICU
- Early successes
  - Painful work on interface with CMS
  - KWH AICU & QMH NICU
- A few more installed
  - Positive experiences
  - No major breakthrough
  - Loss of momentum
- New systems
  - PYNEH / UCH / PMH AICU
  - Second vendor
  - Integration of APACHE / Discharge Summary
- Other factors
  - Shortage of staff
  - **Lower price tag**



中国散文学会 编选

历史不忍细看

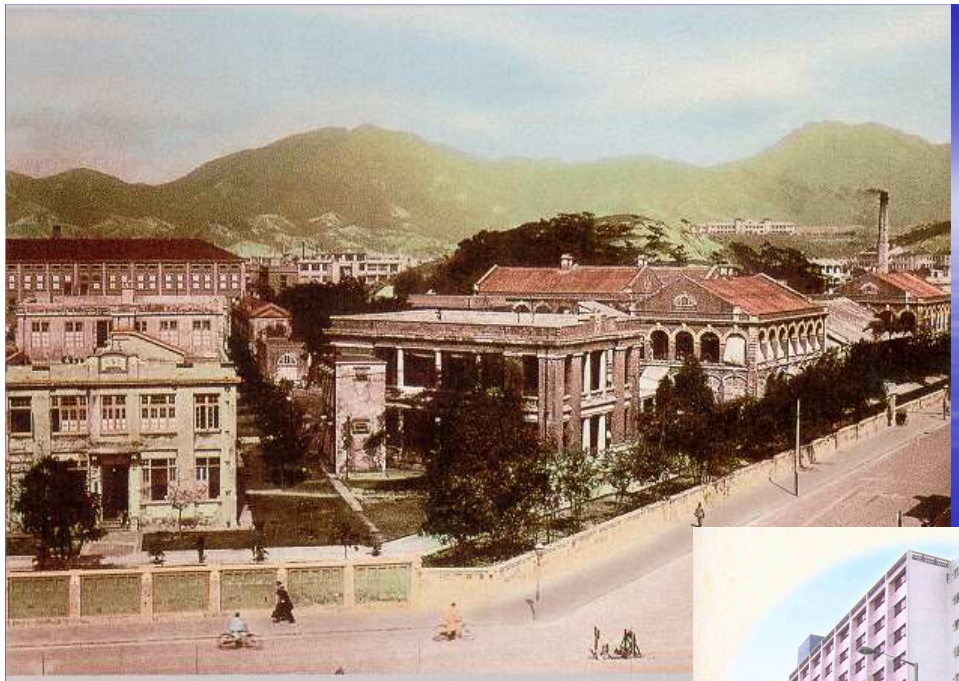
见微知著 以崭新笔触披露惊心动魄的真相

去伪存真 用生动细节还原历史本来的面目

文 欢 主编

河南文艺出版社

1. Choosing a commercial database
2. Confronting problems
3. Observation & Recommendations

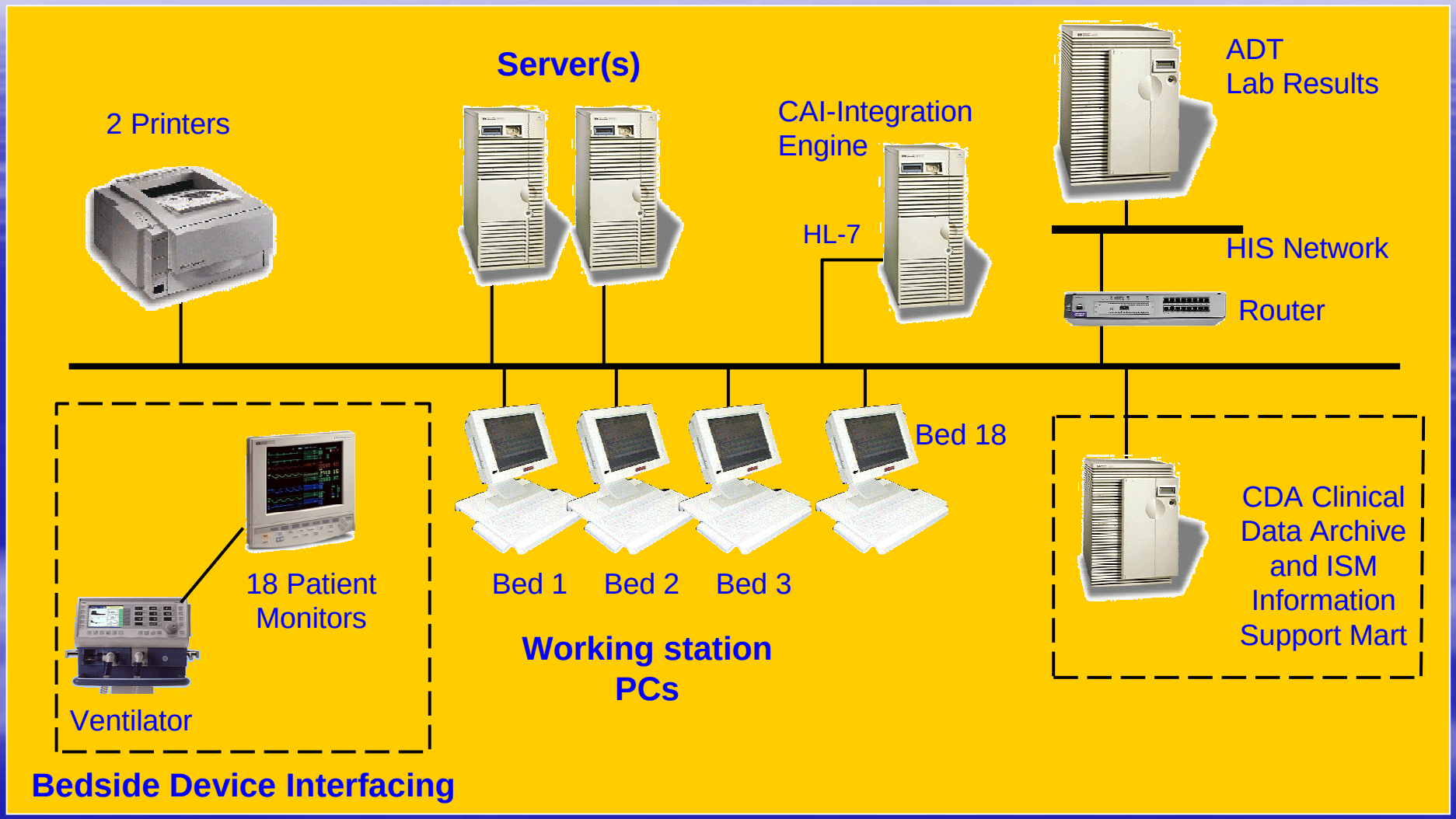


- Tung Wah Group of Hospitals (TWGH) in 1911
- Managed by Hospital Authority (HA) since 1991
- Major acute hospital in KWC (Kowloon West Cluster)
- ~1200 beds and staff force over 2800

- Large scale major refurbishment project completed in July 1997
- Major redevelopment plan started 2009

KWH ICU Information System

Overview



KWH experience

- Second CIS site in H.K. (first site : PMH neonatal ICU)
- Go alive on 16 Feb. 1998
- 9 Flowsheets, 8 Forms (6 forms & 2 notes), MAR and Worklist
- Interfaced with ABG machine, ventilators, pumps and cardiac output measurement
- Linked with ADT (2000) and Laboratory (2001 to 2003)
- CDA (Clinical Data Archive) since 2000
- MAR since 2002 (paperless Jan 2005 since work station installed in pharmacy)
- Assess to ECG (TraceMaster) of Medical Unit since 2002
- CareVue Web since 2003 (Server upgrade 2003)
- Statistic reporting since 2004

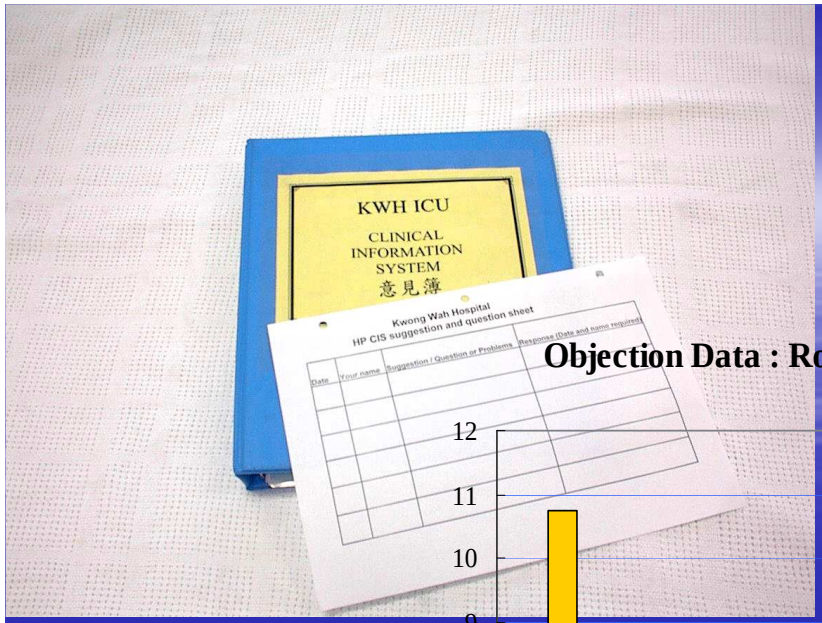
Common questions

- Is the cost justified :
  - Any evidence to show quality care improvement
    - Reduction in nursing documentation
      - More time spent on patient care
      - Reduction in nursing full-time equivalents (FTE)
    - Reduction in length of stay (LOS)
    - Decrease Hospital mortality / occurrence of complications – ICU readmission, self-extubation, nosocomial infection
    - Others :
      - Patient comfort
      - Family satisfaction
      - Recovery of function

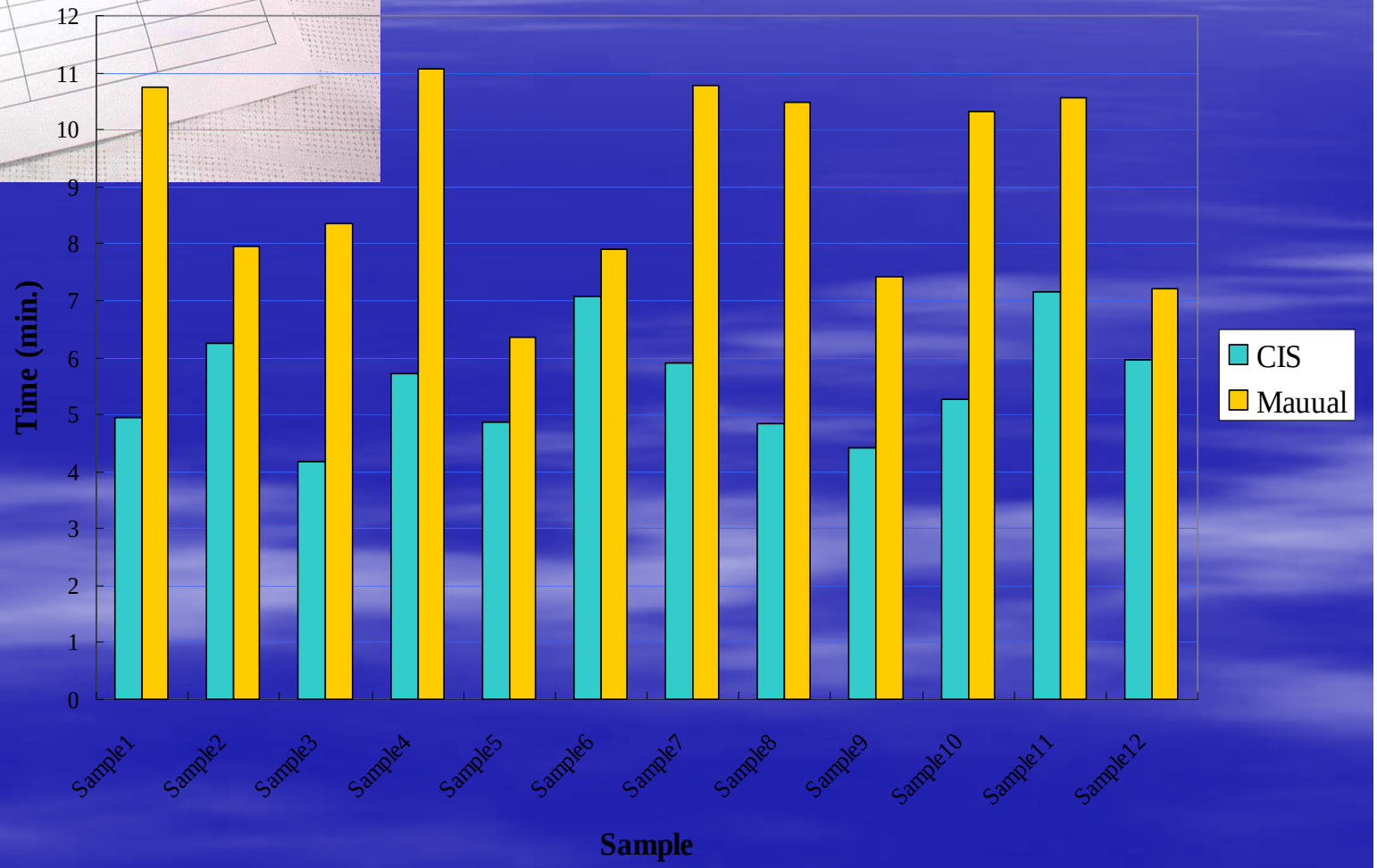
- Must be more than just what is being replicated in the written record or merely a documentation tool
- Too expensive a tool just to be a computer designed to ease documentation and retrieve data faster

Uses and Advantages of EMR

- Improved information access with enhanced data acquisition for monitoring and administrative functions
- Decision support, alerts, and critical pathways
- Support for clinical research and outcomes of quantitative assessment
- Access to reference materials
- Improved medical and nursing documentation with improved legibility and reduction in medication and documentation errors
- Better ability to manage and store data
- Improved data quality and quality of care
- Ability to generate multiple meaningful reports
- Ability to integrate graphical data into the record : waveforms and ECG as an example
- Improved compliance with Accreditation of healthcare organization and other related organizations



Objection Data : Routine Charting - Patient Data Flowsheet / Assessment Flowsheet



C.I.S. 操作 (回收問卷49 份 - Respondent Rate 49/54 = 90%)

	十分滿意	滿意	一般	不滿	十分不滿
1. Patient Data Flowsheet 的內容	6.12%	91.84%	2.04%	0.00%	0.00%
意見					
2. Assessment Flowsheet 的內容	6.12%	83.67%	10.30%	0.00%	0.00%
意見 Difficult to access bedsore's size，省略 Ventilator 病人之 T.V., R.R., Airway, M.V. 或 C.I.S.自動記錄					
3. Admission Form 的內容	2.04%	95.92%	2.04%	0.00%	0.00%
意見 Emotional Status 可否加多一些形容詞					
4. 使用 C.I.S. 的運作純熟程度	0.00%	69.39%	30.61%	0.00%	0.00%

5. 日常常規護理工作轉變	0.00%	73.47%	26.53%	0.00%	0.00%
6. 與其他部門的同事溝通	0.00%	33.33%	64.58%	2.09%	0.00%
7. 記錄各資料的方法/途徑	0.00%	81.25%	18.75%	0.00%	0.00%

	是	否
8. 直至現今，整體上在記錄各項資料時仍感到混淆或無所適從	10.42%	89.58%

如答「是」，請說明以便跟進

IPD, CAPD, Intake & Output chart ；Assessment flowsheet 內之 drains 的數量以每更計或整日之 total 數

	是	否
9. 重溫班的需要	2.08%	97.92%

Why can’t the system do that ??

功能 (回收問卷49 份 - Respondent Rate 49/54 = 90%)

	是	否
1. 直至現今，整體上 C.I.S. 較人手文字記錄節省時間	100.00%	0.00%

2. 多出的時間如何利用

多與病人及其家人溝通，了解其
心理上的照顧
閱讀病人病歷,增加學習知識機會
同事互相交流,提高護理知識及質數
協助及監察護理程序，提高護理質數
協助較忙的同事

3 C.I.S. 資料能有系統性地幫助瞭解、分析病人情況	95.45%	4.55%

Conflicting results

- Reduction in nursing documentation
- More time spent on patient care
- Reduction in length of stay (LOS)
- Reduction in nursing full-time equivalents (FTE)

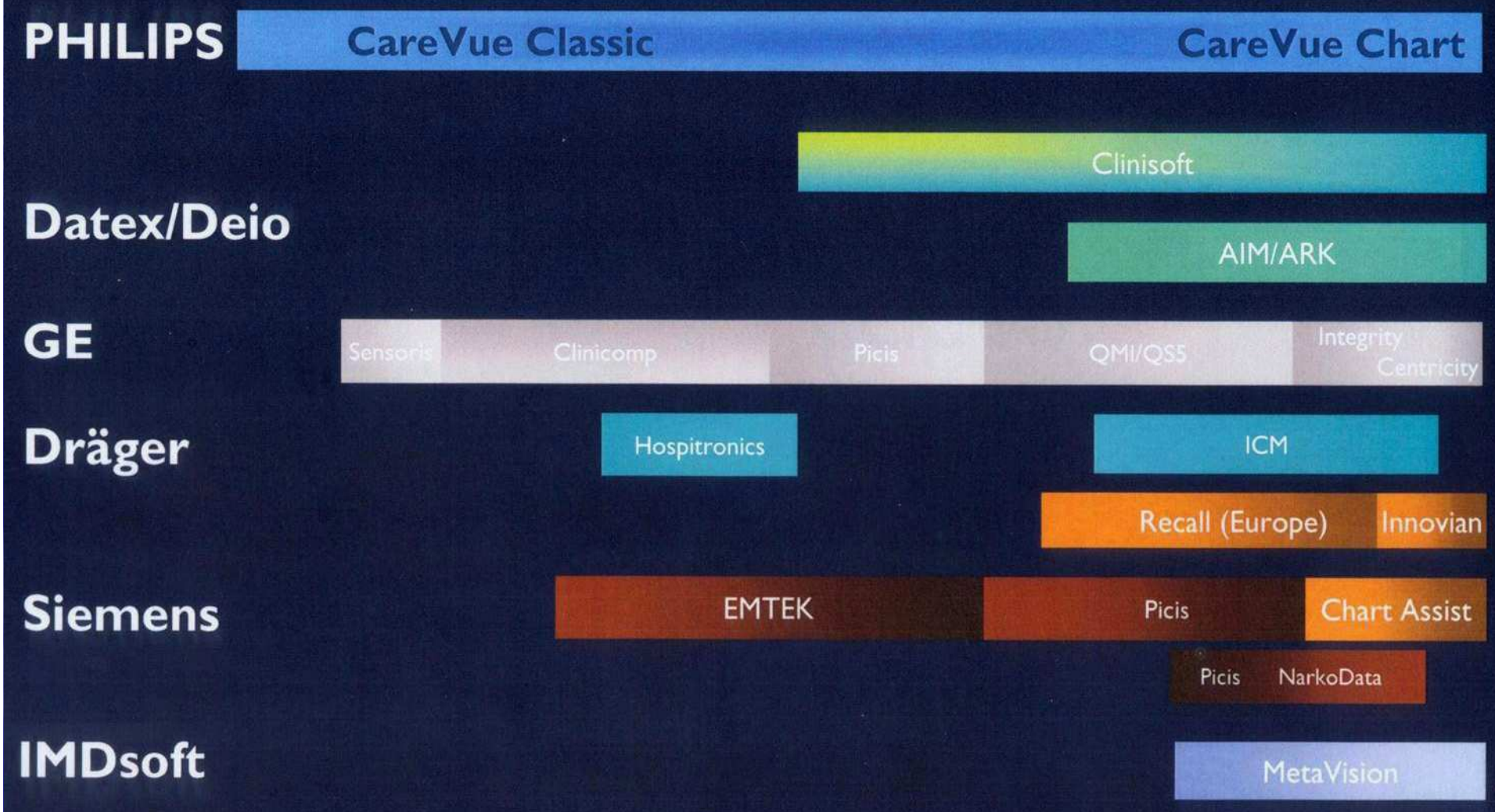
? Factors for conflicting results

- Comprehensive charting is not fully integrated yet with a total HIS
- Manual charting was still required
- Savings in time may be absorbed into other activities
- Nurses may not have utilized the full capabilities of computerized charting

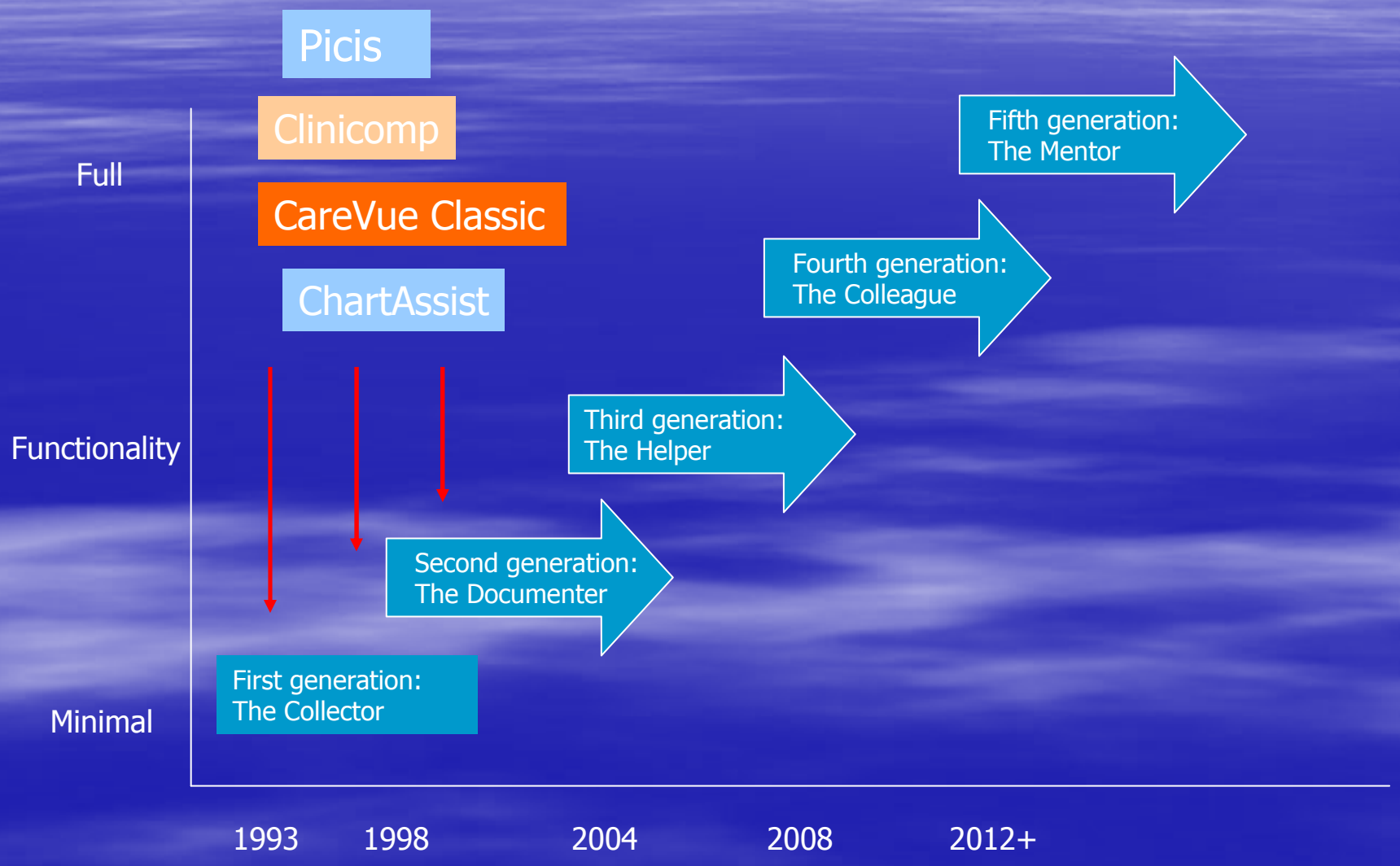
Electronic medical record (EMR) in ICU

- Totally integrated EMR
  - Medical decision making
  - Decision support; critical pathways
- EMR : Electronic patient record that resides in a system specifically designed to support users by providing accessibility to complete & accurate data, alerts, reminders, clinical decision support systems, links to medical knowledge and other aids

CIS Vendor Offerings



The 2004 Gartner Computer-Based Patient Record System Generation Model



Choosing a Database

- Numerous commercial database packages
- Most appropriate system
  - Goals for the eventual output
  - Electronic data capture
    - Necessary equipment; support services
  - Buy it first, build-the-data-transfer-system-later → database collects dust rather than information
  - Data-collection personal requirement

Confronting Problems

- Human factors
- Overlapping infrastructure
- Overwhelming Data during crisis – e.g. resuscitation
- ? Desirable feature : inflexible time limit for charting back
- Manpower and resources
- Standardization of terminology
- Interface with hospital information systems
- Security problem
- Legalization of electronic records and signature

Human factors

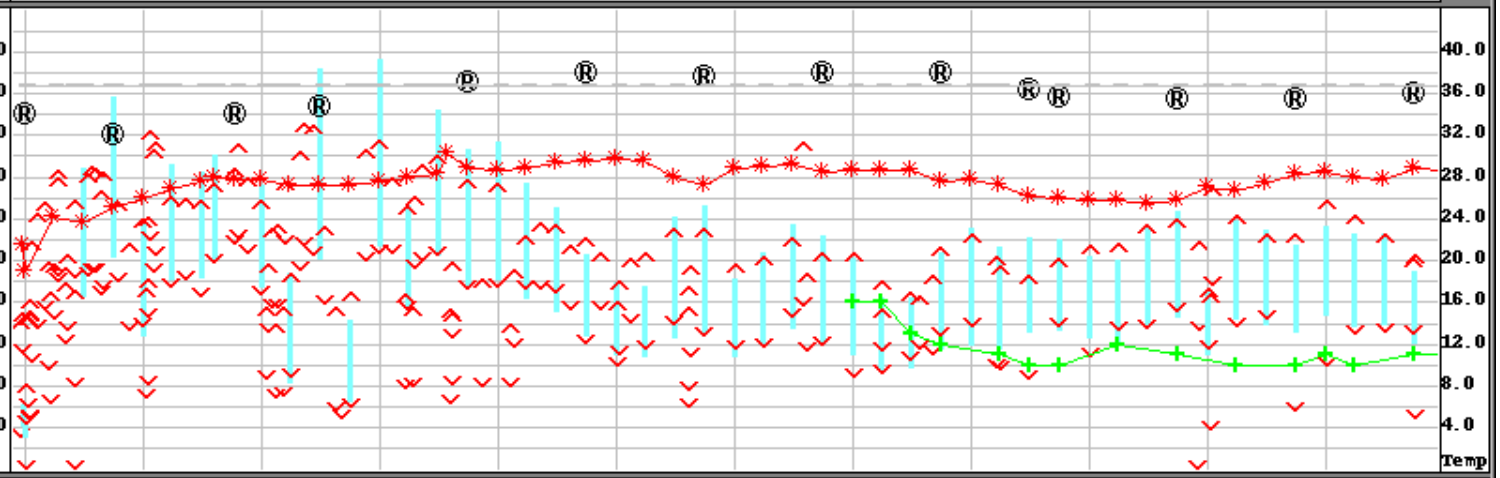
- Second site implemented with CIS
- Information technology relatively new to KWH
- Observed behavior that people fear & resist change

- “Slow implementation process”
- Training and on site support
- Familiar forms and flowsheets
- Choice lists / Structured text / Trending

KWH E5 ICU FLOWSHEET : KWH E5 ICU BED 6 AU, WING MAN VIV HN01001593G

Main Menu | Actions | View | Print | CHART

VITAL GRAPH | VITAL SIGNS | NEURO OBS | SWAN GANZ | RESP | INTAKE OUTPUT | MEDS | INSULI CHART | EXAMS | MANAGEMENTS



		07/01/01 1200	1600	2000	08/01/01 0000	0400	0800	08/01/01 1200	1600	2000	09/01/01 0000	0400	0800
VITAL	Temp. Site/Value	R 34.0	R 34.0	R 34.8	R 37.0	R 38.0	R 37.6	R 38.0	R 38.0	R 36.3	R 35.4	R 35.5	R 36.0
	Heart Rate	95	130	139	138	143	149	144	143	139	129	135	142
	Pulse Rate	94	130	139	138	143	149	144	142	139	129	135	142
	NIBP	0/ 0	120/ 68	129/ 83	158/103	137/ 87	80/ 49	98/ 57	104/ 44	113/ 68	107/ 53	87/ 57	129/ 49
	MAP	21	87	98	123	105	62	73	63	83	71	68	75
	ABP	23/ 15	120/ 63	137/ 87	197/106	158/ 90	90/ 54	92/ 53	102/ 54	116/ 59	103/ 62	87/ 54	117/ 73
NEURO	Pupil Size R/L	/					5mm/5mm	5mm/5mm	5mm/5mm	5mm/5mm	5mm/5mm	5mm/5mm	5mm/5mm
	Pupil Response R/L						FIX/FIX	FIX/FIX	FIX/FIX	FIX/FIX	FIX/FIX	FIX/FIX	FIX/FIX
	Best Eye Response	1	1	1	1	1	1	1	1	1	1	1	1
	Best Motor Response	1	1	1	1	1	1	1	1	1	1	1	1
	Best Verbal Response	1	1	1	1	1	1	1	1	1	1	1	1
	Total GCS score	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3	3	3	3	3
VENT/O	Airway	OralETT	[illegible]	[illegible]				[illegible]		OralETT			OralETT
	O2 Delivery Mode	Vent						[illegible]		Vent			Vent
	FiO2 / O2 Delivered	1.00	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	0.90			0.90
	Ventilator Type	Ser300	Ser300	Ser300			Ser300		Ser300	Ser300			Ser300
	Ventilator Mode	SIMV VC	SIMV VC	SIMV VC			SIMV VC		SIMV VC	SIMV VC			SIMV VC
	Pressure Support	10	10	10			10		10	10			10
INTAKE	2545+ 40 KCL								500				
	4318+ 10 KCL								228	248			
	4318+ 20 KCL								160	320	320	320	320
	4318+ 5 KCL								500				
	D 2.5% + Nacl 0.45%			40	160	160	160	160					
	Gelofusin		500		500			750		500			
	Adrenaline		119	60	100	100	100	97	96	92	92	92	92

FamiliarFlowsheets

12/02/01 1508

ICU ADMIT & TRANSFER SUMMARY : KWH E5 ICU BED 1 CHEUNG, YIM CHING HN00087095H

Main Menu | Actions | View | Print | Store

23/01/01 1330

- Admit & Transfer Det
- Admit & Transfer Out
- Hx & Physical Exam o
- Current Meds / IVF
- Additional Info.

Details:

Date of transfer in: 23/01/01 1322 — Transfer in from: N7 — Unit: H.D.U.

Date of transfer out: — Receiving ward: N4D — Unit: Renal

Length of stay in ICU: days hrs — Transferring nurse:

Admit & Transfer Out Summary

Admission Summary:

Diagnosis: Sepsis

Reason for ICU Admission: Close monitoring and ventilatory support.

Final Diagnosis:

Past History: DM

TAHBSO.
DM with nepl
ESRF on CAPD.

Social History: Non-Smoker — Non-Drinker

Summary: 26/12/00 Admitted with 2/7 x fever, headache, chills and rigors Plain CT brain and lumbar puncture - NAD. Subsequently conditi gradually resolved with antibiotic treatment. Then developed L ptosis and blurred vision. Tensilon test negative. CT orbits (showed soft tissue mass in L orbital apex and L posterior ethmo sinus - ?inflammatory. MRI brain (9/1/01) showed destructive sphenoidal mass - ?fungal infection.

Choicelist

- Unremarkable
- DM
- HT
- COAD
- AF
- IHD
- IHD-PTCA
- IHD-PTCS
- IHD-CABG
- Old MI
- CHF
- Old CVA
- Old Pul TB
- CRF
- CRF-CAPD
- CRF-HD
- CRF-CCPD
- Dementia
- BPH
- PVD
- PVD-Graft
- Epilepsy
- Asthma
- Pacemaker
- Cirrhosis

Physician Notes : KWH E5 ICU BED 9 NG, LUK HN0100907QJ

Main Menu | Actions | View | Print | Store ... | Enter a Note ...

Previous Day

Today

Next Day

Note Entry

Enter note

Note date/time*: 16/02/01 1348 HKT Filter: ◆Physician Notes ◇Nursing Notes

Title: Treatment

```
NPO, R/T to BSB
IVF : 1/2 1/2 Solution
Blood X CBP, R/LFT Ca PO4, Sugar, PT/APTT, ABG
CXR, ECG
Chest physiotherapy
Drugs :
Ventilator Setting :
  SIMV + PS(VC mode) : TV  ml
                       RR  b/min
                       FiO2
                       PS  cmH2O
                       PEEP  cmH2O
                       Trigger
                       I:E
```

Admission Treatment	SIMV + PS (VC mode)
Ventilator Setting	SIMV + PS (PC mode)

: , . ; – ?

Structured Text

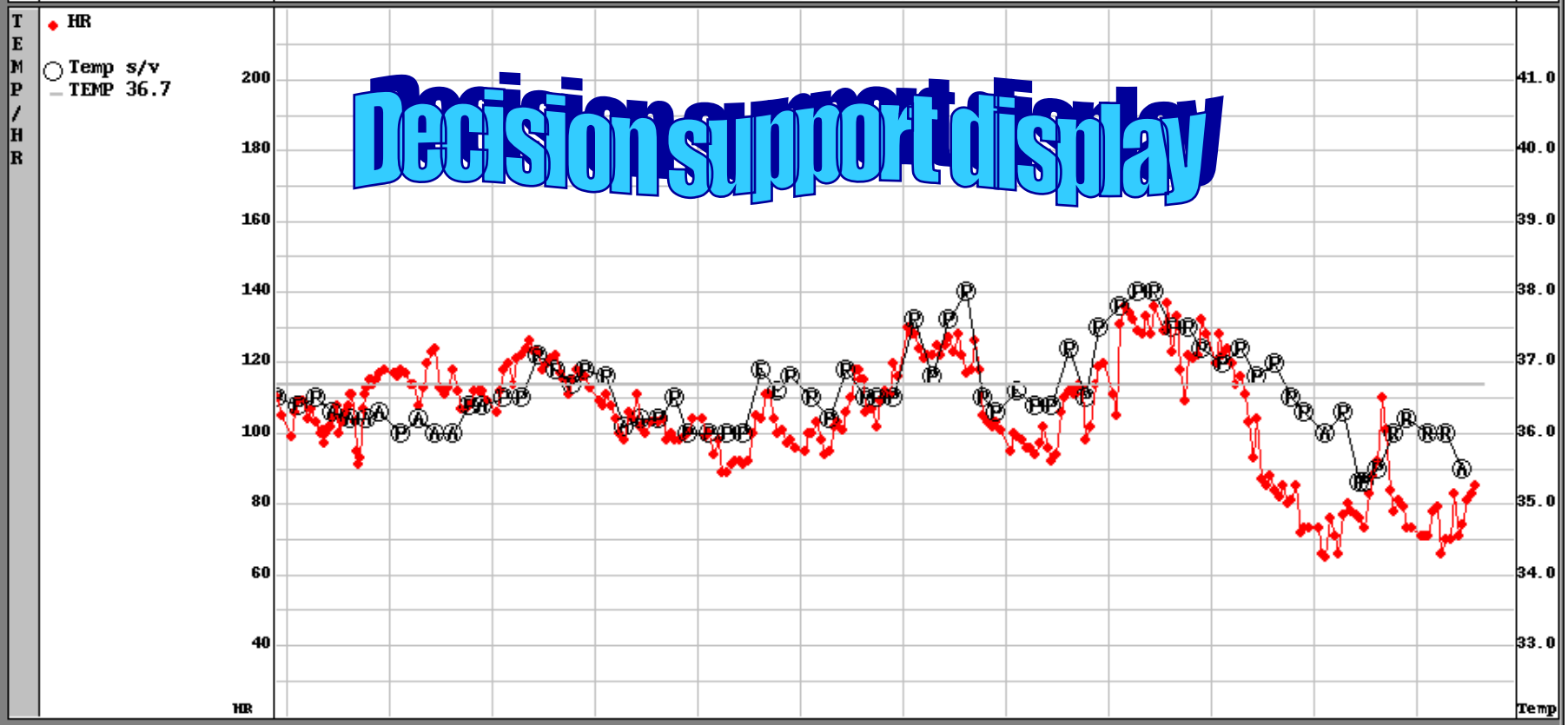
DONE CANCEL

16/02/01 1348

ICU BODY TEMPERATURE CHART : KWH E5 ICU BED 1 CHEUNG, YIM CHING HN00087095H

Main Menu | Actions | View | Print | CHART

q24h Time Auto-charting @q1h	01/02/01 0000	02/02/01 0000	03/02/01 0000	04/02/01 0000	05/02/01 0000	06/02/01 0000	07/02/01 0000	08/02/01 0000	09/02/01 0000	10/02/01 0000	11/02/01 0000	12/02/01 0000
TEMP: Post-op Day	D14	D15	D16	D17	D18	D19	D20	D21	D22	D23	D24	D25
TEMP: Post-op. Day									OT day	D1	D2	D3
TEMP: Temp. Site/Value	PO 36.4	PO 36.0	PO 36.5	PO 36.8	PO 36.0	PO 36.5	PO 37.6	Er 36.6	PO 37.8	PO 37.0	AX 36.0	R 36.0
TEMP: WBC (4-11)	14.80	13.80	12.40	16.00	12.80	12.90	19.10	15.00	20.80	11.20	5.90	4.70
AB: Amphot B 30mg IV	30mg	30mg	30mg	30mg	30mg	30mg	! 30mg	30mg	30mg	30mg	30mg	30mg
AB: Tazocin 4.5gm IV							4.5gm	4.5gm	4.5gm	4.5gm	4.5gm	4.5gm
AB: Vanco 1000mg IV							1000mg					



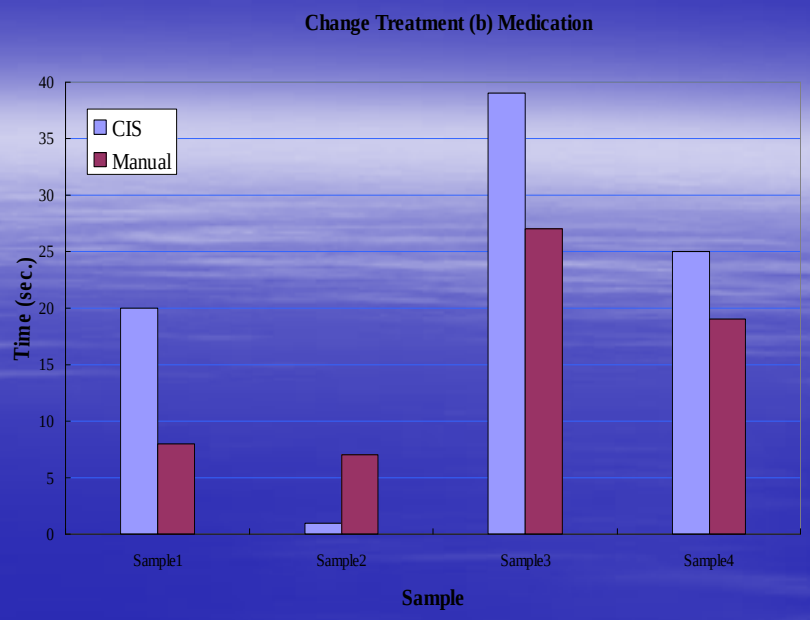
Decision support display

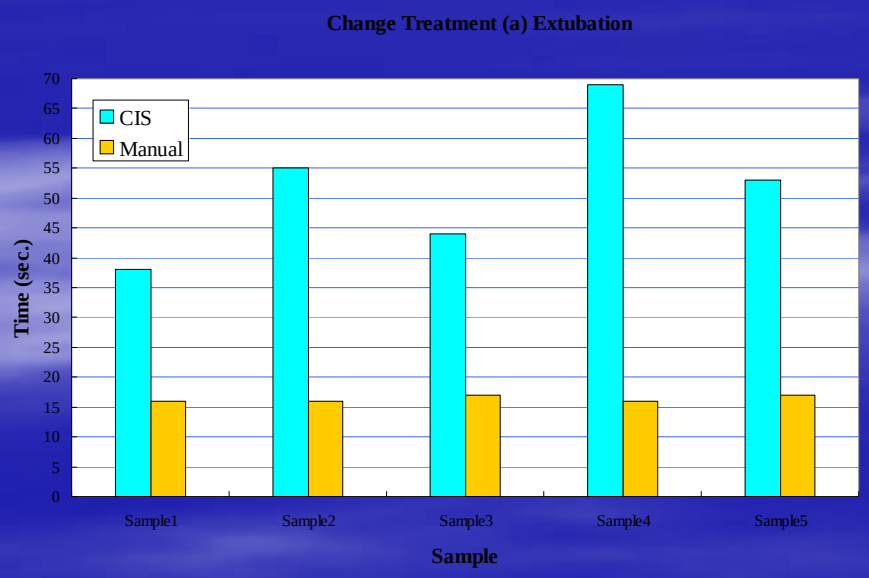
12/02/01 1500

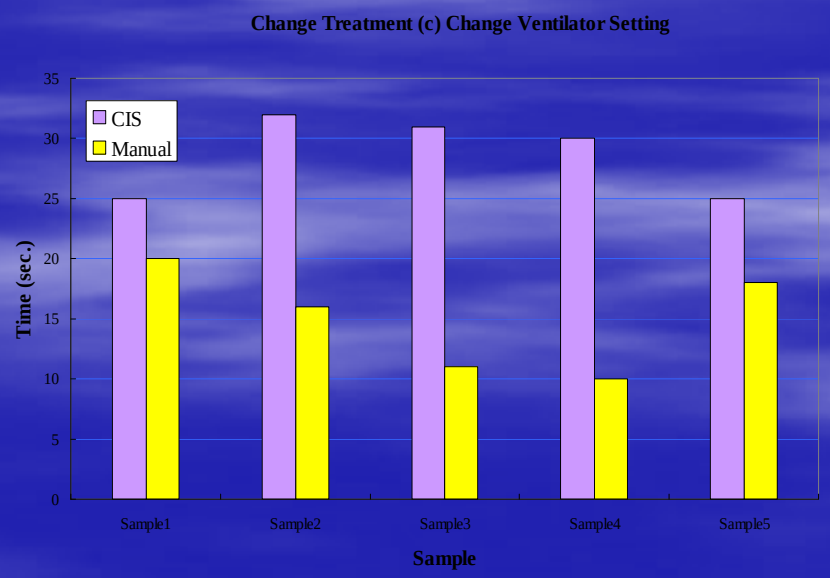
Confronting Problems

- Human factors
- Overlapping infrastructure
- Overwhelming Data during crisis– e.g. resuscitation
- ? Desirable feature : inflexible time limit for charting back
- Manpower and resources
- Standardization of terminology
- Interface with hospital information systems
- Security problem
- Legalization of electronic records and signature

Transfer Out
CIS
Manual
Time (min.)
0
2
4
6
8
10
12
14
16
18
20
Sample1
Sample2
Sample3
Sample4
Sample5
Sample


Change Treatment (b) Medication
CIS
Manual
Time (sec.)
0
5
10
15
20
25
30
35
40
Sample1
Sample2
Sample3
Sample4
Sample


Change Treatment (a) Extubation
CIS
Manual
Time (sec.)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Sample1
Sample2
Sample3
Sample4
Sample5
Sample


Change Treatment (c) Change Ventilator Setting
CIS
Manual
Time (sec.)
0
5
10
15
20
25
30
35
Sample1
Sample2
Sample3
Sample4
Sample5
Sample

ICU RESUSCITATION RECORD : KWH E5 ICU No Bed CHOI, MOON KEE HN00083411K

Main Menu | Actions | View | Print | CHART

VITAL SIGNS | RESP | CPR EVENTS | BLOOD TEST

Exact Time	18/12/00 0219	18/12/00 0220	18/12/00 0221	18/12/00 0222	18/12/00 0224	18/12/00 0226	18/12/00 0227	18/12/00 0228	18/12/00 0233	18/12/00 0234	18/12/00 0235	18/12/00 0236
VITAL: Heart Rate	172	199	200	38	132				57			
VITAL: Heart Rhythm	V Tach	V Tach	V Tach		ST				PEA			
VITAL: NIBP				54/ 31		91/ 34				×123/ 76		92/ 38
VITAL: ABP												
VITAL: CVP (mmHg)												
VITAL: SpO2												
RESP: Airway	Natural											
RESP: O2 Delivery Mode	Ambu											
RESP: FiO2 / O2 Delivered	1.00								1.00			
RESP: Ventilator Type							Ser300					
RESP: Ventilator Mode							SIMV VC					
CPR: CPR Start/Stop	Start							Stop		Start		
CPR: NS												
CPR: 2545												
CPR: Adrenaline												
CPR: Dobutamine												
CPR: Morphine												
CPR: Defibrillation (J)		200	300									
CPR: Adrenali 1mg IV				1mg							0.5mg	0.5mg
CPR: Acertil mg PO												
CPR: Haldol 10mg IV												
CPR: Lasix mg IV												
CPR: Lignocan mg IV		100mg										
CPR: TNG Tab SL												

Event line section

12/02/01 1656

Confronting Problems

- Human factors
- Overlapping infrastructure
- Overwhelming Data during crisis– e.g. resuscitation
- ? Desirable feature : inflexible time limit for charting back
- Manpower and resources
- Standardization of terminology
- Interface with hospital information systems
- Security problem
- Legalization of electronic records and signature

KWH E5 ICU APACHE II : KWH E5 ICU No Bed MAN, MEI NGOR HN01008266I

Main Menu | Actions | View | Print | CHART

APACHE GRAPH | APACHE SCORE | DX

	q12h Time	08/02/01 1200	09/02/01 0000	1200	10/02/01 0000
	Hematocrit(%)	29.0	29.3		
	Total GCS score	3	14	15	
	GCS score for APACHE	15	15	15	
	Best GCS score	15			
	Creatinine(mg/dl)	4.016	4.683		
	Urine Out Total	0	0 0	0 0	0
	Acute Renal Failure		No		
	Severe Cardio Insuff		No		
	Severe Liver Insuff.		Yes		
	Severe Renal Insuff.		No		
	Severe Resp Insuff.		No		
	Immunocompromised		No		
	Operative Status		Elect.		
	Chronic Health Pts		2		
APS	APS Glasgow Coma			0 15	
APS	APS Temperature C			0 36.6	
APS	APS Heart Rate			0 73	
APS	APS MAP			3 157	
APS	APS Respiratory Rate			1 26	
APS	APS Oxygenation			0 155	
APS	APS Arterial pH			2 7.30	
APS	APS Serum HCO3				
APS	APS Serum Sodium			0 137	
APS	APS Serum Potassium			0 4.1	
APS	APS Serum Creatinine			4 4.7	
APS	APS White Bld. Count			0 12.6	
APS	APS Hematocrit			2 29.0	
APS	APACHE II Age Score			3 60	
APS	APACHE II ChronicPts			2 2	
APS	APS Total Pts.			12	
APS	APACHE II Total Pts.			17	
SURGI	13 Gastrointestinal.		08 Othe		

12/02/01 1602

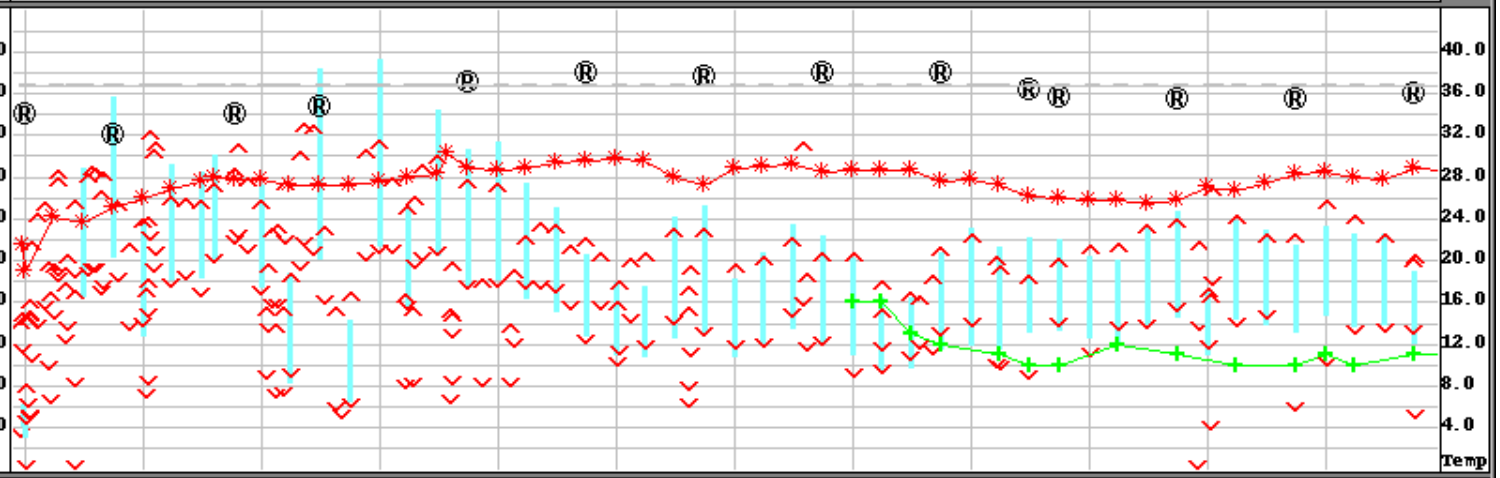
Manpower and resources

- ? Save manpower and resources
- ? Eliminate the need for paper records
  - permanent record still paper-based

KWH E5 ICU FLOWSHEET : KWH E5 ICU BED 6 AU, WING MAN VIV HN01001593G

Main Menu | Actions | View | Print | CHART

VITAL GRAPH | VITAL SIGNS | NEURO OBS | SWAN GANZ | RESP | INTAKE OUTPUT | MEDS | INSULI CHART | EXAMS | MANAGEMENTS



		07/01/01 1200	1600	2000	08/01/01 0000	0400	0800	08/01/01 1200	1600	2000	09/01/01 0000	0400	0800
VITAL	Temp. Site/Value	R 34.0	R 34.0	R 34.8	R 37.0	R 38.0	R 37.6	R 38.0	R 38.0	R 36.3	R 35.4	R 35.5	R 36.0
	Heart Rate	95	130	139	138	143	149	144	143	139	129	135	142
	Pulse Rate	94	130	139	138	143	149	144	142	139	129	135	142
	NIBP	0/ 0	120/ 68	129/ 83	158/103	137/ 87	80/ 49	98/ 57	104/ 44	113/ 68	107/ 53	87/ 57	129/ 49
	MAP	21	87	98	123	105	62	73	63	83	71	68	75
	ABP	23/ 15	120/ 63	137/ 87	197/106	158/ 90	90/ 54	92/ 53	102/ 54	116/ 59	103/ 62	87/ 54	117/ 73
NEURO	Pupil Size R/L	/					5mm/5mm	5mm/5mm	5mm/5mm	5mm/5mm	5mm/5mm	5mm/5mm	5mm/5mm
	Pupil Response R/L						FIX/FIX	FIX/FIX	FIX/FIX	FIX/FIX	FIX/FIX	FIX/FIX	FIX/FIX
	Best Eye Response	1	1	1	1	1	1	1	1	1	1	1	1
	Best Motor Response	1	1	1	1	1	1	1	1	1	1	1	1
	Best Verbal Response	1	1	1	1	1	1	1	1	1	1	1	1
	Total GCS score	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3	3	3	3	3
VENT/O	Airway	OralETT	[illegible]	[illegible]				[illegible]		OralETT			OralETT
	O2 Delivery Mode	Vent						[illegible]		Vent			Vent
	FiO2 / O2 Delivered	1.00	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	0.90			0.90
	Ventilator Type	Ser300	Ser300	Ser300			Ser300		Ser300	Ser300			Ser300
	Ventilator Mode	SIMV VC	SIMV VC	SIMV VC			SIMV VC		SIMV VC	SIMV VC			SIMV VC
	Pressure Support	10	10	10			10		10	10			10
INTAKE	2545+ 40 KCL								500				
	4318+ 10 KCL								228	248			
	4318+ 20 KCL								160	320	320	320	320
	4318+ 5 KCL								500				
	D 2.5% + Nacl 0.45%			40	160	160	160	160					
	Gelofusin		500		500			750		500			
	Adrenaline		119	60	100	100	100	97	96	92	92	92	92

FamiliarFlowsheets

12/02/01 1508

Cost

- Hardware & software
- Statistical & analytic software packages
- Subscription to user group for benchmarking
- Service contract
- Salary for data-collection personnel

Standardization of terminology

- Standardization of language, terminology and categorization used by different care sections
- Important for future data retrieval and analysis

Confronting Problems

- Human factors
- Overlapping infrastructure
- Overwhelming Data during crisis– e.g. resuscitation
- ? Desirable feature : inflexible time limit for charting back
- Manpower and resources
- Standardization of terminology
- Interface with hospital information systems
- Security problem
- Legalization of electronic records and signature

KWH experience
Laboratory Interface

- March 2001 : once daily
- June 2001 : twice daily
- July 2003 : four times a day

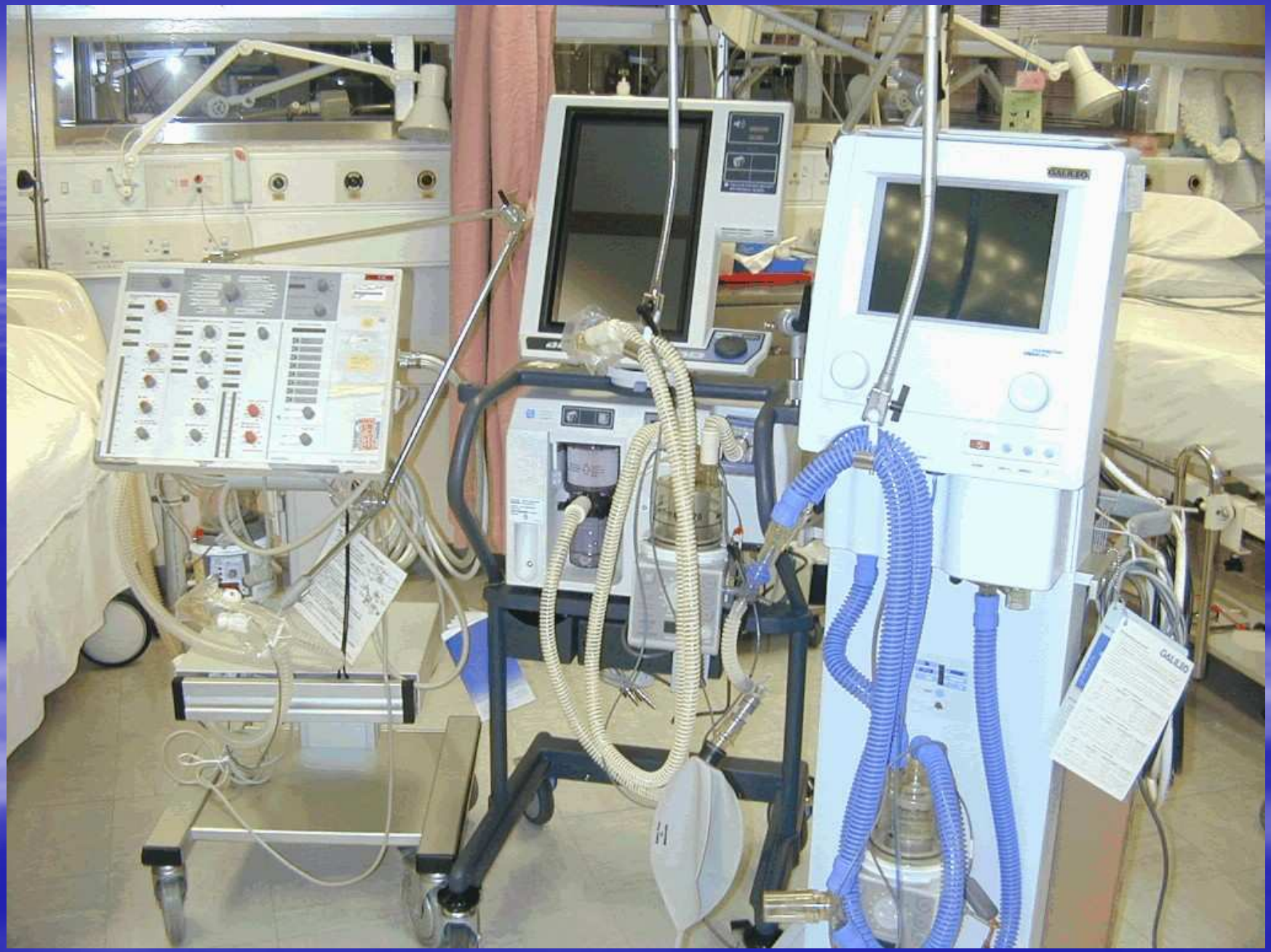
First Asia Pacific Clinical Information System user conference 2001 H.K.

Problems of CIS

- Inflexible
  - Events in between charting require complicated manual entry
  - Over-whelming data during crisis – e.g. resuscitation, admission
  - Time limit for charting back (? Desirable feature)
  - No multitasking capability
- Save manpower or resource ?
  - A lot of hand copy
  - Overlapping infrastructure

Problems of CIS

- "Stand alone" system
  - Overlapping foundation facilities
  - ? Integration with LIS and HIS
- As a "Information Technology Tool"; No commercial ready made configuration
  - Require stable configuration team
  - Extra work load for configuration team
- Device driver needed to link each device to the system : brand and model specific

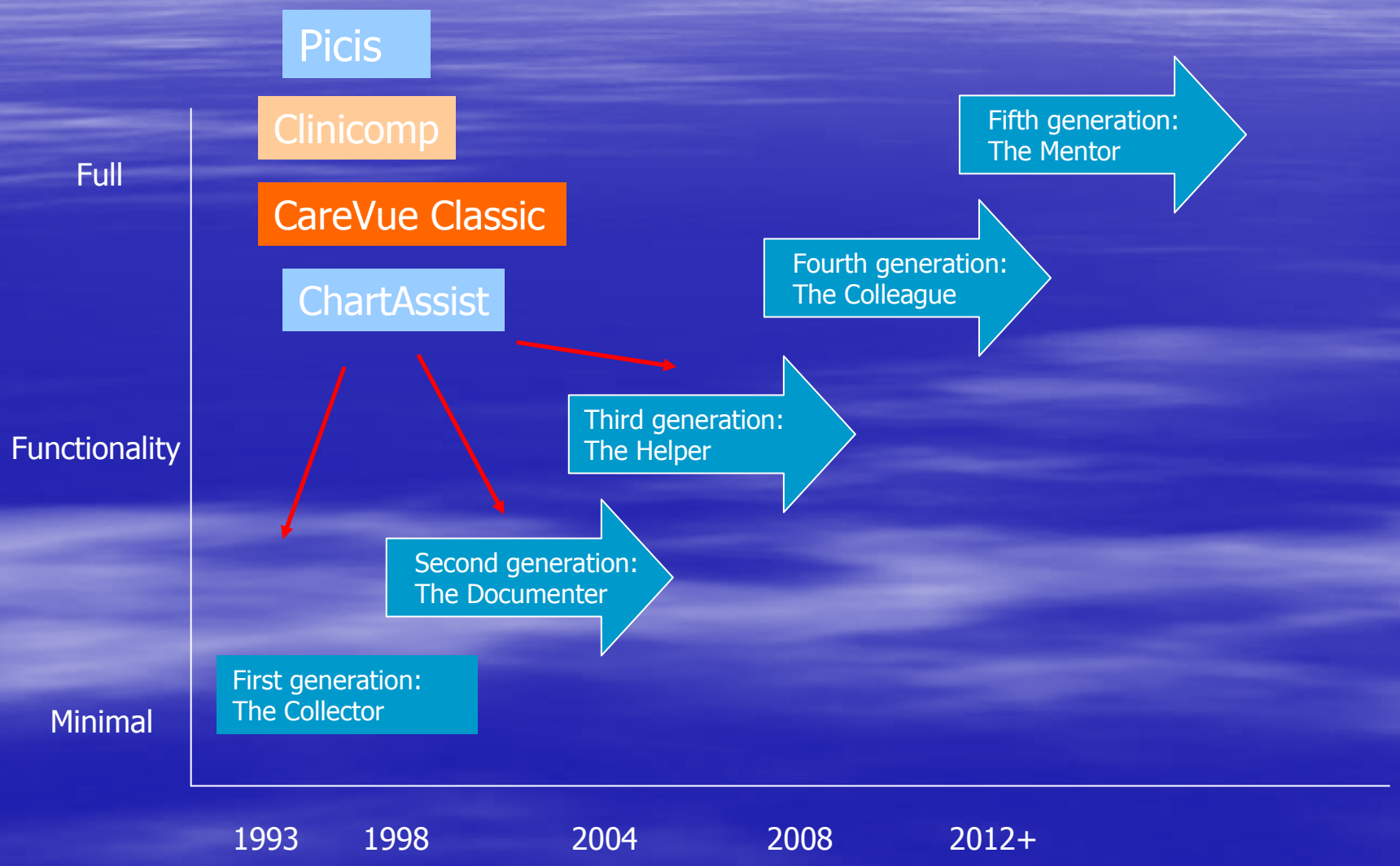

GALILEO
GALILEO

Key factors for success

- Dedicated Configuration / Implementation Team
- Strategic planning - set the goals
- Standardized terminology, definitions and categorization used for different care sections
- Top management commiment
- Technical support

End-users input and commitment

The 2004 Gartner Computer-Based Patient Record System Generation Model



(Clinical Information System)
CIS site visit

07 to 13 and 22 Sept. 05

Limitation of the exercise

- Inadequate time
  - Half to one day trip per vendor
  - Rely on vendor's presentation and designated site visit (?? Show room of the manufacturer)
- Difficult to get real picture of practical issues
- Some (likely targeted) products are just launched or will be launched in the near future

Observation

- Require strong IT support
- Top-management and end-user commitment
  - Require resource
  - Involve frontline staff in the early process
    - “Quality” driven rather than “budget” driven
    - Improve workflow (e.g. shortened handover time)
  - Collaborative team is paramount for success
    - Frontline (doctors, nursing and paramedics) input
    - Rely on commitment of super-users (should include both doctors and nurses)
- Difficult / Impossible for smooth interface with different vendors
  - Despite both compliant to certain standard (e.g. HL7)
  - Vendor would not disclose anything to other vendors
  - Single vendor for physiological monitors and CIS is a must !

Recommendation

- Software update
  - Vendor should provide up-to-date software version and
  - Guarantee free installation of the new software
- Stability of the Vendor in the coming 10 years ?
- Clear documentation of IT support / backup
  - How long will the vendor provide support
  - The cost of on-going maintenance
  - What is the expertise in the vendor's support team
  - Level of training provided to in-house staff

Recommendation

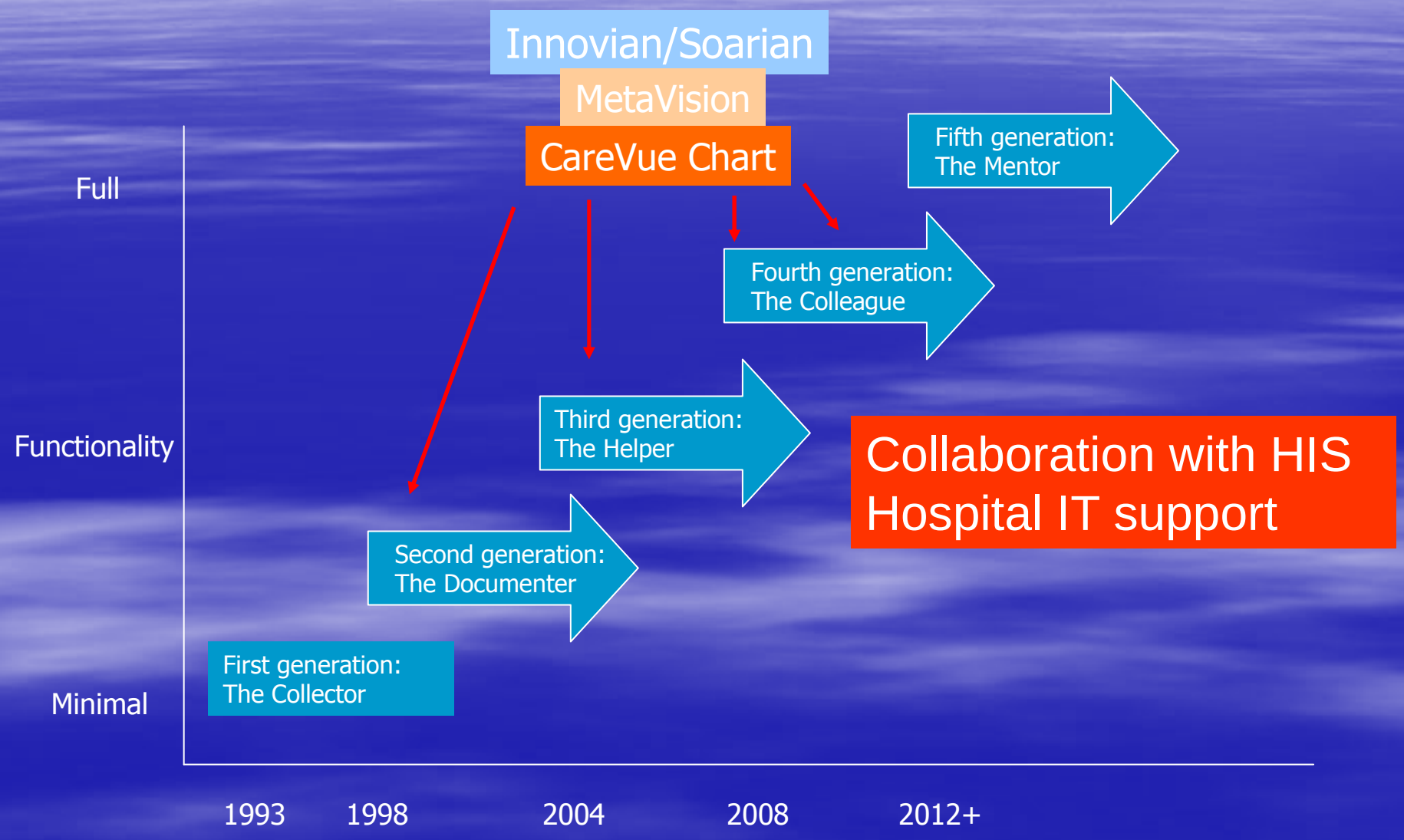
- Wish-list of Interface between CIS and HIS
  - Download fields / data
    - Laboratory results
    - ADT
    - Microbiology and pathology results
  - Bidirectional flow of fields / data
    - Discharge summary (in text rather than PDF format)
    - Severity scoring (e.g. APACHE)
    - Ideally MAR and medication database

Recommendation

- Avoid mixing responsibilities among vendors (including internal vendors)
  - Interface between medical devices and different vendors :
    - Vendor should be responsible to ensure that the interfaces with other vendor's solution in place
  - Interface between vendor and HIS (HAHO) :
    - HIS should open up our desirable list of field/data and
    - Set standard requirement for interface from the CIS vendors

End-users input and commitment

The 2004 Gartner Computer-Based Patient Record System Generation Model



Current situation of KWH

- Philips CareVue Classic / Chart :
  - ICU : 14 beds
  - CCU / HDU : 12 beds
  - Stroke beds (HDU) : 8 beds (pending)
- Philips :
  - Cardiac : TraceMaster ECG archive
  - Obstetric : ADT and medication data archive
- GE :
  - Operating Theatre
- IMDsoft
  - Neurosurgical HDU + Neurosurgical stroke : 12 beds

Redevelopment of Kwong Wah Hospital

QUESTIONS