

Report of the Expert  
Medical Panel to Evaluate  
Recommendations of *The  
Kimberley Chemical Use Review*

Short Report

## BACKGROUND

In 2001, the West Australian Government asked Dr Andrew Harper to report on the health concerns of people who worked for the Kimberley weed spraying program run by the Agricultural Protection Board (APB) between 1975 and 1985. The spray program used two herbicides, 2,4,5-T and 2,4-D, to kill weeds.

Dr Harper's report, *The Kimberley Chemical Use Review*, stated that illness did develop in association with the herbicides used in the spray program, but made it known that his review was not a scientific investigation designed to test specific questions of disease causation such as the relationship between herbicides and ill health.

The Government established an Expert Medical Panel to investigate whether Dr Harper's conclusion about an association between the herbicides and illness in APB workers was scientifically accurate.

The Expert Medical Panel consisted of five specialists, each with particular expertise relevant to the health concerns of the APB workers. The Panel was chaired by Professor Bruce Armstrong.

### Study methodology

The Panel's job was to advise on whether there was a cause-effect association between:

- the herbicides used in the Kimberley weed-spraying program; and
- illness reported by some of the former APB workers.

A cause-effect association is present when something that *may* be harmful to health, such as a chemical, is shown to *be* the cause of a disease or illness. Statistical tests are used to provide an indication of whether or not an observed association is likely to have happened by chance.

Finding out whether an association between exposure to a chemical and a disease or illness is a cause-effect association requires information on:

- whether the chemical could be harmful to human health;
- whether workers have had enough contact with it to experience harmful effects; and
- whether the amount or type of illness among workers is different to what would have happened if there had been no contact with the chemical.

## TOXICITY OF THE HERBICIDES

The Kimberley weed-spraying program used the chlorophenoxy herbicides 2,4,5-T and 2,4-D. The herbicide 2,4,5-T is usually contaminated with a dioxin called TCDD, which is formed when 2,4,5-T is being manufactured. 2,4-D does not contain TCDD.

### The Panel found

- TCDD *probably* causes cancer and almost certainly causes a skin condition called chloracne.
- TCDD *possibly* causes other illnesses.
- Since only 2,4,5-T is contaminated with TCDD, it is probable that any cancer-causing effect of the sprays (chlorophenoxy herbicides) is associated with 2,4,5-T, not with 2,4-D.

### How did the Panel reach these conclusions?

The Panel asked for an independent and thorough review of all the scientific research available about the human health effects of 2,4,5-T, 2,4-D and TCDD, including symptoms, illness and death.

The major findings of this review were:

Chloracne is a severe persistent skin rash that develops soon after exposure to dioxins. There is strong evidence for a cause-effect association between exposure to TCDD and chloracne.

TCDD may increase the rate of cancers in exposed people. There is scientific evidence of a *probable* cause-effect association between exposure to chlorophenoxy herbicides containing TCDD and the development of cancers in general, and two cancers, soft tissue sarcoma and non-Hodgkin lymphoma, in particular.

There is only weak scientific evidence of a cause-effect association between exposure to chlorophenoxy herbicides containing TCDD and illnesses other than cancer and chloracne. Illnesses where this weak association has been found are immune system disorders, diabetes, lipid and lipoprotein disorders and porphyria cutanea tarda (a rare skin disorder).

## WORKERS' EXPOSURE TO DIOXINS

### The Panel found

- The Panel could not rule out the possibility that some batches of 2,4,5-T used in the Kimberley had levels of TCDD that were higher than regulations permitted.
- The available scientific evidence does not support the claim that dioxins could have formed in drums of 2,4,5-T stored outdoors in the Kimberley.
- Measuring serum dioxin levels may provide information to support the epidemiological evidence for a cause-effect association between exposure to the herbicides and illness in APB workers.
- Evidence of the presence of chloracne in an APB worker would indicate that some of the workers had been exposed to high levels of dioxins. However, there is no present indication that chloracne has been diagnosed in any APB worker. A skin survey is not recommended.

### How did the Panel reach these conclusions?

Dr Harper's report presented evidence that the APB workers had high levels of contact with the herbicides they used.

The Panel asked for a report on the regulation of chlorophenoxy herbicides in Western Australia and the levels of TCDD in 2,4,5-T used in Western Australia. The report found:

The level of TCDD in 2,4,5-T has been regulated in Western Australia since 1976, in accordance with Australian standards.

Between 1976 and 1983, when 2,4,5-T was taken off the market by the manufacturer, new batches of 2,4,5-T were tested for TCDD levels. Of the 140 samples taken, six samples were found to have slightly more than the permitted level of TCDD. One faulty batch (two samples) was recalled; it is not known what happened to the other batches with more than the permitted level of TCDD.

A batch of fire damaged chemical used in the manufacture of 2,4,5-T was imported into Western Australia in 1971. This chemical is thought to have had high levels of TCDD. It is not known if it was ever used to make 2,4,5-T.

There is no evidence that Agent Orange as such was ever used in Western Australia.

The Panel asked for a report on the value of measuring levels of TCDD in the blood of APB workers. The report found:

A blood test done now could detect elevated TCDD body burdens in APB workers who sprayed herbicides if their blood levels were similar to those of other herbicide sprayers.

The Panel recommended that a survey of serum TCDD levels in APB workers and other people in the Kimberley be conducted. The survey might provide evidence of high exposure in APB workers, which would strengthen the conclusion of a cause-effect association between exposure to the chlophenoxy herbicides and ill health in the workers. However, the results would be unlikely to alter the Panel's other recommendations.

## THE HEALTH OF APB WORKERS

### The Panel found

- The number of deaths in APB workers is little more than expected based on death rates in a comparable population.
- The APB workers may suffer, or may have suffered already, an increase in the risk of cancer. The rate of cancer among APB workers was 48 per cent higher than among people not employed in the spray program. This finding is not statistically significant, that is, it could be a chance finding.
- A 48 per cent increase in the risk of cancer means that about 13 more cancers might be found in APB workers over the next 15 years than would occur in a similar population not exposed to herbicides. It is estimated there will be about three cancers a year among APB workers over the next 15 years instead of two cancers if they had not been exposed to 2,4,5-T.
- Little evidence was available to determine whether APB workers have experienced increased rates of illnesses other than cancer that could have been caused by exposure to chlorophenoxy herbicides containing TCDD.
- The symptoms of ill health the APB workers reported to Dr Harper do not form a pattern to suggest that they were directly caused by their exposure to chlorophenoxy herbicides during their employment in the spray program.
- The symptoms of stress and anxiety reported by the APB workers appear not to be greater than those in people of a similar age who were not employed in the spray program.

### How did the Panel reach these conclusions?

The Panel asked for a study of deaths and occurrence of cancer in APB workers compared with other groups in the Kimberley, and for a study comparing the symptoms that APB workers reported to Dr Harper with those reported by other exposed groups.

The study of *mortality* found:

Forty-nine deaths of APB workers between 1983 and 2001 were identified. The death rate in APB workers was nine per cent higher than in a comparable group of Kimberley men not employed in the spray program. This increase is small and could be a chance finding.

The study of *cancer rates* found:

Between 1983 and 2001 there were 17 APB workers diagnosed with cancer. The rate of cancer in APB workers was 48 per cent higher than in a comparable group of Kimberley men not employed in the spray program. Statistical tests found that this reported increase could be due to chance. However, an increase in the rate of cancer would be consistent with the known human health effects of exposure to TCDD.

The study of *non-cancer health effects* found:

There was no evidence that chloracne has been diagnosed in any APB worker.

There is little evidence available to assess whether non-cancer health effects possibly associated with exposure to TCDD, such as immune disorders, diabetes, lipid and lipoprotein disorders or porphyria cutanea tarda, are more frequent among APB workers than the general population. The evidence, however, that such conditions are caused by exposure to TCDD and associated chemicals is weak.

There was limited agreement between the symptoms reported by APB workers and those reported by other similarly exposed groups.

There was no evidence that symptoms of stress and anxiety were more common in APB workers than in the rest of the population.

## CONCLUSIONS

### Is there a cause-effect association between the herbicides and illness?

The Panel noted that confidence in the conclusions is limited by the lack of adequate exposure data and uncertainty about the extent to which the APB workers were exposed to TCDD. However, the following three conclusions were made about the cause-effect association between the herbicides and illness.

The APB workers may suffer or may have suffered already an increase in the risk of cancer due to their exposure to herbicides containing the dioxin TCDD in the spray program.

This finding is based on:

- The published evidence of a *'probable'* link between exposure to the chlorphenoxy herbicides containing TCDD and an increased overall cancer risk;
- The information from Dr Harper's review that the spray workers were highly exposed to the herbicide; and
- Evidence that the APB workers have experienced a somewhat higher rate of cancer than similar men in the Kimberley who were not employed in the spray program, although this finding could have been due to chance.

There was little evidence available to determine whether or not the APB workers have experienced increased rates of other conditions that might possibly be caused by exposure to chlorphenoxy herbicides containing dioxins.

The symptoms of ill health that the APB workers reported to Dr Harper do not form a pattern such as to suggest that they were directly caused by their exposure to herbicides during their employment in the spray program.

## Other recommendations of the Expert Medical Panel, in response to the Terms of Reference of their inquiry

The possible increased risk of ill health to APB workers, specifically cancer, should be acknowledged to the APB workers and their families.

Dr Harper's recommendation that the issue of compensation be considered is supported. While a diagnosis of cancer in APB workers could be a compensable condition, decisions relating to individual claimants would need to take into account a number of factors, just one of which would be the potential health impact of participation in the spray program.

A formal survey of blood TCDD levels should be conducted in APB workers and a comparison population in the Kimberley.

Health and medical care should continue to be made available to former APB workers through the Derby Aboriginal Health Service nurse support and liaison service.

The creation of new cancer screening or monitoring programs for APB workers is not recommended, but workers should be encouraged to take part in existing programs.

A stronger unified approach needs to be taken to control the use of pesticides in Western Australia.

## Glossary of key terms

### *Chlorphenoxy herbicide:*

Herbicides are chemicals used to control unwanted plants. The chlorphenoxy herbicides are a particular chemical class of herbicides.

### *2,4-D or 2,4 dichlorophenoxyacetic acid:*

One of the chlorphenoxy herbicides. 2,4-D is still sold in Australia and is not considered highly toxic.

### *2,4,5-T or 2,4,5 trichlorophenoxyacetic acid:*

One of the chlorphenoxy herbicides. 2,4,5-T contains trace amounts of the dioxin TCDD which is an unwanted contaminant produced during manufacture. The toxicity of 2,4,5-T is thought to be chiefly due to the TCDD contamination.

### *Dioxins:*

Organic compounds that are everywhere in the environment. Once ingested by humans they are stored in fat and persist for many years.

### *Rate:*

A rate is the number of people who experience a defined event (eg cancer, death) in a defined population in a particular time period.

### *Statistically significant:*

A statistically significant result means that the observed result is unlikely to be due to chance.

### *TCDD:*

One of the forms of dioxin, which is highly persistent and has been classified as a cancer causing agent.

## Accessing other reports

The Expert Medical Panel's full and summary reports are available from [www.ministers.wa.gov.au](http://www.ministers.wa.gov.au) on Agriculture Minister Kim Chance's homepage. The icon for the Panel's report is found on the top right hand corner of this homepage.

You may also email [fcasella@agric.wa.gov.au](mailto:fcasella@agric.wa.gov.au) or ring **1300 658 556** to obtain a copy of the full report.