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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202540037

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 April 2025 and was last updated on 11 April 2025.

INTRODUCTION

Review question / Objective Population (P): Workers in the transport sector (land, air, and maritime), involved in freight or passenger services and exposed to shift work schedules.

Concept (C): Variables of shift work (e.g., shift duration, night shifts, rotation, rest between shifts, etc.).

Context (C): Formal occupational settings with continuous operations (e.g., transportation systems), evaluated in relation to health, productivity, safety, and well-being outcomes.

To explore which shift work variables have been investigated in the scientific literature in relation to the health, productivity, safety, and well-being of workers in land, air, and maritime transport, in both freight and passenger services.

Background Shift work is a widespread labor arrangement, particularly prevalent in the transport sector, where operational continuity is essential. Workers in land, air, and maritime transport are

frequently exposed to irregular and demanding schedules involving night shifts, extended durations, minimal rest, and unpredictable rotations. These working conditions have been linked to a variety of adverse outcomes including fatigue, sleep disturbances, decreased performance, and increased health risks. However, there is significant heterogeneity in how shift systems are conceptualized and studied across the literature, making it difficult to compare results or formulate evidence-based recommendations. This scoping review aims to systematically identify and classify the variables of shift work that have been analyzed in empirical studies, focusing on their relationship with health, safety, productivity, and well-being outcomes in formal transport occupations.

Rationale We will conduct a narrative synthesis using frequency tables and conceptual mapping. Shift variables will be categorized based on their operational definitions (e.g., shift length, rotation direction, rest intervals) and mapped against reported outcomes. We will explore patterns in the types of variables studied, their distribution across

transport modes, and the consistency of their measurement. No meta-analysis will be conducted.

METHODS

Strategy of data synthesis We will conduct a narrative synthesis using frequency tables and conceptual mapping. Shift variables will be categorized based on their operational definitions (e.g., shift length, rotation direction, rest intervals) and mapped against reported outcomes. We will explore patterns in the types of variables studied, their distribution across transport modes, and the consistency of their measurement. No meta-analysis will be conducted. We will include original empirical studies (quantitative, cross-sectional, cohort, or case-control designs) that examine at least one shift work variable in association with health, safety, productivity, or well-being outcomes. Studies must involve workers in the land, air, or maritime transport sectors and be published in English or Spanish between 2015 and March 2025. Exclusion criteria include studies on military trainees, students, volunteers, grey literature, editorials, opinion pieces, and articles without explicit analysis of shift work variables.

Eligibility criteria We will include original empirical studies (quantitative, cross-sectional, cohort, or case-control designs) that examine at least one shift work variable in association with health, safety, productivity, or well-being outcomes. Studies must involve workers in the land, air, or maritime transport sectors and be published in English or Spanish between 2015 and March 2025. Exclusion criteria include studies on military trainees, students, volunteers, grey literature, editorials, opinion pieces, and articles without explicit analysis of shift work variables.

Source of evidence screening and selection Search results will be imported into the Rayyan platform for screening. Two independent reviewers will conduct title and abstract screening, followed by full-text assessment based on the eligibility criteria. Discrepancies will be resolved through discussion or by consulting a third reviewer. A PRISMA-ScR flow diagram will be used to document the selection process.

Data management Data extraction will be carried out using a standardized charting form adapted from the Joanna Briggs Institute framework. Extracted data will include study details (author, year, country), population characteristics, transport modality, shift work variables studied, outcome domains, measurement instruments, and key

findings. The form will be piloted and refined prior to full extraction.

Reporting results / Analysis of the evidence We will provide a descriptive summary of included studies and analyze the frequency and distribution of shift work variables. We will identify trends in how these variables are defined and measured, and summarize their reported associations with worker outcomes. Particular attention will be given to variations across transport sectors and geographical regions.

Presentation of the results Results will be presented in narrative format, complemented by summary tables and conceptual matrices. These will outline the range of shift work variables studied, their operational definitions, associated outcomes, and the transport contexts in which they were examined. Visual elements (e.g., heatmaps or bubble plots) may be used to illustrate concentrations or gaps in the literature.

Language restriction Only studies published in English or Spanish will be considered for inclusion in this review.

Country(ies) involved Chile (lead country), with potential applicability of findings to international contexts.

Keywords Shift work, Occupational health, Occupational safety, Productivity, Transport.

Contributions of each author

Author 1 - Gonzalo Bravo - Contributed to the design of the protocol and the development of the data extraction strategy. Participated in the drafting and refinement of the manuscript. Will support the screening of sources and the organization of results.

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Author 2 - Ignacio Castellucci - Conceived and designed the review protocol. Led the development of the conceptual framework and eligibility criteria. Contributed to drafting the manuscript and provided critical revisions. Will supervise the screening, extraction, and synthesis processes.

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Author 3 - Carlos Viviani - Provided methodological input on data synthesis and critical appraisal. Reviewed and revised the manuscript for intellectual content. Will assist in interpreting findings and ensuring consistency in data presentation.

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