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Vocational rehabilitation for emergency services personnel: a scoping review.

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Title:

Vocational rehabilitation for emergency services personnel: a scoping review

Authors

Lyndsay Alexander[1,2] and Kay Cooper[1,2]

1. **The Scottish Centre for Evidence-based Multi-professional Practice: A Joanna Briggs Institute Centre of Excellence, School of Health Sciences, Robert Gordon University, UK**
2. **School of Health Sciences, Robert Gordon University, UK**

Corresponding author:

Lyndsay Alexander, l.a.alexander@rgu.ac.uk

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Emergency services; Scoping review; Vocational rehabilitation

Abstract

Objective: The objective of this scoping review is to examine and map the range of vocational rehabilitation available for emergency services personnel.

Introduction: Employee work absence due to illness and injury is an international burden. The emergency service sector (police officers, firefighters and ambulance/paramedic staff) workforce has been shown to report a higher prevalence of illness/injury and sick leave compared to the general population. Despite the evidence of physical and psychological problems that emergency service sector workers can face, vocational rehabilitation (VR) interventions and the structure and effectiveness of VR for these workers are less well known.

Inclusion criteria: This scoping review considered studies that included adult emergency medical services (EMS) personnel (e.g. police officers, firefighters and ambulance/paramedic staff), regardless of age, sex or rank. EMS personnel from any developed nation were included. The interventions included any VR regardless of condition, work status (VR to prevent sick leave or for workers on sick leave) or focus (e.g. mental health issues, neurological problems or musculoskeletal conditions). VR interventions can include work conditioning, work hardening, physiotherapy, counseling, functional restoration and occupational rehabilitation.

Methods: Published and unpublished literature in English from 2007 to 2017 was included in this review. A three-step search strategy was followed that included five databases and nine websites. Data extraction was performed by two reviewers using a pre-determined data extraction form developed by the authors.

Results: This review identified 24,271 sources of information, of which 48 were screened at full-text stage, and 22 sources were eligible to be included in the final scoping review. The majority of the sources provided evidence of VR for police officers and firefighters. VR is typically provided in residential rehabilitation settings as well as some outpatient, off-site and workplace settings. The main type of VR provided is physical, but there is also evidence of psychological rehabilitation and addiction/substance misuse rehabilitation.

Conclusions: This review demonstrated that there is a lack of information in the public domain on VR for staff working in the emergency service sector, as well as a lack of rigorous evaluation available on the effectiveness of VR within the emergency service sector. There is inconsistent provision of VR internationally for emergency service sector staff.

Keywords:

Emergency services; scoping review; vocational rehabilitation

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Review questions/objectives

The objective of this scoping review was to examine and map the range of vocational rehabilitation (VR) interventions available for emergency medical services (EMS) personnel. More specifically, the scoping review focused on the following questions:

i. Which types of VR interventions for police, firefighter and ambulance/paramedic personnel from developed countries have been reported?

ii. What are the characteristics of the VR (such as, but not limited to, physical interventions, psychological interventions or mixed content interventions) reported for police, firefighter and EMS personnel from developed countries?

iii. In what context (healthcare setting, work setting or rehabilitation setting) are VR interventions provided for police, firefighter and ambulance/paramedic personnel from developed countries?

Introduction

Employee work absence due to sickness and injury is a major cost to society and employers worldwide, with costs ranging from £14.1 billion in the United Kingdom,[1] to $61.8 billion in Australia[2] and $225.8 billion in the United States.[3] The emergency medical service sector (EMS), which includes police officers, firefighters and ambulance personnel/paramedics, is a common occupation globally, employing a significant number of people.[4,5] The sector employs around 2.1 million people in the United States, representing around 1.5% of the total workforce.[6] The EMS sector workforce has been shown to report a higher prevalence of illness/injury and sick leave compared to the general population, with musculoskeletal sprains and strains involving the lower trunk, lower limbs and neck/upper limbs the most commonly reported injuries.[7-10] The sector also reports higher blood pressure and higher rates of cardiovascular problems and metabolic syndrome than the general public,[6,11] along with high levels of job stress leading to mental health problems.[12]

Internationally, police officers have a higher incidence of work absence than the general population (women more than men)[4,13,14] due to illness and injury, and also a high incidence of sickness presenteeism, which reflects people working with an injury or illness that impacts their work productivity.[15,16] Police officers are recognized as having a higher risk of injury due to shift work, which has been shown to cause poor sleep quality and fatigue, increased systolic blood pressure in female police officers and increased injury and sick leave.[4,17-20] The profession has also been shown to cause stress-related psychological problems.[21-23] Research has highlighted stress and poor mental health at work for police officers (reported in up to 91% of officers) and occasional suicidal thoughts.[24,25] The most common musculoskeletal injury reported for police officers is low back pain.[13,26-28] A study in Norway found that female police officers demonstrate greater care-seeking behavior to address these issues compared to their male counterparts.[29]

Firefighters are also recognized as having a higher risk of musculoskeletal injury[30] and cardiovascular problems[31,32] than the general population, with 70% of the U.S. firefighter workforce reported as being

overweight or obese.[33] In Canada, strains and sprains are the main musculoskeletal injury for firefighters, most commonly involving the back or knee (knee injuries being the most costly).[34] Firefighters also have reported high rates of stress, poor mental health and post-traumatic stress, in addition to suicide.[35]

Ambulance and paramedic personnel report high rates of health problems in comparison to the general population, such as higher risk and incidence of elevated blood pressure, sleeping problems, low back pain, hearing problems, poor fitness levels,[36,37] musculoskeletal disorders[38,39] and problems related to shift work.[40] These personnel also have higher rates of work absence than police or firefighter personnel,[8,41] and a higher prevalence of care-seeking behavior compared to the general population.[38] Additionally, ambulance and paramedic personnel have higher reported mental health issues compared to other healthcare workers, with the highest risk for suicide.[42,43]

Workplace violence within the EMS sector is an additional issue for all staff, which can lead to serious physical and psychological effects for the worker.[44,45] Workplace violence including physical violence and verbal abuse is recognized as commonplace in the sector worldwide,[46-48] with a recent review reporting 53%-90% of workers had experienced workplace violence.[49]

Vocational rehabilitation (VR) has been recognized as a solution for reducing work absence and its associated costs.[50] Vocational rehabilitation is defined as “whatever helps someone with a health problem to stay at, return to, or remain in work”.[50(p.5)] Vocational rehabilitation is a multi-component approach that includes different interventions specific to a condition. These interventions should begin early and address any physical musculoskeletal problems, psychological disorders and employment factors to facilitate a sustained return to work.[50] Since the seminal work by Waddell and colleagues to produce an evidence base for VR policy development, the benefits of VR have been demonstrated in terms of improving participation at work, reducing sickness absence and reducing disability.[50-52] The majority of studies on VR focus on specific conditions such as psychological, neurological or musculoskeletal conditions, with less focus on specific occupational groups.[53-56]

Despite the evidence relating to the physical and psychological problems that EMS sector workers can face, VR interventions and the structure and effectiveness of VR for EMS personnel are less well known. There is a need to identify existing evidence on the provision of VR in the EMS sector to underpin the content, characteristics and outcomes of workplace VR interventions across the sector. A scoping review was indicated because it is unclear at this stage what specific questions should be asked in a systematic review on this area. This scoping review aimed to map the range of available evidence on VR interventions for EMS sector workers; this evidence will then guide the specific questions and inclusion/exclusion criteria for a future systematic review.[57,58] Identifying which VR interventions and/or EMS sector professional groups have not been investigated to date will also help to focus future primary research studies in these areas. Overall, the information generated by this scoping review is aimed at informing clinicians, managers, stakeholders and international EMS sector organizations regarding VR interventions for EMS sector workers.

A preliminary search for existing scoping reviews and/or systematic reviews on the topic was conducted in the *JBI Database of Systematic Reviews and Implementation Reports*, Cochrane Database of Systematic Reviews, International Prospective Register of Systematic Reviews (PROSPERO), Medline and CINAHL; however, no reviews (published or in progress) were identified.

The objectives, inclusion criteria and methods of analysis for this review were specified in advance and documented in a protocol.[59]

Inclusion criteria

Participants

This scoping review considered studies that included adult EMS personnel (police officers, firefighters and ambulance/paramedic staff) regardless of age, sex or rank. Retired personnel were not the focus of this review and were excluded.

Concept

Vocational rehabilitation delivered to EMS personnel regardless of condition, work status (VR to prevent sick leave or VR for workers on sick leave) or focus (e.g. mental health issues, neurological problems or musculoskeletal conditions) was included in this scoping review. Interventions included work conditioning, work hardening, physiotherapy, counseling, functional restoration and occupational rehabilitation. Studies that included training programs, health promotion or prevention interventions to healthy workers were not included in this review as the focus was on VR for workers with conditions/injuries and not on primary prevention or general health promotion activities.

Context

This scoping review included literature from developed nations and regions such as Australia, New Zealand, United States, Canada, Western Europe and Scandinavia. Developed countries demonstrating “very high human development”, as defined by the 2013 Human Development Index (HDI),[60] were included in this review. EMS sectors are more likely to be well developed and well established in these countries, thus enabling an international comparison. Studies that included emergency sector workers who were identified as living in developing countries or countries defined as low, medium or high human development were not included.[60]

Types of studies

Published and unpublished studies (quantitative, qualitative and text/opinion sources) were considered, as well as reports on government policy, occupational health websites (such as the National Institute for Occupational Safety and Health [NIOSH] in the United States, the Health and Safety Executive [HSE] in the United Kingdom, the Canadian Centre for Occupational Health and Safety [CCOHS] and Safe Work Australia), and emergency services charities (such as the Police Treatment Centre and Fire Fighters Charity, United Kingdom). This review considered both experimental and quasi-experimental study designs including randomized controlled trials, non-

randomized controlled trials, before and after studies and interrupted time-series studies. In addition, descriptive and analytical observational studies including prospective and retrospective cohort studies, case-control studies, analytical cross-sectional studies, case series, individual case reports and descriptive cross-sectional studies were considered for inclusion. Qualitative study designs that were considered included phenomenological, ethnographic, grounded theory and feminist research.

To ensure all sources of information were mapped for this review, press releases, websites and conference abstracts were also considered for inclusion.

Methods

Search strategy

The search strategy aimed to find both published and unpublished literature. A three-step search strategy was followed in this review. Initially, a limited database search was undertaken (MEDLINE and CINAHL) using the terms vocational rehabilitation and emergency medical services, followed by analysis of the text words contained in the title and abstract, and of the index terms used to describe each article. A second search using all identified keywords and index terms was then undertaken across all included databases. Thirdly, the reference lists of all identified reports and articles were searched for additional studies. The databases searched included: CINAHL, MEDLINE, AMED, Cochrane Database of Systematic Reviews and PEDro.

Information sources

The search for unpublished studies included: NIOSH, HSE, CCOHS, Safe Work Australia, BeyondBlue, Canada Institute for Work and Health, Fit for Work and Arbeidstilsynet (Norwegian Labour Inspection Authority websites, and a search of Google Scholar using a modified search (vocational rehabilitation AND police; vocational rehabilitation AND firefighters; vocational rehabilitation AND paramedics).

Study selection

Studies published in English language were included. To ensure inclusion of relevant literature since the publication of the work by Waddell et al,[50] all information available from the previous 10 years was included (2007-2017).

The initial keywords used were vocational rehabilitation, police officers, law enforcement, firefighters, emergency medical service, paramedics, ambulance and rehabilitation. A research librarian assisted in keyword and search strategy development. The detailed search strategy for MEDLINE, CINAHL, and AMED are presented in Appendix I. The searches were conducted in October 2017.

All sources of information (after de-duplication) were screened for inclusion in the review by two reviewers.

Data extraction

Data extraction was performed by two reviewers independently using a pre-determined data extraction form.[59] The main areas relevant to the review question that were extracted included author, country, aim of the project, type of study or source, participant details and sample size, context, intervention details, concept/type of VR and outcomes related to the intervention/VR. Any disagreements that arose were resolved via discussion. As per guidance on scoping review methods, there was no critical appraisal of methodological quality.[57]

Results

Study inclusion

As presented in the PRISMA flowchart (Figure 1)[61] there were 20,174 sources of information (published, unpublished/grey literature/text) screened, 48 full-text records assessed for eligibility by two independent reviewers and 22 records included in the final scoping review. Appendix II lists full-text studies excluded in the final review.

The sources of information included in this review were conducted in the following countries: Netherlands,[62] Australia,[26,63,64] United Kingdom[65-73] and United States,[74-82] and included police officers, firefighters and paramedics/ambulance personnel. The evidence included in this scoping review consists of a wide range of sources, such as a randomized controlled trial, cohort study, pilot study, case study, conference presentation, reports, websites and press releases.

Tables 1 through 5 describe the relevant data from the sources of information in this review related to the three review questions (i.e. which types of VR have been reported, what are the characteristics of the VR intervention; and in what context are VR interventions delivered). There were five types of VR identified in this review (psychological, physical, mixed physical and psychological, addiction/substance abuse, and mixed addiction/substance abuse and psychological). Each table focuses on one type of VR, describing the author, year of publication, country, source, participants, context, intervention and outcomes related to the intervention.

Types of vocational rehabilitation

The majority of VR is provided as physical (Table 2) or mixed physical and psychological (Table 3) to police officers, firefighters and paramedics. Only one source focused on primarily psychological VR for police officers (Table 1), and one focused on addiction/substance abuse for EMS personnel (Table 4). Four sources of information describe mixed addiction/substance abuse and psychological VR for EMS personnel (Table 5).

Characteristics of vocational rehabilitation

The psychological interventions included guideline-based care to inform a three-step intervention (which includes early activation guidance, time-contingent process evaluation and cognitive behavioral principles), stress counselling, sleep relaxation, complementary therapies, psychological programs for specific mental health conditions (depression, anxiety, insomnia), stress management,

mindfulness, individual counselling, holistic therapy, music therapy, trauma therapy, yoga, art and creative therapies. Although the psychological interventions are described, they lack detail in delivery (such as how long the intervention occurred and how often); therefore, they are not reproducible. These interventions were delivered as one-to-one, group programs or as a mixture.

The physical interventions mainly included musculoskeletal physiotherapy; structured and supervised reconditioning programs (including movement pattern training, resistance and cardiovascular exercise); cardiac rehabilitation (including high intensity, occupational specific program); education; cognitive behavioral education; work-focused rehabilitation; Pilates; strength and conditioning; relaxation; goal setting; individual plans; self-managed exercise programs; hydrotherapy; and exercise therapy. These were delivered as one-to-one, group programs, phone guidance or self-managed by the individual.

Addiction/substance abuse rehabilitation also included psychological interventions as before (except addiction solutions) as well as holistic therapy (art and music, as well as trauma therapy), medication, exercise and addiction treatment via group and personalized one-to-one programs.

The results supported physical VR[64,65,72,74] in terms of clinical effectiveness,[69] cost benefits[26,69] and return to work,[26,63] but there was a lack of outcomes available on the effects of psychological and addiction/substance misuse interventions.

Context of vocational rehabilitation

This review was interested in the context in which the VR was delivered to EMS personnel. The results identified that VR is delivered in the workplace, at external healthcare providers and also on a residential basis across interventions.

Discussion

This scoping review aimed to map the extent of VR for emergency service sector workers and specifically identify which types of VR have been reported, the characteristics of the reported VR interventions and the context in which they have been provided.

The review identified 22 sources of evidence that map the current extent of VR for EMS sector workers from both published and unpublished sources. The evidence retrieved demonstrates there is a heavy reliance on individual organizations sharing information about their VR services and content alongside any outcomes. This review found that although there appears to be evidence to support physical rehabilitation interventions for VR,[26,63-66,69-71,74] there is still a lack of rigorous evaluation published on the effectiveness of VR in the EMS sector, especially regarding mental health interventions across all services. This reflects current VR literature in that there is evidence for the effectiveness of VR for return to work and for reducing pain in workers with musculoskeletal disorders.[83,84] However, there is less evidence, providing mixed support, on the effectiveness of VR for workers with mental health problems.[83,85]

In addition, despite the evidence base demonstrating the physical and mental health issues for EMS personnel, the identified costs involved and working days lost, and a thorough and robust search strategy, this review identified a lack of information in the public domain regarding VR in the EMS sector. There may be local areas where VR is in place, but there appears to be a lack of process/systems to report this publically including any associated outcomes in terms of effectiveness, return-to-work effects and impact on lost productivity. There is a need to report VR interventions and their impact widely using standard international reporting guidelines.[86]

The evidence presented for EMS personnel demonstrates that there are VR programs to treat both physical and mental health problems for police officers, firefighters and paramedics, which reflect the main health problems reported for this sector[6,14,30]; however, this is not consistent across nations or professions. In the United Kingdom, VR is mainly provided by charities through residential programs for all three services for physical problems and more recently mental health problems,[67,68,70,73] but there is also workplace and off-site physical rehabilitation for firefighters.[65,66] In Australia, New South Wales provides workplace physical rehabilitation and external specialist support for psychological rehabilitation for police officers and firefighters,[64] whereas this review identified only addiction/substance abuse and mental health provision in the United States at residential settings with follow-up outpatient support for all three services.[78,80-82]

The main content of the physical VR utilized physiotherapy and exercise-based interventions; mental health VR included counseling and psychological interventions, as well as exercise based interventions, and addiction/substance abuse VR also included psychological interventions, which reflects the variety of VR content within the literature.[87] There was a lack of detail across the included evidence on each intervention (in terms of consistently reporting intervention content, how often it was delivered, the setting, the duration, and which outcome measures for impact were used, including the outcomes of these measures); therefore, future reporting of studies should ensure they follow standard reporting guidelines to address this issue. It has been acknowledged that there is a need to increase data sharing to improve outcomes in VR, and an initial move in this direction would require standardized reporting, as well as agreement on terminology, across organizations both nationally and internationally.[88]

The majority of sources identified in this review provided evidence on VR for police officers and firefighters, whereas there was less evidence identified for paramedics/ambulance personnel. Given that there are higher rates of work absence reported by paramedics/ambulance personnel in comparison to police officers and firefighters,[8,41] the results of this review would suggest that there is a greater need for identifying effective VR services for paramedics/ambulance personnel compared to the other two professions.

Limitations of review

There are some limitations to our scoping review that are worth noting. First, we limited the included evidence to English language only due to a lack of interpretation services. As such, our results may

have omitted evidence in other languages, and this may be a reason why there was mainly evidence retrieved from English-speaking countries and a lack of evidence gained from non-English-speaking countries.

Secondly, scoping reviews are inherently limited because the focus is to provide breadth rather than depth of evidence on a particular area.[57,58] However, this method was appropriate for this review, given that our objective was to map the evidence on VR for the EMS sector and ultimately identify which specific questions should be asked in a systematic review in this area. Rather than informing a systematic review, however, the results of this scoping review have identified clear implications for practice and further high-quality primary research that is required before any systematic reviews can be conducted.

Our search strategy did not include the PsycINFO database, which may have led to the omission of additional sources of information for this review. The full search did identify a large body of evidence, but the authors acknowledge this omission may be a limitation of this review.

Conclusion

This review has identified varying evidence reporting VR for physical and mental health problems as well as addiction/substance abuse across developed nations for EMS personnel. A lack of published studies indicates that further high-quality primary research is required to identify the effectiveness of VR across different settings and conditions for EMS personnel, and the relative effectiveness of different intervention types should also be studied. Future studies need to clearly report the details of the VR interventions for the findings to be used in clinical practice and evidence synthesis.

Implications for practice

Robust audit or service evaluation of VR services for EMS workers should be made more readily available in the public domain and shared so that health professionals and organizations can identify effective models of practice.

Implications for research

There is a need for further research to investigate the effectiveness of VR interventions for EMS workers, especially those with psychological and/or addiction/substance misuse problems. Primary research in VR for EMS workers should also be reported widely, including in peer-reviewed journals (adhering to reporting guidelines), to enable systematic reviews into the effectiveness of VR in this area to be conducted and clinical guidelines developed for health professionals.

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Conflicts of interest

There is no conflict of interest in this project.

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566 and-disability-green-paper-improving-lives

567

568 **Appendix I**: Search strategy

569

MEDLINE	**CINAHL**	**AMED**
"vocational rehab*" OR rehab* OR	"vocational rehab*" OR rehab* OR	"vocational rehab*" OR rehab* OR

physio* AND police OR "law enforcement" OR "fire-fighters" OR "emergency medical*" OR paramedic OR ambulance	physio* AND police OR "law enforcement" OR "fire-fighters" OR "emergency medical*" OR paramedic OR ambulance	physio* AND police OR "law enforcement" OR "fire-fighters" OR "emergency medical*" OR paramedic OR ambulance

570 Limits: adults, English language, 2007-2017.

571

572 **Appendix II:** Excluded articles at full-text stage

573 Hou WH, Chi CC, Lo HLD, Kuo KN, Chuang HY. Vocational rehabilitation for enhancing return-to-
574 work in workers with traumatic upper limb injuries (Review). Cochrane Database Syst Rev.
575 2013;(10):CD010002. **Not emergency medical services**

576 Smith DL, Haller JM, Benedict R, Smith LMM. Firefighter incident rehabilitation: interpreting heart rate
577 responses. Prehosp Emerg Care. 2016;20:28-36. **Not vocational rehabilitation**

578 Soklaridisa S, Cassidy JD, van der Veldee G, Tompaf E, Hogg-Johnson S. The economic cost of
579 return to work: an employer's perspective. Work. 2012;43:255-262. **Not vocational rehabilitation**

580 Metropolitan Police OH Services. Occup Health. 10 January 2013. **Not vocational rehabilitation**

581 Summers K, Jinnett K, Bevan S. White Paper: musculoskeletal disorders, workforce health and
582 productivity in the United States [Internet]. The Work Foundation; June 2015 [cited June 30 2017].
583 Available from: www.theworkfoundation.com **Not vocational rehabilitation**

584 Horn GP, Gutzmer S, Fahs CA, Petruzzello SJ, Goldstein E, Fahey GC, et al. Physiological recovery
585 from firefighting activities in rehabilitation and beyond. Prehosp Emerg Care. 2011;15:214-225. **Not**
586 **vocational rehabilitation**

587 Black C. Working for a healthier tomorrow. London: TSO; 17 March 2008. **Not vocational**
588 **rehabilitation; not EMS**

589 Oyeflaten I, Lie SA, Ihlebæk CM, Eriksen HR. Multiple transitions in sick leave, disability benefits, and
590 return to work. A 4-year follow-up of patients participating in a work-related rehabilitation program.
591 BMC Public Health. 2012;12:748. **Not emergency medical services**

592 Baxter M. Safe Work Australia Annual Report 2015-2016 [Internet]. [cited June 30 2017]. Available
593 from: http://www.safeworkaustralia.gov.au/sites/swa/about/annual-reports/pages/annual-reports **Not**
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595 Stergiopoulos E, Cimo A, Cheng C, Bonato S, Dewa CS. Interventions to improve work outcomes in
596 work-related PTSD: a systematic review. BMC Public Health. 2011;11:838. **Not emergency medical**
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598 Safe Work Australia. Return to work survey, the role of the employer and workplace, Australia and
599 New Zealand: 2013 [Internet]. [cited June 30 2017]. Available from: www.safeworkaustralia.gov.au
600 **Not vocational rehabilitation**

601 Smith GR. Workers compensation administration annual report 2008 [Internet]. [cited June 30 2017].
602 Available from: http://www.workerscomp.state.nm.us **Not vocational rehabilitation**

603 White M, Wagner S, Schultz I, Williams-Whitt K, Koehn C, Dionne CE, et al. Interventions to reduce
604 work absence: a stakeholder-centred, best-evidence synthesis of systematic reviews. Canadian
605 Institute for the Relief of Pain and Disability, 2014 [Internet]. Available from: www.cirpd.org **Not**
606 **emergency medical services**

607 Bambra C, Whitehead M, Sowden A, Akers J, Petticrew M. "A hard day's night?" The effects of
608 Compressed Working Week interventions on the health and work-life balance of shift workers: a
609 systematic review. J Epidemiol Community Health. 2008;62(9):764-777. **Not emergency medical**
610 **services**

611 Conn VS, Hafdahl AR, Cooper PS, Brown LM, Lusk SL. Meta-analysis of workplace physical activity
612 interventions. Am J Prev Med. 2009;37(4):330-339. **Not emergency medical services**

613 Czabała C, Charzynska K, Mroziak B. Psychosocial interventions in workplace mental health
614 promotion: an overview. Health Promot Int. 2011;26 suppl 1:i70-84. **Not emergency medical**
615 **services within date range**

616 Osilla KC, Van Busum K, Schnyer C, Larkin JW, Eibner C, Mattke S. Systematic review of the impact
617 of worksite wellness programs. Am J Manag Care. 2012;18(2):e68-e81. **Not emergency medical**
618 **services**

619 Parks KM, Steelman LA. Organizational wellness programs: a meta-analysis. J Occupational Health
620 Psychology. 2008;13(1):58-68. **Not emergency medical services within date range**

621 Pomaki G, Franche RL, Murray E, Khushrushahi N, Lampinen TM. workplace-based work disability
622 prevention interventions for workers with common mental health conditions: a review of the literature.
623 J Occup Rehabil. 2012;22:182-195. **Not emergency medical services**

624 Richardson KM, Rothstein HR. Effects of occupational stress management intervention programs: a
625 meta-analysis. J Occup Health Psych. 2008;13(1):69-93. **Not emergency medical services**

626 Soler RE, Leeks KD, Razi S, Hopkins DP, Griffith M, Aten A, et al. A systematic review of selected
627 interventions for worksite health promotion. Am J Prev Med. 2010;38(2S):S237-S262. **Not vocational**
628 **rehabilitation**

van Dongen JM, Proper KI, van Wier MF, van der Beek AJ, Bongers PM, van Mechelen W, et al. Systematic review on the financial return of worksite health promotion programmes aimed at improving nutrition and/or increasing physical activity. Obesity Rev. 2011;1. **Not vocational rehabilitation**

Faghri PD, Blozie E, Gustavesen S, Kotejoshyer R. The role of tailored consultation following health-risk appraisals in employees' health behavior. J Occup Environ Med. 2008;50(12):1378-1385. **Not vocational rehabilitation**

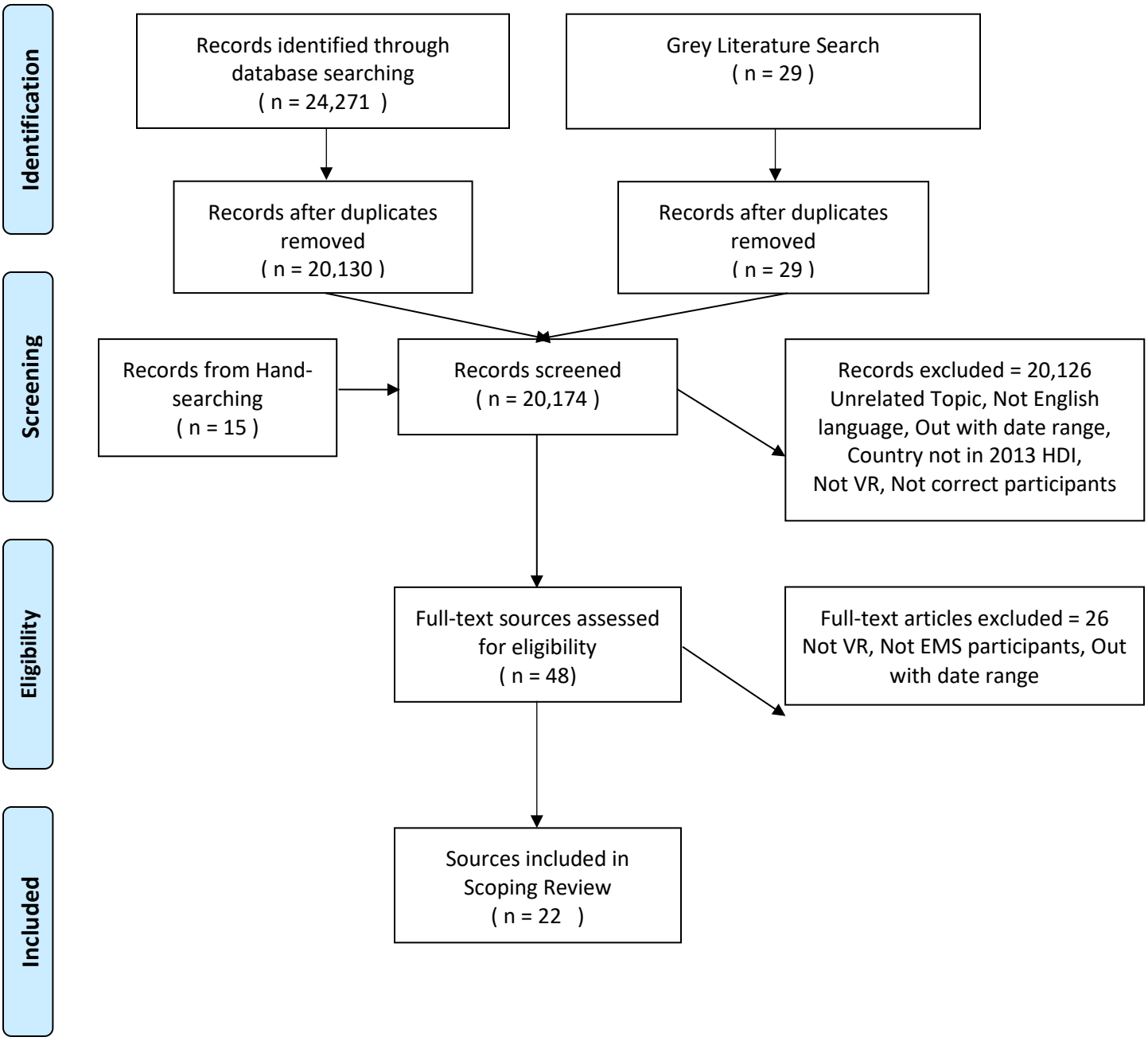
MacKinnon DP, Elliot DL, Thoemmes F, Kuehl KS, Moe EL, Goldberg L, Burrell G. Long-term effects of a worksite health promotion program for firefighters. Am J Health Behav. 2010;34(6):695-706. **Not vocational rehabilitation**

Lamplugh M. All responders treatments programs: Just another gimmick? Addiction professional, Winter. 2015:38-39. **Not vocational rehabilitation**

MacDonald H, Colotla V, Flamer S, Karlinsky H. Posttraumatic stress disorder (PTSD) in the workplace: a descriptive study of workers experiencing ptsd resulting from work injury. J Occup Rehab. 2003;13(2):63. **Out of date range**

Mcleod J. The effectiveness of workplace counselling: a systematic review. Couns Psychotherapy Res. 2010;10(4):238-248. **Not emergency medical services within date range**

PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

Results:

Table 1 – Psychological vocational rehabilitation

Author/year country	Aims/purpose	Study type/Source	Participants Sample size	Context	Intervention	Outcomes/findings
Rebergen et al 2009 Netherlands	Examine effect of Dutch national guideline on management of employees with mental health problems by OPs	RCT	240 Dutch police officers	Police officers treated in external psychotherapeutic center	Guideline based care (GBC) for mental health problems by OPs trained to provide treatment v usual care with minimal involvement of OP and if applicable, access to psychologist. GBC consisted of early activating guidance from OP (mean 3.4 consultations); a time contingent process evaluation and cognitive behavioral principles (stress inoculation training and graded activity). Gradual RTW with regular contact with support and work accommodations were also implemented.	GBC by OPs did not differ in RTW compared to usual care. GCB may be beneficial for majority of workers with "minor" stress related disorders. Healthcare utilization costs significantly lower in intervention group (mean diff -€520; 95% CI -€980, -€59), no significant diff in sick leave and productivity loss costs

Key: RCT – randomized controlled trial; OP – Occupational Physician; RTW – return to work; diff – difference; CI – confidence interval

Table 2: Physical vocational rehabilitation

Concept Type of VR	Author/year country	Aims/purpose	Study type/Source	Participants Sample size	Context	Intervention	Outcomes/findings
Physical reconditioning program	Orr et al 2013 Australia	To determine if a structured and supervised reconditioning program	Pilot study	6 injured police officers Mean age 38.8 years	Workplace setting for police officers	3 officers allocated to training group – 8 training sessions (up to 60 mins) over 4 weeks of a tailored	A workplace reconditioning program under supervision showed improved physical

		improved RTW prospects				reconditioning program (general body reconditioning program devised & supervised by qualified PTI included movement pattern retraining, resistance ex and CV ex). Control group = 3 officers. Both groups received standard medical care also.	performance and attitude towards their physical health compared to standard medical care.
Physical - Physiotherapy	Orr et al 2015 Australia	Profile police attendees of workplace physiotherapy and reconditioning program	Conference presentation	42 Injured police officers: 30 male (mean age 43.3 years) & 12 female (Mean age 38.2 years) attending workplace rehabilitation	Workplace setting for NSW police officers	Workplace physiotherapy and rehabilitation program. Mainly lumbar spine injury (40.5%, n=17)	In-house physiotherapy and rehabilitation program eliminates cost of travel to external physiotherapy services and can limit lost productivity (savings $317.14 per person)
Physical - Physiotherapy	Lothian and Borders Fire and Rescue Service (LBFRS) Best value review 2010 Scotland	Review of Fitness Advisory Unit of LBFRS	Report	No information	External physiotherapy service to Scottish fire-fighters	Physiotherapy service provided by Fitness Assessment and Sports Injuries Centre (FASIC) part of Edinburgh University. Two x two hour sessions per week covering max of 8 patients per session	Employees (81%) off work reported FASIC intervention enabled them to RTW earlier. Employees still at work reported FASIC intervention helped them remain at work (100%)
Cardiac rehabilitation	McBee 2015 Adams 2013a, 2013b, 2014 USA	Aimed to design occupation and sport specific high intensity exercise program	Press article; case study x2 and cohort study	48 year old Mesquite Fire Captain; 39 year old police officer post coronary	Cardiac rehabilitation centre – out patient	High intensity, occupational specific cardiac rehabilitation designed specifically for firefighters, police	Subjectively increased strength and confidence and ready to RTW.

				artery bypass graft; 6 male fire-fighters (mean age 54 years) post coronary revascularization; 40 year old fire-fighter		officers and others with physically demanding jobs. Minimum 18 ex training sessions (3 days a week) of gradually increasing high intensity ex with monitoring and endurance training (treadmill walking, recumbent bike). RTW program included work related equipment such as a 165 pound mannequin to simulate a rescue or wore 10-55lb vests for occupation specific tasks.	RTW and resumed playing ice hockey 6 weeks post-surgery.
Functional Restoration program (FRP)	RehabWorks 2017 UK	Investigate solutions to problems relating to musculoskeletal issues in the workplace for UK Metropolitan Fire Service	Case study	28 firefighters	External centre	3.5 hour assessment then attend average of 6 rehabilitation sessions weekly as part of a group of 8 people. Each session involved group education, cardiovascular ex, rehabilitation ex, cognitive behavioral education, work focused rehabilitation, and 1to 1 with appointed therapist	585 days absence saved between year prior to and post intervention. Full year return on investment of 700%
Physical rehabilitation	TASC 2015 UK	Rehabilitation pilot for 15 ambulance staff to access physical rehabilitation	website	First Paramedic to use service	Paramedic 2 week residential intensive rehabilitation at Police	Daily physiotherapy, Pilates, strength and conditioning, hydrotherapy, relaxation and counselling	Improved mobility and strength of shoulder after rehabilitation

					Treatment Centre		

Key: Sig – significant; ex – exercise; PTI – Physical training instructor; RTW – return to work; CV- cardiovascular; PTSD – Post traumatic stress disorder; OP – Occupational Physician; RCT – randomized controlled trial; LBFRS – Lothian and Borders Fire and Rescue Service; MSK – musculoskeletal; PTSD – Post traumatic stress disorder; Inc – including; TASC – The Ambulance Services Charity; min – minutes; max – maximum; NSW – New South Wales

Table 3: Mixed physical and psychological vocational rehabilitation

Concept Type of VR	**Author/year country**	**Aims/purpose**	**Study type/Source**	**Participants Sample size**	**Context**	**Intervention**	**Outcomes/findings**
Psychological and physical. NSW Police employ 36 injury management advisors to case manage and refer officers to support services, working closely with officers and the workplace.	Crawford 2016 Australia	Examined program and practices to promote health & prevent injuries; support injured workers RTW and workers compensation & death & disability schemes costs & outcomes	Report	NSW Police officers	Worksite programs for police officers	Workforce improvement program expanded since 2014 to include rehabilitation provides 90 different activities, has ~300 PTI RECON – Reconditioning and physiotherapy program trial to help injured officers RTW sooner. In-house physiotherapy and rehabilitation services. Since 2014,151 officers completed program at 3 sites.	Workforce Improvement program - A mental health research body evaluated the program in June 2015 and found the program had a good mix of mental and physical initiatives across prevention and rehabilitation. RECON - Returned officers to pre-injury duties 18 weeks sooner than standard care. Estimated cost savings of 68% reduction in weekly claim costs compared to standard care ($625/wk)

Psychological and physical	Crawford 2016 Australia	Examined programme and practices to promote health & prevent injuries; support injured workers RTW and workers compensation & death & disability schemes costs & outcomes	Report	NSW Fire fighters	Worksite programs and external specialist support for fire fighters	Örebro Musculoskeletal Pain Questionnaire is used as a screening tool to determine whether injured workers require additional psychological and well-being support to help recover from their injuries. If identified, workers are referred for internal and external psychological and well-being support. RTW Durability program aims to improve the functional capability of injured Firefighters and reduce the risk of further injury. Delivered by health & fitness advisor (qualified ex physiologlogist). 4-6 contacts (face to face or via phone), with assessments, goal setting, individual plan and self-managed ex program.	RTW Durability program – since 2015 92 firefighters have participated with only 1 injury reoccurrence after the program.

Physical, wellbeing and psychological	The Police Rehabilitation Trust 2017 UK	To assist officers in their return to full health and fitness	Website	Police officers in UK	Residential rehabilitation at one 158 bed centre	Physiotherapy and wellbeing programs (including physiotherapy, hydrotherapy, stress counselling, general nursing care, health classes, rehabilitation classes, sleep relaxation, & complementary treatments). Psychological programs for depression, anxiety, stress & insomnia (including group and individual sessions and structured exercise).	No outcomes available
Physical and psychological	The Police Treatment Centres 2017; Alexander et al 2017 UK	To promote and improve health and well being	Website and 2017 Final report	Police officers in UK	Intensive 2 week residential programs at 2 centers in UK. Can also offer out-patient physiotherapy	Physiotherapy and psychological programs. Includes group and individual treatment. Psychological wellbeing program includes group sessions on stress management, workshops focusing on relaxation, sleep, mindfulness, group exercise sessions and individual counselling and complementary therapy sessions.	2017 evaluation found Physiotherapy service was clinically effective and cost-efficient ($p<0.01$)

Mainly physical (MSK) rehabilitation (but also includes cardiac, neurological and general physical unfitness) and psychological programs more recently	Hunt L 2010 UK; Dawson, Deary & Fielden 2014; And The Fire Fighters Charity 2017 UK	Provider of services that enhance the quality of life for serving and retired firefighters, fire personnel and their families	Press release, qualitative study and charity website	Firefighters in UK	Intensive 1-2 week (choice of 4, 7 or 10 day stays) residential program at3 rehabilitation centers in UK.	Provides range of physiotherapy, nursing and psychological support programs. Self-referral program includes physiotherapy, exercise therapy, health and lifestyle talks and relaxation.	A pilot study at one centre found patients experienced an average improvement of 13% in their physical condition 3 months after leaving the centre. Study showed a shared background with peers was key in enabling clients return to fire service 'banter', (missing during previous isolated rehabilitation). Focus groups also demonstrated sharing rehabilitation stories with peers was enabling and restorative.

Key: Sig – significant; ex – exercise; PTI – Physical training instructor; RTW – return to work; CV- cardiovascular; PTSD – Post traumatic stress disorder; OP – Occupational Physician; RCT – randomized controlled trial

Table 4: Addiction/substance abuse vocational rehabilitation

Concept Type of VR	**Author/year country**	**Aims/purpose**	**Study type/Source**	**Participants Sample size**	**Context**	**Intervention**	**Outcomes/findings**
Addiction service	Addictions solutions Florida, USA		Website	Emergency response services (Police officers, fire	Fire fighters. Male only residential and	Group and 1 to 1 personalized programs including 12	No available outcomes

				fighters and paramedics)	out-patient service	step and “Break free” plan	

Table 5: Mixed addiction/substance abuse and psychological vocational rehabilitation

Concept Type of VR	Author/year country	Aims/purpose	Study type/Source	Participants Sample size	Context	Intervention	Outcomes/findings
Substance abuse and mental health	Rosecrance Florian Program USA		Website	Uniformed service personnel such as firefighters, paramedics, law enforcement and military	Residential and out-patient rehabilitation in 97 bed centre with 14 bed unit for co-occurring substance abuse and mental health disorders	Addresses substance abuse and mental health issues while offering coping skills and building resiliency	No outcomes available
Addiction - Alcohol and substance abuse and psychological health	American Addiction Centres USA	To effectively treat officers in need, and prepare them to return to the communities they have pledged to protect and serve.	Website	Police, fire-fighters and their immediate families	Confidential free hotline with counsellors. Provides residential and out-patient services in 8 states (Florida, Texas, Nevada, California, Rhode Island, Missouri, New Jersey, & Louisiana)	Addiction and psychological services	No outcomes available
Drug and alcohol treatment centre + PTSD	Station House, Florida, USA	To be the top addiction treatment center for police, firefighters, paramedics, and other first responders	Website	First responders (police, fire fighters, ambulance/paramedics)	Residential and out-patient services	Addiction and PTSD treatment via holistic therapy including art and music therapy (non-verbal therapy) and trauma therapy (rapid reduction	No outcomes available

						technique, cognitive processing therapy, eye movement desensitization and reprocessing and impact of trauma, trauma bonding and trauma responses) using task orientated, competency approach (goal setting). 1 to 1 and peer group sessions	
Addiction and mental health (inc. therapy for depression, PTSD, acute stress disorder & anxiety)	First Responders Recovery, Florida, USA	Work with police officers, firefighters, paramedics, EMTs, emergency dispatchers, members of the military or anyone else that has a career in public safety	Website	First responders (police, fire-fighters and paramedics)	Residential rehabilitation centre (male and female) with out-patient and 24 hour intervention phoneline for follow-up.	Treatment includes counseling; medication; addition treatment services and holistic therapies (inc. art & creative therapy, group therapy, exercise & physical fitness, yoga & mindfulness)	No outcomes available

Key: Inc – including; PTSD – Post-traumatic stress disorder; EMT – Emergency medical technician