INPLASY

Support Staff in Nuclear Medicine: What Do We Know About Their Radiation Exposure and Occupational Classification? A Scoping Review Protocol (Retrospective Registration)

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ADMINISTRATIVE INFORMATION

Support - No support.

Review stage at the time of initial registration - Description: Completed but not published. The evidence search (July–October 2026), study selection, data charting, verification, descriptive synthesis, and preparation of the journal manuscript have been completed. The manuscript is undergoing final editorial preparation and has not yet been submitted to Austral Journal of Imaging. The undergraduate thesis project from which this review arose was officially initiated in March 2025 and is not yet formally closed. This is a retrospective registration. At project initiation, the team was unaware of the relevance of prospective registration for scoping reviews; the decision to publish and register followed recognition of the scientific value of the thesis work. No earlier public registration of this review exists.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2026110085

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 November 2026 and was last updated on 23 November 2026.

INTRODUCTION

Review question / Objective Review question: What evidence was available through 2026 on occupational radiation exposure, dosimetric monitoring, and radiological protection among non-clinical support personnel in nuclear medicine services? Objective: To map published evidence on occupational exposure, monitoring, and radiological protection, and to identify reporting gaps relevant to the formal radiological classification of work areas and the occupational classification of support personnel. PCC: Population—non-clinical support personnel (especially cleaning, secretarial, administrative, transport, and auxiliary services); Concept—occupational radiation exposure, dosimetric monitoring, and radiological protection; Context—diagnostic or therapeutic nuclear medicine services, including radiopharmacies, worldwide.

Background Non-clinical workers may perform duties near patients administered radiopharmaceuticals or in areas with possible radioactive contamination, despite not necessarily handling radioactive sources themselves. Published evidence addresses external exposure, radionuclide incorporation, contamination, monitoring, and protective measures, but varies substantially in worker groups, measurement units,

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and periods of observation. Classification of workers and areas requires an assessment of actual duties and radiological conditions; low observed doses alone do not determine occupational status.

Rationale The literature is dispersed and often reports mixed occupational groups, making it difficult to link dosimetric findings to individual support occupations, working conditions, monitoring arrangements, and formal classification decisions. A scoping review was used to map the heterogeneous evidence and distinguish gaps in published documentation from evidence of absent institutional measures or regulatory non-compliance.

METHODS

Searching for the evidence Five bibliographic sources were searched: MEDLINE via PubMed (30 July 2026; 272 records), Scopus (10 August 2026; 561), CINAHL via EBSCOhost (19 August 2026; 550), SciELO regional portal (3 September 2026; 2), and Web of Science Core Collection (14 September 2026; 102). No language, date, or country limits were applied. The five databases yielded 1,487 records before removal of 844 duplicates.

On 10 October 2026, backward and forward citation searching was performed using CitationChaser. This contributed 147 unique records after detection and removal of duplicates relative to the five databases; they were screened using Rayyan under the same eligibility criteria.

Full PubMed strategy (as documented in Supplementary Material S1):

((("nuclear medicine" OR "occupational exposure" OR PET OR "SPECT/CT" OR "radiation exposure" OR radionuclide* OR "molecular imaging") AND ("cleaning staff" OR "administrative personnel" OR "medical secretaries" OR "housekeeping staff" OR "housekeeping personnel" OR "cleaning personnel" OR "janitorial staff" OR janitor* OR "sanitation workers" OR "support staff" OR "non-medical staff" OR "hospital cleaning workers" OR "environmental services staff") AND ("ionizing radiation" OR "radiation protection" OR "radiation safety" OR "radiation monitoring" OR dosimetry OR "personal dosimetry" OR "radiation effects" OR "radiation exposure" OR "staff exposure" OR "occupational exposure" OR "occupational radiation exposure" OR "occupational dose" OR "effective dose" OR "individual dosimetry" OR "occupational dosimetry" OR "dosimetric monitoring" OR "radiation dose monitoring"))

Full strategies for the other four databases were recorded in Supplementary Material S1, Annex 1. Do not claim additional grey-literature searching without supporting documentation.

Eligibility criteria Included published studies or documents involving cleaners, secretaries, administrative workers, or other identifiable non-clinical support personnel in diagnostic or therapeutic nuclear medicine services, including radiopharmacy settings, regardless of language, publication year, or country. Mixed occupational samples were eligible if support personnel could be identified, but aggregated findings were treated as indirect rather than attributed exclusively to support workers. Environmental measurements in spaces linked to support duties were eligible but were not equated with personal doses. Letters to the editor and studies exclusively involving clinical personnel without identifiable non-clinical support workers were excluded.

Source of evidence screening and selection Four reviewers (JL, JE, LM, PS) independently screened titles and abstracts in Rayyan using blinded assessment. The same reviewers assessed full texts against eligibility criteria. CitationChaser records were added to the same review following duplicate detection and resolution and underwent identical selection procedures. Disagreements were resolved by an additional reviewer (SR), and reasons for full-text exclusion were recorded.

Data management Four reviewers conducted data charting using Bright, with thematic responsibilities as follows: Paula Sola-Bernal (general study characteristics), Lorna Montecinos-Barahona (radiological protection), Jennifer Escobar-Rocabado (dosimetric monitoring), and Javier Labbe (occupational exposure). Charted variables included study characteristics, dosimeters and their mode of use, preventive measures (time, distance, shielding, and personal protective equipment), and reported occupational exposure measures. The charting form was piloted on ten studies and subsequently refined. Extracted data were checked by the reviewers; disagreements were resolved with an additional reviewer (Sergio Ramos-Avasola). Rayyan was used separately for screening and selection. The name “Bright” reflects the lead investigator’s explicit confirmation; its official product designation has not been independently established.

Reporting results / Analysis of the evidence Descriptive synthesis was undertaken without quantitative pooling because studies differed in populations, radiological quantities, measurement procedures, and time frames. An evidence-and-

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gap map coded each publication across nine domains as quantitative specific information (Q), explicit descriptive information (D), indirect/mixed-group information (I), or not reported (—). Reporting frequencies were treated as coverage of information, not methodological quality, adequacy of protection, or compliance with regulations. No formal critical appraisal of included sources is described in the manuscript.

Presentation of the results Results were presented using a PRISMA-ScR flow diagram (Figure 1); a study-characteristics table (Table 1); a table of monitoring, radiological protection, and organisational findings (Table 2); comparative figures for personal external exposure, estimated internal dose, and thyroid iodine-131 activity (Figures 2–4); and a nine-domain evidence-and-gap matrix (Figure 5). The completed review included 21 unique publications from 10 countries. Supplementary Material S1 documents search strategies, eligibility rules, coding definitions, and selection/charting procedures.

Language restriction No language restrictions were applied.

Country(ies) involved Chile. The latest author title page lists institutional affiliations in Chile; included evidence originated from multiple countries worldwide.

Other relevant information The review originated in an undergraduate thesis project officially initiated in March 2025 at Universidad de Valparaíso, Chile. The written thesis project included a research question, objectives, eligibility criteria, and methods for searching and selecting evidence, but was not registered in any public protocol registry. The thesis itself has not yet been formally completed; this does not change the completed status of the evidence synthesis underlying the journal manuscript. Following development of the thesis research, the authors recognized the importance of disseminating the evidence and prepared this scoping review for journal publication. The team initially lacked awareness of prospective protocol registration for evidence syntheses. The current registration is explicitly retrospective and is intended to provide a transparent, publicly accessible record of the work performed, without implying prospective registration or presenting a post hoc protocol as a prespecified registered plan. Targeted searches for related registered and published evidence syntheses were undertaken on 23 November 2026; related reviews were identified, but none of the examined records matched the combined population, context, and occupational-classification question. Direct access to some OSF records was limited.

Keywords Occupational Exposure; Nuclear Medicine; Radiation Protection; Radiation Monitoring; Non-clinical Support Personnel; Housekeeping Staff; Occupational Classification; Scoping Review.

Dissemination plans The completed evidence synthesis is being prepared for submission to Austral Journal of Imaging. Dissemination is planned through a peer-reviewed journal article accompanied by comparative figures, an evidence-and-gap map, and supplementary documentation of the search, selection, charting and coding procedures. The manuscript has not yet been submitted.

Contributions of each author

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