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Investigation of a reported cluster of cancer cases at the National Gallery of Australia

**Proposal prepared in response to an Expression of Interest in Provision of Services
by the National Gallery of Australia**

Organisation

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SUMMARY

The project is a detailed investigation of a reported cancer cluster involving security staff at the National Gallery of Australia.

BACKGROUND

This proposal has been prepared in response to a request for Expressions of Interest In Provision of Services prepared by the National Gallery of Australia (the Gallery). Along with the Gallery document, the report "Assessment of Documents relating to the National Gallery of Australia" by a Comcare Investigator, Mr Mark Wray, was provided to the tenderer, and relevant aspects of this document have been considered.

As described in the request for Expression of Interests, the Gallery "...is seeking expert medical advice on the possible association of security staff cancer illnesses with the Gallery environment.". The concern regarding a possible work-related cancer cluster arose following a review of sick leave in February 2002, in which a cluster of cancer illnesses amongst security staff was identified. This concern regarding a possible work-related cluster of cancers arose in the context of other occupational health and safety concerns at the Gallery over a number of years.

There have been several investigations and reports regarding various occupational health and safety and related matters at the Gallery. One of these was a short report by Dr Andrew Lark, of Health Services Australia, in which it was concluded that "Considering the epidemiological issues, it is in my opinion exceedingly unlikely that there is any occupational cancer causing-agent responsible for this cluster of illness". The report by Mr Wray raised some methodological issues regarding the report, and recommended that another opinion be obtained regarding the possible connection between the identified cancer cases and occupational exposures at the Gallery.

Five cancer cases were identified at the time of the 2002 review of sick leave. There is reportedly anecdotal evidence of other cases of cancer amongst security staff who have worked at the Gallery since it opened in 1982.

METHOD

OBJECTIVES

The research objectives are clearly presented in the request for Expression of Interest in Provision of Services released by the Gallery in late January 2006. The main objective is to provide "...expert medical advice on the possible association of security staff cancer illnesses with the Gallery environment.". This is interpreted for this project to mean that, with respect to an apparent cluster of cases of cancer in current and former security workers at the Gallery, this project will aim to:

- provide an opinion on the likelihood of any work-related contribution to the identified cases of cancer (and any other cases of cancer identified during the project); and
- to recommend what, if any, further action might be warranted.

INTRODUCTION

The project requires an epidemiological assessment of the cluster, but this needs to be as thorough as is reasonably possible. This should be so in most cluster investigations, but it is particularly important in this instance, given the apparent concerns regarding an inadequate investigation to date and the broader, long-running occupational health and safety issues that have been present at the Gallery for many years. It will also be very important to involve all interested parties in the project, so that all concerns are heard addressed as much as is reasonably possible.

There are a number of approaches that can reasonably be taken when investigating an apparent cancer cluster, and many references that provide good guidance in this regard. Recurring themes in these publications are that:

- such investigations commonly do not provide a definitive answer;

- most apparent clusters are almost certainly chance occurrences of cancers due to non-work exposures;
- a small number of cluster investigations have identified important relationships between work-related exposures and cancer;
- investigation requires a careful and considered approach; and
- dismissing apparent clusters without appropriate investigation, consideration and consultation is likely to result in the acrimony of concerned staff and the escalation of tension and worries in the affected workforce¹⁻⁵.

Key questions that need to be answered are presented here. These are used as the basis for the proposed methodology. The questions are:

- Have all the cases been identified?
- Are all the cases of the same (or similar) type?
- Is there statistical evidence to suggest that the number of cases is in excess of what would be expected in this population?
- Do the cancer types have a known common cause, whether occupational or non-occupational?
- Did the persons diagnosed with cancer have a common occupational (or non-occupational) exposure?
- Are there known workplace exposures that could have contributed to the occurrence of the cancers?
- Did the cancers occur at an appropriate time in relation to the possible workplace exposures?
- On the balance of probabilities, is it likely that the identified cancers occurred as a result of occupational exposures?
- Are there any plausible non-occupational causes for the apparent cluster?

The proposed methodology takes the above questions into account. It is not yet possible to be definitive regarding the detailed methodology because some of the necessary information won't be known until the project begins. However, as much detail as is possible has been included.

PROPOSED APPROACH

1) Preliminary and later discussion with all interested parties and review of documents

It is important for the success of the project that the project team gain a detailed understanding of the concerns of all persons with an interest in the issue being investigated by the project. This includes affected workers, other concerned workers, Gallery officers and union representatives, and also (where possible and relevant) previous investigators. This will require a series of meetings to allow such discussions to take place. There should also be provision made for reporting the findings to an appropriate audience.

All relevant documents and reports on investigations already conducted will need to be reviewed.

Since the methodology is likely to have to be refined following initial discussions, it is suggested that the Gallery might like to convene a small group which could meet regularly (as

¹ AFOM Working Party on Occupational Cancer. *Occupational Cancer. A guide to prevention, assessment and investigation*. Sydney: 2003, The Australasian Faculty of Occupational Medicine.

Caldwell GG. Twenty-two years of cancer cluster investigations at the Centers for Disease Control. *Am J Epidemiol*, 1990; 132(Suppl 1):S43-47.

Fleming LE, Ducatman AM, Shalat SL. Disease clusters in occupational medicine: a protocol for their investigation in the workplace. *Am J Ind Med*, 1992; 22:33-47.

Frumkin H, Kantrowitz W. Cancer clusters in the workplace: an approach to investigation. *J Occup Med*, 1987; 29:949-952.

Rothman K. A sobering start to the cluster busters' conference. *Am J Epidemiol*, 1990; 132(Suppl 1):S6-13.

required, and either face-to-face or via teleconference) with the project team members to discuss progress, expectations, concerns, etc.

2) Identification and characterisation of cases

Have all the cases been identified?

Are all the cases of the same (or similar) type?

The extent to which all cancer cases can be identified, and the type of cancer confirmed, depends on the available data sources. Cancer is a notifiable disease in Australia, and State and Territory cancer registries record information on all cases of cancer, including details on the type of cancer and the person affected. These registries have been in operation for several decades. It is possible to obtain information from cancer registries concerning whether a particular person or group of persons have been diagnosed with cancer and, if so, to find out information about the case. However, this requires the name, sex and date of birth of the person, their permission (if this is reasonable to obtain, although this may not be necessary in this instance) and ethics approval by the relevant cancer registry. If information is required from all cancer registries in Australia (as would be needed in a comprehensive study), separate ethics applications would be required for all of them. It might be reasonable to limit enquiries to the registries of the States and Territories in close proximity to the site of the cluster (in this case, to the Australian Capital Territory (ACT) and New South Wales (NSW) – note that the ACT register is run by the NSW Registry).

Therefore, it is proposed that all cancer cases be identified through a request of cancer registries. Whether this request is made just of the ACT and NSW registries, or needs to involve all Australian registries, will be decided following discussions with current employees and management. This will require ethics approval by the relevant registries, a process that can be very frustrating and can be expected to take three to six months. This approach will require a list of the names and date of birth of all Gallery security staff from 1982.

An alternative approach is to attempt to contact all current and previous security staff to ascertain whether or not they have been diagnosed with cancer and, if so, the type of cancer. However, it can be expected to be difficult to track down past employees, and it is likely that the self-report of cancer, especially the type of cancer, will be subject to error. This would provide an approximate number of cases of cancer, and some information on the type, and would allow an estimation of cancer incidence, which could then be compared to population incidences.

3) Epidemiological assessment

Is there statistical evidence to suggest that the number of cases is in excess of what would be expected in this population?

Assessing whether there are more cases of cancer, either overall or of a particular type, requires comparing the rate of cancer in the employees with the rate expected, based on the rates in the general population for persons of the same age and sex.

To calculate rates for the Gallery employees, it is necessary to know the number of cases of cancer, and to take into account the length of time the person was employed at the Gallery, their age at diagnosis, their age when employed (in practice this requires information on date of birth and dates of employment) and their sex.

To calculate the expected rates, information will need to be obtained from the cancer registries and possibly the Australian Bureau of Statistics.

4) Literature review of causes of identified cancers

DO THE CANCER TYPES HAVE A KNOWN COMMON CAUSE, WHETHER OCCUPATIONAL OR NON-OCCUPATIONAL?

Once the cancer types have been identified, a review of the published literature is required to identify the known or suspected occupational (and non-occupational) causes or associations for each cancer type.

This requires a search of the literature, critical appraisal of relevant articles and synthesis of the relevant information. A critical review of relevant published, peer-reviewed literature will be conducted, focussing on review articles. The review will seek to provide a concise summary of the current state of knowledge of the known and suspected causes of each of the identified cancer types.

5) Hygiene assessment and literature review

Did the persons diagnosed with cancer have a common occupational (or non-occupational) exposure?

Are there known workplace exposures that could have contributed to the occurrence of the cancers?

It is very important to gain a thorough understanding of the type, nature and extent of exposures of current and previous Gallery staff. This requires a detailed assessment by an occupational hygienist and occupational physician. At this point it is not known the extent to which such investigations have already been conducted by, or on behalf of, the Gallery. It is proposed that documentation of all relevant hygiene investigations be read by the project team. A thorough hygiene inspection will then be undertaken. This will involve looking at all relevant worksites and work tasks, and interviewing current (and, if relevant, former) Gallery staff. Until this work has started, it will not be known whether any form of workplace monitoring or measurement should be undertaken.

In addition, a review of the published literature will be required to identify the known or suspected cancers associated with the identified exposures.

6) Assessment of temporal plausibility

Did the cancers occur at an appropriate time in relation to the possible workplace exposures?

The latency between exposure and onset of cancer is believed to be typically of the order of at least ten to 15 years. This means that, in most cases, cancers that occur during the first five to ten years of employment are unlikely to be related to that employment. It is therefore important to try to obtain information on how long each person had been working at the Gallery prior to their diagnosis. Calculation of cancer incidence rates can then be made taking into account the time between first employment and diagnosis.

7) Overall assessment

On the balance of probabilities, is it likely that the identified cancers occurred as a result of occupational exposures?

Are there any plausible non-occupational causes for the apparent cluster?

The final advice as to the presence of a cluster and the likelihood of a connection to occupational exposures at the Gallery, or to non-occupational exposures, will be based on all the above information. Similarly, any recommendations will be made once all information has been considered.

REPORT STRUCTURE

The structure of the final report can be decided much later in the project, but is likely to be along the following lines:

- Executive summary;
- Recommendations
- Introduction;
- Methodology;
- Review of previous investigations and discussions with Gallery personnel;
- Current and previous occupational exposures;
- Literature review regarding known associations between identified exposures and occupational cancer;
- Identification of cancer cases;
- Literature review regarding causes of identified cancers;
- Comparison of cancer rates;
- Overall assessment and recommendations

REPORTING

Formal regular reporting will be undertaken as agreed with Gallery staff overseeing the project. This may include:

- participation in teleconferences;
- presentation of brief written reports; and
- presentation at progress meetings.

CONTRIBUTION FROM THE GALLERY

The Gallery will be expected to provide, in connection with the project:

- access to all documentation from previous occupational health and safety or related matters connected with the Gallery that are relevant to the project;
- access to all relevant parts of the Gallery for the purposes of worksite inspection;
- access to current and former staff to discuss any matter relevant to the project;
- access to the OHS committee to discuss any matter relevant to the project;

The Gallery will be expected to meet any reasonable costs associated with requested travel (including airfares, accommodation, food, taxis and parking) in relation to the project. No allowance for this has been made in the tender costs.

ETHICAL ISSUES

The main ethical issue involved in this project relates to the investigation of past and current workers' health status and medical history. In particular, the planned matching of employee name to cancer registry data will require approval of the ethics committee of each registry that is to be approached. It is possible that the ethics committee might require individual permission from employees. However, if it was not possible or practical to gain this permission (because of unknown contact details, for example), and it could be reasonably argued that the investigation is being done for public benefit, it is reasonable to expect that a committee will grant access on the basis of that public benefit without requiring individual consent.

CONFLICT OF INTEREST

There are no known conflicts of interest in connection with this project.

CONFIDENTIAL INFORMATION AND EXISTING INTELLECTUAL PROPERTY

It is not expected the confidential information will be used for the project or included in the project report. No pre-existing intellectual property is expected to be introduced by the respondent.

TIMEFRAME

The respondent notes that the Gallery would like the project completed as soon as possible and undertakes to do that. The main impediment to this is the work required to gain access to cancer registry information. As mentioned earlier in this submission, obtaining ethics approval is typically a long and drawn-out process. It is not unusual for a requirement for several iterations of an ethics document before it is approved, and the ethics committees typically meet only every few months. Therefore, if it is decided to follow the recommended approach of attempting to match employee names with cancer registry data, it is a realistic expectation that the project will not be completed until the end of the year. If it is decided not to pursue the registry matching, the timeframe would be much shorter, but the final conclusions would not be based on the best potentially available information.

There is also likely to be some delay in identifying past employees (if some are to be interviewed).

A lesser impediment is the availability of the project team. The proposed members of the project team are committed on projects until early April. There is scope for preliminary meetings and early work before then, but it is unlikely that substantive work could begin until April.

The time frame after that depends a lot on what is discovered at the preliminary meetings, the final agreed methodology for the project, and the progress of ethics applications. It is proposed that a preliminary time frame be agreed between the project team and Gallery officers once the methodology has been agreed. As a guide, if it is decided not to pursue the matching with the cancer registries, the project is likely to be completed in July. If matching with the cancer registries is conducted, the project will probably not be completed until the end of the year. There will be a lot of time taken up with the ethics processes, but most of the extra time will be because the team will be waiting for responses, rather than the proposals requiring much extra work from the project team.

Therefore, it is proposed that there be a preliminary meeting in mid-March between the project team and the Gallery officer, in order to discuss the methodology in more detail. The project will commence in detail in mid-April.

Dates for progress reports, teleconferences and other discussions, as required, will be as mutually agreed.

BUDGET

It is not possible to provide a definitive budget for the project at this point because there are too many uncertainties. However, an indicative budget can be provided by considering each aspect of the project, based on work on similar previous projects in the past. This is shown below. The costs for professional services are based on costs of \$1,500 per day for T Driscoll, \$1,300 per day for G Foster and \$500 per day for the research officer. The costing assumes that only the ACT and NSW registries are approached for data. If all registries are to be approached, the time allocation for part 2) will be considerably increased, but not by a factor of six (there are six other cancer registries), as there will be some time saving arising from the (hopefully) overlap of ethics consent form content. Note that these are indicative costs only and are not meant as a final tender.

In addition to the costs indicated here, there would be some administrative costs for things such as computing, copying/fax/postage/calls, printing, and obtaining literature and other information. These would not be large (likely to be \$1,000 or less).

Also, no allowance has been made for travel, as it is proposed this would be covered by the NGA, either directly or through reimbursement.

It is suggested that the budget below be used as an indicator of costs, with the final costs to be as agreed once the details of the project are agreed. Similarly, the payment schedule can be worked out once the details are agreed, but this would usually be along the lines of 30% at the beginning of the project; 30% on submission of the draft report; and 40% on submission of the final report.

Indicative budget for project

Task	Study personnel (days)		
	T Driscoll	G Foster	Research officer
1) Preliminary and later discussion with all interested parties and review of documents	5	3	2
Attending meetings (including travel)			
Reviewing documents			
2) Identification and characterisation of cases	3	0	5
Initial contact with registries, preparing and revising ethics applications	2		4
Supplying information to registries, clarifying data anomalies, receiving data			1
Writing methodology	1		
3) Epidemiological assessment	6	0	1
Preparing data files on NGA staff	1		1
Obtaining population cancer incidence data	1		
Preparing population data	1		
Calculating and comparing incidences	2		
Writing methodology and results	1		
4) Literature review of causes of identified cancers	5	0	2
Identifying and obtaining literature	1		2
Reviewing literature	2		
Writing critical appraisal	2		
5) Hygiene assessment and literature review	6	5	2
Reviewing documents	1	1	
Worksite inspections and discussions with relevant staff		3	
Writing report		1	
Identifying literature	1		2
Reviewing literature	2		
Writing critical appraisal	2		
6) Assessment of temporal plausibility	1		
Review of employee data	1		
7) Overall assessment	2		
Review of all information and results			
Writing overall assessment			
Making recommendations			
8) Other aspects of project and preparation of final report	3	2	2
Estimated total time (days)	31	10	14
Estimated costs for study personnel (Pre-GST)	\$46,500	\$13,000	\$7,000

RESEARCH TEAM MEMBERS' ROLES, KNOWLEDGE AND EXPERIENCE

(i) Roles

This project requires extensive epidemiological experience; a detailed knowledge of occupational medicine and occupational health and safety and public health; skills to enable relevant literature to be identified, appraised, summarized and synthesized; detailed knowledge and experience in occupational hygiene; and experience interacting with relevant persons in public authorities. The project team has been assembled to maximise the strengths in these areas. Both key members of the proposed project team are very well qualified to undertake the project. Their relevant experience documented below.

The project will be led by **Dr Tim Driscoll** (MBBS BSc(Med) MOHS PhD FAFOM FAFPHM). Dr Driscoll will be responsible for the majority of the work on the project, including review of available documentation; discussions with current and former staff, Gallery officers and union representatives; literature identification and review; epidemiological analysis; contact with agencies; and preparation of most aspects of the report. In addition, **Mr Gary Foster** (BSc MSc), who is an experienced occupational hygienist, will provide the occupational hygiene expertise in the project. His main task will be leading the worksite inspections, reviewing the available information from previous hygiene surveys, and providing high level advice on occupational hygiene issues. The research officer for the project will probably be **Ms Felicity Driscoll**.

(ii) Knowledge and experience

Dr Driscoll is a specialist in occupational medicine and public health medicine, who until 2001 was head of the Epidemiology Unit at NOHSC. He is also a fellow of the Australasian Faculty of Occupational Medicine and the Australasian Faculty of Public Health Medicine, and now works as an independent consultant in occupational health and public health. Recent clients include the World Health Organisation, the Office of Australian safety and Compensation Council (OASCC - previously NOHSC), the New Zealand Department of Labour, and the University of New South Wales Injury Risk Management Centre. Dr Driscoll has expert knowledge and experience in the development of, and the use, analysis and reporting of, data from various occupational and general measurement and evaluation systems and has a PhD in the epidemiology of work-related fatalities.

Dr Driscoll has recently provided expert advice on the investigation of a possible occupational cancer cluster at a University, and was a member of the Expert Medical Panel of the West Australian Government that was convened to investigate aspects of chemical use by Kimberley pesticide workers, which included consideration of whether the incidence of cancer in the workers was higher than would have been expected, given the incidence in the general community. He has recently been involved in occupational aspects of the World Health Organization Global Burden of Disease Comparative Risk Assessment project, being responsible for producing the sections on occupational carcinogens and occupational exposure to particulates². This project required identifying and using sources of data on work-related exposures, including the CAREX database that provides estimates of exposure to various workplace carcinogens. He was also the key investigator of a recent detailed study of the burden in New Zealand of occupational disease and injury. Dr Driscoll has also been involved in a number of large-scale data measurement projects (such as the second work-related fatalities study and the National Coronial Information System) and reviews of broader OHS data issues (such as components of the Lucas Heights Research Reactor Review, the Forestry Industries Review, Australian Construction Industry Process Measures project, and the New Zealand Injury Data Review).

Mr Foster has had 22 years experience as an occupational hygienist gained mostly in the Occupational Hygiene Unit at NOHSC, where he worked from 1983 to 2001. He has been

² See Concha-Barrientos M, Nelson DI, Driscoll T, Steenland NK, Punnett L, Fingerhut M, Prüss-Ustün A, Corvalan C, Leigh J, Punnett L, Tak SW. Selected occupational risk factors. In: Ezzati M, Lopez AD, Rodgers A, Murray CJL eds. *Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors*. Geneva, World Health Organization, 2004:1651-1802.

managing his own hygiene consultancy since leaving NOHSC. Mr Foster has degrees in chemistry (BSc) and acoustics (MSc) and is a full member of the Australian Institute of Occupational Hygienists and a Certified Occupational Hygienist (COH). He has conducted a wide range of workplace assessments and consultancy for industry and Government clients. He has trained other occupational hygienists and OHS professionals and has carried out many research projects on topics including noise, pesticides, solvents, dusts and whole-body vibration. His expertise covers a wide range of hazards including noise, chemicals, dusts, heat stress and thermal comfort, lighting and human vibration. Through NOHSC, Mr Foster has worked for the International Labour Organisation in Africa, Vietnam, Indonesia, China and Thailand, where he developed train the trainer courses in occupational hygiene for factory inspectors. Details of Mr Foster's consultancy are included in an attached document.

Ms Driscoll has a Bachelor of Arts degree and a professional background in human resources and as an office manager for an anaesthetist. She has experience in general office and project administration.

(iii) Selected publications of particular relevance to this project

Full publications

- Driscoll T, Takala J, Nelson DI, Steenland K, Corvalan C, Fingerhut M. Review of estimates of the global burden of injury and illness due to occupational exposures. *American Journal of Industrial Medicine*, 2005: In press.
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- Chu C, Driscoll T, Dwyer S. The health-promoting workplace: an integrative perspective. *Aust NZ J Public Health* 1997;21:377-385.
- Driscoll TR. Health effects of occupational exposure to hazardous substances in Australia: putting criticisms of the Kerr Report into perspective. *JOHS Aust NZ* 1997; 13(4):341-352.
- Driscoll TR, Hanson, M. Work-related injuries in apprentices. *Aust NZ J Public Health* 1997;21(7):767-771.
- Hull B, Leigh J, Driscoll T, Mandryk J. Factors associated with occupational injury severity in the NSW underground coal mining industry. *Safety Science* 1996;21:191-204.
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AVAILABILITY

As mentioned earlier, the proposed members of the project team are committed on projects until early April. There is scope for preliminary meetings and early work before then, but it is unlikely that substantive work could begin until April.

It is proposed that there be a preliminary meeting in mid-March between the project team and the Gallery officer, in order to discuss the methodology in more detail. The project could then commence in detail in mid-April.

REFEREES

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Occupational Hygiene & Environmental Services Provided

OCCUPATIONAL AND ENVIRONMENTAL NOISE

- o Occupational noise surveys & noise contour mapping
- o Environmental noise – EPA compliance, machinery monitoring
- o Noise control design – enclosure, damping, process modification
- o Noise management programs
- o Screening Audiometry to AS1269 requirements

OCCUPATIONAL HYGIENE AND ENVIRONMENTAL

- o Monitoring workplace hazardous substances including dusts, mists, vapours and gases
- o Dangerous Goods
- o Risk assessment of hazardous substances to WorkCover Regulations
- o Chemical handling and storage, inventories, MSDSs
- o Ventilation assessment & general exhaust ventilation design
- o Walk through occupational hygiene surveys
- o Control solutions and respirator selection
- o Lighting surveys
- o Heat stress and thermal comfort
- o Cold stress
- o Indoor air quality & air conditioning systems evaluation

VIBRATION

- o Whole-body vibration assessment
- o Hand-arm vibration assessment
- o Machine condition monitoring
- o Building & ground vibration

OH&S MANAGEMENT SYSTEMS

- o Preparation of OH&S Policy and Procedures manuals
- o Auditing OH&S management systems to AS 4801 and compliance audit to the new WorkCover OH&S Regulations 2001

RISK ASSESSMENTS

- o Full workplace risk assessments for occupational health & safety

Consulting Staff

GARY FOSTER - Principal Consultant

B.Sc. (Chemistry) Sydney University, M.Sc. (Acoustics) University of NSW

Full member Australian Institute of Occupational Hygienists

Certified Occupational Hygienist

Gary is an experienced occupational hygienist having conducted numerous occupational hygiene and environmental surveys covering a broad range of hazards including noise, chemicals, dusts, heat stress and thermal comfort, lighting and vibration. While at WorkSafe Australia he conducted research on a diverse range of topics and taught hygiene to post graduate students. He has participated on WorkSafe Australia and Standards Australia committees and was part of the team who developed the National Standard and Code of Practice for Noise which has since been adopted by WorkCover as the NSW Noise Regulations and Code of Practice. He has run his own consultancy since 2000.