The Science-Public Interface:
Paritutu Serum Dioxin Study

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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 ≥ 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

e.g. Charlotte's travel tips

PLUS WEEKLY TV LISTINGS

The New Zealand Herald

Best daily newspaper

Thursday, September 9, 2004

$1.20

IVON WATKINS-DOW CHEMICAL PLANT INQUIRY

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

HOW IT HAPPENED

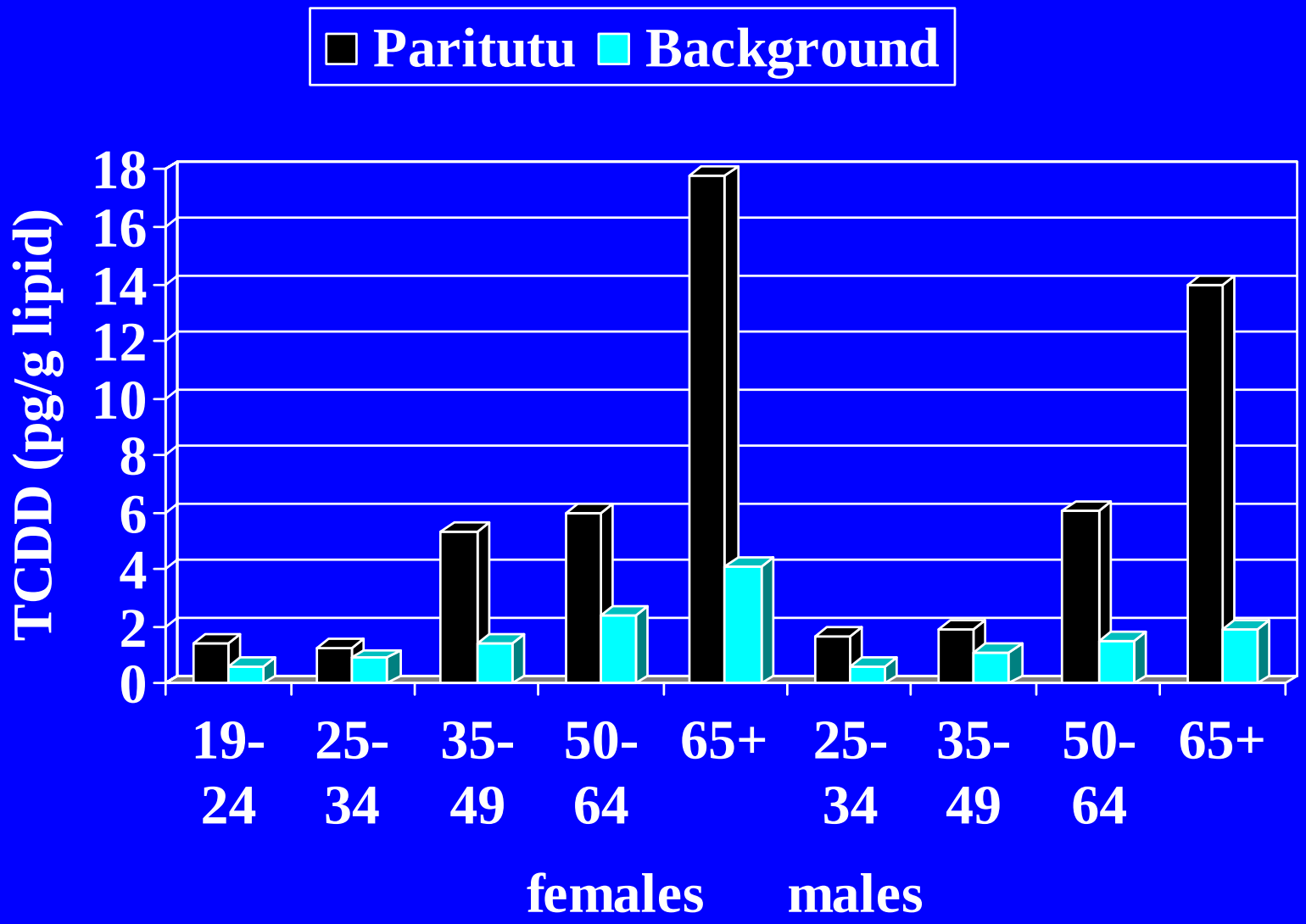
Results

- 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) ≥ 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
Zone A & B	
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
Zone B	
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 ≥ 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 ≥ 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