

## Appendices

- 1) [Methodological details \(Appendix 1\)](#)
- 2) [Details about each identified synthesis \(Appendix 2\)](#)
- 3) [Details about each identified single study \(Appendix 3\)](#)
- 4) [Documents that were excluded in the final stages of review \(Appendix 4\)](#)
- 5) [References](#)

## Association between occupational stress, mental health conditions, and heart disease

**2 October 2024**

[MHF product code: REP 82]

## Appendix 1: Methodological details

We use a standard protocol for preparing rapid evidence profiles (REP) to ensure that our approach to identifying research evidence is as systematic and transparent as possible in the time we were given to prepare the profile.

### Identifying research evidence

For this REP, we searched ACCESSSS and PubMed for:

- 1) evidence syntheses
- 2) protocols for evidence syntheses that are underway
- 3) single studies.

We searched [ACCESSSS](#) using an open text search for “occupational stress.” In [PubMed](#), we used an open text search for “Heart Diseases”[Mesh] AND (“occupational stress”) and limited searches to the last 10 years. We ran a subsequent search in [PubMed](#) using the following strategy: (Veteran OR military OR police) AND (“occupational stress”) AND (“heart” OR “coronary” OR “cardiac”). Links provide access to the full search strategy.

Each source for these documents is assigned to one team member who conducts hand searches (when a source contains a smaller number of documents) or keyword searches to identify potentially relevant documents. A final inclusion assessment is performed both by the person who did the initial screening and the lead author of the rapid evidence profile, with disagreements resolved by consensus or with the input of a third reviewer on the team. The team uses a dedicated virtual channel to discuss and iteratively refine inclusion/exclusion criteria throughout the process, which provides a running list of considerations that all members can consult during the first stages of assessment.

During this process we include published, pre-print, and grey literature. We do not exclude documents based on the language of a document. However, we are not able to extract key findings from documents that are written in languages other than Chinese, English, French, Spanish, or Portuguese. We provide any documents that do not have content available in these languages in an appendix containing documents excluded at the final stages of reviewing. We excluded documents that did not directly address the research questions and the relevant organizing framework.

### Assessing relevance and quality of evidence

We assess the relevance of each included evidence document as being of high, moderate or low relevance to the question.

Two reviewers independently appraised the quality of the guidelines we identified as being highly relevant using AGREE II. We used three domains in the tool (stakeholder involvement, rigour of development, and editorial independence) and classified guidelines as high quality if they were scored as 60% or higher across each of these domains.

Two reviewers independently appraise the methodological quality of evidence syntheses that are deemed to be highly relevant using the first version of the [AMSTAR](#) tool. Two reviewers independently appraise each synthesis, and disagreements are resolved by consensus with a third reviewer if needed. AMSTAR rates overall methodological quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. High-quality evidence syntheses are those with scores of eight or higher out of a possible 11, medium-quality evidence syntheses are those with scores between four and seven, and low-quality evidence syntheses are those with scores less than four. It is important to note that the AMSTAR tool was developed to assess evidence syntheses focused on clinical interventions, so not all criteria apply to those pertaining to health-system arrangements or implementation strategies. Furthermore, we apply the AMSTAR criteria to evidence syntheses addressing all types of questions, not just those addressing questions about effectiveness, and some of these evidence syntheses addressing other types of questions are syntheses of qualitative studies. While AMSTAR does not account for some of the key attributes of syntheses of qualitative studies, such as whether and how citizens and subject-matter experts were involved, researchers' competency, and how reflexivity was approached, it remains the best general quality-assessment tool of which we're aware. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, an evidence synthesis that scores 8/8 is generally of comparable quality to another scoring 11/11; both ratings are considered 'high scores.' A high score signals that readers of the evidence synthesis can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the evidence synthesis should be discarded, merely that less confidence can be placed in its findings and that it needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1):S8.)

## **Preparing the profile**

Each included document is cited in the reference list at the end of the REP. For all included guidelines, evidence syntheses, and single studies (when included), we prepare a small number of bullet points that provide a summary of the key findings, which are used to summarize key messages in the text. Protocols and titles/questions have their titles hyperlinked, given that findings are not yet available.

We then draft a summary that highlights the key findings from all highly relevant documents (alongside their date of last search and methodological quality).

## Appendix 2: Details about each identified evidence synthesis

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Living status	Quality (AMSTAR)	Last year literature searched	Availability of GRADE profile	Equity considerations
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary heart disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Long working hours</li> </ul> </li> <li>Populations <ul style="list-style-type: none"> <li>People with pre-existing conditions</li> </ul> </li> </ul>	<p><a href="#">Stressful work either as a result of high demand and low control or of high effort and low reward are associated with a significantly increased relative risk of recurrent cardiac events following the first</a> (1)</p> <ul style="list-style-type: none"> <li>The pooled analysis from five included studies using the demand-control model indicated a 61% increased risk (95% CI 1.14–2.28), while the measure using an effort-reward imbalance was associated with a 75% increased risk (95% CI 0.99–3.08)</li> <li>Cumulative evidence indicates that severity of disease, high level of work stress, and low level of job satisfaction are the major risk factors for non-return to work following cardiac events</li> <li>Findings should be interpreted with some limitations as there are few studies included</li> </ul>	High	No	6/11	2013	No	<ul style="list-style-type: none"> <li>None reported</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary heart disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Long working hours</li> </ul> </li> </ul>	<p><a href="#">Employees who work long hours have a higher risk of stroke than those working standard hours, though the association with coronary heart disease is weaker but still present</a> (2)</p> <ul style="list-style-type: none"> <li>The meta-analysis aims to assess whether long working hours and cardiovascular disease are associated with cardiovascular disease</li> <li>The analysis included five studies about coronary heart disease, all of which defined long working hours as 45 hours or more per week</li> <li>Working long hours was associated with a modest overall increase in the risk of incident coronary heart disease compared with working standard hours (RR 1.13, 95% CI 1.02–1.26)</li> <li>A sub-group analysis revealed a socio-economic status (SES) dependent association with long-working hours and coronary heart disease with a RR of 2.18 (95% CI 1.25–3.81) among low SES group, 1.22 RR (95% CI 0.77–1.95) in the intermediate SES group, 0.87 RR (95% CI 0.55–1.38) in the high SES group</li> </ul>	High	No	9/11	2014	No	<ul style="list-style-type: none"> <li>Socio-economic status</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> <li>Job insecurity</li> </ul> </li> </ul>	<p><a href="#">Job insecurity is associated with a small elevated risk incident congenital heart disease (CHR), which was partly attributable to lower socio-economic status and established risk factors for incident coronary heart disease</a> (3)</p> <ul style="list-style-type: none"> <li>Aims to synthesize the evidence on perceived job insecurity and incident coronary heart disease</li> <li>Job insecurity was determined based on reported fear of lay-off or unemployment</li> </ul>	High	No	7/11	2012	No	<ul style="list-style-type: none"> <li>Socio-economic status</li> </ul>

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Living status	Quality (AMSTAR)	Last year literature searched	Availability of GRADE profile	Equity considerations
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> </ul> </li> </ul>	<p><a href="#">Two studies that were determined to have sufficient power found that the control dimension of job strain explains excess risk for myocardial infarction for job strain</a> (4)</p> <ul style="list-style-type: none"> <li>The review found that many of the papers examining job strain and myocardial infarction had low power</li> <li>Acceptably powered analyses found that self-reported job strain was a risk factor for incident myocardial infarction when controlled for gender and age</li> </ul>	High	No	2/11	2009	No	<ul style="list-style-type: none"> <li>Socio-economic status</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> </ul> </li> </ul>	<p><a href="#">High strain (high demand, low control) and passive (low demand, low control) jobs were associated with an increased risk of coronary heart disease (RR 1.26, 95% CI 1.12–1.41 and RR 1.14, 95% CI 1.02–1.29, respectively)</a> (5)</p> <ul style="list-style-type: none"> <li>Active jobs (low demand, high control) were not associated with an increased risk of coronary heart disease (RR 1.09, 95% CI 0.97–1.22)</li> <li>Coronary heart disease risk could not be predicted by job demand or job control independently</li> <li>This risk was seen in studies that had a follow-up duration of more than 10 years</li> <li>The meta-analysis pooled the data from 14 cohort studies and adjusted for age, sex, and presence of other diseases or risk factors</li> <li>The study did not identify Veterans as a special population</li> </ul>	High	No	7/11	2014	Not reported	<ul style="list-style-type: none"> <li>Not reported</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Ischemic heart disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> <li>Occupational noise</li> </ul> </li> </ul>	<p><a href="#">There is evidence that employees, both men and women, who report specific occupational exposures including low decision latitude, job strain, or noise have an increased incidence of ischaemic heart disease (IHD)</a> (6)</p> <ul style="list-style-type: none"> <li>The synthesis aims to examine the association between work environment factors including psychosocial/organizational factors as well as physical factors such as noise and near-term development of IHD</li> <li>Two exposures, low decision latitude, and combination of high psychological demands and low decision latitude were judged to have moderate evidence when related to IHD</li> </ul>	Medium	No	4/11	Published 2016	Yes	<ul style="list-style-type: none"> <li>Socio-economic status</li> </ul>

## Appendix 3: Details about each identified single study

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> <li>Effort-reward imbalance</li> </ul> </li> <li>Risk factors <ul style="list-style-type: none"> <li>Non-modifiable risk factors</li> </ul> </li> </ul>	<p><a href="#">There is an independent association between effort-reward imbalance and coronary heart disease, with job strain providing an additive effect</a> (7)</p> <ul style="list-style-type: none"> <li>Study prospectively examines the association between effort-reward imbalance and later coronary heart disease in a multicohort data</li> <li>In the multicohort study, the mean age of participants was 45 with 60% of participants being women</li> <li>After adjusting for age and sex, effort-reward imbalance was associated with a 1.16-fold increase in hazard of incident coronary heart disease (95% CI 1.01–1.34)</li> <li>The pooled hazard ratio was unchanged after further adjustment for socio-economic position, lifestyle factors, and job strain</li> <li>The association was marginally strengthened after exclusion of coronary heart disease cases that occurred during the first three years of follow-up</li> <li>The association was more pronounced in younger participants and participants in a lower socio-economic position but the observed differences across sub-groups are relatively small and low-powered</li> <li>The findings further suggest that the effect of effort-reward imbalance and job strain on incident coronary heart disease is additive, moving up to 1.41 (95% CI 1.12–1.76) for two work stressors</li> </ul>	High	<p>Year published: 2017</p> <p>Setting: Global (Denmark, France, Germany, U.K., Sweden)</p> <p>Methods: Cohort study</p>	<ul style="list-style-type: none"> <li>Sex/gender</li> <li>Socio-economic status</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> </ul> </li> </ul>	<p><a href="#">Job strain and exiting employment was associated with increased risk for coronary heart disease, regardless of external demographic factors; the duration of job strain does not appear to increase risk</a> (8)</p> <ul style="list-style-type: none"> <li>Data was drawn using the Integrated Database for Labour Market Research from Statistics Denmark; participants were between 30 and 59 years old and were employed</li> <li>Job strain was measured by looking at psychological demands at work and job control</li> <li>The Hazard Ratio (HR) for coronary heart disease among those with job strain to those without was 1.16 (95% CI 1.13–1.19) <ul style="list-style-type: none"> <li>Age, sex, family type, migration background, and service use were adjusted</li> </ul> </li> </ul>	High	<p>Focus of study: The relationship between persistent and changing job strain and coronary heart disease</p> <p>Publication date: 1 September 2020</p> <p>Jurisdiction studied: Denmark</p> <p>Methods used: Cohort study</p>	<ul style="list-style-type: none"> <li>Gender/sex</li> </ul>

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	<ul style="list-style-type: none"> <li>There was a higher risk for coronary heart disease for those who had job strain the past one to two years, compared to those who had no job strain (HR 1.21, 95% CI 1.16–1.26) <ul style="list-style-type: none"> <li>There was no dose response if you increased the number of years of job strain</li> </ul> </li> <li>Entering employment was only associated with increased risk of coronary heart disease if the individual entered with job strain (HR 1.23, 95% CI 1.08–1.40) <ul style="list-style-type: none"> <li>No differences across sex were identified</li> </ul> </li> </ul>			
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Long working hours</li> </ul> </li> <li>Risk factors <ul style="list-style-type: none"> <li>Non-modifiable risk factors <ul style="list-style-type: none"> <li>Biological sex</li> </ul> </li> </ul> </li> </ul>	<p><a href="#">Unpaid overtime work is associated with self-reported heart disease, particularly for women, those with low education, and lower incomes</a> (9)</p> <ul style="list-style-type: none"> <li>The type of heart disease reported by participants was not specified in this study</li> <li>Data was collected from 6,245 individuals who completed the German socio-economic panel study</li> <li>The risk of heart disease was increased by 21% in those who completed compensated overtime work, compared to 84% in those who had uncompensated overtime work <ul style="list-style-type: none"> <li>The relative risk (RR) was 1.85, 95% CI 1.05–3.25</li> <li>This rate was not influenced by lifestyle changes or presence of other clinical conditions</li> </ul> </li> <li>The risk of self-reported heart disease for uncompensated overtime work was higher in females (RR = 3.68, 95% CI 1.81–7.48) and those with lower incomes (RR = 2.73, 95% CI 1.39–5.38).</li> <li>The adjusted relative risk of self-reported heart disease and unpaid overtime was 2.23 for those with low education and 1.08 for those with high education</li> </ul>	High	<p>Focus of study: The relationship between overtime work and self-reported heart disease</p> <p>Publication date: October 2018</p> <p>Jurisdiction studied: Germany</p> <p>Methods used: Cohort Study</p>	<ul style="list-style-type: none"> <li>Gender/sex</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Hyper-tensive disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> </ul> </li> <li>Risk factors <ul style="list-style-type: none"> <li>Modifiable risk factors</li> </ul> </li> </ul>	<p><a href="#">Low physical activity is associated with occupational stress and presence of cardiovascular risk factors in law enforcement officers</a> (10)</p> <ul style="list-style-type: none"> <li>A total of 229 law enforcement officers from Quebec participated in this survey</li> <li>Occupational stress was measured using the Police Stress Questionnaire and Perceived Stress Scale</li> <li>Participants were asked to self-report the following cardiovascular risk factors: hypertension, dyslipidemia, type 2 diabetes, and sleep apnea</li> </ul>	High	<p>Focus of study: The relationship between physical activity, occupational stress, and cardiovascular risk factors in law enforcement officers</p> <p>Publication date: November 2023</p> <p>Jurisdiction studied: Canada</p> <p>Methods used: Cross-sectional study</p>	<ul style="list-style-type: none"> <li>None reported</li> </ul>

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
<ul style="list-style-type: none"> <li>Physical activity</li> <li>Populations               <ul style="list-style-type: none"> <li>Police (RCMP and others)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Physically inactive participants with high stress demonstrated higher odds of having at least one cardiovascular risk factor (OR = 2.84, 95% CI 1.01–7.64)               <ul style="list-style-type: none"> <li>There was not a statistically significant difference with stress in the active participant group</li> </ul> </li> <li>Leisure time physical activity significantly moderated the relation between occupational stress and self-appraised mental health (<math>\beta = -0.42</math>, SE = 0.19, 95% CI <math>-0.80</math> to <math>-0.04</math>, P = 0.03) and self-appraised physical fitness (<math>\beta = -0.36</math>, SE = 0.18, 95% CI <math>-0.72</math> to <math>-0.01</math>, P = 0.05)</li> </ul>			
<ul style="list-style-type: none"> <li>Types of heart disease               <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress               <ul style="list-style-type: none"> <li>Long working hours</li> </ul> </li> <li>Risk factors               <ul style="list-style-type: none"> <li>Modifiable risk factors                   <ul style="list-style-type: none"> <li>Physical activity</li> <li>Alcohol use</li> </ul> </li> </ul> </li> <li>Populations               <ul style="list-style-type: none"> <li>Police (RCMP and others)</li> </ul> </li> </ul>	<p><a href="#">Police officers tend to display coronary-prone behaviours linked to a job-centered lifestyle, potentially increasing their risk of coronary heart disease by affecting how they perceive and react to workplace stress</a> (11)</p> <ul style="list-style-type: none"> <li>The subjects were composed of 1,081 police officers and 115 office clerks of all ranks, from officers to management</li> <li>A clustering of coronary heart disease risk factors, including hypertension, dyslipidemia, glucose intolerance, and hyperuricemia, was more frequent in police officers than in office clerks</li> <li>Police officers with coronary-prone behaviour tended to engage in shift work and to work overtime more; yet they were less likely to perceive job stress and to express the relevant physical and psychological symptoms than those without coronary-prone behaviour</li> <li>Coronary-prone behaviour together with age, low workplace social support, and unhealthy habits such as alcohol drinking and lack of physical activity were selected as a significant determinant of clustered coronary heart disease risk factors</li> </ul>	High	<p>Focus of study: The association between job-related behavioural characteristics and the risk of coronary heart diseases in Japanese male police officers</p> <p>Publication date: April 2017</p> <p>Jurisdiction studied: Japan</p> <p>Methods used: Cross-sectional study</p>	<ul style="list-style-type: none"> <li>None reported</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease               <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress</li> <li>Effort-reward imbalance</li> </ul>	<p><a href="#">Psychosocial stressors at work from the job strain and effort-reward imbalance models are associated with an increased risk of atrial fibrillation, separately and in combination</a> (12)</p> <ul style="list-style-type: none"> <li>A total of 5,926 white-collar workers (3,021 women and 2,905 men) free of cardiovascular disease at baseline were followed for an average of 18 years</li> <li>Hazard ratios (HRs) with 95% CIs were estimated using Cox regression models, controlling for socio-economic characteristics and lifestyle-related and clinical risk factors</li> </ul>	High	<p>Focus of study: Examine the separate and combined effect of psychosocial stressors at work from the job strain and effort-reward imbalance at work models on atrial fibrillation incidence</p> <p>Publication date: August 2024</p> <p>Jurisdiction studied: United States</p>	<ul style="list-style-type: none"> <li>None reported</li> </ul>



Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	<ul style="list-style-type: none"> <li>A total of 186 atrial fibrillation incident events were identified over 18 years</li> <li>Workers exposed to job strain (HR 1.83, 95% CI 1.14–2.92) and effort-reward imbalance (HR 1.44, 95% CI 1.05–1.98) had a higher risk of atrial fibrillation in fully adjusted model</li> <li>Combined exposure to job strain and effort-reward imbalance was associated with a two-fold atrial fibrillation risk increase (HR 1.97, 95% CI, 1.26–3.07)</li> </ul>		Methods used: Cohort study	
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> <li>Effort-reward imbalance</li> <li>Job insecurity</li> </ul> </li> </ul>	<p><a href="#">A 15-year prospective cohort study of men and women in Ontario, Canada found no clear relationship between high strain job exposure and the incidence of myocardial infarction and congestive heart failure</a> (13)</p> <ul style="list-style-type: none"> <li>Data was retrieved from the Canadian Community Health Surveys responses for 13,291 men and women above the age of 35 years, working more than 15 hours a week <ul style="list-style-type: none"> <li>Age, socio-demographic factors, pre-existing health conditions, and exposure to other psychosocial factors were adjusted</li> </ul> </li> <li>Overall, the incidence of myocardial infarction and congestive heart failure was 4.82 per 100 persons <ul style="list-style-type: none"> <li>Men had higher rates (6.69 per 100 persons) in comparison with women (2.77 per 100 persons)</li> </ul> </li> <li>The effect of job strain on myocardial infarction was found to be non-significant</li> <li>The study also reported an unclear protective effect of high strain job exposure on the incidence of myocardial infarction and congestive heart failure with a hazard ratio of 0.92 (95% CI 0.46–1.84) for women and 0.75 (95% CI 0.44–1.27) for men</li> </ul>	High	<p>Focus of study: The relationship between job strain and the incident of congestive heart failure and myocardial infarction among a representative sample of men and women in Ontario, Canada</p> <p>Publication date: 16 March 2020</p> <p>Jurisdiction studied: Ontario, Canada</p> <p>Methods used: Cohort study</p>	<ul style="list-style-type: none"> <li>Place of residence</li> <li>Gender/sex</li> <li>Race</li> <li>Education</li> <li>Socio-economic status</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> </ul> </li> <li>Populations <ul style="list-style-type: none"> <li>People with pre-existing conditions</li> </ul> </li> </ul>	<p><a href="#">Working for long hours (<math>\geq 55</math> hours/week versus 35 to 40 hour/week) is associated with an increased risk of recurrent coronary heart disease (HR 1.67, 95% CI 1.10–2.53)</a> (14)</p> <ul style="list-style-type: none"> <li>This risk increased linearly after &gt; 40 hours/week and was higher in magnitude after four years of returning to work.</li> <li>The risk was also higher for those working <math>\geq 55</math> h/week with higher job strain versus those with no job strain (HR 2.55, 95% CI 1.30–4.98)</li> <li>Age, socio-demographic factors, pre-existing health conditions, and exposure to other psychosocial factors were adjusted</li> </ul>	High	<p>Focus of study: The risk of long working hours with recurrent coronary heart disease after returning to work among men and women in Quebec, Canada</p> <p>Publication date: 6 April 2021</p> <p>Jurisdiction studied: Quebec, Canada</p> <p>Methods used: Cohort study</p>	<ul style="list-style-type: none"> <li>Gender/sex</li> <li>Education</li> <li>Socio-economic status</li> </ul>



Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> <li>Effort-reward imbalance</li> <li>Job insecurity</li> </ul> </li> </ul>	<p><a href="#">Work stress was negatively associated with the odds of developing atrial fibrillation among women in the U.S. albeit an insignificant association (OR = 0.79, 95% CI 0.61–1.03) (15)</a></p> <ul style="list-style-type: none"> <li>In a longitudinal observational study following 24,809 women in the U.S., only traumatic life event stress was significantly associated with an increased odds of developing atrial fibrillation with (OR = 1.32, 95% CI 1.11–1.52) in comparison with different types of stressors including work stress and work family spillover</li> <li>The insignificant association of work stress with myocardial infarction is unexplained but could be attributed to its modifiable nature</li> <li>The study did not identify Veterans as a special population</li> </ul>	High	<p>Focus of study: Explore the relationship between developing atrial fibrillation and different psychosocial stressors among women</p> <p>Publication date: November 2018</p> <p>Jurisdiction studied: United States</p> <p>Methods used: Cohort study</p>	<ul style="list-style-type: none"> <li>Gender/sex</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> <li>Job insecurity</li> <li>Long working hours</li> </ul> </li> <li>Risk factors <ul style="list-style-type: none"> <li>Non-modifiable risk factors <ul style="list-style-type: none"> <li>Biological sex</li> </ul> </li> </ul> </li> </ul>	<p><a href="#">Work stressors are not associated with an increased risk of heart disease among Canadians, except for women with physically demanding work (OR = 1.37, 95% CI 1.03–1.83) (16)</a></p> <ul style="list-style-type: none"> <li>Data analysed came from the National Population Health Survey for 13,660 participants in Canada assessing work-related and non-work-related stressors on the risk of developing heart disease for workers aged 40 years and over</li> <li>Work-related stressors were not associated with the risk of developing heart disease among men <ul style="list-style-type: none"> <li>For men, age, body mass index, hypertension, using psychotropic drugs, and having couple-related strains increased the risk of heart disease</li> </ul> </li> <li>Having a job that required physical demands increased women's risk for developing heart disease <ul style="list-style-type: none"> <li>Similarly, child-related strains increased women's risk of heart disease</li> </ul> </li> <li>Other work-related stressors such as psychological demands, job insecurity, working hours, social support at work, and others were not associated with the risk of heart disease among women</li> <li>The study did not identify Veterans as a special population</li> </ul>	High	<p>Focus of study: Explore the relationship between developing heart disease and different work and non-work stressors among Canadians</p> <p>Publication date: September 2017</p> <p>Jurisdiction studied: Canada</p> <p>Methods used: Longitudinal observational study</p>	<ul style="list-style-type: none"> <li>Gender/sex</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress</li> </ul>	<p><a href="#">A higher risk of developing cardiovascular disease by 1.63-fold (95% CI 1.24–2.15) was found for those who had experienced workplace conflict (17)</a></p> <ul style="list-style-type: none"> <li>The risk was especially for developing angina pectoris (OR = 1.79, 95% CI 1.22–2.64) not for myocardial infarction or stroke</li> <li>Workplace conflict increased the risk of myocardial infarction for men specifically (OR = 3.37, 95% CI 1.75–6.49)</li> </ul>	Medium	<p>Focus of study: Explore the relationship between workplace conflict and the risk of developing stroke, myocardial infarction, and angina pectoris</p> <p>Publication date: 26 April 2017</p> <p>Jurisdiction studied: Germany</p>	<ul style="list-style-type: none"> <li>Gender/sex</li> </ul>

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	<ul style="list-style-type: none"> <li>Workplace conflict increased the risk of stroke for those aged above 41 years in comparison with those 18–30 years old (OR = 5.09, 95% CI 2.21–11.73)</li> <li>The study did not identify Veterans as a special population</li> </ul>		Methods used: Retrospective cohort study	
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Effort-reward imbalance</li> </ul> </li> <li>Populations <ul style="list-style-type: none"> <li>People with pre-existing conditions</li> </ul> </li> </ul>	<p><a href="#">Burnout syndrome is uncommon among non-elderly workers with acute coronary syndrome</a> (18)</p> <ul style="list-style-type: none"> <li>Burnout was assessed using the Burnout Syndrome Inventory considering emotional exhaustion, emotional distancing, dehumanization, and professional fulfillment</li> <li>Global stress using Lipp's Stress System Inventory for adults was also used</li> <li>A total of 830 patients with acute coronary syndrome, recruited from cardiology centres and under the age of 65, participated in this study</li> <li>This study found that burnout syndrome was reported in 4.1% of participants still active in the job market, with a confirmed diagnosis of acute coronary syndrome</li> </ul>	Medium	<p>Focus of study: The relationship between burnout and coronary syndrome</p> <p>Publication date: March 2015</p> <p>Jurisdiction studied: Brazil</p> <p>Methods used: Cross-sectional</p>	<ul style="list-style-type: none"> <li>None reported</li> </ul>
<ul style="list-style-type: none"> <li>Types of heart disease <ul style="list-style-type: none"> <li>Coronary artery disease</li> </ul> </li> <li>Types of occupational stress <ul style="list-style-type: none"> <li>Job strain</li> </ul> </li> </ul>	<p><a href="#">Job strain was correlated with increased high sensitivity c-reactive protein and albumin urine excretion rate, both of which are endothelial dysfunction markers</a> (19)</p> <ul style="list-style-type: none"> <li>A total of 105 participants with chronic coronary syndrome and 105 healthy controls were involved in this study</li> <li>The relationship between job strain and high increased high sensitivity c-reactive protein and albumin urine excretion rate, suggest that these markers can be used to stratify cardiovascular risk</li> <li>Depression severity was positively correlated with status chronic coronary syndrome</li> </ul>	Low	<p>Focus of study: The relationship between job strain and ischemic heart disease</p> <p>Publication date: July 2024</p> <p>Jurisdiction studied: Romania</p> <p>Methods used: Cross-sectional study</p>	<ul style="list-style-type: none"> <li>None reported</li> </ul>

## Appendix 4: Documents excluded at the final stages of reviewing

Document type	Hyperlinked title
Single studies	<a href="#">The overall fractions of coronary heart diseases and depression attributable to multiple dependent psychosocial work factors in Europe</a>
Commentary	<a href="#">Social and environmental risks as contributors to the clinical course of heart failure</a>
	<a href="#">Association between work-related stress and coronary heart disease: A review of prospective studies through the job strain, effort-reward balance, and organizational justice models</a>

## References

1. Li J, Zhang M, Loerbroks A, Angerer P, Siegrist J. Work stress and the risk of recurrent coronary heart disease events: A systematic review and meta-analysis. *International Journal of Occupational Medicine and Environmental Health* 2015; 28(1): 8-19.
2. Kivimäki M, Jokela M, Nyberg ST, et al. Long working hours and risk of coronary heart disease and stroke: A systematic review and meta-analysis of published and unpublished data for 603&#x2008;838 individuals. *The Lancet* 2015; 386(10005): 1739-1746.
3. Virtanen M, Nyberg ST, Batty GD, et al. Perceived job insecurity as a risk factor for incident coronary heart disease: Systematic review and meta-analysis. *British Medical Journal* 2013; 347: f4746.
4. Pejtersen JH, Burr H, Hannerz H, Fishta A, Hurwitz Eller N. Update on work-related psychosocial factors and the development of ischemic heart disease: A systematic review. *Cardiology Review* 2015;23(2): 94-98.
5. Xu S, Huang Y, Xiao J, et al. The association between job strain and coronary heart disease: A meta-analysis of prospective cohort studies. *Annals of Medicine* 2015; 47(6): 512-518.
6. Theorell T, Jood K, Järvholm LS, Vingård E, Perk J, Östergren PO, Hall C. A systematic review of studies in the contributions of the work environment to ischaemic heart disease development. *European Journal of Public Health* 2016; 26(3): 470-7.
7. Dragano N, Siegrist J, Nyberg ST, et al. Effort-reward imbalance at work and incident coronary heart disease: A multicohort study of 90,164 Individuals. *Epidemiology* 2017; 28(4): 619-626.
8. Rugulies R, Framke E, Sørensen JK, et al. Persistent and changing job strain and risk of coronary heart disease: A population-based cohort study of 1.6 million employees in Denmark. *Scandinavian Journal of Work and Environmental Health* 2020; 46(5): 498-507.
9. Li J, Siegrist J. The role of compensation in explaining harmful effects of overtime work on self-reported heart disease: Preliminary evidence from a Germany prospective cohort study. *Americal Journal of Industrial Medicine* 2018; 61(10): 861-868.
10. Poirier S, Gendron P, Houle J, Trudeau F. Physical activity, occupational Stress, and cardiovascular risk factors in law enforcement officers: A cross-sectional study. *Journal of Occupational and Environmental Medicine* 2023; 65(11): e688-e694.
11. Shiozaki M, Miyai N, Morioka I, et al. Job stress and behavioral characteristics in relation to coronary heart disease risk among Japanese police officers. *Industrial Health* 2017; 55(4): 369-380.
12. Tiwa Difo E, Lavigne-Robichaud M, Milot A, et al. Psychosocial stressors at work and atrial fibrillation incidence: An 18-Year prospective study. *Journal of the American Heart Association* 2024; 13(16): e032414.
13. Smith P, Gilbert-Ouimet M, Brisson C, Glazier RH, Mustard CA. Examining the relationship between the demand-control model and incident myocardial infarction and congestive heart failure in a representative sample of the employed women and men in Ontario, Canada, over a 15-year period. *Canadian Journal of Public Health* 2021; 112(2): 280-288.
14. Trudel X, Brisson C, Talbot D, Gilbert-Ouimet M, Milot A. Long working hours and risk of recurrent coronary events. *Journal of the American College of Cardiology* 2021; 77(13): 1616-1625.
15. Westcott SK, Beach LY, Matsushita F, et al. Relationship between psychosocial stressors and atrial fibrillation in women >45 years of age. *American Journal of Cardiology* 2018; 122(10): 1684-1687.

16. Marchand A, Blanc ME, Beaugregard N. Exposure to work and nonwork stressors and the development of heart disease among Canadian workers aged 40 years and older: A 16-year follow-up study (1994 to 2010). *Journal of Occupational and Environmental Medicine* 2017; 59(9): 894-902.
17. Jacob L, Kostev K. Conflicts at work are associated with a higher risk of cardiovascular disease. *German Medical Science* 2017; 15: Doc08.
18. Prosdócimo AC, Lucina LB, Marcia O, et al. Prevalence of Burnout Syndrome in patients admitted with acute coronary syndrome. *Arquivos Brasileiros de Cardiologia* 2015; 104(3): 218-225.
19. Moisii P, Jari I, Ursu AM, Naum AG. The relationship between job strain and ischemic heart disease mediated by endothelial dysfunction markers and imaging. *Medicina (Kaunas)* 2024; 60(7): 1048.

Waddell K, Dass R, Grewal E, Saleh R, Ali A, Wilson MG. Rapid evidence profile #82: Association between occupational stress, mental health conditions, and heart disease. Hamilton: McMaster Health Forum, 2 October 2024.

This rapid evidence profile was funded by the Chronic Pain Centre of Excellence for Canadian Veterans and the Atlas Institute for Veterans and Families, which are in turn funded by Veterans Affairs Canada. The McMaster Health Forum receives both financial and in-kind support from McMaster University. The views expressed in the rapid evidence profile are the views of the authors and should not be taken to represent the views of Chronic Pain Centre of Excellence for Canadian Veterans, the Atlas Institute for Veterans and Families, or McMaster University.