



Centre universitaire de santé McGill  McGill University Health Centre

**Infection Control Professionals :  
At the heart of Antibiotic  
Stewardship**

Dr. Charles Frenette  
IPAC May 2019



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Centre universitaire de santé McGill  McGill University Health Centre

**Disclosures**

None

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**Objectives**

- Review Goals and objectives of Antibiotic Stewardship
- Areas of potential interventions
  - C.difficile
  - UTI
  - Respiratory tract Infections
  - SSI
- Ten commandments

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## Patient Safety at Risk

- Antibiotic usage inappropriate or unjustified in 30-50 % of cases in health care institutions:

Ingram PR, et al. Intern Med J 2012;42:719-721.  
Levin PD, et al. J Hosp Med 2012;7:672-678.  
Patel SJ, et al. Ped Inf Dis J 2009;28:1047-1051.

- Risks :

- Side Effects
- Super infections (*Clostridium difficile*)
- AB resistance

Alshammari TM, et al. Am J Health System Pharm 2014;71:37-43.  
Boggs SR, et al. Pediatrics 2011;128:e1289-1292.  
Hensgens MP, et al. J Antimicrob Chemother 2012;67:742-748.

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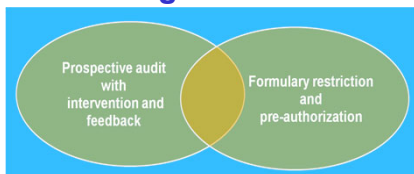
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## Basic Strategies



- Prospective audits and feedback
- Formulary restriction
- Dedicated resources

Barlam TF, et al. Clin Infect Dis 2016;62:1-27

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## The beginnings as a resident... Driver = Cost

- Antibiotics restricted to ID – mandatory consult
  - Imipenem
  - Metronidazole
  - Tobramycin
  - Third generation Cephalosporins

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## Consequences....

ID resident



Surgery resident

At 3.00 am .....

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## Goals and Objectives

Coordinated interventions designed to improve and measure the appropriate use of antibiotic agents :

- Right Indication
- Right choice
- Right dose
- Right route
- Right duration

Barlam TF, et al. Clin Infect Dis 2016;62:1-27

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**2004: 12 hospitals**  
**22.5/1000 admissions**

THE NEW ENGLAND JOURNAL OF MEDICINE

**ORIGINAL ARTICLE**

### A Predominantly Clonal Multi-Institutional Outbreak of *Clostridium difficile*-Associated Diarrhea with High Morbidity and Mortality

Vivian G. Loo, M.D., Louise Poirier, M.D., Mark A. Miller, M.D., Matthew Oughton, M.D., Michael D. Libman, M.D., Sophie Michaud, M.D., M.P.H., Anne-Marie Bourgault, M.D., Tuyen Nguyen, M.D., Charles Frenette, M.D., Mirabelle Kelly, M.D., Anne Vibien, M.D., Paul Brassard, M.D., Susan Fenn, M.L.T., Ken Dewar, Ph.D., Thomas J. Hudson, M.D., Ruth Horn, M.D., Pierre René, M.D., Yury Monczak, Ph.D., and André Dascal, M.D.

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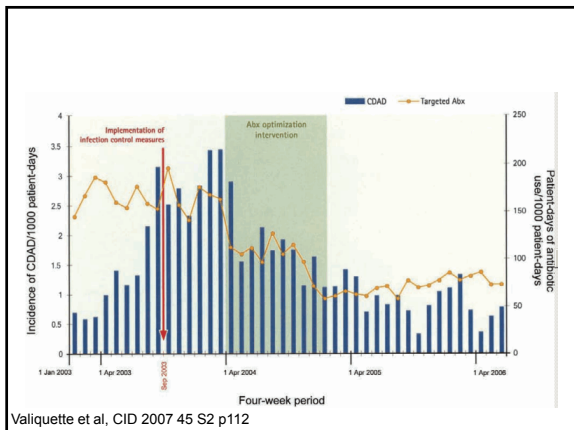
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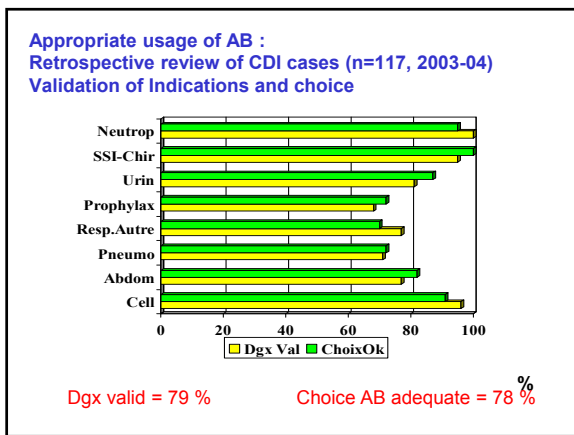
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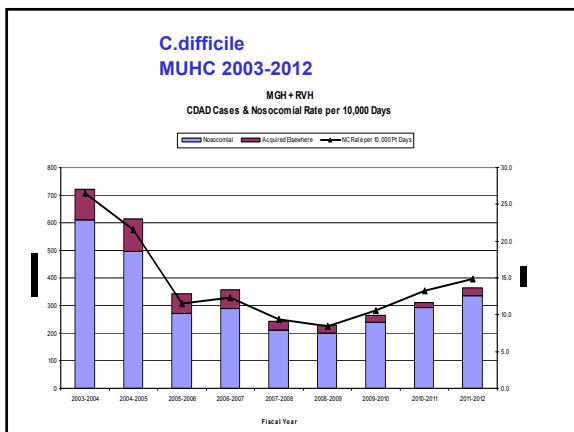
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### Unnecessary Antimicrobial Use in Patients with Current or Recent Clostridium difficile Infection

Megan K. Shaughnessy, Infection control and hospital epidemiology, February 2013, vol. 34, no. 2

Of 246 patients with new-onset CDI, 445 antimicrobial courses.

- ◆ 77 % at least 1 unnecessary antimicrobial dose
- ◆ 26% of patients received **only** unnecessary antimicrobials
- ◆ 45% of total non-CDI antimicrobial days included unnecessary antimicrobials.

The leading indications for unnecessary antimicrobial use were :

- ◆ urinary tract infection
- ◆ pneumonia

**Conclusions. Twenty-six percent of patients with recent CDI received only unnecessary (and therefore potentially avoidable) antimicrobials**

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### C.difficile Plan of Action New C.difficile Policy : 5 axis

- Isolation and Precautions
- Cleaning and disinfection
- Antibiotic stewardship
- Excreta management
- Administrative / organizational measures

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### Conclusion #1

- To reduce CDI
  - Have to review AB usage....



*"Don't forget to take a handful of our complimentary antibiotics on your way out."*

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### Welcome to a new Institution !

- No program
- No pharmacist
- CDI / MRSA / VRE everywhere
- Imipenem / Meropenem / Vancomycin / Timentin used profusely ...

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### Commandment # 1

- Need local guidelines approved locally
  - First by peers
  - Then by all departments
  - Ideally implicated in choices
    - Need local data pathogens ( HAI)
    - Sensitivities and antibiogram

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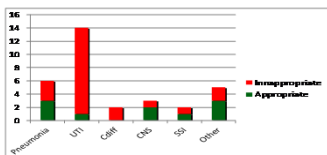
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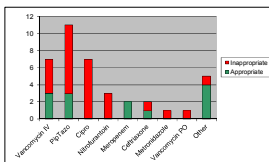
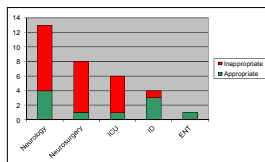
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### First Evaluation : MNH Dec 2011

Usage appropriate : 10/32= 31 %



Reasons Inap:  
 Indication n = 12  
 Choice n = 15  
 Dose n = 6  
 Route n = 0  
 Duration n = 4




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### Main Problem Encountered

#### Diagnosis of UTI

- ◆ Treatment of ASB bacteria
- ◆ U/A not done – not looked at
  - No WBC = No UTI
- ◆ Quantification not looked at
- ◆ No distinction pathogens/skin flora
- ◆ Cipro given as first line

Pneumonia with Normal CXR  
 Prolong surgical prophylaxis  
 Meropenem first line AB( \$150.00/day)

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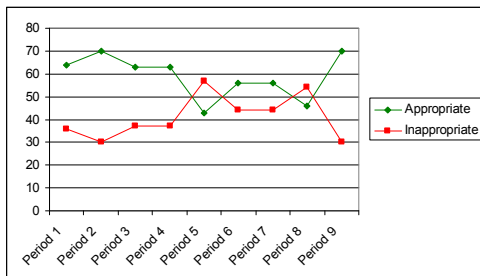
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### ATB Stewardship MNH 2012

Appropriate versus Inappropriate use of antimicrobials per period




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### Role of ICP : Do you do surveillance for HA-UTI ?

- Look at + URINE CULTURES ?
- How often do you find Criteria for HA-UTI ?
- Is patient on Antibiotics ?
  - MATCH OR MISMATCH ?

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### Role of ICP

- Document nosocomial UTI
  - presence of NHSN Criteria, IPAC definition
- Document Symptoms
- Treatment : appropriate / non appropriate
- Review cases
  - Round with IC officer/ pharmacist/ ID Md for ABS

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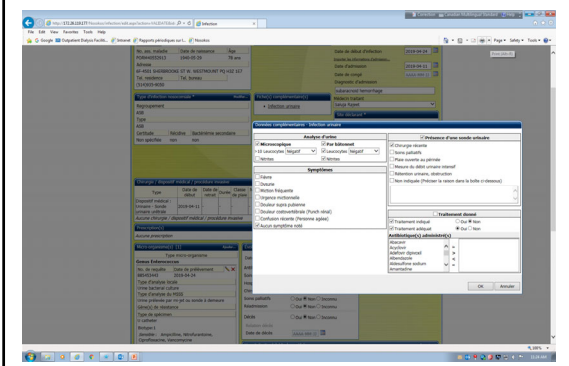
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### Incorporated in Software platform...



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### From Antibiotic Stewardship to Laboratory stewardship

- Why is the culture done anyway ?  
(or make yourself have less work)

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### Review of reasons for Urine Cultures on Surgical Wards: N= 344

	Hartley* (ICHE 2013)	Loeb* (ICHE 2001)	Revised McGeer* (2012)
% Undocumented	14.2	14.2	14.2
% Appropriate (excluding undocumented)	63.1	25.6	33.7
% Inappropriate (excluding undocumented)	22.7	60.2	52.0

\*Sepsis workup, pre-urolologic procedure and repeat testing for contaminated sample were deemed appropriate during analysis.

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### Results: Causes of Inappropriateness

Documented Reason for Testing	Frequency [N (%)]
Foul smell	11 (3.2%)
Cloudy	11 (3.2%)
Dark color, concentrated	7 (2.0%)
Urinary retention	12 (3.5%)
Urinary sediment	7 (2.0%)
Catheter discomfort, non-localizing pain, perineal pruritus	12 (3.5%)
Unexplained isolated leukocytosis	9 (2.6%)
Elevated creatinine	2 (0.6%)
Sent "off protocol" (at time of catheter insertion, removal, in & out, or when urinalysis ordered)	9 (2.6%)
Pre-operative non-urolologic surgery	4 (1.2%)
Duplicate test within 1 calendar day	23 (6.7%)

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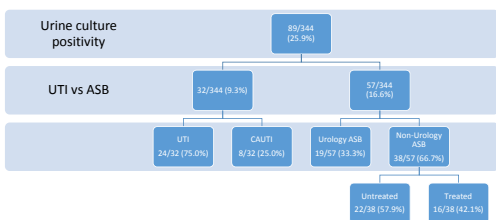
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### Results: Secondary Outcomes




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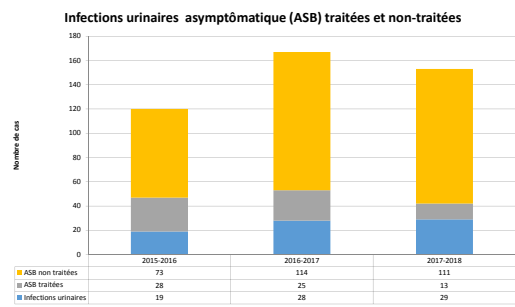
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### Surveillance of Urine Cultures in LTC France Nadon




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### What about Emergency ? A look at Respiratory Tract Infections

- A good deal of AB are started in ER....
  - ◆ Its not me , its them....
- After SARS , MERS , H1N1 pandemic
  - How many of you validate if syndromic precautions are taken in ER ?
  - If so do you look if Antibiotics/Antivirals initiated ?
  - Do they need them ?

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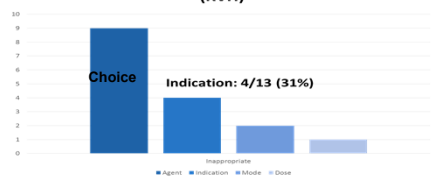
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### Results RVH ER

Figure 2. RVH ATB Use (Emergency Departement)



Table 2. Repartition of Inappropriate ATB (RVH)




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Table 4. Distribution of ATB prescription by indication

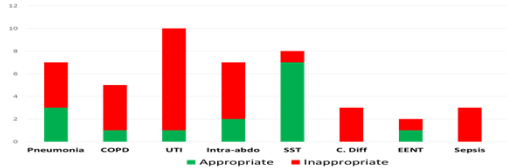
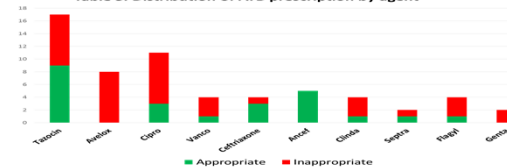


Table 3. Distribution of ATB prescription by agent




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### Description of inappropriate ATB use

#### 1. First line agent for COPD exacerbation:

- ◆ Avelox IV/PO prescribed but no risk factors for resistance

◆ **First choice:** Decrease use of Quinolones:

- Amoxil PO
  - Septra PO
  - Doxy PO
- a. Risk of C. diff  
b. Good agent for resistant pathogens

PCR for respiratory viruses very useful for clinical decision

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### Description of inappropriate ATB use

#### 2. First line agent for UTI lower:

- ◆ Cipro PO prescribed but acute uncomplicated UTI

◆ **First choice:** Decrease use of Quinolones:

- Septra PO
  - Nitrofurantoin PO
- a. Risk of C. diff  
b. Good agent for resistant pathogens

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### Is it a virus or a bacteria ?

Brief Report

Evaluating the impact of the multiplex respiratory virus panel polymerase chain reaction test on the clinical management of suspected respiratory viral infections in adult patients in a hospital setting

Colin Yee MD<sup>1</sup>, Eva Suarathana MD, PhD<sup>2\*</sup>, Nandini Dendukuri PhD<sup>3</sup>, Ioana Nicolau MSc<sup>3</sup>, Makeda Semret MD<sup>4</sup>, Charles Frenette MD<sup>4</sup>

<sup>1</sup> Division of Infectious Disease, McGill University Health Centre, Montreal, QC, Canada  
<sup>2</sup> Technology Assessment Unit, McGill University Health Centre, Montreal, QC, Canada

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## Impact on Antimicrobial Usage

Table 2

Distribution of clinical management before and after the MRVP test in patients in the ward

Test results	n	Antiviral treatment				Antibiotic treatment			
		Empirically treated <sup>a</sup>	Postresult treatment		Empirically treated <sup>a</sup>	Postresult treatment			
			Continued <sup>b</sup>	Discontinued <sup>b</sup>		Continued <sup>b</sup>	Discontinued <sup>b</sup>		
Hospitalized patients									
Negative	62	15 (24.2)	5 (33.3)	10 (66.7)	41 (66.3)	35 (85.4)	6 (14.6)		
Positive noninfluenza	10	4 (40.0)	0 (0)	4 (100)	7 (70.0)	5 (71.4)	2 (28.6)		
Positive influenza	17	7 (41.2)	7 (100)	0 (0)	12 (70.6)	9 (75.0)	3 (25.0)		
Patients diagnosed in the emergency room									
Negative	31	8 (25.8)	1 (12.5)	7 (87.5)	22 (70.9)	17 (77.2)	5 (22.7)		
Positive noninfluenza	22	7 (31.8)	2 (28.6)	5 (71.4)	11 (50.0)	7 (63.6)	4 (36.4)		
Positive influenza	44	16 (36.4)	14 (87.5)	2 (12.5)	19 (43.2)	13 (68.4)	6 (31.6)		

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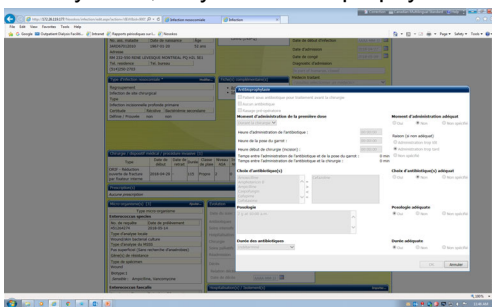
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## Do you do SSI surveillance ?

- If you do, do you validate prophylaxis ?




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## Evaluate prophylaxis in case of SSI

- Indication
- Choice
- Dose
- Route
- Duration

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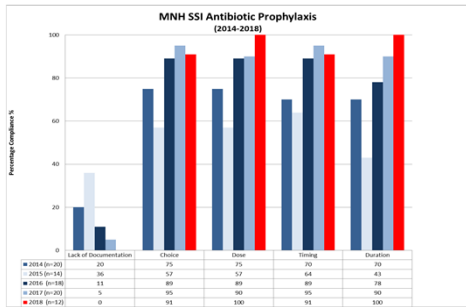
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**SSI Report – 2018**  
Susan Rachel




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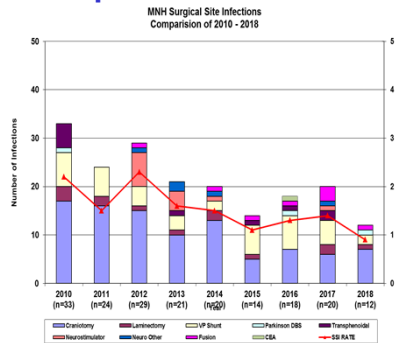
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**SSI Report**




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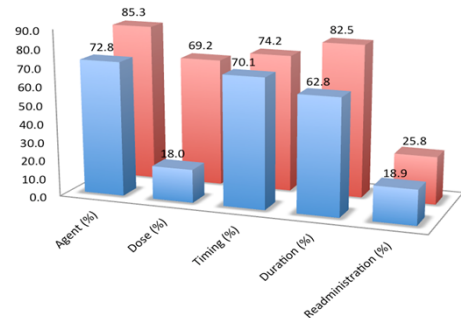
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**Systematic Audit Post Feedback (2013-14)**




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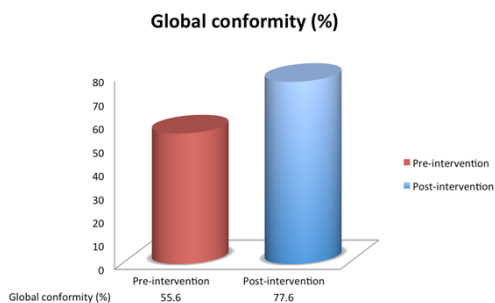
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**Systematic Evaluation of prophylaxis  
50 consecutive OR charts reviewed / service**




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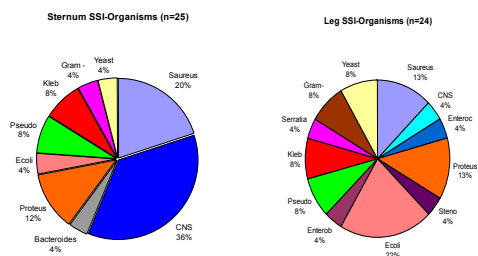
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**Choosing the right AB for prophylaxis:  
Know your pathogens!**  
Pathogens of SSI in cardiac Surgery 2011-2012 (Connie Patterson)




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**Recommendations**

- Better gram negative coverage
  - Cefazolin 2 gms Q8h X 24 hours
  - Gentamicin 5 mgs / kg X1 dose

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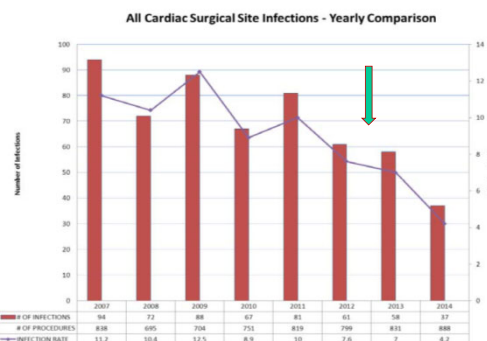
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### Rate of SSI in Cardiac Surgery




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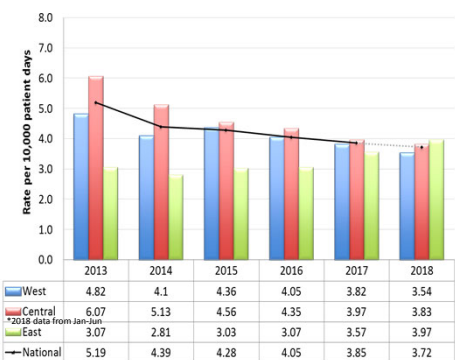
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### CNISP Regional HA-CDI rates per 10,000 pt-days, 2013 to 2018\*




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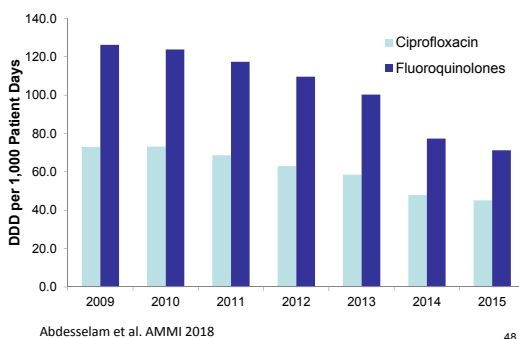
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### CNISP-Anti Microbial Usage




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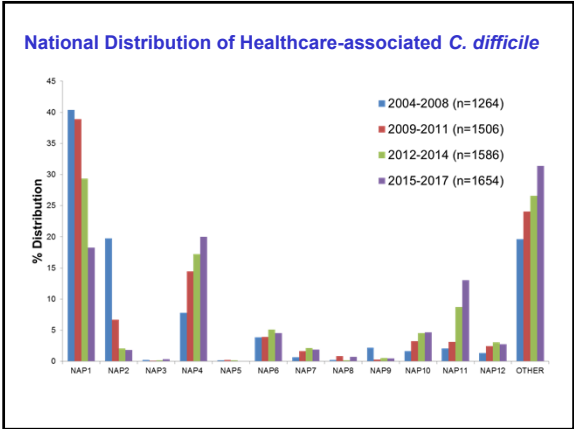
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**The 10 Commandments (Andrew Morris)**

- Thou shalt have no other antibiotics before dental procedures to prevent endocarditis or prosthetic joint infections.
- Thou shalt not treat wound swabs, asymptomatic bacteriuria, or other culture results without clear evidence of infection.
- Thou shalt not use the terms "pan-culture" or "broad-spectrum" in vain.
- Remember that most patients need a rest from antibiotics by the 7th day.
- Honor your culture and susceptibility results.

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**The 10 Commandments (Andrew Morris)**

- Thou shalt not use antibiotics "just in case" or "to be safe".
- Thou shalt not commit to antibiotics post-operatively: use them like you would a condom (just before and during the event).
- Thou shalt not claim that "finishing all of your antibiotics" will reduce resistance: it breeds it.
- Thou shalt not covet guidelines when they fly in the face of evidence or common sense

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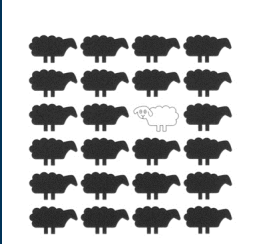
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Who is the black sheep ?



- Awareness
- Leadership support

Qui est le mouton noir?

Institut national de santé publique Québec

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*"An idea that is developed and put into action is more important than an idea that exists only as an idea" -- Buddha*



*It is easier to divert a river than to change behavior...*

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