Clinical Safety & Effectiveness
Cohort 18 Team #8

South Texas Veterans Health Care System
Medical Intensive Care Unit
Vancomycin De-escalation Project

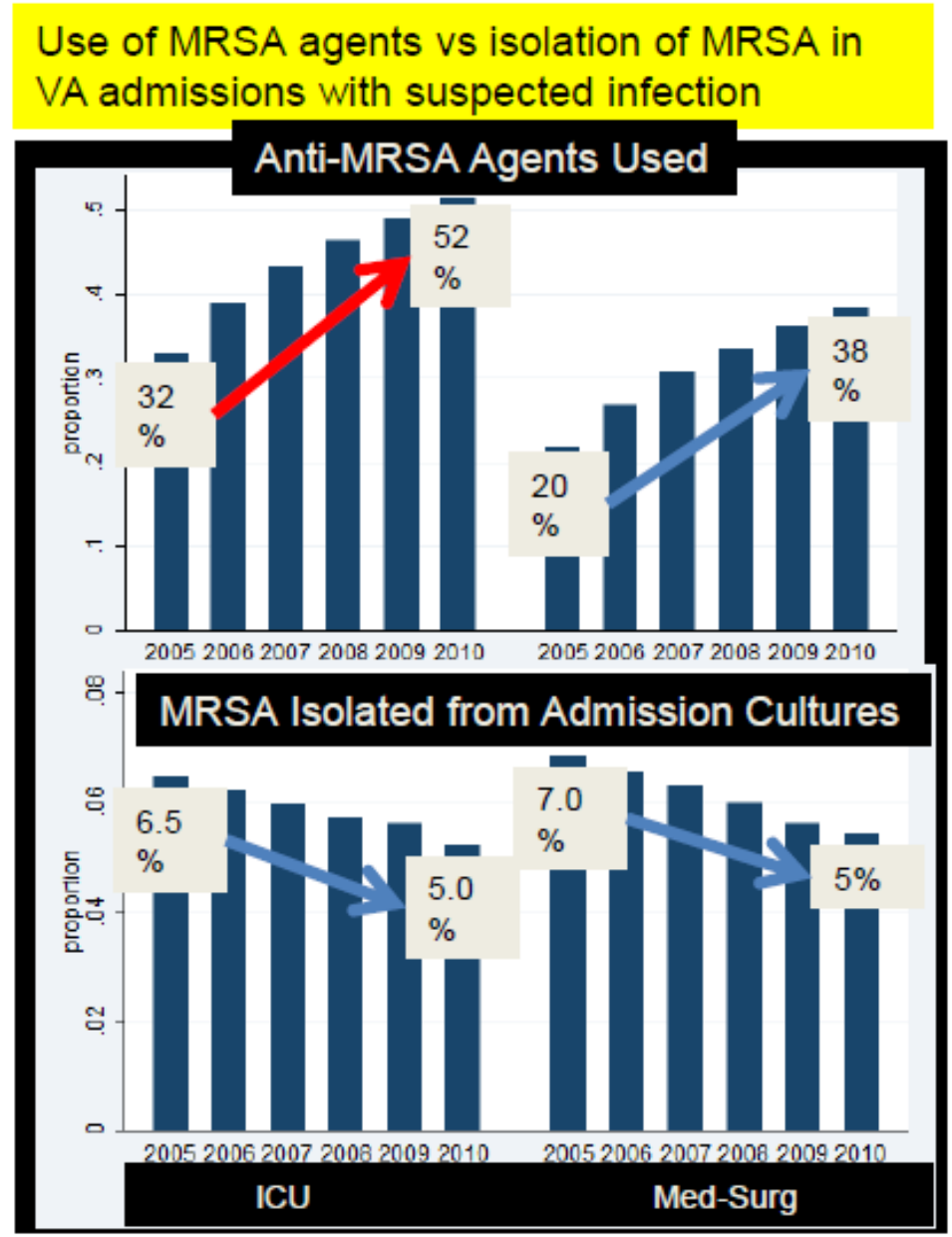
CENTER FOR PATIENT SAFETY & HEALTH POLICY
UT HEALTH SCIENCE CENTER™
SAN ANTONIO

The Team

- Team champion: Marcos I. Restrepo, MD
- Team Leader: Kelly Echevarria, Pharm.D.
- Process experts:
  - Patricio De Hoyos, MD
  - Celeste Bryson, RN
  - Andrew Thompson, Pharm.D.
  - Celida Martinez, RN
- Team facilitator: Edna Cruz, RN, M.Sc., CPHQ, CPPS

Background

- Vancomycin use increasing while MRSA (methicillin-resistant S. *Aureus*) decreasing
- De-escalation is an important tenet of antimicrobial stewardship (ASP) recognized by national societies
  - Resistance
  - Side effects
  - *Clostridium difficile*



Harris. Antimicrob Agents Chemother 2010;54:3143, Jinno. Am J Infection Control 2012;1, Robicsek. J Clin Micro 2008;46:588, Jones. Clin Infect Dis 2015;61:1403, http://cid.oxfordjournals.org/content/early/2014/06/14/cid.ciu296.full.pdf+html
Jones et al. Abstract 753, IDSA 2012

Background

- De-escalation recommended by VA Stewardship Task Force
  - Sample policy
  - Educational webinar VA-wide
- All VA patients screened for MRSA at admission
  - >90% negative predictive value for MRSA infections
- Continued MRSA therapy may increase adverse effects and logistical issues
- Despite this, de-escalation of anti-MRSA therapy often does not occur

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AIM Statement

To increase the occurrence of de-escalation of anti-MRSA antibiotics in STVHCS MICU

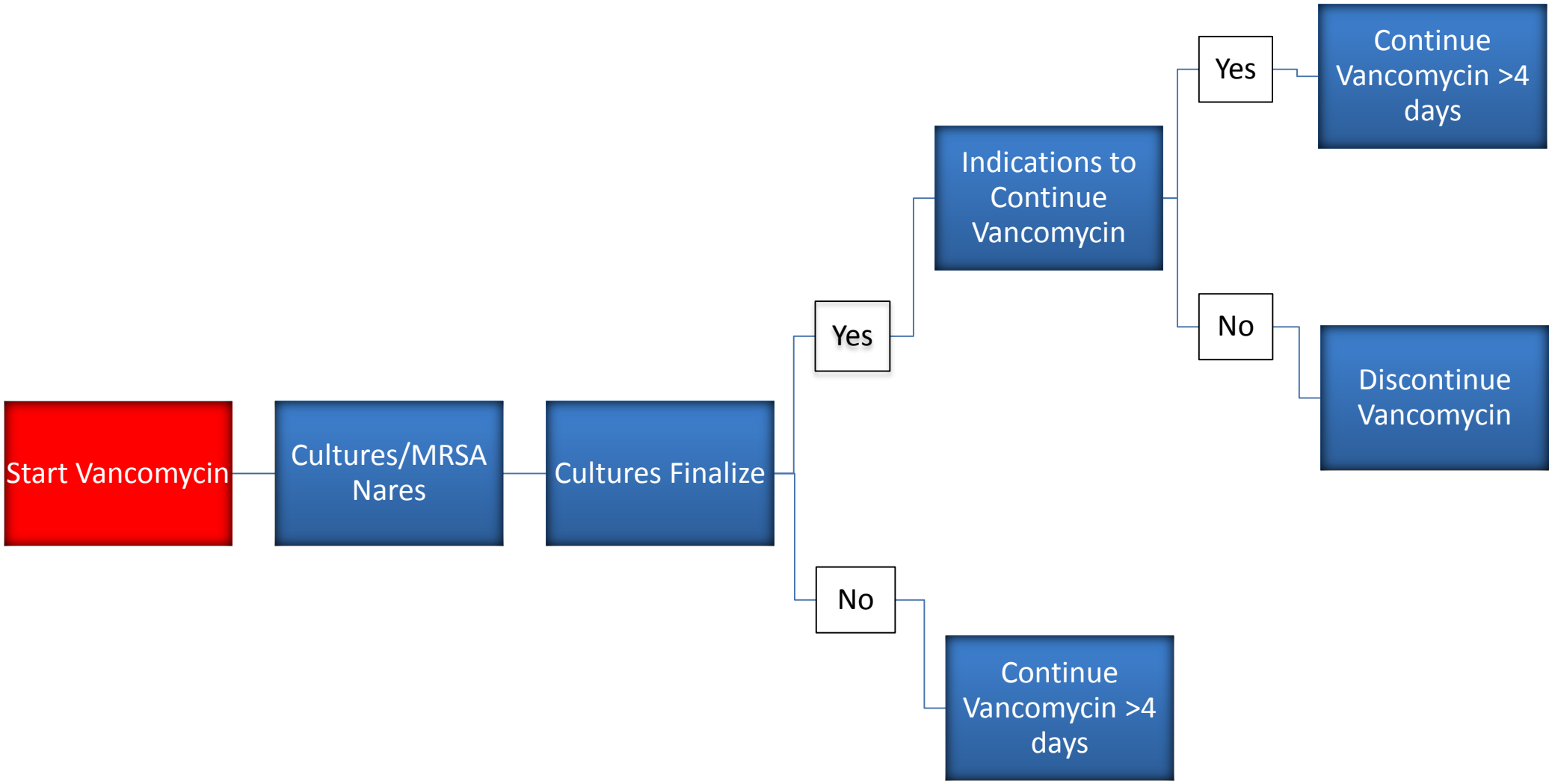
- To at least 80% *
- By Day 4
- In eligible patients
- By April 30th, 2016

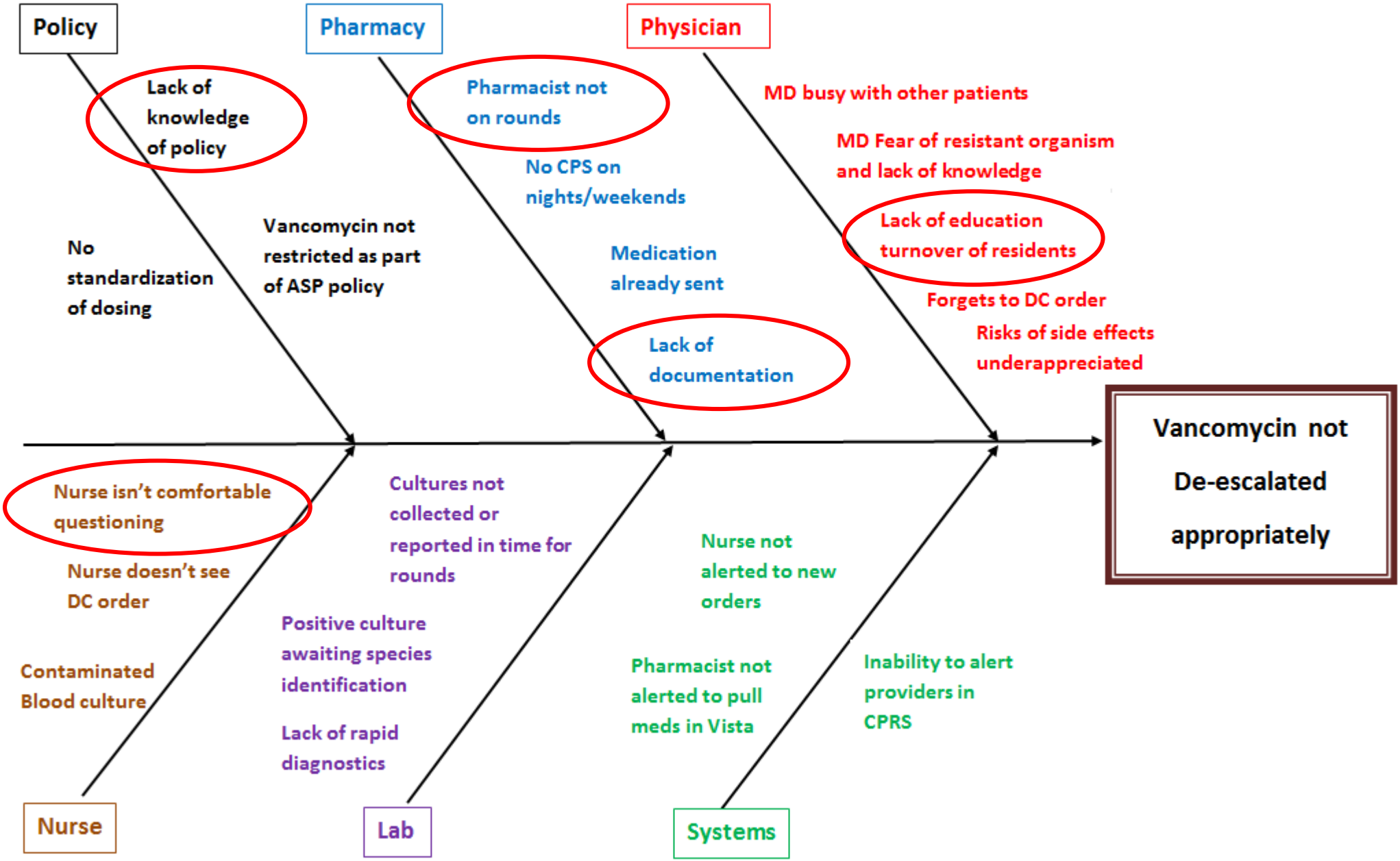
**revised from original aim statement after baseline data reviewed*

Project Milestones

• Team Created	January 2016
• AIM statement created	February 2016
• Team Meetings	Jan-April 2016
• Background Data, Brainstorm Sessions	February 2016
• Workflow and Fishbone Analyses	February 2016
• Interventions Implemented	March 2016
• Data Analysis	May 2016
• CS&E Presentation / Graduation	June 2016

Vancomycin De-escalation Process Flow




Policy
Pharmacy
Physician
Lack of knowledge of policy
Pharmacist not on rounds
MD busy with other patients
MD Fear of resistant organism and lack of knowledge
No CPS on nights/weekends
Lack of education turnover of residents
No standardization of dosing
Vancomycin not restricted as part of ASP policy
Medication already sent
Forgets to DC order
Risks of side effects underappreciated
Lack of documentation
Vancomycin not De-escalated appropriately
Nurse isn't comfortable questioning
Cultures not collected or reported in time for rounds
Nurse not alerted to new orders
Nurse doesn't see DC order
Positive culture awaiting species identification
Contaminated Blood culture
Pharmacist not alerted to pull meds in Vista
Inability to alert providers in CPRS
Lack of rapid diagnostics
Nurse
Lab
Systems

Interventions

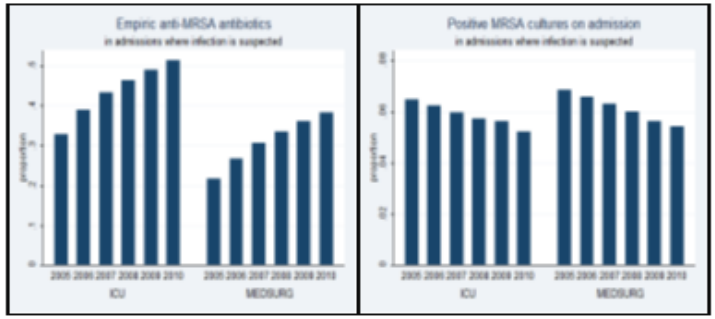
- In service / lectures to MICU nurses and UTHSCSA Medicine residents and MICU teams
  - Handout
  - Video
- Multidisciplinary rapid rounds MICU Monday to Friday
- Pharmacist on MICU rounds
  - De-escalation notes in medical record
- Empowering nurses to ask if plan to de-escalate

Education: Handout

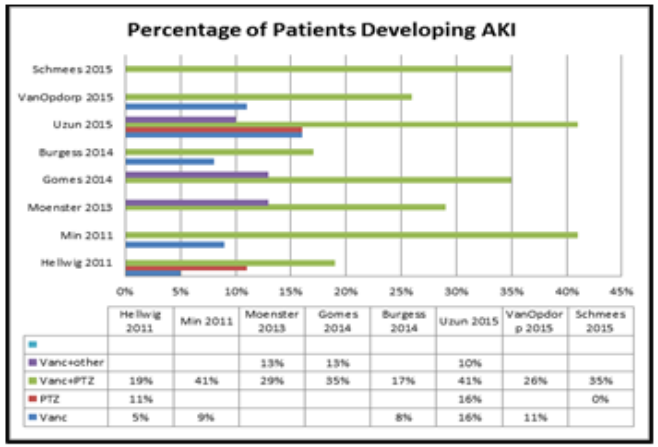
Inpatient Antimicrobial Stewardship Pearl #1: Anti-MRSA De-escalation

BACKGROUND

- Since implementation of universal screening and isolation for patients found to be colonized or infected with methicillin-resistant *Staph aureus* (MRSA), the incidence of these infections have declined across the VHA system.
- Vancomycin is the most commonly used antibiotic in VA facilities and use is increasing despite declining MRSA rates.
- The CDC, IDSA and National VA Guidance from the Antimicrobial Stewardship Task Force recommend the use of a 48-72 hour "time-out" and de-escalation to the narrowest possible therapy.



- During all of 2015, there were only 11 patients in MICU with clinical cultures positive for MRSA (9 of which were sputum)
- Data from the VA indicate that a negative MRSA nares screening test has > 98% negative predictive value for MRSA lower respiratory tract infection
- Many patients are continued on vancomycin despite negative screening and clinical cultures, leading to
  - Longer duration of vancomycin use
  - More levels, dose changes
  - Excess nursing, pharmacy and physician time and waste
  - Increased potential for adverse events (nephrotoxicity), resistance and *C.diff*
  - Although preliminary – some evidence suggests the combination of vancomycin + piperacillin/tazobactam may be more likely to cause acute kidney injury



	Hellwig 2011	Min 2011	Moenster 2013	Gomes 2014	Burgess 2014	Uzun 2015	VanOpdorp 2015	Schmees 2015
Vanc+other			13%	13%		10%		
Vanc+PTZ	19%	41%	29%	35%	17%	41%	26%	35%
PTZ	11%					16%		0%
Vanc	5%	9%			8%	16%	11%	

De-escalation of Vancomycin at STVHCS

- De-escalation of anti-MRSA antibiotics is part of the STVHCS Antimicrobial Stewardship Policy
- Patients are reviewed at 48-72 hours after therapy started and cultures drawn
- Consideration for de-escalation if –
  - Clinical cultures show no growth of MRSA (or unspeciated gram-positive cocci)
  - Screening of MRSA nares are negative (also review prior flags for past 12 months)
  - The patient does not have a deep non-culturable infection where MRSA is likely –
    - Severe skin/soft tissue infection
    - Prosthetic joint infection
    - Septic arthritis
    - Deep epidural or visceral abscess
  - Cultures indicate an alternative organism/explanation where therapy can be targeted
- Goal is de-escalation in the above cases by 96 hours

MICU Vancomycin De-escalation

Clinical Pharmacy Specialist can –

- Educate physicians about situations where de-escalation is appropriate and provide recommendations on rounds and in the chart via vancomycin de-escalation notes

Pulmonary / Critical Care Fellow can -

- Institute daily "rapid rounds" with nursing to identify patients on vancomycin who may be candidates for de-escalation prior to dosing or drawing blood levels

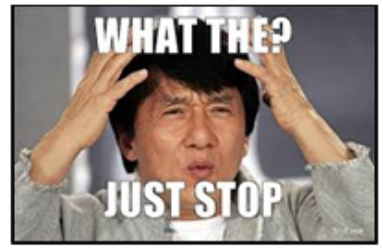
Critical Care nurses can –

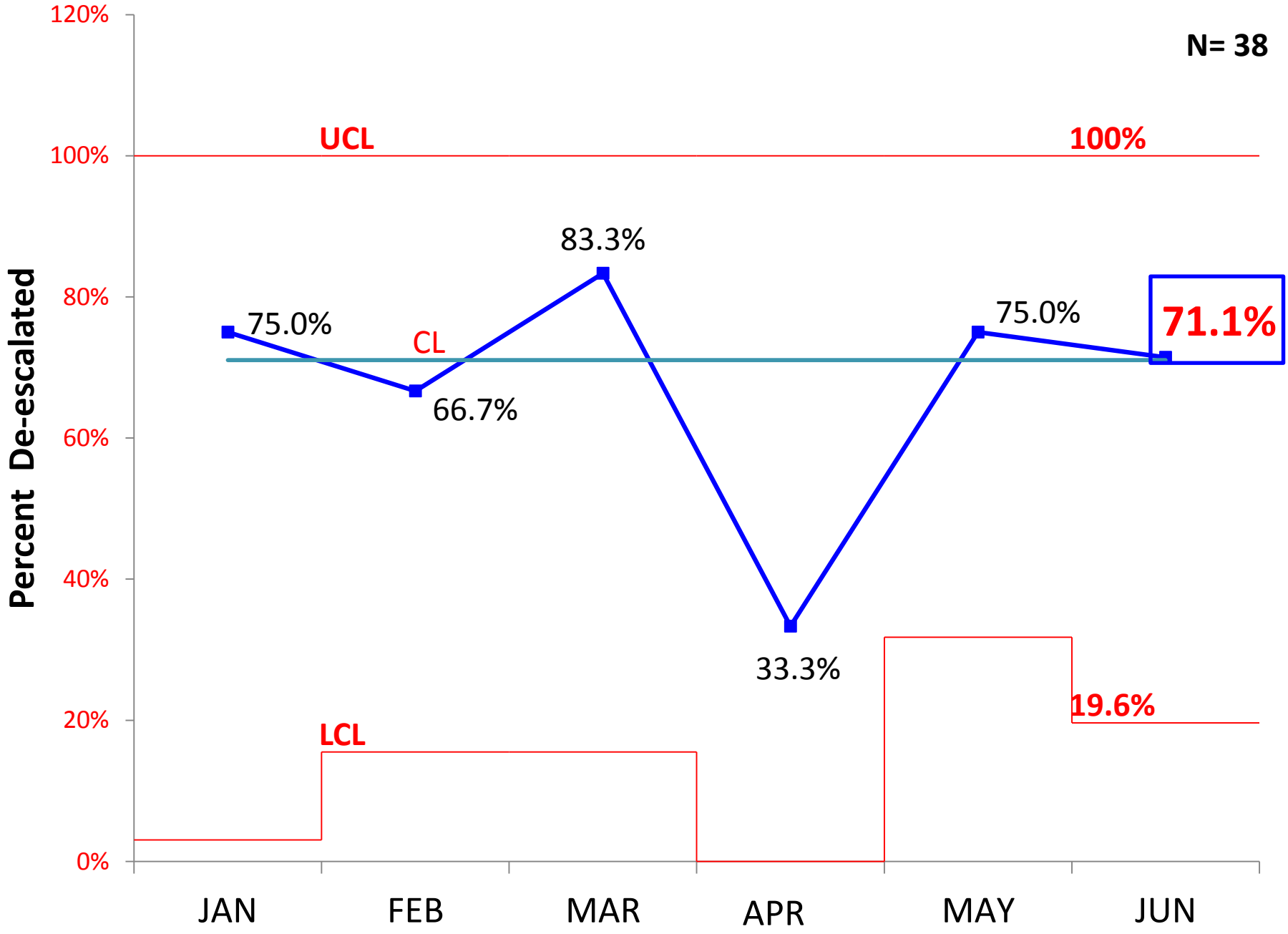
- Double check with MICU team prior to morning dose / rounds to see if vancomycin is likely to be continued and refer physicians to this document for criteria for de-escalation

You can make a difference!

Just say NO to continued VANCO!

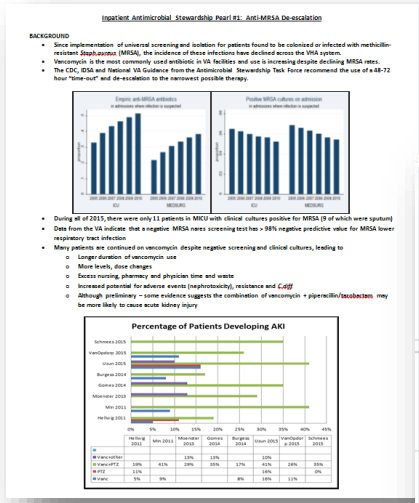
(when it isn't needed)




N= 38
120%
100%
80%
60%
40%
20%
0%
Percent De-escalated
UCL
100%
83.3%
75.0%
CL
75.0%
71.1%
66.7%
33.3%
19.6%
LCL
JAN
FEB
MAR
APR
MAY
JUN

Interventions

Handout



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Empiric anti-MRSA antibiotics in admissions where infection is suspected

Positive MRSA cultures on admission in admissions where infection is suspected

ICU MEDURG

- During all of 2015, there were only 11 patients in MICU with clinical cultures positive for MRSA (9 of which were sputum)
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Percentage of Patients Developing AKI

Schmess 2015
VanOpdorp 2015
Usun 2015
Burgess 2014
Gomes 2014
Moenster 2013
Min 2011
Hellwig 2011

0% 5% 10% 15% 20% 25% 30% 35% 40% 45%

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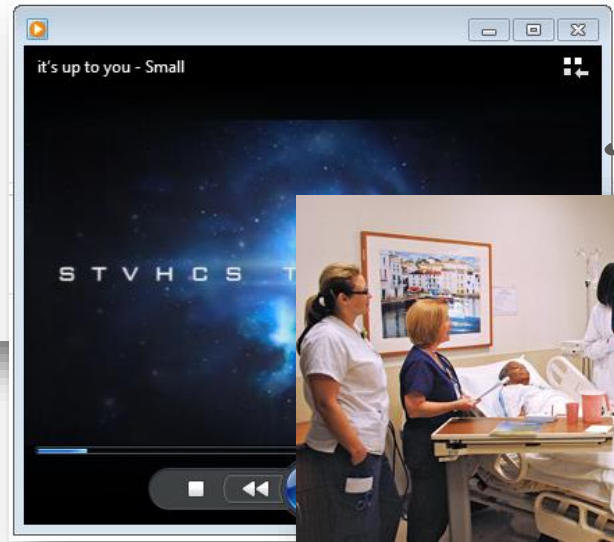
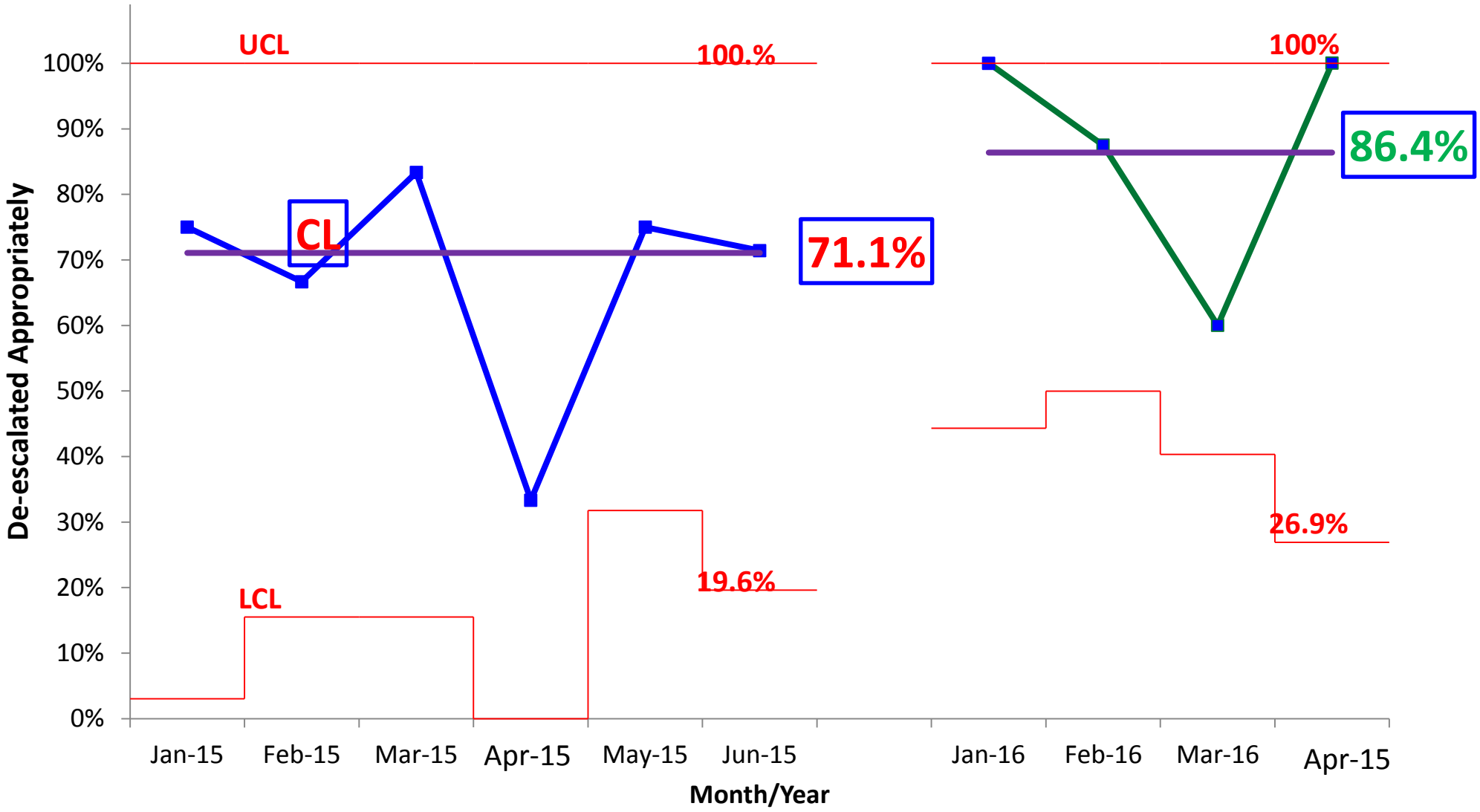
Video



Multidisciplinary rapid rounds

PharmD participation &documentation

RN empowerment to ask for de-escalation


STVHCS MICU Vancomycin De-escalation Project
p Chart
UCL
100.%
CL
71.1%
LCL
19.6%
100%
86.4%
26.9%
De-escalated Appropriately
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jan-16
Feb-16
Mar-16
Apr-15
Month/Year

Results Summary

Aim Statement: To increase the occurrence of de-escalation of anti-MRSA antibiotics in STVHCS MICU to at least 80% by day 4 in eligible patients by April 30th, 2016

Results: *We increased the de-escalation compliance rate from a mean of 71% to 86% among eligible patients in STVHCS MICU*

Return on Investment

- Vancomycin itself is cheap but complicated
- Who touches vancomycin EVERY day?
  - Physician
  - Pharmacists
  - Nurses
  - Lab
  - Runner

Return on Investment

- 15 minutes of each person's time per day of vancomycin = > $100 per day of vancomycin
- Nephrotoxicity (10-40%) with continued vancomycin
  - Acute renal failure costs $20-40,000 per event
- Each day of antibiotics increases risk of *C.diff* infection, resistance
- Employee satisfaction Priceless

- ***Limitation***
  - Limited intervention time and sample size in the MICU

Beyond the immediate investment

- ✓ "improved knowledge of residents and nurses"
  - ✧ both through in-service education, rapid rounds
- ✓ "increased documentation in the medical record"
- ✓ "active and continuous pharmacist presence"
- ✓ "multidisciplinary participation on antimicrobial related activities"

Change in culture of antibiotic use and antibiotic stewardship across the MICU team

What's next?

- Collect data through June in MICU
- Consider expanding data collection to other wards and if room for improvement extend intervention
  - Medicine / PCU
  - Surgery
  - SICU
- Education already given to medicine residents at noon conference – discuss results with hospitalists
- Present at Antibiotic Subcommittee

iMICU iMovie

Thank you!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