What is a cancer cluster?

The term ‘cancer cluster’ refers to the occurrence of a specific cancer in more than the expected number of cases within a group of people in a geographic location over a period time. Suspected clusters are often reported by members of the general public who are concerned when an unusually high number of cancer cases is diagnosed in their family, friends, neighbours or co-workers.

Cancer is a common group of about 100 diseases. In Queensland in 2008–12, one in every two males and one in every two females will develop cancer by the age of 85 years. These figures show the unfortunate reality that cancer occurs more often than many people realise, and occasionally this is found in a confined location such as a community or a workplace.

Who responds to an enquiry about a reported cancer cluster?

Queensland Health’s Hospital and Health Service public health units are the primary contact points for reporting a suspected cluster of non-communicable disease such as cancer. An experienced public health practitioner is responsible for conducting an assessment of reported suspected cancer clusters.

What is the purpose of an assessment of a reported cancer cluster?

The purpose of a Queensland Health assessment is to determine whether, based on the most current information about cancer, the reported number of cancer cases is significantly higher than the expected incidence of cancers in Queensland. If the number of cases is above the expected level, the assessment will examine whether this is associated with a carcinogenic, or cancer-causing, risk factor that may be present within the neighbourhood or workplace where the cases occurred. If so, this triggers a hazard-exposure assessment to examine whether exposure to any known cancer risk factors at the place of concern are linked to the occurrence of the cancer.

What cancers are included in a cluster assessment?

Under the Queensland Health Guidelines: Assessment of Clusters of Non-communicable Disease 2012, suspected clusters of any malignant cancers require public health assessment. Cancers that are non-malignant such as non-melanoma skin cancers and ductal carcinoma in-situ (DCIS) of breast are not included because the lack of reliable population data for these conditions makes comparison difficult.
**How is the assessment done?**

When there is an enquiry from a concerned individual or agency, Queensland Health staff undertake an assessment of the suspected cancer cluster as defined by the Queensland Health Guidelines: Assessment of Clusters of Non-communicable Disease 2012.

Basic information is gathered about the number of cases, age, sex, address, occupation, period of work or residence, age at diagnosis of cancer, type of cancer, the population potentially at risk (for example, all employees in the workplace) and any suspected exposure to potentially cancer-causing elements based on current knowledge.

This information is evaluated and the number of cases that could be expected if the population within the suspected cluster had the same risk profile as the Queensland population is estimated. The expected number of cases is then compared with the reported number of cases.

If the reported number of cases is greater than the expected number of cases, the assessment will determine whether the reported cancer cases were associated with their common exposure to elements or hazards present at the relevant neighbourhood or workplace, or whether the apparent cluster could have occurred by chance alone.

In most cases, assessments are resolved at the evaluation of the basic information.

**When is a suspected cancer cluster likely to be a confirmed cancer cluster?**

What is suspected to be a cancer cluster at first impression may not be confirmed as a cluster even if an assessment shows that the number of cases is greater than the expected range for the population. Historically, most suspected clusters are found to have occurred by chance alone, and they rarely have an identifiable cause. In only 5%–15% of suspected cancer clusters is the difference between the reported number and the expected number, based on the state rates, found to be statistically significant. This is because a variety of factors often work together to create the appearance of a cluster when in fact nothing abnormal is occurring.

A suspected cancer cluster is more likely to be a confirmed cluster if:

- the cases are all one type of cancer, rather than different types
- it is a rare type of cancer
- it is a type of cancer that is not usually found in a certain age group
- there is a significant exposure to a known carcinogen.

**Can cancer clusters occur by chance?**

Yes.

Cancer incidents do occur randomly. Even if there are more people with one type of cancer in a community than might be expected, it cannot be assumed that each person’s cancer was caused by exposure to a common cancer-causing agent in the environment. The cluster may have occurred simply by chance as a pattern of random distribution. There is a tendency for people to see patterns in random events and conclude a connection to a common exposure, particularly when more than one of their relatives, neighbours or workmates have cancer of the same or even different type.

We tend to isolate a perceived cluster from its context without considering the pattern of random variation. This is known as the ‘Texas Sharpshooter Fallacy’ (he shoots at the side of a barn and then draws a bull’s-eye around the bullet holes). Similarly, we might notice a number of cancer cases, then draw our population base around the smallest area possible, without considering that the cases actually come from a much larger population.
Does the confirmation of a cancer cluster suggest the presence of a causal agent?

No.

Confirmation of a cancer cluster does not necessarily mean that a hazardous carcinogen is present at the geographic location under assessment. The epidemiological and environmental assessments often result in inconclusive evidence, based on current knowledge, of the presence of any known chemicals or other elements in sufficient quantities to cause cancer. The assessment of a cancer cluster is extremely complex due to a lot of uncertainty around identification and measurement of risk factors and sufficient, prolonged exposure to those risk factors often for decades. The assessment of environmental factors in the workplace or community in recent suspected cancer clusters has so far told us little about their relationship to the cancer cases. Moreover, not all risk factors could be known.

A confirmed cancer cluster could therefore be the result of any of the following:

- chance due to random variation
- differences in the case definition between reported cases and expected cases
- known causes of cancer, such as smoking
- unknown causes of cancer.

What needs to be considered when reporting a suspected cancer cluster?

Understanding cancer is important to understanding cancer clusters. When considering the possible existence of a cancer cluster in a particular area, it is important to also consider these facts:

- Cancer is a common disease, affecting one in two men and women in Queensland in their lifetime. Because of this, cancer rates are very variable in small populations and rarely match the overall rate for a larger area, such as the state. So, for any given period of time, some populations have rates above the overall state rate and others have rates below the overall rate. Even when there is an excess, this may be completely consistent with random variability.
- Cancer is not a single disease, it is a group of more than 100 different diseases, each with different risk factors and causes.
- Everyone is at risk of cancer at any age but the risk increases with age. Cancer rates vary by age, race, gender, risk factors and type.
- Environmental factors account for a small percentage of all cancers.
- Cancer is not infectious.
- Cancer does not develop immediately after contact with a carcinogen. It can be 10 to 30 years or even more between exposure to a carcinogen and diagnosis of cancer. This makes it very difficult to establish what caused the cancer.
- School and office environments generally do not contain significant hazardous exposures. Asbestos can be a concern in older buildings. Exposure to asbestos is known to cause lung cancer and mesothelioma, but it is not known to cause breast cancer, colorectal cancer or brain cancer which are the types of cancer more likely to be reported by people in these environments.

What is the process for reporting a suspected cancer cluster?

If you suspect a cancer cluster, you should contact the Hospital and Health Service public health unit in your region. https://www.health.qld.gov.au/system-governance/contact-us/contact/public-health-units/default.asp
What are some other sources of information about cancer clusters?

More information on cancer clusters can be found on the websites listed below.


5. Centers for Disease Control and Prevention (US) [www.cdc.gov/ncdh](http://www.cdc.gov/ncdh)

6. World Health Organization [www.who.int/cancer](http://www.who.int/cancer)

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