Trends over time in incidence of selected Occupational Diseases in the EU (2000-2012)

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Outline of talk

• Can we estimate time trends in incidence reliably from imperfect data systems?

• Background to study and methods

• National trends in selected ODs in EU

• Other uses of surveillance data: to evaluate interventions

• Factors that can bias trends analysis if ignored
European Data Systems for recording Occupational Diseases

• Data systems vary across countries in terms of objectives, management, scope, criteria …

& probably therefore in degree of under-reporting.

• “The diversity … makes it hard to compare the statistics between countries”*

*European Commission Report on the current situation in relation to occup. disease systems in EU Member States and EFTA/EEA countries
What questions are we trying to answer using these systems?

<table>
<thead>
<tr>
<th>Questions</th>
<th>Data</th>
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<tr>
<td>How common is the problem?</td>
<td>Absolute Incidence of Disease (per 100,000 population)</td>
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<td>Is the situation getting worse or better?</td>
<td>Change in Incidence of Disease over time, ie ‘TIME TREND’</td>
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<td>Is there evidence that interventions (including laws/directives)</td>
<td>Change in incidence in specific time periods</td>
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<td>have affected incidence?</td>
<td>(with appropriate allowance for confounders)</td>
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All questions are of interest at national level but also have a international (comparative) dimension.
Measurement of Time Trends from imperfect data systems – is it possible?

Illustration: New cases/month of an OD in a single country 2000-2010

(i) Total cases in total population

(ii) 'Cases 'captured' by surveillance system
In this example estimated time trend ≅ True Time trend

Incidence RATE RATIO (RR) *: cases each year vs 2005 cases

RATE RATIO in 2010 = $\frac{\text{New cases in 2010}}{\text{New cases in 2005}}$ (assuming population size is constant)
Comparing Time Trends between countries using imperfect data

Vertical comparison - re absolute incidence - may be invalid
But comparison of ‘gradients’ may be valid
Method for comparing Time Trends between countries:

(i) Rate Ratios plots with a fixed reference year (here: 2005)

(ii) Gradient of the line $\equiv$ ‘time trend’
Assumptions needed for VALIDITY of trends analysis from imperfect data

A. The data collection system is stable over time

  ie rules for inclusion of cases, definition of OD, population coverage, number of reporters, etc DO NOT CHANGE over time

  or

B. If not, we need to be able to ‘adjust’ for temporally changing factors in the system (via statistical analysis).

  • To interpret results as a true picture of trends in incidence, we need to be convinced of A or B.
Background to study and data

MODERNET – a European Collaboration for Monitoring trends in Occupational Diseases and tracing new and Emerging Risks in a NETwork

10 countries has provided data:
- **Czech Republic**: Urban P
- **Belgium**: Godderis L; Schouteden M; Mylle G
- **Netherlands**: van der Molen H; Pal Teake
- **Norway**: Wannag, Axel; Gravseth H
- **Italy**: Campo G; Colosio C
- **France**: Paris, C; Telle-Lamberton, M; Benesfa, L; Bonneterre, V; Faye, S; Valenty M; Riviere S.
- **Finland**: Sauni, R
- **Spain**: Martínez Jarreta B
- **Switzerland**: Miedinger, D
- **UK**: McNamee R; Agius R, Stocks J; Carder M
Selected occupational diseases

• Allergic and irritant contact dermatitis
• Asthma
• Noise-induced hearing loss
• Carpel tunnel syndrome
Types of data system & inclusions

• Compensation systems 2001-2012

• Physician reporting schemes
  • Established : from 2001 and before
  • (Newer : beginning 2005 or later)

• Physician schemes are varied: some voluntary/
some not; some based on systematic surveys of ‘at risk’
workers; some not

• 10 countries, 22 data systems ....& growing
Statistical Methods

• Omit first year of data collection

• Estimate incidence RATE RATIOS relative to 2006

• Use Poisson regression/negative binomial models (multi-level where appropriate)*

• Use population denominators if available

• Use surrogate denominators if necessary e.g. no. of reporters or no. of reporting centres

*See McNamee et al. Occupational & Environmental Medicine 2008
Trends in compensation schemes relative to 2006: Contact Dermatitis

On average: 9% decrease per year

Fig 1.1. Contact dermatitis - recognised compensation claims
Trends in physician reporting schemes relative to 2006: Contact Dermatitis

On average: 6% decrease per year; Some heterogeneity….
Trends in compensation schemes relative to 2006: Asthma

On average (exc Spain): 4% decrease per year
Fig 2.2. Asthma - physician reporting (established data collections)

On average 6% decrease per year
Trends in compensation schemes relative to 2006: Noise Induced Hearing Loss

Fig 3.1. Noise-induced hearing loss - recognised compensation claims

- Belgium
- Czech Republic
- Finland
- Spain
- UK
- Italy
- Switzerland

Incidence rate ratio relative to 2006
Trends in physician reporting relative to 2006: Noise Induced Hearing Loss

Fig. 3.2. Noise-induced hearing loss - physician reporting (established data collections)
Trends in compensation schemes relative to 2006: CTS

Fig 4.1. Carpel tunnel syndrome - recognised compensation claims

Incidence rate relative to 2006

- Belgium
- Czech Republic
- Finland
- Spain
- UK

Trends in physician reporting schemes relative to 2006: CTS

Fig 4.2. Carpel tunnel syndrome - physician reporting (established data collections)

- Italy MALPROF2
- UK (rheumatologists)
- NL-NR
- France RNV3P

Incidence rate ratio relative to 2006

Graph showing trends from 2000 to 2012.
Other ‘trends’ work
Using trend data to evaluate effects of workplace legislation:
Changes in UK reported incidence of asthma following the 2004 COSHH amendment effective April 2005

Stocks et al. Occup Environ Med 2013;70:476-482
Direction of trends can change: Work-related mental ill-health relative to 2006: UK Occupational Physician reporting scheme

UK OPRA scheme: anxiety and/or depression

YEAR

Incidence Rate Ratio


YEAR
Factors that could bias estimation of time trends

- Change in criteria or in compensation rules
- Changes in awareness of work-disease linkage over time by doctor or by patient (cf influence of media)
- Changes in the reporting base (reporters, centres, populations covered: in principle we can adjust for these)
- Changes in reporter behaviour: voluntary reporters may get tired…. (‘fatigue’ – see McNamee et al 2008)
Acknowledgements

• Members of MODERNET who are part of the ‘trends’ collaboration

• Other members of MODERNET

• Funding: the MODERNET collaboration has EU Cost funding for meetings
Our attitude to European OD data

The motto of an epidemiologist *?

“dirty hands but a clean mind”.

*Geoffrey Rose

Dirty hands: get involved in all possible data sources without waiting for perfection;

Clean mind: be clear about your question; think about sources of bias;