National research priorities in occupational lung cancer

Supplementary materials

December 2024

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National research priorities in occupational lung cancer: Supplementary materials

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Anonymous online survey

The below is a copy of the anonymous online survey that was used to collect the most important issues and topics related to occupational lung cancer that researchers should be focusing on as viewed by key stakeholders. They online survey was hosted on the Qualtrics platform.

Research Priority Setting in Occupational Lung Disease

Project ID number 39219

Project Sponsor: Lung Foundation Australia and Monash University

Chief Investigator/s:

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You are invited to take part in this study. Please read this Explanatory Statement in full before deciding whether to participate. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the email addresses listed above.

Why are we conducting this study?

Occupational lung diseases are entirely preventable. It is clear there is a need for a more coordinated and strategic approach to occupational lung disease research in Australia to improve the prevention of these conditions and how best to care for people that are impacted. The inclusion of both consumers with lived experience of lung cancer or at risk of lung cancer due to occupational exposure and multidisciplinary professionals with on-the-ground real-world experience in the prevention and management of occupational lung disease is vital to ensuring that research and healthcare priorities are based on these diverse experiences.

Who is funding the study?

Lung Foundation Australia was funded to complete the study by the Department of Health and Aged Care. The funding body has no role in the design or completion of the study activities, including data analysis / interpretation of findings. This will be acknowledged in all output. The Department of Health and Aged Care will receive the top priorities for future research in occupational lung disease each year in an annual report.

What are the aims of this study?

This study aims to collect research priorities from a range of people impacted by or interested in occupational lung cancer. The findings will help guide research by ensuring that research funds and efforts are directed to the areas identified as being most important to people impacted by occupational lung diseases.

Who is being asked to participate?

You are invited to participate in this study if you are:

- Living with, or caring for, someone impacted by occupational lung cancer
- Anyone diagnosed with or suspected of having occupational lung cancer
- Anyone at significant risk of occupational lung cancer (i.e., current or former exposure to occupational lung carcinogens in the workplace)
- A multidisciplinary health professional working with people impacted by occupational lung disease
- A professional working in occupational safety or hygiene, epidemiology, public health, organisational behaviour change (particularly in high-risk industries), regulation, or other relevant fields
- A researcher working to understand occupational lung disease, including their prevention

- Another stakeholder with a professional interest in occupational lung cancer or preventing occupational lung carcinogens

Do I have to participate?

Participation in this study is voluntary. If you decide you do not wish to participate you do not have to and there will be no repercussions to this decision.

If you are someone living with or at risk of occupational lung cancer and decide that you do not wish to participate this will not affect any treatment or care you currently receive or may do so in the future.

What will I be asked to do?

If you are interested in being part, we ask that you read the information provided here and ask us any questions before proceeding. If you would like to take part in this study, we will ask you to complete an anonymous online survey which will ask you to list important priorities, comments or ideas you may have that you feel researchers should be working on to better prevent, diagnose/detect, and care for people impacted by occupational lung cancer. The survey will take approximately 10-30 minutes of your time. You can click a link at the end of the survey to find out more information or register for a free event hosted by Lung Foundation Australia.

Possible benefits and risks

There are no immediate personal benefits to you from participating in the study. Instead, your participation and the outcomes from this study will be used to ensure the valuable perspective of those impacted by or interested in occupational lung disease is included in identifying the top priorities for future research in occupational lung disease.

Confidentiality

The responses you provide in this survey are anonymous. If you decide to register to attend a free Research Forum (optional) you will be asked to provide your contact details, however, a fake name can be used if you prefer. This registration information cannot be linked to your participation in the study in anyway. The information collected from your survey responses will be stored in ways that will not reveal who you are. This means that you cannot be identified in any type of publication that results from this study and it will not be possible to identify individual responses. Study data may also be used for conference presentations and publication findings may be discussed in the media or used for advocacy efforts.

Storage of data

Online surveys will be conducted via the Qualtrics survey platform which is supported by Monash University. Study data will only be accessible to the research team and stored securely in password protected electronic files. All study data will be retained for a period of five years upon which it will be deleted. In the event you voluntarily and optionally provide your contact details for further invitation to the Research Forums this is stored separately and cannot be linked to study data in password protected electronic files accessible to the research team.

Use of data for other purposes

In accordance with data sharing guidelines, de-identified data may be made available for use by other authorised researchers. This data will be held on secure public repositories and may be a requirement of some journals prior to publication. Any shared data will not include your identifying details.

Results

A summary of the results will be available on the Lung Foundation Australia website after conclusion of the Research Forums.

Consenting to participate in the project and withdrawing from the study

Clicking the link at the end of this document indicates that you have read this explanatory statement and consent to participating in the study via an online survey. However, it is important to note that responses are anonymous and it will not be possible to identify your responses to remove these once you have submitted your responses.

Complaints

Executive Officer
Monash University Human Research Ethics Committee (MUHREC) Office of Research Ethics and Integrity
Room 116, Administration Building B (3D) 26 Sports Walk, Clayton Campus Monash University VIC 3800
Tel: +61 3 9905 2052

Email: muhrec@monash.edu

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics Committee (MUHREC):

Clicking 'Next' indicates that you consent to participate in this study.

The purpose of this online survey is to identify research needs in occupational lung cancer. Specifically, results from this survey will be used to identify where researchers, governments, and other funding bodies should be directing their attention, time, and resources.

This work is being conducted by Lung Foundation Australia, in partnership with multidisciplinary researchers from across the country, and Monash University. Lung Foundation Australia was funded by the Department of Health and Aged Care to complete this work and will present the outcomes to the Department in an annual report.

All responses are welcome, and we encourage you to list as many research questions or comments as you can. Responses are anonymous. In the event you do choose to leave your contact details, this will be kept confidential, and all responses will be de-identified.

Which of the following best described you?

- ☐ I am a worker at risk of occupational lung cancer (e.g., current or former exposure to occupational lung carcinogens in the workplace)
- ☐ I am someone diagnosed with or suspected of having lung cancer likely to be caused by an occupational exposure
- ☐ I am a family member or caregiver of someone impacted by occupational exposure to occupational lung carcinogens in the workplace or diagnosed with or suspected of having lung cancer to be caused by an occupational exposure
- ☐ I am someone working to help people living with occupational lung cancer or workers at risk of occupational lung cancer (including research)

If 'worker' or 'someone diagnosed with or suspected of having occupational lung cancer' is selected

Which industry have you mostly worked in?

- ☐ Construction
- ☐ Mining and quarrying
- ☐ Manufacturing
- ☐ Tunnelling
- ☐ Transportation
- ☐ Stonemasonry / Stone benchtop fabrication
- ☐ Other _____

If 'some working to help people living with occupational lung cancer or workers at risk of occupational lung cancer' is selected

Which of the following best describes your professional role? [pleasure select all that apply]

- Researcher / Academic (main area of interest) _____
- Epidemiologist (main area of interest)_____
- Respiratory / Respiratory and Sleep Physician
- Occupational and Environmental Physician
- General Practitioner
- Radiologist
- Oncologist
- Psychiatrist
- Rheumatologist
- Occupational Hygienist
- Occupational Health and Safety Professional
- Respiratory Care Nurse
- Occupational Health Nurse
- Lung Cancer Nurse
- Nurse (other) _____
- Radiographer
- Physiotherapist
- Exercise Physiologist
- Occupational Therapist
- Rehabilitation Counsellor
- Psychologist
- Social Worker
- Public Health / Health Promotion
- Union / Worker representative
- Industry representative
- Solicitor / Lawyer
- Workplace safety regulator
- Other _____

How long have you been working with occupational lung cancer patients or at-risk workers, in occupational health and safety and/or involved in topics related to occupational lung cancer?

- Up to 2 years
- 2-4 years
- 5-7 years

- ☐ 8-10 years
- ☐ More than 10 years up to 20 years
- ☐ More than 20 years

For all respondents to complete onwards

What is your gender identify?

- ☐ Man
- ☐ Woman
- ☐ Prefer not to say
- ☐ My gender is not listed _____

Do you identify as Aboriginal and/or Torres Strait Islander?

- ☐ No
- ☐ Yes, Aboriginal
- ☐ Yes, Torres Strait Islander
- ☐ Yes, both Aboriginal and Torres Strait Islander
- ☐ Prefer not to say

What is your age range?

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65-74
- ☐ 75-84
- ☐ 85 +
- ☐ Prefer not to say

Which state or territory are you primarily based in?

- ☐ ACT
- ☐ NSW
- ☐ NT
- ☐ QLD
- ☐ SA

- TAS
- VIC
- WA
- Prefer not to say

What language do you prefer to use at home? _____

ISSUES OR TOPICS THAT ARE IMPORTANT TO YOU

This next section asks you to list any issues or topics about occupational lung cancer you believe researchers should be working on to improve or better understand.

We encourage you to be creative and include any topic areas you believe are important. Some aspects of this survey may be more relevant to your experience than others - this is okay.

Please list as many issues/topics as you can, or feel free to make descriptive comments so we understand the issue. The use of dot-points is encouraged.

What are the most important issues or topics you believe researchers should be working regarding:

EXPOSURE - IDENTIFICATION OF OCCUPATIONAL EXPOSURES THAT CAUSE LUNG CANCER?

PREVENTION - PREVENTION OF OCCUPATIONAL EXPOSURES THAT CAUSE LUNG CANCER?

SCREENING - OCCUPATIONAL EXPOSURE HISTORY THAT WOULD WARRANT LUNG CANCER SCREENING?

DIAGNOSIS - APPROACHES TO DIAGNOSE OCCUPATIONAL LUNG CANCER?

MANAGEMENT - LIVING WITH AND MANAGING THE IMPACTS OF OCCUPATIONAL LUNG CANCER?

Please list any other important issues or topics in your opinion or experience. These can be related to the above areas or can be areas not mentioned above.

Research Forum agendas

Face-to-face Research Forum (multidisciplinary professionals)

Date: 9th October 2024

Forum Time: 9:00am – 4:50 pm AEDT (registration from 8:30am AEDT)

Networking Event: 4:50 pm – 5:50 pm AEDT – (Level 1 Foyer, Pullman On The Park Hotel)

Location: Pullman Melbourne on the Park | 192 Wellington Parade, East Melbourne VIC 3002

Forum Objectives:

- Agree on the top research priorities for future research in occupational lung cancer
- Create a national Occupational Lung Disease Research Network to facilitate sharing of knowledge and collaboration

Time	Description
8:30am (30 mins)	**Registration** and tea and coffee
9:00am (5 mins)	**Welcome and Acknowledgement of Country**
9:05am (10 mins)	**Opening Address – Minister for Department of Health VIC**
9:15am (10 mins)	**Priority Setting – Background and Aims**
9:25 am (20 mins)	**Presentation from the Department of Health and Aged Care**
9:45am (5 mins)	**Introduction of Occupational Lung Cancer for Research Priority Setting**
9:50 am (10 mins)	**Introducing the consumer voice**
10:00am (5 mins)	**Occupational lung disease research network**
10:05am (15 mins)	**Research priority process – Overview**
10:20 am (50 mins)	**Breakout Session 1: Initial small group discussion of the priority area**
11:10 am	**Morning tea**

(20 mins)	
11:30 am (90 mins)	**Session 1: Group update and discussion**
	Independent Ranking of the Priorities
	Session 1a: Group Discussion - Review and discuss the ranking results within the wider group
1:00pm (60 mins)	**Networking Lunch**
2:00pm (10 mins)	**Introduce - Generating Research Questions**
2:10pm (60 mins)	**Breakout session 2: Research question generation for addressing the top priorities**
3:10pm (30 mins)	**Afternoon Tea**
3:40pm (60 mins)	**Session 2: Group update**
4:40pm (10 mins)	**Summary and next steps**
	Research Forum concludes
4:50 pm (60 mins)	**Networking Event**

Virtual Research Forum (consumers)

Date: 13th November 2024
Time: 4:00-6:00pm (ACT, NSW, VIC, TAS), 3:00-5:00pm (QLD), 3:30-5:30pm (SA), 2:30-3:30pm (NT), 1:00-3:00pm (WA)

Objectives:

- Agree upon the top priorities for future research in occupational lung cancer
- Create an Occupational Lung Disease Research Network to facilitate sharing of knowledge and collaboration

Time (AEST - QLD)	**Description**
3pm (3 mins)	**Welcome and Acknowledgement of Country**
3:03pm (3 mins)	**Background and objectives**
3:06pm (8 mins)	**Priority Setting**
3:14pm (33 mins)	**Theme Discussion and Rankings**

3:47 pm (30 mins)	**Research Ideas**
4:17pm (3 mins)	**Lung Foundation Australia occupational lung diseases Support Service**
4:20pm (3 mins)	**Introducing our expert panel**
4:23pm (15 mins)	**Presentation 1: Hear from an occupational and environmental physician**
4:38pm (15 mins)	**Presentation 2: Hear from a dust disease lawyer**
4:53 pm (5 mins)	**Q&A with the presenters and LFA support staff**
4:58 pm	**Wrap Up**
5pm	**Research Forum Concludes**

Anonymous feedback surveys

Evaluation form – Multidisciplinary Professionals

The below is a copy of the evaluation form that was provided to all attendees of the face-to-face Research Forum for multidisciplinary professionals. This was completely anonymously and provided in a pen-and-paper format at the conclusion of the research forum and in addition was delivered online as a follow-up survey via the Qualtrics platform. Of the 51 attendees, 35 completed evaluations were received.

Thank you for attending the second Occupational Lung Disease Research Forum and participating in the discussions surrounding the top priorities for future research in occupational lung cancer. We will continue to host Research Forums in 2025 where a network of multidisciplinary processionals, such as yourself, and consumers can come together to discuss priorities in occupational lung disease.

To help improve the way these Research Forums are run, please complete the following anonymous evaluation form. Results will be reported to the funding body, the Federal Department of Health and Aged Care.

Please indicate the extent to which you agree with the following statements:

1. Overall, I believe the Research Forum was valuable

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2. I had the opportunity to network with colleagues

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

3. I have a greater understanding of existing research in the exposure, prevention, diagnosis and screening, and management of occupational lung cancers as a result of participating in the Research Forum

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

4. I believe the outcomes of the priority setting align with key gaps in our current understanding of the exposure, prevention, diagnosis and screening, and management of occupational lung cancer

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

5. I believe the identified priorities will contribute to a more coordinated approach to future research

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

6. I believe the identified priorities effectively incorporate the perspectives of all key stakeholders with a vested interest in occupational lung cancer and occupational lung cancer carcinogens

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

6a. Do you have any suggestions on how could this be improved in later years?

_____

_____

7. In your opinion, what would improve the Research Forums and future priority setting activities in later years?

_____

_____

8. Which occupational lung disease would you like to see prioritised in 2025?

_____

_____

If you are engaged in research:

Please indicate the extent to which you agree with the following statements:

1. I have new ideas for future research as a result of participating in the Research Forum

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2. I have new ideas for future research collaboration as a result of participating in the Research Forum

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Group members (face-to-face Research Forum)

Group allocation	First name	Last name	Affiliation (Optionally provided)
Group 1	**Deborah**	**Glass**	**Monash University**
Group 1	Deborah	Yates	
Group 1	**Bernard**	**Stewart**	**Clinical Oncology Society of Australia (COSA)**
Group 1	Rebecca	Tipping	Gordon Legal
Group 1	Elham	Beheshti	Asbestos and Dust Disease Research Institute (ADDRI)
Group 1	Jennifer	Coles	Asbestos and Dust Disease Research Institute (ADDRI)
Group 1	Matthew	Britton	Trial to Triumph
Group 2	**Hayley**	**Barnes**	**Alfred Hospital and Monash University**
Group 2	Ross	Sottile	Maurice Blacburn
Group 2	Fiona	Hore-Lacy	Monash University and Alfred Hospital
Group 2	Kathryn	Mathews	iCare
Group 2	**Kate**	**Anderson**	**The Australian National University**
Group 2	Kathleen	Mahoney	Asbestos and Silica Safety and Eradication Agency (ASSEA)
Group 2	Rebekah	Mccutcheon	Fit Test Australia
Group 3	Tess	Dickie	Gordon Legal
Group 3	Peter	Knott	GCG Health Safety Hygiene and the University of Melbourne
Group 3	Sara	McLaughlin-Barrett	
Group 3	**Renee**	**Carey**	**Curtin University**
Group 3	Alana	Morris	Minerals Council of Australia
Group 4	**Graeme**	**Edwards**	**Australasian Faculty of Environmental Medicine (AFOEM)**
Group 4	Simon	Royce	Monash University
Group 4	Evan	Pengelly	Resources Safety and Health Queensland
Group 4	**Nikky**	**LaBranche**	**The University of Queensland**
Group 4	Carla	Fuentes	Polaron
Group 4	Marc	Mcphee	Australian Workers Union
Group 5	Megan	Sanders	Thoracic Oncology Group of Australasia (TOGA)
Group 5	Warren	Harrex	President AFOEM
Group 5	**Tim**	**Driscoll**	**School of Public Health, University of Sydney**
Group 5	Stephanie	Welsh	Asbestos Disease Support Society (ADSS)

Group 5	Alisson	Venegas	Polaron
Group 5	Sarah	Woon	Sater and Gordon
Group 5	Joanna	Mcneill	Patient advocate
Group 5	Mehri	Vijdani	Polaron
Group 6	Paris	Papagianis	Monash University
Group 6	Maggie	Davidson	Western Sydney University
Group 6	Anita	Arian	Maurice Blackburn
Group 6	**Ryan**	**Hoy**	**The Alfred Hospital**
Group 6	Aruvi	Thiruvarudchelvan	
Group 7	Jane	McDermot	McDermott Rickards Lawyers
Group 7	Peter	Franklin	The University of Western Australia
Group 7	Rebecca	Martin	Slater and Gordon
Group 7	**Steven**	**Kao**	**Chris O'Brien Lifehouse and Asbestos and Dust Disease Research Institute (ADDRI)**
Group 7	**Jo**	**Dickinson**	**University of Tasmania**
Group 7	Fraser	Brims	Sir Charles Gairdner Hospital
Group 7	Jade	Lee Campbell	Australian Workers Unions
Group 8	Claudia	Sim	Monash University
Group 8	Jacqui	Brown	Work Safe Victoria
Group 8	Ewan	Wylie	Heart of Australia
Group 8	**Jane**	**Bourke**	**Monash University**
Group 8	Mechele	Dorrity	Northern Sydney Local Health District, The Chronic Disease Community Rehabilitation Service (CDCRS) Sydney
Group 8	Kristen	Bennett	Curtin University

NB: Bold indicates an ONSC member

Survey outcomes

Priority Area 1: Exposure – Identification of occupational exposures that cause lung cancer
Research Topics (10)
Epidemiological studies (better understanding of exposure and risk) • Measuring exposure-response- response relationship including concentration, frequency, prevalence rate • Quantifying the lung cancer risks from the carcinogens • Emerging and understudied exposures
Cumulative and combined risk factors • The exposure of multiple carcinogens and the impact on lung cancer risk • Additive risk factors e.g. smoking in the workplace, vaping • Interactions between exposures and genetic predisposition • Developing models to assess the impact of occupational and environmental factors
High risk occupations/ high risk exposures • Exposures across industries/ occupations/ and tasks • Population-based studies to track lung cancer incidence to identify higher-risk industries/occupations
New sources of risk • New exposures • Newer industries • New products o Composites of recovered/ recycled materials to assess exposure risk
Air pollution
Exposure history/ registry
Disease reporting
First Nations risk • Are exposure rates higher for first nations groups living in rural and remote communities?
Toxicology and pathogenesis
Innovative methods to measure exposure and risk • Biological monitoring techniques • Non-invasive techniques • Developing workplace measures to identify exposures

NB: outcomes does not include the additions or the adaptions during the multidisciplinary Research Forum

Priority Area 2: Prevention of occupational exposures that cause lung cancer
Research Topics (11)
Barriers and facilitators to effective prevention and control

• Barriers to prevention implementation • Barriers of implementation for small businesses and vulnerable worker populations • Maintenance of control implementations • Culturally appropriate implementation
Worker education • Worker awareness and risk education • Worker awareness and education – effectiveness of initial and on-going training • Develop evidence-based training programs that can effectively communicate exposure risks • Education regarding PPE • Education materials in diverse languages • Effectiveness of workplace training
Compliance • Data collections on workplace compliance • Is current practice enough? • International compliance comparisons
Risk perception and communication • Population perception of risk • Risk communications – including employers and employees
Prevention and health promotion
Exposure limits • Verification of workplace exposure limits
Exposure monitoring tools • Improving monitoring tools • Developing real time exposure monitoring devices • Personalised exposure monitoring devices
Technological innovations • How new technologies can be effectively integrated into high-risk industries without introducing new hazards
Regulation and standards • National guidelines and standards on local exhaust ventilation • Maintenance • Defining when prevention is successful or when a ban/elimination is required
Efficacy of Personal Protective Equipment (PPE)
Alternative materials/ processes

Priority Area 3: Screening#
Research Topics (7)
Understanding who should be screened

• Exposure history – low to high risk for screening • Risk stratification/matrix e.g. development of a job-exposure matrix for lung cancer screening – similar to CAREX Tool
Screening criteria • Establish clear eligibility criteria based on of age groups, exposure duration, exposure concentration or intensity, and additional risk factors e.g. smoking or vaping • Criteria for subsidy – occupational criteria for the National Lung Cancer Screening Program • Develop methods and national guidelines for health monitoring requirements
Screening implementation • Barriers to accessing screening – geographical access, lack of awareness, insufficient training or healthcare providers to inquire about occupational histories • Psychological and social considerations – addressing the psychological impacts of screening (e.g. addressing false positives) • Promoting supportive environments to destigmatise health concerns • Extend workforce scope e.g. nurse practitioners
Efficacy and effectiveness • Screening tools • Best methods • Ongoing evaluation of screening program effectiveness for at-risk populations
Education • Health practitioner education on occupational history and symptom recognition
First Nations
Cost benefit analysis of screening with occupational criteria

Priority Area 4: Diagnosis – Approaches to diagnose occupational lung cancer
Research Topics (8)
Best practice • Early diagnosis • Clear definitions • Maintenance of changing methods to diagnose
Education for health professionals • Ask about occupational histories • Raising clinical awareness of occupational risks • Standardised diagnosis protocols • Educating patients on diagnosis pathways
Diagnostic techniques

• Use of advanced imaging techniques - establishing optimal radiation dose • Biomarkers • Non-invasive techniques
Role of Multidisciplinary Teams in diagnosis
Diagnosing comorbidities
Disease differentiation
Standards of care
Case studies

Priority Area 5: Management – Living with and managing the impacts of occupational lung cancer
Research Topics (9)
Care coordination • Multidisciplinary support including comprehensive care teams and care navigators • Cultural safety and support – tailored support for diverse populations
Psychosocial impacts and support • Managing expectations and uncertainties • Mental health support access including family support • Navigating changes in life roles • Managing stigma
Self-management strategies • Lifestyle adjustments • Self-improvement strategies to manage symptoms e.g. breathing strategies, energy conservations
Patient health promotion and support • Quality of life • Support after diagnosis • Working after a diagnosis of occupational lung cancer • Worker rights education
Compensation considerations • Cost-benefit timelines to access compensations • Understanding pathways and support: ensuring individuals understand their options and entitlements
Financial Aspects (personal and societal) • Economic burden of occupational lung cancer • Financial toxicity to patients, families, and carers
Priority populations support
Differences between occupational lung cancer and non-occupational lung cancer management • Are different treatments needed? Biologically different? Are different support services required?

Carer impact

Research questions

The tables below contain the research questions derived from the face-to-face Occupational Lung Cancer Research Forum held for multidisciplinary professionals on Wednesday 9 October 2024. Attendees were asked to come together across disciplines to collaboratively brainstorm the most pressing and important research questions for each priority area in small groups. Small groups were randomly allocated and reflected diverse discipline coverage. Small groups recorded their research questions on butcher's paper. Despite being separated, there were some similarities in the research questions generated across small groups, but these have been retained and transcribed verbatim for transparency.

Priority area: Exposure – Identification of occupational exposures that cause lung cancer

	Group 1	Group 3	Group 5	Group 6
Top research questions	How can the registry be forced to collect a comprehensive exposure history? Is there an excess of lung cancer for construction workers?	Develop methods to incorporate retrospective exposure assessment into current occupational requisites. Investigate the use of non-invasive means to assess exposures including self-testing.	How do we standardise/ centralise health monitoring data of exposure? What are the implications of novel exposures to known lung carcinogens and new materials?	Tools for rapid assessment of newer products for implementation. Establishing prospective high-risk cohort to investigate exposure-response relationship and cumulative and/or combined risk factors e.g. from different industries - silica exposed workers?
Other research questions	How can government authorities provide information about industrial chemical use in Australia? Including waste materials. Who is the correct authority to carry out horizon scanning?	Long term additive risk of vaping and exposure to occupational lung carcinogens. Focus future exposure assessments to consider multiple concurrent exposures, i.e. occupational exposure.	N/A	Investigation of processes to identify new sources of risk. Prospective epidemiological studies - establish a high-risk cohort for occupational lung diseases.

	Group 1	Group 3	Group 5	Group 6
	Does respiratory testing for silica lead to early diagnosis? What is the specificity and sensitivity of respiratory testing?	Does poor psychosocial health increase with exposure of lung carcinogens (vice versa)?		Retrospective epidemiological studies - occupational vs non occupational cancers. Emerging/understudied - environmental/ pollutants, exposure carcinogen studies, post covid exposure to chemicals. Cross-occupational exposure estimates (cumulative and combined risk factors). Comparison of multiple exposures from multiple occupations compared to a primary occupation. Innovative measures of exposure and risk - capitalising on existing datasets and real time monitoring environmental data vs prevalence.

Priority area: Prevention – Prevention of occupational exposures that cause lung cancer

	Group 2	Group 4	Group 7
Top research questions	What are the barriers and facilitators for effective prevention and control? What are the most effective exposure monitoring tools?	What are the most effective education tools for improving occupational lung disease awareness information to targeted populations across employers, workers, industry e.g.,	What are the barriers for employers to provide a safe workplace? What should the compliance priorities be for carcinogens based on hazards and current kinds of control?

	Group 2	Group 4	Group 7
		young people before entering the workforce? What are the barriers and enables to data sharing amongst stakeholders involved in respiratory hazards testing?	
Other research questions	What is the best model of care to increase risk communication or risk perception? What are the barriers in prevention for CALD communications? Monitoring tools for broader exposure. Workplace and individual tools. Assessing efficacy of real time monitoring tools. Innovative exposure monitoring tools. Who are the priority people to target for education? Psychosocial barriers to effective prevention and control. What are the barriers and strategies to overcome? Understanding and overcoming health literacy and literacy barriers for worker prevention. And what are the outcome measures appropriate for this group?	N/A	What are the current perceptions among workers in at-risk industries? What is the current level of knowledge among workers in high-risk occupations about occupational hazards? What is the effectiveness of current training programs and its impacts on behaviour change? What is the current knowledge of workers/employers on the awareness, implementation and maintenance of higher order of control? What do employers/workers know about the breadth of carcinogenic materials in their workplace? What are the most effective tools to educate workers? What are the most effective monitoring tools and standards to measure inhaled occupational carcinogens? What are the alternative materials to common carcinogens currently used in the workplace?

	Group 2	Group 4	Group 7
	How at-risk workers best receive health risk/prevention information?		What is the current rate of compliance in small-medium business for high-risk industries? What is the current rate of compliance with existing controls in high-risk industries? Do the control measures adequately protect against the carcinogens?

Priority area: Screening

	Group 3	Group 5	Group 8
Top research questions	What factors influence an occupationally exposed persons willingness to screen? Leveraging existing knowledge to identify eligibility criteria for occupational lung cancer screening?	What are the best occupational metrics for using in a screening program? Can we improve the effectiveness of lung cancer screening by including high risk occupational exposure?	What at risk occupational groups would benefit from screening? Are occupational lung disease programs currently in place effective in terms of diagnosing lung cancer?
Other research questions	How can we remove barriers (e.g., resources) to screening? What is the role of multidisciplinary teams? Can we identify acute conditions caused by lung carcinogens that prioritise screening for lung cancer?	Can we develop a non-invasive accessible on-site screening tool e.g., breath to reduce the need for diagnostic imaging?	N/A

Priority area: Diagnosis – Approaches to diagnose occupational lung cancer

	Group 1	Group 6	Group 7
Top research questions	How much do health professionals know about occupational exposure? Developing occupational history taking for lung cancer patient (beyond smoking).	Development of a self-reporting work history-based tool. Development of a non-invasive test that indicates previous exposures to guide health care professionals.	What is the appropriate standardised protocol for determining occupational relatedness of lung cancer? - including patient exposure histories. What is the molecular pathology profile of occupational lung cancers? - predictive/implications for prognosis and treatment.
Other research questions	How do we ensure health professionals are educated regarding occupational risk? Does developing earlier and less invasive diagnostic testing improve compliance? What diagnostic test is available to differentiate between occupational lung cancer and lung cancer? Is there an early diagnostic checklist that can facilitate further investigation?	Development of standardised occupational health and safety exposure/work history questionnaire. Longer retention of records (e.g., ATO, WorkSafe, exposures, etc.). Support for occupational health nurses, ad hoc worksite occupational hygienists' tests for air quality or exposure levels, report back to lawyers/health professionals. AI to identify trends in exposure levels and disease. Integrating occupational professionals and AI and ad hoc regulators to identify relationships in exposure and disease.	What tools are currently used to assess the association of lung cancer to occupational risk factors? When is a multidisciplinary team most effective in the diagnosis of lung cancer? What are the novel identification measures to diagnose lung cancers? What are the characteristics of early on set/ short latency lung cancer diagnosis? What is the effect of comorbidities on the susceptibility to occupational lung cancer?

Priority area: Management – Living with and managing the impacts of occupational lung cancer

	Group 2	Group 4	Group 8
Top research questions	What are the psychosocial impacts and support required for occupational lung cancer? What is the optimal care pathway for occupational lung cancer?	What are the patient and carer supports needed for following a history of occupational lung cancer (psychosocial supports, health system support, financial and legal support) How are these "identified" supports most effectively implemented?	What is the effectiveness of care coordination? Evaluation of return to work in people with occupational lung cancer (including benefits and limitations and patient perceptions).
Other research questions	How can we project the future burden of disease for occupational lung cancer? Value of specific occupational lung cancer nurse navigator. And mode of delivery. What are the key barriers to accessing and understanding compensation? Are patient navigators effective? What are the barriers and enablers to returning to work? How to best support or improvement health programs needed? Who should comprise a multidisciplinary team? Is there value in adding a	N/A	What are the gaps in care coordination?

	Group 2	Group 4	Group 8
	specific occupational lung cancer specialist? Determining appropriate management programs e.g., pulmonary rehabilitation programs. Stigma to accessing support (barrier and overcome). Innovative strategies to provide and improve multidisciplinary team for all (access) communities. What models of care exist for providing multidisciplinary team pathways?		