



# Outcome Measurements & Service Performance Review in Acute Surgery

Mr Antonio Foliaki, FRACS  
Acute Surgical Unit  
Auckland Hospital

Acknowledgment: Mr Li Hsee, FRACS  
Acute Surgical Unit  
Department of Surgery

# Overview

- Scope of problems in Acute Surgery
- Review of workload and case volume
- Current ASU structure
- Working principles
- Acute Surgical Patient Pathway
- Key Performance Indicators (KPIs)
- Future directions

# Scope of Problems in Acute Surgery

- Access block in ED (delay in surgical assessment)
- Lack of timely access to acute surgical care
  - Generalist vs. Sub-specialist
- Shortage of Surgeons
- ↑ sub-specialisation post fellowship
- Pressure to ↑ elective throughput
- Potential for erosion of surgical skills in emergency surgery

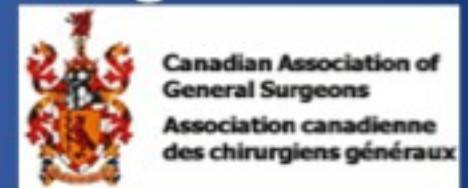


# Scope of Problems in Acute Surgery

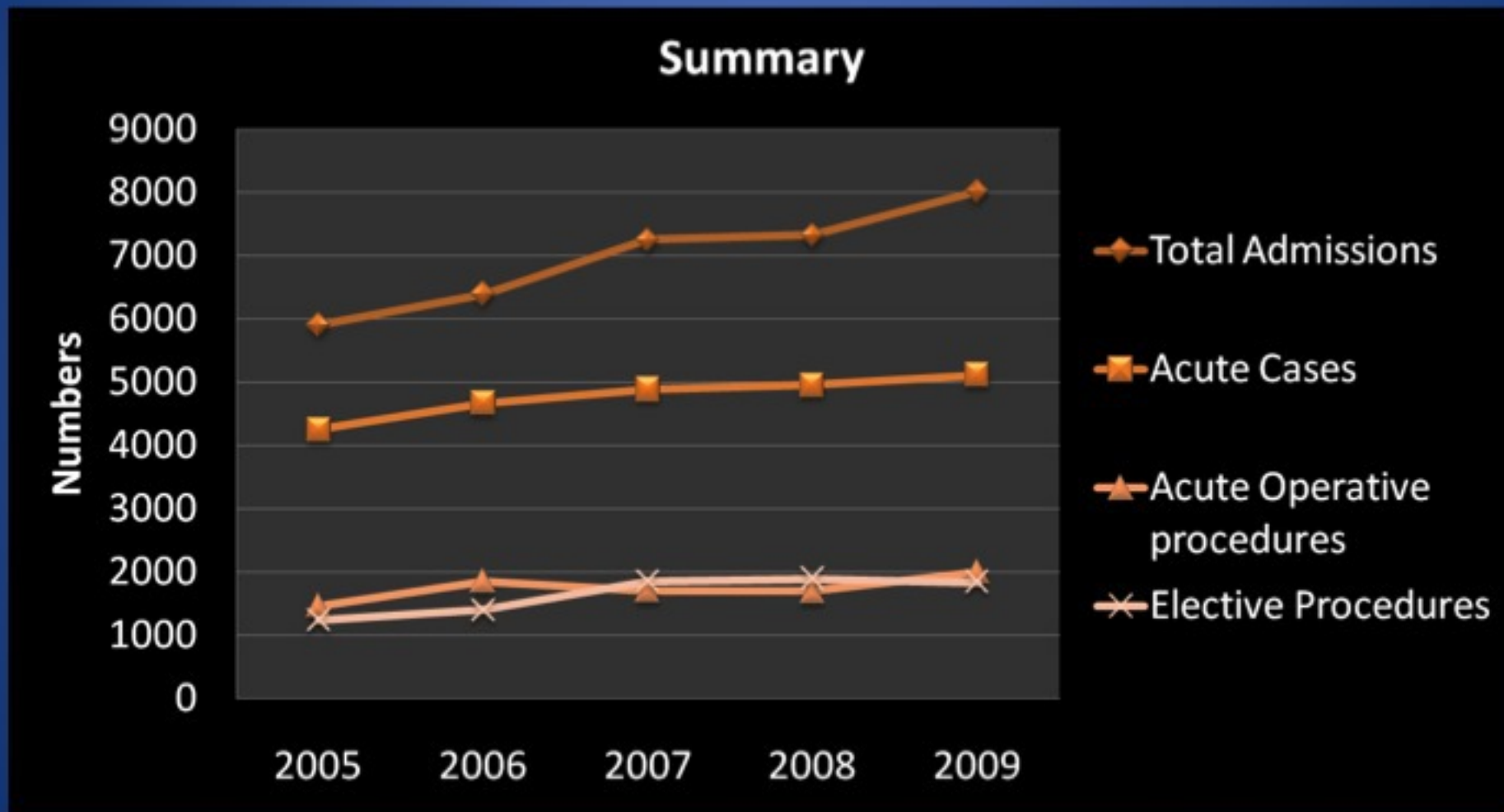
- Lack of Consultant input in managing acute cases
- Consultant commitment while on call
- Lack of timely access to OR
- Non essential acute work after hours
- Disruption of elective theatres
- Lack of resources, funding and understanding at the government and area district health boards levels

# Global Solution in Acute Surgery

- USA: AAST oversight of ACS fellowship
  - Hospital accreditation
  - Fellowship curriculum and training
- Canada: Canadian Association of General Surgeons-Education Committee
  - Developing curriculum in training
- RACS: Position Statement on ES and summit on ES
- Australia: Inaugural ES conference and 12 point plan on ES from GSA

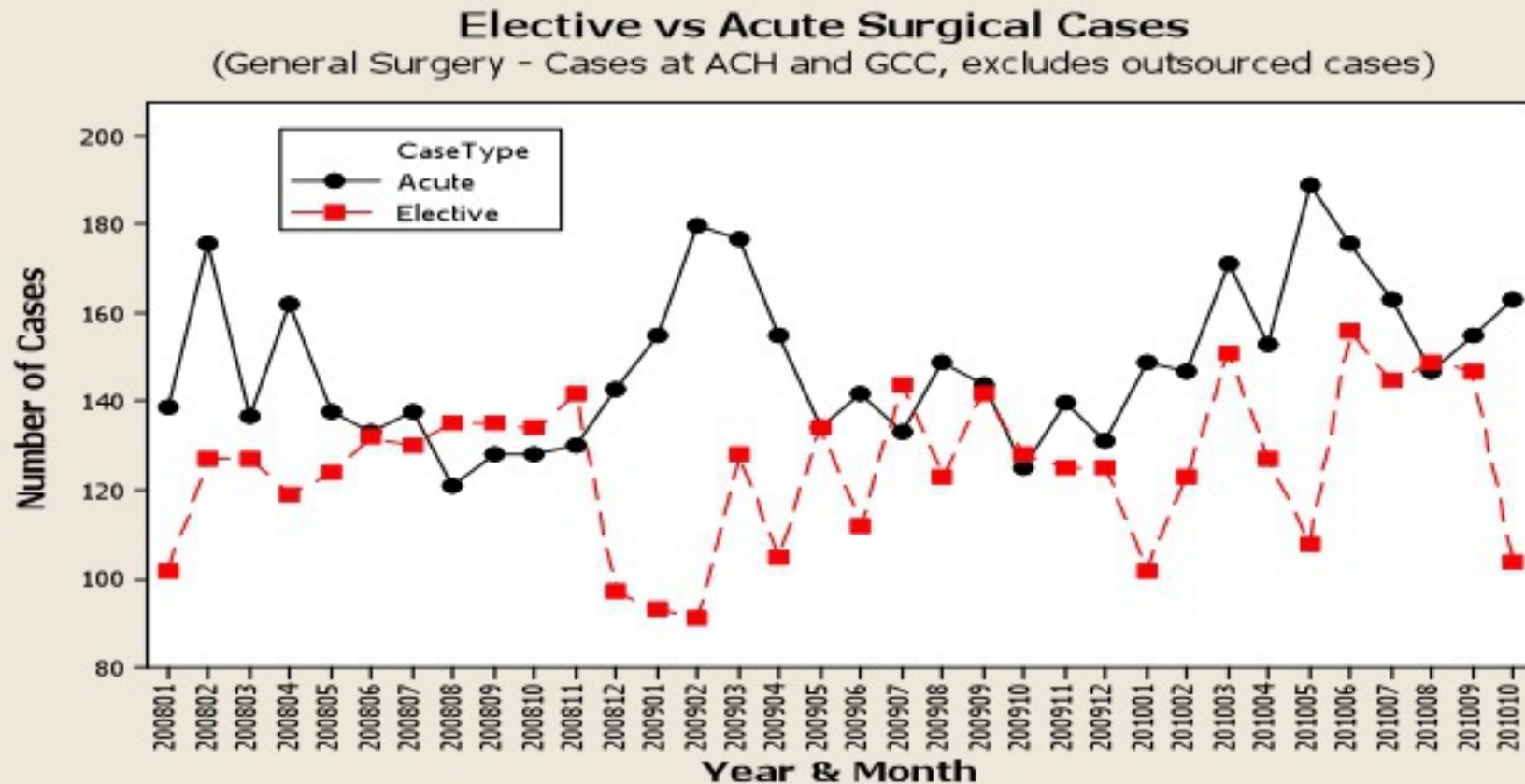


# Summary Workload





# Acute vs. Elective Cases



# Acute Operative vs. Non-operative

FYear	Acute-N	Acute-T	Grand Total
2005	2,592	1,375	3,967
2006	2,940	1,487	4,427
2007	3,186	1,493	4,679
2008	3,212	1,563	4,775
2009	3,212	1,362	4,574
2010	3,558	1,513	5,071
2011(20 Dec2010)	1,736	828	2,564
Grand Total	20,436	9,621	30,057

↑ in volume 11%



# The NZ Setting

- Recognised as a growing problem to manage acute patients in public hospitals
- Most hospitals manage acute surgical patients differently with no uniformity
- At Auckland City Hospital
  - ACUTE SURGICAL UNIT

# ASU Goal

- Aim: Increase timeliness of clinical assessment & management of emergency surgical patients in appropriate time frame

# Working Principles of ASU

- Consultant led service
- Dedicated operating theatre
- Separation of acute and elective workloads
- Robust handover process
- Engage the subspecialists for their expertise
- Enhance training for Registrars in ES
- Promote advanced roles of nursing and allied health professionals



# 12 Point Plan in ES



1. EGS is a continuing core competency
2. ES should be consultant led
3. Dedicated Staff to ES with need for training
4. Separation of ES & elective streams
5. Timely access to OR
6. ES should be done during working hours unless threat to life, limb or organ
7. Consultant should contribute to Mx of OR efficiency
8. Safe hours principles
9. Robust Handover
10. Best practice: KPIs
11. Community need & regional variation
12. Service be valued, resourced and remunerated

# Acute Flow & Distribution

## General Surgery - Acute Flow

Avg Patients per month

Note that this chart follows the flow of patients who had left ED under the General Surgery CBU based on 2008, 2009 and 2010 (Aug-10) calendar years



Average number of Gen Surgery patients entering acute pathway	Referral Source		Admission to AED or APU:	Discharge or inpatient?	First IP Ward	Theatre?	Surgical Team	Theatre (1st Theatre event only)	Discharge Ward		Discharge Destination
354 100%	Self Referral	ADMISSION	ED	Send to IP Ward (Bed Request has been made)	232 66%	Theatre	GS Team	In Theatre	GS Ward	DISCHARGE	Home
	190 54%		160 45%	111 31%		106 30%	61 17%				
	General Practitioner		APU	No Theatre		Non GS Team	Outlier Ward				
	94 27%						50 14%				
	Accident Clinic						GS Ward				
	55 15%						78 22%				
	Other Hospital		Discharge from AED/APU				232		34%		Outlier Ward
6 2%	43 12%										
Other	10 3%	122 34%	232		232						
354		354	354	354	232	232	232				

Additional Data:

Returns to theatre  
Avg=22 per month

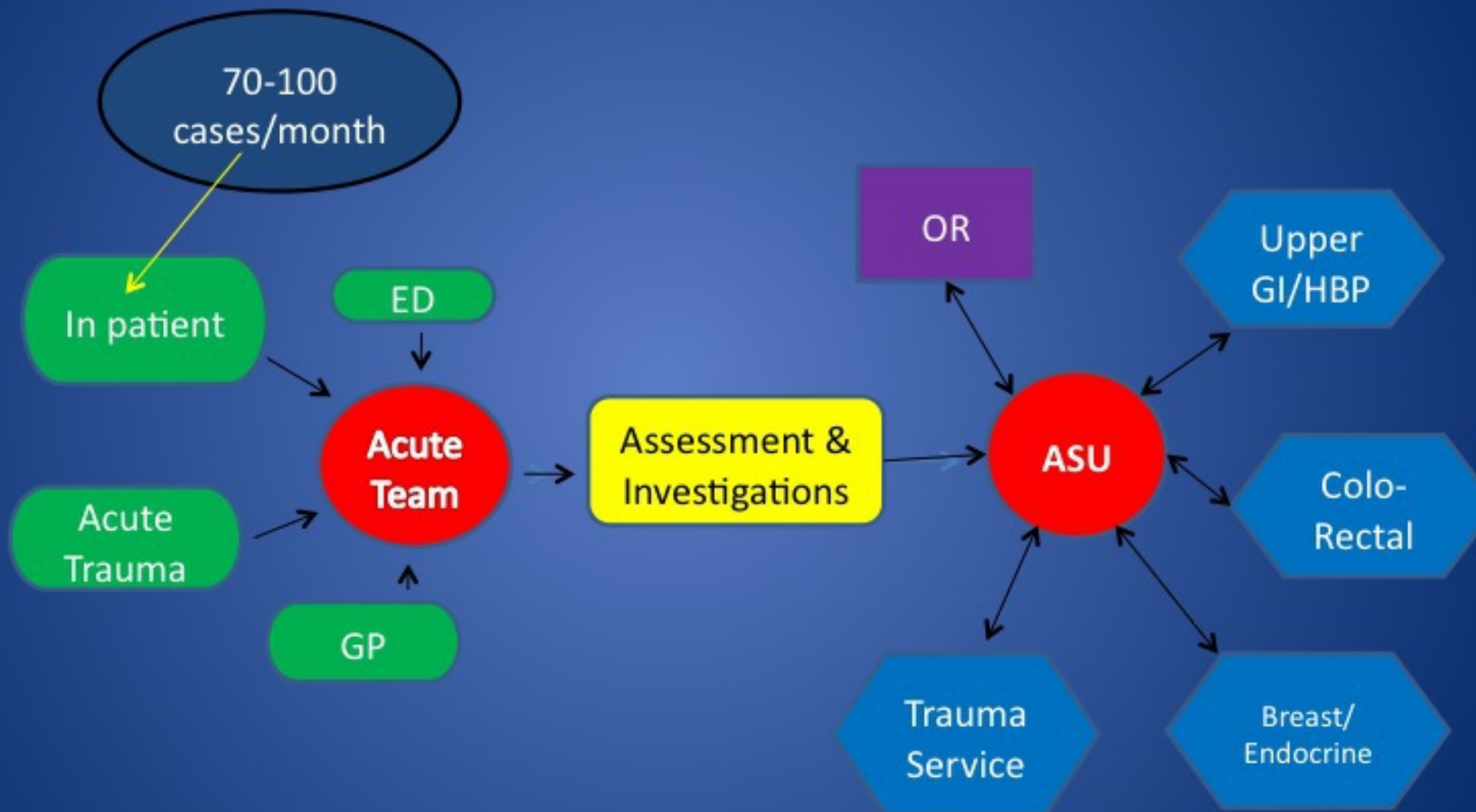
Number of Acute Gen Surg Discharges

Additional Data:

Returns to theatre  
Avg=22 per month

Number of Acute Gen Surg Discharges

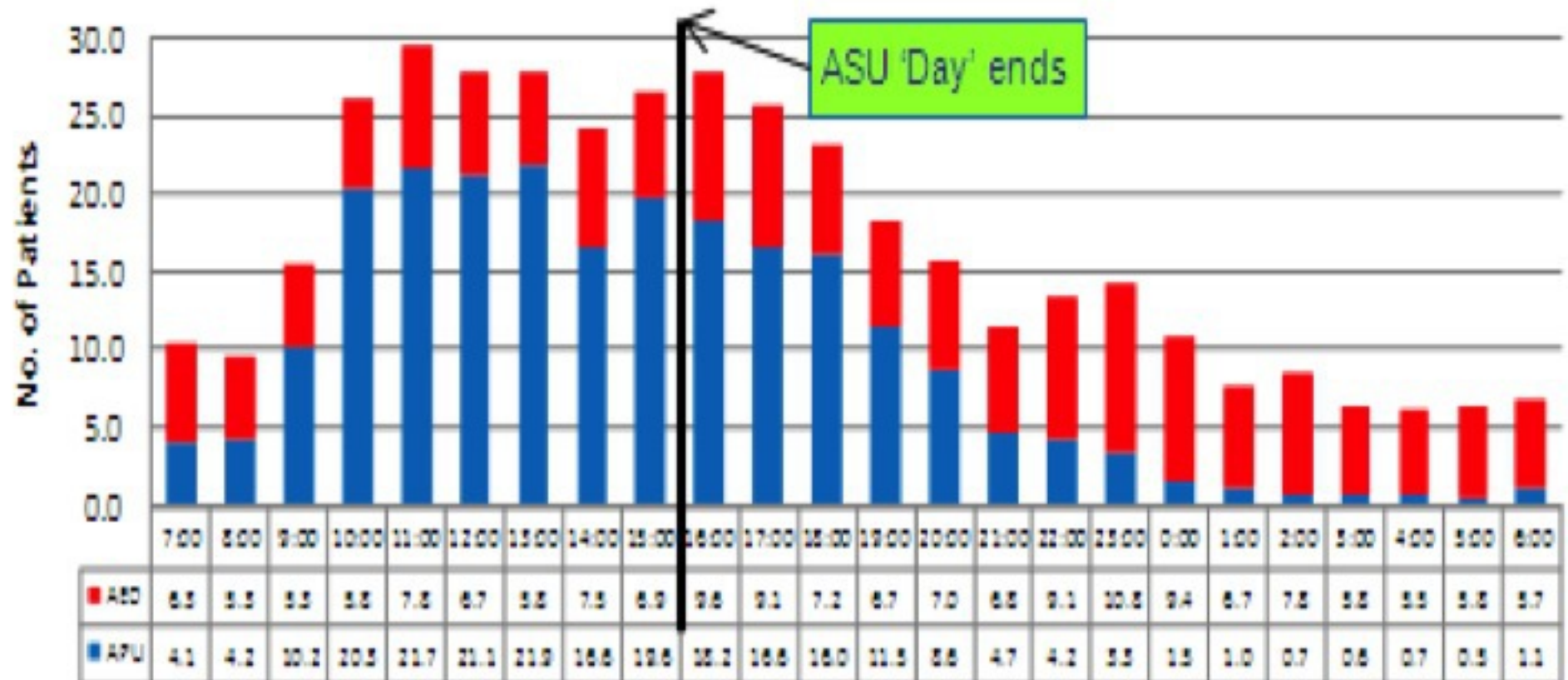
# Acute Patient Flow



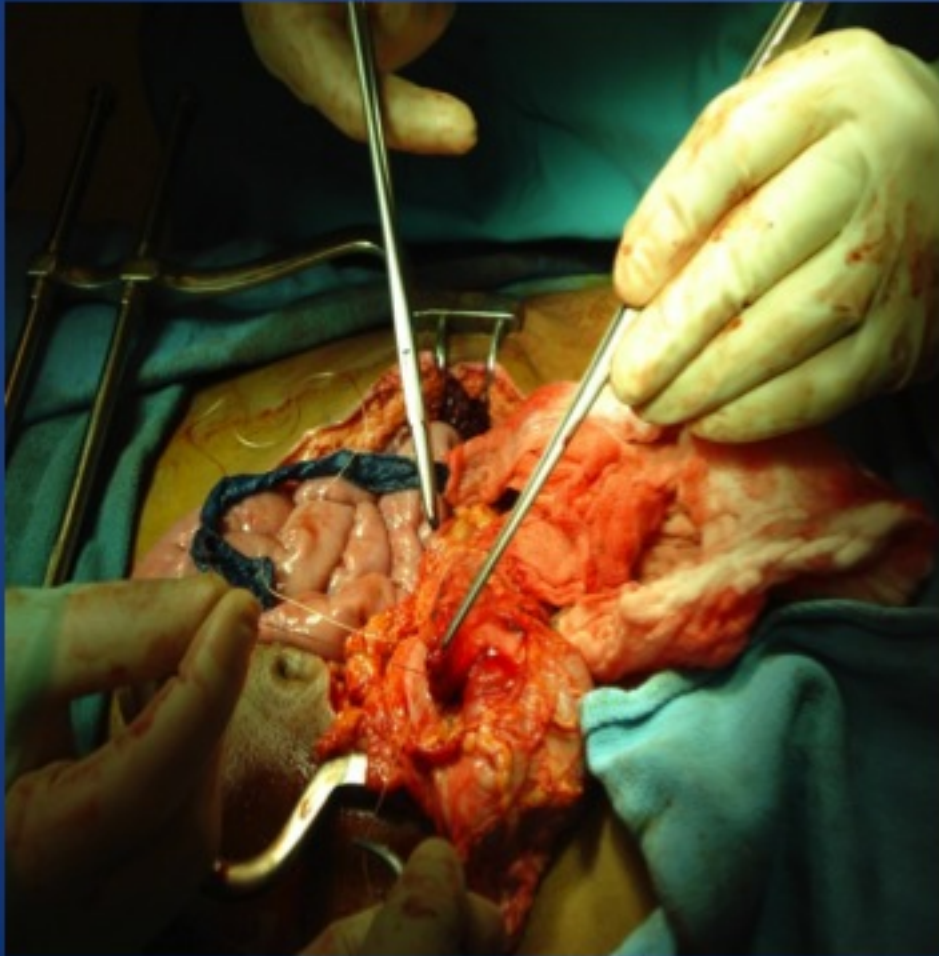


# Average Daily Distribution ED/APU

Ave. Presentations to AED/APU of Gen Surgical Patients (Jan 09 - Jul 10)



# Acute Operating Room



- Dedicated operating room for ASU
- Utilise additional OR as available
- On going prioritisation of acute patients
- Meetings with OR coordinator/Anaesthetist
- Assign cases to appropriate Registrars

# Case-mix in Acute Surgery

- Emergency/Emergent laparotomy
- Cholecystectomy
- Laparoscopy & appendicetomy
- Tracheostomy
- Thoracotomy
- Trauma Laparotomy
- Neck Explorations
- Intermediate and minor cases



# Key Performance Indicators

- Defining best practice
- Identifying service deficiencies and area of improvement
- Can be a wide range of checklists, protocols and guidelines
- Start with evaluation of process....meaningful clinical outcome

# KPI in ASPP Study

- Aim to evaluate Acute Surgical Patient Pathway and early trend of KPIs
- Patient data identified using ACH electronic medical records: individual details left confidential
- Statistical analysis using Anderson-Darling Normality and Anova tests by statisticians
- In conjunction with ASPP project

Patient arrives at:  
AED → APU



KPI

Referred to General Surgery or  
Discharged



KPI

**Gen. Surgery:**  
Inpatient investigation +/- treatment or  
discharged (AED/APU)



No Operation



Operation

KPI



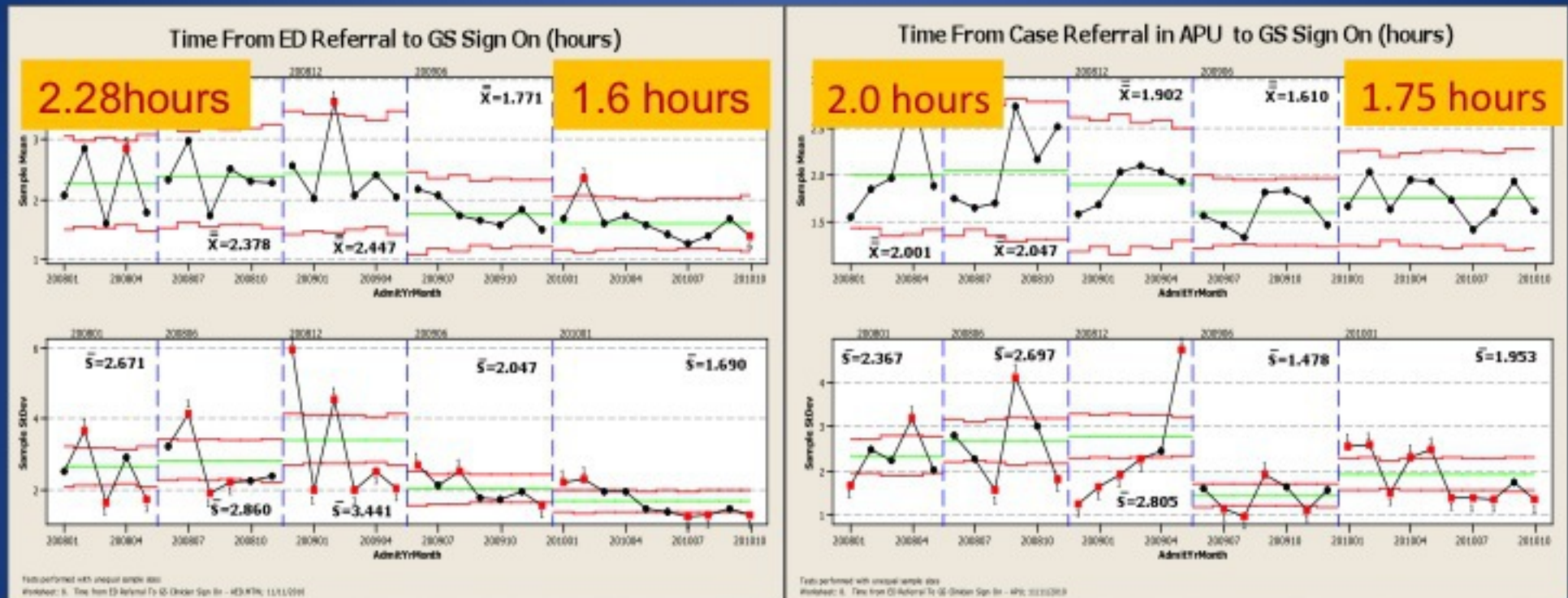
Patient is discharged from ward



# KPIs in ASPP

1. Time Elapse between ED/APU patient referral & first been seen by surgical team
  - complying with 6 hour rule (MOH)
2. LOS of non admitted patients
  - in ED/APU
3. Pre-operative LOS
  - decision to operative to OR
4. Acute cases operated on during working hours
  - in vs. out operating hours

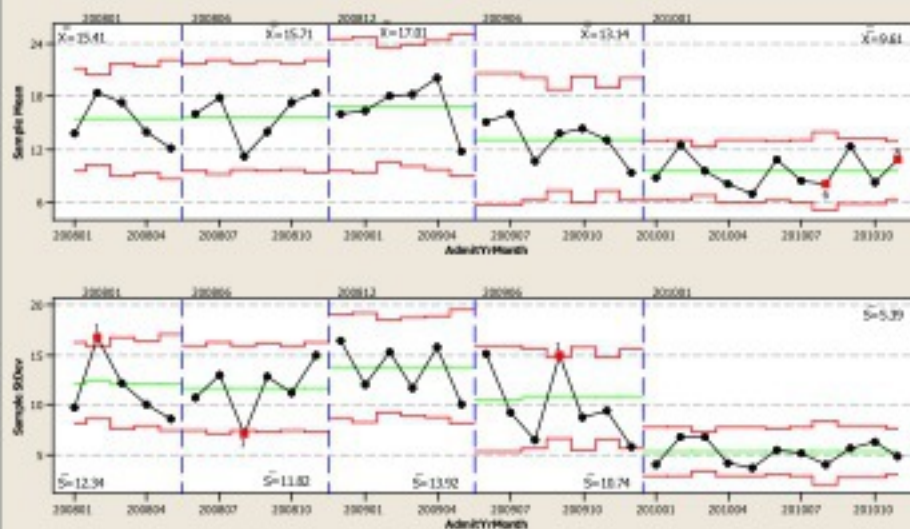
# KPI: ED/APU Assessment Time



ED Referrals: 41 minutes quicker  
APU: Trend is patients being seen quicker  
ANOVA test:  $p < 0.005$ (ED),  $p = \text{NS}$ (APU)

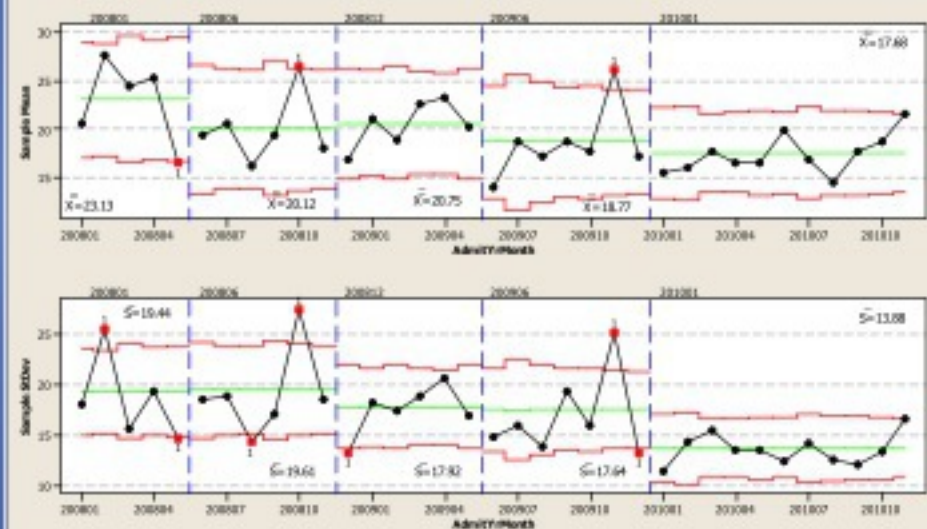
# KPI: LOS Non-admitted Patients

Average LOS for Patients discharged from AED



Tests performed with statistical sample size  
Workbook: AED - LOS - Non-Admitted Patients (Default: AED or APU) 16/11/2011

Average LOS for Patients discharged from APU

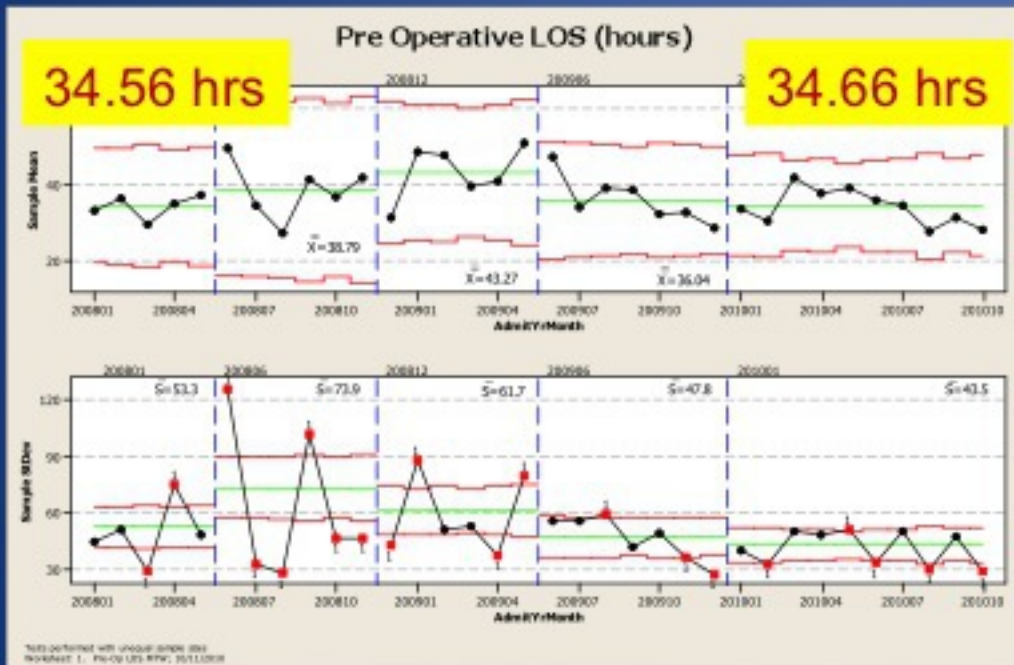


Tests performed with statistical sample size  
Workbook: APU - LOS - Non-Admitted Patients (Default: AED or APU) 16/11/2011



# KPI: Pre-operative LOS

- $P=NS$
- Possible Hypothesis:
  - Higher Volume cases
  - Pre-emptive booking
  - Shortage of OR staff
  - Shortage of beds
  - More urgent cases displacing minor ones
  - Other emergency cases

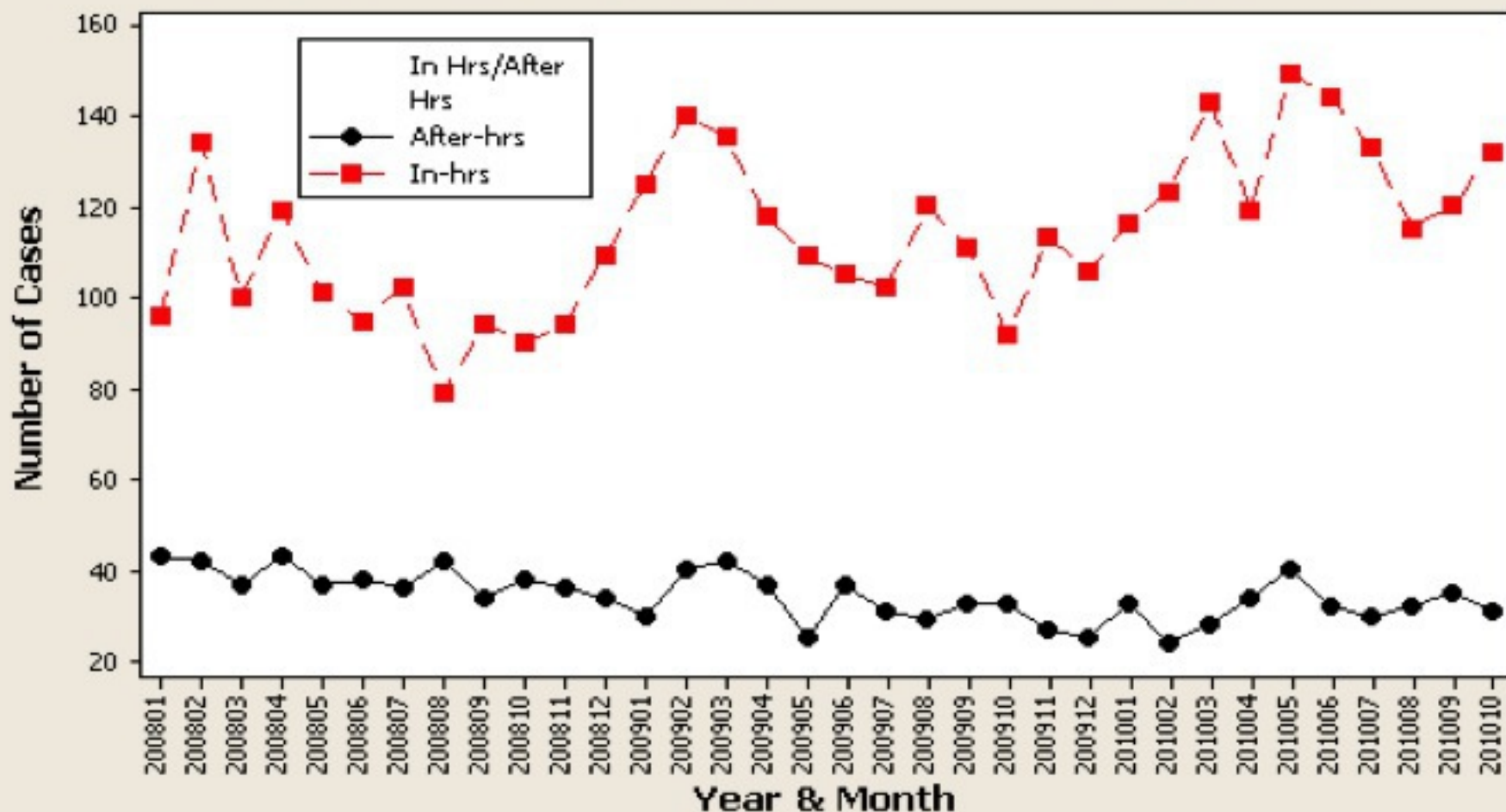


# KPI: Pre operative LOS

- Appendectomy
- 2008 median: 6.6 hours
- 2010 median: 4 hours
- Laparoscopic/open cholecystectomy
- 2008 median: 16 hours
- 2010 median: 13 hours

# KPI: 'In' vs. 'Out' operation

**Acute Operative Cases by General Surgery - In-Hours vs After-Hrs**  
(In-Hours between 7am and 7pm, After-Hours between 7pm and 7am)





# Conclusions

- KPIs showed early positive trend of facilitating acute patient flow
- Study support the utility of ASU at Auckland City Hospital

# Outcomes of consolidating non-elective surgery: The surgical hospitalist/Acute care surgery model: A systematic review

Kreindler et al

- Results:
- 18 studies
  - USA (10), UK (4), Canada (3), Australia (1)
- Outcomes :
  - Patient access
  - Surgical outcomes
  - Timing of surgery
  - Workload

# Outcome measures

## Primary:

- Access to non-elective surgery

- Wait time to non-elective surgery (i.e., time from when patients present to when they receive surgery)
- Measures of particular segments of the wait (e.g., length of stay in the Emergency Department)
- Proportion of patients seen or treated within benchmark time.

- Surgical Outcomes

- Mortality
- Complications
- Inpatient LOS

## Secondary:

- Staff and patient satisfaction (measured by “pre” and “post” surveys),
- Educational opportunities for residents, and Any unintended impacts and harms.



# Conclusions

- Promising indications that the surgical hospitalist/ acute care surgery model may improve access to non-elective surgery
- Available studies have too high risk of bias to permit firm conclusions
- Little is known about impacts of consolidation at the regional as opposed to the hospital level

# Summary

- Remains an integral part of General Surgery @ACH
- Refine the clinical service in acute surgery
  - Look after acute patients well!!!
  - Maximize current resources
  - Anticipate growth and workload in volume/case mix
- Foster training in acute surgery at all levels
- Provide leadership in the field in the national and regional levels
- Rewarding career pathway in AS
- Further data on clinical outcomes and KPIs
- Review clinical guidelines, protocols and pathway