

# Carbapenem stewardship HCTM PPUKM Experience

Lau Chee Lan

Pharmacist

17<sup>th</sup> May 2017

**Pusat Perubatan UKM**  
*UKM Medical Centre*



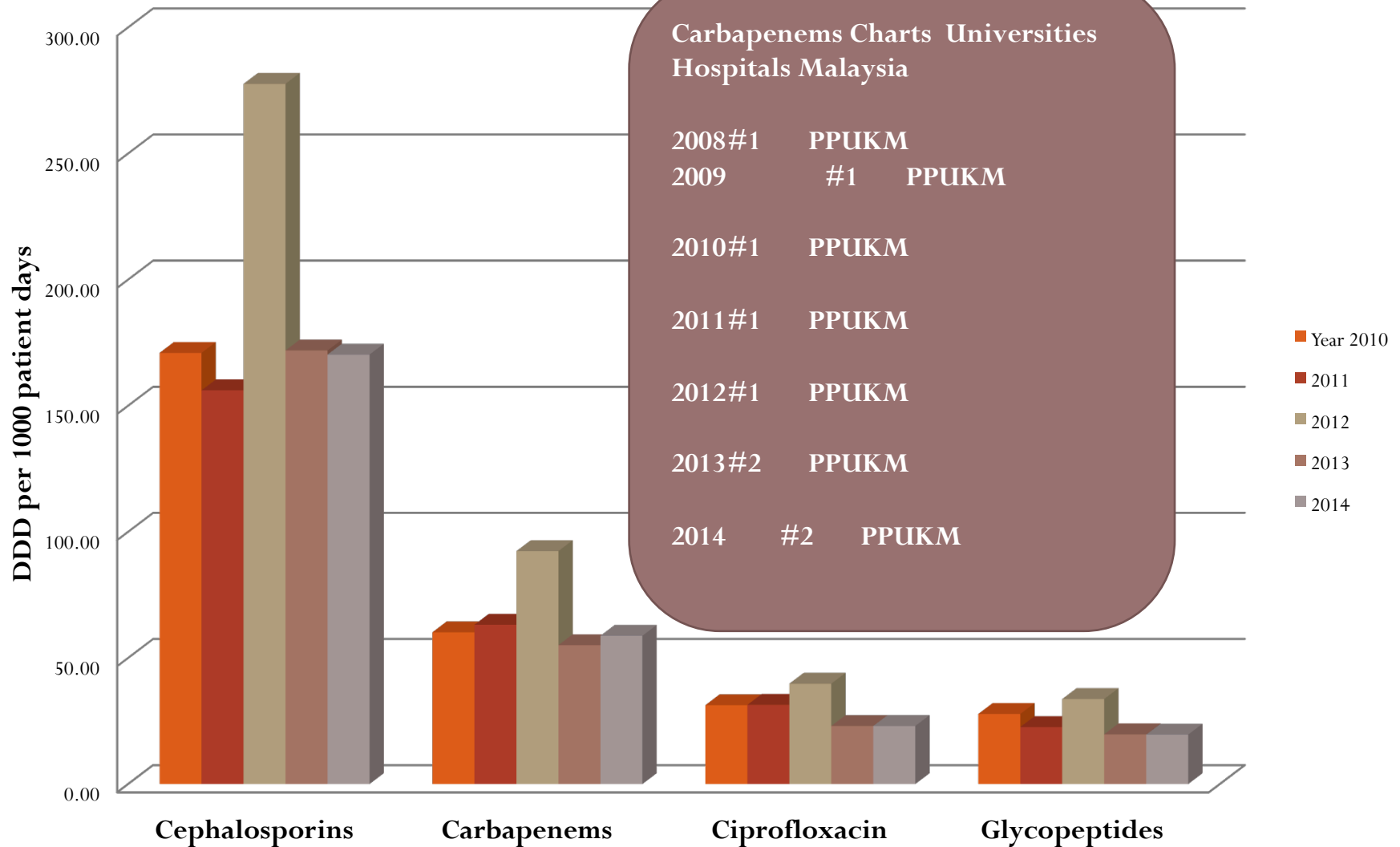
# Hospital Canselor Tuanku Muhriz PPUKM

- 900 bedded Teaching hospital
- 1 ID physician
- 23 pharmacists [10 ward pharmacists---3 AMS certified pharmacists]



# Antibiotic use Billboard-Malaysia

## Usage of Major Antimicrobial groups 2010-2014

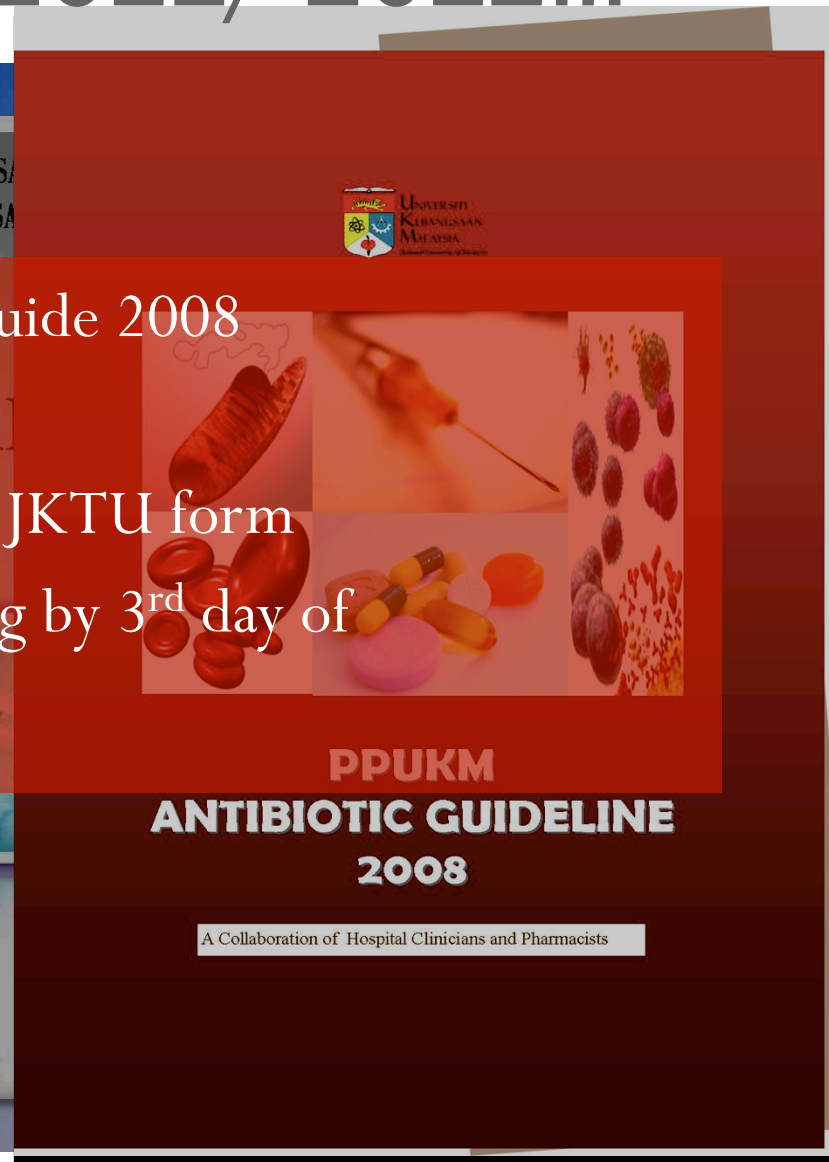
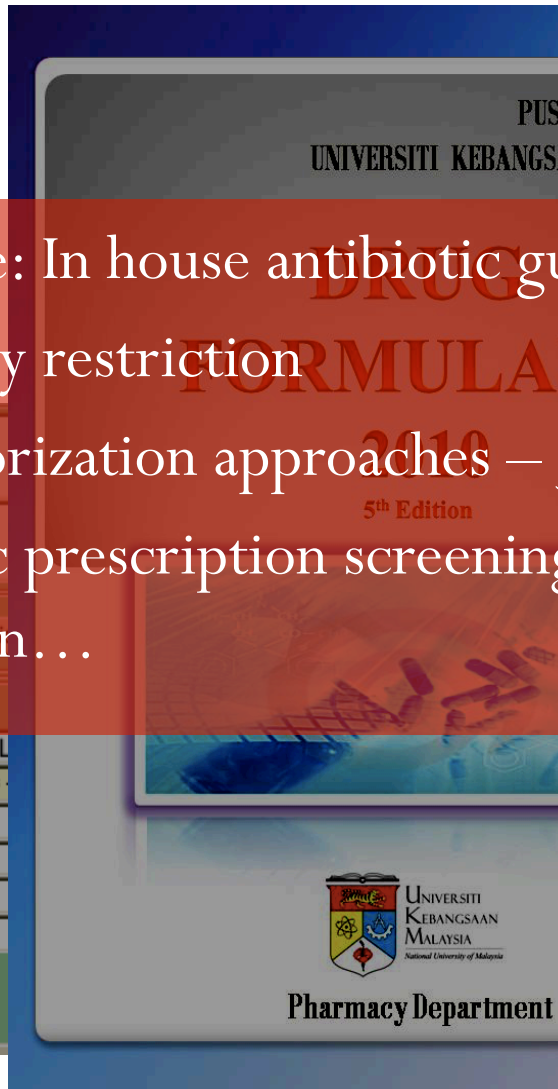


# Approaches before 2011/ 2012...

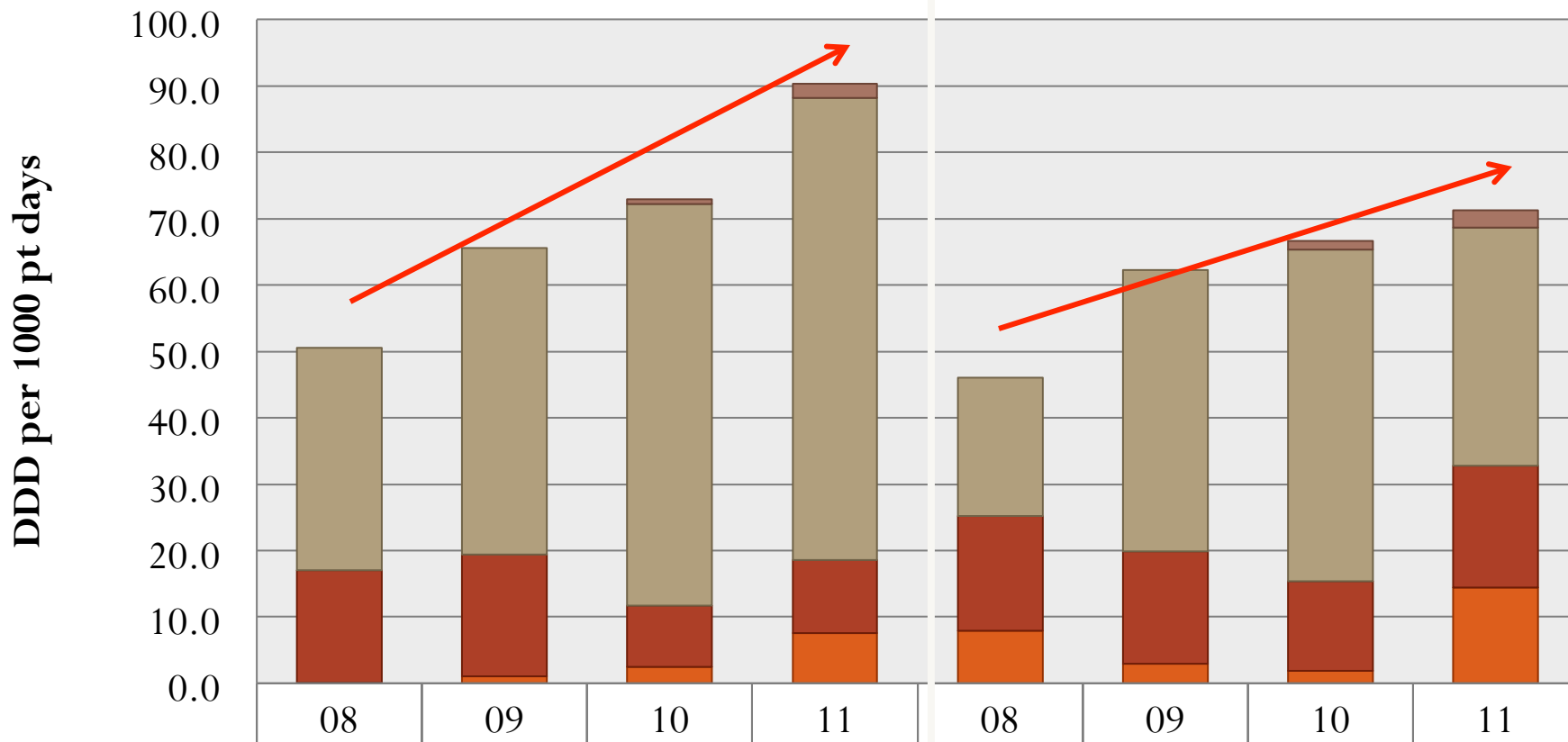
- - Guideline: In house antibiotic guide 2008
- - Formulary restriction
- - pre-authorization approaches – JKTU form
- - Antibiotic prescription screening by 3<sup>rd</sup> day of prescription...

Patient	Drug Description
	AMINO ACID, GLU&FAT EMUL
	SULPHAMETHOXAZOLE 400MG

Legend : Status ==> Drugs Tiers  
Legend : DM-Discharge Medicine



## Carbapenems use across Medical & Surgical disciplines 2008 -2011



	Medical				Surgical			
	08	09	10	11	08	09	10	11
Doripenem	0.0	0.0	0.8	2.1	0.0	0.0	1.3	2.7
Meropenem	33.6	46.2	60.5	69.6	20.9	42.4	49.9	35.8
Imipenem	16.9	18.3	9.2	11.0	17.3	17.0	13.6	18.5
Ertapenem	0.1	1.1	2.5	7.6	7.9	2.9	1.8	14.4

Year 2011 June.....

PPUKM Antibiotic Guide Revision Workshop .....



# Immediate Concurrent Feedback (ICF) Prospective Review with

Eur J Clin Microbiol Infect Dis (2009) 28:1447–1456  
DOI 10.1007/s10096-009-0803-8

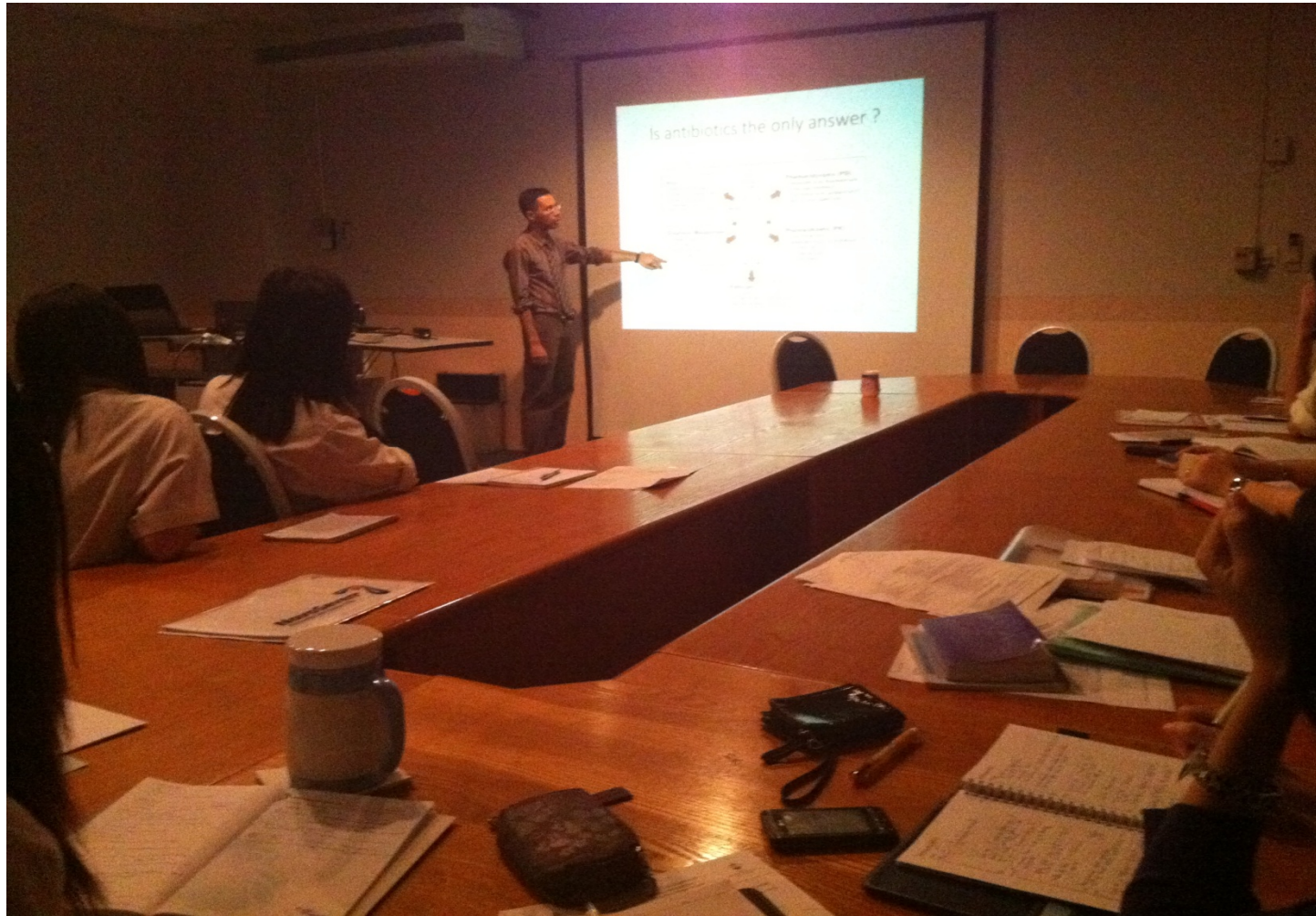
ARTICLE

## **Antimicrobial stewardship program directed at broad-spectrum intravenous antibiotics prescription in a tertiary hospital**

**V. C. C. Cheng • K. K. W. To • I. W. S. Li • B. S. F. Tang • J. F. W. Chan • S. Kwan •  
R. Mak • J. Tai • P. Ching • P. L. Ho • W. H. Seto**

Cheng VC et al. 2009. Antimicrobial stewardship program directed at broad-spectrum intravenous antibiotics prescription in a tertiary hospital. **Eur J Clin Microbiol Infect Dis.** 28(12):1447-56

# In house Education Sessions





# Immediate Audit

Antibiotic Clerking Form (Updated 20.3.12)

Patient Sticker: Name (RN)

Current Problem/Diagnosis				Past Medications			
<b>Antibiotics(Current &amp; Previous):</b>							
Start	Drug & Regime	End	Remarks	Start	Drug & Regime	End	Remarks
Purpose of antibiotic		<input type="checkbox"/> Prophylaxis		<input type="checkbox"/> Empirical		<input type="checkbox"/> Known pathogen tx	
Previous Antibiotics		<input type="checkbox"/> No <input type="checkbox"/> Yes, Switch from:					
Antibiotic Allergy Hx		<input type="checkbox"/> Unknown <input type="checkbox"/> Yes, Please specify:					
Ventilator		<input type="checkbox"/> No <input type="checkbox"/> Yes		OT		Date: <input type="checkbox"/> Type:	
Inotropes				<input type="checkbox"/> Urgent		<input type="checkbox"/> Semi-urgent <input type="checkbox"/> Elective	
Category of Infection		<input type="checkbox"/> Community acquired		<input type="checkbox"/> Hospital acquired			
Organ/System involved		<input type="checkbox"/> Lung <input type="checkbox"/> Urinary <input type="checkbox"/> CNS <input type="checkbox"/> Wound <input type="checkbox"/> CVS <input type="checkbox"/> IV Catheter related <input type="checkbox"/> PD related <input type="checkbox"/> BSI <input type="checkbox"/> Intraabdominal <input type="checkbox"/> Disseminated systemic infection <input type="checkbox"/> Unspecified sepsis <input type="checkbox"/> Multiple infection <input type="checkbox"/> Unknown <input type="checkbox"/> Others:					
Immunocompromised		<input type="checkbox"/> No <input type="checkbox"/> Yes		<input type="checkbox"/> Transplant		<input type="checkbox"/> On long term steroids/immunocompromised	
		<input type="checkbox"/> HIV		<input type="checkbox"/> Chemotherapy		<input type="checkbox"/> Others (Specify: _____)	
Laboratory Result		Relevant Microbiology Results					
Collected Date	Specimen	Organism Isolated			Sensitivity		
Antibiotic							
Date							
Na							
K							
Urea							
*SrCr							
CrCL							

# Aug 2011- Table Round

- One ID physician
- Clinical Pharmacists Team
- 6 Medical wards + CCU/  
CRW



# Carbapenem stewardship in Medical wards

- Initial phase
- Weekly round by bedside
- Prospective Audit and Feedback  
( Labour intensive)

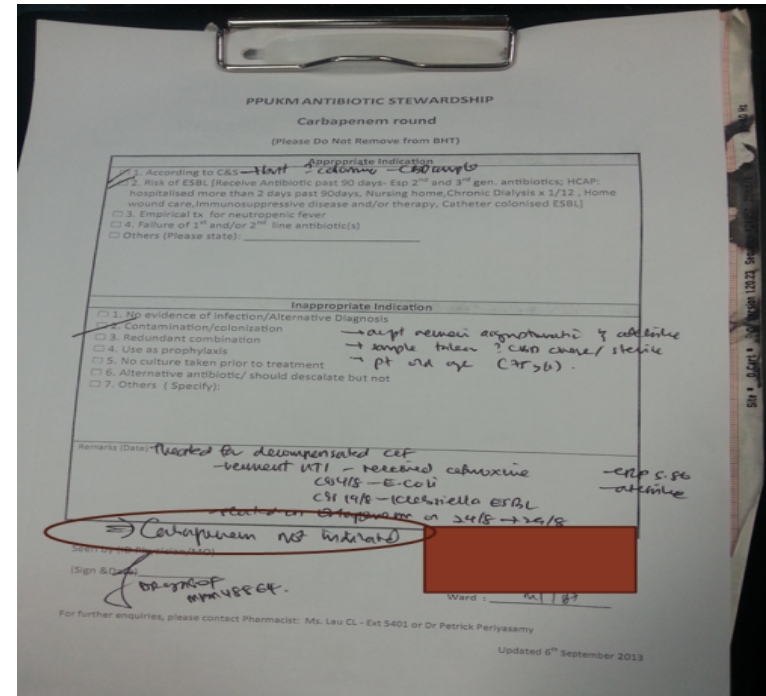
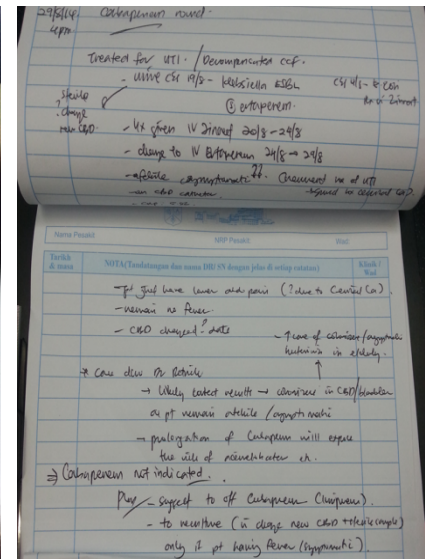
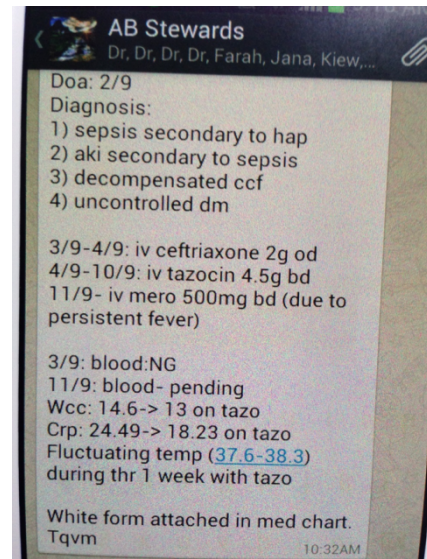


# Sept 2013-

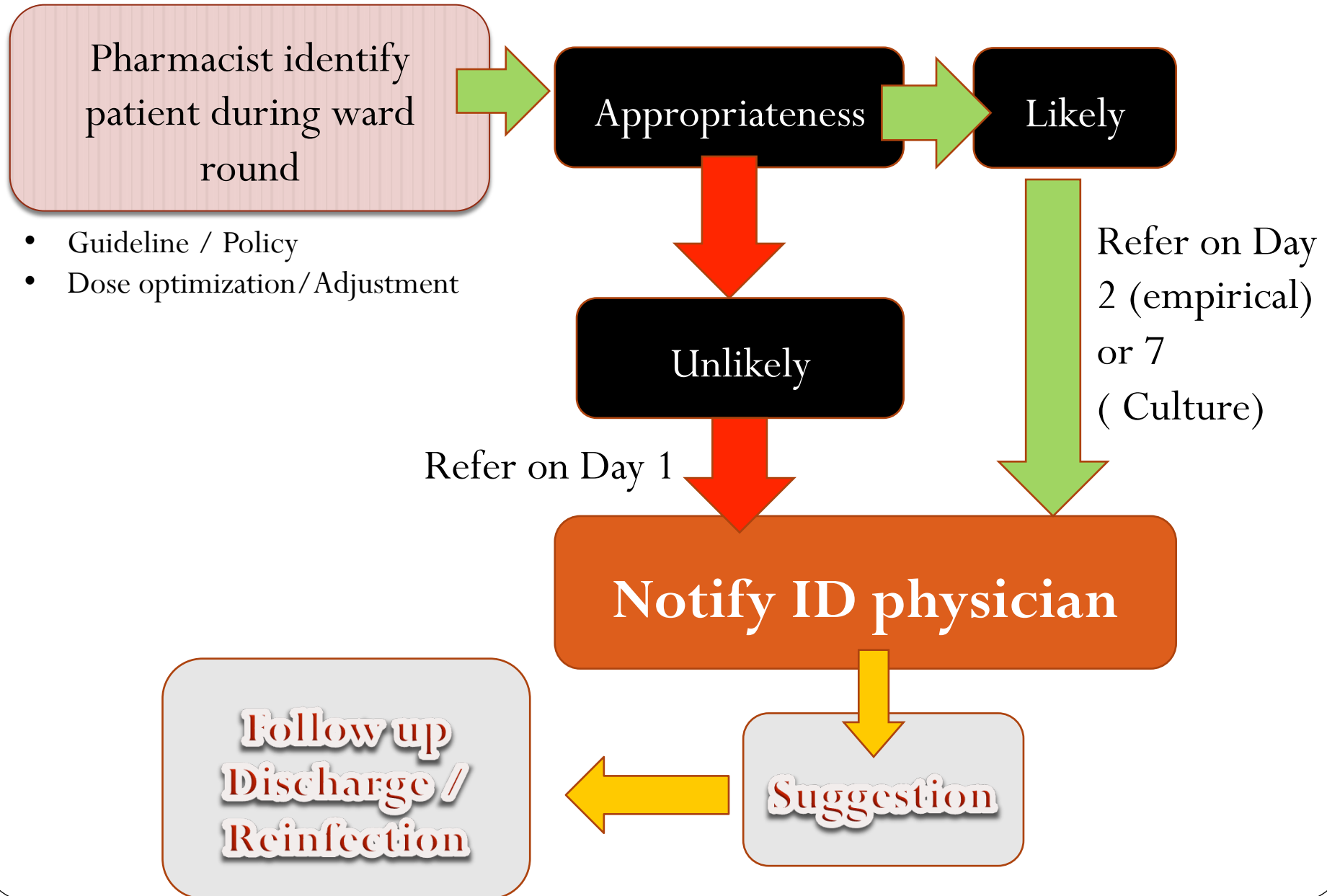
- Feedback form attached to BHT
- Improve frequency of review instead of weekly
- Revise criterias for referrals

e.g

- Blood culture positive of ESBL
  - Day 7
- Asymptomatic UTI
  - Day 1



# Prospective Audit and feedback- Carbapenem



# Measurement

# Prescription Appropriateness

	Total (%)			
<b>Number of carbapenem cases</b>	2013	2014	2015	2016
<b>Appropriateness</b>	119 (79.3%)	83 (79.8%)	92 (77.3%)	69 (64.5%)
1. According to C&S	47	34	33	23
2. Risk of ESBL	37	29	32	27
3. Empirical Treatment of neutropenic fever	5	1	0	4
4. Failure of 1 <sup>st</sup> line antibiotic	20	16	26	13
5. Microbiologist/physician recommendation	1	0	0	0
6. Others	4	3	1	2
<b>Inappropriateness</b>	31 (20.7%)	21 (20.2%)	27 (22.6%)	38 (35.5%)
1. No evidence of infection/ alternative diagnosis	12	10	8	10
2. Contamination/colonization	4	3	2	0
3. Redundant combination	0	0	0	0
4. Use as prophylaxis	0	0	2	0
5. No culture taken prior to treatment	0	1	0	1
6. Alternative antibiotic/ should deescalate but not	8	5	13	21
7. Inappropriate (/under) Dose				0
8. Others	8	2	2	6
<b>TOTAL CASE Reviewed</b>		104	117	111

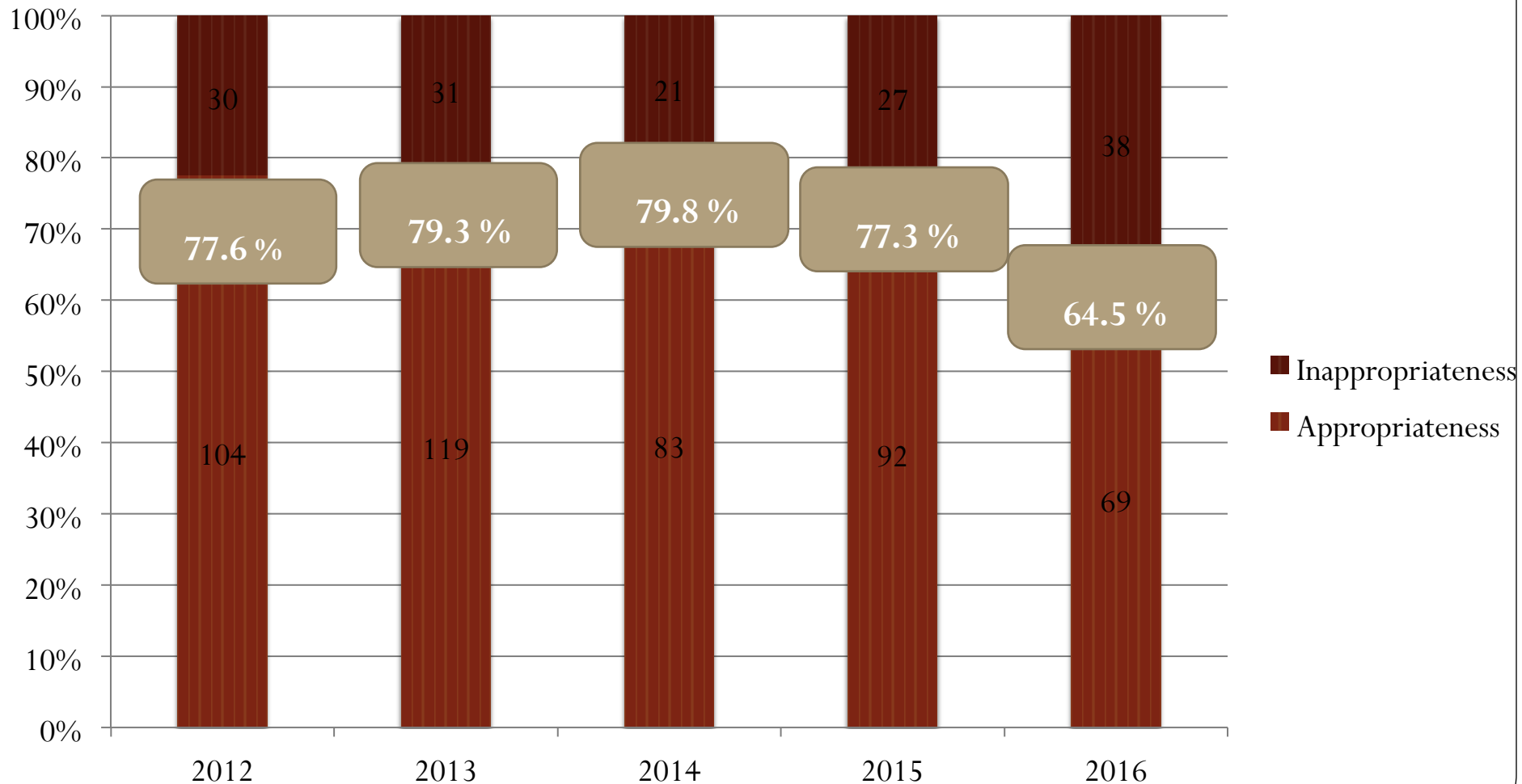
# Risk of ESBL

- Risk of ESBL [Receive Antibiotic past 90 days- Esp 2nd and 3rd gen. antibiotics; HCAP: hospitalised more than 2 days past 90days, Nursing home, Chronic Dialysis x 1 / 12 ,Home wound care, Immunosuppressive disease and/or therapy, Catheter colonised ESBL]

Refence. Malaysia Consensus guidelines for the management of infections by ESBL-producing bacteria. 2001



# Appropriateness of carbapenem prescription



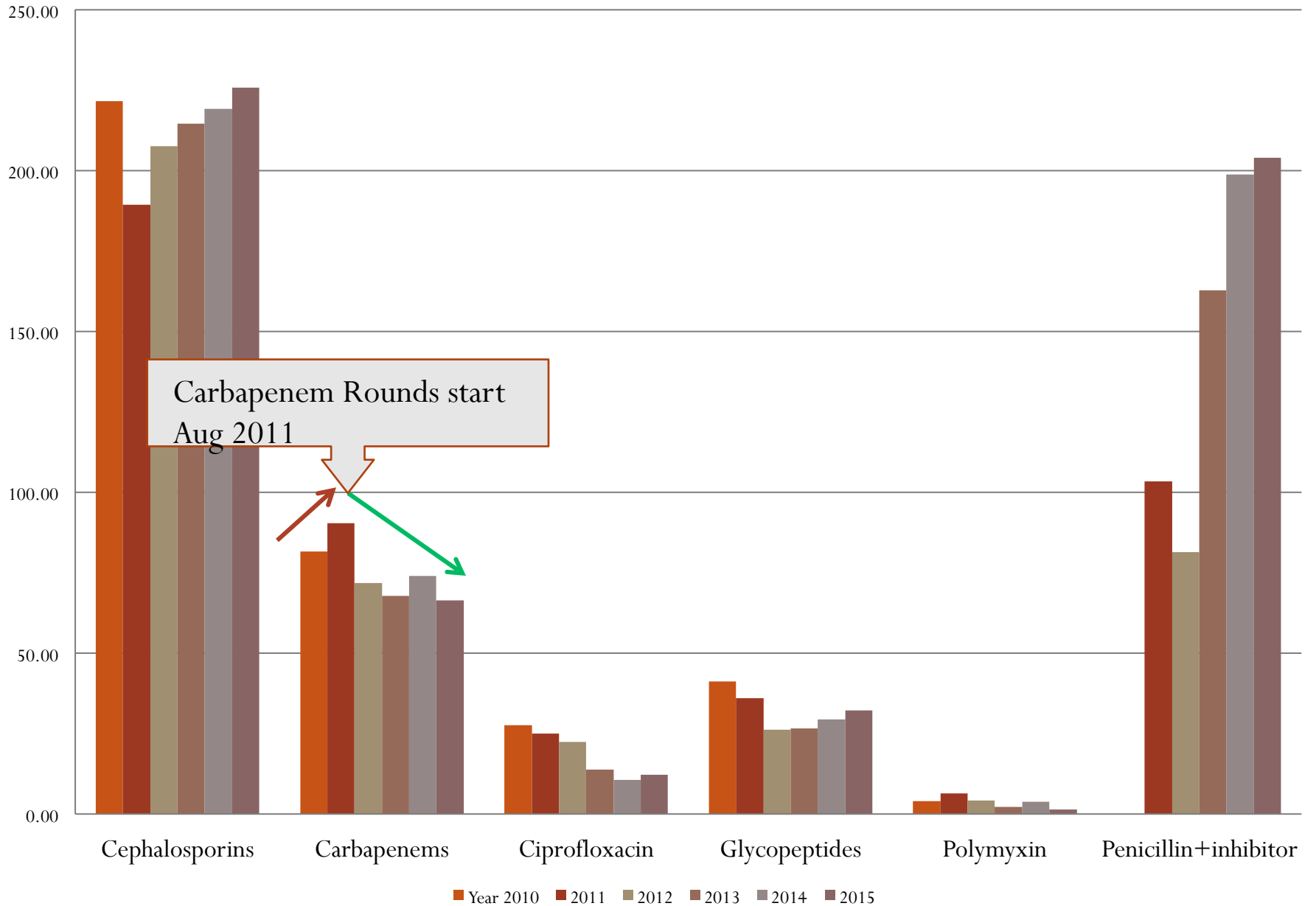
# Acceptance of Suggestion :

Suggestion	2013		2014		2015		2016	
	A	R	A	R	A	R	A	R
1. Change of antibiotics	7	0	2	2	19	5	3	9
2. Change dosage/ duration	9	2	5	2	7	1	4	2
3. Discontinue Antibiotic	16	2	10	2	13	3	4	8
4. Others (please specify)	1	3	0	0	2	0	7	8
<b>Total</b>	33 (82.5%)	7 (17.5%)	17 (73.9%)	6 (26%)	41 (82%)	9 (18%)	18 (40%)	27 (60%)

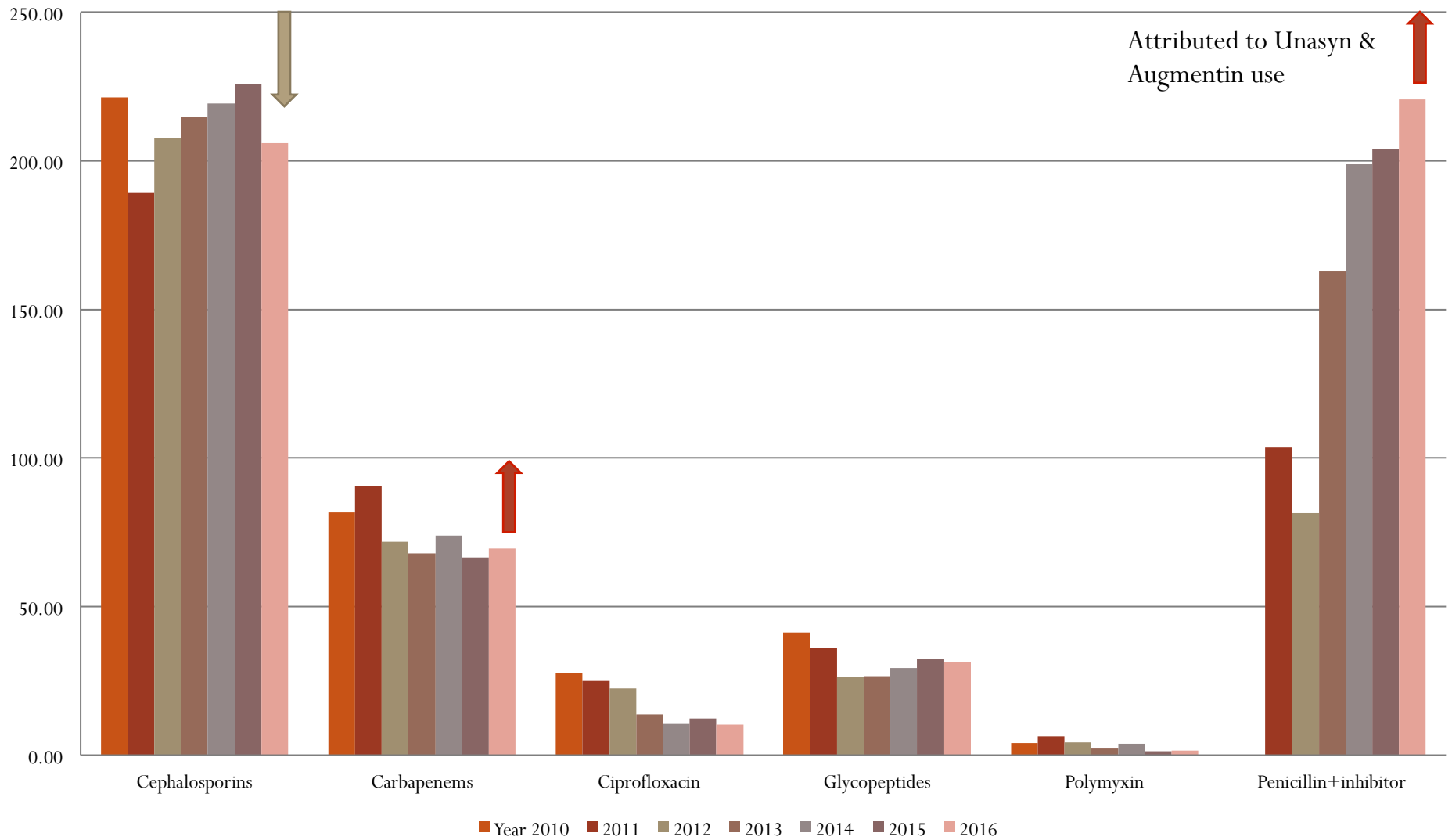
## Reason for rejection (Year 2016)

Patient still sick, do not want to deescalate	9
Pt improving, do not want to deescalate	6
Await surgery, to keep abx	0
Physician's preference	4
Others (please specify) :	7
<b>Total</b>	26

# PPUKM Medical Antimicrobials Usage 2010-2015



# PPUKM Medical Antimicrobials Usage 2010-2016



# •Balance Check ( year 2013-2016 data)

## •3a Mortality

Suggestion	Deceased	
	Yes	No
Accepted	6	93
Rejected	6	38

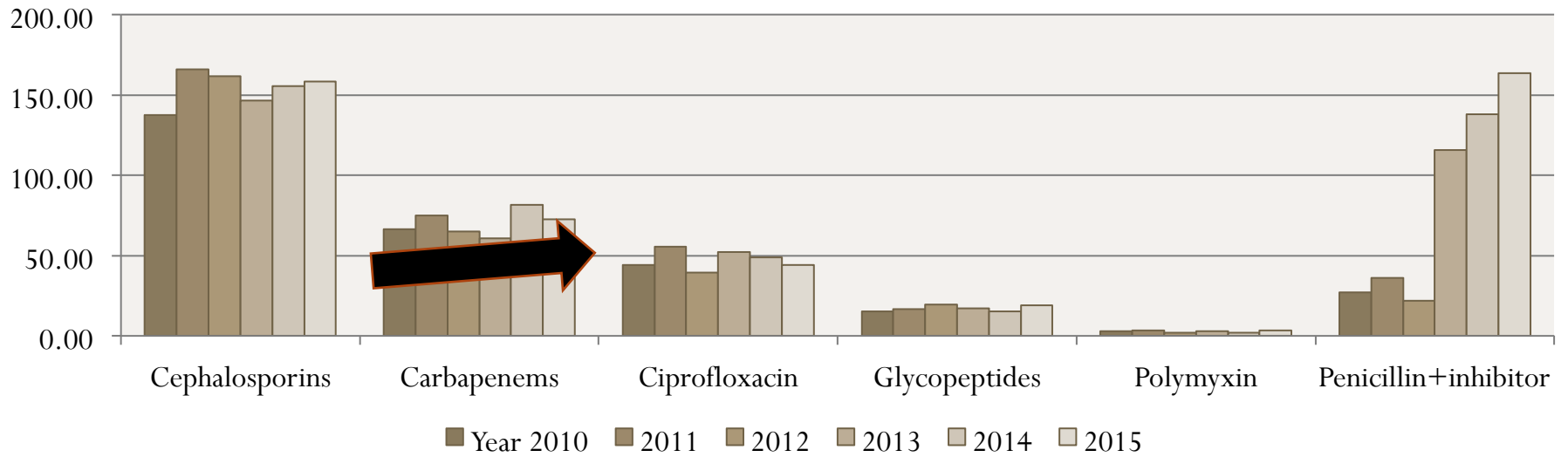
P = 0.19 (Fisher's)

## 3.b 14 Days re-infection

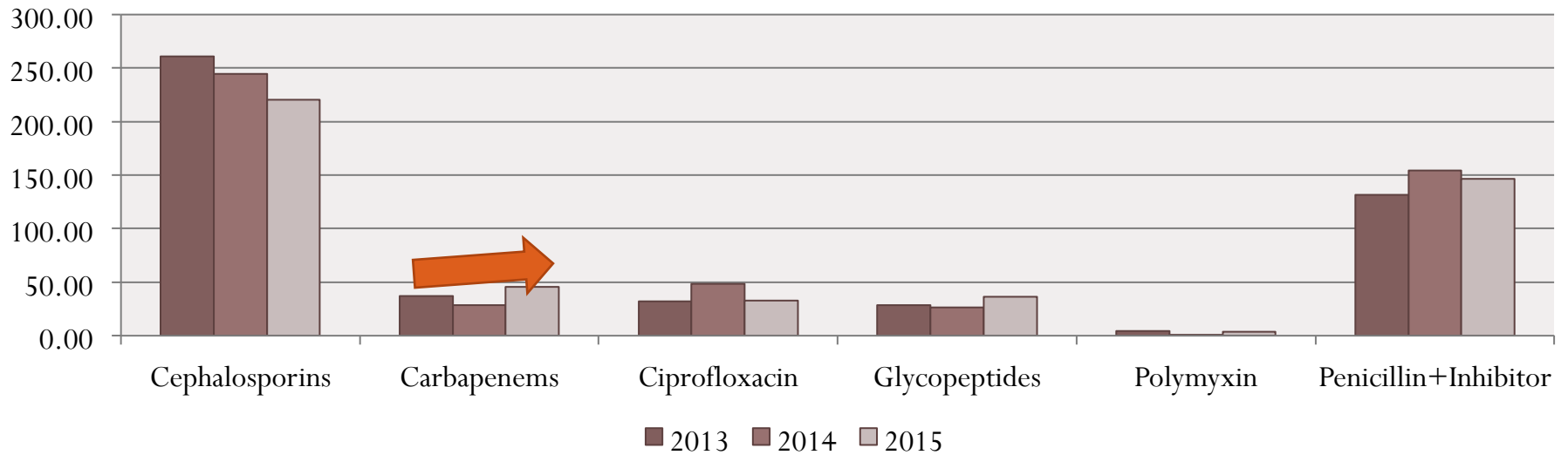
Suggestion	14 days re-infection	
	Yes	No
Accepted	8	59
Rejected	7	18

P = 0.11 (Fisher's)

### PPUKM Surgical Antimicrobials Usage 2010-2015



### PPUKM Orthopedic Usage 2013-2015



# Challenges

- Human Resources
  - - One ID physician
  - - Pharmacists with multiple port folios
- Focus only on Carbapenems ( may lead to balloon effect)
- Loose definition on prescription appropriateness
- Judgement of appropriateness
  - 1<sup>st</sup> review, second review, or overall
- Labour Intensive

# Challenges

- Balance Measure
  - Measurement: Discharge or certain period of timing
  - – Infection related mortality, readmission
- Lost follow up
- Hospital wide implementation
- Correlation Usage vs antibiotic resistance
- Clinical Impact Assessment



# HCTM PPUKM AMS Committee

## Hospital Administrative management

**Prof. Dr. Ismail Mohd Saiboon [ Timbalan Dekan/Timbalan Pengarah ]**

## Team member

- Head of AMS / ID physician

**Dr. Petrick Periyasamy**

- Clinical Pharmacist

**Lau Chee Lan**

- Clinical Microbiologist

**Prof. Madya Dr. Ramliza Ramli**

- Infection control

**Prof. (K) To' Puan Dr Nordiah Awang Jalil**

- IT officer

**En. Sulaiman Jalil**

- Pharmacologist

**Prof. Madya Dr. Isa Naina Mohamed**

- Clinicians

**Prof. Madya Dr. Abdul Halim Abd Rashid**

**Prof. Madya Dr. Raha Abdul Rahman**

**Prof. Madya Dr. Razman Jarmin**

**Prof. Madya Dr. Raja Affendi Raja Ali**

**Dr Tan Toh Leong**

# TOP 5 Pathogens (MEDICAL) 2015

## Blood Stream Infection (BSI) (N=229 [Top 5 is 60%])

- Staphylococcus aureus [n= 54; MRSA 22 (41%)]
- Escherichia coli [n= 28; ESBL 5 (18%), CRE 1 (4%)]
- Klebsiella spp [n= 23; ESBL 8 (35%), CRE 1 (4%)]
- Burkholderia cepacia [n=21 (9%)]
- Pseudomonas aeruginosa [n=12 (5%)]

## Respiratory Infection (N=187 [Top 5 is 86%])

- Klebsiella spp [n=56; ESBL 27 (48%)]
- Staphylococcus aureus [n=44; MRSA 14 (32%)]
- Pseudomonas aeruginosa [n=43 (23%)]
- Enterobacter spp [n=9; ESBL 2 (22%)]
- Stenotrophomonas maltophilia [n=8 (4%)]

## Urine Infection (N=237 [Top 5 is 86%])

- Escherichia coli [n= 82; ESBL 30 (37%); CRE 3 (4%)]
- Klebsiella spp [n=58; ESBL 31 (53%); CRE 1 (1%)]
- Enterococcus spp [n=26; VRE 6 (23%)]
- Pseudomonas aeruginosa [n=25(11%)]
- Acinetobacter spp [n=12 (5%)]

## Skin and Soft Tissue Infections (SSTI) (N=200)

- Pseudomonas aeruginosa [n=58 (24%)]
- Staphylococcus aureus [n=55; MRSA 18 (33%)]
- Escherichia coli [n=27; ESBL 10 (37%); CRE 1 (4%)]
- Klebsiella spp [n=24; ESBL 12 (50%); CRE 1(4%)]
- Proteus spp [n=19; ESBL 2 (11%); CRE 1 (5%)]

Collaborative effort by HCTM PPUKM Antimicrobial Stewardsh



UNIVERSITI KEBANGSAAN MALAYSIA

Hospital Canselor Tuanku Muhriz UKMMC

April 2016



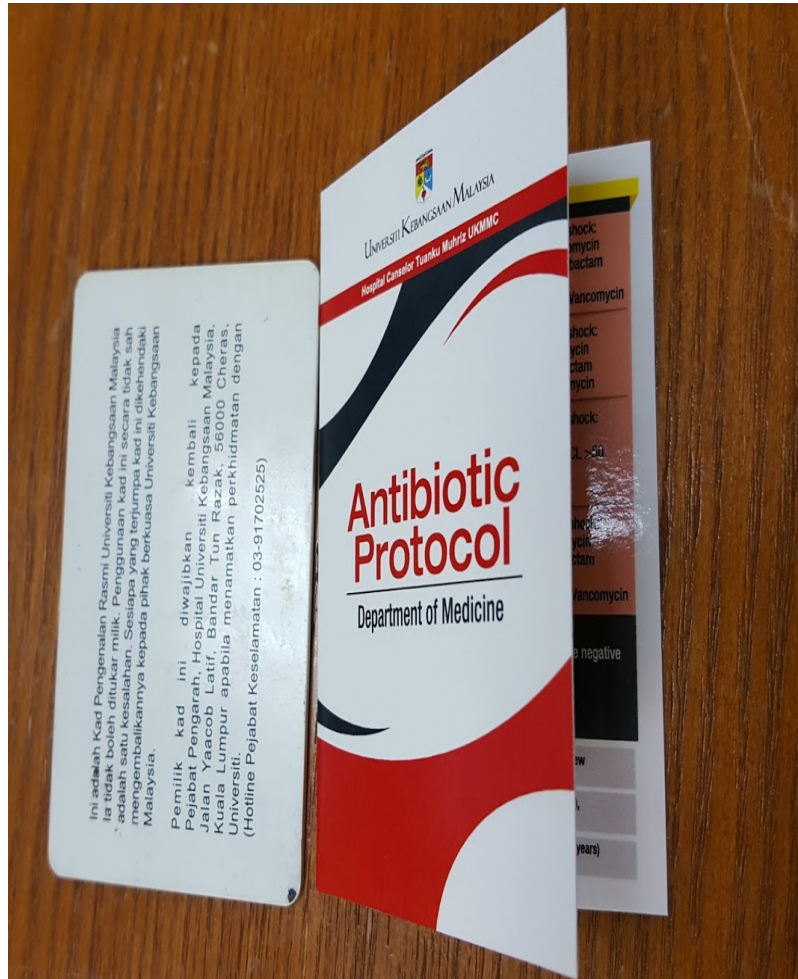
## Antibiotic Protocol

		(Send cultures before starting antibiotics)	
		TYPE 2 (HAI)	TYPE 3 (NI)
<b>Empirical Therapy</b>			
<b>TYPE 1 (CAI)</b>			
<b>Blood</b>	IV Amoxicillin / clavulanate If IVDU: IV Cloxacillin	IV Piperacillin / tazobactam ± Amikacin	If patient in severe sepsis / septic shock: IV Imipenem / Meropenem + Vancomycin Otherwise use IV Piperacillin / tazobactam ± Vancomycin if high suspected of MRSA use Vancomycin
<b>Lung</b>	IV Amoxicillin / clavulanate + IV Azithromycin if severe CAP : Ceftriaxone + Azithromycin	Piperacillin / tazobactam OR Cefepime ± Amikacin	If patient in severe sepsis / septic shock: Imipenem / Meropenem + Vancomycin Otherwise use Piperacillin / tazobactam OR Cefepime ± Amikacin ± Vancomycin
<b>Urine</b>	IV Amoxicillin / clavulanate OR Nitrofurantoin* if CI >50 *NOT for Pyelonephritis	Nitrofurantoin if CI >50 OR Ertapenem if CI <50	If patient in severe sepsis / septic shock: Imipenem / Meropenem Otherwise use Nitrofurantoin if CI >50
<b>Soft and Skin tissue</b>	Amoxicillin / clavulanate	Amoxicillin / clavulanate + Gentamicin	If patient in severe sepsis / septic shock: Imipenem / Meropenem + Vancomycin Otherwise use Piperacillin / tazobactam ± Amikacin if strongly suspected of MRSA use Vancomycin
<b>Continuing Treatment</b>	If the pathogen is sensitive or culture is negative & patient responds clinically; Consider ORAL switch if 1. T < 38 °C for >24 hours Clinical improvement AND 2. Orally tolerated, AND 3. No sign of sepsis AND 4. No high risk/ Deep seated infection.		deescalate to narrowest spectrum antimicrobials If culture negative and clinically stable, consider 5-7 days duration (*Strongly recommended for ID consult)

TYPE 1

No contact with health care system in the last 90 days AND No prior antibiotic treatment in the last 90 days AND

# Antibiotic Protocol 2015



- Distribution to new HOs, new MOs



CMEs at departments



Present at faculty meeting

# HUMAN TIME MONEY Barrier KNOWLEDGE

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- Sampling accuracy
- Documentation :
  - Prescription: Indication, duration
  - Sampling request
- Technology & Equipment
  - CPOE record may not be accurate as antibiotic administration
- Confidence toward generic antibiotic bioavailability
- Office bearer

# PASSION

# BELIEF

## Success Factors

# DEDICATION

- Support from hospital management
  - Part of Hospital Patient safety committee
- Multiprofessionals team
- Dedicated Infection control
- Maintain communication
- Research opportunities
- Publication

# Next step

- Treatment Protocol for all disciplines
  - Compliance audit
  - Education
- Rapid ID / AST reporting
- Surgical Prophylaxis Practice
  - Key Performance Indicator
- Balance & Outcome measure

# administrative meeting





**KEEP  
CALM  
AND DO**

**ANTIMICROBIAL  
STEWARDSHIP**



**Thank you**