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CCCAS collaborative

Comprehensive Antimicrobial Stewardship

Saul R. Hymes, MD

Medical Director, Pediatric Antimicrobial Stewardship

Stony Brook Children's Hospital

Steering Committee Member, CCCAS

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DISCLOSURES

- I have none

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GOALS & OBJECTIVES

- Outline the problem of antimicrobial resistance
  - Discuss human antimicrobial overuse and what we are doing to address it
- Define the problem of animal antimicrobial overuse and why it is relevant to human health
- What do we mean by a One Health approach to antimicrobial stewardship?
  - what problems does it have the potential to solve?

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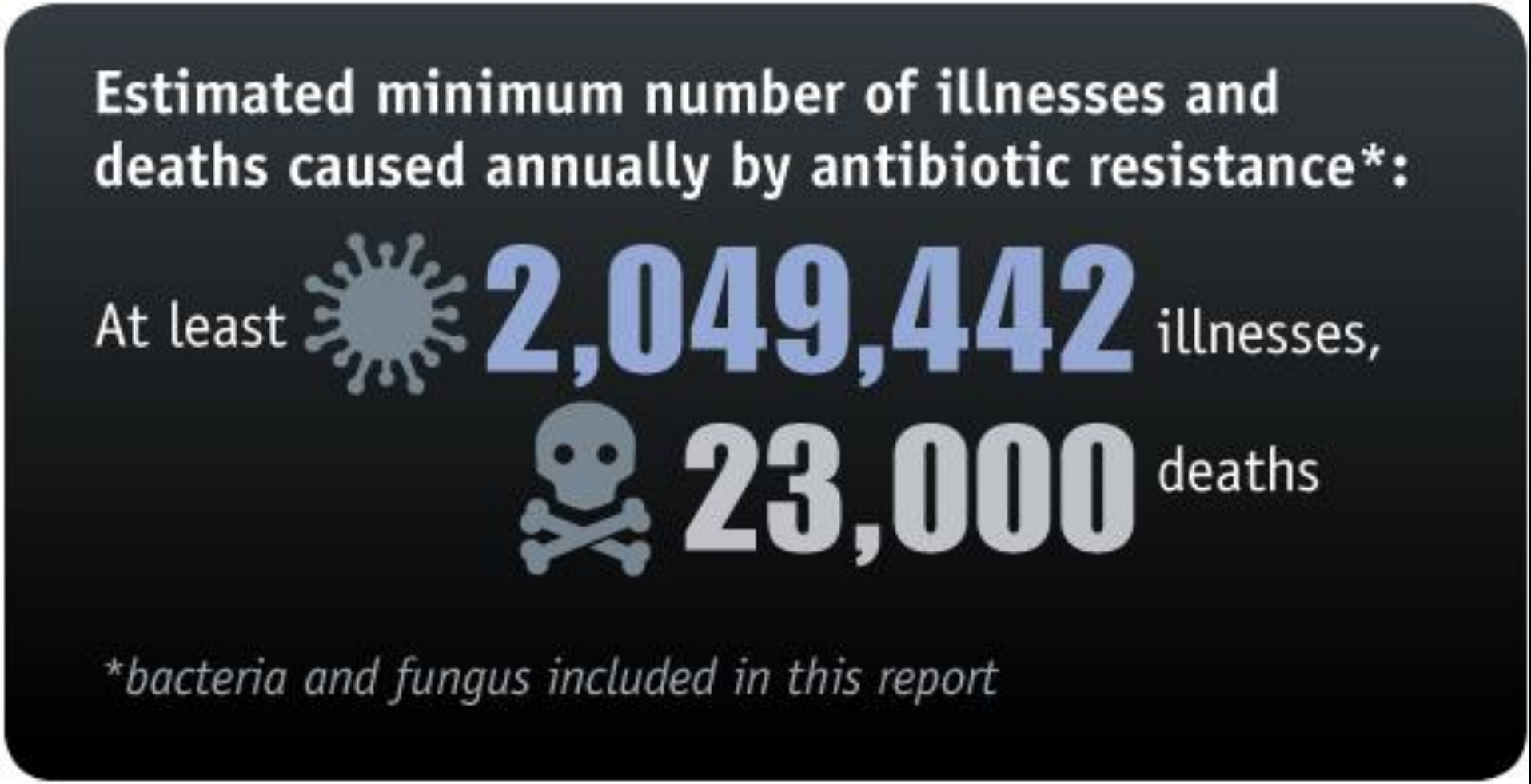
#? THREAT OF 21ST C.



- 2018 estimates revise deaths to >150,000

CDC Threat Report, 2013

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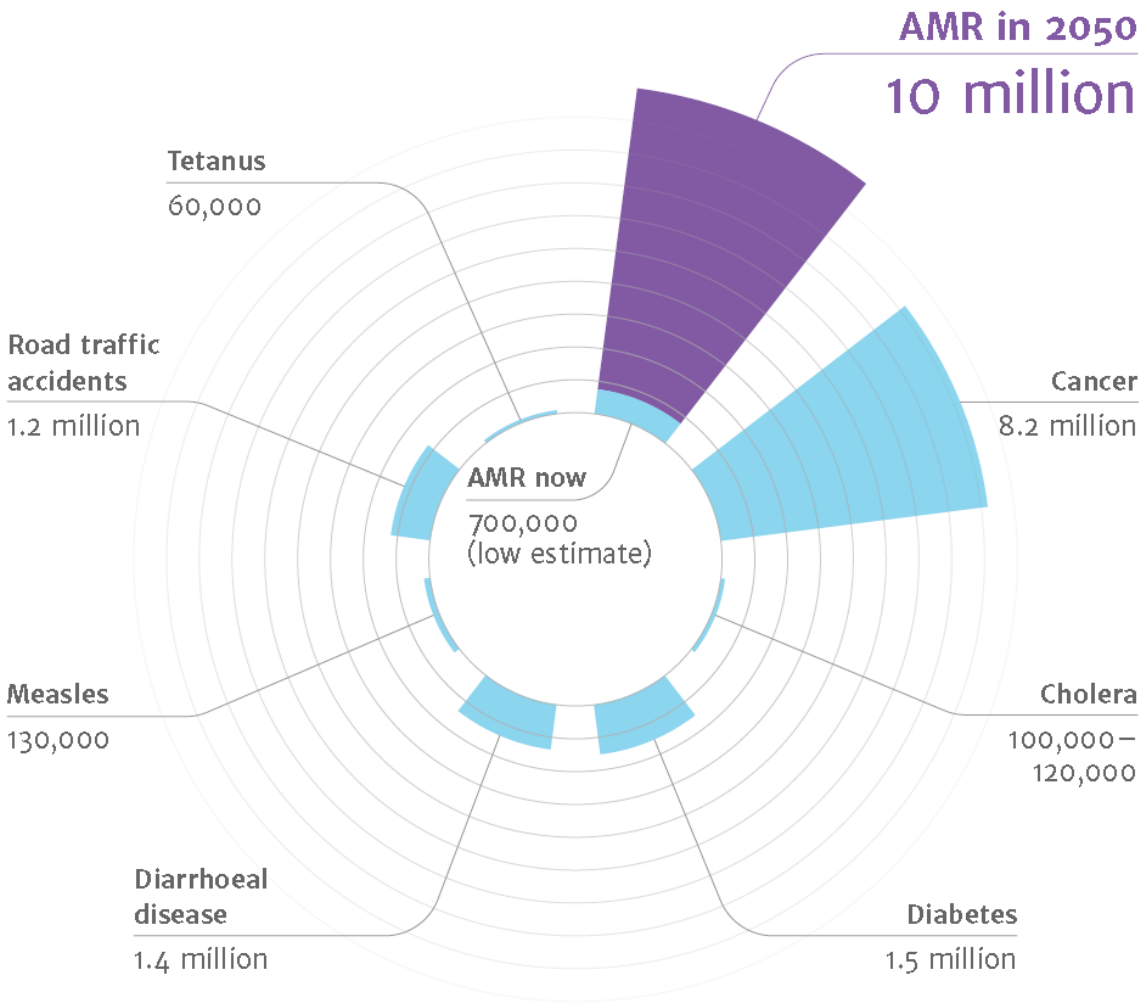
#? THREAT OF 21ST C.



WHO Report, 2016

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#? THREAT OF 21ST C.

"If we're not careful, we will soon be in a post-antibiotic era. For some patients and some microbes, we are already there."

—Tom Frieden,

Former Director of the CDC

Attack of the superbugs: July 2041

What if antibiotics stop working?

How the world belatedly responded to antimicrobial resistance. An imagined scenario from 2041

https://www.economist.com/the-world-if/2019/07/06/what-if-antibiotics-stop-working

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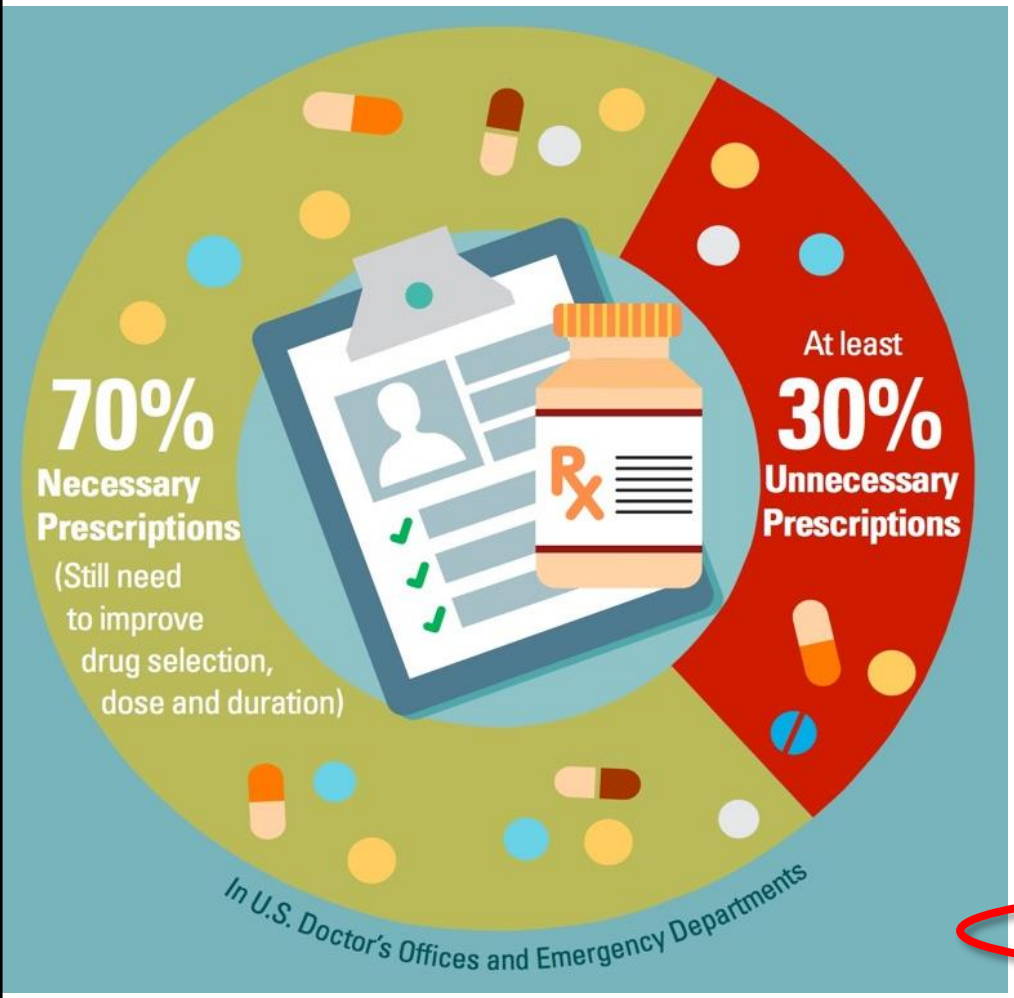
THIS ONE'S ON US



Risk factors for community-onset urinary tract infections due to Escherichia coli harbouring extended-spectrum b-lactamases

Esther Calbo[1]*, Verónica Romaní[1], Mariona Xercavins[2], Lucía Gómez[1], Carolina Garcia Vidal[1], Salvador Quintana[3], Jordi Vila[4] and Javier Garau[1]

[1]Department of Internal Medicine, Infectious Diseases Unit, Hospital Mútua de Terrassa, Barcelona, Spain; [2]Service of Microbiology, Hospital Mútua de Terrassa, Barcelona, Spain; [3]Intensive Care Unit, Hospital Mútua de Terrassa, Barcelona, Spain; [4]Department of Microbiology, Hospital Clínic, University of Barcelona, Spain

Received 7 October 2005; returned 6 November 2005; revised 13 January 2006; accepted 25 January 2006

	Cases (n = 19)	Controls (n = 55)	P
Male/female	4/15	12/43	NS
Mean age (years) (SD)	61.8 (25)	61.3 (23)	NS
Place of residence			
home	17 (89%)	51 (93%)	NS
long-term care facility	2 (10%)	4 (7%)	NS
Bacteraemia	1	3	NS
Charlson score, mean	2.5	1.7	NS
Hospitalization	5 (26%)	4 (7%)	0.04
Intravenous treatment (home programme)	4 (21%)	1 (2%)	0.01
Previous bacterial infection	13 (68%)	18 (33%)	0.01
Urinary abnormalities	11 (58%)	18 (33%)	<0.03
Oral cefuroxime	12 (63%)	5 (9%)	<0.05

CDC Data
Calbo et al. JAC, 2006

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IS THIS HOW WE FIX IT?

Core Elements of Hospital Antibiotic Stewardship Programs

CDC, 2014

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IS THIS HOW WE FIX IT?

Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Recommendations and Reports / Vol. 65 / No. 6
November 11, 2016

Core Elements of Outpatient Antibiotic Stewardship

CDC, 2016

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NO…BUT THIS IS…?

FORUM ON ANTIBIOTIC STEWARDSHIP

JUNE 2, 2015

Inpatient: 2017, Outpatient: 2020

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HUMAN ASP'S

- CDC gives guidance on structure
  - Committee led by Medical Director (me!), Pharmacy Lead
  - Need institutional buy-in
  - Multiple members on committee—micro, infection control, nursing…nutrition…?
- Various activities to either review use post hoc, or restrict use in advance
- All depend on data!!
  - what you're using, how you use it, and do interventions move the needle?

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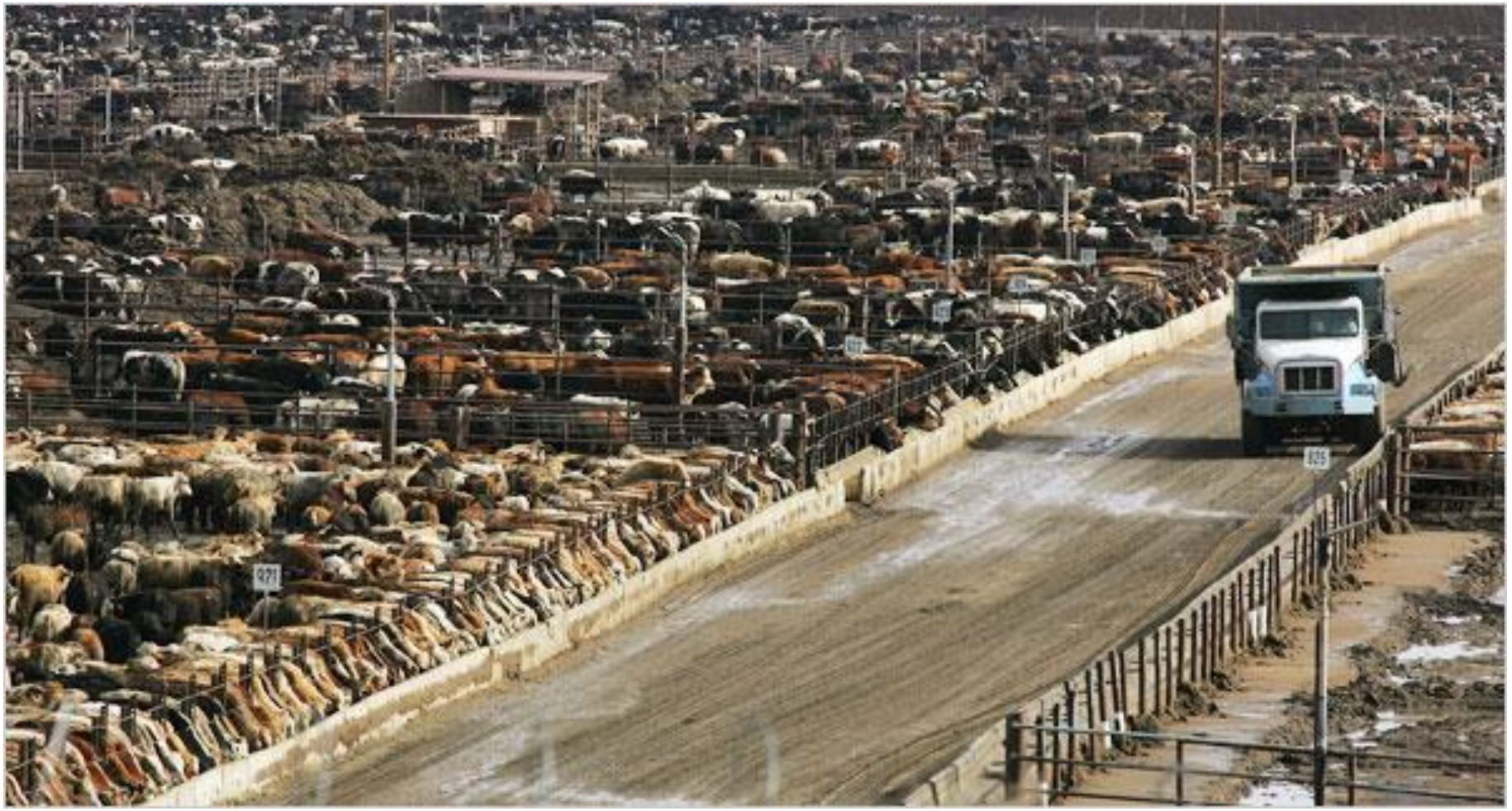
MORE THAN JUST US



NY Times

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MORE THAN JUST US

Antimicrobial Drugs Approved for Use in Food-Producing Animals: 2009 Sales and Distribution Data Reported by Drug Class

drug class	Kilograms	pounds	% of total
FOOD-ANIMAL USE			
aminoglycosides	339,678	748,862	2%
cephalosporins	41,328	91,113	0%
ionophores	3,740,627	8,246,671	23%
lincosamides	115,837	255,377	1%
macrolides	861,985	1,900,352	5%
penicillins	610,514	1,345,953	4%
sulfas	517,873	1,141,715	3%
tetracyline	4,611,892	10,167,481	28%
NIR	2,227,366	4,910,501	14%
sub-total	13,067,100	28,808,024	**79.8%**
HUMAN MED USE	3,300,000	7,275,255	**20.2%**
TOTAL	16,367,100	36,083,279	100%

Source: FDA

Mother Jones

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FARM ANTIBIOTIC USE

- 1. Disease prevention
  - Given to all animals to prevent infection (unhealthy conditions)
  - E.g. Mass administration to entire buildings/herds
  - Or injected into chicken eggs along with vaccines
- 2. Outbreak containment
  - Given to animals near a sick animal to prevent an infection spreading to the herd
- 3. Treatment of sick animals

- Growth Promotion no longer permitted as a use*

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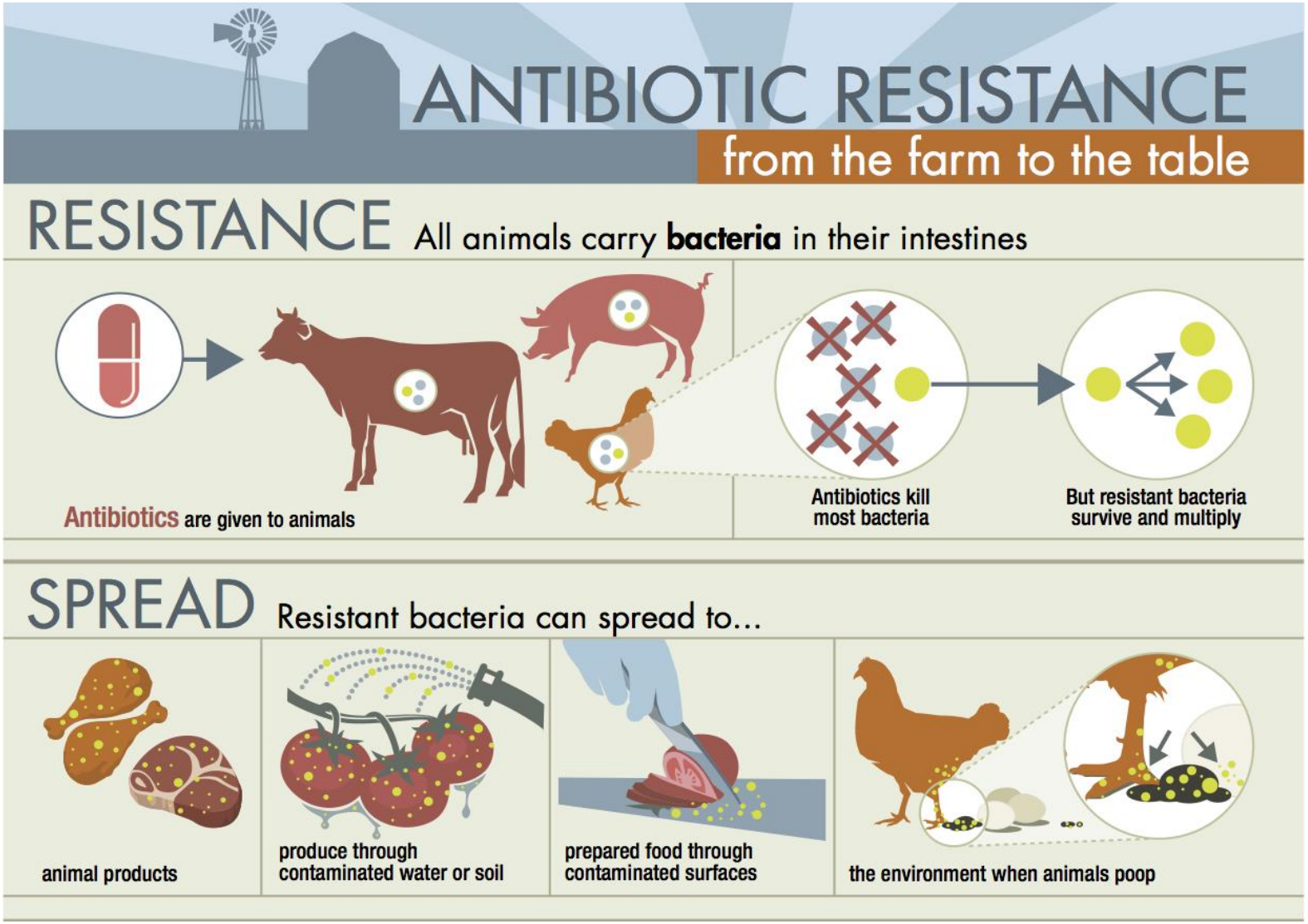
SO WHAT?



CDC

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SO WHAT?

- Resistant bacteria found on food or in the environment can spread to people but not just about the bacteria
- Unmetabolized antimicrobials get into soil and ground water through urine and manure
  - → resistance in environmental organisms

- 1 in 5 resistant infections in humans originated from antibiotic use in animals (CDC, 2013)

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SO WHAT?

Swine Farming Is a Risk Factor for Infection With and High Prevalence of Carriage of Multidrug–Resistant *Staphylococcus aureus* FREE

Shylo E. Wardyn ✉, Brett M. Forshey, Sarah A. Farina, Ashley E. Kates, Rajeshwari Nair, Megan K. Quick, James Y. Wu, Blake M. Hanson, Sean M. O'Malley, Hannah W. Shows ...
Show more

Clinical Infectious Diseases, Volume 61, Issue 1, 1 July 2015, Pages 59–66,
https://doi.org/10.1093/cid/civ234
Published: 29 April 2015 **Article history** ▾

- Swine Farmers 6-8x more likely to be colonized with same strain as pigs
- Resistance patterns show drug-resistance came from the pigs

CID, 2015

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SO WHAT?

...work from my lab has shown that, first, the "livestock-associated" strain of methicillin-resistant S. aureus (MRSA) that was found originally in Europe and then in Canada, ST398, is in the United States in pigs and farmers; that it's present here in raw meat products; that "LA" S. aureus can be found not only in the agriculture-intensive Midwest, but also in tiny pig states like Connecticut. With collaborators, we've also shown that ST398 can be found in unexpected places, like Manhattan,

Pediatrics
December 2015, VOLUME 136 / ISSUE 6
From the American Academy of Pediatrics
Technical Report

Nontherapeutic Use of Antimicrobial Agents in Animal Agriculture: Implications for Pediatrics

Jerome A. Paulson, Theoklis E. Zaoutis, THE COUNCIL ON ENVIRONMENTAL HEALTH, THE COMMITTEE ON INFECTIOUS DISEASES

https://scienceblogs.com/aetiology/2015/04/30/st398-carriage-and-infections-in-farmers-united-states
Pediatrics, 2015

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

One Health

One Health recognizes that the health of people is connected to the health of animals and the environment. It is a collaborative, multisectoral, and transdisciplinary approach—working at the local, regional, national, and global levels—with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment.

A One Health approach is important because 6 out of every 10 infectious diseases in humans are spread from animals.

New York State Department of Health Unveils Comprehensive Strategy to Combat Antimicrobial Resistance In NYS

NYSDOH launches Antimicrobial Resistance Prevention and Control Taskforce to lead coordinated response to protect New Yorkers

ALBANY, N.Y. (July 21, 2016) – New York State Commissioner of Health Dr. Howard A. Zucker today announced the establishment of a multidisciplinary New York State Antimicrobial Resistance Prevention and Control Task Force.

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The Joint Commission

??

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DEPENDS ON WHO THE GROUP IS…

- FDA Guidance 213 on veterinary antibiotic use
  - Voluntary guidance to manufacturers around use conditions
- USDA Veterinary Feed Directive (1/1/2017)
  - Removed most antibiotics from OTC lists, required prescriptions
  - Still allowed to be in food and water
  - No longer allowed to be used for "growth promotion" so now Rx's are being written for "disease prevention"
- USDA/FDA is unable to regulate as needed

NEWS RELEASE

For immediate release: June 3, 2019

For more information:
Blair Horner, NYPIRG, bhorner@nypirg.org, 518-436-0876 x257
Zameena Mejia, Senator Brian Kavanagh's office, zmejia@nysenate.gov, 347-277-2346
Justin Wilcox, Assemblywoman Jamie Romeo's office, wilcoxj@nyassembly.gov, 518-455-5373
Michael McCauley, Consumer Reports, mmccauley@consumer.org, 415-902-9537

LEGISLATORS AND OVER 70 GROUPS CALL FOR PASSAGE OF BILL THAT WILL REDUCE THREAT OF ANTIBIOTIC-RESISTANT "SUPERBUGS"

Senator Kavanagh, Assemblywoman Romeo and Advocates Urge Action and Protect the Public's Health

(Albany) — Senator Brian Kavanagh and Assemblywoman Jamie Romeo joined NYPIRG and over 70 national and state environmental, health, and consumer organizations today to call on the State Legislature and the Governor to take action against the immediate and growing threat to the public's health posed by antibiotic-resistant "superbugs."

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What you need to know: Why New York is more worried about 'superbugs'

Reason for concern

Lawmakers and advocates gathered in Albany on Monday to urge the passage of a bill that would reduce the use of antibiotics in food-producing animals. *(Photo: Chad Arnold)*

We'll see where this takes us…

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eating and health

McDonald's Says It Won't Be Serving Chicken Raised On Antibiotics

MARCH 04, 2015 4:38 PM ET

KFC: Mission Accomplished on Antibiotics

January 24, 2019 | Lena Brook

With this commitment, the popular fast-food restaurant is helping to transform antibiotic use practices in the chicken industry.

Chain Reaction: How Top Restaurants Rate on Reducing Antibiotics in Their Meat Supply

NRDC

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QUESTIONS