

# Making the Cut

## Antimicrobial Stewardship in Surgery

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# Disclosures

- No conflicts of interest to disclose



# Why Stewardship in Surgery?

## New National Estimate\*

Each year, antibiotic-resistant bacteria and fungi cause at least an estimated:



**2,868,700**  
infections



**35,900** deaths



*Clostridioides difficile*\*\* is related to antibiotic use and antibiotic resistance:



**223,900**  
cases



**12,800** deaths



**CLOSTRIDIROIDES DIFFICILE**



CARBAPENEM-RESISTANT  
**ENTEROBACTERIACEAE**



ESBL-PRODUCING  
**ENTEROBACTERIACEAE**

15% of all antibiotics in hospitals are for surgical prophylaxis

Many common surgical conditions are infectious in nature

Infections with resistant bacteria =  
↑ morbidity and  
require ↑ resources



# Emphasis from Surgical Societies

SURGICAL INFECTIONS  
Volume 17, Number 6, 2016  
© Mary Ann Liebert, Inc.  
DOI: 10.1089/sur.2016.187

## Antimicrobial Stewardship: A Call to Action for Surgeons

Massimo Sartelli,<sup>1</sup> Therese M. Duane,<sup>2</sup> Fausto Catena,<sup>3</sup> Jeffrey M. Tessier,<sup>4</sup> Federico Coccolini,<sup>5</sup>  
Lillian S. Kao,<sup>6</sup> Belinda De Simone,<sup>3</sup> Francesco M. Labricciosa,<sup>7</sup>  
Addison K. May,<sup>8</sup> Luca Ansaloni,<sup>5</sup> and John E. Mazuski<sup>9</sup>

## SURGICAL PERSPECTIVE

### Treating Wisely: The Surgeon's Role in Antibiotic Stewardship

Ira L. Leeds, MD, MBA,\* Anne Fabrizio, MD,† Sara E. Cosgrove, MD,‡ and Elizabeth C. Wick, MD§

CIR ESP. 2019;97(4):187-189

## CIRUGÍA ESPAÑOLA

www.elsevier.es/cirugia



Editorial

### Antimicrobial Stewardship Programs and Surgery: What Is Our Role?\*



Research article | [Open Access](#) | [Published: 01 August 2017](#)

## The *Global Alliance for Infections in Surgery*: defining a model for antimicrobial stewardship—results from an international cross-sectional survey

[Massimo Sartelli](#) , [Francesco M. Labricciosa](#), ... [Fausto Catena](#) [+ Show authors](#)

*World Journal of Emergency Surgery* **12**, Article number: 34 (2017) | [Cite this article](#)

This is now a  
surgical priority



# Lots of Opportunities – Reducing Harm

Research

JAMA Surgery | Original Investigation

## Association of Duration and Type of Surgical Prophylaxis With Antimicrobial-Associated Adverse Events

Westyn Branch-Elliman, MD, MMSc; William O'Brien, MS; Judith Strymish, MD; Kamal Itani, MD; Christina Wyatt, MD; Kalpana Gupta, MD, MPH

- Multicenter, national retrospective cohort study in Veterans Affairs health care system over 5 years
- 79,058 patients received cardiac, orthopedic, colorectal, or vascular procedures and received surgical prophylaxis ranging from < 24 hrs to > 72 hrs
- Surgical site infections **not associated** with duration of surgical prophylaxis
- Odds of acute kidney injury and post-operative *C. difficile* infection increased with **each additional day** of prophylaxis



# Lots of Opportunities – Shorter Durations



The NEW ENGLAND  
JOURNAL of MEDICINE

ORIGINAL ARTICLE

## Trial of Short-Course Antimicrobial Therapy for Intraabdominal Infection

Robert G. Sawyer, M.D., Jeffrey A. Claridge, M.D., Avery B. Nathens, M.D., Ori D. Rotstein, M.D., Therese M. Duane, M.D., Heather L. Evans, M.D., Charles H. Cook, M.D., Patrick J. O'Neill, M.D., Ph.D., John E. Mazuski, M.D., Ph.D., Reza Askari, M.D., Mark A. Wilson, M.D., Lena M. Napolitano, M.D., *et al.*, for the STOP-IT Trial Investigators\*

- Open-label, randomized, multicenter study of patients with complicated intra-abdominal infection and adequate source control
- Patients (n=518) randomized to fixed-duration of 4 days or continuing until 2 days after resolution of fever, leukocytosis, and ileus
- Surgical site-infection, recurrent IAI, and death was **no different** with 4 days of antibiotics vs 8 days (absolute difference -0.5%; 95% CI -7.0 – 8.0)



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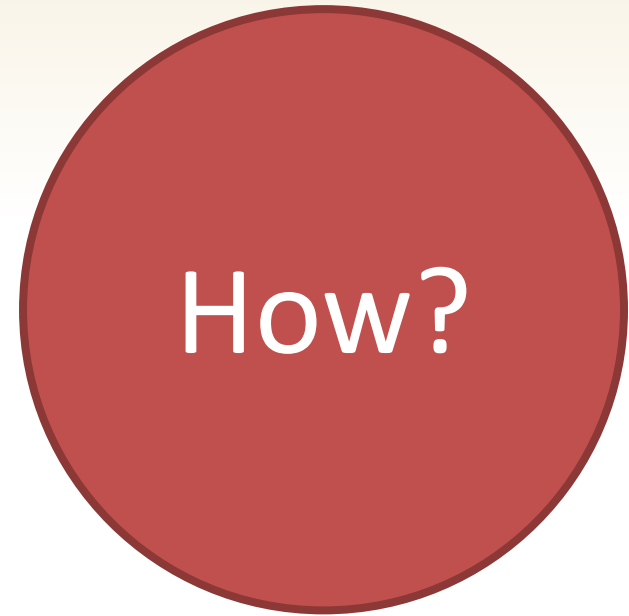
Robert G. Sawyer, M.D., Jeffrey A. Claridge, M.D., Avery B. Nathens, M.D., Ori D. Rotstein, M.D., Therese M. Duane, M.D., Heath ... Askari,

### Bottom Line

Each additional day of antibiotics causes harm  
Shorter is better (with source control)

- Operative abdominal infection (IAI) in the intensive care unit (ICU) is a common and often fatal complication. Intra-abdominal infection (IAI) is a common and often fatal complication of abdominal surgery. Shorter course of antibiotics is better (with source control).
- Patients (n=518) randomized to fixed-duration of 4 days or continuing until 2 days after resolution of fever, leukocytosis, and ileus
- Surgical site-infection, recurrent IAI, and death was **no different** with 4 days of antibiotics vs 8 days (absolute difference -0.5%; 95% CI -7.0 – 8.0)







# “Surgeons Do Not Listen”

## *Surgeons Do Not Listen: Evaluation of Compliance with Antimicrobial Stewardship Program Recommendations*

THERESE M. DUANE, M.D., JESSICA X. ZUO, B.A., LUKE G. WOLFE, M.S., GONZALO BEARMAN, M.D., M.P.H.,  
MICHAEL B. EDMOND, M.D., M.P.H., M.P.A., KIMBERLY LEE, PHARM.D., LAURIE COOKSEY, PHARM.D.,  
MICHAEL P. STEVENS, M.D., M.P.H.

*From Virginia Commonwealth University Health System, Richmond, Virginia*

Retrospective analysis to determine differences in intervention acceptance between medical and surgical services

- **2322** interventions
  - 1108 medical (M)
  - 1214 surgery (S)
- Compliance
  - **83.5% M vs 70% S** (p<0.0001)

- **8 of 15** surgical services with compliance rate <75%
- Less compliance with interventions to de-escalate vs escalate



# Stewardship and Culture


- Culture influences shapes and outcomes of healthcare interventions
  - Impacts patient outcomes
- Stewardship success = changing attitudes and behavior around antimicrobial prescribing
- Healthcare culture made up of microcultures among different specialties
- “One size fits all” may not be an effective approach for all groups

How are surgical services different than medical services when it comes to antimicrobial prescribing?



# Antibiotics: Surgery vs Medicine

## The Differences in Antibiotic Decision-making Between Acute Surgical and Acute Medical Teams: An Ethnographic Study of Culture and Team Dynamics

E Charani , R Ahmad, T M Rawson, E Castro-Sanchèz, C Tarrant, A H Holmes

*Clinical Infectious Diseases*, Volume 69, Issue 1, 1 July 2019, Pages 12–20, <https://doi.org/10.1093/cid/ciy844>

### Ethnography

Study of people within context where they exist, live, and work

Central London teaching hospital with 1300 beds and existing ASP

500 hours of direct observations of study participants in rounds and daily meetings

Follow-up face-to-face interviews with 23 healthcare professionals



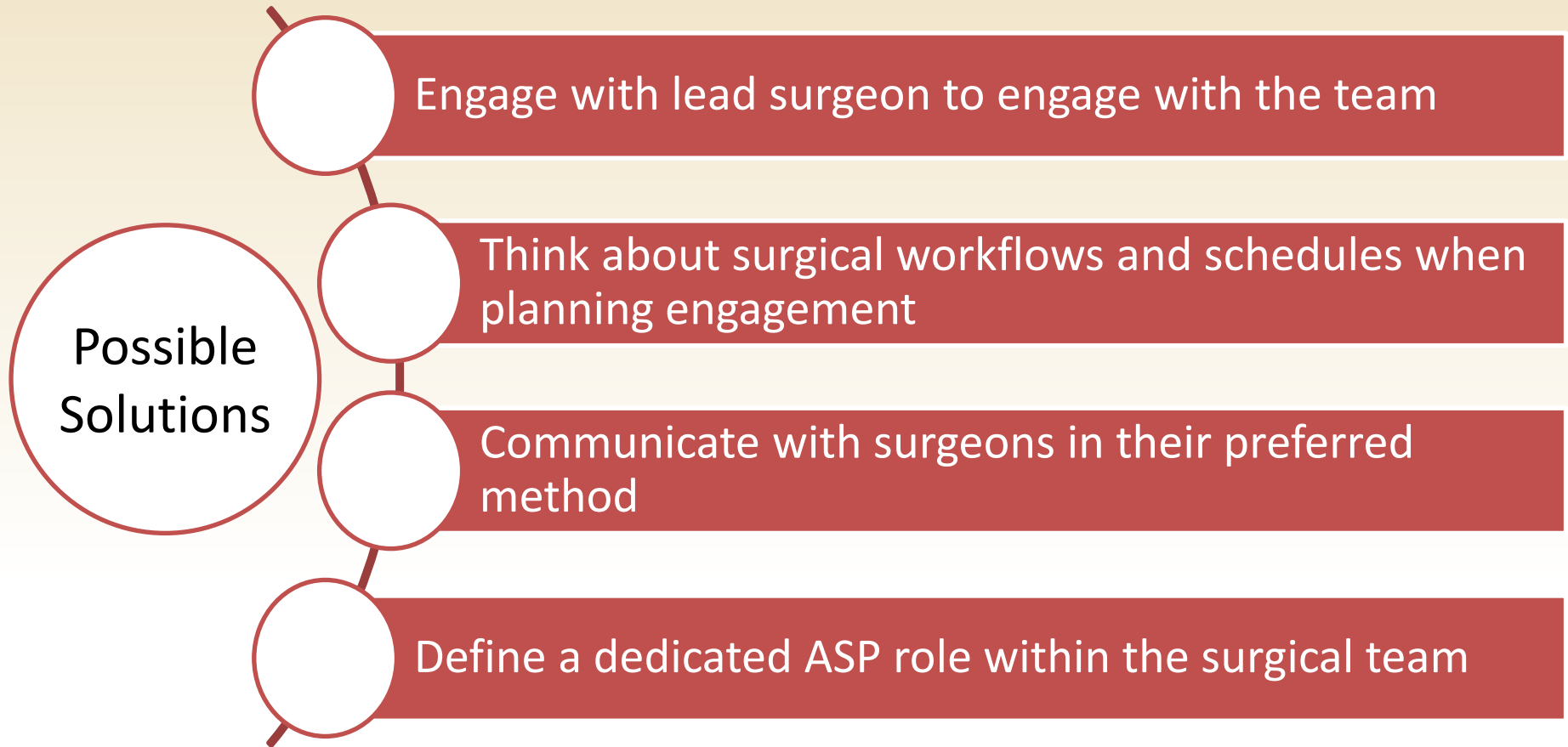
# Antibiotics: Surgery vs Medicine

## Key team dynamics and characteristics

	Surgery	Medicine
<b>Culture theme</b>	Individualistic	Collaborative
<b>Team structure</b>	Surgeon-led, top-down	Multidisciplinary
<b>Rounds</b>	Rushed, focused	Collectivist, relaxed
<b>Team communication</b>	Technology-based	Face-to-face
<b>Medication review</b>	Not regularly reviewed	Reviewed daily
<b>Infection management</b>	Prophylaxis and prevention	Diagnosis and de-escalation
<b>Antibiotic prescribing</b>	Loose and complex decision making	Rationalized decision making and policy driven

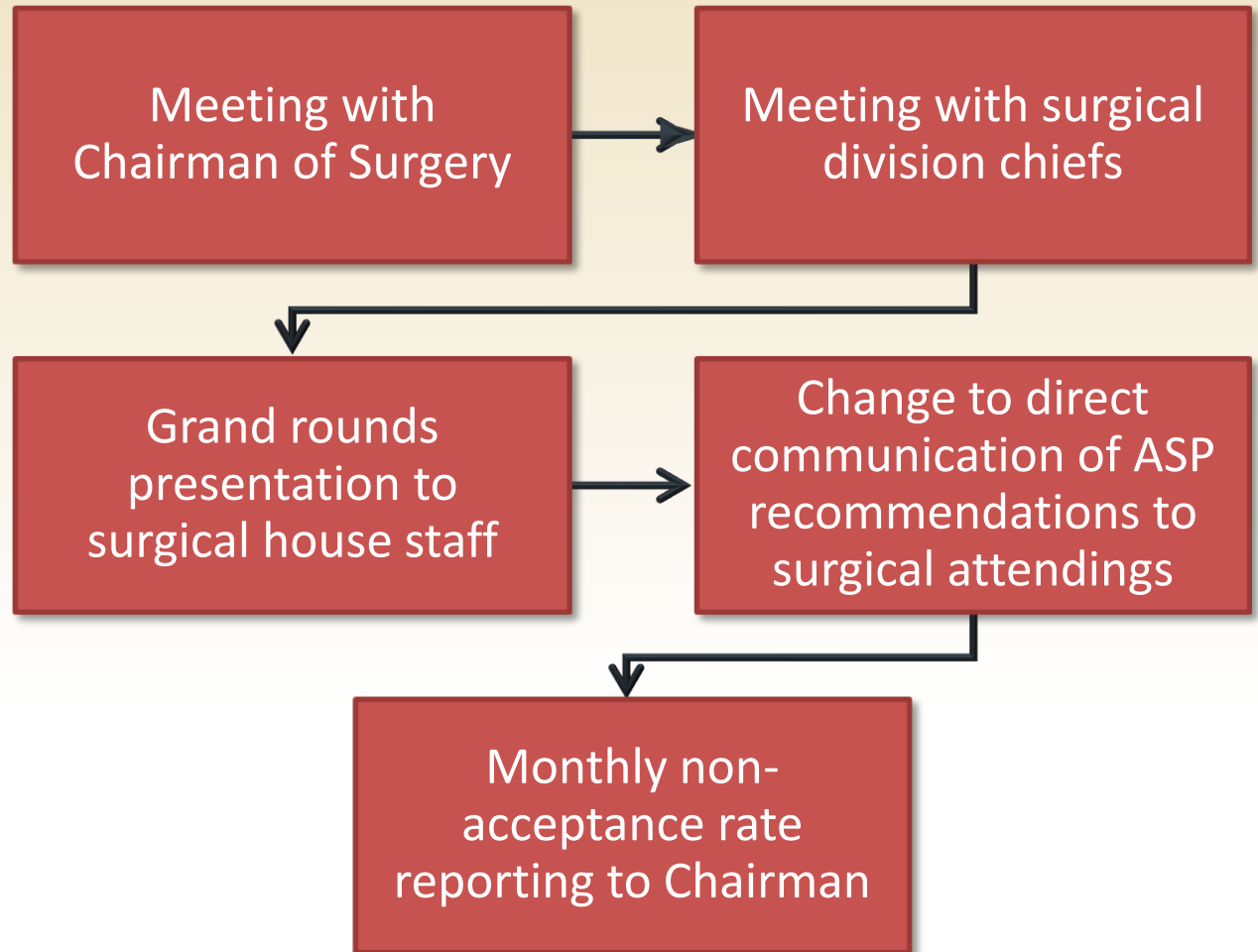


# Antibiotics: Surgery vs Medicine



# ASP in Surgery: UTMB Experience

- **2020 goal:**  
Decrease non-acceptance rate of ASP interventions by 10%
- Non-acceptance rate of ASP interventions:
  - **47% Surgical services**
  - 10-15% Medical services



# ASP in Surgery: UTMB Experience

## 167. Communication is Key: A Multifaceted Approach to Improving Essential ASP Metrics in Surgical Services

Rachel S Britt, PharmD, David Reynoso, MD, PhD, Philip H Keiser, MD,  
R Scott Ferren, PharmD, BCIDP

*Open Forum Infectious Diseases*, Volume 7, Issue Supplement\_1, October 2020, Page S91,  
<https://doi.org/10.1093/ofid/ofaa439.211>

**Published:** 31 December 2020

- Retrospective, pre-post study between 12/2018 and 09/2020
- Non-acceptance rate of ASP interventions decreased from 43% to 27% ( $p < 0.01$ )
- Biggest changes observed in trauma, general, and cardiothoracic surgical services
- No difference in overall DOT/1000 patient days or drug cost



# ASP in Surgery: UTMB Experience

## Tips for ASPs in Surgery

1

Present institutional data – service and provider specific

2

Develop guidelines and protocols with surgeons' input

3

Stress that cost is a secondary outcome rather than primary

4

Garner institutional support from leaders





# 7-VINCut Project

7-VINCut project = national project with goal to reduce antibiotics to < 7 days in surgical services



antibiotics



Article

## Surgeon-led 7-VINCut Antibiotic Stewardship Intervention Decreases Duration of Treatment and Carbapenem Use in a General Surgery Service

Josep M. Badia <sup>1,\*</sup>, Maria Batlle <sup>1</sup>, Montserrat Juvany <sup>1</sup>, Patricia Ruiz-de León <sup>1</sup>, Maria Sagalés <sup>2</sup>, M Angeles Pulido <sup>3</sup>, Gemma Molist <sup>4</sup> and Jordi Cuquet <sup>5</sup>

- Multidisciplinary team led by surgeons
- Introduced educational initiatives
- PAF for orders > 7 days
- Communication via notes and handshake ASP

- 123 cases received an ASP recommendation
- **90.2%** adherence to recommendations
- **Significant decrease** in durations > 7 days and antibiotic use

- **94.1% of surgeons found project useful**
- 56.3% less likely to accept project without surgeons on ASP team
- 64.7% felt surgeons should participate in ASPs



# Resources



**Surgical Infection Society**

Dedicated to the Understanding, Prevention,  
& Management of Surgical Infections

- Guidelines and Position Papers
  - Prevention of Surgical Site Infections
  - Intra-abdominal Infections
  - Antibiotic Use in Traumatic Facial Fractures
- Surgical Infections Journal
- Webinars
- Bug In Your Ear Podcast



*The World Society of Emergency Surgery*



Global Alliance for Infections in Surgery

- Guidelines and Position Papers
  - Appendicitis
  - Surgical infection control
  - Intra-abdominal Infections
  - Promotion of stewardship
- Projects, educational videos, and infographics



# The Takeaway

- Antimicrobial stewardship is important in surgical services
  - Reduce harm
  - Preserve antimicrobials
- Implementing successful ASPs in surgery can be difficult due to the microculture regarding antimicrobial prescribing
- Get creative – involve and listen to your surgeons



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