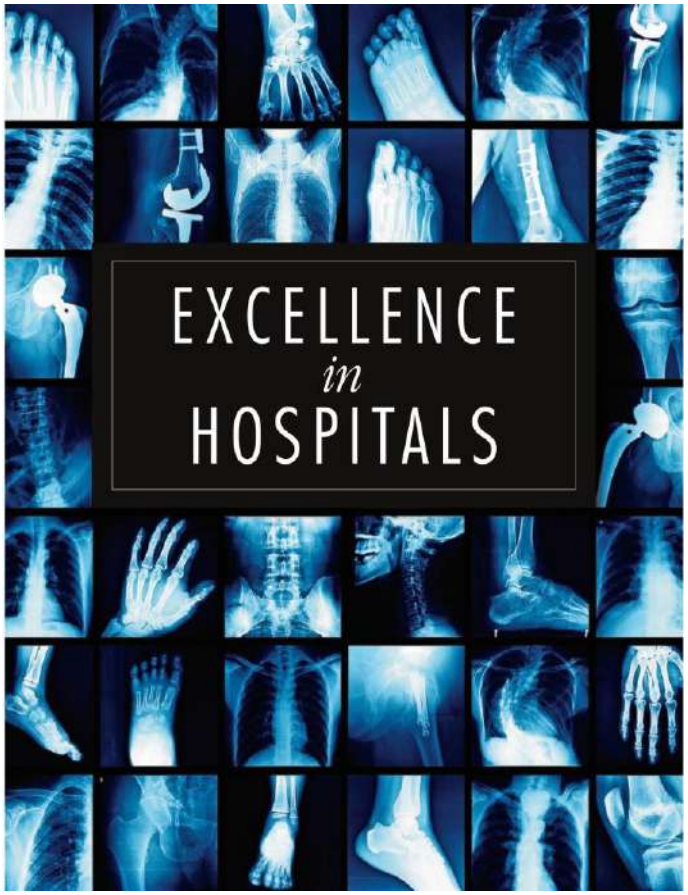
2015 Dr. Stanley Ho Medical Development Foundation Symposium

Quality improvement in surgery

Paul BS LAI
Department of Surgery
The Chinese University of Hong Kong

Patients need “high value health care”



- **Quality**
  - Structure, process, outcome
- **Safety**
  - Avoid preventable harms
- **Appropriate use of resource**
  - Avoidable procedures
- **Patients’ experience**
  - Did we ever ask?

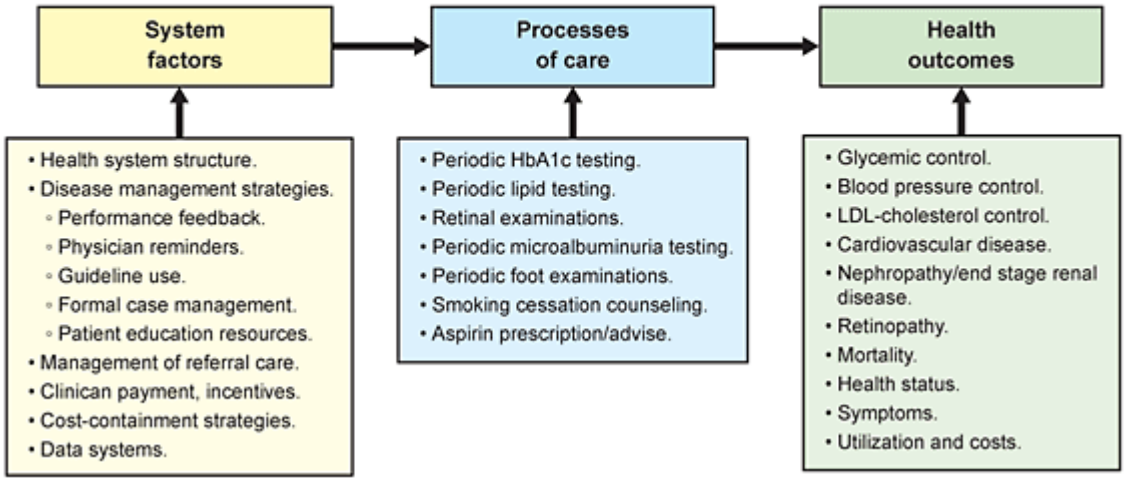
What is quality?

- Oxford Dictionary Definition:
  - The standard of something as measured against other things of a similar kind; the degree of excellence of something.

- Quality means differently to different people.

The Donabedian Model (1966)
structure - process - outcome

Figure 2. TRIAD conceptual model of relationships among system-level factors, processes, and outcomes of care



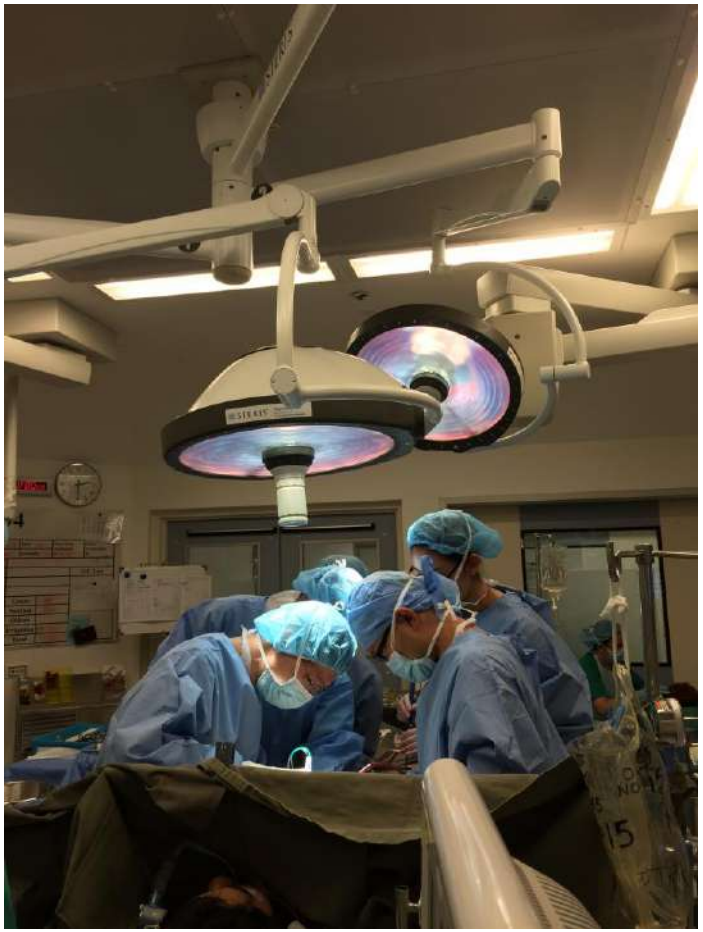
essentially the whole patient journey

6 dimensions of quality healthcare

- ***effective***
  - delivering health care that is adherent to an evidence base and results in improved health outcomes for individuals and communities, based on need;
- ***efficient***
  - delivering health care in a manner which maximizes resource use and avoids waste;
- ***accessible***
  - delivering health care that is timely, geographically reasonable, and provided in a setting where skills and resources are appropriate to medical need;
- ***acceptable/patient-centred***
  - delivering health care which takes into account the preferences and aspirations of individual service users and the cultures of their communities;
- ***equitable***
  - delivering health care which does not vary in quality because of personal characteristics such as gender, race, ethnicity, geographical location, or socioeconomic status;
- ***safe***
  - delivering health care which minimizes risks and harm to service users.

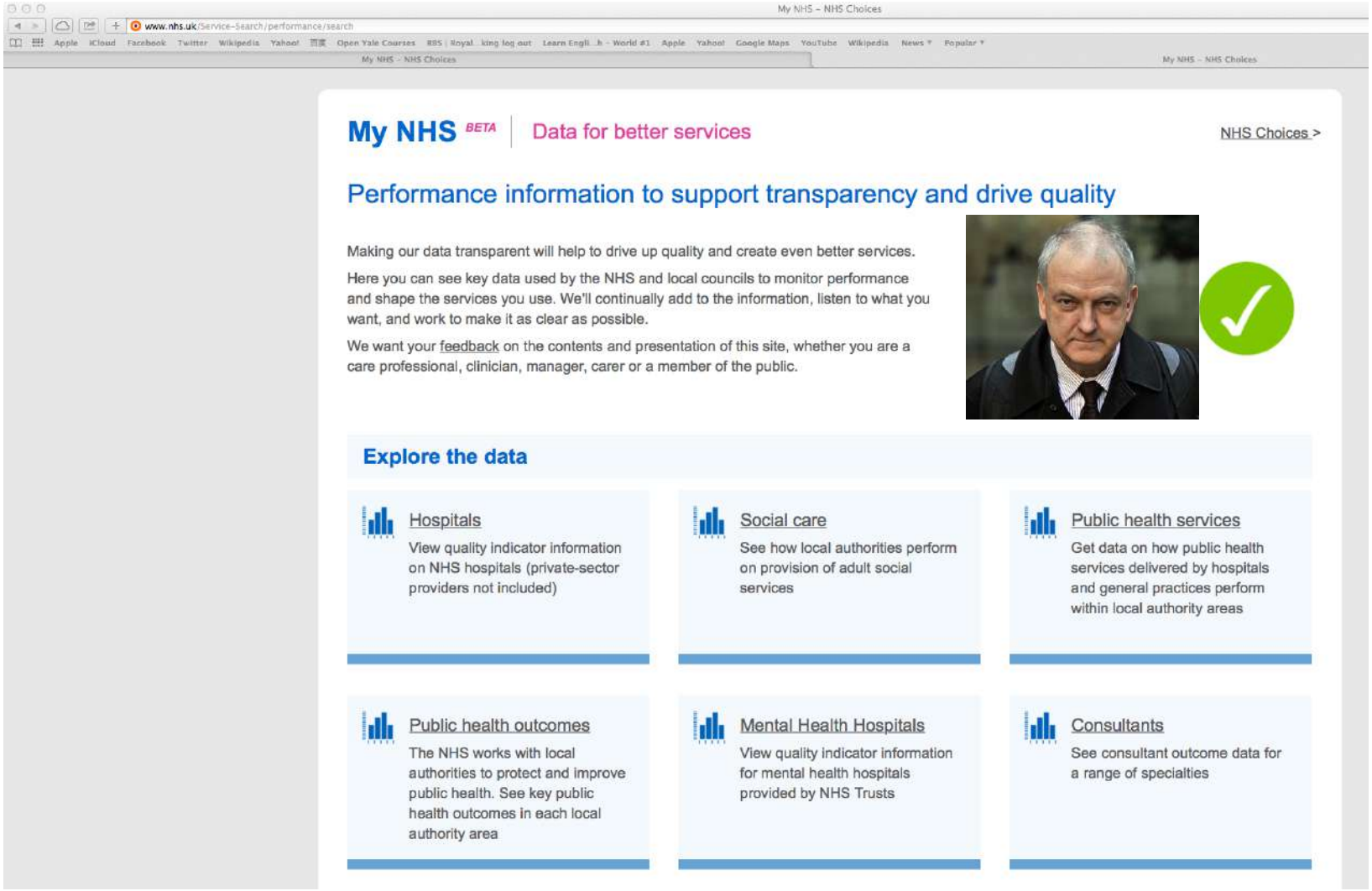
Quality of Care, WHO 2006

Targeting high value surgical care?



$$\text{Value} = \frac{\textbf{Quality}}{\text{Cost}}$$

My NHS – NHS Choices



http://www.scts.org/modules/surgeons/surgeon.aspx?id=314&name=zamvar

UK Surgeons

Vipin Yadao Zamvar

GMC Number: **4133379**
Hospital(s): **Royal Infirmary Edinburgh**
Special Interests: **Adult Cardiac Surgery**

Surgeon Overview

- Number and type of operations performed
- In-hospital mortality rate (risk adjusted)
- Average patient risk profile

See other Surgeons

Back

Number and type of operations performed

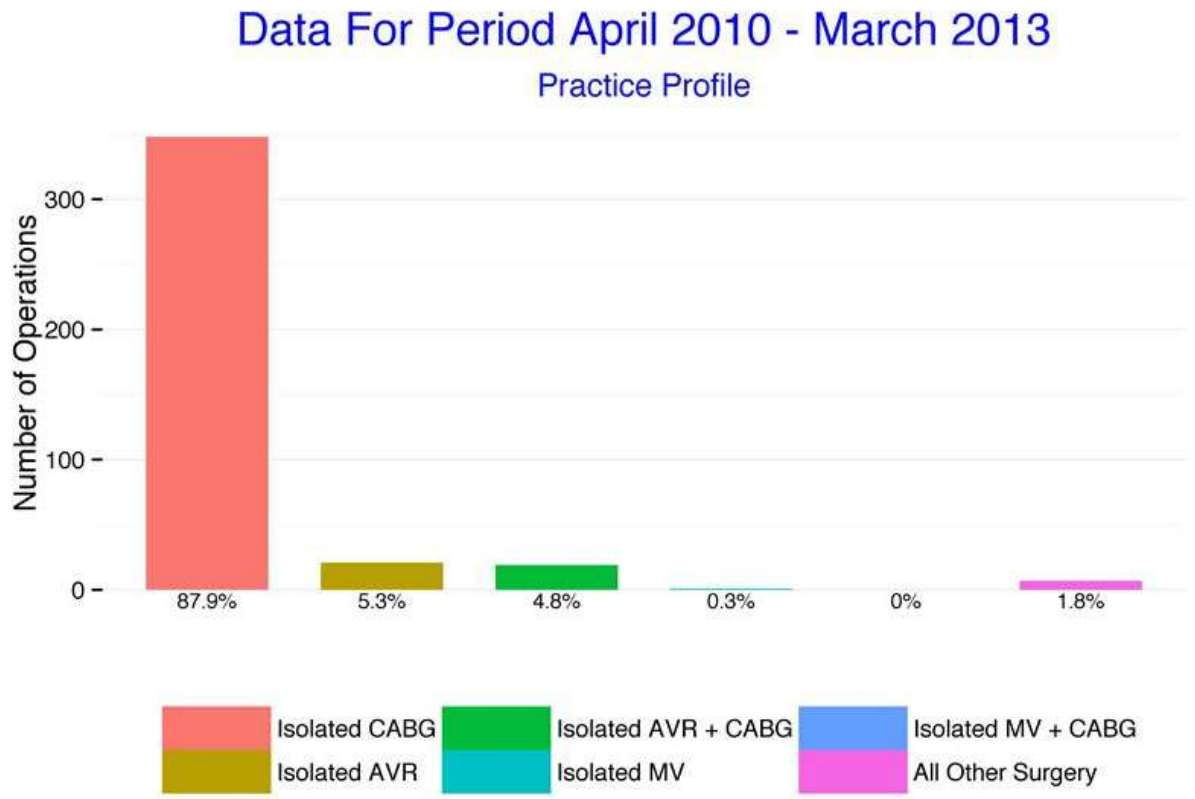
This graph shows the number and percentage of each type of heart surgery done by this consultant surgeon. The number of operations is shown in the line going up the left hand side. The percentage (%) underneath each coloured bar shows how much of this consultant's heart surgery is made up each procedure type.

The 'key' underneath the graph shows what procedure(s) each coloured bar shows. The abbreviations used are explained below:

- **Isolated**: This procedure has been carried out on its own. No other procedures were done during the same operation.
- **CABG**: Coronary artery bypass grafting
- **AVR**: Aortic valve replacement
- **MV**: Mitral valve procedure

You can find out more about these procedures in the 'About cardiothoracic surgery' section. If you or someone you know if having heart surgery, it may be helpful to know whether the consultant does lots of that procedure. If you have questions or concerns about the number of procedures being done at your hospital, you should speak to your heart surgeon.

Click here for help understanding this graph



In-hospital mortality rate (risk adjusted)

This graph shows the percentage of patients who die before being discharged from the hospital they had their operation at. This is called the 'in-hospital mortality rate'.

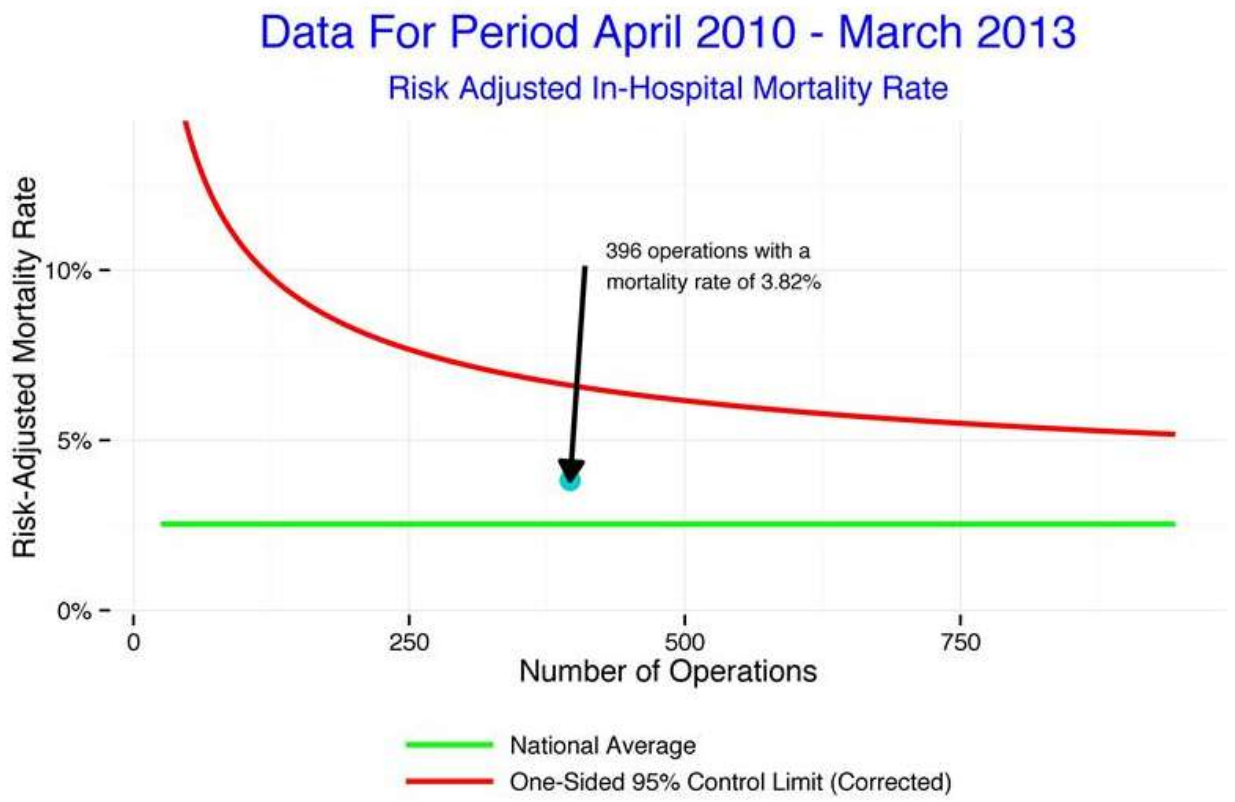
Some consultants do more complicated surgery on patients who are more sick, whilst others do fairly routine surgery. So that we can make fair comparisons between these consultants, the mortality rate has been 'risk adjusted' to take into account the difficulty of each operation.

The green line in the middle of the graph shows the average mortality rate for heart surgery in the UK. The blue dot shows the risk adjusted mortality rate for the consultant you are looking at. The lower the blue dot is on the graph, the lower the percentage of patients who have died after surgery.

If the blue dot is underneath the red line near the top of the graph, then the mortality rate shown by the blue dot is within the limits we would expect.

For more information on understanding mortality rates, look at the Understanding the graphs page

Click here for help understanding this graph



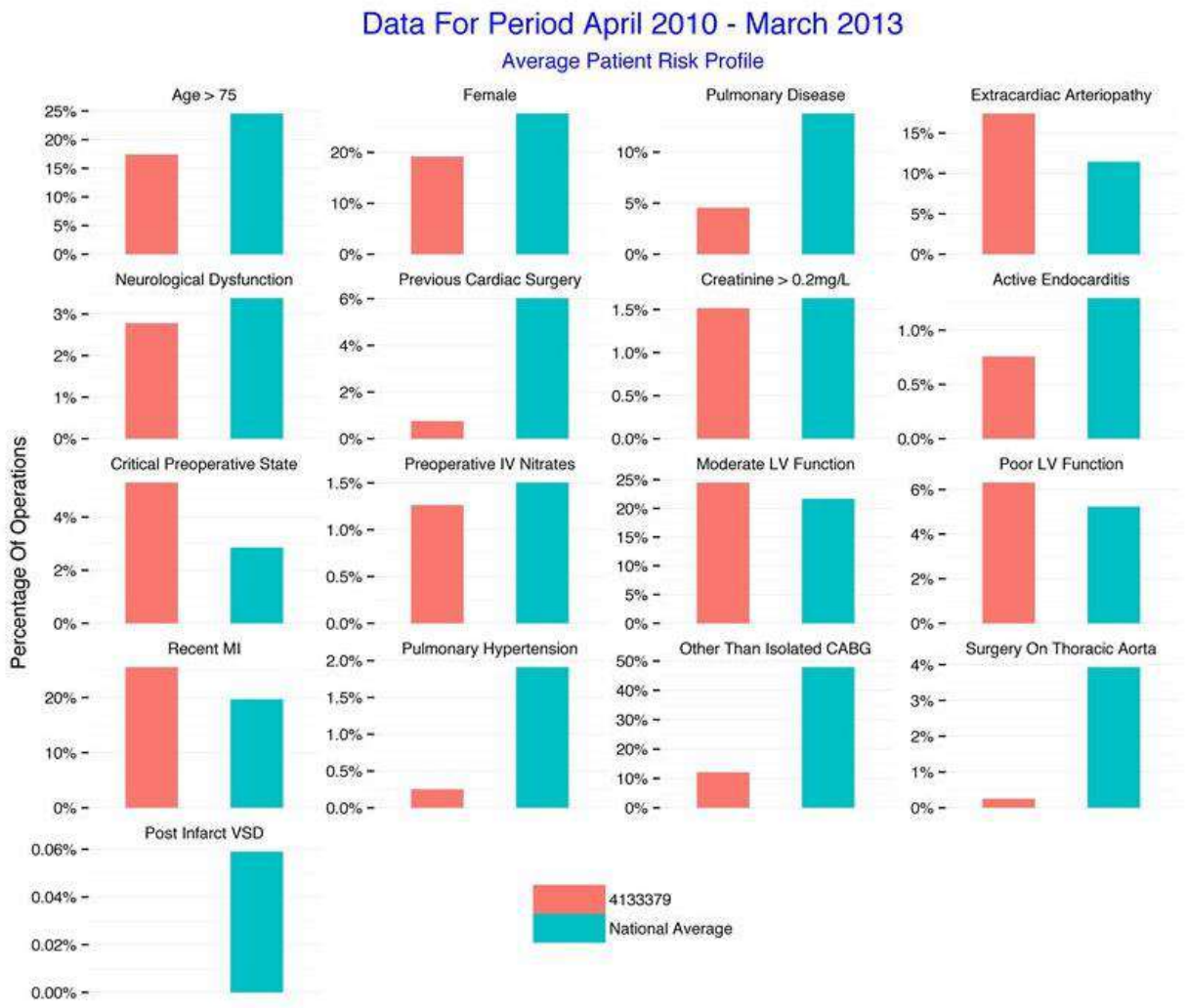
Average patient risk profile

Some risk factors like age, gender, and other medical problems can affect the outcome of heart surgery.

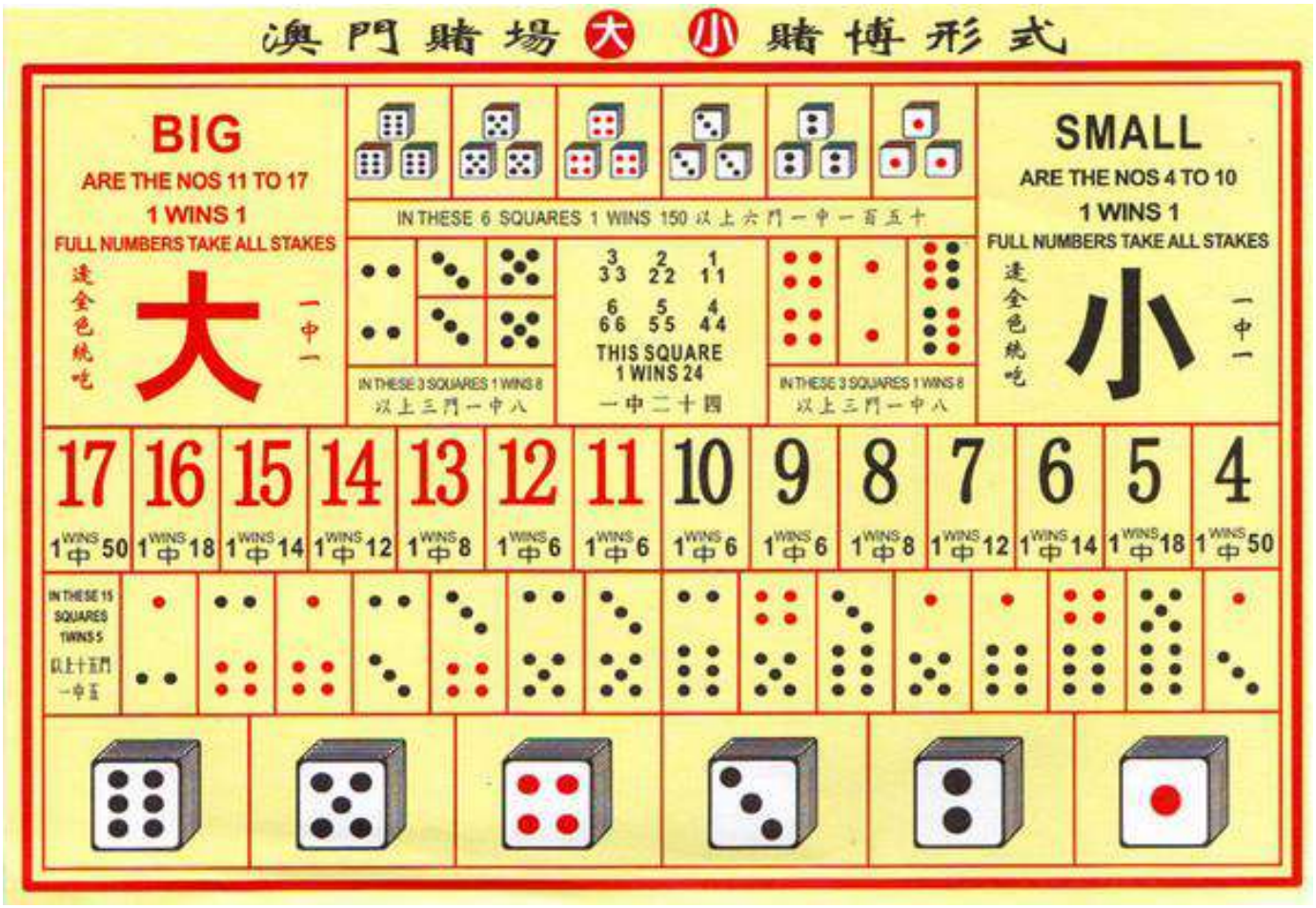
Each of the graphs below shows what percentage of this consultant's patients have each risk factor (peach bar on the left) next to the average for the whole of the UK (green baron the right). This can tell you whether the consultant operates on high risk patients in general, and whether they specialise in doing particular types of complicated surgery, like operations on the thoracic aorta.

You can find out more about the risk factors in the 'About cardiothoracic surgery' section.

Click here for help understanding this graph



Knowing one's risk



track-record may not mean anything …

Stop publishing individual surgeons' death rates

Most deaths are related to team dynamics and hospital infrastructure, says **Stephen Westaby**

A surgeon was recently castigated in the press for allegedly manipulating operative data.[1] Repeating the US experience, publication of surgeon specific mortality data (SSMD) has shifted emphasis from patient care to self preservation.[2 3]

In the 1980s the US Health Care Financing Administration collected but did not disclose individual death rates for New York state cardiac surgeons.[3] A newspaper sued and then published the information, but was criticised, and soon afterwards, risk averse behaviour and gaming with risk stratification were widely documented.[5]

The answer was to avoid high risk patients. In Massachusetts, the risk profile in centres with higher mortality fell.[3] Cardiologists struggled to obtain coronary artery bypass grafts for comorbid patients, but not in

with infrastructure and process.[19] Only 30% of the deceased patients had received satisfactory postoperative care.

Because few deaths are related to surgical error, publication of SSMD diverts attention from deficiencies in NHS infrastructure. An understanding of why patients die allows something to be done about it; attributing a pile of bodies to an individual surgeon does not.

Risk averse behaviour benefits neither patients nor the profession. Surgeons will endorse truly transparent outcome data that contribute to patient safety, such as the star rating system.[5] In Berwick's commissioned review of the NHS after the Francis inquiry, he reiterated that hospitals not individuals must be held accountable for poor outcomes.[20] Surely the surgical royal colleges knew this. Soon afterwards, SSMD were released for other surgical specialties and interventional

BMJ 2014; 349:g5026

PERSONAL VIEW

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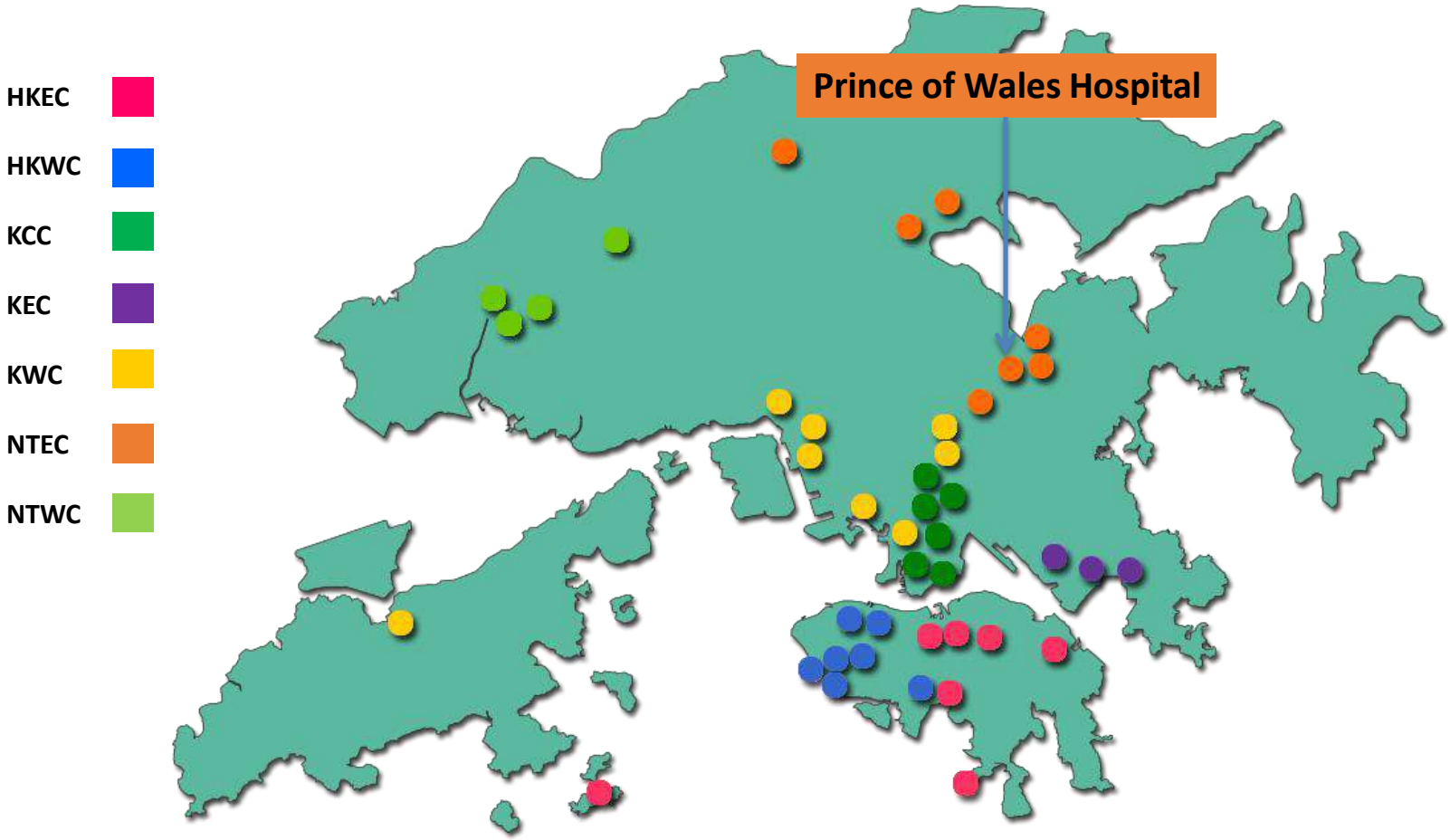
Transparency leads to better choices ?

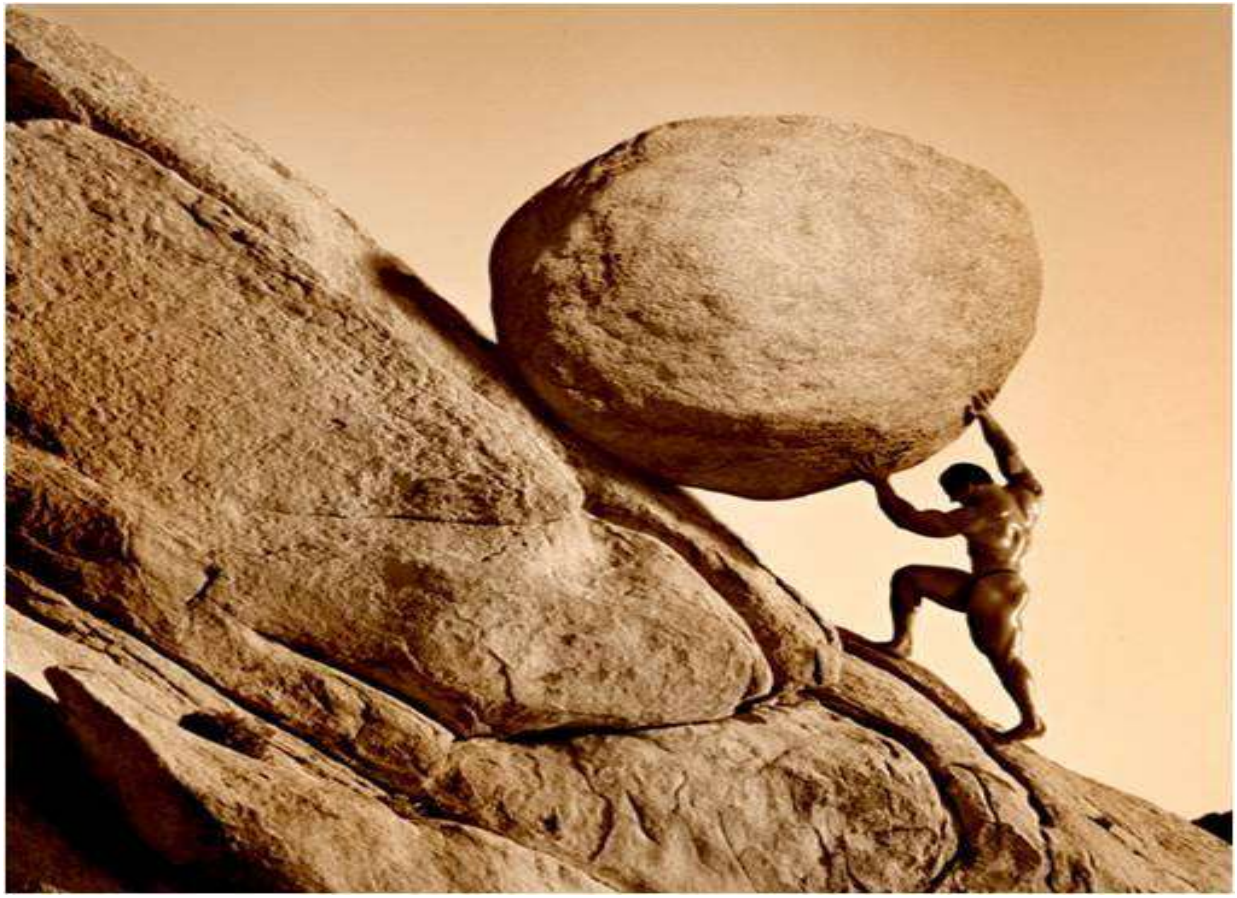
曾子曰：「吾日三省吾身：為人謀，而不忠乎？與朋友交，而不信乎？傳，不習乎？」

论语學而第四

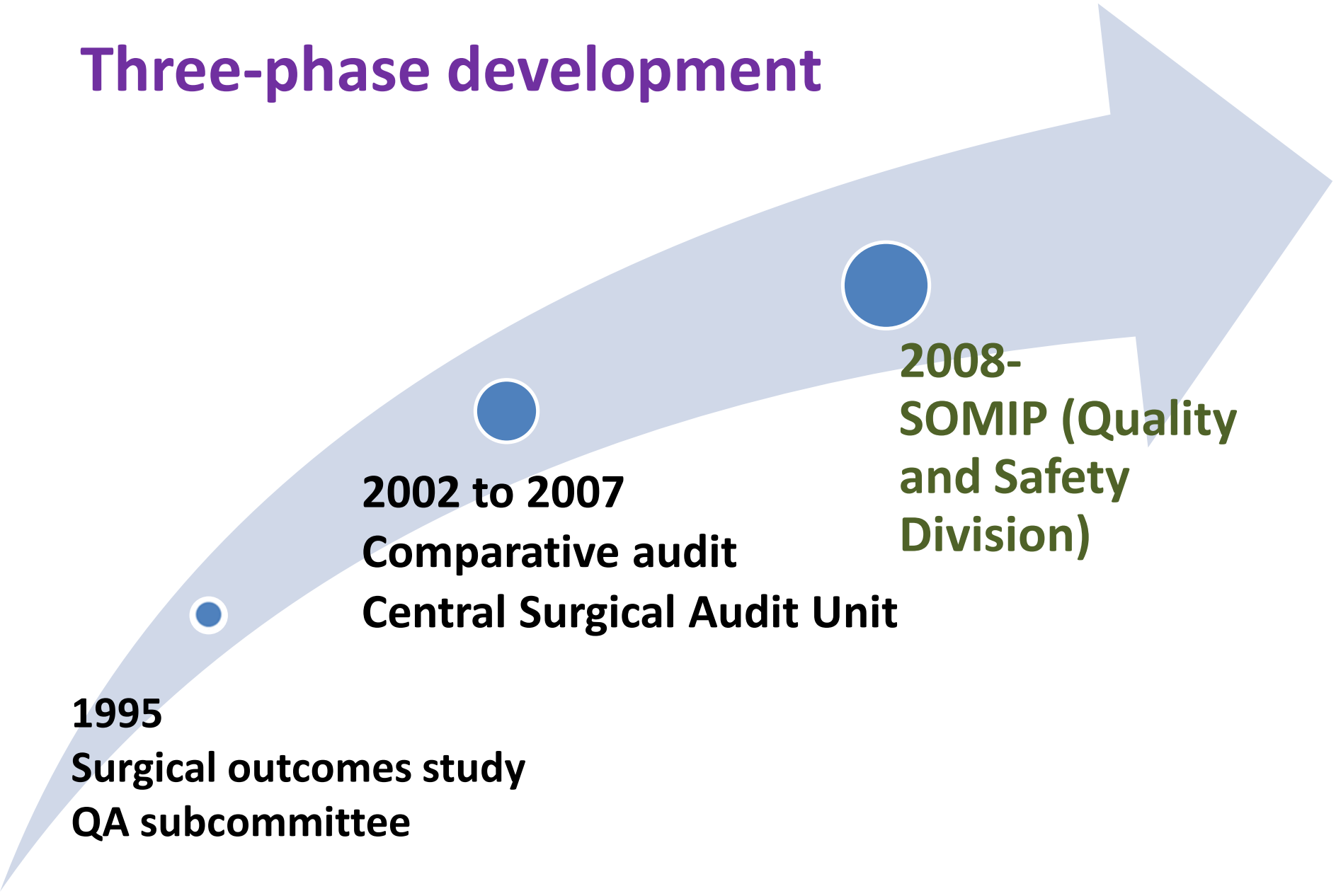
7 clusters in Hospital Authority of Hong Kong



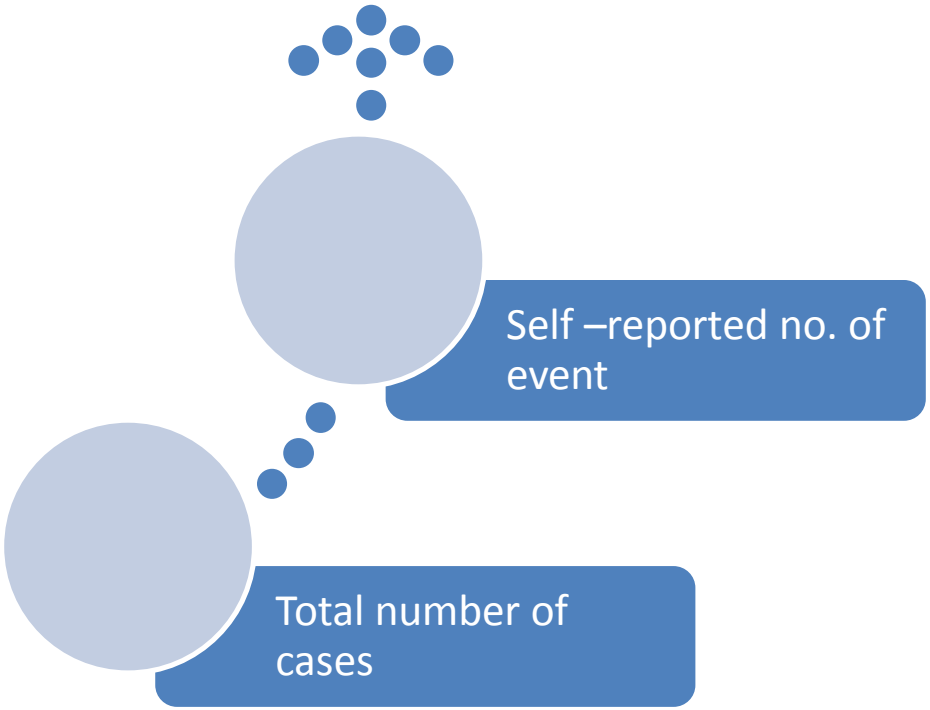
Monitoring surgical outcomes is not easy

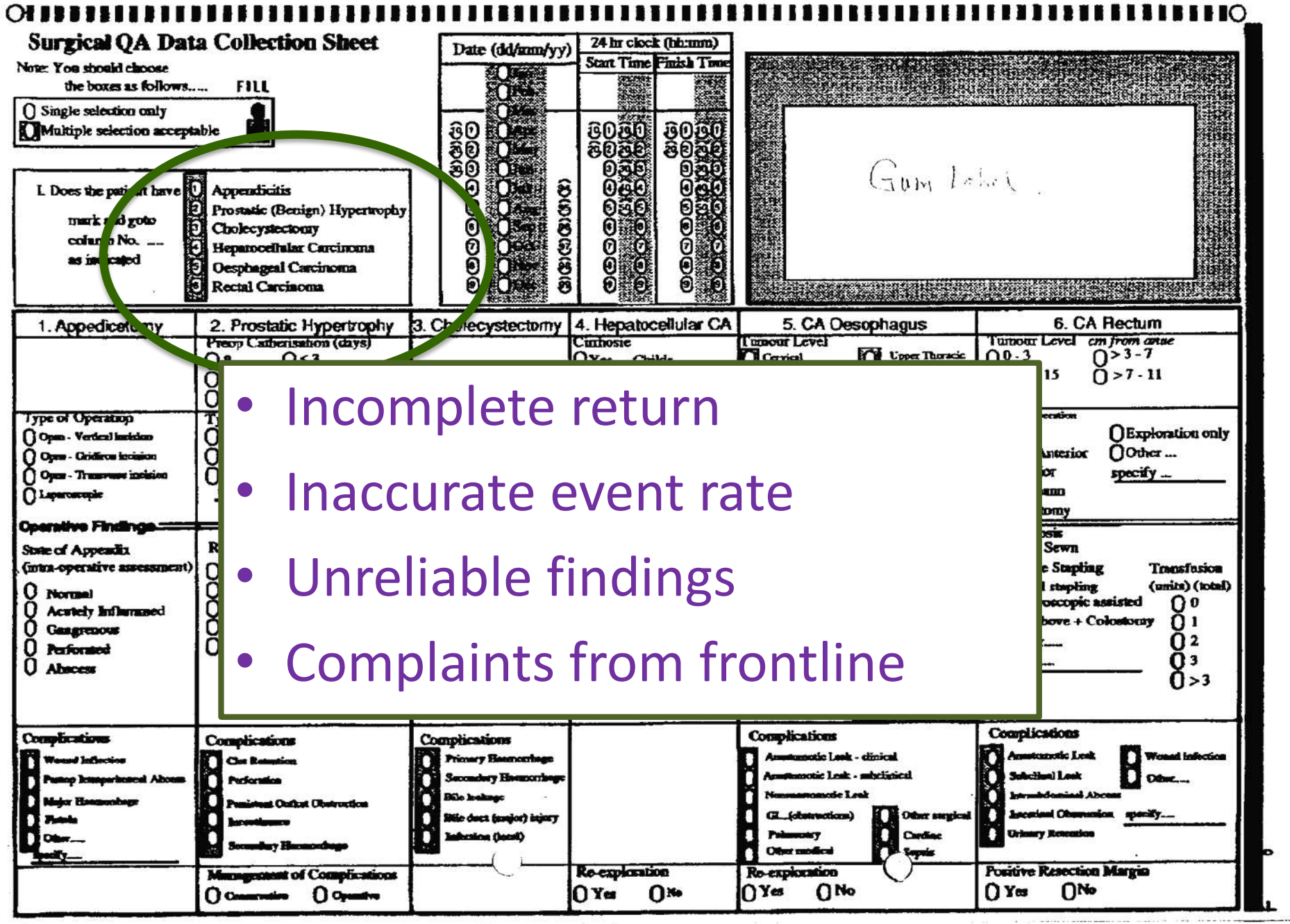


Three-phase development



Surgical Outcomes Study 1995-96 only crude mortality/morbidity rates





- Incomplete return
- Inaccurate event rate
- Unreliable findings
- Complaints from frontline

Clinical Surgical Audit Unit (CSAU) 2002-2006

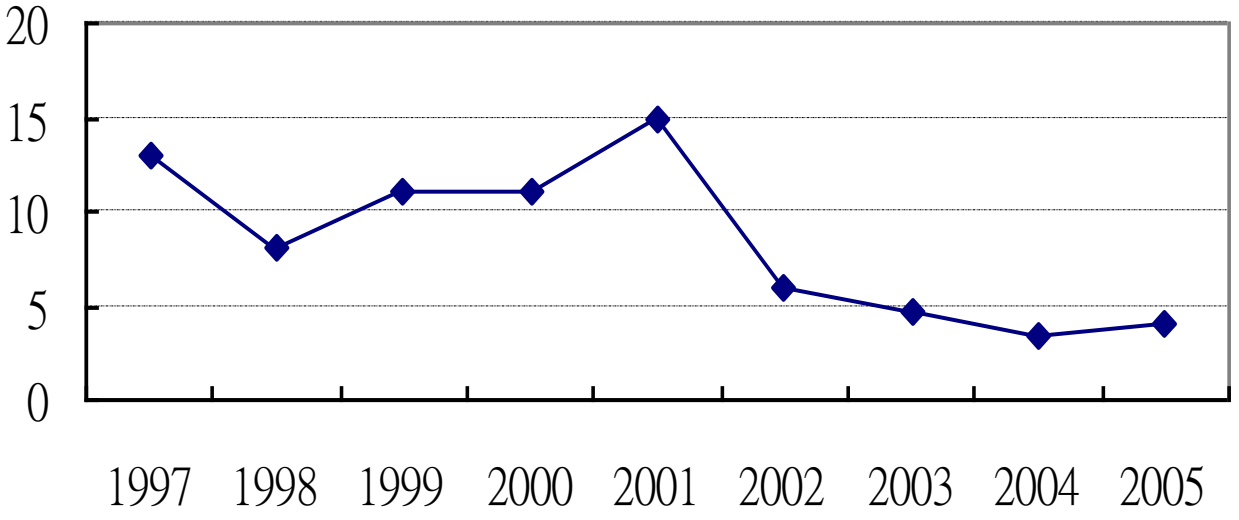
- One full time nurse and one part-time surgeon
- Backed up by OTRS, ePR, CDARS
- Followed the UK practice of comparative audits

Comparative Audit 2002 - 2006

Year	*Topics*	*Risk-adjustment*	*Focus of comparison*
2002	Hepatectomy Esophagectomy Liver Transplantation	No No No	Mortality
2003	Total cystectomy	Yes	Mortality
2004	Laparoscopic surgery Whipple's operation	No Yes	Trend Mortality
2005	Emergency colectomy Major lung resection	Yes Yes	Mortality Mortality and survival
2006	Esophagectomy – second audit Ca rectum	Yes	Mortality Mortality and survival

Completing the audit cycle

- 1st HA audit in 2002 (1/1997 to 6/2001) found that HA esophagectomy in-hospital mortality rate was 11%.
- Once this information was released, our colleagues started to improve;
- 2nd HA audit in 2006 (7/2001 to 2005) showed dramatic improvement.



Dr Shukri Khuri
1943 - 2008

ANNALS OF SURGERY
Vol. 228, No. 4, 491–507

The Department of Veterans Affairs' NSQIP

The First National, Validated, Outcome-Based, Risk-Adjusted, and Peer-Controlled Program for the Measurement and Enhancement of the Quality of Surgical Care

Shukri F. Khuri, MD,* Jennifer Daley, MD,† William Henderson, PhD,‡ Kwan Hur, MS,‡ John Demakis, MD,‡ J. Bradley Aust, MD,§ Vernon Chong, MD,‖ Peter J. Fabri, MD,¶ James O. Gibbs, PhD,‡ Frederick Grover, MD,# Karl Hammermeister, MD,# George Irvin III, MD,** Gerald McDonald, MD, MS,†† Edward Passaro, Jr., MD,‡‡ Lloyd Phillips, MD,§§ Frank Scamman, MD,‖‖ Jeannette Spencer, RN, MS, CS,* John F. Stremple, MD, MS,¶¶ and the participants in the National VA Surgical Quality Improvement Program

*From the *Brockton/West Roxbury VA Medical Center, West Roxbury, Massachusetts, Harvard Medical School, Boston, Massachusetts, Brigham and Women's Hospital, Boston, Massachusetts; †Brockton/West Roxbury VA Medical Center, West Roxbury, Massachusetts, Harvard Medical School, Boston, Massachusetts, Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center, Boston, Massachusetts; ‡Hines VA Center for Cooperative Studies in Health Services, Hines, Illinois; §Department of Surgery, University of Texas Health Science Center, San Antonio, Texas; ‖Veterans Integrated Service Network 17, Grand Prairie, Texas; ¶Tampa VA Medical Center, Tampa, Florida, University of South Florida College of Medicine, Tampa, Florida; #Denver VA Medical Center, Denver, Colorado, University of Colorado Health Sciences Center, Denver, Colorado; **University of Miami Department of Surgery, Miami, Florida, University of Miami School of Medicine, Miami, Florida, Miami VA Medical Center, Miami, Florida; ††Department of Surgery, Department of Veterans Affairs Headquarters, Washington DC; ‡‡West Los Angeles VA Medical Center, West Los Angeles, California, University of California Los Angeles, Los Angeles, California; §§Veterans Integrated Service Network 11, Ann Arbor, Michigan; ‖‖Department of Anesthesia, National Anesthesia Services, Iowa City, Iowa; ¶¶Pittsburgh VA Medical Center, Pittsburgh, Pennsylvania, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania*

Objective
To provide reliable risk-adjusted morbidity and mortality rates after major surgery to the 123 Veterans Affairs Medical Centers (VAMCs) performing major surgery, and to use risk-adjusted outcomes in the monitoring and improvement of the quality of surgical care to all veterans.

Summary Background Data
Outcome-based comparative measures of the quality of surgical care among surgical services and surgical subspecialties have been elusive.

Methods
This study included prospective assessment of presurgical risk factors, process of care during surgery, and outcomes 30 days after surgery on veterans undergoing major surgery in 123 medical centers; development of multivariable risk-adjustment models; identification of high and low outlier facilities by observed-to-expected outcome ratios; and generation of annual reports of comparative outcomes to all surgical services in the Veterans Health Administration (VHA).

Results
The National VA Surgical Quality Improvement Program (NSQIP) data base includes 417,944 major surgical procedures performed between October 1, 1991, and September 30, 1997. In FY97, 11 VAMCs were low outliers for risk-adjusted observed-to-expected mortality ratios; 13 VAMCs were high outliers for risk-adjusted observed-to-expected mortality ratios. Identification of high and low outliers by unadjusted mortality rates would have ascribed an outlier status incorrectly to 25 of 39 hospitals, an error rate of 64%. Since 1994, the 30-day mortality and morbidity rates for major surgery have fallen 9% and 30%, respectively.

Conclusions
Reliable, valid information on patient presurgical risk factors, process of care during surgery, and 30-day morbidity and mortality rates is available for all major surgical procedures in the 123 VAMCs performing surgery in the VHA. With this information, the VHA has established the first prospective outcome-based program for comparative assessment and enhancement of the quality of surgical care among multiple institutions for several surgical subspecialties. Key features to the success of the NSQIP are the support of the surgeons

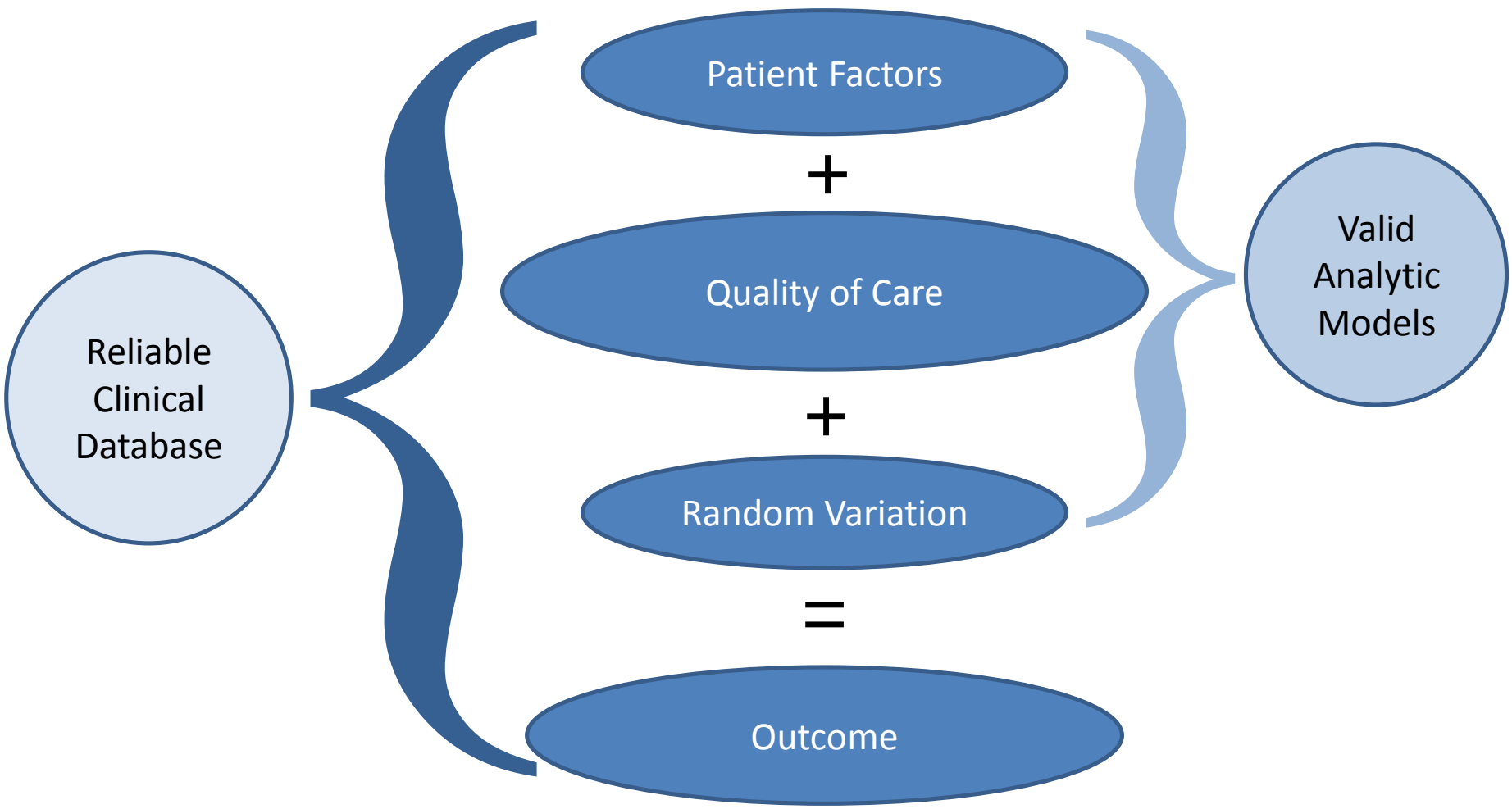
Surgical Outcomes Monitoring and Improvement Program (SOMIP)

- Started in 2008
- Elective and emergency operations (~250,000 procedures per year)
- Major and Ultra-major operations
- Covers General surgery, Urology, Plastic and Paediatric surgery
- 66 risk factors
- Collect post-operative mortality and morbidity at 30-, 60- and 90-day

Special features of SOMIP/NSQIP

- Focus on hospital, rather individual surgeon (17 HA hospitals)
- Single-year comparison and continuous monitoring
- Compare a bundle of operations rather than individual operation
- A comprehensive set of variables to help construct risk-adjusted models with high discriminative power (C-index of 0.9)
- Robust and reliable data capturing by nurse reviewers
- All variables are well-defined and documented in a data definition manual

Why risk adjustment?



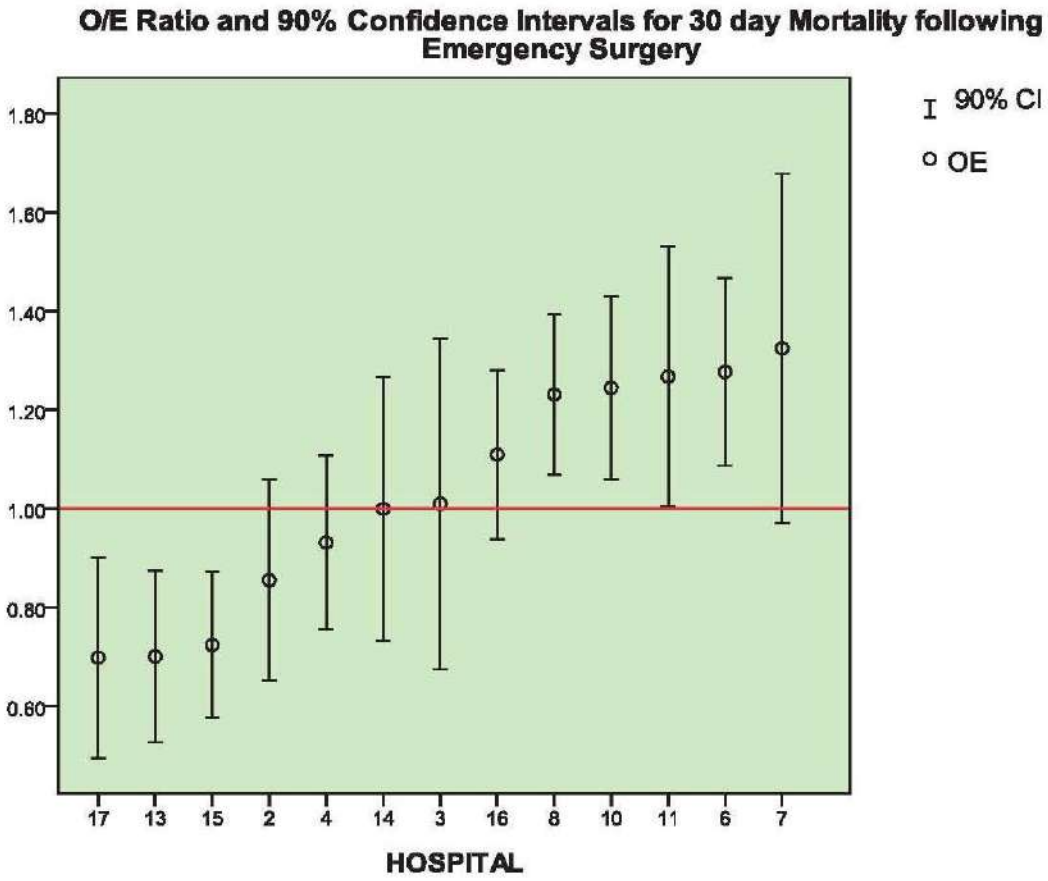
Significant variables in the model of Emergency surgery 30-day mortality

3 times	2 times	1 time
Age	**Sex**	weight loss
ASA	**Operative Magnitude**	Uncorrected bleeding tendency
Functional status	**Ascites**	Hepatomegaly
Neurological status	**Preop dyspnea**	steroid
Disseminated cancer	**Sepsis/septic shock**	psychosis
Severe COPD	**Blood loss**	Preop dialysis
Pulse		Cardiac surgery
		Systolic blood pressure
		Preop blood transfusion
		Degree of urgency
		Complexity score
Albumin	**WBC**	Hb
Urea/Creatinine		Haematocrit
Blood gases		Sodium
alkaline phosphatase		glucose
		bilirubin

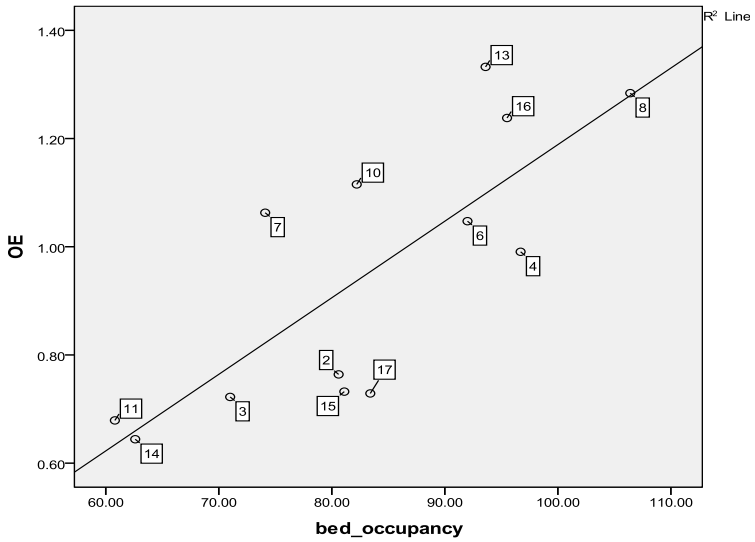
Significant variable in the model of Elective surgery 30-day mortality

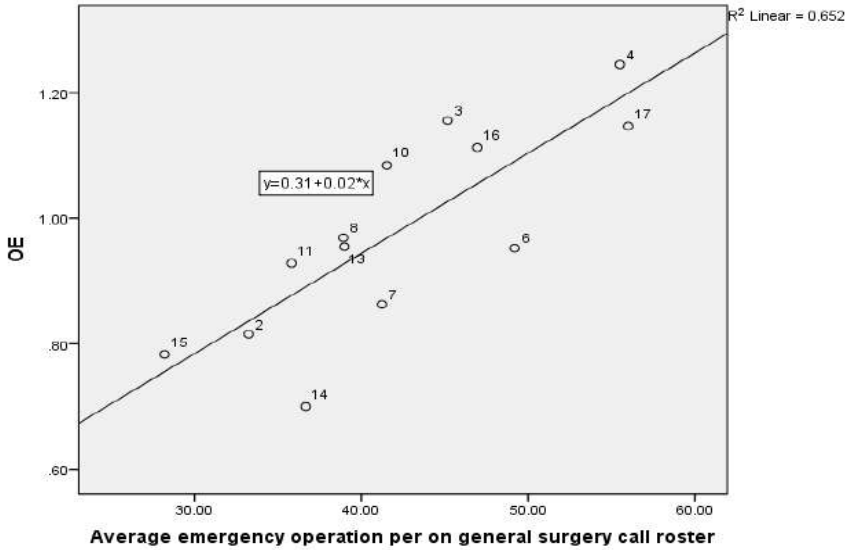
3 times	2 times	1 time
Age	**Operative Magnitude**	Functional status
ASA	**Weight loss**	Neurological status
Disseminated cancer	**Ascites**	Angina
Presence of gangrene		Severe COPD
		Preop dyspnea
		Immunosuppression
Blood loss		Pulse
		Operation time
Urea/Creatinine	**Alkaline phosphatase**	Sodium
Albumin		WBC
		Bilirubin

Risk-adjusted mortality rates



Multi-level analysis
to identify contributing system factors

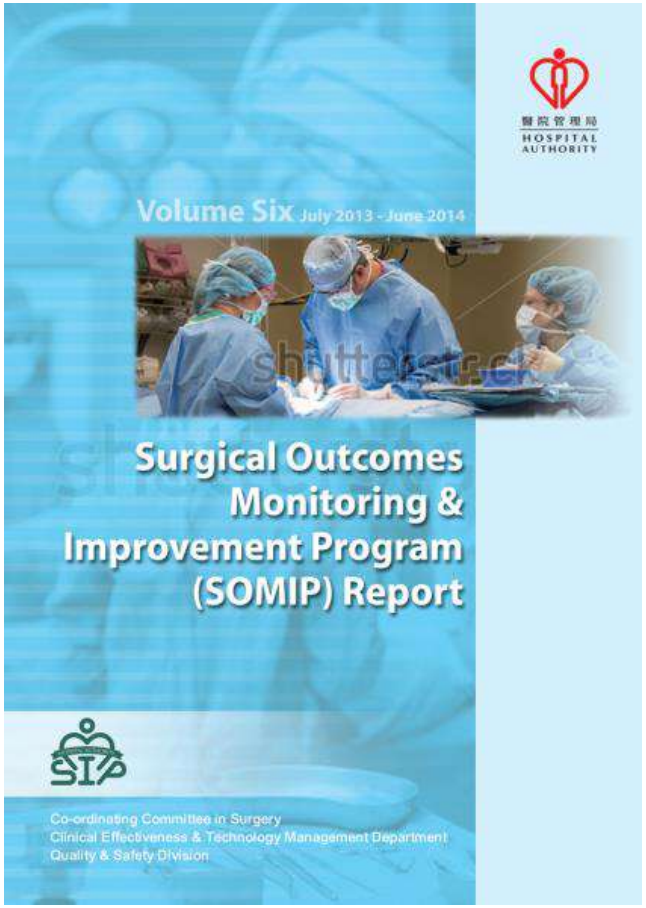




Workload issues – no. of patients requiring surgical care
Manpower issues – surgeons, anaesthetists, intensivists, nurses, etc.
Hardware issues – ICU beds, operating theatres, ward beds, etc.
Other supports – physicians, diagnostics, interventional radiology, etc.


Surgical Outcomes Monitoring &
Improvement Program (SOMIP) Report
Volume One: Descriptive Report
July 2008 – June 2009
Co-ordinating Committee in Surgery
Clinical Effectiveness & Technology Management Department
Quality & Safety Division
Surgical Outcomes Monitoring &
Improvement Program
(SOMIP) Report
Volume Five
July 2012 – June 2013
Co-ordinating Committee in Surgery
Clinical Effectiveness & Technology Management Department
Quality & Safety Division
Volume Six July 2013 - June 2014
Surgical Outcomes
Monitoring &
Improvement Program
(SOMIP) Report
Co-ordinating Committee in Surgery
Clinical Effectiveness & Technology Management Department
Quality & Safety Division
Program (SOMIP) Report
Volume Four
July 2011 – June 2012
Co-ordinating Committee in Surgery
Clinical Effectiveness & Technology Management Department
Quality & Safety Division
Volume Two
July 2009 – June 20
Co-ordinating Committee in Surgery
Quality & Safety Division
HOSPITAL AUTHORITY

Actionable data from SOMIP



術後沒深切治療　死亡率較預期高33%

[redacted]院緊急手術全港最差

醫管局昨公布被視為公立醫院每年成績表的「手術成效監察計畫」報告，新界東龍頭醫院威爾斯親王醫院的緊急手術成績「包尾」，術後病人死亡率比預期高出三成三。醫管局專家認為，威院緊急手術個案中，僅一成八病人使用深切治療服務，更有病人術後因病牀爆滿無法入住深切治療部，建議增加加護病牀配合；但威院在預約手術方面則錄得佳績。

記者：黃利源

最新出爐的「手術成效監察計畫」報告，覆蓋二〇一二年七月至去年六月底共二萬三千多個大型和超大型手術，其中五千三百多個為緊急手術，一萬八千多個屬預約手術。緊急手術死亡率下降至百分之七點七，預約手術死亡率則維持於百分之零點七。報告根據不同手術的預期死亡率作出調整，計算出實際與預期對比的死亡比例，如果平均數值大於一，表示實際死亡率高於預期，數值介乎〇與一之間，代表實際死亡率比預期低。

預約手術錄佳績

緊急手術	實際與預期死亡比例*
威爾斯親王醫院	1.33
屯門醫院	1.28
伊利沙伯醫院	1.24

預約手術	實際與預期死亡比例*
屯門醫院	1.88
大埔那打素醫院	1.96#
聯合醫院	1.57#

部分公立醫院外科手術表現「倒數」排名

註：*實際與預期死亡比例大於1，代表術後死亡個案比預期多，數值愈大反映醫院表現愈差；#大埔那打素醫院和聯合醫院的「實際與預期死亡比例」平均值較高，因部分手術表現優於預期水平，未被評為表現綠色。

資料來源：醫院管理局

January 2014


Heaven
Hell

Kübler-Ross model – 5 stages of grief

Denial – Anger – Bargaining – Depression – Acceptance

Action plans for SOMIP team

- Yearly SOMIP forum
- Discuss with senior surgeons and frontlines in for areas of improvement

  *** from defensive to proactive*

  *** focus on quality improvement measures*

  *** sharing of best practice*

  *** involvement of senior surgeons within HA to assist the process of review and quality improvement measures*

To convince surgeons that there is always room for improvement

PDSA Quality Improvement Cycles

Resource as fuels

Can do attitude

Safety first culture