

BMJ Open Cancer risk factors and access to cancer prevention services for people experiencing homelessness: a scoping review protocol

Tobias Schiffler ¹, Maren Jeleff ¹, Alejandro Gil-Salmerón,^{2,3} Lin Yang,^{4,5} Sandra Haider,¹ Felipe B Schuch,^{6,7} Igor Grabovac ¹

To cite: Schiffler T, Jeleff M, Gil-Salmerón A, *et al.* Cancer risk factors and access to cancer prevention services for people experiencing homelessness: a scoping review protocol. *BMJ Open* 2023;**13**:e074710. doi:10.1136/bmjopen-2023-074710

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2023-074710>).

Received 14 April 2023
Accepted 18 July 2023



© Author(s) (or their employer(s)) 2023. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

For numbered affiliations see end of article.

Correspondence to

Ms Maren Jeleff;
maren.jeleff-entscheff@meduniwien.ac.at

ABSTRACT

Introduction Homelessness is a complex social issue that significantly impairs the health of those affected. People experiencing homelessness (PEH) have a higher prevalence of adverse health outcomes, including premature mortality, compared with the general population, with cancer being the second-leading cause of death. The objective of this scoping review is to map the evidence to assess the exposure of PEH to known cancer risk factors and identify barriers and facilitators PEH experience in accessing cancer prevention services.

Methods and analysis This scoping review will be conducted in line with the Joanna Briggs Institute guidelines for scoping reviews. For a time window from the date of database establishment until 20 February 2023, the research team will create a detailed search strategy and apply it to the following databases: CINAHL, Embase, Global Index Medicus, PubMed, Scopus and Web of Science. In addition, we will search OpenGrey and Google for grey literature and contact non-governmental organisations to request relevant reports. In the first stage, eligibility criteria will be assessed through a blinded title/abstract assessment, and following this assessment, a full-text screening will be performed. Subsequently, the research team will perform the data extraction and synthesise all relevant information in relation to the scoping review question.

Ethics and dissemination As this protocol does not involve gathering primary data, ethical approval is not necessary. The results of this review will be published in a peer-reviewed journal and on institutional websites.

INTRODUCTION

Globally, cancer is a pressing public health issue affecting millions of people each year.^{1–5} Although anyone can be impacted by cancer, specific population subgroups, such as people experiencing homelessness (PEH), face a higher risk of developing the disease.^{6–8} Homelessness is a multifaceted social issue characterised by a lack of stable, safe or adequate housing resulting from various economic, social and health-related factors.^{9 10} Higher prevalence of cancer and

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ In line with the Joanna Briggs Institute guidelines for scoping reviews, this protocol will serve as a guide for the different steps of the proposed research.
- ⇒ The scoping review will provide a broad overview of the evidence published in peer-reviewed as well as grey literature relevant to cancer prevention in people experiencing homelessness and will cover literature without a date limit.
- ⇒ The studies to be included in the scoping review will be selected without any restrictions on language.

higher rates of cancer-related mortality were observed among PEH compared with the general population.¹¹ Several cancer risk factors may disproportionately affect PEH, particularly behavioural, environmental and healthcare-related factors.

Behavioural cancer risk factors include tobacco use, alcohol consumption and use of illicit substances, all of which are highly prevalent among PEH.¹² Environmental risk factors that are more common among PEH include exposure to the sun, pollutants or hazardous substances, as well as poor living conditions.^{6 13} PEH may be exposed to poor living conditions, such as overcrowding, which can contribute to the spread of infections that, in further consequence, can lead to cancer.^{5 14} Finally, healthcare-related risk factors include limited access to healthcare and insufficient healthcare utilisation, both of which can contribute to delayed diagnoses of cancer and poorer treatment outcomes. Barriers to healthcare access are pervasive among PEH, such as a lack of insurance, transportation or knowledge of available resources, which can result in the underutilisation of cancer screening and preventive care.^{15 16} Additionally, it is crucial to acknowledge bias and stigma perpetrated

by healthcare providers, as well as the intersectionality of homelessness and racism—considering that PEH are more likely to be part of an already minoritised groups—leading to higher levels of healthcare service avoidance and thus more aggravated health issues.¹⁷

Often, behavioural, environmental and healthcare-related risk factors are interconnected. The use of illicit substances—which poses a cancer risk factor in itself—may also lead to risky sexual practices that can increase the risk of contracting sexually transmitted infections (eg, human papillomavirus infections) known to be associated with cancer.^{18 19} Addressing these risk factors and ensuring adequate access to healthcare and cancer prevention services can reduce cancer risk among PEH. Thus, identifying risk factors in a timely manner is crucial in reducing the cancer burden and improving the overall health outcomes of this high-risk marginalised population.²⁰

While PEH are more likely to develop cancer than those with stable and secure housing,²¹ they disproportionately face challenges in accessing early and appropriate cancer preventive services, including primary prevention and diagnostic cancer screenings.¹⁵ While these challenges may be a consequence of a lack of insurance coverage, transportation and financial ability, not accessing these services can result in delayed cancer diagnoses, leading to more advanced-stage cancer and poorer health outcomes, such as increased morbidity and mortality rates.^{22–24} Moreover, PEH may face language barriers, stigma and a lack of trust in medical professionals,^{25 26} when the quality of cancer care they receive is often lower than that provided to the general population.²⁷

Although research on cancer risk factors and access to cancer prevention services for PEH is still scarce, a few previous studies have suggested that PEH may face additional challenges when it comes to cancer prevention and care.^{8 15} Given the paucity of research in this field and the research pointing to worse outcomes along the cancer care continuum in PEH, we aim to map the evidence on cancer risk factors and access to cancer prevention services for this population. For this purpose, a scoping review is an appropriate strategy to explore a broad range of literature, including both academic and grey literature, and summarise and synthesise the current state of knowledge on a particular topic.²⁸

Objective

The objective of this scoping review is to map the available evidence to assess the exposure of PEH to known cancer risk factors and identify barriers and facilitators PEH experience to accessing cancer prevention services (ie, screening).

Research questions

1. What is the prevalence of known cancer risk factors among PEH (eg, smoking, obesity, sun exposure, alcohol consumption, age, cancer-causing substances, diet, hormones, immunosuppression, infectious agents, radiation)?

2. What are the barriers and facilitators to accessing cancer prevention services for PEH?

METHODS AND ANALYSIS

The scoping review builds on the methodology for scoping reviews proposed by the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis.²⁹ A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews and JBI Evidence Synthesis was conducted to identify any current or underway reviews on the same topic. We found one review by Asgary from 2018¹⁵ that presents data on cancer incidence and mortality and the accessibility of cancer screening in PEH. We plan to include the latest research on cancer risk factors and access to cancer prevention services that has been published until the date of our literature search.

Eligibility criteria

We defined inclusion and exclusion criteria following the population, concept and context framework.²⁹ It allows for determining the group of individuals that are the focus of the study, the specific topic of interest as well as the environmental factors that may influence the population or concept.

Population

Inclusion criteria

- ▶ PEH are defined as the study population (including people living in supportive housing, transitional housing, unstable housing, inadequate housing and inappropriate housing).
- ▶ Study participants experienced homelessness at the time data were collected.
- ▶ PEH without a current or past cancer diagnosis.
- ▶ PEH 18 years old or over.

Exclusion criteria

- ▶ People not experiencing homelessness.
- ▶ PEH are among the studied population, but there are no specific data on outcomes or how homelessness influences cancer risk or access to cancer preventive services.
- ▶ PEH who were not homeless at the time of data collection. This is mainly due to the potential recall bias among participants who were formerly experiencing homelessness, as the recollection of their experiences may differ from the actual circumstances they faced during that specific period.
- ▶ PEH diagnosed with any type of cancer or who are cancer survivors.
- ▶ PEH under 18 years.

Concept

Inclusion criteria

- ▶ Cancer risk factors among PEH.
- ▶ Access (perceived and/or measured) for PEH to secondary cancer prevention services (ie, screening

for specific cancer types, such as breast, cervical, colon, lung, oral, prostate and skin cancer).

Exclusion criteria

- ▶ Access for PEH to curative/therapeutic healthcare services.
- ▶ Access for PEH to tertiary prevention services.

Context

Inclusion criteria

- ▶ Studies conducted in any setting/country/healthcare system.
- ▶ No limitations in terms of sex and gender.
- ▶ Original research and reviews (qualitative, quantitative and mixed-methods study designs).
- ▶ Grey literature.
- ▶ Time frame: from inception to 20 February 2023.

Exclusion criteria

- ▶ Any publication type that is not original research or a review (eg, posters, protocols, comments, editorials, conference proceedings).

Types of sources

The scoping review will encompass a range of study designs, including both experimental and quasi-experimental designs, such as randomised controlled trials, non-randomised controlled trials and pre–post studies. Prospective and retrospective cohort studies, case–control studies and analytical cross-sectional studies will also be included. In addition, descriptive observational studies, such as case series, individual case reports and descriptive cross-sectional studies, will be considered for inclusion.

In order to gain comprehensive insights beyond a quantitative point of view, we will also consider qualitative studies providing in-depth data on factors enabling or hindering access to cancer prevention among a vulnerable population such as PEH. Furthermore, reviews that meet our eligibility criteria will also be taken into account.

Search strategy

The search strategy aims to locate both published and unpublished studies. After an initial limited search of MEDLINE (PubMed) and Scopus (Elsevier) to identify relevant articles, the titles and abstracts of these articles, along with the index terms used to describe them, will be used to develop a comprehensive search strategy for CINAHL (Ebsco), Embase (Elsevier), Global Index Medicus (World Health Organization), MEDLINE (PubMed), Scopus (Elsevier) and Web of Science (Clarivate). The search strategy will be adapted for each database.

The search will cover the above databases without restricting the language or date range of relevant studies. To ensure comprehensive coverage, the journal ‘*Social Sciences & Humanities Open*’ will be searched manually as it is not indexed in any of the included databases. Sources of unpublished studies and grey literature, such as trial

registries and grey literature databases (eg, OpenGrey), will also be searched. Furthermore, we will assess the eligibility of references cited in articles considered relevant for our scoping review to determine their inclusion. The complete search strategy employed for the electronic databases, along with the search terms used for the grey literature search, can be found in online supplemental appendix.

Study and source of evidence selection

After the database search, all identified citations will be inserted into EndNote V.20 (Clarivate Analytics, Pennsylvania, USA), and duplicates will be removed automatically and manually. Then, two reviewers will screen the titles and abstracts for relevant sources with regard to the inclusion criteria and will retrieve the full texts of selected studies. Four reviewers will assess the full-text eligibility in groups of two, and discussion rounds will be held to resolve any conflicting decisions. The reasons for excluding sources and the final number of included results will be reported in the final scoping review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews flow diagram.³⁰

Data extraction

The data extraction tool will include information about source details, characteristics and results extraction, in accordance with the JBI methodology guidance for scoping reviews.²⁹ Specifically, the data extraction table will contain the following specific information:

1. Author(s).
2. Year of publication.
3. Type of evidence source.
4. Region where the study was conducted.
5. Study objectives.
6. Methodology/methods.
7. Study design.
8. Population and total sample size within the study or source of evidence.
9. Number of PEH included in the study sample.
10. Sample age, sex and gender.
11. Screening types and details of these.
12. Key findings that relate to the scoping review question.
 - a. Cancer risk factors.
 - b. Screening rates.
 - c. Barriers to accessing screening.
 - d. Facilitators to access screening.

The initial data extraction tool will be subject to modification and revision as needed during the data extraction process. In case of disagreements between reviewers during the data extraction process, they will be resolved through discussion or with the involvement of an additional reviewer. The data extraction tool will be used for both scientific literature and grey literature.

Data analysis and presentation

By analysing the data collected through the data extraction framework, we will obtain insights into the existing body

of research on cancer risk factors and the accessibility of cancer prevention services for PEH. Moreover, the analysis will identify knowledge gaps related to cancer prevention in PEH that have not received sufficient attention and may require additional research. The findings will be presented in an appropriate visual and aggregate format using a table to present descriptive results of the scoping review for each included source of evidence. In addition, we will provide a narrative synthesis of the findings and their relevance in connection with our specific objective and research questions.

Patient and public involvement

None.

Ethics and dissemination

Ethical approval is not required as this study is a retrospective review of publicly available evidence sources and does not involve collecting primary data. We will disseminate the findings of the scoping review through publication in a peer-reviewed journal and presentations at symposia and conferences. To ensure that the review findings reach the relevant stakeholders, a dissemination strategy will be developed later in the review process. The scoping review described in this protocol was registered in the Open Science Framework Registries (<https://doi.org/10.17605/OSF.IO/X78AJ>).³¹

Author affiliations

¹Department of Social and Preventive Medicine, Center for Public Health, Medical University of Vienna, Vienna, Austria

²International Foundation for Integrated Care, Oxford, UK

³International University of Valencia, Valencia, Spain

⁴Department of Cancer Epidemiology and Prevention Research, Cancer Care Alberta, Alberta Health Services, Calgary, Alberta, Canada

⁵Departments of Oncology and Community Health Sciences, University of Calgary, Calgary, Alberta, Canada

⁶Department of Sports Methods and Techniques, Federal University of Santa Maria, Santa Maria, Brazil

⁷Faculty of Health Sciences, Universidad Autonoma de Chile, Providencia, Chile

Twitter Tobias Schiffler @SchifflerTobias

Acknowledgements We thank Birgit Heller and Caroline Reittbrecht from the University Library of the Medical University of Vienna for co-developing and applying our search strategy. We also thank Johannes Lanzerstorfer for supporting us with the preliminary literature search.

Contributors MJ, TS and IG conceptualised the research; TS wrote the protocol; AG-S, LY, SH and FBS aided in developing the research question, eligibility criteria and study methods; all authors contributed to the drafting and editing of this protocol and approved the final manuscript.

Funding This work was partly supported by resources of the CANCERLESS project that received funding from the European Union's Horizon 2020 research and innovation program (Grant agreement ID: 965351).

Disclaimer The funders did not play a role in deciding to publish or develop the protocol.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Tobias Schiffler <http://orcid.org/0000-0003-1373-5279>

Maren Jeleff <http://orcid.org/0000-0002-6789-9167>

Igor Grabovac <http://orcid.org/0000-0001-9605-1467>

REFERENCES

- 1 Richters A, Aben KKH, Kiemeny LALM. The global burden of urinary bladder cancer: an update. *World J Urol* 2020;38:1895–904.
- 2 Keum N, Giovannucci E. Global burden of colorectal cancer: emerging trends, risk factors and prevention strategies. *Nat Rev Gastroenterol Hepatol* 2019;16:713–32.
- 3 Rungay H, Shield K, Charvat H, et al. Global burden of cancer in 2020 attributable to alcohol consumption: a population-based study. *Lancet Oncol* 2021;22:1071–80.
- 4 Arnold M, Ferlay J, van Berge Henegouwen MI, et al. Global burden of oesophageal and gastric cancer by histology and subsite in 2018. *Gut* 2020;69:1564–71.
- 5 de Martel C, Georges D, Bray F, et al. Global burden of cancer attributable to infections in 2018: a worldwide incidence analysis. *Lancet Glob Health* 2020;8:e180–90.
- 6 Baggett TP, Chang Y, Porneala BC, et al. Disparities in cancer incidence, stage, and mortality at Boston health care for the homeless program. *Am J Prev Med* 2015;49:694–702.
- 7 Holowatyj AN, Heath EI, Pappas LM, et al. The epidemiology of cancer among homeless adults in metropolitan Detroit. *JNCI Cancer Spectr* 2019;3:pkz006.
- 8 Lawrie K, Charow R, Giuliani M, et al. Homelessness, cancer and health literacy: a scoping review. *J Health Care Poor Underserved* 2020;31:81–104.
- 9 Fitzpatrick S. Explaining homelessness: a critical realist perspective. *Hous Theory Soc* 2005;22:1–17.
- 10 Tsai J, O'Toole T, Kearney LK. Homelessness as a public mental health and social problem: new knowledge and solutions. *Psychol Serv* 2017;14:113–7.
- 11 Aldridge RW, Menezes D, Lewer D, et al. Causes of death among homeless people: a population-based cross-sectional study of linked hospitalisation and mortality data in England. *Wellcome Open Res* 2019;4:49.
- 12 Taylor EM, Kendzor DE, Reitzel LR, et al. Health risk factors and desire to change among homeless adults. *Am J Health Behav* 2016;40:455–60.
- 13 Joseph A, Kindratt T, Pagels P, et al. Knowledge, attitudes, and practices regarding skin cancer and sun exposure among homeless men at a shelter in Dallas, TX. *J Cancer Educ* 2020;35:682–8.
- 14 Moffa M, Cronk R, Fejfar D, et al. A systematic scoping review of environmental health conditions and hygiene behaviors in homeless shelters. *Int J Hyg Environ Health* 2019;222:335–46.
- 15 Asgary R. Cancer screening in the homeless population. *Lancet Oncol* 2018;19:e344–50.
- 16 Asgary R, Garland V, Jakubowski A, et al. Colorectal cancer screening among the homeless population of New York City shelter-based clinics. *Am J Public Health* 2014;104:1307–13.
- 17 Weisz C, Quinn DM. Stigmatized identities, psychological distress, and physical health: intersections of homelessness and race. *Stigma and Health* 2018;3:229–40.
- 18 Williams SP, Bryant KL. Sexually transmitted infection prevalence among homeless adults in the United States: a systematic literature review. *Sex Transm Dis* 2018;45:494–504.
- 19 Caccamo A, Kachur R, Williams SP. Narrative review: sexually transmitted diseases and homeless youth—what do we know about

- sexually transmitted disease prevalence and risk *Sex Transm Dis* 2017;44:466–76.
- 20 Fazel S, Geddes JR, Kushel M. The health of homeless people in high-income countries: descriptive epidemiology, health consequences, and clinical and policy recommendations. *The Lancet* 2014;384:1529–40.
 - 21 Drescher NR, Oladeru OT. Cancer screening, treatment, and outcomes in persons experiencing homelessness: shifting the lens to an understudied population. *JCO Oncol Pract* 2023;19:103–5.
 - 22 Campbell DJT, O'Neill BG, Gibson K, et al. Primary healthcare needs and barriers to care among Calgary's homeless populations. *BMC Fam Pract* 2015;16:139.
 - 23 Gelberg L, Andersen RM, Leake BD. The behavioral model for vulnerable populations: application to medical care use and outcomes for homeless people. *Health Serv Res* 2000;34:1273–302.
 - 24 Hauff AJ, Secor-Turner M. Homeless health needs: shelter and health service provider perspective. *J Community Health Nurs* 2014;31:103–17.
 - 25 Wen CK, Hudak PL, Hwang SW. Homeless people's perceptions of welcomeness and unwelcomeness in healthcare encounters. *J Gen Intern Med* 2007;22:1011–7.
 - 26 Paisi M, Kay E, Plessas A, et al. Barriers and enablers to accessing dental services for people experiencing homelessness: a systematic review. *Community Dent Oral Epidemiol* 2019;47:103–11.
 - 27 Sayani A. Socially based inequities in breast cancer care: intersections of the social determinants of health and the cancer care continuum. *Critical Studies* 2017;13:24–36.
 - 28 Peterson J, Pearce PF, Ferguson LA, et al. Understanding scoping reviews: definition, purpose, and process. *J Am Assoc Nurse Pract* 2017;29:12–6.
 - 29 Aromataris E, Munn Z. *JB I Manual for Evidence Synthesis*. JBI, 2020.
 - 30 Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-SCR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.
 - 31 Jeleff M, Schiffler T, Gil-Salmerón A, et al. Cancer risk factors and access to cancer prevention services for people experiencing homelessness: a Scoping review: open science framework. 2023.

Appendices

Appendix I: Search strategies for all databases

CINAHL (EBSCO)

Theme	#	Searches
	S63	S59 AND S62
homelessness	S62	S60 OR S61
	S61	AB (homeless* OR unhoused* OR ill-housed* OR "ill housed*" OR houseless* OR unsheltered* OR shelterless* OR peh OR "shelter based" OR "shelter-based" OR roofless* OR "street people*" OR "rough sleep*" OR "sleeping rough" OR "transitional housing*" OR "temporary housing*" OR ((insecur* OR inadequa* OR precari* OR instab* OR unstabl* OR transient* OR rough*) AND (shelter* OR accomodation* OR housing* OR living*)))
	S60	TI (homeless* OR unhoused* OR ill-housed* OR "ill housed*" OR houseless* OR unsheltered* OR shelterless* OR peh OR "shelter based" OR "shelter-based" OR roofless* OR "street people*" OR "rough sleep*" OR "sleeping rough" OR "transitional housing*" OR "temporary housing*" OR ((insecur* OR inadequa* OR precari* OR instab* OR unstabl* OR transient* OR rough*) AND (shelter* OR accomodation* OR housing* OR living*)))
	S59	S36 OR S58
cancer screening	S58	S47 AND S57
	S57	S53 OR S56
	S56	S54 OR S55
	S55	AB access* OR barrier* OR facilitat* OR challeng* OR opportunit* OR attitude* OR behavior* OR behaviour* OR practice* OR experience* OR perception* OR perceive* OR disparit* OR disparat* OR participat* OR use OR navigat* OR utiliz* OR attend* OR hurdle* OR imped* OR limit* OR obstacle* OR block* OR hindrance* OR hinder* OR difficult* OR restrict* OR restrain* OR possibilit* OR perspective* OR approach* OR partak* OR differen* OR gap OR inequalit* OR unequal* OR discrepan* OR incongru* OR distinct* OR imbalance* OR diverge* OR complian* OR appointment* OR adhere*
	S54	TI access* OR barrier* OR facilitat* OR challeng* OR opportunit* OR attitude* OR behavior* OR behaviour* OR practice* OR experience* OR perception* OR perceive* OR disparit* OR disparat* OR participat* OR use OR navigat* OR utiliz* OR attend* OR hurdle* OR imped* OR limit* OR obstacle* OR block* OR hindrance* OR hinder* OR difficult* OR restrict* OR restrain* OR possibilit* OR perspective* OR approach* OR partak* OR differen* OR gap OR inequalit* OR unequal* OR discrepan* OR incongru* OR distinct* OR imbalance* OR diverge* OR complian* OR appointment* OR adhere*
	S53	S48 OR S49 OR S50 OR S51 OR S52
	S52	MH health status disparities
	S51	(MH "Health Behavior")
	S50	(MH "Attitude to Health")
	S49	MH healthcare disparities

	S48	MH health services accessibility
	S47	S43 OR S46
	S46	S44 OR S45
	S45	AB (mammograph* OR endoscop* OR "Papanicolaou test*" OR "pap test*" OR "pap smear*" OR "Papanicolaou smear*" OR "occult blood*" OR colonoscop* OR "Prostate-Specific Antigen" OR "Prostate Specific Antigen" OR psa OR ((cancer* OR neoplas* OR tumor* OR tumour* OR malignan* OR precancer*) AND (prevent* OR screen* OR test* OR detect* OR check*)))
	S44	TI (mammograph* OR endoscop* OR "Papanicolaou test*" OR "pap test*" OR "pap smear*" OR "Papanicolaou smear*" OR "occult blood*" OR colonoscop* OR "Prostate-Specific Antigen" OR "Prostate Specific Antigen" OR psa OR ((cancer* OR neoplas* OR tumor* OR tumour* OR malignan* OR precancer*) AND (prevent* OR screen* OR test* OR detect* OR check*)))
	S43	S37 OR S38 OR S39 OR S40 OR S41 OR S42
	S42	(MH "Prostate-Specific Antigen")
	S41	MH colonoscopy
	S40	MH occult blood
	S39	MH endoscopy
	S38	MH mammography
	S37	MH early detection of cancer
cancer risk	S36	S5 AND S35
	S35	S13 OR S34
	S34	S30 OR S33
	S33	S31 OR S32
	S32	AB smok* OR tobacco* OR alcohol* OR cocaine* OR crack* OR meth* OR obes* OR overweight* OR diet* OR sun OR sunlight* OR exercis* OR "physical activit*" OR sedentar* OR age OR pollut* OR radiat* OR hormon* OR "immune tolerance*" OR immunosuppression* OR infect* OR inflam*
	S31	TI smok* OR tobacco* OR alcohol* OR cocaine* OR crack* OR meth* OR obes* OR overweight* OR diet* OR sun OR sunlight* OR exercis* OR "physical activit*" OR sedentar* OR age OR pollut* OR radiat* OR hormon* OR "immune tolerance*" OR immunosuppression* OR infect* OR inflam*
	S30	S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29
	S29	MH inflammation
	S28	MH infection
	S27	MH immune tolerance
	S26	MH hormones
	S25	(MH "Radiation")
	S24	MH environmental pollution
	S23	MH age factors
	S22	MH exercise
	S21	MH sunlight
	S20	MH diet
S19	MH obesity	
S18	MH methamphetamine	

S17	MH cocaine
S16	MH alcoholism
S15	MH alcohol drinking
S14	MH smoking
S13	S9 OR S12
S12	S10 OR S11
S11	AB risk* OR chance* OR determinant* OR caus*
S10	TI risk* OR chance* OR determinant* OR caus*
S9	S6 OR S7 OR S8
S8	MH social determinants of health
S7	MH risk assessment
S6	MH risk factors
S5	S1 OR S4
S4	S2 OR S3
S3	AB cancer* OR neoplas* OR tumor* OR tumour* OR malignan*
S2	TI cancer* OR neoplas* OR tumor* OR tumour* OR malignan*
S1	MH neoplasms

Embase (Elsevier)

Theme	#	Searches
	#61	#55 AND #60
homelessness	#60	#58 OR #59
	#59	((homeless*:ti,ab,kw OR unhoused*:ti,ab,kw OR 'ill housed*:ti,ab,kw OR ill:ti,ab,kw) AND housed*:ti,ab,kw OR houseless*:ti,ab,kw OR unsheltered*:ti,ab,kw OR shelterless*:ti,ab,kw OR peh:ti,ab,kw OR 'shelter based':ti,ab,kw OR 'shelter-based':ti,ab,kw OR roofless*:ti,ab,kw OR 'street people*:ti,ab,kw OR 'rough sleep*:ti,ab,kw OR 'sleeping rough':ti,ab,kw OR 'transitional housing*:ti,ab,kw OR 'temporary housing*:ti,ab,kw OR ((insecur*:ti,ab,kw OR inadqua*:ti,ab,kw OR precari*:ti,ab,kw OR instab*:ti,ab,kw OR unstabl*:ti,ab,kw OR transient*:ti,ab,kw OR rough*:ti,ab,kw) AND (shelter*:ti,ab,kw OR accomodation*:ti,ab,kw OR housing*:ti,ab,kw OR living*:ti,ab,kw))) NOT 'pseudoeitheliomatous hyperplasia':ti,ab,kw
	#58	#56 OR #57
	#57	'homelessness'/exp
	#56	'homeless person'/exp
		#55
cancer screening	#54	#45 AND #53
	#53	#51 OR #52
	#52	access*:ti,ab,kw OR barrier*:ti,ab,kw OR facilitat*:ti,ab,kw OR challeng*:ti,ab,kw OR opportunit*:ti,ab,kw OR attitude*:ti,ab,kw OR behavior*:ti,ab,kw OR behaviour*:ti,ab,kw OR practice*:ti,ab,kw OR experience*:ti,ab,kw OR perception*:ti,ab,kw OR perceive*:ti,ab,kw OR disparit*:ti,ab,kw OR disparat*:ti,ab,kw OR participat*:ti,ab,kw OR use:ti,ab,kw OR navigat*:ti,ab,kw OR utiliz*:ti,ab,kw OR attend*:ti,ab,kw OR hurdle*:ti,ab,kw OR imped*:ti,ab,kw OR limit*:ti,ab,kw OR obstacle*:ti,ab,kw OR block*:ti,ab,kw OR hindrance*:ti,ab,kw OR hinder*:ti,ab,kw OR difficult*:ti,ab,kw OR restrict*:ti,ab,kw OR restrain*:ti,ab,kw OR possibilit*:ti,ab,kw OR perspective*:ti,ab,kw OR approach*:ti,ab,kw OR partak*:ti,ab,kw OR differen*:ti,ab,kw OR gap:ti,ab,kw OR inequalit*:ti,ab,kw OR unequal*:ti,ab,kw OR discrepan*:ti,ab,kw OR incongru*:ti,ab,kw OR distinct*:ti,ab,kw OR imbalance*:ti,ab,kw OR diverge*:ti,ab,kw OR complian*:ti,ab,kw OR appointment*:ti,ab,kw OR adhere*:ti,ab,kw
	#51	#46 OR #47 OR #48 OR #50
	#50	'health disparity'/exp
	#49	'health behavior'/exp
	#48	'attitude to health'/exp
	#47	'health care disparity'/exp
	#46	'health care access'/exp
	#45	#43 OR #44
	#44	mammograph*:ti,ab,kw OR endoscop*:ti,ab,kw OR 'papanicolaou test*:ti,ab,kw OR 'pap test*:ti,ab,kw OR 'pap smear*:ti,ab,kw OR 'papanicolaou smear*:ti,ab,kw OR 'occult blood*:ti,ab,kw OR colonoscop*:ti,ab,kw OR 'prostate-specific antigen':ti,ab,kw OR 'prostate specific antigen':ti,ab,kw OR psa:ti,ab,kw OR ((cancer*:ti,ab,kw OR neoplas*:ti,ab,kw OR tumor*:ti,ab,kw OR tumour*:ti,ab,kw OR

	malignan*:ti,ab,kw OR precancer*:ti,ab,kw) AND (prevent*:ti,ab,kw OR screen*:ti,ab,kw OR test*:ti,ab,kw OR detect*:ti,ab,kw OR check*:ti,ab,kw))
	#43 #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42
	#42 'prostate specific antigen'/exp
	#41 'colonoscopy'/exp
	#40 'occult blood'/exp
	#39 'papanicolaou test'/exp
	#38 'endoscopy'/exp
	#37 'mammography'/exp
	#36 'cancer screening'/exp
	#35 'early cancer diagnosis'/exp
cancer risk	#34 #3 AND #33
	#33 #10 OR #32
	#32 #30 OR #31
	#31 smok*:ti,ab,kw OR tobacco*:ti,ab,kw OR alcohol*:ti,ab,kw OR cocaine*:ti,ab,kw OR crack*:ti,ab,kw OR meth*:ti,ab,kw OR obes*:ti,ab,kw OR overweight*:ti,ab,kw OR diet*:ti,ab,kw OR sun:ti,ab,kw OR sunlight*:ti,ab,kw OR exercis*:ti,ab,kw OR 'physical activit*:ti,ab,kw OR sedentar*:ti,ab,kw OR age:ti,ab,kw OR pollut*:ti,ab,kw OR radiat*:ti,ab,kw OR hormon*:ti,ab,kw OR 'immune tolerance*:ti,ab,kw OR immunosuppression*:ti,ab,kw OR infect*:ti,ab,kw OR inflam*:ti,ab,kw
	#30 #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29
	#29 'inflammation'/exp
	#28 'infection'/exp
	#27 'immunological tolerance'/exp
	#26 'hormone'/exp
	#25 'radiation exposure'/exp
	#24 'pollution'/exp
	#23 'age'/exp
	#22 'sedentary lifestyle'/exp
	#21 'exercise'/exp
	#20 'sunlight'/exp
	#19 'diet'/exp
	#18 'obesity'/exp
	#17 'methamphetamine'/exp
	#16 'cocaine smoking'/exp
	#15 'cocaine'/exp
	#14 'alcoholism'/exp
	#13 'drinking behavior'/exp
	#12 'tobacco use'/exp
#11 'cigarette smoking'/exp	
#10 #8 OR #9	

#9	risk*:ti,ab,kw OR chance*:ti,ab,kw OR determinant*:ti,ab,kw OR caus*:ti,ab,kw
#8	#4 OR #5 OR #6 OR #7
#7	'social determinants of health'/exp
#6	'high risk behavior'/exp
#5	'risk assessment'/exp
#4	'risk factor'/exp
#3	#1 OR #2
#2	cancer*:ti,ab,kw OR neoplas*:ti,ab,kw OR tumor*:ti,ab,kw OR tumour*:ti,ab,kw OR malignan*:ti,ab,kw
#1	'malignant neoplasm'/exp

Global Index Medicus (World Health Organization)

Theme	#	Searches
cancer risk	1	cancer* OR neoplas* OR tumor* OR tumour* OR malignan*
	2	risk* OR chance* OR determinant* OR caus*
	3	smok* OR tobacco* OR alcohol* OR cocaine* OR crack* OR meth* OR obes* OR overweight* OR diet* OR sun OR sunlight* OR exercis* OR "physical activit*" OR sedentar* OR age OR pollut* OR radiat* OR hormon* OR "immune tolerance*" OR immunosuppression* OR infect* OR inflam*
	4	2 OR 3
	5	1 AND 4
cancer screening	6	mammograph* OR endoscop* OR "Papanicolaou test*" OR "pap test*" OR "pap smear*" OR "Papanicolaou smear*" OR "occult blood*" OR colonoscop* OR "Prostate-Specific Antigen" OR "Prostate Specific Antigen" OR psa OR ((cancer* OR neoplas* OR tumor* OR tumour* OR malignan* OR precancer*) AND (prevent* OR screen* OR test* OR detect* OR check*))
	7	access* OR barrier* OR facilitat* OR challeng* OR opportunit* OR attitude* OR behavior* OR behaviour* OR practice* OR experience* OR perception* OR perceive* OR disparit* OR disparat* OR participat* OR use OR navigat* OR utiliz* OR attend* OR hurdle* OR imped* OR limit* OR obstacle* OR block* OR hindrance* OR hinder* OR difficult* OR restrict* OR restrain* OR possibilit* OR perspective* OR approach* OR partak* OR differen* OR gap OR inequalit* OR unequal* OR discrepan* OR incongru* OR distinct* OR imbalance* OR diverge* OR complian* OR appointment* OR adhere*
	8	6 AND 7
	9	5 OR 8
homelessness	10	homeless* OR unhoused* OR ill-housed* OR "ill housed*" OR houseless* OR unsheltered* OR shelterless* OR peh OR "shelter based" OR "shelter-based" OR roofless* OR "street people*" OR "rough sleep*" OR "sleeping rough" OR "transitional housing*" OR "temporary housing*" OR ((insecur* OR inadequa* OR precari* OR instab* OR unstabl* OR transient* OR rough*) AND (shelter* OR accomodation* OR housing* OR living*))
	11	9 AND 10

MEDLINE (PubMed)

Theme	#	Searches
cancer risk	1	neoplasms[mesh]
	2	cancer*[tiab] OR neoplas*[tiab] OR tumor*[tiab] OR tumour*[tiab] OR malignan*[tiab]
	3	1 OR 2
	4	risk factors[mesh] OR risk assessment[mesh] OR health risk behaviors[mesh] OR social determinants of health[mesh]
	5	risk*[tiab] OR chance*[tiab] OR determinant*[tiab] OR caus*[tiab]
	6	cigarette smoking[mesh] OR tobacco use[mesh] OR alcohol drinking[mesh] OR alcoholism[mesh] OR cocaine[mesh] OR cocaine smoking[mesh] OR methamphetamine[mesh] OR overweight[mesh] OR diet[mesh] OR sunlight[mesh] OR exercise[mesh] OR sedentary behavior[mesh] OR age factors[mesh] OR environmental pollution[mesh] OR radiation exposure[mesh] OR hormones[mesh] OR immune tolerance[mesh] OR infections[mesh] OR inflammation[mesh]
	7	smok*[tiab] OR tobacco*[tiab] OR alcohol*[tiab] OR cocaine*[tiab] OR crack*[tiab] OR meth*[tiab] OR obes*[tiab] OR overweight*[tiab] OR diet*[tiab] OR sun[tiab] OR sunlight*[tiab] OR exercis*[tiab] OR "physical activit*" [tiab] OR sedentar*[tiab] OR age[tiab] OR pollut*[tiab] OR radiat*[tiab] OR hormon*[tiab] OR "immune tolerance*" [tiab] OR immunosuppression*[tiab] OR infect*[tiab] OR inflam*[tiab]
	8	4 OR 5 OR 6 OR 7
	9	3 AND 8
cancer screening	10	early detection of cancer[mesh] OR mammography[mesh] OR endoscopy[mesh] OR Papanicolaou Test[mesh] OR Occult Blood[mesh] OR colonoscopy[mesh] OR Prostate-Specific Antigen[mesh]
	11	mammograph*[tiab] OR endoscop*[tiab] OR "Papanicolaou test*" [tiab] OR "pap test*" [tiab] OR "pap smear*" [tiab] OR "Papanicolaou smear*" [tiab] OR "occult blood*" [tiab] OR colonoscop*[tiab] OR "Prostate-Specific Antigen" [tiab] OR "Prostate Specific Antigen" [tiab] OR PSA[tiab] OR ((neoplasms[mesh] OR cancer*[tiab] OR neoplas*[tiab] OR tumor*[tiab] OR tumour*[tiab] OR malignan*[tiab] OR precancer*[tiab]) AND (prevent*[tiab] OR screen*[tiab] OR test*[tiab] OR detect*[tiab] OR check*[tiab]))
	12	10 OR 11
	13	health services accessibility[mesh] OR healthcare disparities[mesh] OR health knowledge, attitudes, practice[mesh] OR health behavior[mesh] OR health status disparities[mesh]

	14	access*[tiab] OR barrier*[tiab] OR facilitat*[tiab] OR challeng*[tiab] OR opportunit*[tiab] OR attitude*[tiab] OR behavior*[tiab] OR behaviour*[tiab] OR practice*[tiab] OR experience*[tiab] OR perception*[tiab] OR perceive*[tiab] OR disparit*[tiab] OR disparat*[tiab] OR participat*[tiab] OR use[tiab] OR navigat*[tiab] OR utiliz*[tiab] OR attend*[tiab] OR hurdle*[tiab] OR imped*[tiab] OR limit*[tiab] OR obstacle*[tiab] OR block*[tiab] OR hindrance*[tiab] OR hinder*[tiab] OR difficult*[tiab] OR restrict*[tiab] OR restrain*[tiab] OR possibilit*[tiab] OR perspective*[tiab] OR approach*[tiab] OR partak*[tiab] OR differen*[tiab] OR gap[tiab] OR inequalit*[tiab] OR unequal*[tiab] OR discrepan*[tiab] OR incongru*[tiab] OR distinct*[tiab] OR imbalance*[tiab] OR diverge*[tiab] OR complian*[tiab] OR appointment*[tiab] OR adhere*[tiab]
	15	13 OR 14
	16	12 AND 15
	17	9 OR 16
homelessness	18	ill-housed persons[mesh]
	19	homeless*[tiab] OR unhoused*[tiab] OR ill-housed*[tiab] OR ill housed*[tiab] OR houseless*[tiab] OR unsheltered*[tiab] OR shelterless*[tiab] OR PEH[tiab] OR "shelter based"[tiab] OR "shelter-based"[tiab] OR roofless*[tiab] OR "street people*"[tiab] OR "rough sleep*"[tiab] OR "sleeping rough"[tiab] OR "transitional housing*"[tiab] OR "temporary housing*"[tiab] OR ((insecur*[tiab] OR inadequa*[tiab] OR precari*[tiab] OR instab*[tiab] OR unstabl*[tiab] OR transient*[tiab] OR rough*[tiab]) AND (shelter*[tiab] OR accomodation*[tiab] OR housing*[tiab] OR living*[tiab])) NOT "Pseudoepitheliomatous hyperplasia"[tiab]
	20	18 OR 19
	21	17 AND 20

Scopus (Elsevier)

Theme	#	Searches
cancer risk	1	TITLE-ABS-KEY (cancer* OR neoplas* OR tumor* OR tumour* OR malignan*)
	2	TITLE-ABS-KEY (risk* OR chance* OR determinant* OR caus*)
	3	TITLE-ABS-KEY (smok* OR tobacco* OR alcohol* OR cocaine* OR crack* OR meth* OR obes* OR overweight* OR diet* OR sun OR sunlight* OR exercis* OR "physical activit*" OR sedentar* OR age OR pollut* OR radiat* OR hormon* OR "immune tolerance*" OR immunosuppression* OR infect* OR inflam*)
	4	2 OR 3
	5	1 AND 4
cancer screening	6	TITLE-ABS-KEY (mammograph* OR endoscop* OR "Papanicolaou test*" OR "pap test*" OR "pap smear*" OR "Papanicolaou smear*" OR "occult blood*" OR colonoscop* OR "Prostate-Specific Antigen" OR "Prostate Specific Antigen" OR psa OR ((cancer* OR neoplas* OR tumor* OR tumour* OR malignan* OR precancer*) AND (prevent* OR screen* OR test* OR detect* OR check*)))
	7	TITLE-ABS-KEY (access* OR barrier* OR facilitat* OR challeng* OR opportunit* OR attitude* OR behavior* OR behaviour* OR practice* OR experience* OR perception* OR perceive* OR disparit* OR disparat* OR participat* OR use OR navigat* OR utiliz* OR attend* OR hurdle* OR imped* OR limit* OR obstacle* OR block* OR hindrance* OR hinder* OR difficult* OR restrict* OR restrain* OR possibilit* OR perspective* OR approach* OR partak* OR differen* OR gap OR inequalit* OR unequal* OR discrepan* OR incongru* OR distinct* OR imbalance* OR diverge* OR complian* OR appointment* OR adhere*)
	8	6 AND 7
	9	5 OR 8
homelessness	10	TITLE-ABS-KEY (((homeless* OR unhoused* OR ill-housed* OR "ill housed*" OR houseless* OR unsheltered* OR shelterless* OR peh OR "shelter based" OR "shelter-based" OR roofless* OR "street people*" OR "rough sleep*" OR "sleeping rough" OR "transitional housing*" OR "temporary housing*" OR ((insecur* OR inadequa* OR precari* OR instab* OR unstabl* OR transient* OR rough*) AND (shelter* OR accomodation* OR housing* OR living*)))) AND NOT "Pseudoepitheliomatous hyperplasia")
	11	9 AND 10

Web of Science (Clarivate)

Theme	#	Searches
cancer risk	1	TS=(cancer* OR neoplas* OR tumor* OR tumour* OR malignan*)
	2	TS=(risk* OR chance* OR determinant* OR caus*)
	3	TS=(smok* OR tobacco* OR alcohol* OR cocaine* OR crack* OR meth* OR obes* OR overweight* OR diet* OR sun OR sunlight* OR exercis* OR "physical activit*" OR sedentar* OR age OR pollut* OR radiat* OR hormon* OR "immune tolerance*" OR immunosuppression* OR infect* OR inflam*)
	4	#2 OR #3
	5	#1 AND #4
cancer screening	6	TS=(mammograph* OR endoscop* OR "Papanicolaou test*" OR "pap test*" OR "pap smear*" OR "Papanicolaou smear*" OR "occult blood*" OR colonoscop* OR "Prostate-Specific Antigen" OR "Prostate Specific Antigen" OR psa OR ((cancer* OR neoplas* OR tumor* OR tumour* OR malignan* OR precancer*) AND (prevent* OR screen* OR test* OR detect* OR check*)))
	7	TS=(access* OR barrier* OR facilitat* OR challeng* OR opportunit* OR attitude* OR behavior* OR behaviour* OR practice* OR experience* OR perception* OR perceive* OR disparit* OR disparat* OR participat* OR use OR navigat* OR utiliz* OR attend* OR hurdle* OR imped* OR limit* OR obstacle* OR block* OR hindrance* OR hinder* OR difficult* OR restrict* OR restrain* OR possibilit* OR perspective* OR approach* OR partak* OR differen* OR gap OR inequalit* OR unequal* OR discrepan* OR incongru* OR distinct* OR imbalance* OR diverge* OR complian* OR appointment* OR adhere*)
	8	#6 AND #7
	9	#5 OR #8
homelessness	10	TS=(homeless* OR unhoused* OR ill-housed* OR "ill housed*" OR houseless* OR unsheltered* OR shelterless* OR peh OR "shelter based" OR "shelter-based" OR roofless* OR "street people*" OR "rough sleep*" OR "sleeping rough" OR "transitional housing*" OR "temporary housing*" OR ((insecur* OR inadequa* OR precari* OR instab* OR unstabl* OR transient* OR rough*) AND (shelter* OR accomodation* OR housing* OR living*))
	11	TS=("Pseudoepitheliomatous hyperplasia")
	12	#10 NOT #11
	13	#9 AND #12

Search terms used for OpenGrey:

- “Homeless”
- “Homeless cancer prevention”
- “Cancer prevention”
- “Cancer screening”
- “Cancer risk factors”
- “Cancer detection”

1. All search results will be checked for relevant hits;
2. Full-texts of reports will be downloaded and screened for eligibility

Search terms used for Google:

- “Homeless AND cancer prevention”, “Homeless AND cancer screening”, “Homeless AND cancer risk factors”, “People experiencing homelessness AND cancer prevention”, “People experiencing homelessness AND cancer risk factors”, and “People experiencing homelessness AND cancer screening”

1. First ten pages of search results will be checked for relevant hits;
2. In case the first ten pages contain many relevant hits, five additional pages of search results will be checked;
3. Where available, full-texts of reports will be downloaded and screened for eligibility

Screening of “Social Sciences and Humanities Open” for the following key words:

- Homelessness AND cancer screening/prevention
- Homelessness AND cancer risk factors