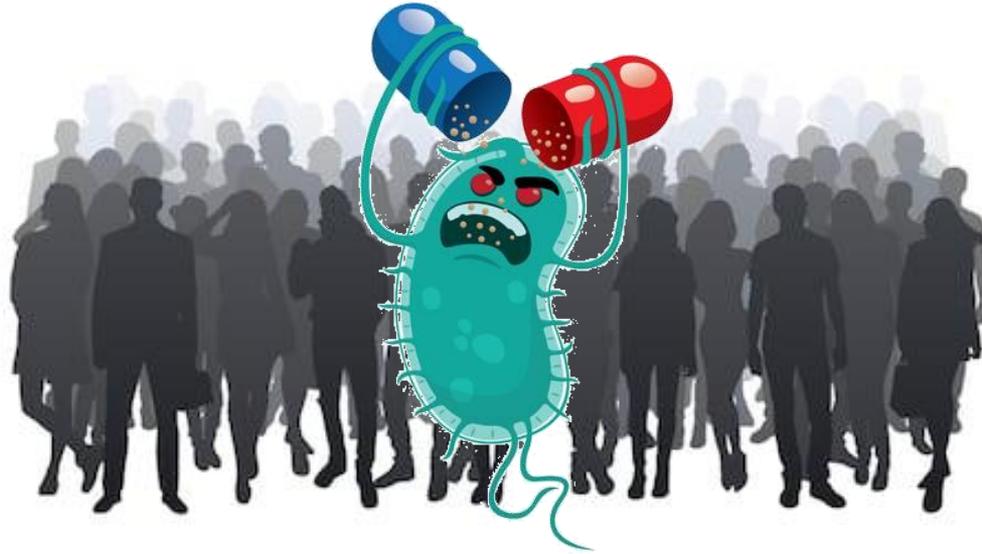


# Antimicrobial Resistance Surveillance and Public Health



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# Disclosure Statement

I have no affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization.

The background of the cover art is a collage of images related to a pandemic response. On the left, a man in a yellow hazmat suit stands prominently. In the center, a woman in a white lab coat stands with a soldier in military gear and a man in a blue shirt. To the right, a woman in a purple biohazard suit looks through a microscope. The bottom right corner shows a petri dish with various colored bacteria. The overall scene is set against a city skyline at night with a bright light source in the sky.

# PANDEMIC

A GAME BY MATT LEACOCK

# Art imitating life...

**EPIDEMIC**

1-...  
2-...  
3-...

**EVENT FORECAST**  
Play any time. Not an action.

Draw, look at, and rearrange the top 6 cards of the Infection Deck. Put them back on top.

IF THE PURPLE DISEASE IS NOT ERADICATED, DRAW A CARD FROM THE BOTTOM OF THE INFECTION DECK. PLACE 3 PURPLE DISEASE CUBES (ONLY) ON THIS CITY. DISCARD THAT CARD TO THE INFECTION DISCARD PILE.

**PANDEMIC**

**OUTBREAKS**

**INFECTION RATE**

**PLAY**

- Do 4 actions
- Draw 2 cards
- Infect any epidemic
- Discard to 7 cards
- Infect cities

# Real world problems...

Antimicrobial stewardship programs are multidisciplinary teams of experts attempting to slow the development of antimicrobial resistance around the world by promoting appropriate use of antimicrobials.

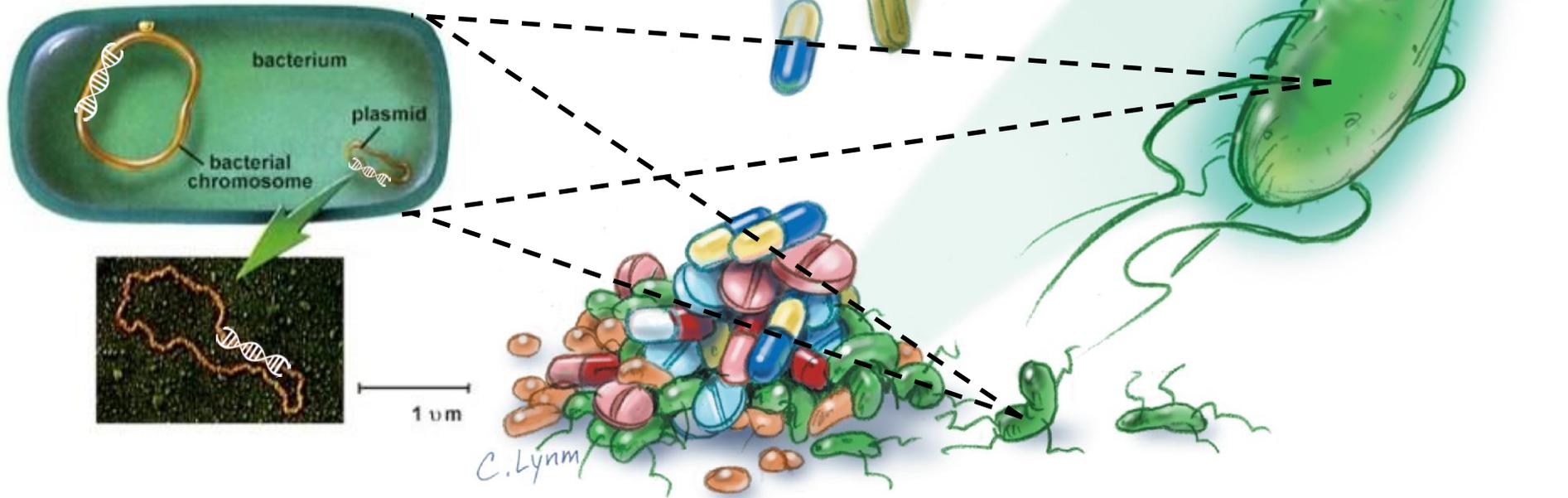
Public health practitioners are a vital part of the success of antimicrobial stewardship programs.

We can make use of the data that are available to help inform interventions and avoid public health problems.

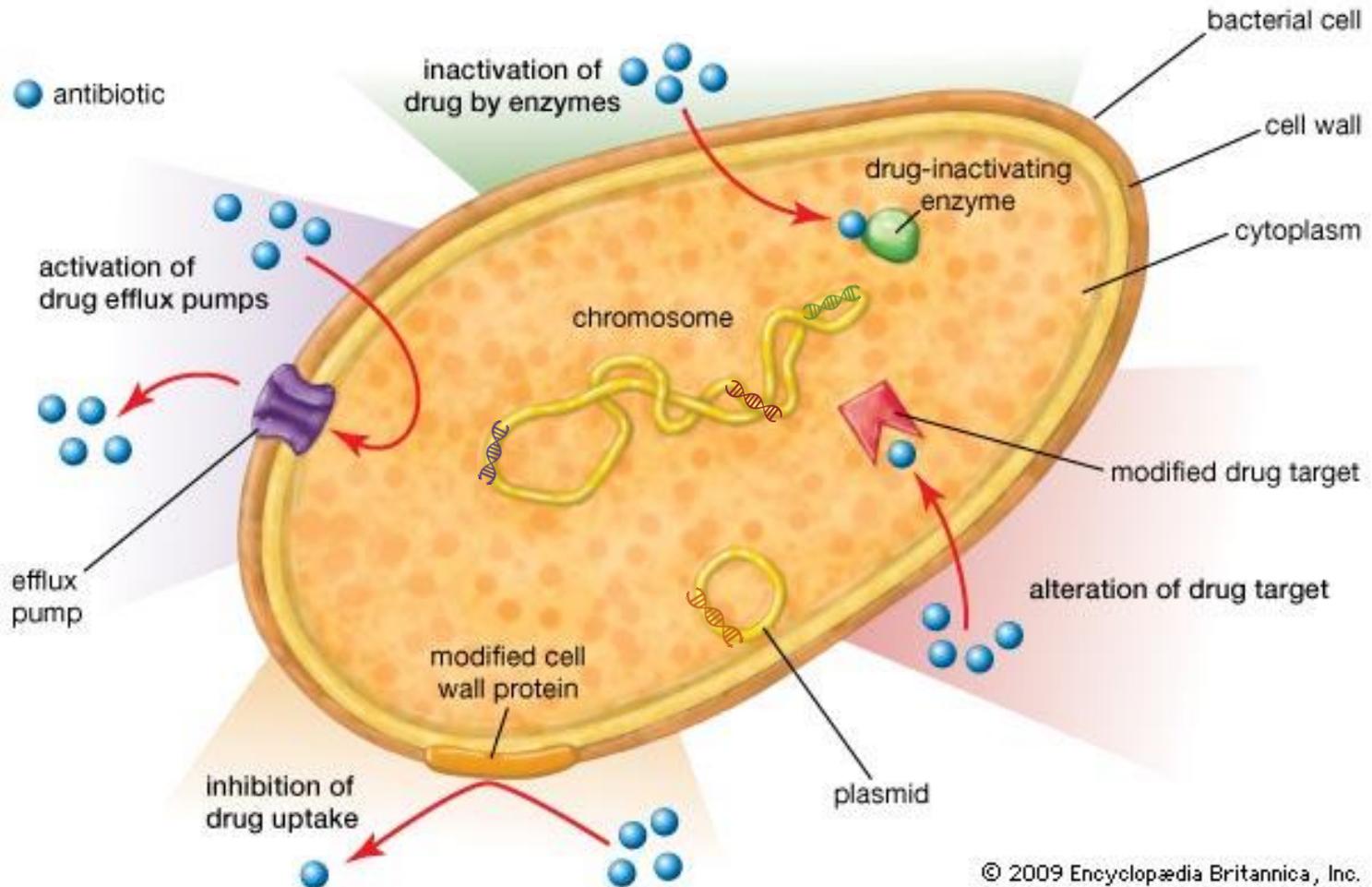


# Antibiotic resistance...

When bacteria acquire genetic mutations that allow them to become resistant to the effects of antibiotics.

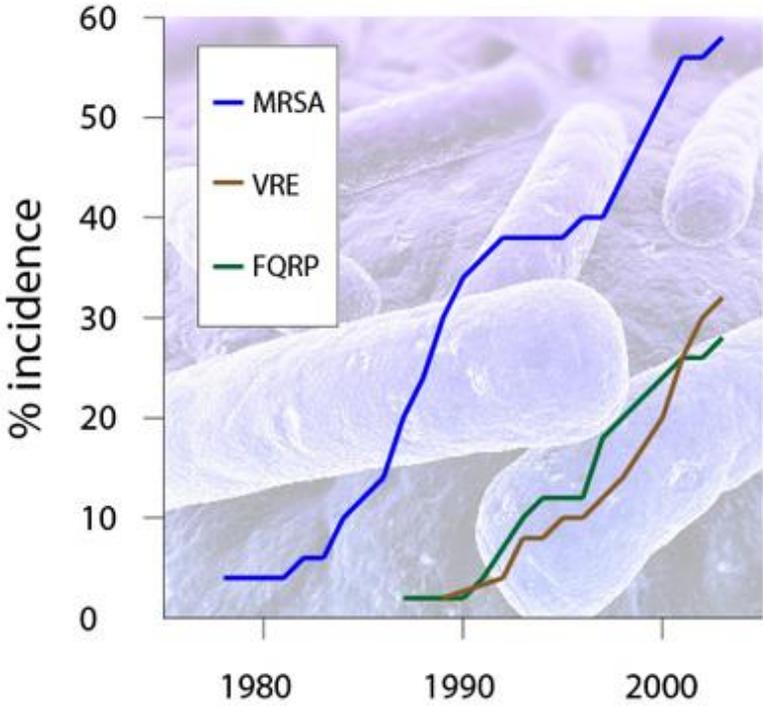


# Antibiotic resistance...



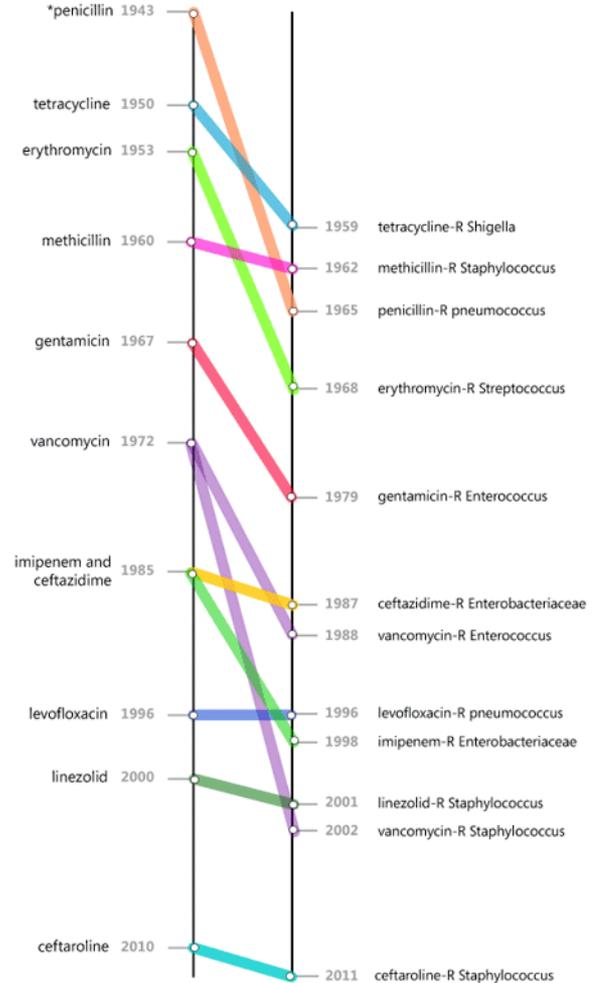
# Antibiotic resistance...

Antibiotic-resistant infections



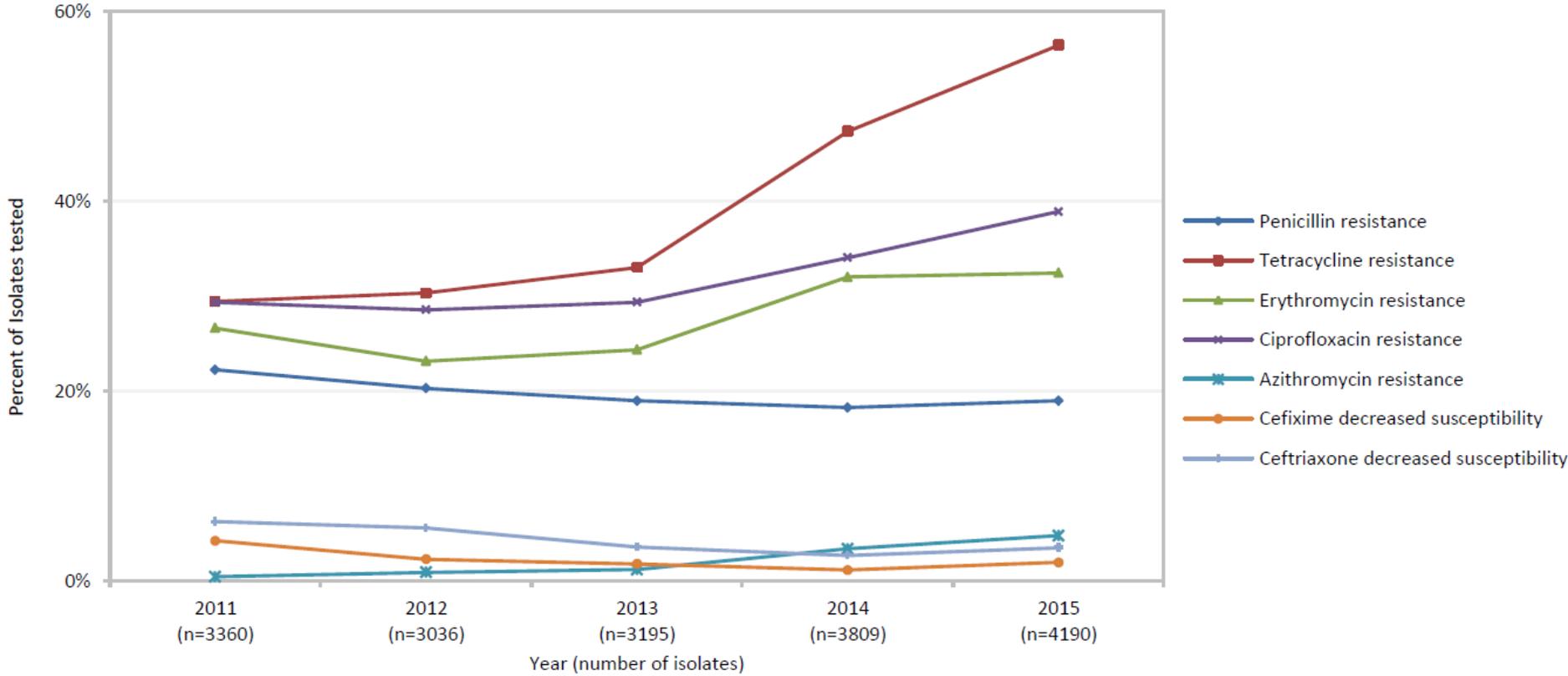
Source: Centers for Disease Control and Prevention

ANTIBIOTICS INTRODUCED   ANTIBIOTIC RESISTANCE IDENTIFIED



# Antibiotic resistance...

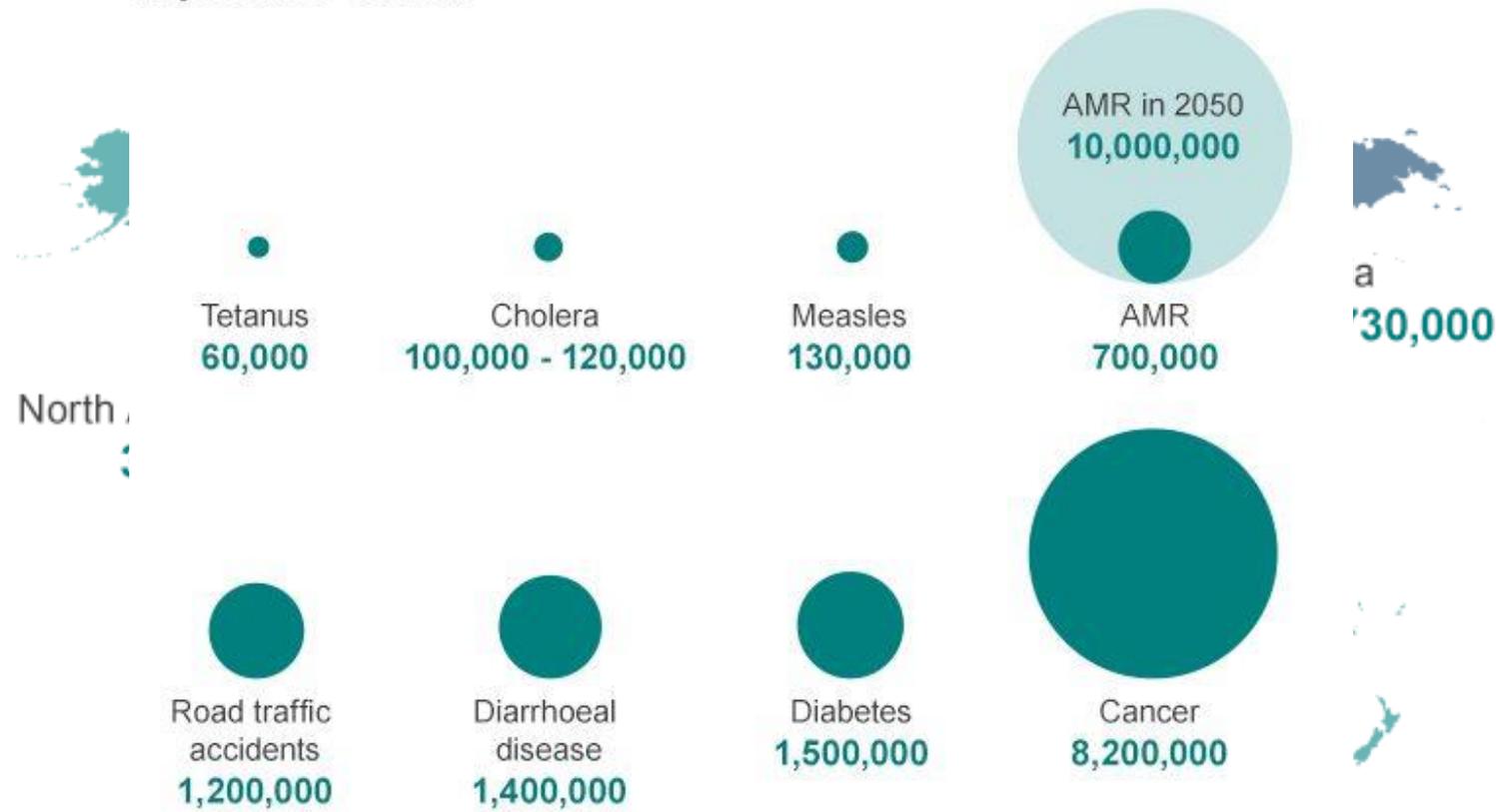
Figure 4: Percent of gonorrhea isolates demonstrating resistance/decreased susceptibility to selected antibiotics, 2011-2015



Source: PHAC, Canadian Antimicrobial Resistance Surveillance System 2017 Report

# Antibiotic resistance...

**Deaths** Deaths attributable to antimicrobial resistance every year compared to other major causes of death



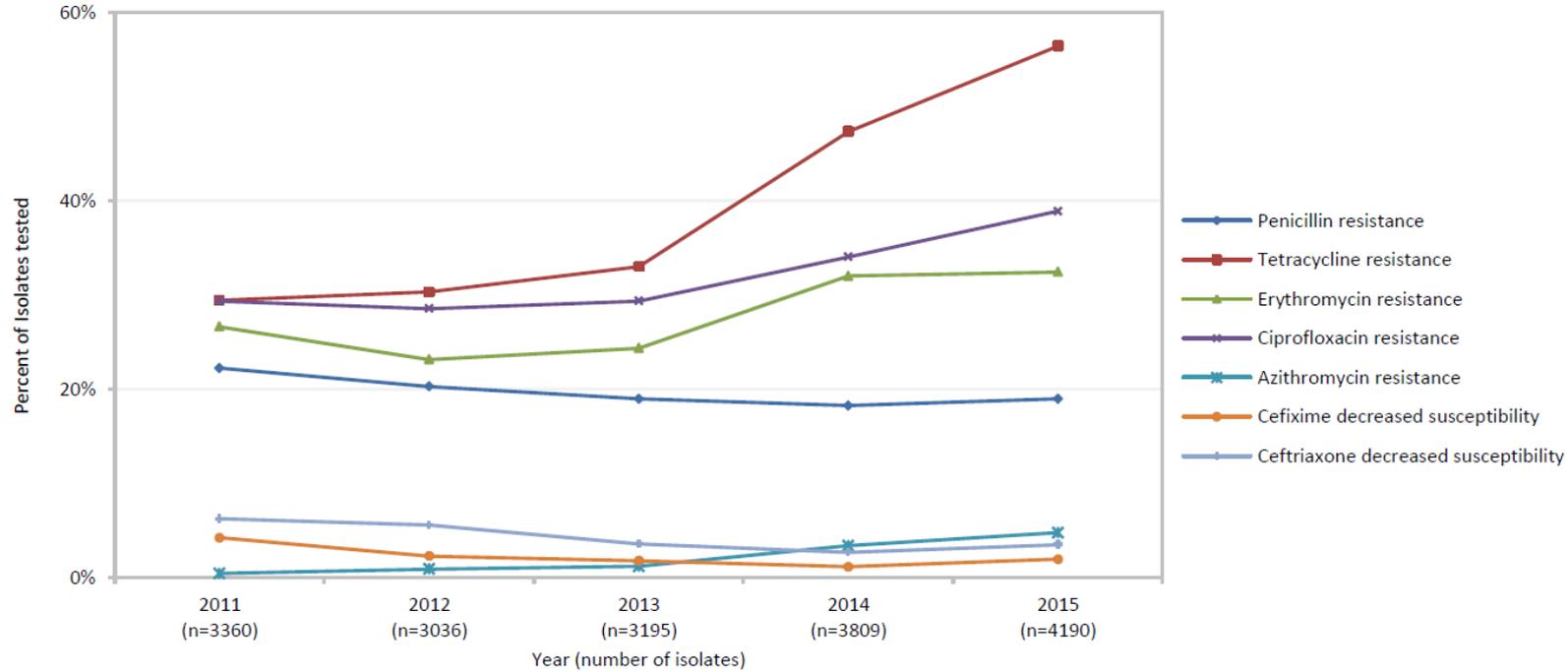
Source: Review on Antimicrobial Resistance 2014

1 deaths/year...

# AMR surveillance...

We can use surveillance methods to track the epidemiology of antibiotic resistant infections and use those data to inform public health practitioners and policy makers.

Figure 4: Percent of gonorrhea isolates demonstrating resistance/decreased susceptibility to selected antibiotics, 2011-2015



# Antimicrobial resistance...



## *Neisseria gonorrhoeae*

- people are often asymptomatic
- symptoms include:
  - painful urination
  - abnormal genital discharge
  - genital pain
- untreated infection can lead to:
  - pelvic inflammatory disease
  - infertility
- first line treatment is azithromycin and ceftriaxone

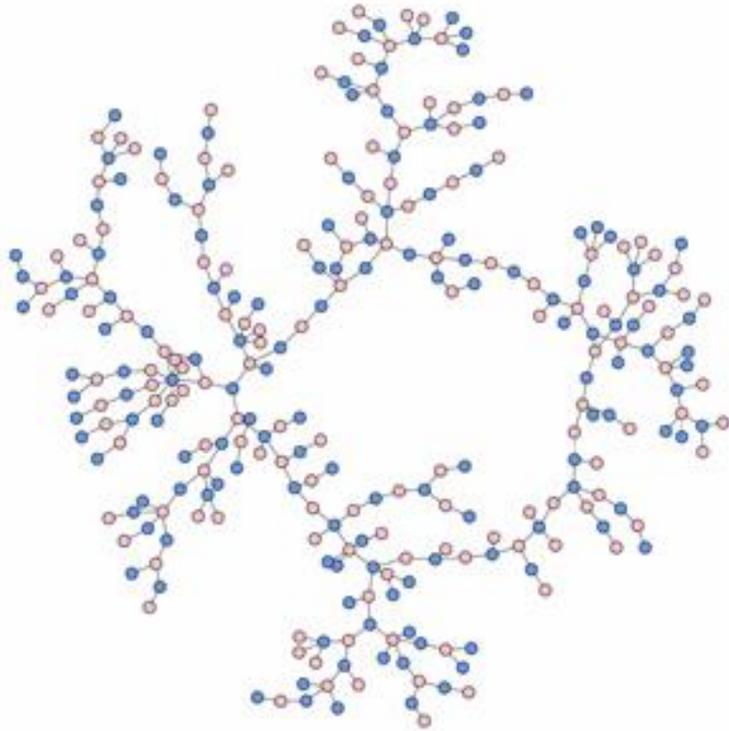


March  
2018

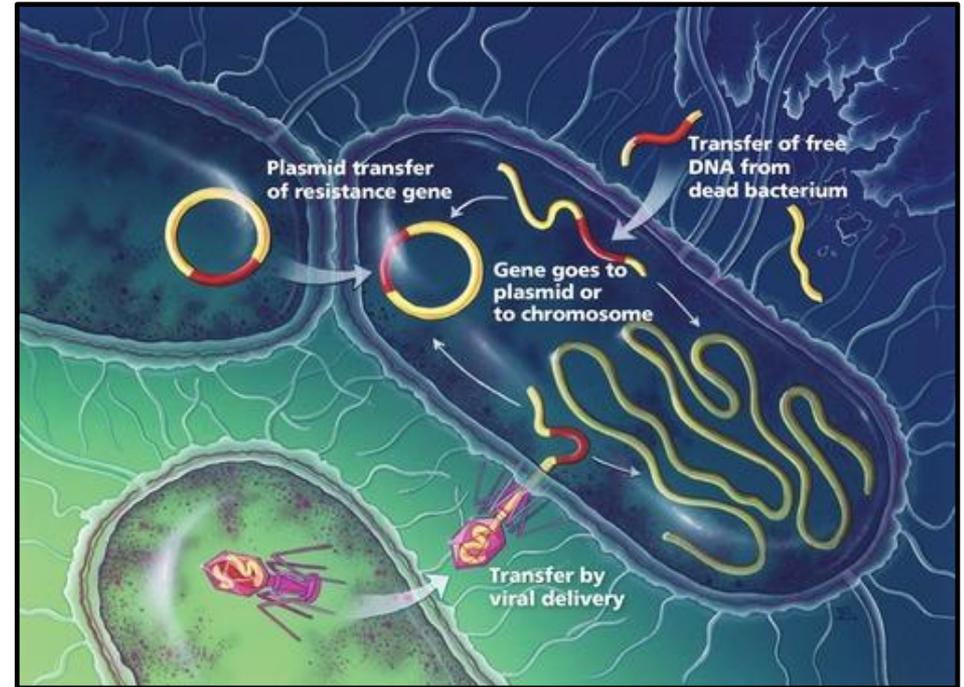


# What's all the fuss about?

These bacteria can spread...



As the bacteria spread, the resistance genes go with them. These genes can then be shared among the local bacterial populations (within and between species).



# AMR surveillance and public health...

What resistance is present in the population?



# AMR surveillance and public health...

What resistance is present in the population?

How do the bacteria spread?



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Which infection control measures should be in place?



# AMR surveillance and public health...

What resistance is present in the population?

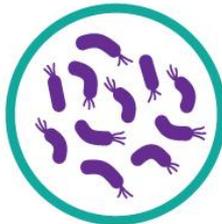
How do the bacteria spread?

Which infection control measures should be in place?

Are we actively monitoring illnesses?

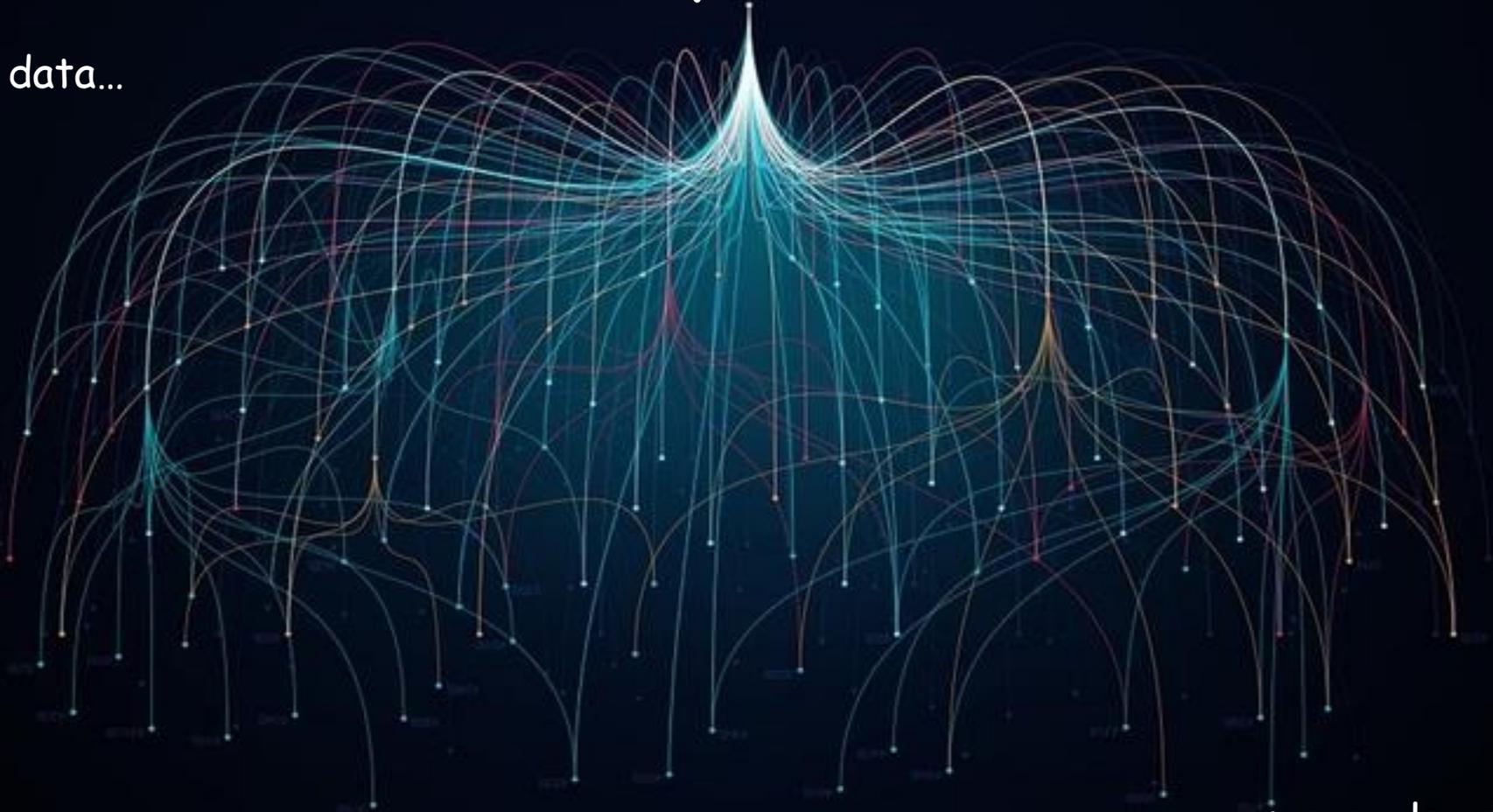


# AMR surveillance and One (Public) Health...



# AMR surveillance and public health...

Big data...



...vs. granular data.

# The goal of antimicrobial stewardship...

Antimicrobial stewardship programs are multidisciplinary teams of experts attempting to slow the development of antimicrobial resistance around the world by promoting appropriate use of antimicrobials.



# Focus on local data...

Local antimicrobial resistance surveillance.

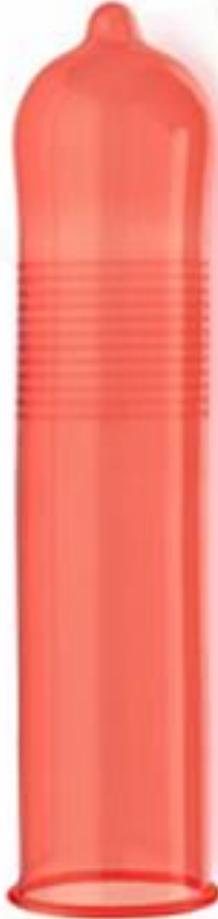
Local antibiotic prescribing patterns (for individual clinicians).

Local educational interventions (for individual patients).

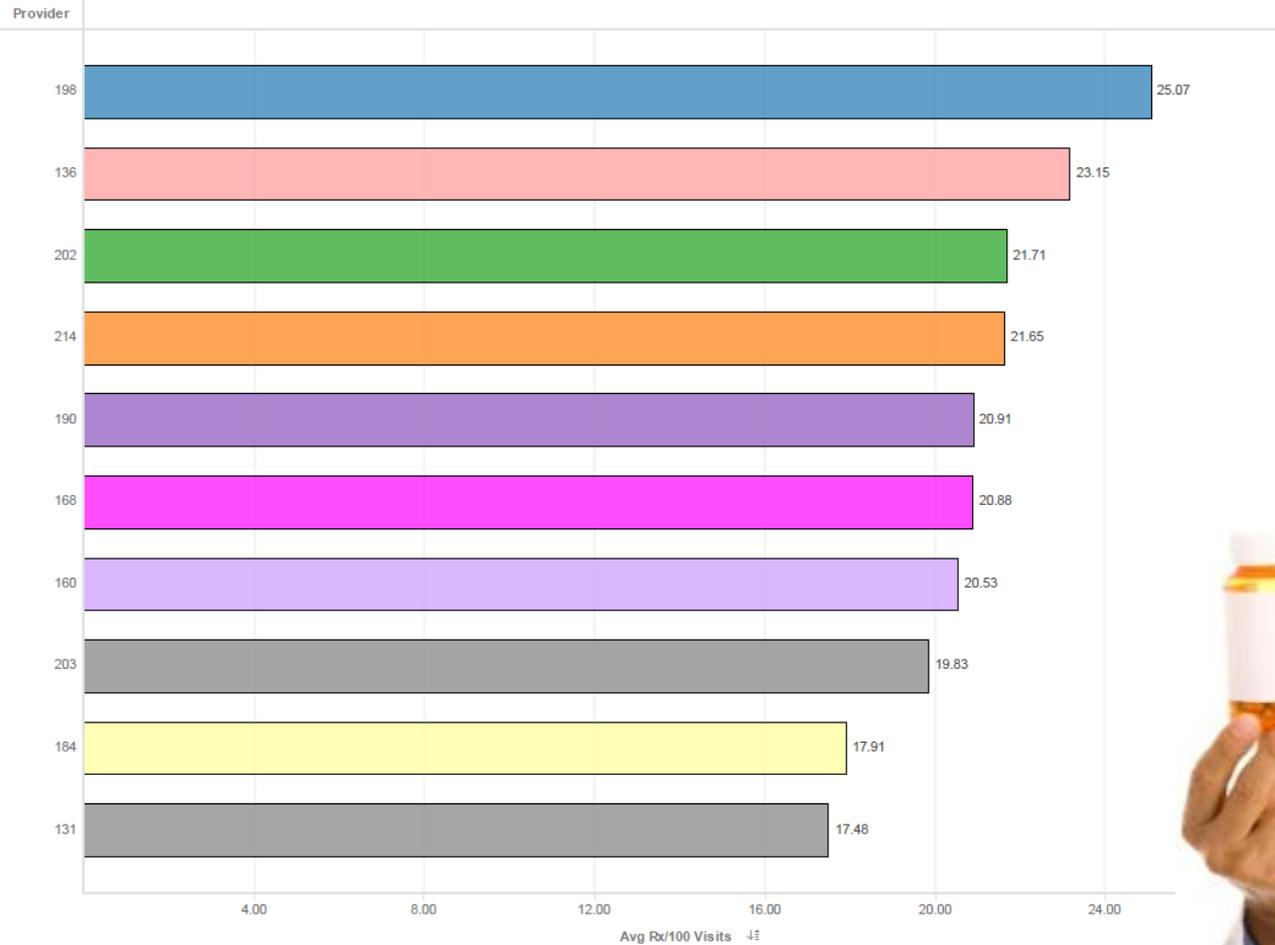


# Find local solutions...

One size does not fit all.

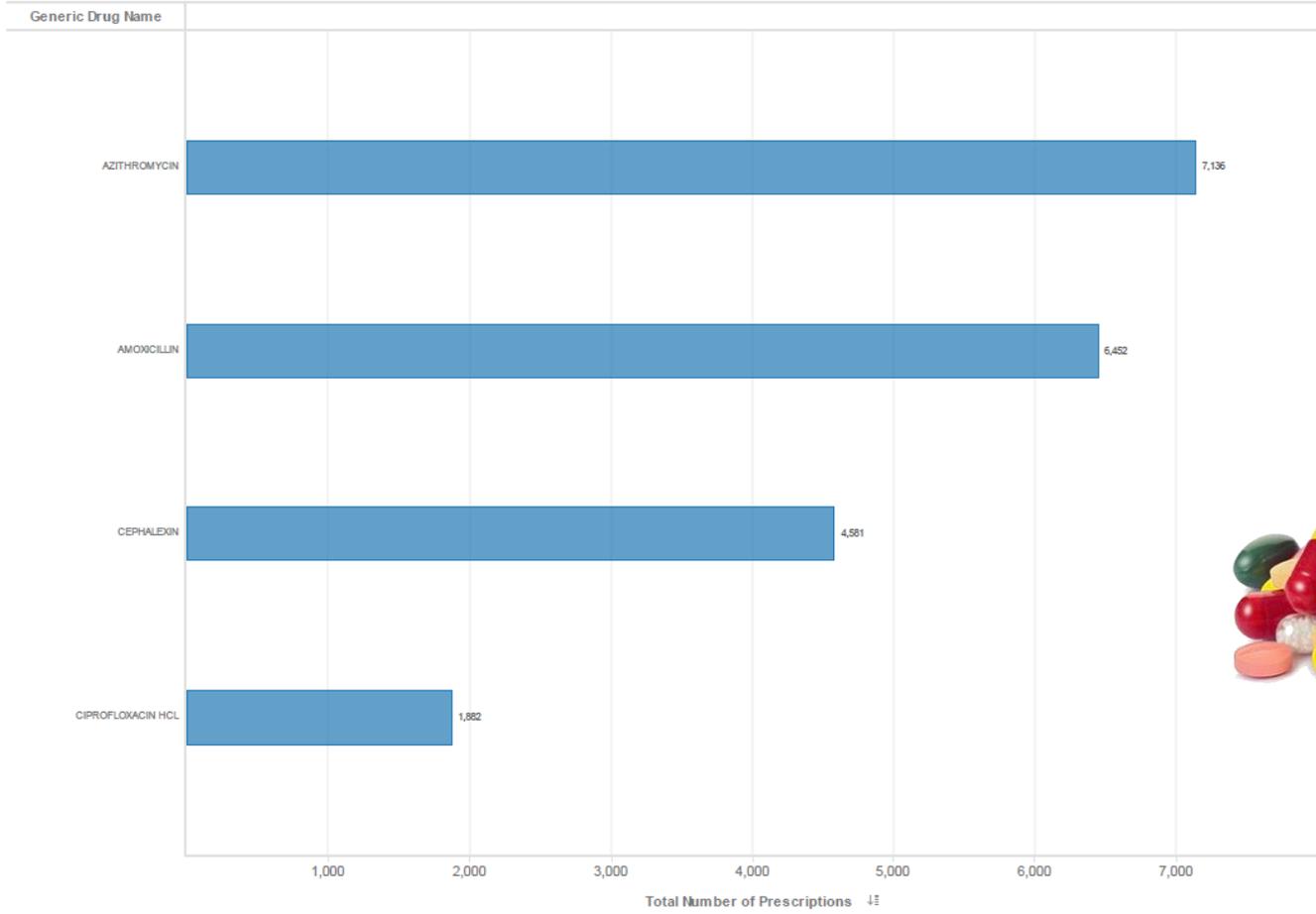


# Regina community clinics...



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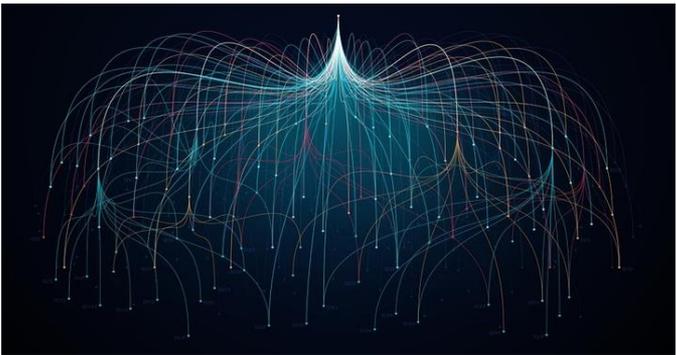
Total Number of Prescriptions by Generic Drug Name



# Regina community clinics...

## Most Frequently Used Antibiotics

 National (2016)	 Local (2015-2017)
Amoxicillin (25%)	Azithromycin (24%)
Azithromycin (10%)	Amoxicillin (18%)



Sources: PHAC, Canadian Antimicrobial Resistance Surveillance System 2017 Report; PHC Med Access EMR

### Regina Qu'Appelle Health Region ANTIBIOGRAM Outpatients January 1, 2016 - December 31, 2016

Azithromycin = Erythromycin

All Specimens – % Susceptible

	# Isolates tested	Penicillin PO	Penicillin IV M	Penicillin IV NM	Ampicillin/Amoxicillin	Amoxicillin-Clavulanic acid	Piperacillin-Tazobactam	Cephalexin <sup>4</sup>	Cefazolin	Cloxacillin	Ceftriaxone	Ceftriaxone IV M	Ceftriaxone IV NM	Ceftazidime	Ertapenem	Meropenem	Clindamycin	Erythromycin	Tetracycline/Doxycycline	Ciprofloxacin	Levofloxacin	Trimethoprim-Sulfamethoxazole	Nitrofurantoin (urine only)	Gentamicin <sup>5</sup>	Tobramycin	Vancomycin	
GRAM-POSITIVE BACTERIA																											
<i>Staphylococcus aureus</i> , all	954							76	76	76							81	69	97			95	100	98		100	
- methicillin-susceptible	784							100	100	100							83	79	97			95	100	99		100	
- methicillin-resistant (MRSA)	264				R	R	R	R	R	R	R			R	R	R	75	35	99			96	100	98		100	
<i>Staphylococcus epidermidis</i>	*27							48	48	48							70	48	89			70	100	93		100	
Viridans group streptococci																											
<i>Enterococcus</i> species (urine) <sup>2</sup>	305				96			R	R	R	R			R	R	R	R		22	85		R	97	85		100	
<i>Enterococcus faecalis</i> <sup>2</sup>	50				88			R	R	R	R			R	R	R	R		22	84		R	100	86		100	
<i>Enterococcus faecium</i> <sup>2</sup>	*13				8			R	R	R	R			R	R	R	R		77	8		R	39	85		69	
<i>Streptococcus pneumoniae</i>	30	83	83	100									93	100				76	93		100	83				100	
Group B Streptococcus	30	100								100								73	67							100	
Group A Streptococcus																											
<i>Streptococcus anginosus</i> group	*25	92								96								83	69							100	

Come "play the game" with us...



...and we can all win together.

# Antimicrobial Stewardship Program



Stopping Bugs

Saving Drugs

# Thank you!

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[www.rqhealth.ca/asp](http://www.rqhealth.ca/asp)



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