### Intensive Care Unit Outcomes Monitoring and Improvement Program (ICUOMP)

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Program Committee of ICUOMP

Coordinating Committee in Intensive Care COC (ICU)

**Service Enhancement Presentation** 

**Clinical Safety and Quality Services II** 

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### Introduction

APACHE—acute physiology and chronic health evaluation physiologically based classification system

WILLIAM A. KNAUS, MD; JACK E. ZIMMERMAN, MD, FACP; DOUGLAS P. WAGNER, PhD; ELIZABETH A. DRAPER, MS; DIANE E. LAWRENCE, BS

1977





2015

National and international benchmarked analyses of Hong Kong Hospital Authority Intensive Care Unit data

2010

Report on 2010 data (trends 2007-2010)



2016



Quality scale



### **Data Collection**



### **Data Definition & Operation Manual**

ICU Outcomes Monitoring and Improvement Prog



Intensive Care Unit Outcomes Monitoring Program (ICUOMP)

> Report on Data Quality Study (2016)

Submitted by Statistics and Workforce Planning Department Strategy and Planning Division Hospital Authority Head Office

July 2017

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		run	10/04/2010	они
	₩	POH	10/04/2018	Ca + PO4
		POH	10/04/2018	CK, LFT, RFT
All Laboratories		POH	09/04/2018	RFT
Biochemistry		POH	08/04/2018	CBC
Microbiology		POH	08/04/2018	LFT, RFT, RL
Anatomical Pathology	DUN	POH	08/04/2018	Ca + PO4
	UH)	POH	06/04/2018	CBC, DC
		POH	06/04/2018	AESR
		POH	06/04/2018	CRP
		POH	06/04/2018	LFT, RFT
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### Number of ICU & HDU Admissions



### Data Management Flow Chart

14,201 ICU and HDU admissions submitted to ICUOMP adult patient database in HK (Jan 2016 – Dec 2016)



### **Characteristics of Patients**

Patient characteristics	ICUOMP 2016
Number of hospitals	15
Total admissions (Jan 2016 to Dec 2016)	14,201
Number of admissions analyzed	12,731 (89.6%)
Male gender (%)	62.9
One or more chronic illnesses (%)	15.6

### **Characteristics of Patients**

Patient characteristics	ICUOMP 2016
Mechanical ventilator support in first 24 hours of ICU stay (%)	53.3
Off hours admissions (%)	60.5
Off hours discharges (%)	12.3
Transfer to other ICUs (%)	0.76

### Age Distribution



### **Descriptive Outcomes**

Categories	Number of ICU Admissions (%)	ICU Mortality (%)	Crude Hospital Mortality (%)	Crude 30-Day Mortality (%)	Crude 90-Day Mortality (%)
Overall (ICU)	12,731 (100%)	8.55	16.36	14.08	18.62
Emergency (Non Operative)	7,236 (56.8%)	12.34	21.88	19.42	24.60
Emergency (Post Operative)	2,636 (20.7%)	6.92	16.37	12.97	18.10
Elective (Post Operative)	2 <i>,</i> 859 (22.5%)	0.56	2.42	1.64	3.95

### **Descriptive Outcomes**

Categories	Observed total ICU length of stay Mean, days (SD)	Observed total ICU length of stay Median, days (IQR)
Overall (ICU)	4.87 (9.04)	2.11 (1.04-4.86)
Emergency (Non Operative)	5.88 (10.60)	2.76 (1.46-5.96)
Emergency (Post Operative)	5.10 (7.70)	2.61 (1.40-5.60)
Elective (Post Operative)	2.16 (4.08)	1.01 (0.85-1.94)

### Number of Admissions Among HK ICUs



# 4 Categories of ICU patients and2 Quality indicators

Categories	Risk Adjusted Mortality	Risk Adjusted Length of Stay
Overall (ICU)		ICU Stay
Emergency (Non Operative)	30-Day	
Emergency (Post Operative)	Hospital	
Elective (Post Operative)		

### Accuracy of ICUOMP Model



### Example: Overall ICU admissions (30-Day)



## Example: Overall ICU admissions (Hospital Mortality)



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### Summary of Risk Adjusted Model (Mortality)

Categories		Low Outliers	High Outliers
Overall (ICU)	Hospital	Nil	Nil
	30-Day	Nil	А
	90-Day	В	Nil
Emergency (Non Operative)	Hospital	Nil	Nil
	30-Day	E	А
	90-Day	В	Nil
Emergency (Post Operative)	Hospital	Nil	Nil
	30-Day	Nil	А,С
	90-Day	Nil	Nil
Elective (Post Operative)	Hospital	Nil	Nil
	30-Day	Nil	Nil
	90-Day	Nil	Nil

Importance of Better Understandings of Length of Stay (LOS)

- Relates to the efficiency of the intensive care process
- Serves as an indirect marker of the quality of care
- Helps to benchmark between ICUs based on summary measures of differences

### Example: Overall ICU Admissions



### Summary of Risk Adjusted Model (Length of Stay)

Categories	Low Outliers	High Outliers
Overall (ICU)	D, G, H, K, O	C, F, I
Emergency (Non Operative)	В, Н, К	A, C, I
Emergency (Post Operative)	G, H, O	F, M
Elective (Post Operative)	D, G, H	B, C, J, N

### Post Hoc Analysis of Mortality

Number of Patients Treated per Intensivist or ICU Nurse

Off hour ICU Admissions

Number of ICU Doctors or Nurses

Patient-Level Variables

Post Hoc Analysis

Hospital-Level Variables

ICU Staffing Model

Off hour ICU Discharges

Total ICU Length of Stay per Intensivist or ICU Nurse

### Performance is Related to 24 hours Intensivists Availability



### Performance is Related to the Workload



### Performance is Related to the Workload



