

# Washington One Health Combating Antimicrobial Resistance Strategic Plan—2025



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Washington One Health Combating Antimicrobial Resistance Strategic Plan—2025

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## Executive Summary

Antimicrobial resistance (AR) is a critical global public health threat. Worldwide, deaths due to AR in 2019 were approximately 1.27 million and are expected to increase in the coming years. AR threatens animal and environmental health as well. Antibiotic use is the most important modifiable driver of the emergence of AR, but widespread opportunities for transmission of AR should also be addressed. (Figure 1)

One Health (OH) has been described as “an approach that recognizes that the health of people is closely connected to the health of animals and our shared environment,” and “a framework for planning and acting together to proactively address polycrisis and improve human, animal, and ecosystem health and well-being.” A OH approach entails collaboration and sharing of information between human, animal, and environmental sectors, and between clinical, research, and public health disciplines. This framework can be applied as a complementary approach to other strategies focused on preventing and reducing AR within individual sectors.

In 2014, Washington State convened a OH Steering Committee which established two workgroups: OH Surveillance and Data Integration Workgroup and OH Antimicrobial Stewardship (AS) Workgroup. The latter workgroup, active during 2015-2019, is the predecessor to the OH Combating Antimicrobial Resistance Collaborative. The OH AS Workgroup provided internal and external education, published several manuscripts in peer reviewed journals, authored a position statement for the Council of State and Territorial Epidemiologists, raised public awareness of AR, and hosted a statewide Summit on OH AS. (Table 1)

The OH AS Workgroup faced several challenges during its tenure, including perception of the “blame game”, lack of funding, competing priorities, and the SARS-CoV-2 pandemic. Upon regrouping in 2022, the workgroup identified a need for strategic planning to focus efforts. The OH Needs Assessment undertaken by the Washington State Department of Health (DOH) Zoonotic Disease Program solicited input from a broad group of interested parties who identified AR as the most important OH topic that DOH was most ready to address. In January 2024, the multidisciplinary workgroup to combat AR from a OH approach was relaunched under a new name, the OH Combating Antimicrobial Resistance Collaborative (OH CAR Collaborative). In 2024, membership of the OH CAR Collaborative included interested representatives from state agencies and organizations with a wide range of expertise relevant to OH and AR. (Table 2)

The structure of the OH CAR Collaborative was modeled on the [OH Minnesota Antimicrobial Stewardship Collaborative](#) with a central coordinating body and workgroups to set goals and carry out projects. (Figure 2)

The collaborative established vision and mission statements.

### Vision

Animal, human, agricultural, and environmental health sectors collaborating to reduce and prevent emergence and transmission of antimicrobial resistance.

## **Mission**

- Recognize widespread drivers of antimicrobial resistance
- Recognize that all sectors can make improvements in infection control and antimicrobial use
- Work collaboratively to prevent antimicrobial resistance, with a focus on improving antimicrobial use
- Share diversity of experience, lessons, and ideas between sectors to spur One Health cross-pollination and collaboration

The collaborative is made up of active members and interested parties. Active members participate in one of five workgroups, led by a chair and co-chair who guide each workgroup to select achievable projects. (Table 3) In 2024, the collaborative met regularly for strategic planning and to discuss potential projects that can positively impact AR or AU and improve the health of humans, animals and/or the environment. We acknowledge risks, such as lack of resources, challenges to collaboration, data gaps, and concerns about potential business impacts, that may threaten our progress. Currently, the strategic plan is a living document that will be updated annually until it can be adapted into a 5-year plan.

## **Background**

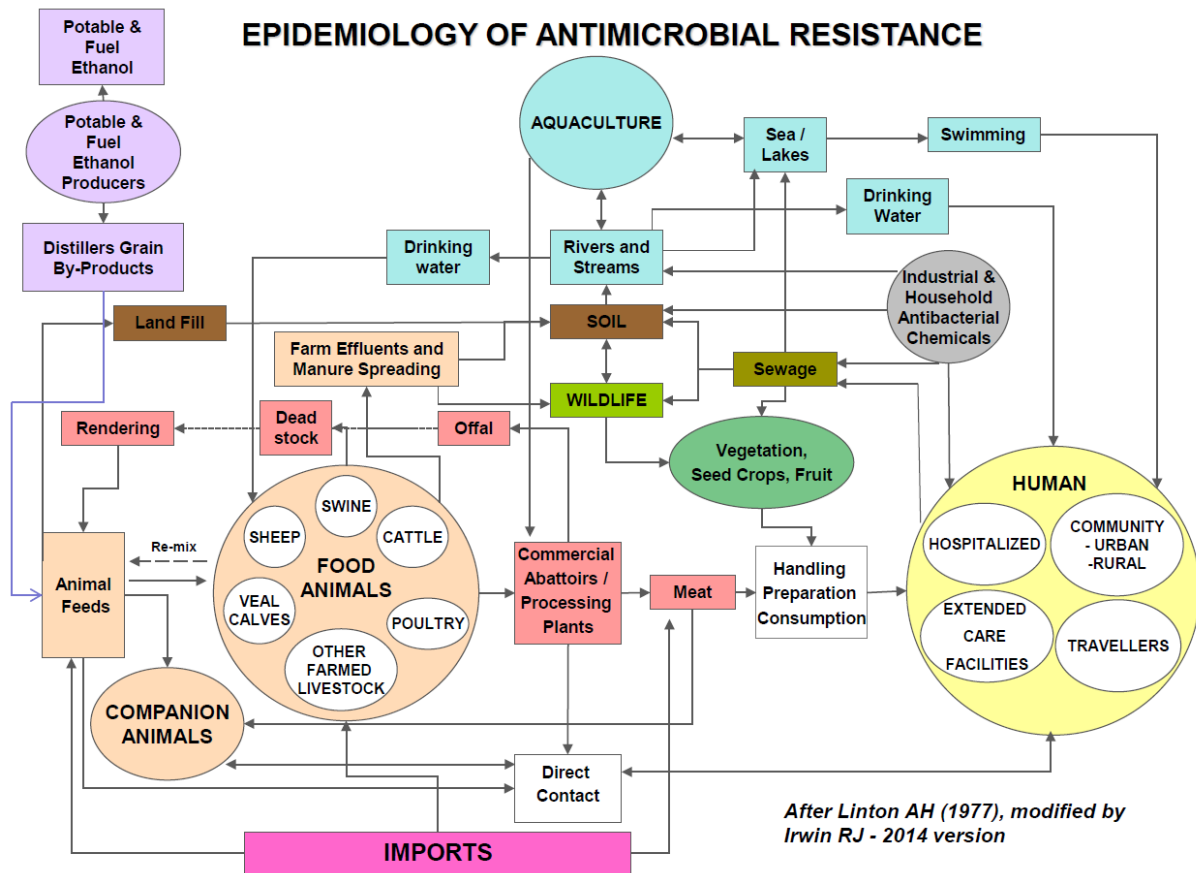
### **Antimicrobial Resistance and Antimicrobial Use**

Antimicrobial resistance (AR) is one of the top threats to global public health and development. Worldwide, deaths among humans attributable to AR in 2019 were estimated to be 1.27 million (1,2) and are predicted to increase dramatically in the coming decades (3). AR infections cause more severe illnesses and deaths, higher healthcare costs, and increased harm to society. AR jeopardizes our ability to practice modern medicine. In time, AR may make routine procedures such as a caesarian section and joint replacement, as well as advanced therapies such as cancer chemotherapy and organ transplantation, too risky to undertake. AR threatens animal and environmental health as well, but threats are not as clearly enumerated.

Use of antimicrobial agents, including those used in human medicine, veterinary practice, animal and plant agriculture, and aquaculture, contribute to the emergence and dissemination of antimicrobial-resistant microorganisms. Antimicrobial use (AU), specifically use of antibiotics, is the greatest contributor to emergence of AR, and is an important modifiable target for mitigating AR.

In addition to AU, many other factors contribute to increasing AR. Resistance genes do not respect phylogenetic, geographical, or ecological borders. Transmission of resistant organisms can occur not only between animals and humans, but also from food and other animal products, through environmental routes such as effluents, sewage, water and soil, and through travel and movement of humans, animals, and products between regions. (Figure 1) All these routes of AR transmission can be targeted for action. Figure 1 shows the complicated and interconnected effects of AU and transmission of AR.

**Figure 1. Epidemiology of Antimicrobial Resistance**



**One Health**

According to US Centers for Disease Control and Prevention (CDC), “One Health (OH) is an approach that recognizes that the health of people is closely connected to the health of animals and our shared environment.” OH is not a new concept but has gained prominence due to increasing recognition of the impacts of interactions between people, animals, plants, and the environment. Human population growth and expanding human settlements bring humans and animals and other vectors in closer contact, resulting in more frequent opportunities for diseases to move between them. Changes in climate and land use allow microbes to expand into new habitats and populations. In addition, modern trade and travel allow diseases to quickly move from one region of the world to another in less than 24 hours. A OH approach acknowledges interconnected health effects and entails collaboration and sharing of information between human, animal, and environmental sectors, and between clinical and scientific disciplines.

**Combating Antimicrobial Resistance through a One Health Approach**

According to CDC, more than 2.8 million antibiotic-resistant infections occur in the United States each year, and more than 35,000 people die as a result. (4) Antimicrobial resistance (AR) is mobile, impartial, and agile, posing a collective risk across human and animal populations. Inappropriate

and unnecessary use of antimicrobials in humans, animals or environment settings contributes to the proliferation of resistance, underscoring the necessity of cross-sectoral approaches to antimicrobial stewardship (AS) and preventing transmission of AR. AS is both a public health imperative, as well as an ethical obligation to protect the well-being of future generations.

The emergence of AR on one part of the globe can quickly spread to other regions, as demonstrated by worldwide spread of carbapenemase-producing bacterial organisms (5) and of the multidrug resistant yeast, *Candida auris* (6). Use of antimicrobials on agricultural crops can contaminate soil and waterways with antimicrobial residues and AR genes which may lead to emergence of AR in the environment and antimicrobial resistant infections in humans and animals. (7) Wildlife and companion animals have the potential to serve as an environmental reservoir of bacterial resistance with implications for human and ecosystem health. (8-10) Climate change (11,12), poverty (13), and inadequate civil and governmental structures for maintaining safety and health (14,15) for humans, animals, and the environment also contribute to AR. A OH framework focuses on collaboration, coordination, and communication between human health, animal health, and environmental science professionals. This framework can be applied as a complementary approach to other strategies focused on reducing AR.

Since 2015, Washington has taken a OH approach to combating AR. This strategic plan represents a renewed and revitalized effort to include new partners, access new ideas and energy, develop clear and attainable goals, and share responsibility for this important work.

### **One Health Combating Antimicrobial Resistance Collaborative – Past and Present**

In 2014, Washington State, convened a OH Steering Committee made up of representatives from the Governor’s Office, academic institutions, human and animal health professions, the Veterinary Medical Association, and Washington State Departments of Ecology, Fish and Wildlife, and Health (DOH). This Steering Committee established two workgroups: OH Surveillance and Data Integration Workgroup and OH Antimicrobial Stewardship (AS) Workgroup. The latter group, active during 2015-2019, is the precursor to the OH Combating Antimicrobial Resistance Collaborative. Its goal was to integrate human and animal health expertise to learn from each other, partner on activities, and provide externally focused education to improve antibiotic use in Washington.

The OH AS Workgroup began by sharing information between members about AU and AS in human, animal, and agricultural sectors. We learned about how antimicrobials are used in human and animal medicine, animal agriculture, and in apiculture and certain agricultural crops like viticulture and fruit production. The Workgroup collaborated on public and professional educational efforts on the threat of AR and the importance of AS in all sectors. (Table 1) Table 1 describes the efforts and products of the workgroup which included education, publication of manuscripts in peer reviewed journals, authoring a position statement for the Council of State and Territorial Epidemiologists, raising public awareness of AR, and hosting a statewide Summit on OH AS.



**Table 1: Activities and Successes of the Washington One Health Antimicrobial Stewardship Workgroup During Years 2015-2022**

Year	Activity	Description
2015	Developed Mission and Vision statements	Mission and Vision statements describing the OH AS Workgroup efforts
2015	Educational lectures for members of workgroup	Educational presentations to workgroup members to educate them on antimicrobial stewardship in human medicine, varying uses of antibiotics in animals, and use of antibiotic and antifungals on agriculture crops
2015	Lead authorship for Council of State and Territorial Epidemiologists 2015 Position Statement on <a href="#">Strengthening AS in Veterinary Medicine (16)</a>	Recommended a comprehensive and collaborative One Health approach to address antimicrobial stewardship, and suggested actions that local, state and federal public health agencies can take to improve understanding and application of stewardship strategies across the spectrum of human and animal health. (12)
2016	<a href="#">Letter to Washingtonians on the importance of AS in all sectors</a>	Open letter to people of Washington State describing the threat of antimicrobial resistance and the role each group—the public, physicians, veterinarians, and food producers—can play in improving antibiotic use.
2017	<a href="#">2017 Governor’s Proclamation on AR and AS</a>	The Washington State Governor published a proclamation describing the threat of antibiotic resistance and the importance of improving antibiotic use.
2016, 2021, 2022	Publications in peer reviewed literature	<ul style="list-style-type: none"> <li>• <a href="#">A survey of veterinary antimicrobial prescribing practices, Washington State 2015 (16)</a></li> <li>• <a href="#">Antimicrobial stewardship through a one health lens: Observations from Washington State (17)</a></li> <li>• <a href="#">Outpatient antibiotic resistance patterns of Escherichia coli urinary isolates differ by specialty type (18)</a></li> <li>• <a href="#">Antimicrobial Resistance Patterns of Urinary Escherichia coli Among Outpatients in Washington State, 2013-2017: Associations with Age and Sex (19)</a></li> <li>• <a href="#">Surveillance for antibiotic-resistant E. coli in the Salish Sea ecosystem (20)</a></li> </ul>
2017, 2023	Antimicrobial stewardship resources for small animal veterinarians	<ul style="list-style-type: none"> <li>• Brochure directed at small animal veterinarians on ways to improve antibiotic use posted on Washington State Veterinary Medical Association website (INSERT LINK)</li> <li>• Poster on “<a href="#">Judicious Antimicrobial Use Guidance for Common Companion Animal Conditions</a>”</li> </ul>
2017	Beef tour for public health	Washington Beef Commission hosted a group of public health and human health professionals on a tour of a dairy and cattle feed lot to describe their use of antibiotics and efforts to prevent overuse.
2018	One Health Antimicrobial Stewardship Summit	Two-day stakeholder meeting held in April 2018 to discuss antibiotic resistance across settings and engage sectors in future antibiotic stewardship efforts in Washington.
2018	Public outreach at Washington State Fair	Table in visitors’ tent providing fun and educational resources for fairgoers on antibiotic resistance and how to use antibiotics wisely.

Several challenges arose during the OH AS Workgroup's tenure: concern that one sector was being blamed as more responsible for AR due to irresponsible use of antibiotics; determining the scope of OH AS efforts; lack of leadership support; lack of designated funding; and difficulty identifying consistent partners from all sectors. The SARS-CoV-2 pandemic halted efforts for several years and upon reconvening the group, we identified a need for strategic planning to establish a roadmap, set priorities, and track progress.

With funding from Washington State Foundational Public Health Services (FPHS), DOH convened a 2-day in-person OH Needs Assessment (OHNA) in March 2023 to discuss OH focus areas for prioritization by DOH and state partners. These focus areas included interagency collaboration, disease prevention and surveillance, outbreak response, data sharing, and more. Attendees included representatives from state and local health jurisdictions, academic institutions, and agencies such as the WA Department of Fish and Wildlife and WA Department of Agriculture. After robust discussion, the attendees ranked topics based on perceived importance and on readiness to address it. AR was identified as the most important topic that DOH was most ready to address. The OHNA resulted in a [27-page report](#) that outlined work completed, key findings, proposed actions, current state, and desired state of OH efforts in Washington. With input from the OHNA and from the August 2023 OH Zoonotic Disease Conference, in January 2024 we relaunched efforts to combat AR from a OH approach under a new name, the OH Combating Antimicrobial Resistance Collaborative (OH CAR Collaborative). In 2024, membership of the OH CAR Collaborative included interested representatives from state agencies and organizations (Table 2) with a wide range of expertise relevant to OH and AR.

**Table 2: Summary of Active Membership of OH CAR Collaborative in 2024**

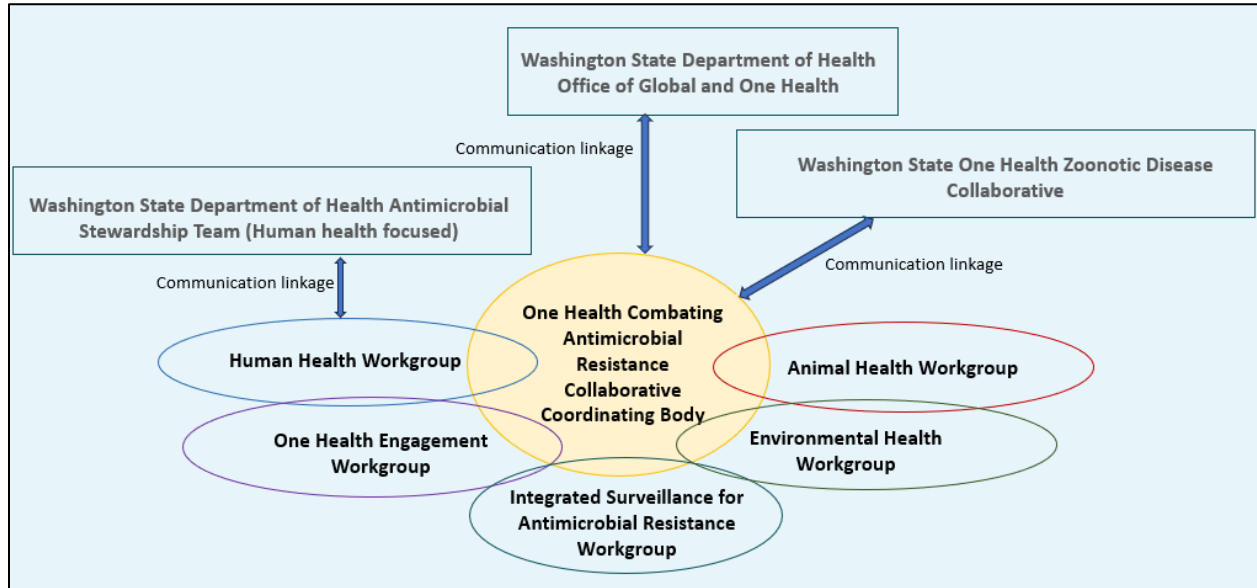
Description	Organization/Agency	Expertise
Public Health	<ul style="list-style-type: none"> <li>Local Health Jurisdictions (LHJs)</li> <li>Washington State Department of Health (DOH)</li> </ul>	<ul style="list-style-type: none"> <li>Epidemiology</li> <li>Infection Prevention</li> <li>Medicine</li> <li>Nursing</li> <li>Veterinary Medicine</li> </ul>
Natural Resources	<ul style="list-style-type: none"> <li>Washington State Department of Ecology (ECY)</li> </ul>	<ul style="list-style-type: none"> <li>Environmental contaminants and drift</li> <li>Critical areas</li> <li>Shoreline protection</li> <li>Land use</li> </ul>
Agriculture	<ul style="list-style-type: none"> <li>Washington State Department of Agriculture (WSDA)</li> </ul>	<ul style="list-style-type: none"> <li>Food Safety</li> <li>Natural Resource Management</li> <li>Veterinary Medicine</li> </ul>
Academic Institutions	<ul style="list-style-type: none"> <li>Eastern State University (ESU)</li> <li>Central Washington University (CWU)</li> <li>Washington State University (WSU)</li> <li>University of Washington (UW)                             <ul style="list-style-type: none"> <li>Center for One Health Research</li> <li>International Training and Education Center</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Research</li> <li>Human Medicine</li> <li>Veterinary Medicine</li> <li>Laboratory Science</li> <li>Global Health</li> </ul>
Wildlife	<ul style="list-style-type: none"> <li>Washington State Department of Fish and Wildlife (DFW)</li> <li>Wildlife Rehabilitation</li> <li>Sealife Response, Rehabilitation, and Research (SR3)</li> </ul>	<ul style="list-style-type: none"> <li>Habitat Management</li> <li>Terrestrial Wildlife</li> <li>Aquatic Mammals</li> </ul>
Research Institutions	<ul style="list-style-type: none"> <li>Pacific NW National Lab</li> </ul>	<ul style="list-style-type: none"> <li>Research</li> <li>National Security</li> </ul>
Professional Organizations	<ul style="list-style-type: none"> <li>Washington State Academy of Family Physicians (WAFP)</li> <li>Washington State Veterinary Medical Association (WSVMA)</li> </ul>	<ul style="list-style-type: none"> <li>Human Medicine</li> <li>Veterinary Medicine</li> </ul>

We seek to be inclusive and recognize that at the outset important partners are missing from this effort. We plan focused outreach to Tribal partners and agricultural producers and encourage members to identify other partners who can provide relevant expertise and viewpoints.

The structure of the OH CAR Collaborative was modeled on the [OH Minnesota Antimicrobial Stewardship Collaborative](#) with a central coordinating body and workgroups to set goals and carry out projects. Figure 2 shows the structure of the OH CAR Collaborative and communication linkages to other related groups including the human focused DOH Antimicrobial Stewardship

team, the Office of Global and One Health, and the Washington State OH Zoonotic Disease Collaborative.

**Figure 2: Structure of OH CAR Collaborative and communication linkages to other related groups**



## Strategic Approach for 2025

The OH CAR Collaborative is all-volunteer with no allocated financial support to advance the work. At the outset, any progress is dependent on participation by interested parties with relevant expertise who can contribute time to this work. We will seek to identify dedicated funding streams to support and advance projects and partnerships to support our collaborative efforts.

### Vision

Animal, human, agricultural, and environmental health sectors collaborating to reduce and prevent emergence and transmission of antimicrobial resistance.

### Mission

- Recognize widespread drivers of antimicrobial resistance
- Recognize that all sectors can make improvements in infection control and antimicrobial use
- Work collaboratively to prevent antimicrobial resistance, with a focus on improving antimicrobial use
- Share diversity of experience, lessons, and ideas between sectors to spur One Health cross-pollination and collaboration

## **Structure, Meetings, and Workgroups**

The Collaborative is made up of active members who attend and contribute to quarterly meetings and have membership in one or more workgroups. Interested parties may attend quarterly meetings and receive updates from the group without additional duties. Workgroups are led by a chair and co-chair who coordinate and lead meetings. Workgroup leaders are encouraged to serve a 1-year term with the potential to extend their term. The co-chair is encouraged to become the chair in subsequent years and recruit a new co-chair from among the workgroup members. The membership of each workgroup sets priorities and goals for the year, assigns responsibilities, carries out projects, and tracks achievement of goals. Workgroup leaders report on progress to quarterly all-member meetings. Workgroup leaders are encouraged to ascertain expertise and the amount of time and resources that workgroup members can contribute and guide the group to select achievable projects.

In the first year of activities, the all-member collaborative group met monthly for four months and then transitioned to quarterly meetings. We will maintain the quarterly all-member meeting schedule in 2025. In the latter half of 2024, workgroups scheduled and convened their first meetings, established the frequency of their meetings, and fostered discussion of projects.

## **Goals, Strategies, and Activities**

The Coordinating Body of the OH CAR Collaborative provided overarching guidance as workgroups began their efforts, but any outcomes resulting from the Collaborative depend on workgroups and their members. Early on, workgroup members shared their area of expertise and particular interest for action with fellow members. Leaders encouraged them to consider several questions to help guide identifying and planning projects.

- What can we do in Washington to positively impact AR or AU and improve the health of humans, animals, and/or the environment?
- Should workgroup efforts focus on mitigating spread of AR, improving AU, or both?
- Are there other efforts in Washington, nationally, or internationally that can inform, impact, or advance our work?

The Coordinating Body established key strategies to guide each workgroup (Table 3) and workgroup leaders and members identify feasible projects to advance during the year.

**Table 3. One Health Combating Antimicrobial Resistance Workgroup Key Strategies**

<b>Workgroup</b>	<b>Key Strategies</b>	<b>Planned Projects</b>
All	<ul style="list-style-type: none"> <li>– Promote cross-pollination of ideas between sectors concerned with antimicrobial resistance in humans, animals, and the environment.</li> <li>– Leverage similar efforts (global, national, state, local).</li> <li>– Avoid duplication of effort.</li> <li>– Share and collaborate when possible.</li> </ul>	<ul style="list-style-type: none"> <li>– Not applicable</li> </ul>
One Health Engagement	<ul style="list-style-type: none"> <li>– Promote awareness of risks and mitigation of antimicrobial resistance.</li> </ul>	<ul style="list-style-type: none"> <li>– AMR resource hub development with fact sheets, print materials, social media campaigns, and newsletter</li> <li>– AMR Patch for Girl Scouts and 4-H outreach</li> <li>– Washington State Fair Outreach</li> <li>– K-12 outreach and curriculum development</li> </ul>
Human Health	<ul style="list-style-type: none"> <li>– Advance understanding, prevention, or reduction of antimicrobial resistance in humans.</li> </ul>	<ul style="list-style-type: none"> <li>– Create educational pamphlets and flyers on good infection prevention practices when interacting with animals.</li> <li>– Promote preventative health measures that impact AMR prevalence (i.e., vaccination, hygiene and sanitation practices, PPE use).</li> </ul>
Animal Health	<ul style="list-style-type: none"> <li>– Advance understanding, prevention, or reduction of antimicrobial resistance in animals.</li> </ul>	<ul style="list-style-type: none"> <li>– To be determined in 2025</li> </ul>
Environmental Health	<ul style="list-style-type: none"> <li>– Advance understanding, prevention, or reduction of antimicrobial resistance in the environment and in food.</li> </ul>	<ul style="list-style-type: none"> <li>– To be determined in 2025</li> </ul>
Integrated Surveillance for Antimicrobial Resistance	<ul style="list-style-type: none"> <li>– Support integrated surveillance for antimicrobial resistance across sectors.</li> </ul>	<ul style="list-style-type: none"> <li>– Write and submit for publication a concept paper on challenges and strategies for integrating AMR data across human, animal, and environmental sectors.</li> </ul>
Coordinating Body	<ul style="list-style-type: none"> <li>– Seek support for OH CAR Collaborative efforts through funding and allocation of resources.</li> </ul>	<ul style="list-style-type: none"> <li>– Provide quarterly updates to leadership of DOH Office of Global and One Health, DOH AS Team, and DOH OH ZD Collaborative.</li> <li>– Seek grant funding to support OH CAR Collaborative.</li> <li>– Debrief annually with workgroup chairs and co-chairs.</li> <li>– Update description of roles and responsibilities annually.</li> <li>– Review and update Strategic Plan in quarter 4 of 2025 and annually through 2027. Subsequent update cadence TBD.</li> <li>– Track metrics for evaluating success.</li> </ul>

## Monitoring and Evaluation

For 2024, prior to implementing the 2025 Strategic Plan, we used process measures to evaluate success of the OH CAR Collaborative. (Table 4)

**Table 4: Process Measures for OH CAR Collaborative for 2024**

Description of Activity	Number Completed	Number of Opportunities	Achieved (completed/opportunities)
All-member meetings	6	6	6/6
Sectors represented among active membership	3	3 (human, animal, environmental)	3/3
Human Health workgroup meeting	3	Not defined	Not applicable
Animal Health workgroup meeting	2	Not defined	Not applicable
Environmental Health workgroup meetings	4	Not defined	Not applicable
One Health Engagement workgroup meetings	1	Not defined	Not applicable
Integrated Surveillance for AR workgroup meetings	2	Not defined	Not applicable
Strategic Plan completed	1	1	1/1

The collaborative and workgroups are encouraged to develop [SMARTIE](#) goals that are specific, measurable, achievable, relevant, time bound, inclusive, and equitable. We will strive to develop both process and outcome measures that will demonstrate efforts and outcome of efforts.

## Risks

During the life of the plan, risks may arise that threaten progress. The following risks were identified:

- Resources: Lack of committed funding and personnel; lack of time and competing priorities among members; lack of leadership support.
- Collaboration: Inability to recruit and/or maintain partners willing to share expertise and implement projects; inability to recruit participants from all relevant stakeholder groups; lack of consensus within and between sectors; inadequate communication between members, their respective organizations, policy makers, and the public; politics; conflicts of interest.
- Research/Data analysis: Knowledge or data gaps; data privacy, confidentiality, quality, and usefulness; complex measurements or outputs; lack of willingness to share data and experiences; ability to identify meaningful outcome metrics; adequacy of landscape analysis to guide efforts and avoid duplication.

- Other: Inability to maintain political will and inspire change; concern among sectors regarding additional regulations.

The strategic plan is a living document. At the outset, DOH is providing guidance and leadership for the OH CAR Collaborative with the possibility of transferring leadership to another DOH office or to another Washington agency or organization. As the collaborative is a new entity, we are writing a 1-year strategic plan with plans to revise annually in 2025, 2026 and 2027, and subsequently adapt into a 5-year plan.

## Acronyms and Abbreviations

Full name	Abbreviation or Acronym
Antimicrobial Resistance	AR
Antimicrobial Stewardship	AS
Antimicrobial Use	AU
Center for One Health Research	COHR
Central Washington University	WSU
Local Health Jurisdictions	LHJ
One Health Combating Antimicrobial Resistance Collaborative	OH CAR Collaborative
One Health Needs Assessment	OHNA
One Health	OH
University of Washington	UW
US Centers for Disease Control	CDC
Washington State Department of Agriculture	WSDA
Washington State Department of Ecology	ECY
Washington State Department of Fish and Wildlife	DFW
Washington State Department of Health	DOH
Washington State University	WSU
Western State University	ESU

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