

A close-up photograph of a petri dish containing a bacterial culture. The medium is a light brown color, and there are several white, fuzzy bacterial colonies of varying sizes and shapes, some appearing as small dots and others as larger, more confluent patches. The lighting is bright, highlighting the texture of the colonies.

Antimicrobial Resistance

Role of Attending Veterinarians at Animal Facilities

Objectives

Define Antimicrobial Resistance (AMR)

Identify risk factors contributing to AMR

Determine what you can do about it

Learn about ongoing efforts and resources



Photo credit: <https://flickr.com/photos/nathanreading/6855788039>

What is AMR?

Microorganisms encode survival mechanisms in DNA

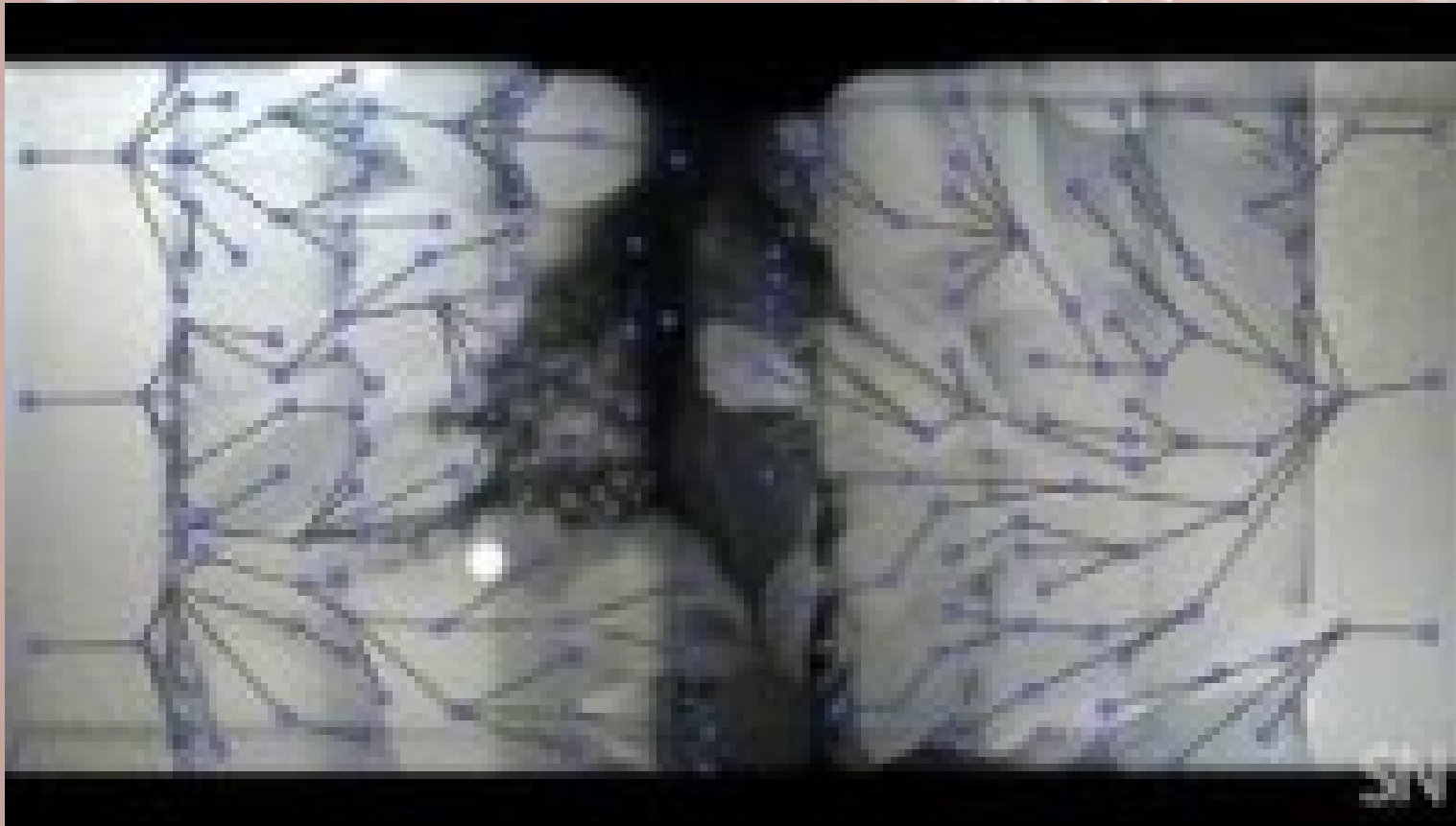
- Avoid inhibition and destruction by traditional antibiotics

Microbes trade and spread genes as they multiply

- The more bacteria and fungi are in the presence of antimicrobials, the more likely they will trade and spread resistance genes, becoming able to establish drug-resistant infections in humans and animals

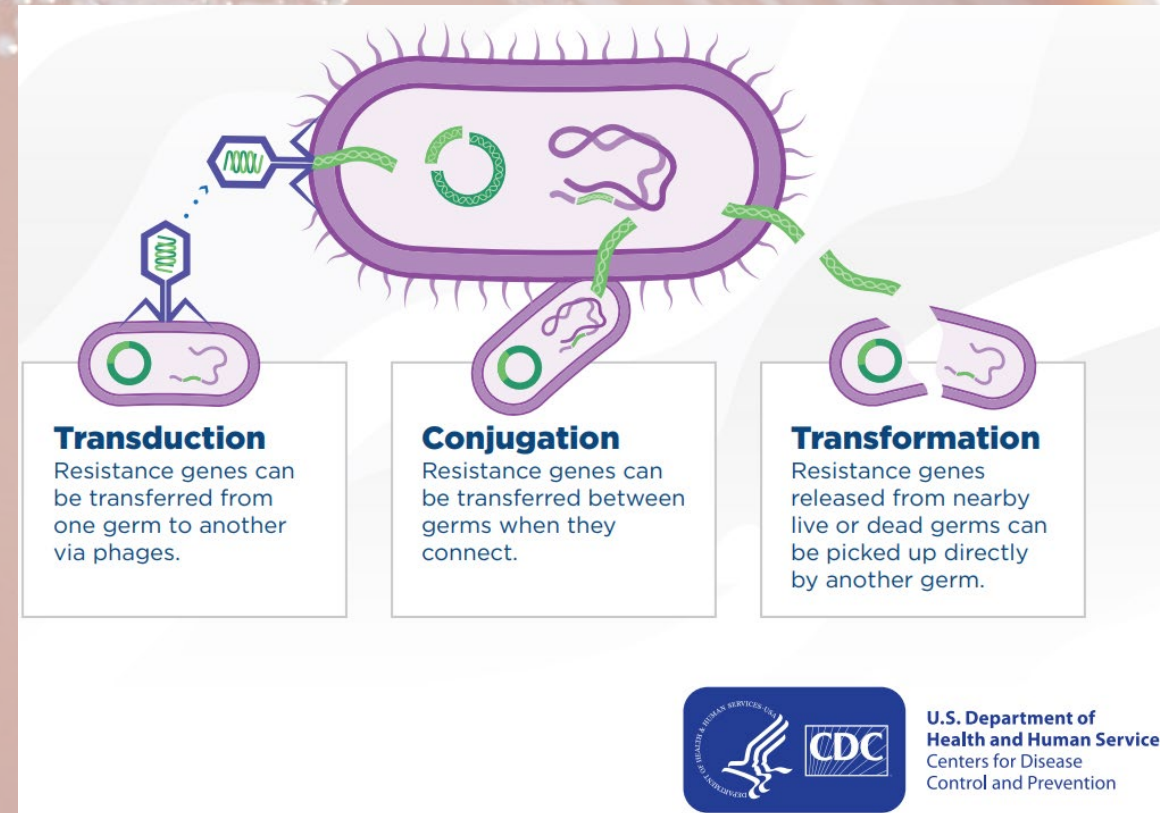
Video of AMR

[Click Here](#) to be directed to the video clip below.



Trading Genes

- Some bacterial DNA are in small pieces called plasmids
- Easily traded between neighbors
- Fast multiplication rate means millions of copies produced and spread rapidly



Impact of AMR in Humans

- Traditional drugs no longer work! 1 in 8 MRSA, 1 in 3 *E. coli* are resistant to first-line treatments
- 2013: 2.6 million infections, 44,000 deaths
- 2019: 2.8M infections, 35,000 deaths in US; 3.1M deaths worldwide
- 18 bacteria and fungi of concern



Impact of AMR in Animals

- AMR infections cause serious threat to animal health
- AVMA reports >20 pathogens of concern with resistance patterns
- Increasing efforts to prevent infections and practice good antimicrobial stewardship

Animal pathogens of heightened concern

	Aminoglycosides	Amphenicols	Carbapenems	Cephalosporins	Fluoroquinolones	Lincosamides	Macrolides	Penicillins	Pleuromutlins	Sulfonamides	Tetracyclines	Trimethoprim
<i>Aeromonas</i> spp		●									●	●
<i>Campylobacter jejuni</i>	●				●	●	●				●	
<i>Edwardsiella</i> spp		●									●	●
Enterobacteriales	● ● ●	●		● ●	●			● *		● ●	● ●	●
<i>Enterococcus</i> spp					*		●	●				
<i>Flavobacterium psychrophilum</i>		●									●	●
<i>Moraxella</i> spp							●				●	
<i>Ornithobacterium rhinotracheale</i>								●		●	●	
Pasteurellaceae					● ●		●	● ●	●	●	● ●	
<i>Pseudomonas aeruginosa</i>	●		●		●							
<i>Salmonella</i> spp	●	●		●	●		●	●	●	●	●	
<i>Staphylococcus</i> spp	●			●	●	●	● ●	● *			● *	
<i>Streptococcus</i> spp				●	●			●				
<i>Vibrio</i> spp	●	●		●	●		●	●		●	●	●

● Dogs & Cats
 ● Cattle
 ● Chickens & Turkeys
 ● Equine
 ● Fish & Shrimp
 ● Sheep & Goats
 ● Swine

AMR is a Global, One Health Concern

Increasing infections outside of hospitals (community-acquired)

- Greater exposures (not contained)
- Difficult to track spread
- Threaten immunocompromised



The screenshot shows the top portion of a website article. At the top left is the FDA U.S. Food & Drug Administration logo. To the right are search and menu buttons. Below the header is a breadcrumb trail: Home / Animal & Veterinary / Resources for You / Animal Health Literacy / Get the Facts! Raw Pet Food Diets can be Dangerous to You and Your Pet. The main heading of the article is "Get the Facts! Raw Pet Food Diets can be Dangerous to You and Your Pet". Below the heading are social sharing icons for Facebook, Twitter, LinkedIn, Email, and Print.

Original Investigation | Public Health

September 15, 2021

Ongoing Outbreak of Extensively Drug-Resistant *Campylobacter jejuni* Infections Associated With US Pet Store Puppies, 2016-2020

Antimicrobial Stewardship

- Standards and guidance on proper use of antibiotics
- Reduce likelihood of selection pressure leading to resistance
- Prevent unnecessary or inappropriate use
- Continuous monitoring and evaluation of antimicrobial use practices
- Require veterinary oversight
- Husbandry and prevention

ANTIMICROBIAL STEWARDSHIP definition and core principles



ANTIMICROBIAL STEWARDSHIP FOR VETERINARIANS DEFINED

Antimicrobial stewardship refers to the actions veterinarians take individually and as a profession to preserve the effectiveness and availability of antimicrobial drugs through conscientious oversight and responsible medical decision-making while safeguarding animal, public, and environmental health.

CORE PRINCIPLES OF ANTIMICROBIAL STEWARDSHIP IN VETERINARY MEDICINE

Antimicrobial stewardship involves maintaining animal health and welfare by implementing a variety of preventive and management strategies to prevent common diseases; using an evidence-based approach in making decisions to use antimicrobial drugs; and then using antimicrobials judiciously, sparingly, and with continual evaluation of the outcomes of therapy, respecting the client's available resources.

Objectives

~~Define AMR~~

Identify risk factors contributing to AMR

Determine what you can do about it

Learn about ongoing efforts and resources

AMR Risk Factors

- Expired, contaminated, or blanket prescription antimicrobials
- Written plans: “routine” prevention or group treatments
- Poor infection control strategies
- Health or environmental stressors



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AMR Risk Factors

Risks	Management Strategies
Immune-suppressed patients: pregnant, young, stressed, cancer, diabetes, Cushing's, allergies, chronic steroid use	Ensure good welfare, closely oversee treatments, take additional infection control precautions
Poor hygiene allows infections to spread	Biosecurity, quarantine, infection control
Poor antimicrobial stewardship	Vaccinate against bacterial infections; conduct culture and susceptibility testing; avoid antibiotics as routine prophylaxis
Raw food diets (~25% contamination rate)	Hygiene; sanitization of food prep areas, tools and storage areas

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Qualifications of Attending Veterinarians

- Graduate of an AVMA accredited veterinary school, OR
- Certificate issued by AVMA Education Commission for Foreign Veterinary Graduates, OR
- Equivalent formal education as determined by the APHIS administrator;
- Training and/or experience in the care and management of the species being attended to as the veterinarian, AND
- Authority granted by the regulated facility to provide veterinary care for the animals

The Attending Veterinarian's Authority

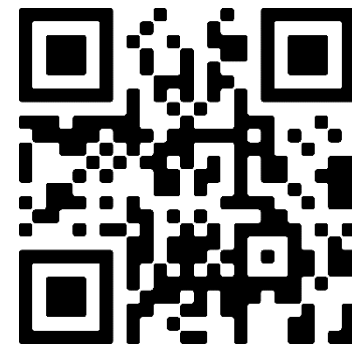
- Ensure adequate veterinary care
- Oversee the adequacy of other aspects of animal care and use
- Duties performed by the AV to ensure compliance with the regulations are ultimately the responsibility of the licensee, who must provide the AV adequate authority to carry out his/her functions
- ***Authority over all aspects of veterinary care***

Licensees'/Registrants' Responsibilities

- Hire an Attending Veterinarian under formal arrangements
- Give the Attending Veterinarian authority
- Establish and follow programs of adequate veterinary care
- Perform daily observation of all animals
- Communicate directly and frequently with the Attending Veterinarian
- Provide appropriate facilities and equipment for adequate veterinary care

Requirements of a Program of Veterinary Care

- ✓ Availability of appropriate personnel, facilities, and equipment
- ✓ Methods to prevent and control disease, including emergency care
- ✓ Daily observation of all animals to assess health and well-being
- ✓ Guidance to personnel involved in the care and use of animals
- ✓ Adequate pre-procedural and post-procedural care



Actions to Take with Individual Facilities

Preventive medicine program

- **Vaccinations**, deworming
- Screening tests

Written treatment protocols

Nutrition choices, food handling, preparation, and storage



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Actions to Take with Individual Facilities

Minimize health stressors:

- Underlying conditions
 - Parasites
 - Poor body condition
 - Allergies

Manage immunocompromised patients carefully

- Infection control measures
- Emphasize communication

Actions to Take with Individual Facilities

Infection control strategies

- Animal and human hygiene
- Quarantine/isolation
- Personal Protective Equipment (PPE)
- Disinfection (contact time!)



Photo credit – Adobe Stock

Actions to Take with Individual Facilities

Maximize animal welfare!

- Poor welfare → chronic stress → immune suppression → more infections

Eliminate stressors from:

- Housing – sanitization, injuries, overcrowding, fighting, compatibility
- Environment – temperature, humidity, ventilation
- Nutrition – appropriate diets, animals in good body condition
- Psychological distress – enrichment, socialization

Actions to Take in Your Practice

Commit to a plan of stewardship

Judicious use of antimicrobials

- Culture and sensitivity
- Right drug, dose, duration
- Consider alternative therapies

Actions to Take in Your Practice

- Use published, accepted medical diagnostics and treatment guidelines
- Monitor and evaluate antimicrobial use practices
- Emphasize preventive strategies
- Educate clients, ensure compliance with antibiotic instructions
- Professional development on current drug recommendations

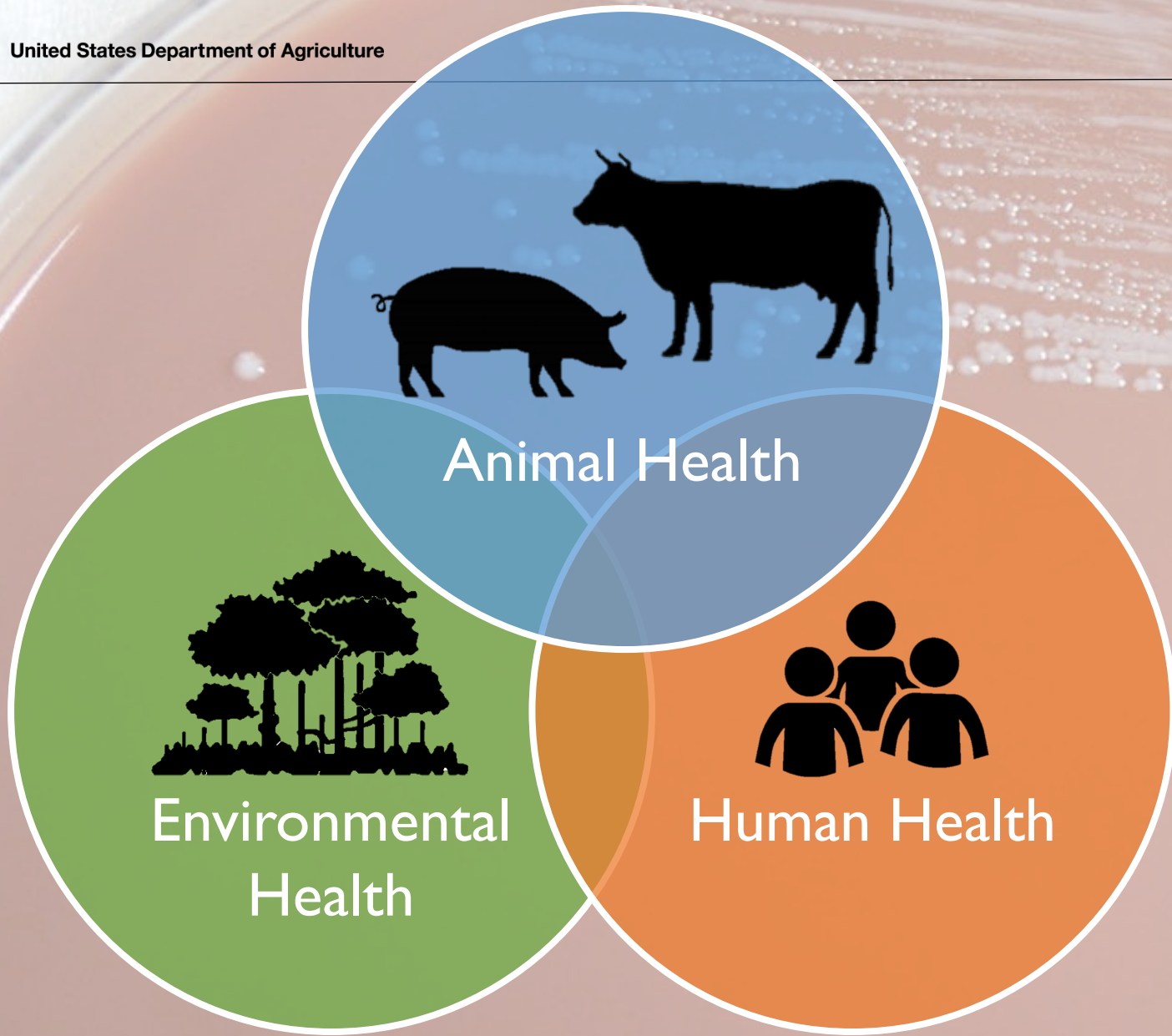
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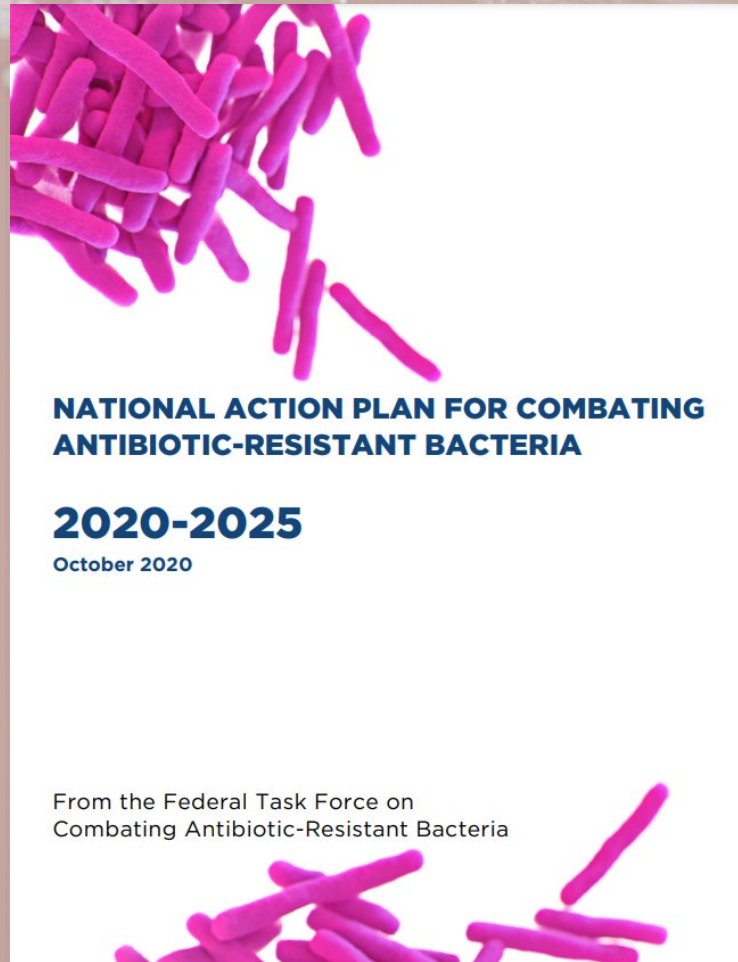
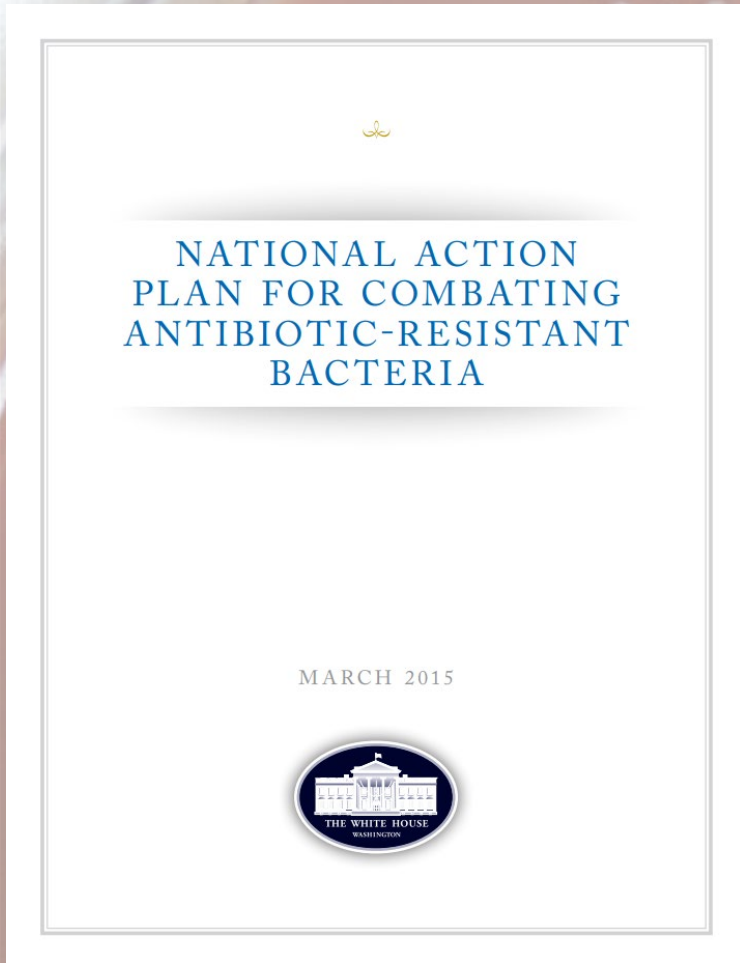
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Antimicrobial
Resistance is a
One Health
challenge



Animal Health and Antimicrobial Resistance



Antimicrobial Use and
Stewardship Monitoring



Monitoring



Education and Outreach



and University Partners

Environmental Health



Crops



Wildlife



Preventing antimicrobial resistance together



Food and Agriculture
Organization of the
United Nations



environment
programme



World Health
Organization



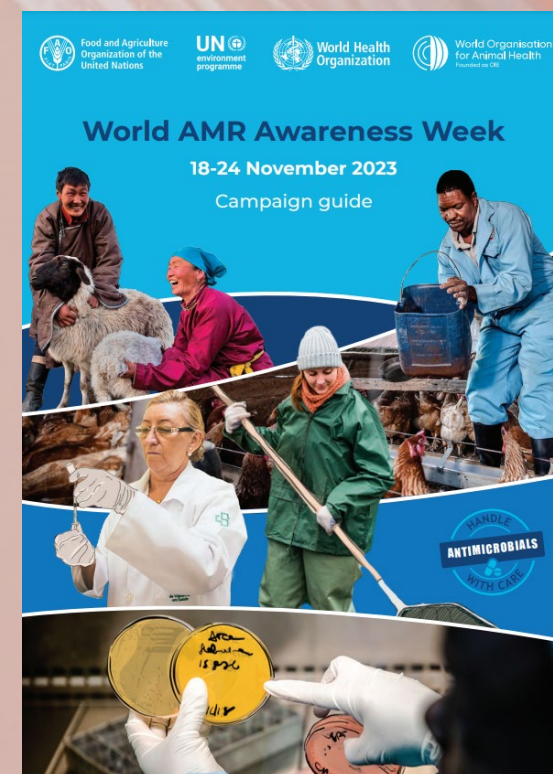
World Organisation
for Animal Health
Founded as OIE

Resources



- [Animal Care Aids](#)
- [Centers for Disease Control & Prevention](#)
- [U.S. Antibiotic Awareness Week \(USAAW\)](#)
- [National Antimicrobial Resistance Monitoring System](#)
- [FDA Center for Veterinary Medicine](#)
- [World Organisation for Animal Health \(WOAH\) ANIMUSE](#)
- [AVMA](#) and other VMAs:

AAAP	AAFP/AAHA
AABP	APV
AAEP	AASRP
	AASV

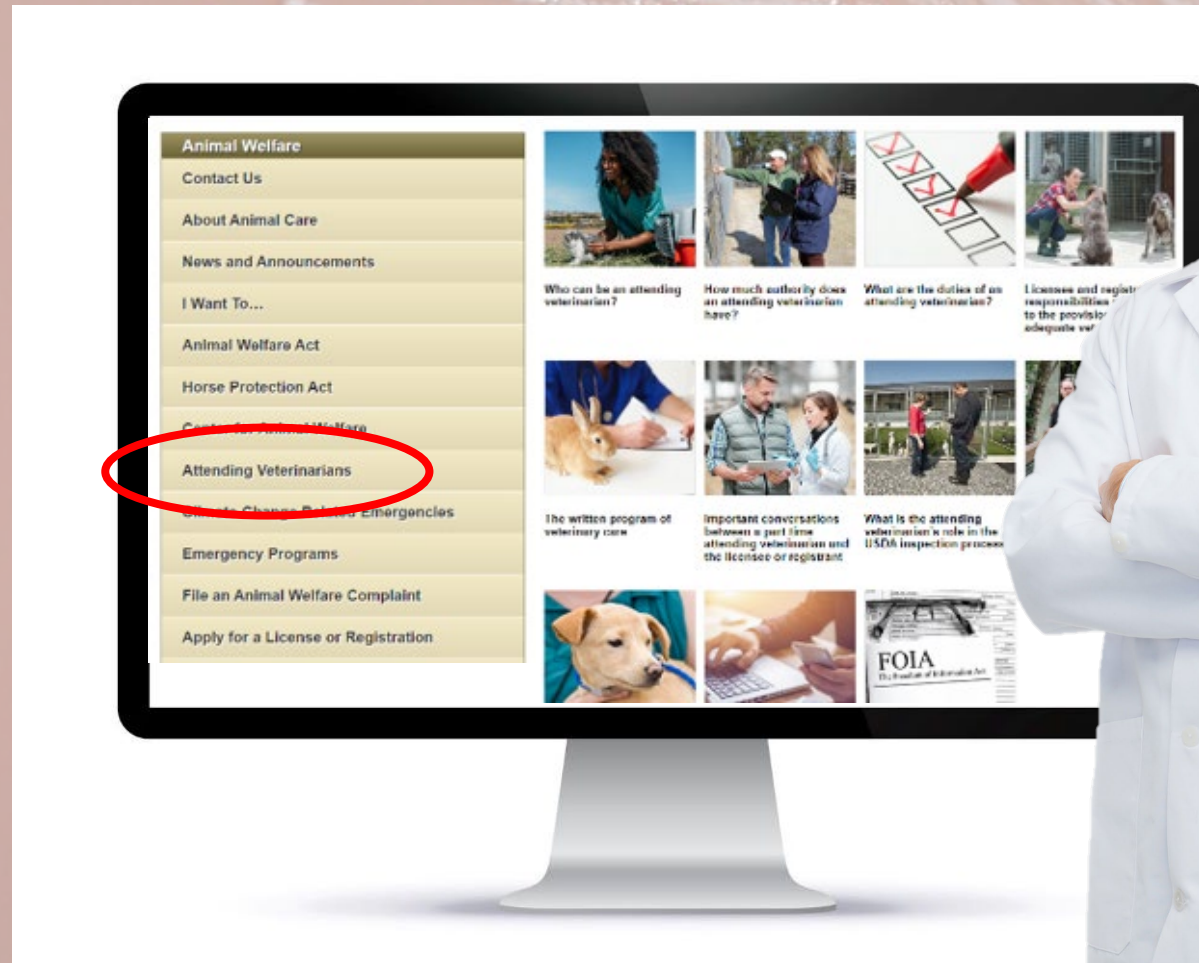


Resources

- [Presidential Advisory Council on Combating Antibiotic Resistant Bacteria](#)
- [National Action Plan for Combating Antibiotic-Resistant Bacteria 2020-2025](#)
- [National Animal Health Laboratory Network \(NAHLN\) Dashboard](#)
- [National Animal Health Monitoring and Surveillance \(NAHMS\)](#)
- [National Institute of Antimicrobial Resistance Research and Education](#)
- [Ontario Animal Health Network](#)
- [USDA APHIS Vet Services NVAP Modules](#)
- [USDA One Health](#)
- [University of Minnesota AMR Learning Site](#)
- [World Antimicrobial Resistance Awareness Week \(WAAW\)](#)

Website: Attending Veterinarians

[www.aphis.usda.gov/
animalwelfare](http://www.aphis.usda.gov/animalwelfare)



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Slide References

4. <https://youtu.be/yybsSqcB7mE>
5. <https://www.cdc.gov/drugresistance/pdf/threats-report/How-AR-Moves-508.pdf>
6. <https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf>
7. <https://www.avma.org/sites/default/files/2020-10/AntimicrobialResistanceFullReport.pdf>
8. <https://www.fda.gov/animal-veterinary/animal-health-literacy/get-facts-raw-pet-food-diets-can-be-dangerous-you-and-your-pet>

Slide References

8. <https://www.wormsandgermsblog.com/2019/06/articles/animals/dogs/raw-diets-and-multidrug-resistant-bacteria/>
8. <https://www.cdc.gov/campylobacter/outbreaks/puppies-9-17/index.html#print>
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8. <https://www.cdc.gov/drugresistance/pdf/Assessing-Campylobacter-Burden-in-Dogs-508.pdf>
9. https://www.avma.org/sites/default/files/resources/AntimicrobStewardshipDef_CorePrinciplesFlyer_052318.pdf

Thank you!

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