

Lung Cancer Screening Update

Recommendations:

That the Board:

1. Notes that Lung Cancer is a significant health issue, with lung cancer being leading cause of death for Māori women and second (after cardiovascular disease) for Māori men. There is a substantial inequity in lung cancer, with Māori developing lung cancer about 8 years earlier, with 3-4 times higher mortality than for European.
2. Notes that trials of low dose CT screening in asymptomatic people at high risk of lung cancer have demonstrated significant reductions in lung cancer mortality. No population-based testing of CT screening for lung cancer has been conducted in New Zealand, and internationally there have been no studies which focus on equity or on Indigenous people.
3. Notes that Lung Cancer Screening research programme is a series of interconnected studies, and the flagship project within the Māori Health Pipeline.
4. Notes that the programme is Māori-led, and aims to generate specific evidence to ensure that any national programme works for Māori.
5. Notes that the preliminary work has been completed. This included focus groups, a survey and a cost-effectiveness equity analysis. The pilot study (50-100 CT scans) is due to commence shortly. Larger studies are planned and are awaiting research funding decisions.

Prepared by: Dr Karen Bartholomew (Director Health Outcomes), Dr Kate Parker (Lung Cancer Screening Research Manager), Prof Dr Sue Crengle (University of Otago)
Endorsed by: Dr Dale Bramley (Chief Executive)

Glossary

AAA	- Abdominal aortic aneurysm
CT	- Computerized Tomography scan (or 'CAT' scan)
DHB	- District Health Board
HPV	- Human papilloma virus
LDCT	- Low dose CT
PHO	- Primary Health Organisation

Executive Summary

Waitematā DHB has been leading the development of screening approaches that design-in equity, including Abdominal Aortic Aneurysm (AAA) screening, human papilloma virus (HPV) self-testing and Lung Cancer Screening. The Lung Cancer Screening research programme draws on the lessons learned in previous work, and has been established as the flagship project within the Māori Health Pipeline which is endorsed by Kōtahi Hauora the Iwi-DHB Partnership Board.

The Lung Cancer Screening research programme seeks to develop evidence to ensure that any future national programme benefits Māori. The programme is a research collaborative with the University of Otago, Waitematā DHB and Auckland DHB, led by Professor Dr Sue Crengle and supported by a Māori-led steering group. The programme has completed foundational work, and is moving on to pilot the screening pathway undertaking 50-100 CT scans early in 2021. Larger trials are planned to [REDACTED]. Northland DHB has been included in the latest planned study, which is supported by Kōtuiti Hauora. Counties Manukau DHB have also been included to provide a Northern Region catchment for the expanded programme. The planned studies are currently under competitive research grant assessment processes.

1. Background

Each year lung cancer causes more deaths than melanoma, breast and prostate cancer combined. Most lung cancers are diagnosed at a late stage (symptomatic) resulting in a very low survival rate that has persisted over time; New Zealand has worse 5-year survival than similar countries (age standardised 5-year net survival 15.3% 2010-2014).¹

Lung cancer is a significant health issue for Māori and has been found to be the greatest contributor to the absolute inequity in mortality for Māori compared to NZ European/Other. In a recent comparative study of indigenous populations in high income countries, Māori had the highest lung cancer incidence and mortality.²

Due to the current and persistent inequity better diagnosis and treatment of lung cancer is a high priority for Māori health equity and health gain as highlighted in the Ministry of Health Cancer Action Plan, and the recent Te Aho o Te Kahu Cancer Control Agency report.³ It is one of the two cancer equity priorities identified by the Northern Region Integrated Cancer Service (NRICS).

A range of actions are required to address inequities in lung cancer mortality and achieve survival equity, including:

- Tobacco cessation
- Improved symptom awareness
- Low dose CT screening of asymptomatic people at high risk of lung cancer, and
- Improved diagnostic and treatment services.

Given that smoking prevalence remains high for Māori (census estimates of 35-40%), and that patterns of incidence largely reflect historical smoking patterns, it is likely that differences in lung cancer incidence will persist for some time. This would be true even if all smokers stopped today.

Internationally, lung cancer screening trials have demonstrated a 20-26% reduction in lung cancer mortality.⁴ However, in implementing any new screening programme, there are always risks and

¹ Arnold M., Rutherford M., Bardot A. et al. Progress in cancer survival, mortality, and incidence in seven high-income countries 1995–2014 (ICBP SURVMARK-2): a population-based study. *Lancet Oncology* 20(11) (2019) 1493-1505

² Disney G., Teng A., Atkinson J., Wilson N. and Blakely A. Changing ethnic inequalities in mortality in New Zealand over 30 years: linked cohort studies with 68.9 million person-years of follow-up. *Population Health Metrics* (2017) 15:15

³ Te Aho o Te Kahu. Lung Cancer Quality Improvement Monitoring Report (2021).

<https://teaho.govt.nz/reports/publications>

⁴ See Aberle DR, Adams AM, Berg CD, Black WC, Clapp JD, Fagerstrom RM, et al. Reduced lung-cancer mortality

benefits that need to be assessed, along with specific local policy and implementation issues. We have outlined a range of local policy and implementation areas in a recent publication with Australian colleagues.⁵

In the case of lung cancer screening there is real potential for harm (direct harm from diagnostic or treatment interventions, including death) and harms associated with incidental findings, as well as issues related to service capacity (diagnostic and treatment services). Screening is not an activity to be undertaken lightly, and requires substantive resources to undertake clinical protocol development, quality assurance, data management and clinical governance. This research programme aims to provide directly policy relevant information to guide the implementation of lung cancer screening nationally. The research programme is intentionally designed for Māori, aiming to reduce Māori mortality, and the life expectancy gap, from lung cancer.

To date the programme has focussed on three key pieces of work:

1. A survey alongside a series of focus groups to address an important gap in our understanding about how Māori would like to engage with a screening programme for lung cancer, and how the programme should be designed to reduce inequities.
2. A re-analysis of the cost effectiveness of lung cancer screening in NZ to address issues in a 2018 study from Jaine et al which concluded that LCS was unlikely to be cost-effective for any group in New Zealand.
3. Trialling lung cancer screening in New Zealand, initially Māori-specific.

The status of the projects within the programme are noted below, with further detail in the following sections.

Current status of Lung Cancer Screening studies

Lung Cancer Screening	ADHB	WDHB	CMDHB	NDHB
Focus Groups	Complete			
Surveys	Complete			
Survey – Northland extension	Complete			
Survey – Midland DHB extension	Initiated, on track			
Cost Effectiveness Analysis	Complete			
Establish Te Hā Kotahi (Consumer Advisory Group)	Complete			
Pilot (50 scans)	Initiated, on track			
Invitation trial (500 scans) testing central vs primary care invitation	Awaiting funding decision			

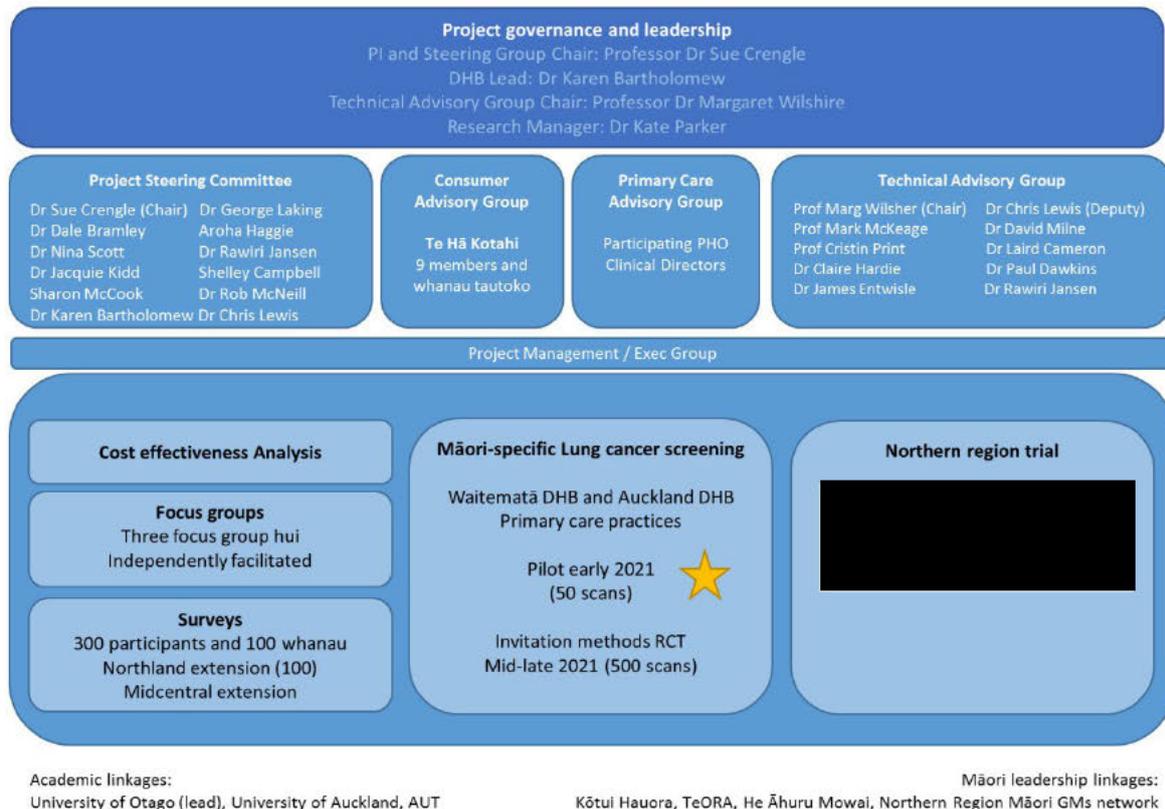
Complete
Initiated, on track
Awaiting funding decision

with low-dose computed tomographic screening. The New England journal of medicine. 2011;365(5):395-409; and de Koning, H. et al. Reduced Lung-Cancer Mortality with Volume CT Screening in a Randomized Trial. N Engl J Med 2020; 382:503-513.

⁵ Manners, D., Dawkins, P., Pascoe, D., Crengle, S., Bartholomew, K. and Leong, T.L. (2021), Lung cancer screening in Australia and New Zealand: the evidence and the challenge. Intern Med J, 51: 436-41. <https://onlinelibrary.wiley.com/action/showCitFormats?doi=10.1111%2Fimj.15230>

2. Project governance

The project is Māori-led with the academic Principal Investigator Professor Sue Crengle (Waitaha, Kāti Mamoe, Kāi Tahu), University of Otago. The Steering group is also Māori-led, supported by a Technical Advisory Group, a Primary Care Advisory Group and centering a whanau approach through Te Hā Kotahi, the Consumer Group (see section 5 below).



3. Survey and Focus Groups

A mixed method approach was employed incorporating qualitative and quantitative methods. An A+ Trust Grant (Auckland DHB) was awarded for this work. The initial work involved a series of focus groups with Māori that were potentially eligible for lung cancer screening. The focus groups were independently managed by experienced Māori facilitators. The focus groups explored beliefs and attitudes relating to the lung cancer screening pathway, including questions around what information was needed for participants to make an informed choice about participation, along with other key issues such as blood sampling and biobanking, the provision of smoking cessation advice and how to avoid the risk of stigmatisation of participants. These groups also tested the acceptability and usefulness of draft survey questions enabling them to be refined for use in the wider questionnaire based work.

Following focus groups, a survey was conducted of more than 300 Māori smokers or ex-smokers who would potentially be eligible for lung cancer screening, to investigate attitudes, beliefs and intention to participate. Alongside this, a similar but tailored survey was conducted amongst approximately 100 whānau members (a whānau tautoko survey) or support people of the main survey participants.

Survey results have been analysed, and the initial results will be presented shortly at the upcoming University of Auckland and Waitematā DHB online Research Symposium.⁶ In addition, supplementary surveys have been conducted in Northland (75 eligible participants and 25 whānau members) and planning is underway to also conduct similar surveys in Mid Central DHB as part of their cancer hui currently underway.

4. Cost effectiveness of lung cancer screening

Cost effectiveness is a critical aspect of any national screening programme (one of the eight screening criteria in New Zealand).⁷ A 2018 study from the University of Otago Burden of Disease study (BODE3)⁸ concluded that LCS was unlikely to be cost-effective for any group in New Zealand. This has been challenging for progressing any national discussions on lung cancer screening. Waitematā DHB and Auckland DHB therefore invested in re-evaluating the cost-effectiveness.

The complex model underlying this work was requested by the research team, and access was kindly granted by BODE. The model was reviewed in detail, finding a number of issues with the model which altered the findings of the original study (a correction was subsequently published, indicating it was cost effective for Māori). Our research team then extended the model with alternative assumptions based in Māori health equity, and updated a range of model parameters to the most recently available evidence. Our paper has been recently published⁹ and demonstrates the programme is likely to be highly cost-effective for all populations groups, particularly for Māori women.

5. Establishment of Te Hā Kotahi (consumer advisory group)

Involving whānau from the beginning of the journey is a foundational approach for the research programme. Out of the survey and focus group participants a Consumer Advisory Group was proposed and subsequently developed. Participants include potentially eligible people and their whānau. The group meets regularly, supported by DHB kaumatua, and has contributed significantly to the framing of the research programme, research questions, participant materials, logo and design and to the name of the programme. The programme name, Te Oranga Pūkahukahu: Lung Health Check, has recently been approved by GM Tikanga Dame Naida Glavish. The meaning of the name is outlined below.

⁶ Link here: <https://www.waitematadhb.govt.nz/about-us/research-learning/symposium/>

⁷ National Health Committee (2003). The National Health Committee report, Screening to Improve Health in New Zealand, presents recommended criteria for assessing screening programmes in New Zealand. <https://www.nsu.govt.nz/publications/screening-improve-health-new-zealand-criteria-assess-screening-programmes>

⁸ Jaine R. et al. Cost-effectiveness of a low-dose computed tomography screening programme for lung cancer in New Zealand. *Lung Cancer* 124, (2018):233-40. <https://pubmed.ncbi.nlm.nih.gov/30268467/>

⁹ McLeod M, Sandiford P, Kvizhinadze G, et al Impact of low-dose CT screening for lung cancer on ethnic health inequities in New Zealand: a cost-effectiveness analysis *BMJ Open* 10(2020). <https://bmjopen.bmj.com/content/10/9/e037145>

TE ORANGA PŪKAHUKAHU LUNG HEALTH CHECK.

Proposed by Te Hā Kotahi as the preferred programme name with supporting rationale.

oranga: (noun) survivor, food, livelihood, welfare, health and living.

pūkahukahu: (noun) lungs, moss.

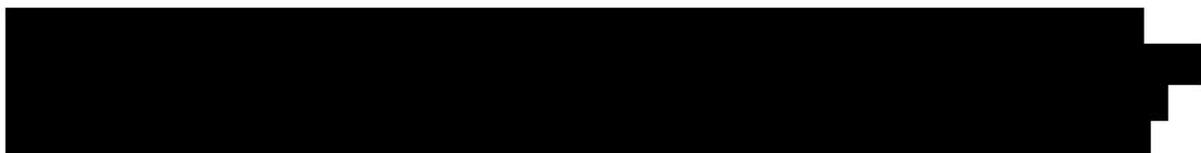
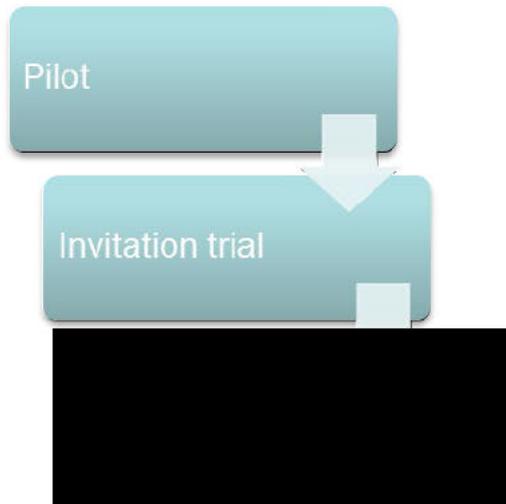
The Māori kupu (word) for lungs is pūkahukahu. Interestingly the pūkahukahu is also the name of the mound at the base of a Kauri tree that protects the root system of the tree. The name pūkahukahu is not a commonly known kupu, however it is the most appropriate to describe the lung and lung health.

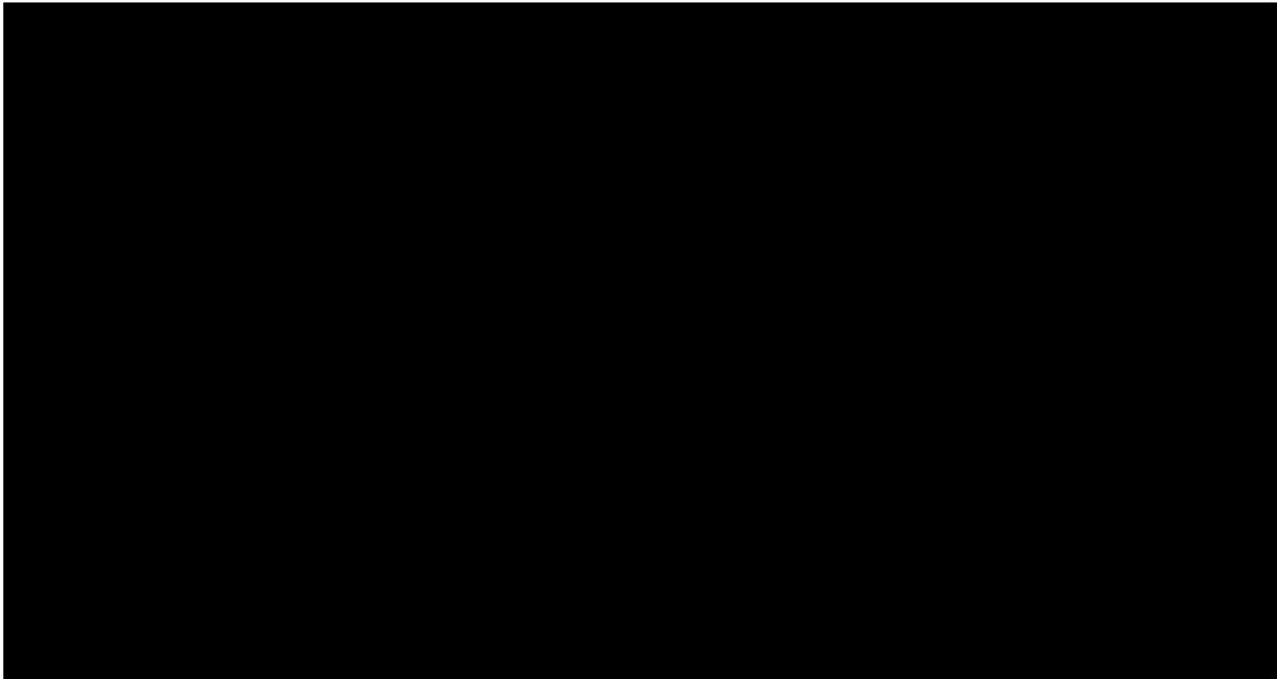
The Kauri tree plays an important role in Māoridom and stretches back to the beginning of the Te Ao Māori. Tāne, along with his siblings, lived in the darkness between their coupled parents. Tāne and his siblings separated their parents, Ranginui (the sky father) and Papatūānuku (the earth mother), creating light and life to exist and prosper. So began time, the world of light, and the title of Tāne Mahuta, god of the forest and all its living creatures. Such is the nature of life and the position and role of kauri as the greatest rangatira of our forests. Kauri is known as Te Whakaruruhau - the great protector of the forest - referring to the many species that shelter in the arms of the kauri. Many large kauri trees were given names and revered as chiefs of the forest. The connection with the pūkahukahu to the Kauri tree and to the lungs and breath of mankind makes the name Te Oranga Pūkahukahu a mighty name for this kaupapa.

Te Oranga Pūkahukahu as a name symbolises that lung health is a journey, not only for ourselves but for our whānau and loved ones so that we can be around to see the next generations grow.

6. Lung cancer screening trials

The findings from the foundational work have directly informed the subsequent design of the pilot and invitation trial, to be conducted with Māori participants.



7. Next steps

Māori workforce development is a key part of this programme and the team are working closely with the Māori recruitment advisor and the Director of Nursing Māori. The Lung Cancer Screening project team are expanding, with a Māori research assistant and a Māori data manager recently appointed, and recruitment for a Māori research nurse currently underway. The pilot will begin in early 2021.

The team are working on preparation for the pilot with secondary care services, to determine the 'readiness' for implementation, and to address any gaps. This includes radiology, respiratory services, pathology, cardiothoracic surgery and a range of other DHB services.



In December 2020, the Health Research Council, Te Aho o Te Kahu (the Cancer Control Agency) and the Ministry of Health announced a new Request for Proposals (RFP) to fund research that will drive equitable cancer outcomes. This RFP has a stream of funding dedicated to lung cancer screening and is hence well-aligned with the current work. The team are currently putting in an application for the Northern Region expansion programme to this grant round. We are awaiting decisions on three other funding applications.