The role of cancer registration in research on occupational and environmental carcinogens

Joachim Schüz
Head, Section of Environment and Radiation
International Agency for Research on Cancer
Lyon, France

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Need for cancer registration

Key messages

Population-based cancer registries play a central role in cancer control programmes because they provide the means to plan, monitor and evaluate the impact of specific interventions in targeted populations.
Five most common cancers in 2012 by HDI

International Agency for Research on Cancer

World Health Organization

GLOBOCAN 2012
ESTIMATED CANCER INCIDENCE, MORTALITY AND PREVALENCE WORLDWIDE IN 2012
Projected burden of cancer: World (2012-2030)

Assuming no change in underlying incidence

- Mortality:
  - 2012: 8.20 million cases
  - 2030: 13.04 million cases
  - 59.0% increase

- Incidence:
  - 2012: 14.07 million cases
  - 2030: 21.65 million cases
  - 53.9% increase

(million cases)
Population-based cancer registration

Global Status of Cancer Registration

- CI5 High quality PBCR (national)
- CI5 High quality PBCR (regional)
- PBCR (national or regional)
- Registration activity
- No data / status unknown
The GICR

A process to change the scope and pace of cancer control information

• Phased objectives through IARC Regional Hubs to target 20 LMIC by 2020 and a further 30 by 2025

Significant Developments:

• Governance model with an inclusive partnership approach
• Regional expansion: a transition to implementation
  - Four Hubs launched, two in development; three-year operational plans
• Resource mobilization using revised communication tools

http://gicr.iarc.fr/
Need for cancer registration

Hospital-based cancer registries:
- Collection of cases in a certain hospital
- Clinical relevance, such as treatment related analyses
- Rarely representative of cancer burden in population

Population-based cancer registries:
- Collection of all cases in defined catchment area
- Description of cancer burden
- Starting point for epidemiological research
- Early warning system of changes in cancer burden
Population based cancer registries

Challenges:
- Complete ascertainment of cases residing in catchment area
- Definition of population under risk in catchment area

Observing changes in incidence:
- (actual) changes in underlying risks
- (actual) changes in underlying population at risk
- Better detection or diagnosis, earlier diagnosis
- Other effects: - improved registration
  - cancer classification
  - reducing under-diagnosis
  - cancer awareness
Changes in underlying risks

Lung cancer risk in Danish and Swedish males over time, influenced by changing smoking behaviour in the underlying populations
Changes in detection

Systematic cervix screening

Opportunistic PSA screening
Challenge: Completeness

Problems:
- Better completeness over time may be misinterpreted as increase in the cancer incidence
- Completeness levels varying by region may be misinterpreted as « local clusters » of cancer

Incidence of childhood cancer (per million), Germany 1980-2013

http://www.kinderkrebsregister.de
Role in occupational and environmental cancer research

Cancer control:
- Changes in incidence following preventive measures (if anticipated effect is sufficiently large)

Aetiological research:
- Register-based occupational cohort studies
- Source of identification of cases for analytical studies

Hypothesis-generating:
- Observing time trends and cohort effects
- Observing geographical variation and by other sociodemographic factors
Cancer control: Asbestos ban, Germany

Mesothelioma mortality, absolute number of deaths

Eastern part

Western part

All ages

Ages 80+

Ages 65-79

Ages <65

Schonfeld et al., Cancer Causes Control, 2014
Register-based cohorts: Mobile phone subscribers, Denmark

~720,000 records ➔ 420,095 individuals ➔ 14,249 cancers
Register-based cohorts: Mobile phone subscribers, Denmark

Glioma

Meningioma

Years of subscription

In men

Frei et al., BMJ, 2011
Hypothesis-generating: Testicular cancer incidence, Nordic countries

Testicular cancer, 1998-2003
In incidence / 100,000.

Distinct geographical patterns in incidence

Risk in immigrants reflects those of their home country while second-generation adapts to host country

Exposures in early life or before birth may matter
Hypothesis-generating: Consistency check – mobile phones and glioma

Male mobile phone users at increased risk after 10 years

Modelled incidence rate time trend of glioma versus observed

Deltour et al., Epidemiology, 2012
Hypothesis-generating: Observed lung cancer risk by occupation, Nordic countries (males)

Pukkala et al., Acta Oncologica, 2009
Conclusions

- Population-based cancer registries (PBCR) play key role in cancer control

- PBCR have important roles in occupational and environmental cancer research:
  - monitoring of preventive measures
  - source of cases in epidemiological studies
  - hypothesis-generating by monitoring changes in trends over time, location and other factors

- Challenge: Incomplete registration may give misleading results