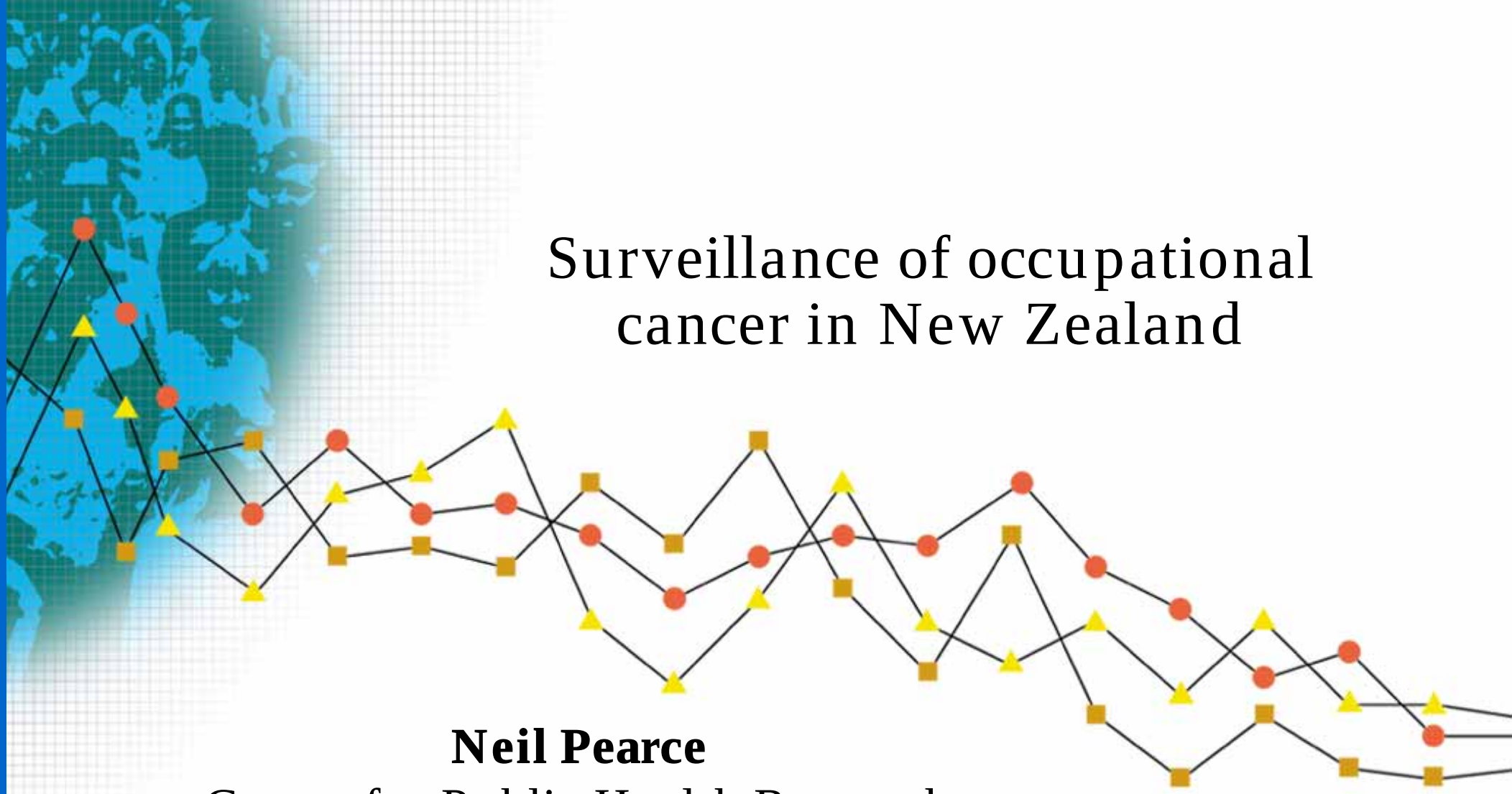
Surveillance of occupational cancer in New Zealand



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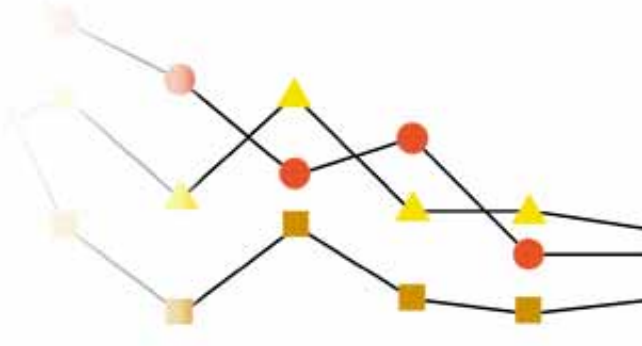
The OSH Occupational Cancer Project

Occupational Safety and Health, Department of Labour

- Dr Evan Dryson
- Dr Chris Walls

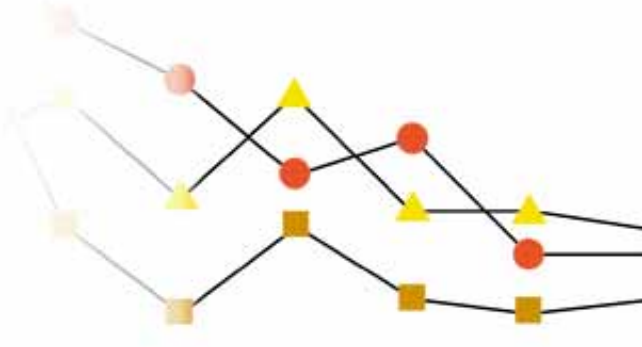
Centre for Public Health Research, Massey University

- Professor Neil Pearce
- Dr Dave McLean
- Dr Andrea ‘t Mannetje



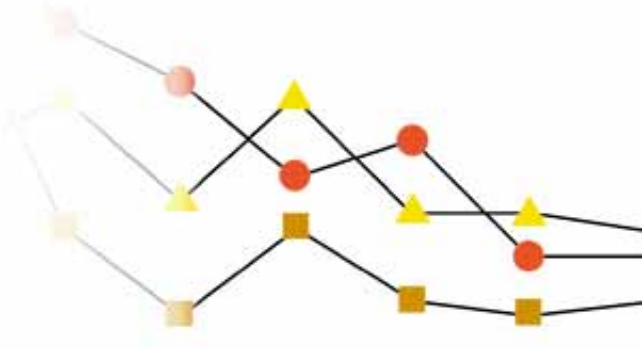
Occupational cancer in NZ

- Estimates from overseas studies
  - 237-425 deaths per year
  - 325-773 incident cases
- OSH NODS data for 1992-1997
  - 11 total
  - 2.2 per year
  - not including asbestos cancers
    - Mesothelioma 94 cases 1992-97
    - Lung cancer 49 cases 1992-97
- ACC data for 2001/2002
  - 4 cases compensated



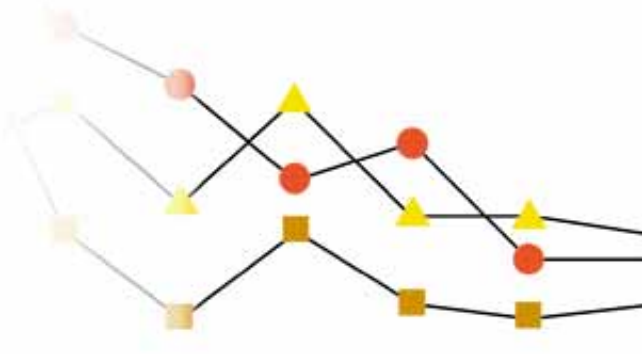
OSH Cancer Project – methods 1

- OSH notified by NZ Cancer Registry for all new cases of:
  - Bladder cancer (from January 2001)
  - Non-Hodgkin's lymphoma (from June 2001)
  - Leukemia (from November 2001)
- Aged 25 – 70 years
- Both genders
- Excluded if never worked in NZ



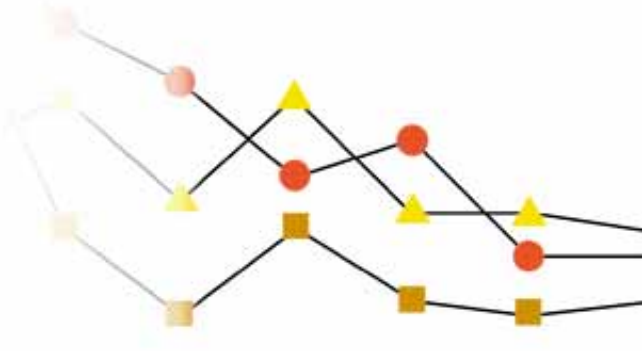
OSH Cancer project – methods 2

- Letter to clinician
- Letter to general practitioner
- Letter to subject
- Interview by OSH nurse
- File assessment by OSH Cancer Panel



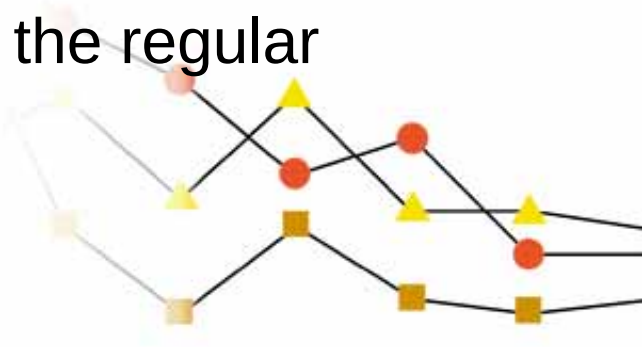
OSH Cancer Panel assessment

- Identification of occupational exposures (type, length, intensity)
- Reference to internationally published research literature
- Calculation of probability
  - Etiological fraction (EF) = RR-1/RR
    - for a probability of >50%, RR must be 2 or greater
- Classification (probable, possible, no)



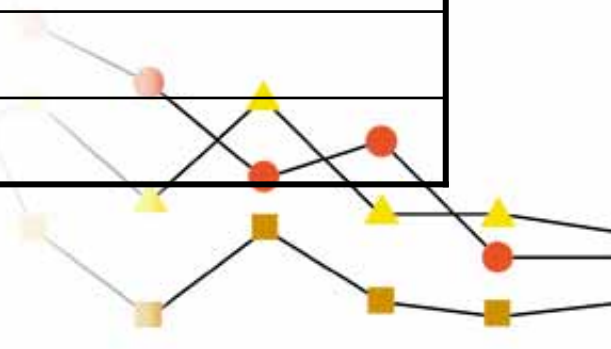
Interim results: Bladder cancer

- 210 cases of bladder cancer assessed for 2001 (48 female, 162 male)
  - 3 (6%) female cases considered to be probable and 1 (2%) possible occupational cancers
  - 45 (28%) male cases considered “probable” and 11 (7%) considered “possible” occupational cancers
  - These estimates are very similar to those that can be predicted from overseas studies
  - None of the cases were identified through the regular NODS system



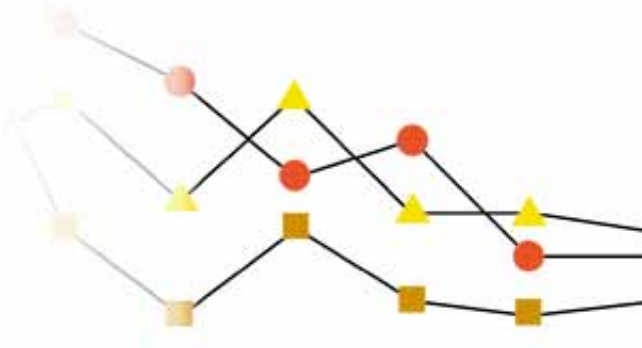
Male bladder cases n = 45

Occupation	No (%)	Possible carcinogen
Truck/heavy machinery	23 (51%)	Exhaust, diesel/petrol
Engineering/metal workers	8 (18%)	Cutting/cooling oils
Crop farming/orchardist	3 (7%)	Pesticides
Textile/leather	3 (7%)	Dyes
Painters/furniture	3 (7%)	Benzidine, etc
Plastics manufacture	2 (4%)	Dyes
Hairdresser	1 (2%)	Dyes
Analytical chemist	1 (2%)	PAHs
Retail sales	1 (2%)	Not known



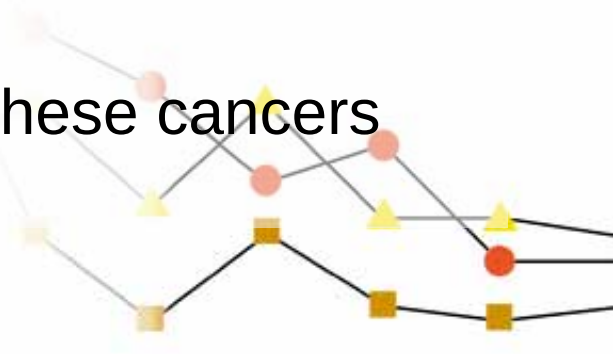
Occupational Cancer in Adult New Zealanders: Investigators

- Dave McLean – CPHR
- Andrea ‘t Mannetje - CPHR
- Neil Pearce – CPHR
- Fiona McKenzie (CPHR)
- Soo Cheng (CPHR)
- Evan Dryson – OSH
- Chris Walls – OSH
- Hans Kromhout – Utrecht University
- Paolo Boffetta – IARC, Lyon, France
- Aaron Blair – NCI, Washington, DC



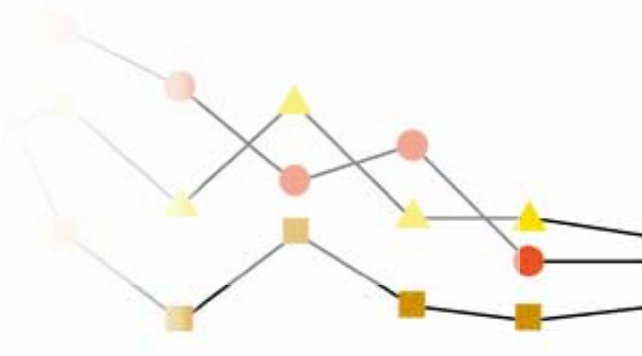
Occupational Cancer in Adult New Zealanders: Objectives

- To develop a New Zealand specific population-based job-exposure matrix
- To conduct a series of New Zealand Cancer Registry-based case-control studies of occupational factors as causes of bladder cancer, non-Hodgkin's lymphoma, leukaemia and lung cancer
- To quantify the proportion of cases of these cancers that are due to known occupational causes
- To identify additional occupational causes of these cancers



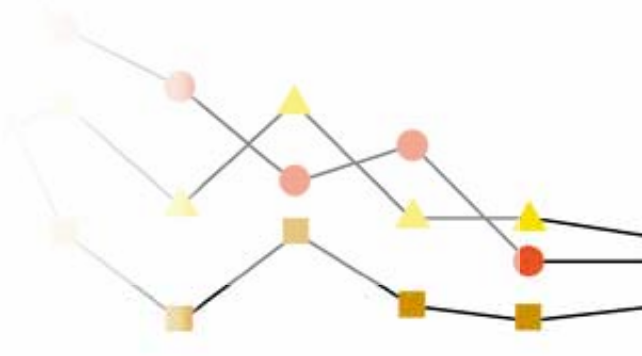
Occupational Cancer in Adult New Zealanders: Known causes

- Bladder cancer – polycyclic aromatic hydrocarbons (PAHs)
- Non-Hodgkin's lymphoma – phenoxy herbicides, chlorophenols
- Leukaemia – benzene
- Lung cancer - asbestos



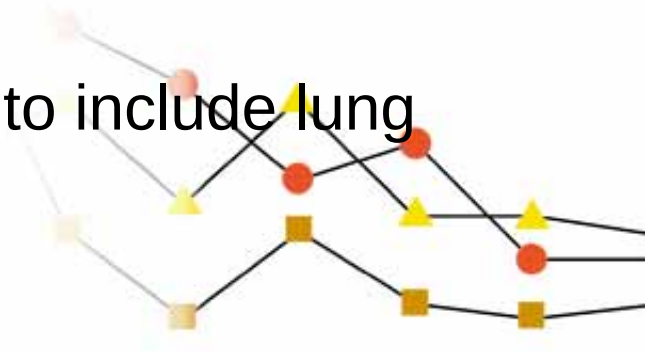
Occupational Cancer in Adult New Zealanders: Suspected causes

- Bladder cancer – arsenic, chromium, coke dust, cutting fluids, herbicides, oils, petroleum, zinc, hairdressing
- Non-Hodgkin's lymphoma – meat processing, farming, metal working, wood working, pesticides, hairdressing
- Leukaemia – electromagnetic fields, meat processing, pesticides, engine exhausts, petroleum
- Lung cancer – meat processing



Occupational Cancer in Adult New Zealanders: Methods

- Interviews are already routinely being conducted with all adult *cases* of bladder cancer, non-Hodgkins lymphoma and leukemia
- We will select population *controls* at random from the New Zealand Electoral Roll and conduct identical interviews with them
- Both sets of interviews will involve a full occupational history and we will develop a job-exposure matrix to assess specific occupational exposures
- More recently, the study has been extended to include lung cancer



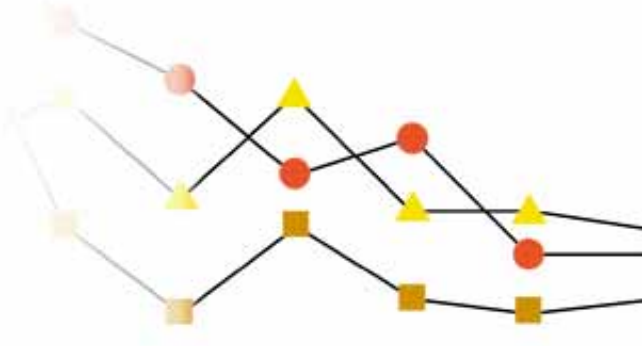
The OSH Occupational Cancer Project

Opportunities

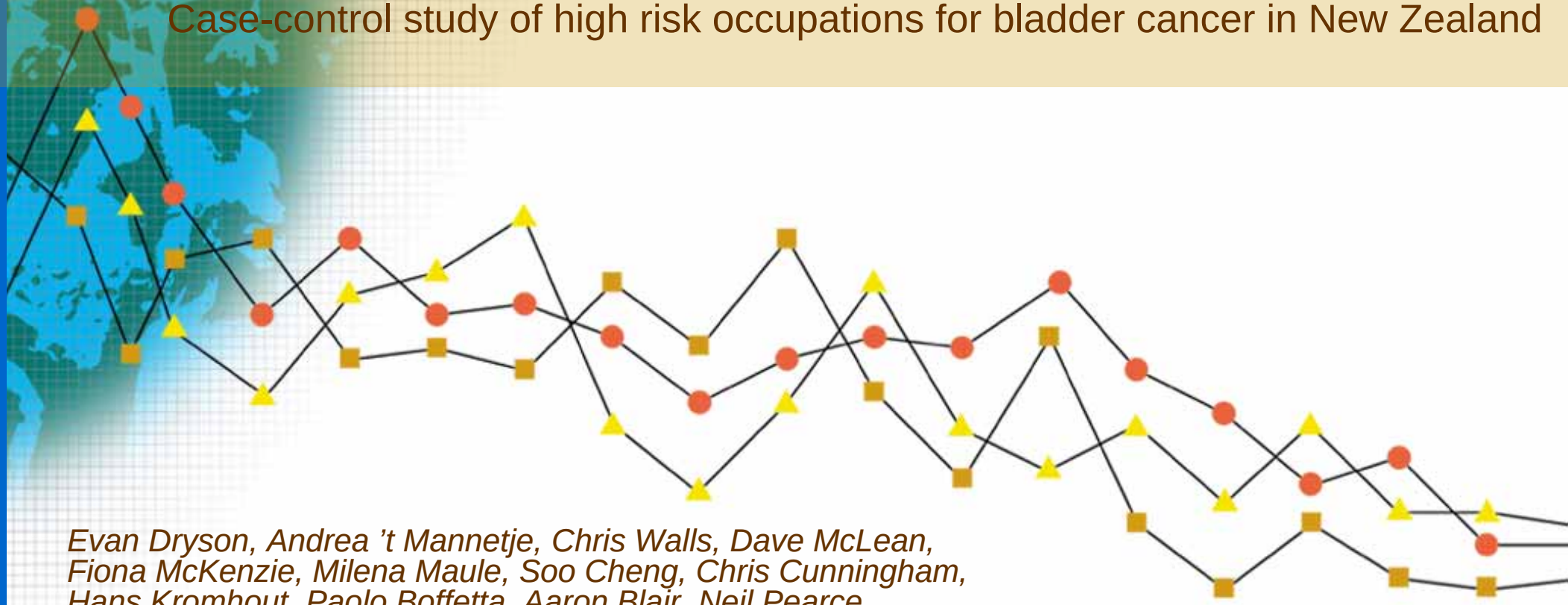
- Cancer registration is compulsory
- Almost all cases are identified
- The sites can be varied
- Raises awareness
- Can potentially be used for compensation
- Considerable potential for research

Difficulties

- Relatively expensive
- Difficulties with data collection
- Difficulties in taking action about exposures
- Clinician resistance
- Difficulties with compensation (ACC)



Case-control study of high risk occupations for bladder cancer in New Zealand



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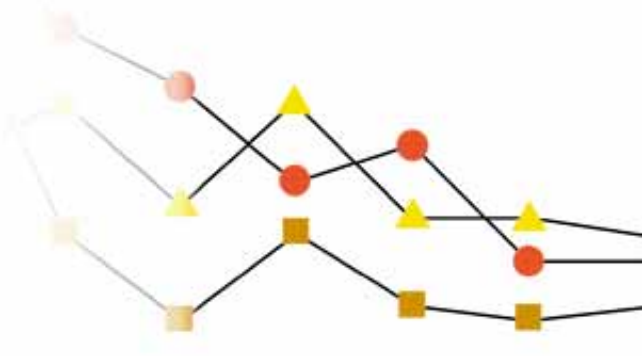
Massey University
Wellington
New Zealand

Methods:

- **incident bladder cancer cases**
- **notified 2003-2004, nation-wide**
- **aged 20-75**
- **population controls**

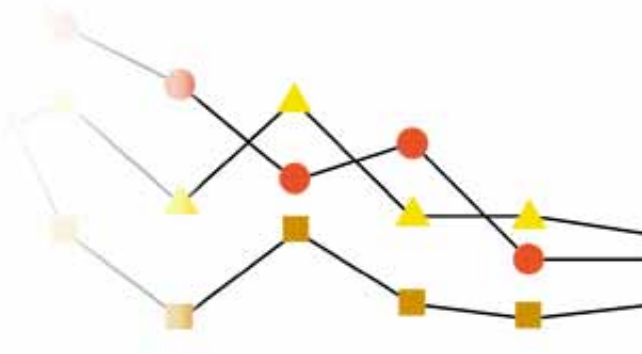
- **interview face-to-face**
  - lifetime occupational history
  - lifestyle factors



The study population

	Bladder cancer cases		population controls	
	n	%	**n**	%
Total	**213**	100%	**471**	100%
Gender				
Men	**165**	54%	**221**	47%
women	**48**	46%	**250**	53%
Age at interview				
20-50	**29**	20%	**62**	13%
51-60	**57**	37%	**137**	29%
61-70	**110**	40%	**260**	55%
71-	**17**	3%	**12**	3%
Smoking				
Never	**63**	30%	**232**	49%
Ex	**97**	46%	**200**	42%
Current	**50**	23%	**36**	8%
NZSEI (occupational class)				
class 1 (75-90) highest	**5**	2%	**8**	2%
class 2 (60-75)	**14**	7%	**31**	7%
class 3 (50-60)	**27**	13%	**58**	12%
class 4 (40-50)	**37**	17%	**90**	19%
class 5 (30-40)	**59**	28%	**170**	36%
class 6 (10-30) lowest	**71**	33%	**114**	24%

Response rate cases: 64%
Response rate controls: 48%



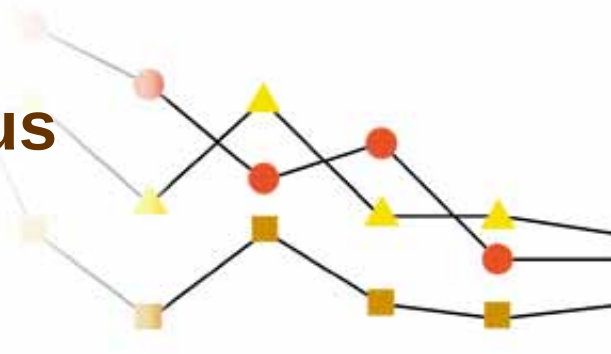
Logistic regression

explanatory variables:

- **Occupation**
- **Industry**

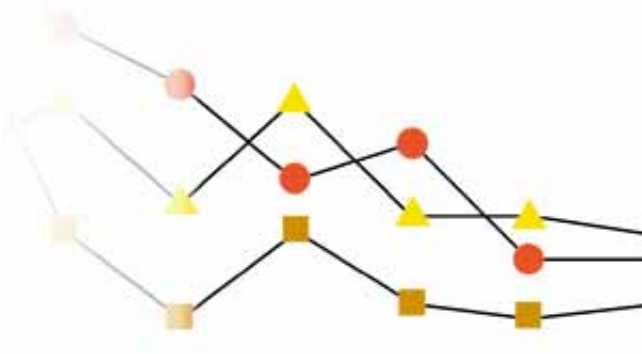
confounders:

- **Sex**
- **Age**
- **Smoking**
- **Ethnicity**
- **Occupational status**



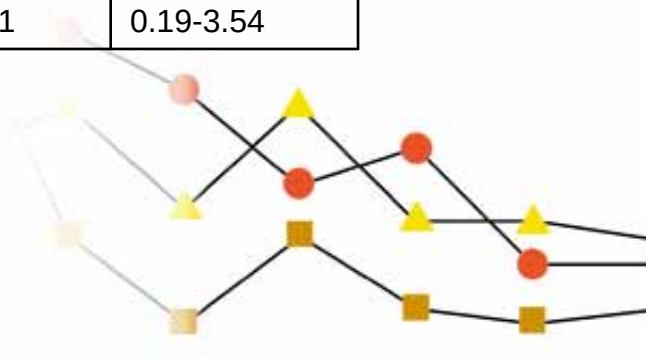
Results: a priori high risk occupations and industries

Hairdressers, sales workers, market farmers and crop growers, tailors and dressmakers, rubber workers, textile workers, drivers, building workers.



a priori high risk **occupations** and **industries** : **farming**

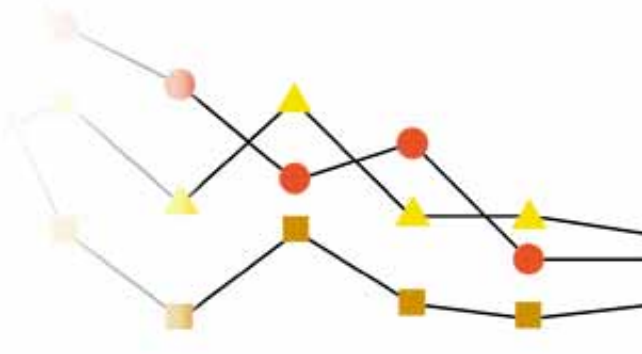
***A priori* high risk occupations for bladder cancer**			
	cases/ controls (n)	**OR**	**95%CI**
Hairdressers, beauty therapists and related workers			
5141- Hairdressers, beauty therapists and related worker**s**	6/6	4.02	1.05-15.36
51411- Hairdresser	6/3	9.15	1.60-52.22
Textile products machine operators			
826-Textile products machine operators	17/38	1.93	0.96-3.88
8263-Sewing and embroidering machine operators	13/24	2.91	1.31-6.50
82631-Sewing machinist	12/23	3.07	1.35-6.96
8264-Textile bleaching, dyeing and cleaning machine operators	3/10	0.81	0.19-3.54



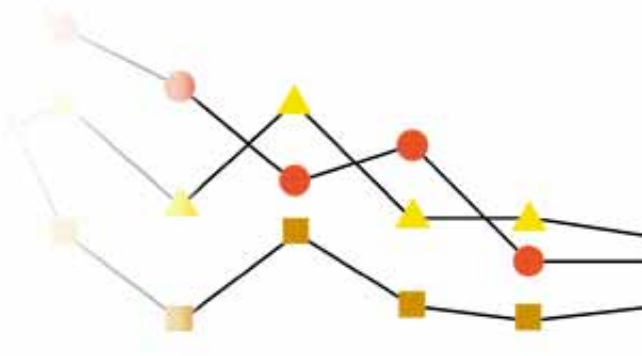
Other a priori high risk **occupations** and **industries**

Tailors and dressmakers			
743-Tailors and dressmakers	5/4	2.84	0.62-13.05
Rubber and plastics products machine operators			
823-Rubber and plastics products machine operator	7/4	2.82	0.75-10.67
Building and related workers			
84-Building and related workers	8/6	2.15	0.68-6.73
91512 – Builders labourer	10/6	2.65	0.92-7.63
Market farmers and crop growers (females)			
611-Market farmers and crop growers	7/15	2.05	0.72-5.83
6112-Fruit growers	4/10	2.03	0.55-7.48
6113- Gardeners and nursery growers	2/4	1.32	0.19-9.05

No increased risk:
Sales workers
Painters
Metal workers
Drivers

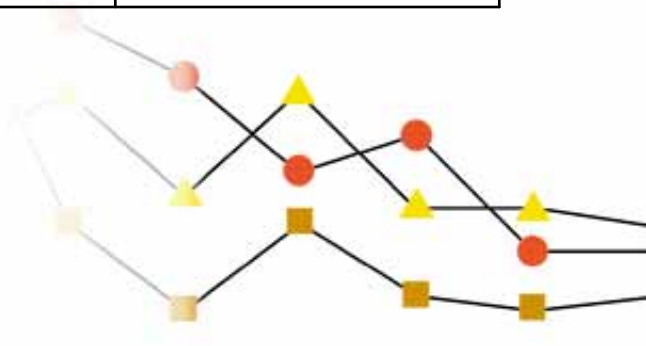


Results: a posteriori high risk occupations and industries



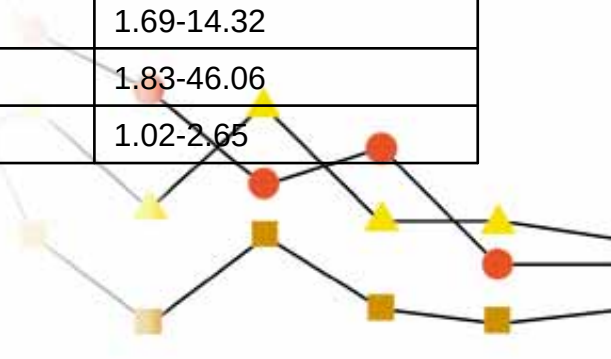
A posteriori high risk **occupations**

	cases/ controls (n)	OR	95%CI
Occupations - reduced risk			
2331-Primary teaching professionals	3/37	0.26	0.07-0.90
331-Finance and sales associate professionals	23/53	0.53	0.30-0.95
4114-Secretaries	3/49	0.28	0.08-0.95
422-Client information clerks	4/45	0.28	0.09-0.85
Occupations - increased risk			
12213-Production manager (manufacturing)	9/6	2.99	1.01-8.86
311-Physical science and engineering technicians	13/10	2.77	1.15-6.70
8143-Papermaking plant operators	6/1	12.80	1.31-125.11

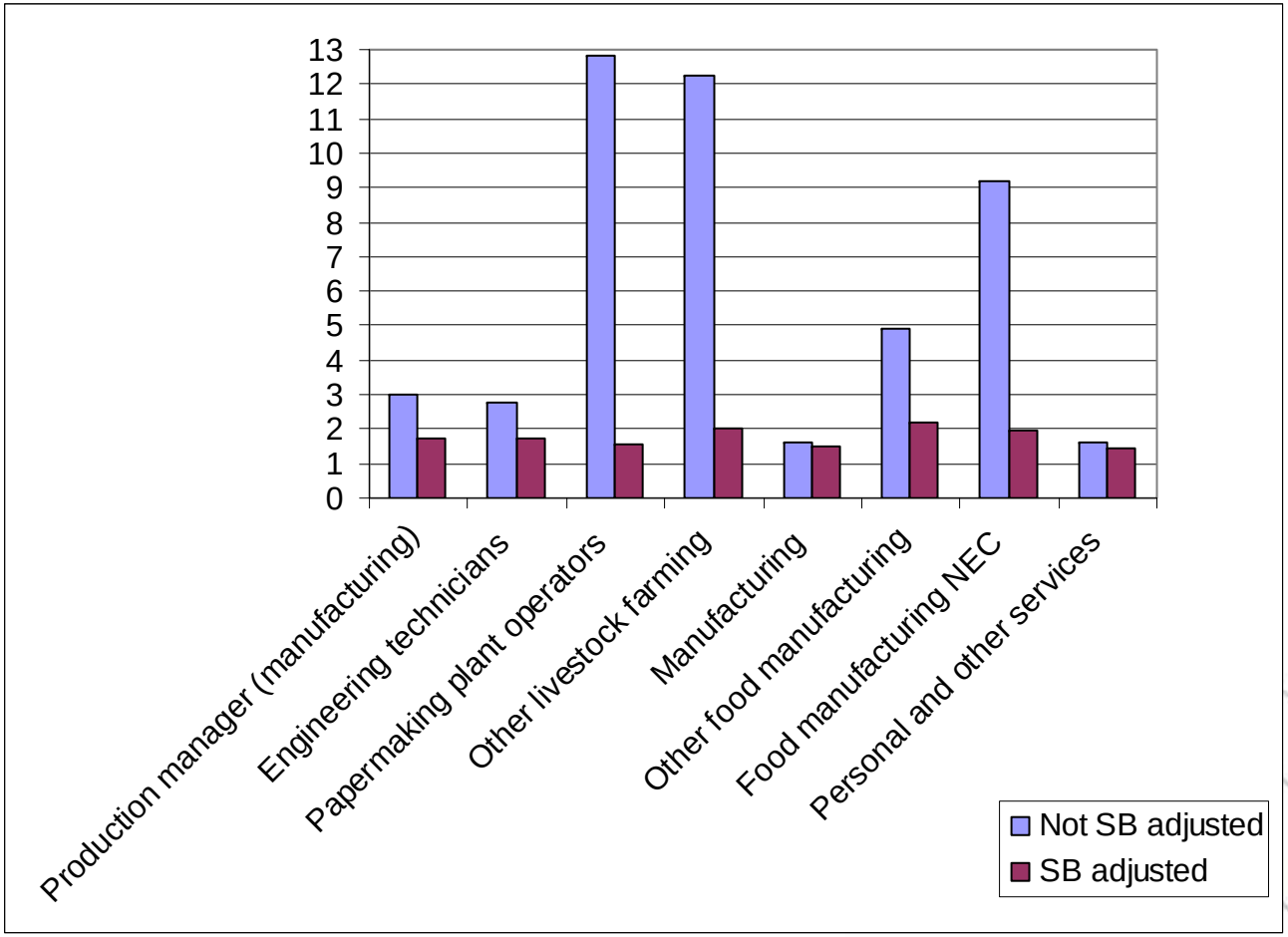


A posteriori high risk **industries**

	cases/ controls (n)	OR	95%CI
Industries - reduced risk			
K75-Services to finance and insurance	1/32	0.08	0.01-0.57
K752-Services to insurance	1/24	0.10	0.01-0.80
L77-Property services	3/27	0.18	0.05-0.63
L772-Real estate agents	2/21	0.18	0.04-0.84
N-Education	23/128	0.44	0.26-0.76
N842-School education	13/85	0.49	0.25-0.95
N8421-Primary education	5/45	0.34	0.13-0.92
N844-Other education	3/16	0.18	0.06-0.54
Industries - increased risk			
A015-Other livestock farming	9/2	12.26	2.29-65.80
C-Manufacturing	132/208	1.60	1.20-2.31
C217-Other food manufacturing	13/6	4.92	1.69-14.32
C2179-Food manufacturing NEC	8/2	9.17	1.83-46.06
Q-Personal and other services	38/68	1.64	1.02-2.65



A posteriori high risk **occupations** and **industries** – effect of semi-Bayes adjustment



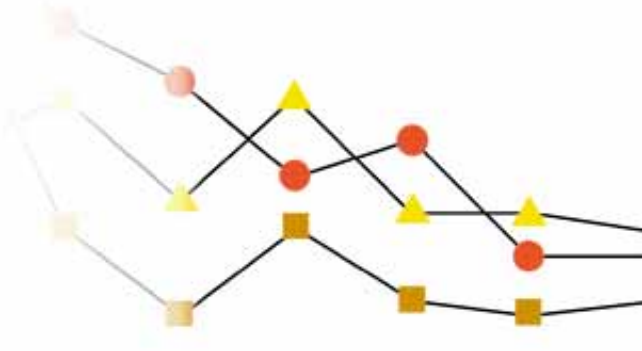
Conclusions

Although study was small, this study gave valuable insight in the occupational risk-patterns of bladder cancer in New Zealand

- **hairdressing** and **textile work** associated with an increased risk of bladder cancer; these are both female-dominant occupations where the likely causative agents are aromatic amines

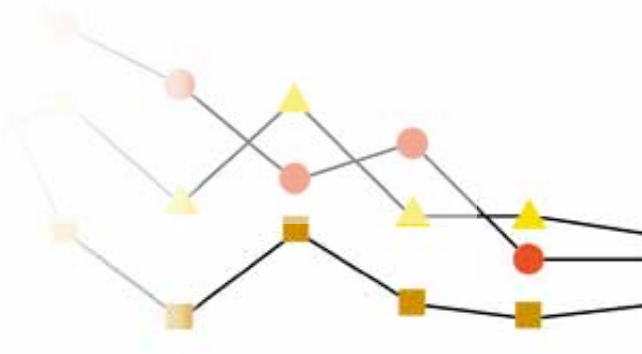
- There were also non-significantly increased risks for **tailors and dressmakers, rubber and plastics product machine operators, building workers and female market farmers and crop growers**

- **Semi-Bayes estimates** helped identify the most robust findings of our study (hairdressing and textile work)



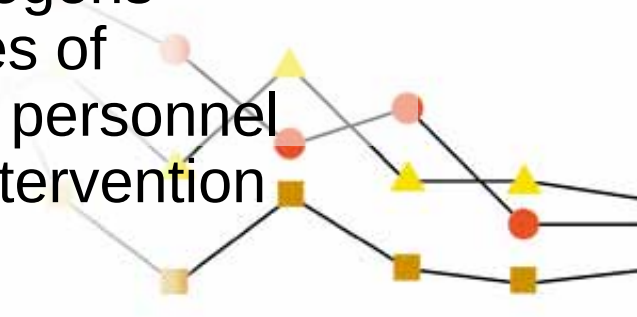
Workplace exposure to carcinogens: Background

- “Research is required to build upon existing knowledge in order to develop an effective approach to the reduction of exposure to carcinogens in the workplace”
- Occupational cancer was identified as a priority by the NOHSAC report, involving 237-425 deaths a year



Workplace exposure to carcinogens: What does the study involve?

- A literature review of the occupational causes of cancer and the known solutions for reducing and/or preventing exposures
- The development of a New Zealand specific Information System on Occupational Exposure to Carcinogens (NZ-CAREX)
- The development of a New Zealand specific Agricultural Chemicals Exposure Matrix (NZ-ACEM)
- A survey in key New Zealand industries, evaluating the work practices regarding occupational carcinogens currently in place, the knowledge and attitudes of employers, employees and health and safety personnel about workplace carcinogens and possible intervention strategies.



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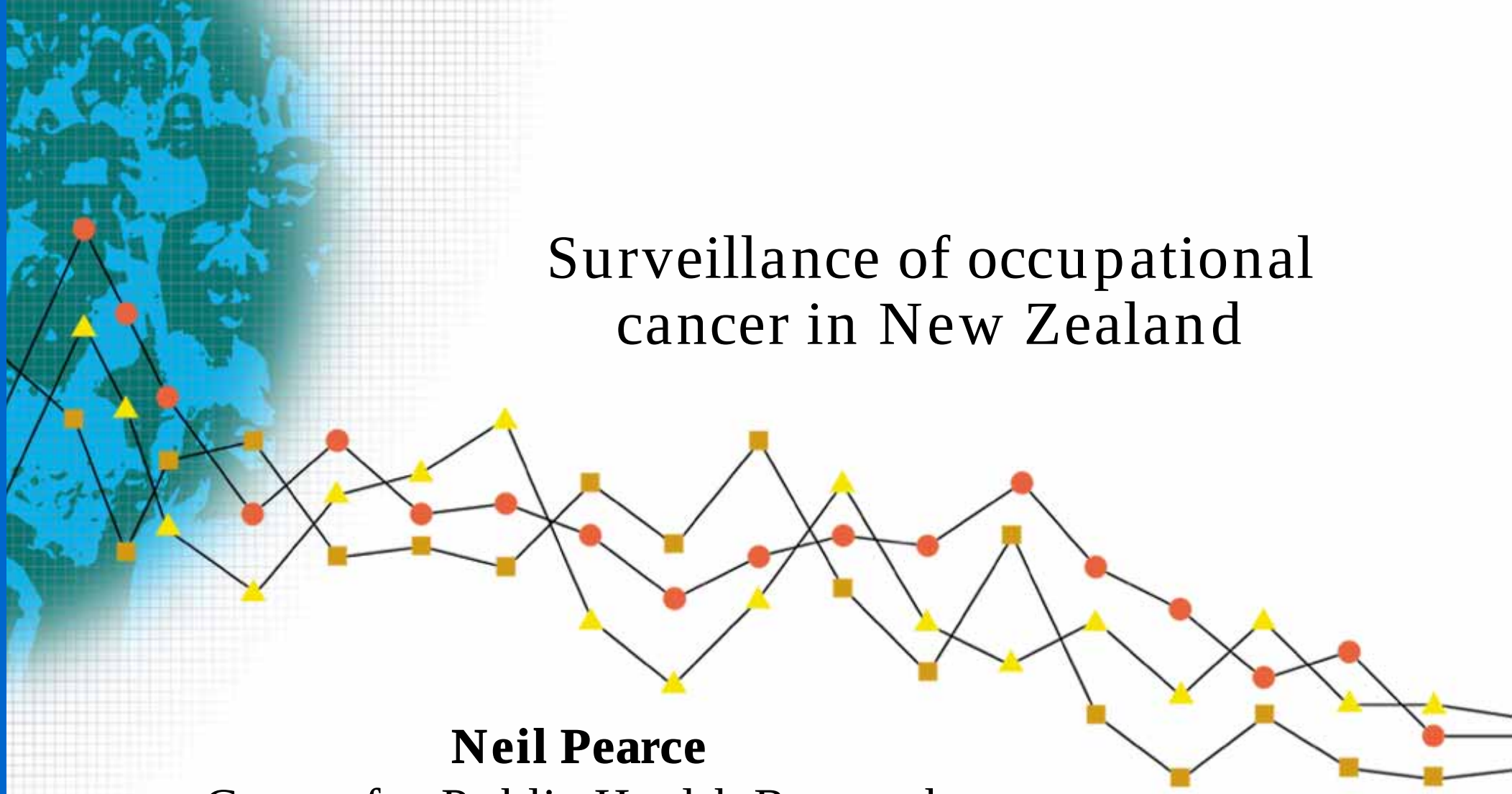

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