MONASH University
Medicine, Nursing and Health Sciences

Monash Centre for Occupational & Environmental Health (MonCOEH)

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MonCOEH Research

- Occupational cohort studies (mainly cancer & mortality)
  - Petroleum and aluminium industry workers
  - Firefighters including Fiskville
  - Orchardists, lead workers, asbestos cement workers
  - Nurses (musculoskeletal disorders)
- Case control studies (mainly cancer outcomes)
  - Breast cancer and shift work
  - Leukaemia/lymphoma and benzene
  - Childhood leukaemia, prostate cancer, lymphoma
- Air pollution and other environmental studies
  - Hazelwood mine fire: Morwell Community study
  - Cardiac effects of 2006/7 bushfire pollution in Melbourne
  - Climate change: heat and air pollutants
  - Follow-up of Port Pirie lead exposed children

MonCOEH Research continued

- Veteran health studies
  - Australian Gulf War veterans and follow-up study
  - Korean war veterans
  - Peacekeepers and Middle East Areas of Operations
- Mobile phone studies
  - Cognitive effects in school children
  - Brain tumours in young adults
- Occupational disease registries:
  - Australian Mesothelioma Registry
  - SABRE – occupational lung disease cases
- ISCRR
  - Noise induced hearing loss & compensation
  - Injured workers long term health outcomes
  - WorkHealth research and evaluation
- Disease clusters: RMIT brain cancer & ABC breast cancer

Planning Research

Hypotheses – must be clear

Research protocol

–Research question(s)
–Study design
–Methodology
–Exposure assessment
–Feasibility & Pilot study
–Time lines

Documentation is critical

Research Governance and Ethics

Reviewed by Ethics committee

Also
DEPM Research Governance Officer audits studies

Study Structure

- Steering Committee for Govt/industry studies
  - Funding body
  - Stakeholders
- May also have a Scientific Advisory Committee:
  - Independent scientists
- Findings published
  - Peer reviewed papers so scrutiny by scientific community
  - Policy orientated reports to funders
  - Summary sent to participants
    - > Individuals not identifiable in reports

Fiskville Exposures & possible Health Effects

Combustion products – lung and bladder cancer

Hydrocarbon fuels - poss blood cancers if benzene present

Diesel fuel –?

Diesel exhaust particulate – lung cancer

Solvents possibly

cancer, hearing loss, neurotoxicity (depends on the solvent)

Foams containing PFOA or PFOS – possibly

testicular, kidney, prostate, ovarian cancers and NHL, renal disease, diabetes (3M factory)

Health effect can determine type of study that's feasible

Main Types of Study - Cross-sectional/Panel

Relatively weak type of study

Look at current health status of pre-defined population

Need to compare health status with unexposed group

Decide on exposure of interest

Must try to find everyone, concern about the missing
Have they died or left job/area because they are sick?
This could underestimate risk

Could be used if population normative data available
eg rate of diabetes or renal disease
Makes assumptions about the population

Main Types of Study - Cohort

Strong study design

Prospective, interview and follow into future

- Could be 30 years

or Retrospective, records-based

- Usually quicker and so cheaper

Need to compare health status with unexposed group or general population similar age and sex etc

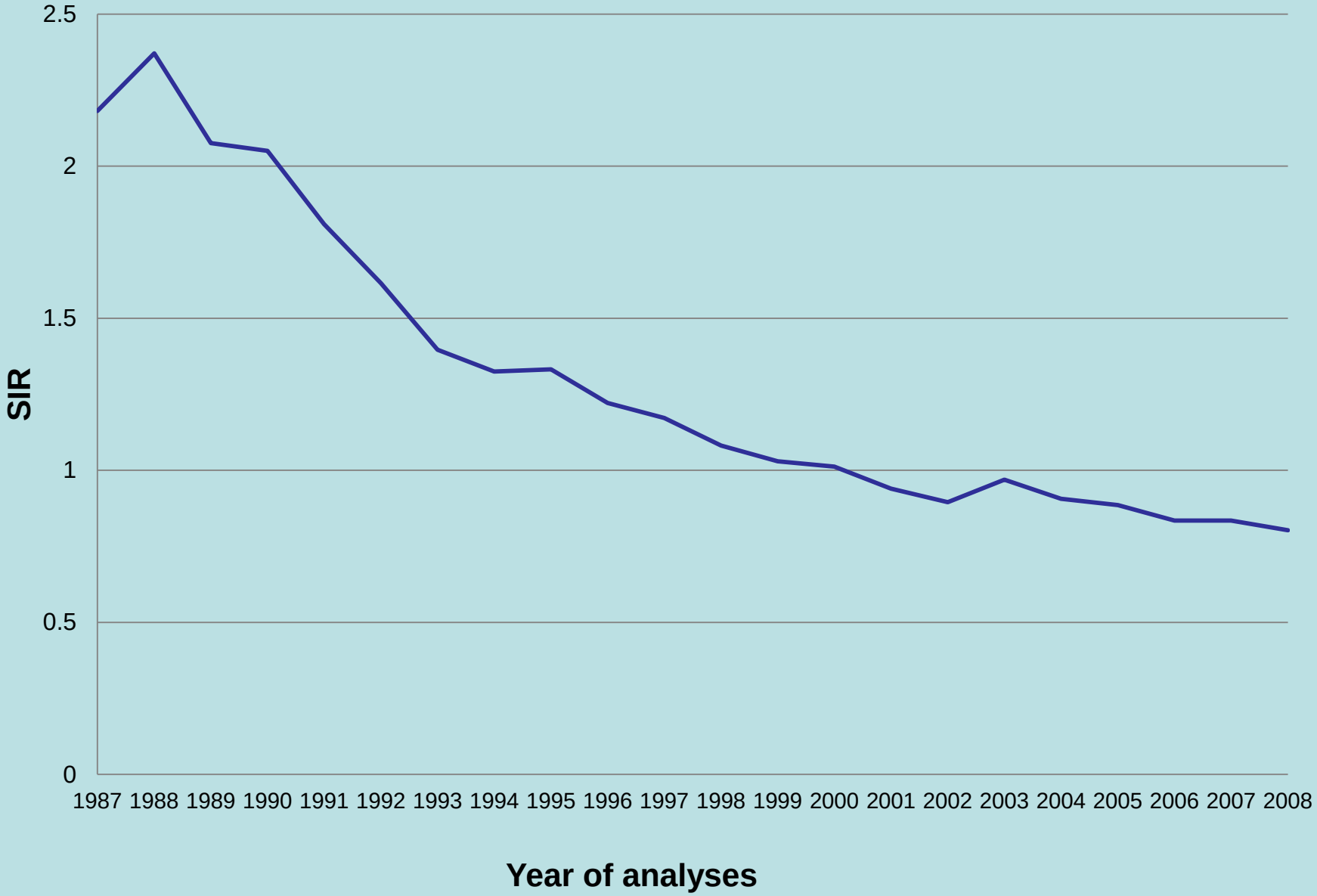
- Relative risk

State and national cancer & mortality comparison data
Other disease endpoints more problematic

Cohort Studies

- Identification of risks so action can be taken
  - eg exposure to benzene or aluminium pot room fumes
- Identification of new occupational diseases
  - eg Myelodysplastic Syndrome and benzene
- Exposure assessment important
- Track risks over time
- Reassurance to cohort members
  - Health Watch funded since 1980

Leukaemia incidence in Health Watch over time



Main Types of Study - Case-control

Always retrospective

Identify cases of interest,

- good for less common outcomes

Match to controls on age, sex, SES etc.

Compare proportion of cases & controls exposed

- Odds ratio
- Beware biases

Association vs Causation - Epidemiology

Epidemiology shows associations

Criteria for causation (Bradford Hill 1965)

- Strength of association
- Exposure response
- Temporal relationship
- Biologically plausible
- Evidence from other studies

Summary

- Document Protocol and Procedures
- Assess feasibility
- Needs a team with variety of expertise
  - Record keeping skills vital
  - Good exposure assessment very important but not easy without records and where there are multiple exposures
- Statistical considerations
  - Sample size
  - Denominator (are all those at risk identified)?
  - Comparison group needs to be appropriate
  - Confounders and biases eg smoking, pesticides (rural living)
- Causality

Thank you

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