

# Emergency Medical Service/911 Workforce Mental or Behavioral Health Issues



## Main Point

- A new systematic evidence review on Emergency Medical Service/911 workforce mental or behavioral health issues is recommended on the basis of appropriateness and importance, nonduplication, moderately high impact, feasibility, and moderately high potential value.



## Background and Purpose

In the course of delivering life-saving prehospital care, first responders are regularly exposed to high levels of occupational stress.<sup>1</sup> A key subset of the Emergency Medical Service (EMS) workforce, Public Safety Telecommunicators (911 call takers and dispatchers), are likely subjected to similar occupational stress. A study of EMS ambulance workers, excluding telecommunicators, showed high prevalence rates of mental or behavioral health issues, including post-traumatic stress disorder (PTSD) (11%), anxiety (15%), depression (15%), and general psychological distress (27%).<sup>2</sup>

An even larger part of the EMS workforce is impacted by occupational burnout and moral injury. A survey of EMS providers from the world's largest cities found 60 percent who agreed that "I feel burned out in my EMS work" and 36 percent who agreed that "I don't want to do EMS work anymore."<sup>3</sup> *Occupational burnout* may be defined as a syndrome resulting from chronic workplace stress that has not been successfully managed; it may be characterized by lethargy while on the job, negativism toward one's occupation, and diminished professional output.<sup>4</sup> First responders are likewise routinely subjected to *moral injury* during stressful circumstances in which individuals "perpetrate, fail to prevent or witness events that contradict deeply held moral beliefs and expectations."<sup>5</sup>

All of these mental or behavioral health issues can degrade the functioning of the EMS/911 workforce by their impacts on recruitment, retention, and quality of work, among others. Thus, it is important to identify organizational and system-wide interventions for mitigation of stressors and promotion of resilience, or "adapting well in the face of adversity, trauma, tragedy, threats, or of significant sources of stress."<sup>6</sup>



The purpose of this topic development brief on behavioral health issues of the EMS/911 workforce is to summarize available research for the National Highway Traffic Safety Administration (NHTSA) to inform their decision about whether to commission a new systematic review.

The Guiding Questions for this brief are:

1. What is the scope of literature and ongoing research from the United States on:
  - a. Incidence, prevalence, and severity of mental health issues (depression, anxiety, PTSD, suicidality, and substance abuse) and occupational stress (burnout, stress, moral injury) in the EMS/911 workforce?
  - b. Interventions addressing mental health or occupational stress in the EMS/911 workforce? This calls for discussion of content, resources, and intensity of interventions.
2. What is the context of mental health and occupational stress issues and interventions to address mental health and occupational stress in the EMS/911 workforce in the United States, including clinical and EMS context? This calls for consideration of educational/training, regulatory issues, workflow, financing, trauma exposure, and resources.
3. What research is needed to close evidence gaps regarding mental health and occupational stress issues and interventions to address mental health and wellness in the EMS/911 workforce?



## Methods

Using a hierarchical process with established selection criteria, we assessed the topic of EMS/911 mental health and occupational stress issues for a systematic review or other type of evidence review. See Appendix A for a detailed description of the criteria.

1. Determine the *appropriateness* of the topic for inclusion in the EPC Program.
2. Establish the overall *importance* of a topic as representing a health or healthcare issue in the United States.
3. Determine the *desirability of a new evidence review* by examining whether a new evidence review would be duplicative.
4. Assess the *potential impact* of a new evidence review.
5. Assess whether the *current state of the evidence* allows for an evidence review (feasibility).
6. Determine the *potential value* of a new evidence review.

To define the inclusion criteria for identifying studies about the Guiding Questions, we specified the population, interventions, comparators, outcomes, timing, and setting (PICOTS) of interest (Table 1). To characterize the contextual issues, we focused on comparative studies that provide the best information about the interventions of interest

but will consider, as appropriate, implementation studies that might not have a comparison group.

**Table 1. PICOTS criteria for identifying pertinent studies on the Guiding Questions**

<b>Population</b>	<p>Overall EMS/911 workforce</p> <p>Subgroups:</p> <ul style="list-style-type: none"> <li>• Field responders</li> <li>• Public Safety Telecommunicators (911 call takers and dispatchers)</li> <li>• Workforce with self-identified burnout, moral injury, or undergoing interventions, who may be at increased risk for mental or behavioral health issues</li> </ul>
<b>Interventions</b>	<p>Guiding Question 1a: Not applicable</p> <p>Guiding Question 1b:</p> <ul style="list-style-type: none"> <li>• Interventions intended to address mental health and occupational stress in the EMS workforce by nongovernmental organizations or governmental agencies (local, State, or national)</li> </ul> <p>Guiding Question 2:</p> <ul style="list-style-type: none"> <li>• Interventions intended to address mental health and occupational stress in the EMS workforce by nongovernmental organizations or governmental agencies (local, State, or national)</li> <li>• Studies provide information on one or more aspects of the intervention: <ul style="list-style-type: none"> <li>○ Peer support</li> <li>○ Educational/training interventions</li> <li>○ Regulatory issues (e.g., work hours)</li> <li>○ Resources (e.g., debriefing, counseling)</li> </ul> </li> </ul>
<b>Comparators</b>	<p>Guiding Question 1a: Not applicable</p> <p>Guiding Questions 1b and 2: No programmatic intervention or another intervention</p>
<b>Outcomes</b>	<p>Guiding Question 1a:</p> <ul style="list-style-type: none"> <li>• Incidence</li> <li>• Prevalence</li> <li>• Severity</li> </ul> <p>Guiding Question 1b:</p> <ul style="list-style-type: none"> <li>• Frequency of referral for intervention</li> <li>• Leave of absence from work</li> <li>• Leaving the profession or current position</li> <li>• Harms and unintended consequences</li> </ul> <p>Guiding Question 2: Information about educational training, regulatory issues, and resources used in interventions</p>
<b>Timing</b>	<p>September 11, 2001, to current</p> <ul style="list-style-type: none"> <li>• Pre-COVID-19 pandemic</li> <li>• During COVID-19 pandemic</li> </ul>
<b>Setting</b>	<p>Prehospital Public Safety Answering Point (PSAP)/ Emergency Communication Center (ECC)</p>
<b>Study Design</b>	<p>Guiding Question 1a:</p> <ul style="list-style-type: none"> <li>• Observational/epidemiological studies on incidence, prevalence, and/or severity</li> </ul> <p>Guiding Question 1b:</p> <ul style="list-style-type: none"> <li>• Randomized controlled trials, nonrandomized controlled trials, and observational cohort studies with at least one comparison group, pre-post studies, or other quasi-experimental studies</li> </ul> <p>Guiding Question 2:</p> <ul style="list-style-type: none"> <li>• Randomized controlled trials, nonrandomized controlled trials, observational cohort studies with at least one comparison group, or implementation studies without a comparison group</li> </ul>

EMS = emergency medical service; PICOTS = population, intervention, comparison, outcomes, timing, setting and study design

## Appropriateness and Importance

We assessed the nomination for appropriateness and importance by reviewing selected literature and by discussing the topic with internal subject matter experts.

## Desirability of New Review/Duplication

We searched for high-quality, completed or in-process evidence reviews published during the last 3 years related to the Guiding Questions of the nomination. By searching for reviews, we sought not only to identify duplication but also to facilitate efficient estimation of the likely volume of primary studies. (See References.) Accordingly, we conducted a search of evidence reports and technology assessments funded by the Agency for Healthcare Research and Quality (AHRQ) or the U.S. Department of Veterans Affairs, Cochrane Database of Systematic Reviews, health technology assessments from other sources, and PubMed® Health. We also conducted a search of AHRQ products in development, Cochrane protocols, and the PROSPERO Database. See Appendix B for sources searched.

## Impact of a New Evidence Review

We estimated the potential impact of a new evidence review by analyzing the current standard of care, the existence of potential knowledge gaps, and practice variation. We considered whether it was possible for this review to influence the current state of practice through various dissemination pathways such as practice recommendations or clinical practice guidelines.

## Feasibility of New Evidence Review

We searched PubMed®, PsycInfo®, and Cochrane from September 11, 2001, to September 3, 2021, separately for EMS field responders versus 911 dispatchers. All identified titles and abstracts were classified by Guiding Question and were assessed to determine the size and scope of a potential evidence review.

See Appendix B for sources searched and Appendix C for the Cochrane, PsycInfo, and PubMed search strategies.

## Value

We considered whether or not the clinical, consumer, or policymaking context had the potential to respond with evidence-based change, and whether a partner organization would be likely to use this evidence review to influence practice.



## Results

See Appendix A for detailed assessments of all EPC selection criteria.

## Appropriateness and Importance

The topic meets all of the criteria for appropriateness. There is a high prevalence of mental health and occupational stress issues in the EMS/911 workforce, and a sizable adverse impact of such issues on the performance of the EMS/911 workforce, as described in Background and Purpose.<sup>1-3</sup>

## Desirability of New Review/Duplication

We did not find a recent high-quality evidence review that fully addressed the Guiding Questions on this topic, as indicated in Appendix A. We identified a total of 9 systematic reviews<sup>2, 7-14</sup> pertaining to aspects of Guiding Question 1a (incidence, prevalence, and severity of mental health and occupational stress issues in the EMS/911 workforce) and a total of 10 systematic reviews<sup>7, 8, 15-22</sup> pertaining to Guiding Questions 1b and 2 (interventions addressing mental or behavioral health issues in the EMS/911 workforce).

These were not considered duplicative because the majority of systematic reviews focused on groups that overlapped with the EMS/911 workforce target group but were not exact matches. (For example, some considered only ambulance personnel, only one included dispatchers, and others included police and firefighters.) Additionally, there is considerable heterogeneity of the identified systematic reviews. Most of the identified systematic reviews had a limited scope or focused on specific types of interventions (e.g., nonpharmacological interventions or suicide prevention programs). See the duplication and feasibility columns in Table 2.

## Impact of a New Evidence Review

A new systematic review may have a moderately high level of impact. (See Appendix A.) It should help to improve understanding of how best to address mental health issues and occupational stress for the EMS/911 workforce, especially those related to the COVID-19 pandemic.

## Feasibility of a New Evidence Review

A new evidence review is feasible. (See Appendix A.) We searched PubMed from September 11, 2001, to September 3, 2021, with 729 citations from September 11, 2001, through December 31, 2009, and 6,208 citations from January 1, 2010, through September 3, 2021. Additionally, we searched the PsychInfo database from September 11, 2001, to September 3, 2021, with 928 citations from September 11, 2001, to December 31, 2009, and 2,597 citations from January 1, 2001, through September 3, 2021. For Cochrane, we identified 93 citations from September 11, 2001, through December 31, 2009, and 496 citations from January 1, 2010, through September 3, 2021. While the preponderance of the literature is from 2009 or later, extending the search period back to September 11, 2001, would not increase the work significantly and would be advisable in capturing the historically attendant impacts of September 11, 2001, on the EMS/911 workforce.

The identified systematic reviews pertaining to various aspects of the Guiding Questions suggest an estimated size of review of approximately 122 original articles (based on summation of unique articles from relevant reviews, as shown in Table 2), which would require a large review. Based on the internal experts' familiarity with the literature and a cursory review of primary articles identified, the studies will be very heterogeneous in their methods and outcomes, which will increase the work of conducting the review. See the feasibility columns of Table 2.

**Table 2. Guiding Questions and search results for assessing whether a new systematic review would be duplicative and feasible in EMS field responders versus 911 dispatchers**

Guiding Question	Duplication (9/11/2001-Current) and Feasibility for EMS Field Responders	Duplication (9/11/2001-Current) and Feasibility for 911 Dispatchers
1a: Incidence, prevalence, and severity of behavioral health issues	Total number of identified systematic reviews: 9 <ul style="list-style-type: none"> <li>AHRQ EPC: 0</li> <li>Cochrane: 0</li> <li>VA ESP: 0</li> <li>PubMed: 6<sup>2, 7, 9-12</sup></li> <li>PsycInfo: 3<sup>13, 14, 23</sup></li> </ul> Primary articles: 71 <sup>24-94</sup>	Total number of identified systematic reviews: 0 <ul style="list-style-type: none"> <li>AHRQ EPC: 0</li> <li>Cochrane: 0</li> <li>VA ESP: 0</li> <li>PubMed: 0</li> <li>PsycInfo: 0</li> </ul> Primary articles: 0
1b and 2: Interventions addressing behavioral health issues and mental health	Total number of identified systematic reviews: 10 <ul style="list-style-type: none"> <li>AHRQ EPC: 0</li> <li>Cochrane: 0</li> <li>VA ESP: 0</li> <li>PubMed: 5<sup>7, 8, 15-17</sup></li> <li>PsycInfo: 5<sup>18-22</sup></li> </ul> Primary articles: 41 <sup>95-135</sup> <u>Clinicaltrials.gov</u> <ul style="list-style-type: none"> <li>Recruiting: 0</li> <li>Active: 0</li> <li>Complete: 0</li> </ul>	Total number of identified systematic reviews: 1 <ul style="list-style-type: none"> <li>AHRQ EPC: 0</li> <li>Cochrane: 0</li> <li>VA ESP: 0</li> <li>PubMed: 1<sup>15</sup></li> <li>PsycInfo: 0</li> </ul> Primary articles: 10 <sup>136-145</sup> <u>Clinicaltrials.gov</u> <ul style="list-style-type: none"> <li>Recruiting: 0</li> <li>Active: 0</li> <li>Complete: 0</li> </ul>

AHRQ=Agency for Healthcare Research and Quality, EMS = emergency medical service; EPC = Evidence-based Practice Center; VA ESP= Veterans Affairs Evidence Synthesis Program

## Value

The potential value of a new systematic review on the topic is moderately high. NHTSA, as well as EMS/911 agencies and public health agencies at the Federal, State, and local level, could use the findings to craft evidence-informed guidelines and policies that mitigate mental health and occupational stress issues among the EMS/911 workforce. Additionally, the findings could aid implementation of effective interventions to address the mental health and occupational stress issues, and specifically, the novel stresses from the COVID-19 pandemic.



## Conclusions

- Appropriateness and importance: The topic is both appropriate and important.
- Duplication: A new review would not be duplicative of an existing product. The majority of systematic reviews identified focused on groups that overlapped with the EMS/911 workforce target group but were not exact matches. Most of the identified systematic reviews had a limited scope or focused only on specific types of interventions.
- Impact: A new systematic review could have moderately high impact.
- Feasibility: A new review is feasible, but the evidence base has grown enough to require a relatively large review.
- Value: The potential value is moderately high.



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The information in this report is intended to help healthcare decision makers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of health care services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

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## Afterword

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Recognized for excellence in conducting comprehensive systematic reviews, AHRQ's EPC Program is developing a range of rapid evidence products to assist end-users in making specific decisions in a limited timeframe.

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## Appendix A. Selection Criteria Assessment

**Table A-1. Selection criteria for a systematic review**

Selection Criteria	Assessment Questions	Assessment
Appropriateness	1a. Does the nomination represent a health care drug, intervention, device, technology, or health care system/setting available (or soon to be available) in the United States?	Yes
	1b. Is the nomination a request for a systematic review?	Yes
	1c. Is the focus on effectiveness or comparative effectiveness?	Yes
	1d. Is the nomination focus supported by a logic model or biologic plausibility? Is it consistent or coherent with what is known about the topic?	Yes
Importance	2a. Represents a significant disease burden; large proportion of the population	High prevalence, significant burden of disease <sup>1-3</sup>
	2b. Is of high public interest; affects healthcare decision making, outcomes, or costs for a large proportion of the U.S. population or for a vulnerable population	Yes, affects healthcare decision making for a critical workforce
	2c. Represents important uncertainty for decision makers	Yes
	2d. Incorporates issues around both clinical benefits and potential clinical harms	Yes
	2e. Represents high costs due to common use, high unit costs, or high associated costs to consumers, to patients, to healthcare systems, or to payers	Yes, fostering behavioral health among EMS/911 workforce as an essential element of healthcare is necessary to maintain integrity of workforce
Desirability of a New Evidence Review/Duplication	3. Would not be redundant (i.e., the proposed topic is not already covered by available or soon-to-be available high-quality systematic review by AHRQ or others)	We found no recent high-quality systematic reviews that completely cover this topic. At least eight systematic reviews have been published on related, but not duplicative, topics within the past 2 years, suggesting an increase in the overall body of evidence, interest in the topic, or both
Impact of a New Evidence Review	4a. Is the standard of care unclear (guidelines not available or guidelines inconsistent, indicating an information gap that may be addressed by a new evidence review)?	Yes
	4b. Is there practice variation (guideline inconsistent with current practice, indicating a potential implementation gap and not best addressed by a new evidence review)?	No, no current existing universal guideline; heterogeneous approaches with variability by jurisdiction
Primary Research	5. Effectively utilizes existing research and knowledge by considering: - Adequacy (type and volume) of research for conducting a systematic review - Newly available evidence (particularly for updates or new technologies)	Approximately 122 original articles would meet inclusion for review <sup>2,7-145</sup>

Selection Criteria	Assessment Questions	Assessment
Value	6a. The proposed topic exists within a clinical, consumer, or policymaking context that is amenable to evidence-based change	Yes, guidelines informed by evidence may drive change among the EMS/911 workforce, as with other issues that have changed care delivery and practice
	6b. Identified partner who will use the systematic review to influence practice (such as a guideline or recommendation)	Yes, NHTSA to develop evidence-informed guidelines that mitigate mental health and occupational stress issues among the EMS/911 workforce

AHRQ = Agency for Healthcare Research and Quality; EMS = Emergency Medical Service; NHTSA = National Highway Traffic Safety Administration

Note: References are cited in the main report.



## Appendix B. Search for Evidence Reviews To Determine Duplication

Listed in Table B-1 are the sources searched, hierarchically.

**Table B-1. Hierarchy of sources searched**

Hierarchy	Source
Primary search	AHRQ: Evidence reports and technology assessments <a href="https://effectivehealthcare.ahrq.gov/">https://effectivehealthcare.ahrq.gov/</a> ; <a href="https://www.ahrq.gov/research/findings/ta/index.html">https://www.ahrq.gov/research/findings/ta/index.html</a> ; <a href="https://www.ahrq.gov/research/findings/evidence-based-reports/search.html">https://www.ahrq.gov/research/findings/evidence-based-reports/search.html</a>
	VA Products: PBM, and HSR&D (ESP) publications, and VA/DoD EBCPG Program <a href="https://www.hsrdr.research.va.gov/publications/esp/">https://www.hsrdr.research.va.gov/publications/esp/</a>
	Cochrane Systematic Reviews <a href="http://www.cochranelibrary.com">http://www.cochranelibrary.com</a>
	HTA (CRD database): Health Technology Assessments <a href="http://www.crd.york.ac.uk/crdweb/">http://www.crd.york.ac.uk/crdweb/</a>
Secondary search	AHRQ products in development <a href="https://effectivehealthcare.ahrq.gov/">https://effectivehealthcare.ahrq.gov/</a>
	VA products in development <a href="https://www.hsrdr.research.va.gov/publications/esp/">https://www.hsrdr.research.va.gov/publications/esp/</a>
	Cochrane Protocols <a href="http://www.cochranelibrary.com/">http://www.cochranelibrary.com/</a>
	PROSPERO Database (international prospective register of systematic reviews and protocols) <a href="http://www.crd.york.ac.uk/prospéro/">http://www.crd.york.ac.uk/prospéro/</a>
Tertiary search	PubMed <a href="https://www.ncbi.nlm.nih.gov/pubmed/">https://www.ncbi.nlm.nih.gov/pubmed/</a>
	PsycINFO <a href="http://www.apa.org/pubs/databases/psycinfo/index.aspx">http://www.apa.org/pubs/databases/psycinfo/index.aspx</a>

AHRQ = Agency for Healthcare Research and Quality; CRD = Centre for Reviews and Dissemination; DoD = U.S. Department of Defense; EBCPG = Evidence-Based Clinical Practice Guideline; ESP = Evidence Synthesis Program; HSR&D = Health Services Research & Development; HTA = Health Technology Assessment; PBM = Pharmacy Benefits Management; VA = U.S. Department of Veterans Affairs

# Appendix C. Search Strategy and Results To Determine Feasibility

**Table C-1. Cochrane Search Strategy, from September 11, 2001, to September 3, 2021**

Search #	String
1	"emergency medical services":ti,ab,kw OR EMS:ti,ab,kw OR ([mh "emergency medical services"] NOT ([mh "emergency service, hospital"] OR [mh "advanced trauma life support care"] OR [mh "poison control centers"] OR [mh triage]))
2	"emergency medical responder":ti,ab,kw
3	"Advanced EMT":ti,ab,kw OR "advanced emergency medical technician":ti,ab,kw OR AEMT:ti,ab,kw
4	Paramedic*:ti,ab,kw
5	"emergency medical services":ti,ab,kw OR EMS:ti,ab,kw
6	"emergency medical technician":ti,ab,kw OR "emergency medical technicians":ti,ab,kw
7	"emergency responders":ti,ab,kw OR [mh "Emergency Responders"]
8	"first responder":ti,ab,kw OR "first responders":ti,ab,kw
9	"law enforcement":ti,ab,kw OR police:ti,ab,kw OR [mh police]
10	Firefighters:ti,ab,kw OR "fire fighter":ti,ab,kw OR "fire fighters":ti,ab,kw OR "firefighter":ti,ab,kw
11	"fire department":ti,ab,kw
12	"police dispatcher":ti,ab,kw OR dispatcher:ti,ab,kw
13	"emergency medical dispatcher":ti,ab,kw OR "emergency medical dispatcher"[mh] OR "medical dispatcher":ti,ab,kw
14	((911:ti,ab,kw OR "9 1 1":ti,ab,kw) AND dispatcher:ti,ab,kw)
15	"field dispatcher":ti,ab,kw OR "field responder":ti,ab,kw
16	Ambulance:ti,ab,kw OR [mh ambulances] OR "emergency mobile unit":ti,ab,kw
17	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16
18	Depression:ti,ab,kw OR [mh depression]
19	Anxiety:ti,ab,kw OR ([mh ^anxiety] OR [mh catastrophization] OR [mh ^"performance anxiety"]) OR [mh "anxiety disorders"]
20	"post traumatic stress disorder":ti,ab,kw OR "posttraumatic stress disorder":ti,ab,kw OR PTSD:ti,ab,kw
21	"post traumatic stress injury":ti,ab,kw OR "posttraumatic stress injury":ti,ab,kw OR PTSI:ti,ab,kw OR [mh "Stress Disorders, Post-Traumatic"]
22	"stress disorders":ti,ab,kw OR [mh "stress disorders, traumatic"]
23	Suicidality:ti,ab,kw OR suicide:ti,ab,kw OR [mh suicide] OR suicidal:ti,ab,kw
24	"suicide ideation":ti,ab,kw OR "suicidal ideation":ti,ab,kw OR [mh "suicidal ideation"]
25	"suicide attempt":ti,ab,kw OR "suicide attempts":ti,ab,kw OR [mh "suicide, attempted"]
26	"substance abuse":ti,ab,kw OR "substance use":ti,ab,kw OR "drug use disorder":ti,ab,kw OR "drug use disorders":ti,ab,kw OR "drug abuse":ti,ab,kw OR [mh "Substance-Related Disorders"]
27	"mental health":ti,ab,kw OR [mh "mental health"]
28	"mental illness":ti,ab,kw
29	"Psychological effects":ti,ab,kw
30	Burnout:ti,ab,kw OR "burn out":ti,ab,kw OR [mh "Burnout, Psychological"] OR [mh "Burnout, Professional"]
31	"moral injury":ti,ab,kw OR "moral injuries":ti,ab,kw
32	Resilience:ti,ab,kw OR resiliency:ti,ab,kw OR [mh "Resilience, Psychological"]
33	Debriefing:ti,ab,kw OR [mh "crisis intervention"] OR "critical incidence stress debriefing":ti,ab,kw OR "critical incident stress management":ti,ab,kw
34	"Psychological first aid":ti,ab,kw
35	"secondary traumatization":ti,ab,kw OR "secondary traumatisat[i]on":ti,ab,kw OR "secondary trauma":ti,ab,kw OR "compassion fatigue":ti,ab,kw OR [mh "compassion fatigue"] OR "vicarious trauma":ti,ab,kw
36	#18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35
37	#17 AND #36

**Table C-2. PsycInfo Search Strategy, from September 11, 2001, to September 3, 2021**

Search #	String
1	TI ("emergency medical services" OR EMS) OR AB ("emergency medical services" OR EMS) OR ((mh "emergency medical services") NOT ((mh "emergency service, hospital") OR (mh "advanced trauma life support care") OR (mh "poison control centers") OR (mh triage)))
2	TI ("emergency medical responder") OR AB ("emergency medical responder")
3	TI ("Advanced EMT" OR "advanced emergency medical technician" OR AEMT) OR AB ("Advanced EMT" OR "advanced emergency medical technician" OR AEMT)
4	TI (Paramedic) OR AB (Paramedic)
5	TI ("emergency medical services" OR EMS) OR AB ("emergency medical services" OR EMS)
6	TI ("emergency medical technician" OR "emergency medical technicians") OR AB ("emergency medical technician" OR "emergency medical technicians")
7	TI ("emergency responders") OR AB ("emergency responders") OR (mh "Emergency Responders")
8	TI ("first responder" OR "first responders") OR AB ("first responder" OR "first responders")
9	TI ("law enforcement" OR police) OR AB ("law enforcement" OR police) OR (mh police)
10	TI (Firefighters OR "fire fighter" OR "fire fighters" OR "firefighter") OR AB (Firefighters OR "fire fighter" OR "fire fighters" OR "firefighter")
11	TI ("fire department") OR AB ("fire department")
12	TI ("police dispatcher" OR dispatcher) OR AB ("police dispatcher" OR dispatcher)
13	TI ("emergency medical dispatcher" OR "medical dispatcher") OR AB ("emergency medical dispatcher" OR "medical dispatcher") OR "emergency medical dispatcher"(mh)
14	TI ((911 OR "9 1 1") AND dispatcher) OR AB ((911 OR "9 1 1") AND dispatcher)
15	TI ("field dispatcher" OR "field responder") OR AB ("field dispatcher" OR "field responder")
16	TI (Ambulance OR "emergency mobile unit") OR AB (Ambulance OR "emergency mobile unit") OR (mh ambulances)
17	TI (Depression) OR AB (Depression) OR (mh depression)
18	TI (Anxiety) OR AB (Anxiety) OR ((mh ^anxiety) OR (mh catastrophization) OR (mh ^"performance anxiety")) OR (mh "anxiety disorders")
19	TI ("post traumatic stress disorder" OR "posttraumatic stress disorder" OR PTSD) OR AB ("post traumatic stress disorder" OR "posttraumatic stress disorder" OR PTSD)
20	TI ("post traumatic stress injury" OR "posttraumatic stress injury" OR PTSI) OR AB ("post traumatic stress injury" OR "posttraumatic stress injury" OR PTSI) OR (mh "Stress Disorders, Post-Traumatic")
21	TI ("stress disorders") OR AB ("stress disorders") OR (mh "stress disorders, traumatic")
22	TI (Suicidality OR suicide OR suicidal) OR AB (Suicidality OR suicide OR suicidal) OR (mh suicide)
23	TI ("suicide ideation" OR "suicidal ideation") OR AB ("suicide ideation" OR "suicidal ideation") OR (mh "suicidal ideation")
24	TI ("suicide attempt" OR "suicide attempts") OR AB ("suicide attempt" OR "suicide attempts") OR (mh "suicide, attempted")
25	TI ("substance abuse" OR "substance use" OR "drug use disorder" OR "drug use disorders" OR "drug abuse") OR AB ("substance abuse" OR "substance use" OR "drug use disorder" OR "drug use disorders" OR "drug abuse") OR (mh "Substance-Related Disorders")
26	TI ("mental health") OR AB ("mental health") OR (mh "mental health")
27	TI ("mental illness") OR AB ("mental illness")
28	TI ("Psychological effects") OR AB ("Psychological effects")
29	TI (Burnout OR "burn out") OR AB (Burnout OR "burn out") OR (mh "Burnout, Psychological") OR (mh "Burnout, Professional")
30	TI ("moral injury" OR "moral injuries") OR AB ("moral injury" OR "moral injuries")
31	TI (Resilience OR resiliency) OR AB (Resilience OR resiliency) OR (mh "Resilience, Psychological")
32	TI (Debriefing OR "critical incidence stress debriefing" OR "critical incident stress management") OR AB (Debriefing OR "critical incidence stress debriefing" OR "critical incident stress management") OR (mh "crisis intervention")
33	TI ("Psychological first aid") OR AB ("Psychological first aid")
34	TI ("secondary traumatization" OR "secondary traumatisatation" OR "secondary trauma" OR "compassion fatigue" OR "vicarious trauma") OR AB ("secondary traumatization" OR "secondary traumatisatation" OR "secondary trauma" OR "compassion fatigue" OR "vicarious trauma") OR (mh "compassion fatigue")

Search #	String
35	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16
36	S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34
37	S35 AND S36
-	Limiters - Peer Reviewed; Published Date: 20010101-; Publication Type: All Journals; Language: English

**Table C-3. PubMed Search Strategy, from September 11, 2001, to September 3, 2021**

Search #	String
1	"emergency medical services"[tiab] OR EMS[tiab] OR ("emergency medical services"[mh] NOT ("emergency service, hospital"[mh] OR "advanced trauma life support care"[mh] OR "poison control centers"[mh] OR triage[mh]))
2	"emergency medical responder" [tiab] OR EMR[tiab]
3	"emergency medical technician" [tiab] OR EMT[tiab] OR "emergency medical technicians"[mh]
4	"Advanced EMT"[tiab] OR "advanced emergency medical technician"[tiab] OR AEMT[tiab]
5	Paramedic[tiab] OR paramedics[tiab]
6	"first responder"[tiab]
7	"emergency first responder"[tiab]
8	"law enforcement"[tiab] OR police[tiab] OR police[mh]
9	Firefighters[tiab] OR firefighters[mh] OR "fire fighter"[tiab] OR "fire fighters"[tiab] OR firefighter[tiab]
10	"fire department"[tiab]
11	dispatcher[tiab] OR dispatchers[tiab]
12	"emergency medical dispatcher"[tiab] OR "emergency medical dispatcher"[mh] OR "medical dispatcher"[tiab]
13	((911[tiab] OR "9/11" [tiab] OR "9-11" [tiab] OR "9-1-1" [tiab] OR "9 1 1" [tiab]) AND (dispatcher[tiab] OR dispatchers[tiab]))
14	"field dispatcher"[tiab] OR "field responder"[tiab] OR "field responders"[tiab]
15	Ambulance[tiab] OR ambulances[tiab] OR ambulance[mh] OR "emergency mobile unit"[tiab]
16	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15
17	Depression[tiab] OR depression[mh]
18	Anxiety[tiab] OR (anxiety[mh:noexp] OR catastrophization[mh] OR "performance anxiety"[mh:noexp]) OR "anxiety disorders"[mh]
19	"post traumatic stress disorder"[tiab] OR "post-traumatic stress disorder"[tiab] OR PTSD[tiab]
20	"post traumatic stress injury"[tiab] OR "post-traumatic stress injury"[tiab] OR PTSTI[tiab] OR "Stress Disorders, Post-Traumatic"[mh]
21	"stress disorders"[tiab] OR "stress disorders, traumatic"[mh]
22	Suicidality[tiab] OR suicide[tiab] OR suicide[mh] OR suicidal[tiab]
23	"suicide ideation"[tiab] OR "suicidal ideation"[tiab] OR "suicidal ideation"[mh]
24	"suicide attempt"[tiab] OR "suicide attempts"[tiab] OR "suicide, attempted"[mh]
25	"substance abuse"[tiab] OR "substance use"[tiab] OR "drug use disorder"[tiab] OR "drug use disorders"[tiab] OR "drug abuse"[tiab] OR "Substance-Related Disorders"[mh]
26	"mental health"[tiab] OR "mental health"[mh]
27	"mental illness"[tiab]
28	"Psychological effects"[tiab]
29	Burnout[tiab] OR "burn out"[tiab] OR "Burnout, Psychological"[mh] OR "Burnout, Professional"[mh]
30	"moral injury"[tiab] OR "moral injuries"[tiab]
31	Resilience[tiab] OR resiliency[tiab] OR "Resilience, Psychological"[mh]
32	Debriefing[tiab] OR "crisis intervention"[mh] OR "critical incidence stress debriefing"[tiab] OR "critical incident stress management"[tiab]
33	"Psychological first aid"[tiab]
34	"secondary traumatization"[tiab] OR "secondary traumatisation"[tiab] OR "secondary trauma"[tiab] OR "compassion fatigue"[tiab] OR "compassion fatigue"[mh] OR "vicarious trauma"[tiab]
35	17 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34
36	16 AND 35
37	2001/09/11:2021[dp] AND Eng[la]

Search #	String
38	36 AND 37

