

**Applied Practicum Experience:
One Health Rapid Response Team Scoping Review – Final Report**

Introduction and Project Goals

One Health is the multisectoral and collaborative approach to achieving the best health outcomes for humans, animals, and the shared environment (Centers for Disease Control and Prevention, 2022). This approach is relevant and necessary at all government levels to ensure that appropriate specialists represent their area of expertise in complex, transboundary health issues. On the other hand, rapid response teams (RRTs) are designated personnel who are trained, equipped, and ready to deploy at any public health emergency. The U.S. Centers for Disease Control and Prevention (CDC) One Health Office (OHO) and Emergency Response Capacity Team (ERCT) are collaborating to conduct a scoping literature review of One Health Rapid Response Teams (OH-RRTs). This review intends to gather further insight on frameworks, best practices, and established OH-RRTs to inform best practices for One Health coordination during emergency responses.

Before my work as a OH-RRT Scoping Review Intern began, the OHO met with CDC librarians to establish a search strategy by developing key search terms and investigating relevant databases for published articles regarding OH-RRT. The search string used in Embase, Medline (Ovid), Scopus, and Academic Search Complete included One Health Rapid Response Teams, One Health Emergency Preparedness, One Health Outbreak Investigations, One Health Response, Multisectoral Rapid Response Teams, Multidisciplinary Rapid Response Teams, Multisectoral Emergency Preparedness, and Multisectoral Outbreak Investigations. In total, 9,421 articles were extracted from fourteen databases and then uploaded to Covidence, a web-based literature review tool where the analysis of the text took place (Appendix, Figure 1). To prepare for the OH-RRT scoping review, I reviewed a student-prepared Covidence training slide deck, watched Covidence user training, and reviewed the overarching concepts for RRT Establishment, Training, Response, and Monitoring and Evaluation (Centers for Disease Control and Prevention, 2020).

Title and Abstract Screening Project Accomplishments

The first step in the OH-RRTs scoping review was to conduct a title and abstract screening of the articles uploaded into Covidence. The Covidence system presented the titles and abstracts of each article included in the search strategy and required a vote of “relevant”, “not relevant”, or “maybe relevant” to filter the studies into appropriate categories. At the title and screening step of the review, the OH-RRT review was set to require two votes on each study to determine its next step. Any combination of “relevant” and “maybe relevant” designations from the two voters moved the article to the next step of full text review. Two “not relevant” votes moved the study to an irrelevant categorization, which would not require any further review. Any combination of “relevant” or “maybe relevant” and “not relevant” would move the study into a conflict bucket, requiring an additional vote on whether the study moves on to full text or is labelled as irrelevant. To assist with making this determination, Covidence has a feature that allows users to input relevant keywords that are both relevant and not relevant to the scoping

topic. The relevant keywords appear with a green highlight, while the not relevant keywords appear with a red highlight. Although duplicate articles were removed in the search provided by the CDC librarians and through Covidence's automation, the same articles published in different journals did appear multiple times which necessitated a manual removal from the queue of screened studies.

The process in determining whether a study was “relevant”, “maybe relevant”, or “not relevant” started with recognizing the highlights. Inclusion criteria for the OH-RRT scoping review comprise of studies published within the last 10 years with key words such as One Health, emergency, response, zoonotic disease, preparedness, epidemic, outbreak, disaster, multisectoral, and vector. Exclusion criteria for the OH-RRT scoping review comprise of studies not published in English or having key words such as one health system, hospital, cardiac arrest, ICU, nurse, and shock. Studies with multiple red highlights were likely voted as “not relevant”, whereas studies with many green highlights needed more investigation into whether the study is relevant. After reading through the titles and abstracts and acknowledging the highlights, tags were affixed to each article if appropriate. The reviewers created the tags include antimicrobial resistance (AMR), environmental health, natural disaster, One Health, outbreak response, RRT, vector-borne disease, and zoonotic disease. Studies that were tagged with both a One Health related tag and a RRT related tag were most likely moved on to the next phase of full text review without comment. Studies tagged with a topic of either the One Health or the RRT scope and mentions of other corresponding topic in the abstract were likely designated as maybe relevant, with a comment indicating the full text is needed to make a concrete determination of the study's relevancy. Studies with only one-sided tags and without any tags were likely sent to the irrelevant studies section.

Data Analysis and Key Findings

After completing the title and abstract screens of the 9,421 studies, OHO staff requested preliminary data analysis to be done. However, approximately 8,300 studies only received one vote and needed the second vote to reveal the categorization. Covidence's system is designed to blind the votes until both votes have been completed, so the settings of this review were changed from requiring two votes per study to one vote per study in the abstract and title screening portion of this review for this preliminary analysis. Once this change was made, all studies with one “yes” or one “maybe” vote were automatically moved to full-text review while all studies with one “not relevant” vote were marked as irrelevant. Of the 9,421 studies in the OH-RRT scoping review, 394 articles were moved to the full text review phase while 8,656 were reported as irrelevant (Appendix, Figure 1).

Throughout the title and abstract screening portion of the scoping review, common themes were prevalent amongst studies related to One Health and RRTs. While I am unable to export data on studies that were deemed not relevant, I can provide a more qualitative summary of the themes present throughout the review.

1. AMR and One Health – Articles that investigate AMR and its relation to One Health are often in the molecular research and exploratory phase, so these articles likely do not have RRT elements. From this literature search, articles regarding AMR emergencies and responses to those emergencies have yet to be investigated.
2. Clinical RRTs – An abundant number of studies use the term “Rapid Response Teams” in the context of clinical or emergency room settings. These RRT functions range from pulmonary to cardiac to Intensive Care Unit (ICU) emergencies. For the

purpose of this scoping review, these RRTs are not classified as public health RRTs and were excluded from the review.

3. Singular Zoonotic or Vector-Borne Disease – Studies containing both One Health and RRT elements often commented on the response to a single zoonotic disease and how the region or country responded to the disease outbreak. Articles containing information on One Health and RRT actions towards a zoonotic disease outbreak were moved to full-text review. A breakdown of the specific zoonotic diseases mentioned in relevant studies are depicted in Table 1.
4. One Health University Curriculum – This noteworthy theme across literature shows how the One Health concept is being recognized at the university and collegiate level. By introducing the One Health concept, practice, and application to students, they are more prepared to solve complex issues in an interdisciplinary manner.
5. Emerging Infectious Diseases (EIDs) – Studies included in our search strategy often highlighted the concern for EIDs, but they often did not acknowledge that most of these diseases are zoonotic and require a One Health approach for a solution.
6. One Health versus RRT Articles – Throughout the 9,421 articles screened, studies included were more likely to include One Health topics compared to public health RRTs with the comprehensive search terms.
7. COVID-19 and One Health – Within the inclusion time frame encompassing the COVID-19 pandemic, articles pertaining to COVID-19 response appeared and were screened in this part of the process. COVID-19 articles were not considered One Health issues unless the mention of COVID-19 was in terms of a zoonotic disease rather than only impacting people.
8. Animal Rescue, Health, and/or Welfare – Emerging responses to animals and their wellbeing in disaster response was observed across many more recent studies. Studies are encouraging emergency responders to include animals in their rescue, stating that these animals have invaluable meaning to their owners. Table 1 reflects the number of relevant studies that primarily focus on animal rescue and welfare.
9. Prime Examples of OH-RRTs – A few studies stood out as providing a well-defined OH-RRT framework or provided a well-coordinated response to a zoonotic disease. These studies are explored further in Table 1.

To synthesize the range of information from the OH-RRT scoping review title and abstract screen, a summary table was developed that lists studies moved to full-text review containing emergency response to a single zoonotic disease; emergency response to a single vector-borne disease; animal rescue, health, and welfare; overall One Health preparedness and response; and other. The data depicted in Table 1 was exported from Covidence to an Excel file after all studies received one vote

Table 1. Summary of relevant OH-RRT articles from title and abstract screening moved to full-text review.

<i>Articles included by Category (n = 394)</i>	<i>One Health specifics</i>	<i>Title and Abstract Screening Relevancy</i>
Emergency Response to a	Zoonotic Diseases: African Swine Fever (n = 2) Anthrax (n = 3)	Yes Relevant (n = 73) Maybe Relevant

single Zoonotic Disease (n = 153)	Avian Influenza, Highly Pathogenic Avian Influenza, or HPAI (n = 7) Brucella (n = 1) Cholera ¹ (n = 12) <i>E. coli</i> (n = 3) Ebola or EVD (n = 49) Francisella Tularensis (n = 1) Fungal Meningitis (n = 1) H1N1, Swine Flu, or Influenza A (n = 7) H5N1 or Bird Flu (n = 1) Hendra Virus (n = 1) Lassa Fever (n = 4) Leptospirosis (n = 4) Listeriosis (n = 1) Middle Eastern Respiratory Syndrome or MERS (n = 4) Monkeypox (n = 4) Nipah Virus (n = 4) Pandemic Influenza (n = 2) Rabies (n = 8) Rhipicephalus Sanguineus (n = 1) Salmonella (n = 1) SARS-CoV-2 or COVID-19 ² (n = 23) Severe Acute Respiratory Syndrome or SARS (n = 3) Schmallenberg Virus (n = 1) Shellfish Poisoning (n = 1) Toxoplasmosis (n = 1) <i>T. solium taeniasis</i> (n = 1) Viral Hemorrhagic Fever or VHF (n = 1) Zoonotic Tuberculosis or ZTB (n = 1)	(n = 80)
Emergency Response to a single Vector-Borne Disease (n = 31)	Vector, Disease caused: Mosquito – Aedes, Chikungunya (n = 1) Dengue (n = 1) Rift Valley Fever (n = 3) Yellow Fever (n = 1) Zika Virus (n = 9) Mosquito – <i>Anopheles</i> , Malaria (n = 3) Mosquito – <i>Culex</i> , West Nile Virus (n = 4) Fleas, Plague (n = 1) Sandflies, Leishmaniasis or Visceral Leishmaniasis (n = 2) Ticks, Crimean-Congo Hemorrhagic Fever (n = 2)	Yes Relevant (n = 14) Maybe Relevant (n = 17)

	Q Fever or Rickettsial diseases (n = 1) Tsetse flies, African trypanosomiasis (n = 2)	
Animal Rescue, Health, and/or Welfare (n = 16)	Related to: Animal Emergency Management and Response (n = 12) Animal Zoonotic Diseases (n = 4)	Yes Relevant (n = 8) Maybe Relevant (n = 8)
Overall One Health Preparedness and Response (n = 161)	Related to: Case Studies and Preparedness Scenarios (n = 4) Education and Training (n = 5) Established OH-RRTs (n = 3) Multisectoral Collaboration for One Health Preparedness and Response (n = 26) One Health Response Framework, Infrastructure, and Tools (n = 77) Policies and Plans (n = 17) Programs (n = 9) Response Review and Evaluation (n = 20)	Yes Relevant (n = 61) Maybe Relevant (n = 100)
Other (n = 33)	Related to: AMR (n = 5) Disaster (n = 3) Environmental Health (n = 6) Food System (n = 8) Healthcare System (n = 1) Multiple Zoonotic Diseases (n = 9) RRT (n = 1)	Yes Relevant (n = 14) Maybe Relevant (n = 19)

¹Due to the limited nature of titles and abstracts, the applicability of cholera to One Health was up to my discretion since cholera is not a zoonotic disease. If further investigation into the full text of cholera related articles shows otherwise, they will be excluded from the scoping review.

²For this purpose, COVID-19 was considered a zoonotic disease and One Health issue if other parts of the abstract described COVID-19 as zoonotic. If further investigation into the full text of COVID-19 related articles shows otherwise, they will be excluded from the scoping review.

Next Steps and Recommendations

With the title and abstract screening portion completed, the immediate next step is to conduct a full-text review for the relevant studies to further characterize and assess themes, best practices, and recommendations. While meeting with representatives from the OHO and ERCT before moving on to the full-text review, the discussion concluded to keep the primary categories that studies fell under and not focus on excluding further studies in full-text review. The two topics that stood out to the meeting attendees includes Animal Emergency Management and Response and One Health Response Framework, Infrastructure, and Tools. The Animal Emergency Management and Response category will likely provide information on the most established framework without directly being named an RRT. As for the One Health Response Framework, Infrastructure, and Tools, this category has potential to be filtered down to including

studies that have direct relation to RRTs and possibly excluding studies that expand on prevention and control measure to One Health issues. In the next steps, the review is planning to be moved from Covidence to EndNote 20 for further analysis. While in EndNote 20, I plan to read through the full text and extract additional variables or notable elements of the articles as part of the continued data gathering.

For continued work on the OH-RRT scoping review, I recommend maintaining consistency throughout the review, managing the project in an organized fashion, and utilizing the support offered by the CDC Librarians. By filtering all studies through the same lens, the reviewers can ensure that no crucial information is missed or disregarded. Being organized throughout the project has helped keep the work moving efficiently and accurately. Lastly, the CDC Librarians are full of in-depth knowledge regarding any type of literature or scoping review. They are happy to assist with any questions and brainstorm solutions for any obstacles. While this scoping review project is time consuming, its completion will surely be rewarding.

Sources

Centers for Disease Control and Prevention (CDC). (2022, February 7). *One Health Basics*.
<https://www.cdc.gov/onehealth/basics/index.html>.

Centers for Disease Control and Prevention (CDC). (2020, May). *Guidance for U.S. Centers for Disease Control and Prevention Staff for the Establishment and Management of Public Health Rapid Response Teams for Disease Outbreaks*.
<https://www.cdc.gov/coronavirus/2019-ncov/downloads/global-covid-19/RRTManagementGuidance-508.pdf>.

Appendix

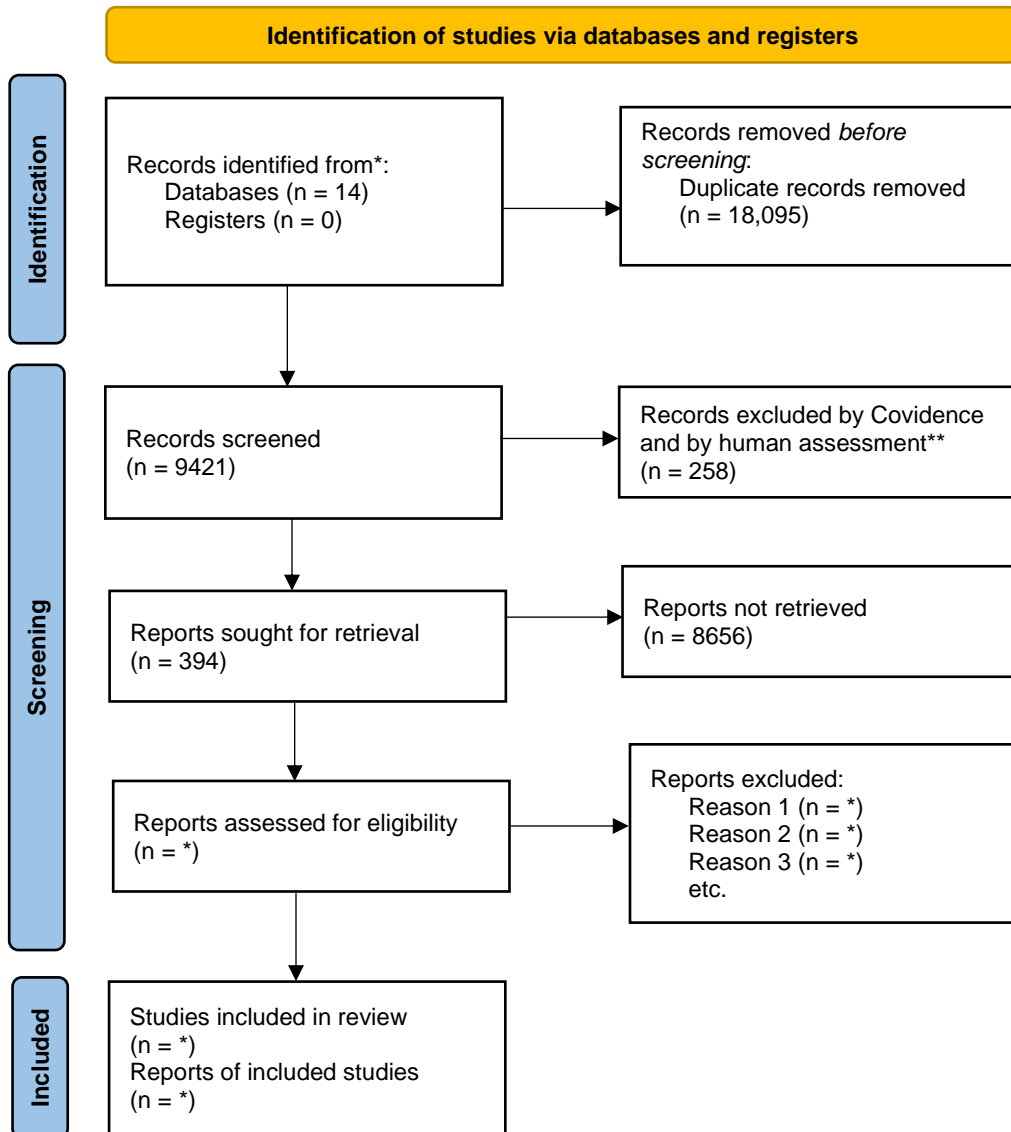


Figure 1. PRISMA 2020 flow diagram for OH-RRTs scoping literature review. Items marked with an asterisk (*) indicate next steps for the review and have yet to be completed.