

# The Science-Public Interface: Paritutu Serum Dioxin Study

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September 2005

# Outline

- 2,4,5-T manufacture in New Zealand
- Paritutu serum dioxin study
- Health implications?
- Challenges

# Manufacture of Herbicide 2,4,5-Trichlorophenoxyacetic Acid

- Former Ivon Watkins-Dow chemical plant in Paritutu, New Plymouth
- 1962 - 1987
- On site trichlorophenol manufacture from 1969
- TCDD formed during TCP manufacture remains as contaminant in 2,4,5-T
- 1 ppm TCDD until 1973 (0.1 ppm)
- 1986 release of estimated 70-735 mg TCDD



# Paritutu Serum Dioxin Study (ESR, 2005)

2 phases:

- 1) Community consultation
- 2) Blood testing of a potentially highly exposed group
  - Residence within 2 km east and 1 km south of IWD for  $\geq 1$  year between 1962 – 1987
  - No occupational organochlorines exposure or significant period outside New Zealand

# Paritutu Serum Dioxin Study (ESR, 2005)

- Selection from self-selected residents based on spatial, toxicokinetic and multi-pathway exposure modelling
- Results compared with Ministry for the Environment's national serum study from 1996-7 (projected to 2004)

You cannot  
be serious

Bad call  
sinks  
Serena CEO



e.g.

Charlotte's  
travel tips  
PLUS WEEKLY TV LISTINGS



# The New Zealand Herald

IVON WATKINS-DOW CHEMICAL PLANT INQUIRY

Thursday, September 9, 2004

Editorial edition

1000  
Sunday  
Supplements

## Report set to reverse years of denials on 2,4,5-T danger

By Bruce Taylor  
Political reporter

A report on the alleged negligence by Dow AgroSciences, Inc., in its manufacture of 2,4,5-T, a chemical plant in Waiuku suggested a range of health and environmental risks that could lead to legal action.

The company faces claims for years that it has been manipulating its use, says Michael Morrissey, and other documents.

In August 2003, Dow has been in the off-and-on process of preparing for today's release of the study and its findings from the environmental assessment of its Waiuku chemical plant, which houses the 2,4,5-T plant.

The study comes from the Justice and Environment Department — now Environment — and is to be the New Zealand's largest of its kind, which took 14 years to complete.

The report underscores the scale of safety issues in a general public health, product and will encourage new measures that protect 1.5 million of our New Zealanders.

The level of public health issues, in its first two weeks since its preliminary release,



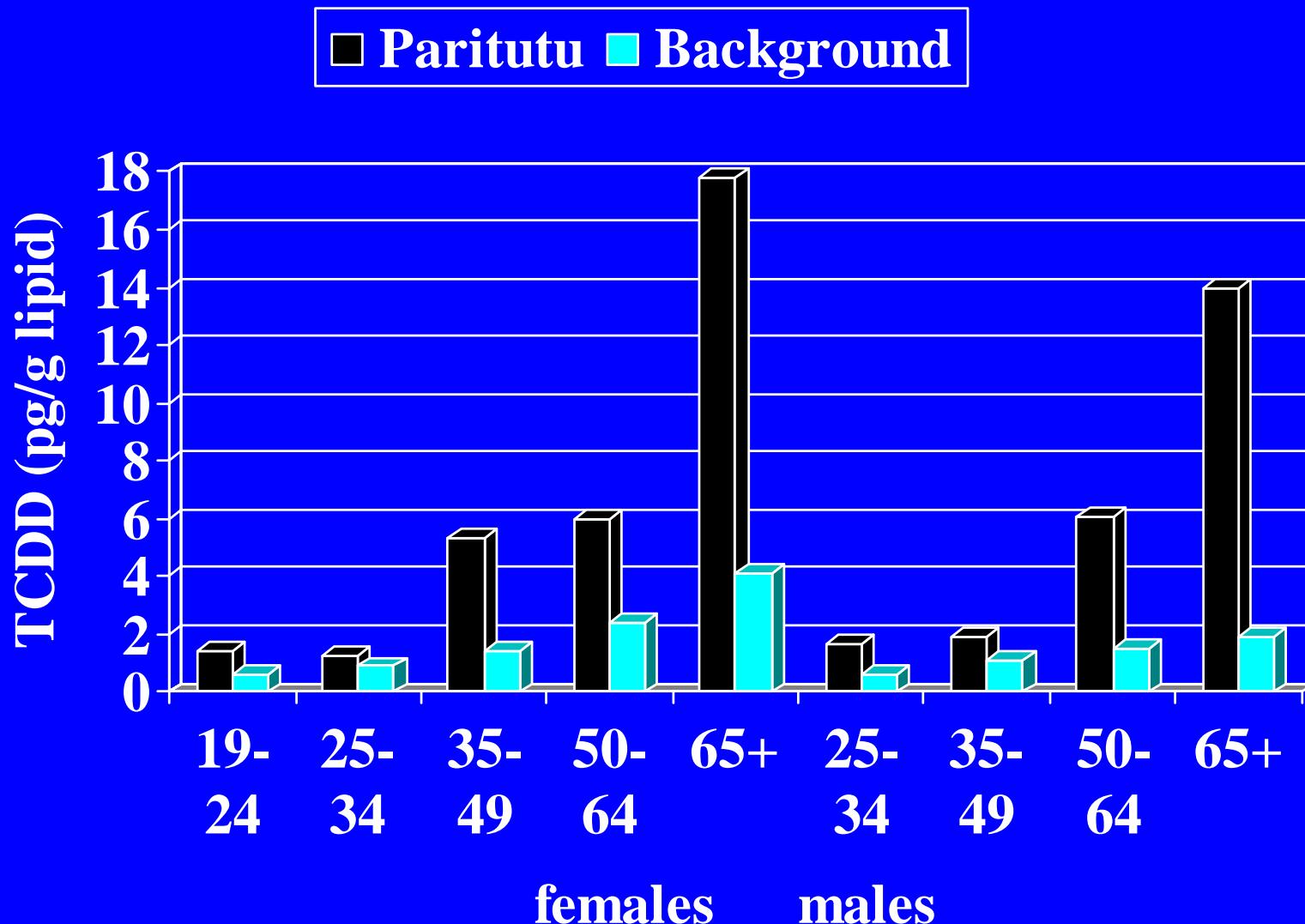
### HOW IT HAPPENED

- 1960 Dow AgroSciences (then called Dow Elanco) creates 2,4,5-T in Waiuku, New Zealand
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- 2004 Dow AgroSciences begins production of 2,4,5-T in Waiuku, New Zealand

# Results

- Mean TCDD level significantly elevated above background level for New Zealanders of same age and gender
  - mean TCDD 6.5 pg/g lipid
  - (expected 1.7 pg/g lipid)

# Mean TCDD by Age and Gender



# Duration of Residence 1962-1987

1)  $\geq$  15 years (n=15):

mean TCDD 14.6 pg/g  
(expected 2.4 pg/g)

2) < 15 years (n=37):

mean TCDD 3.2 pg/g  
(expected 1.5 pg/g)

# Conclusions

- Main exposure from fugitive aerial emissions with a small contribution from home-grown leafy vegetables and ‘exposed’ fruit
- Location (within 1km to east and 400 m to south of IWD) and duration of residence important
- Exposure unlikely to be result of a single release of TCDD

# Public Reaction

- *“In my opinion all this talk on dioxin is a load of bullshit”* (study participant)
- *“What we are dealing with is New Zealand’s Chernobyl”* (Dioxin Investigation Network)

# What Does This Mean for Health?

- Possible that TCDD levels found may have health consequences for individuals or may cause increased rates of disease, in particular cancer, on a population basis

# TCDD and Cancer

- International Agency for Research on Cancer
  - human carcinogen (1997)
  - strongest evidence for all cancers combined rather than specific sites
- Institute of Medicine
  - Sufficient evidence:
    - Non-Hodgkin's lymphoma
    - Hodgkin's disease
    - Soft tissue sarcoma
    - Chronic lymphocytic leukaemia (since 2002)

# Occupational Cohorts

	All Cancers	
	SMR	95% CI
Fingerhut et al, 1991	1.5	1.2-1.8
Becher et al, 1996	1.3	1.0-1.5
Hooiveld et al, 1996	1.5	1.1-1.9
Ott & Zober, 1996	1.9	1.1-3.0
Combined (IARC, 1997)	1.4	1.2-1.6
Koveginas et al, 1997	1.2	1.1-1.3

# Seveso Cohort (Bertazzi et al, 2001)

	All Cancers	
	RR	95% CI
<i>Zone A &amp; B</i>		
total	1.0	0.9-1.2
males	1.1	1.0-1.3
males 15-20 yrs latency	1.3	1.0-1.7
<i>Zone B</i>		
total	1.1	0.9-1.2

# Seveso Zone B and Paritutu

- Zone B (20 yrs after accident)
  - 1996 mean TCDD 11 pg/g; range 1- 62.6 pg/g (Landi et al, 1998; 1997)
- Paritutu (17 yrs after 2,4,5-T manufacture ceased)
  - 2004 mean TCDD 14.6 pg/g (residence  $\geq$  15 yrs 1962-87)

# What is the Cancer Risk?

- Highly uncertain cancer risk
- Estimated may be up to 10% above national cancer mortality rate for those who lived in most exposed areas  $\geq 15$  years from 1962 – 1987
- 10 % represents worst case scenario based on current knowledge

# Challenges

- Scientific uncertainty about health effects of TCDD
- Identification of 1962-1987 residents
- Small population
- Different stakeholder perspectives
- Communicating a small increase in cancer risk