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Statement on Cancer Clusters

This statement provides information about cancer clusters and is intended to support guidelines issued by State and Territory Health Departments and Cancer Councils.

Background

Cancer is common in the Australian community. The lifetime risk of developing cancer is one in two for males and one in three for females.[1] Cancer is not a single disease but a group of more than 100 different diseases. Each type of cancer has its own risk factors and causes and there is wide variation in the success with which different cancers can be treated.

Cancer clusters are often suspected initially on the basis of anecdotal evidence. They rarely involve more than one type of cancer and most suspected cancer clusters are not confirmed on investigation.[2]

Cancer clusters for which a common environmental cause is identified are very rare,[3] although there are historical cases of cancer clusters linked to occupational and environmental hazards such as mesothelioma in asbestos workers.[4]

What is a cancer cluster?

A cancer cluster is the occurrence of a greater than expected number of cancer cases within a group of people in a geographical area over a period of time. The identification of a cluster using this definition does not necessarily imply that there is a causal agent, because cancer events can occur by chance. It does, however, indicate the need to assess whether the cluster can be related to factors other than chance.

NHMRC considers that for a detailed assessment to be undertaken, the following features would need to be present:

1. Type of cancer

The cancers are of the same or related types (for instance they are all types of breast cancer or they are all types of leukaemia). Where unrelated cancers arise, their occurrence is likely coincidental, because different cancers are generally not caused by the same specific agent.

2. Occurrence

There is a higher than expected number of cancer cases in the population, taking into account population size, age and gender, and the period over which the cancers have appeared.[5] Because cancer is common, a group of cancer cases can occasionally be expected to occur by chance within a small population. Expected numbers of a type of cancer in a population can be estimated using reports from the Australian Institute of Health and Welfare[1, 6] or local cancer Registries. However in small populations the number of cases may be too small for meaningful statistical analysis.

3. Lifestyle, occupational and environmental exposures

Initial investigation suggests that the population has been exposed to known or suspected carcinogens (any agent that causes cancer), and the duration and level of exposure could reasonably be expected to give rise to the incidence and type of cancer observed.

Although an identifiable cause may or may not be found, a suspected cancer cluster is more likely to be confirmed as a cluster rather than a coincidence, if:

- there are a large number of cases of the same type of cancer
- the cases occur in an age group not usually affected by the particular cancer
- a rare type of cancer is involved.[2]

Assessing suspected cancer clusters

Assessments of suspected cancer clusters should be conducted in accordance within State/Territory guidelines and frameworks.

Acknowledging that jurisdictions have different approaches to the assessment of cancer clusters, NHMRC recommends the following principles when assessing suspected cancer clusters:

1. Response to inquiry

The combination of a variety of factors can create the appearance of a cluster[2] and most reports of a suspected cancer cluster can be resolved when they are first reported. State and Territory agencies (usually the State/Territory Department of Health) should collect the following *epidemiology* (incidence and prevalence of disease) and the *hazard assessment* information on the suspected cluster to determine whether further assessment and evaluation should occur.

Epidemiology – Description of suspected cluster cases

- How many known cases of cancer?
- What types of cancer?
- From what population have the cases arisen?
- When were the cancers diagnosed?
- What broader population can be used to assess the expected number of cases?
- Does the number of cases potentially exceed the expected number?

Hazard Assessment – Description of exposures (lifestyle, occupational and environmental)

- What exposures are people concerned about?
- Is there a way of measuring those exposures?
- Did the cancers develop after the cases were exposed to the suspected agent?
- Can known or suspected occupational and/or environmental risk factors for the particular tumour be identified?
- Have lifestyle risk factors been identified (e.g. smoking, alcohol consumption, drugs, exposure to sunlight or other forms of radiation or chemicals)?

The vast majority of suspected clusters are determined not to be cancer clusters during the initial inquiries because the epidemiology fits within the general population profile, or exposure to a known or suspected hazard cannot be identified. Further investigation is not warranted unless the increase in cancers is substantially higher than the normal occurrence of cancer of a particular type, or the increase cannot be explained by exposure to known carcinogens such as smoking. However, the detection of significant epidemiological and exposure concerns would indicate the need for further assessment.

Throughout the assessment the investigating agency (usually State/Territory Health Departments) should maintain communication with the concerned party and informants about the inquiry and advising the next steps in the investigation. This can help to allay unnecessary concern and alarm.

2. Cluster assessment

If not resolved at the initial point of inquiry, it may be necessary to appoint a cluster manager to undertake a staged assessment to determine whether a cluster has occurred, or is occurring. The cluster manager must determine what data needs to be collected, including expert epidemiological, occupational and environmental health assessments. Additional considerations may also include broader social, political and economic factors relevant to the situation. It is important for the cluster manager to establish a supportive relationship with the informants and liaise with the relevant stakeholders. Part of the cluster manager's role is to provide all stakeholders with a written response, either finalising the case or advising that further assessment of a suspected cluster is warranted, based on epidemiological and exposure concerns.

3. Further assessment

If the cluster assessment indicates a cluster is present, further assessment is needed to determine whether the cluster can be related to factors other than chance. Although the science of cancer cluster assessment is complex, it is important to communicate the findings of further assessment to the public in a way that is clear, balanced, and scientifically correct.[7]

4. Monitoring

In some cases a cause for the cluster cannot be identified and monitoring of cancer incidence in the population which has experienced the cancers may be recommended.

5. Reporting

The agency should report outcomes of the cancer cluster assessment to relevant jurisdictional agencies in accordance with State or Territory guidelines. A copy of the assessment report should also be provided to the concerned parties and informants.

The assessment process should be conducted thoroughly and documented appropriately.

References

1 AIHW (Australian Institute of Health and Welfare) & AACR (Australasian Association of Cancer Registries), Cancer in Australia: an overview, 2008. Cancer series no. 46. Cat. no. CAN 42. Canberra: AIHW, 2008.

2 National Cancer Institute, US National Institutes of Health, Cancer Clusters Fact Sheet, www.cancer.gov/cancertopics/factsheet/Risk/clusters, 2006 (accessed 13 July 2010).

3 Thun MJ and Sinks T, Understanding Cancer Clusters, CA: *A Cancer Journal for Clinicians*. 2004;54:273-280.

4 Milne JEH, Thirty-two cases of mesothelioma in Victoria, Australia: a retrospective survey related to occupational asbestos exposure, *British Journal of Industrial Medicine*. 1976;33:115-122.

5 Rothman KJ, Greenland S, Lash TL (eds), Modern Epidemiology (3rd edition). Wolters Kluwer, Philadelphia, 2008.

6 Australian Institute of Health and Welfare, Cancer Australia & Australasian Association of Cancer Registries, Cancer survival and prevalence in Australia: cancers diagnosed from 1982 to 2004. Cancer Series no. 42. Cat. no. CAN 38. Canberra: AIHW, 2008.

7 Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Environmental Hazards and Health Effects, Cancer Clusters Frequently Asked Questions, http://www.cdc.gov/nceh/clusters/faq.htm (accessed 13 July 2010).