Contaminated sites and health

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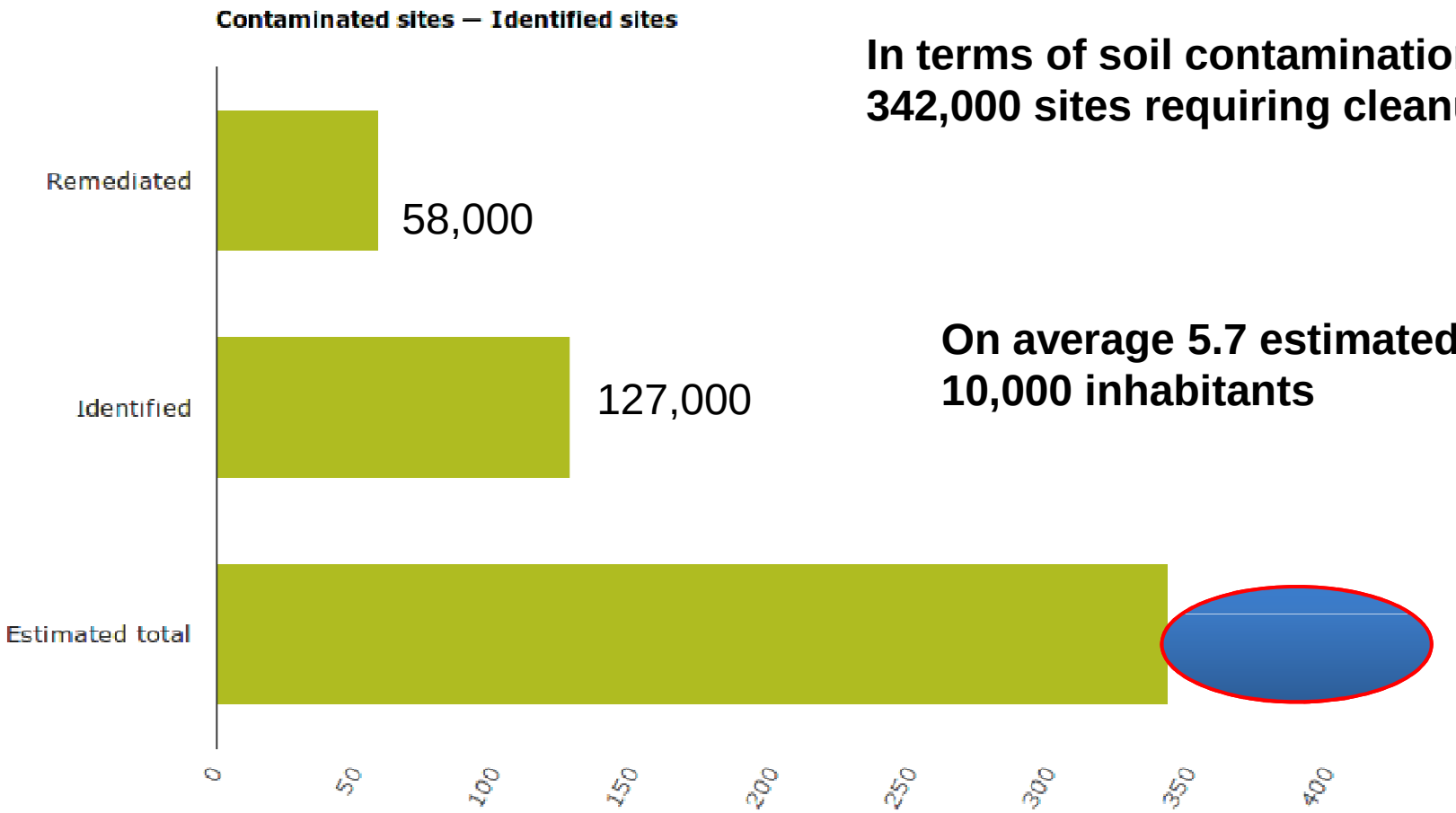
In Europe the percentage of people living close to contaminated sites is large



In terms of soil contamination, there are 342,000 sites requiring cleanup

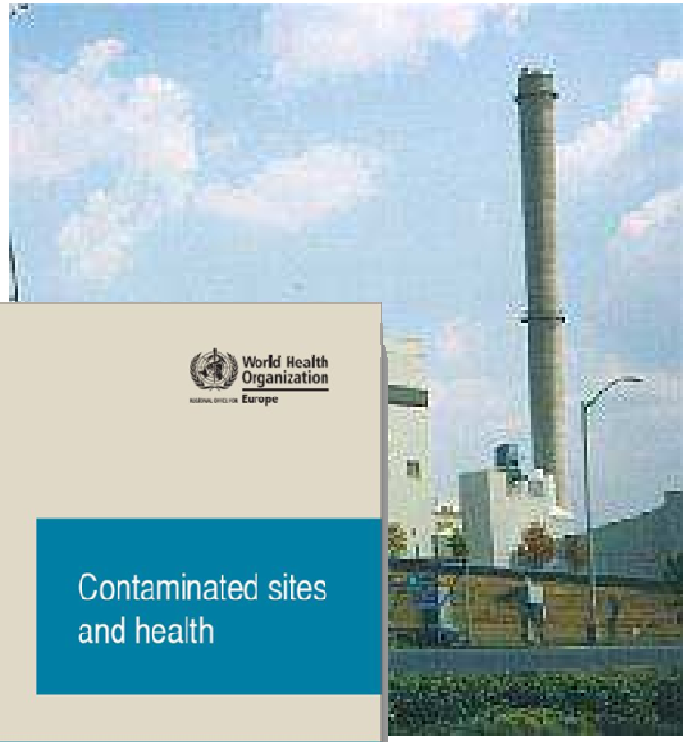
On average 5.7 estimated CSs per 10,000 inhabitants

http://www.eea.europa.eu/data-and-maps/indicators/progress-in-management-of-contaminated-sites-3/assessment

The WHO European Region

- 53 Member States
- 900 000 000 pop

WORLD HEALTH ORGANIZATION
EUROPE



World Health Organization
Europe
Contaminated sites and health
Report of two WHO
Syracuse, Italy, 18
Catania, Italy, 21–


World Health Organization
Europe
Human
in Area
Industrial Contami


Journal of Environmental and Public Health
Industrially Contaminated Sites and Health
Guest Editors: Marco Martuzzi, Roberto Pasetto, and Piedad Martin-Olmedo

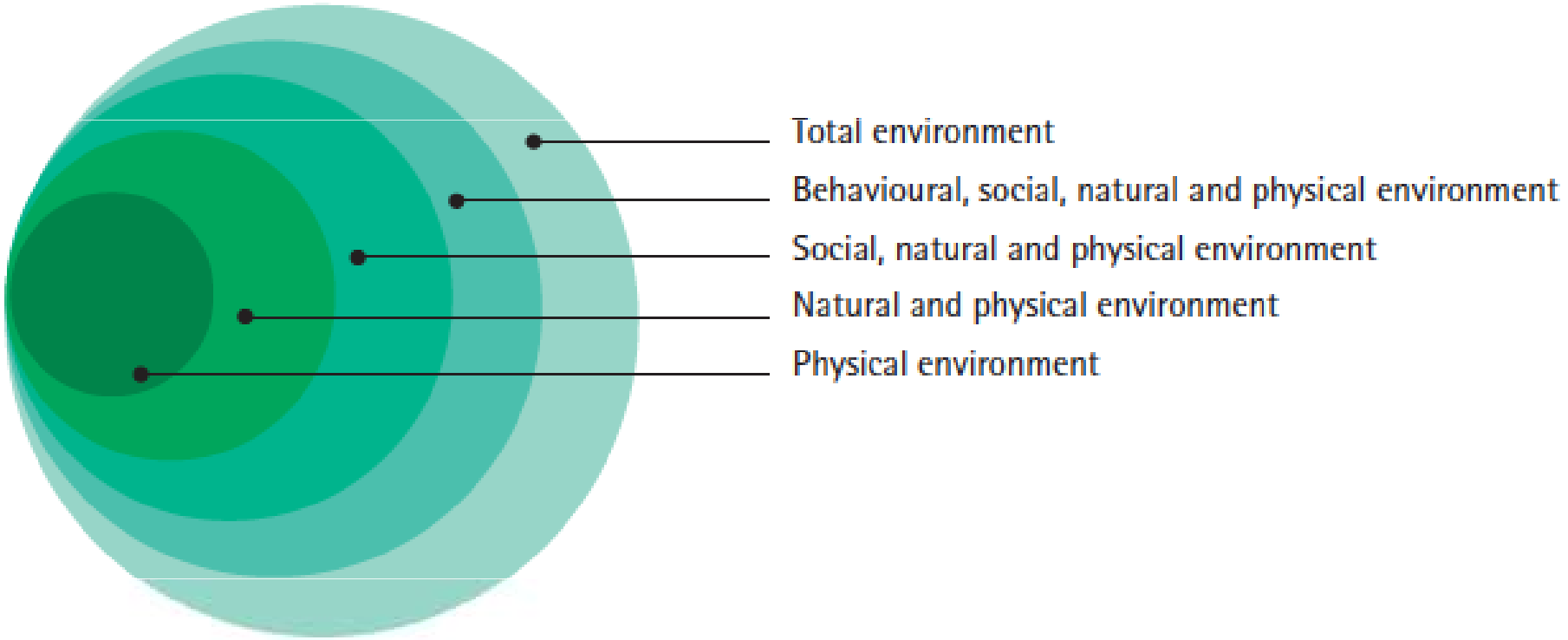
“Industrially contaminated” sites

- **Large concentrations of industrial facilities**
  - Chemical, petrochemical
  - Waste treatment
  - Power generation
  - Heavy industry, manufacture
  - …
- **Environmental impacts on:**
  - Air
  - Water
  - Soil
  - Food (fruit and veg, meat, fish)
  - Noise
  - Activities (e.g., transport)
  - …

Health impacts of industrially CS

- Heterogeneous hazards, multiple pathways (soil, air, water and food chain)
- Difficulty in gathering quantitative exposure estimates
- Chemical cocktails
- Often densely populated / urban areas, other risks
- Complexity of the socioeconomic context, including occupational patterns
- Multiple aetiology of most relevant diseases

FIGURE 1 DEFINITION OF THE ENVIRONMENT [a]



[a] (Adapted from Smith, Corvalàn and Kjellström, 1999)

Human health in ICS

Measure contamination (from known noxious agents)

↓

Assess human exposure (to known noxious agents)

↓

Estimate health risks (from known health effects)

AND/OR

Analyse health profile of local populations

↓

Compare with known or suspected contaminants

↓

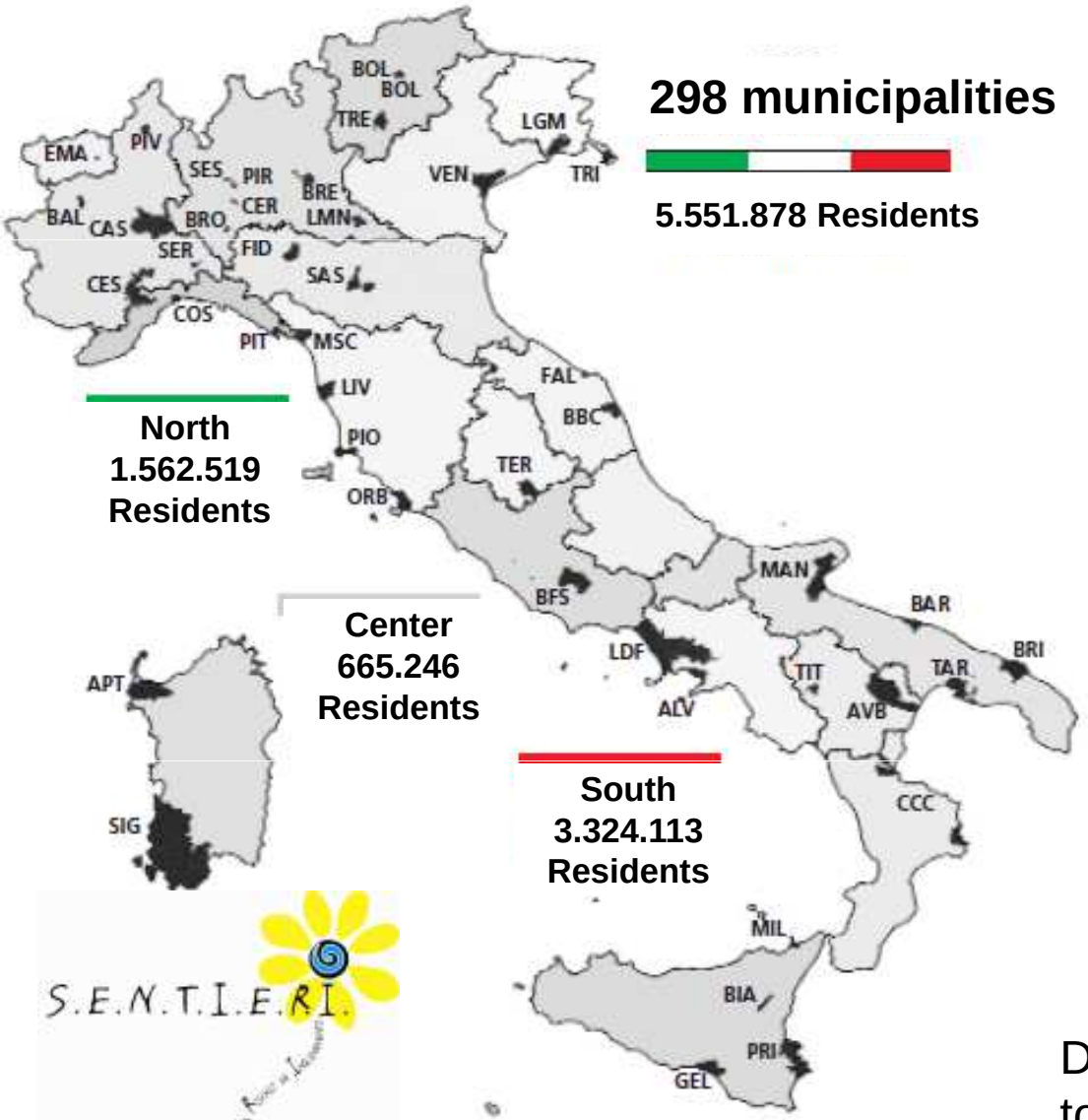
Assess role of contamination/attributable risks

Questions

- What is the level of contamination, and what health risks can it bring? (Traditional risk assessment approach)
- What is the health profile of resident populations, as described by health statistics (mortality, morbidity)? (Descriptive epidemiology)
- What is the contribution of environmental contamination? (Analytical epidemiology)
- How does it interplay with other health determinants? How are risks and impacts perceived? (Overall assessment)
- What implications for remediation, clean up, future development? (Risk management)

SENTIERI Project

44 National Priority Contaminated Sites



298 municipalities

5.551.878 Residents

North
1.562.519
Residents

Center
665.246
Residents

South
3.324.113
Residents

A network of Italian scientific institutions operating on a national and regional level develop the SENTIERI Project (*Epidemiological Study of Residents in National Priority Contaminated Sites*)

- **Health and socioeconomic profiles of populations living in 44 NPCSs**
- **Environmental characterization of emission sources and pollutants**
- **Focus on children**

Design: first level epidemiological approach to deal withthe health impact of contaminated areas

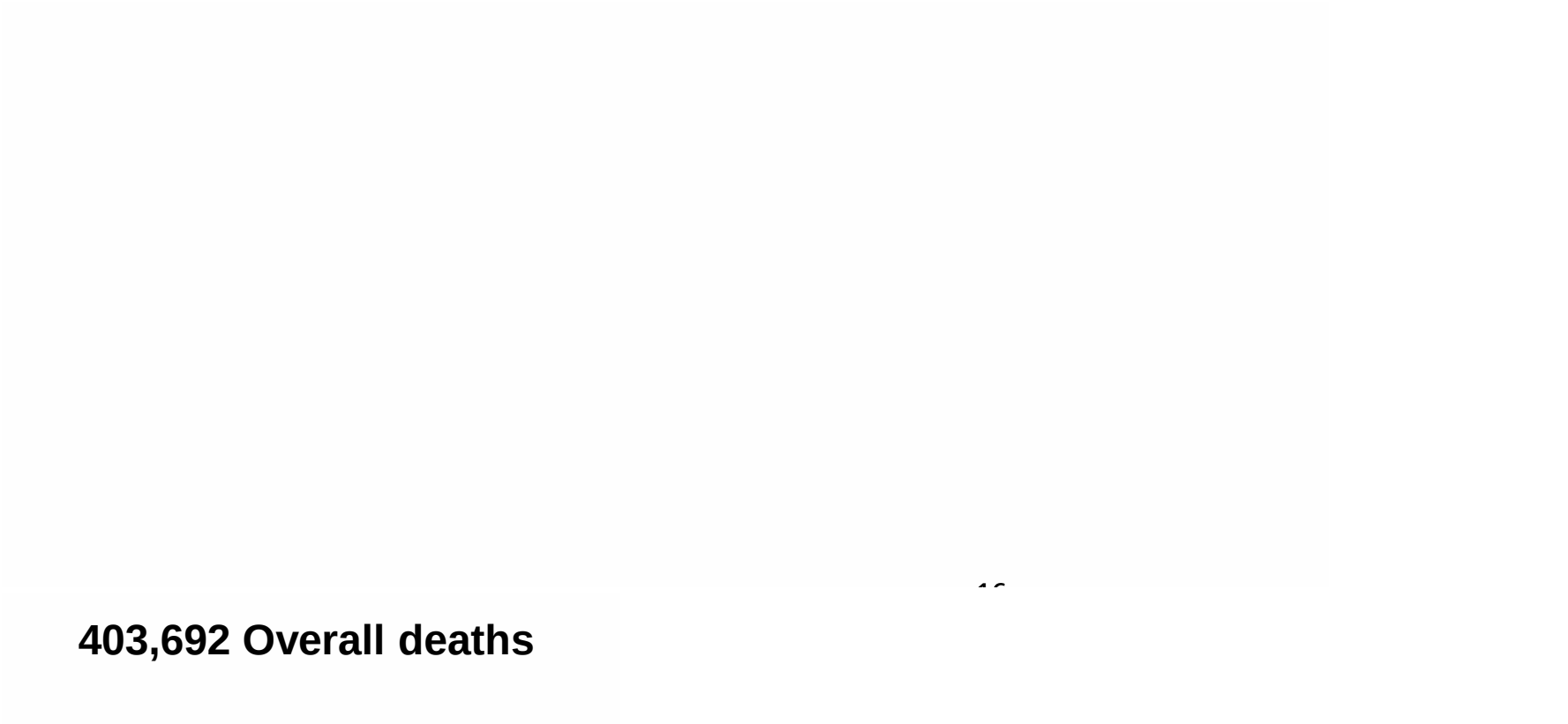
http://www.hindawi.com/journals/jeph/si/480565/

SENTIERI (2001-08)

Cause	Men			Women			Total		
	Obs	SMR	obs-exp	Obs	SMR	obs-exp	Obs	SMR	obs-exp
All causes	*204 713*	*102.7*	*5 292*	*198 979*	*102.4*	*4 678*	*403 692*	*102.5*	*9 969*
Dis. of circulatory system	76 094	100.8	589	93 656	101.4	1 298	169 750	101.1	1 887
Dis. of respiratory system	15 623	103.5	528	10 162	101.0	100	25 785	102.5	627
Dis. of digestive system	11 075	107.1	730	10 377	109.2	877	21 452	108.1	1 607
Dis. of genitourinary system	2 798	103.2	87	2 900	103.7	104	5 698	103.5	192
All cancers	*67 844*	*104.8*	*3 083*	*48 231*	*102.6*	*1 226*	*116 075*	*103.9*	*4 309*
Lung cancer	19 975	107.4	1 381	4 097	103.7	147	24 072	106.8	1 528
Breast cancer				8 323	103.0	244	8 323	103.0	244

- 9,969 excess deaths in 8 years, ie 1,200/year
- 2.5% increase in mortality, compared to regional backgrounds

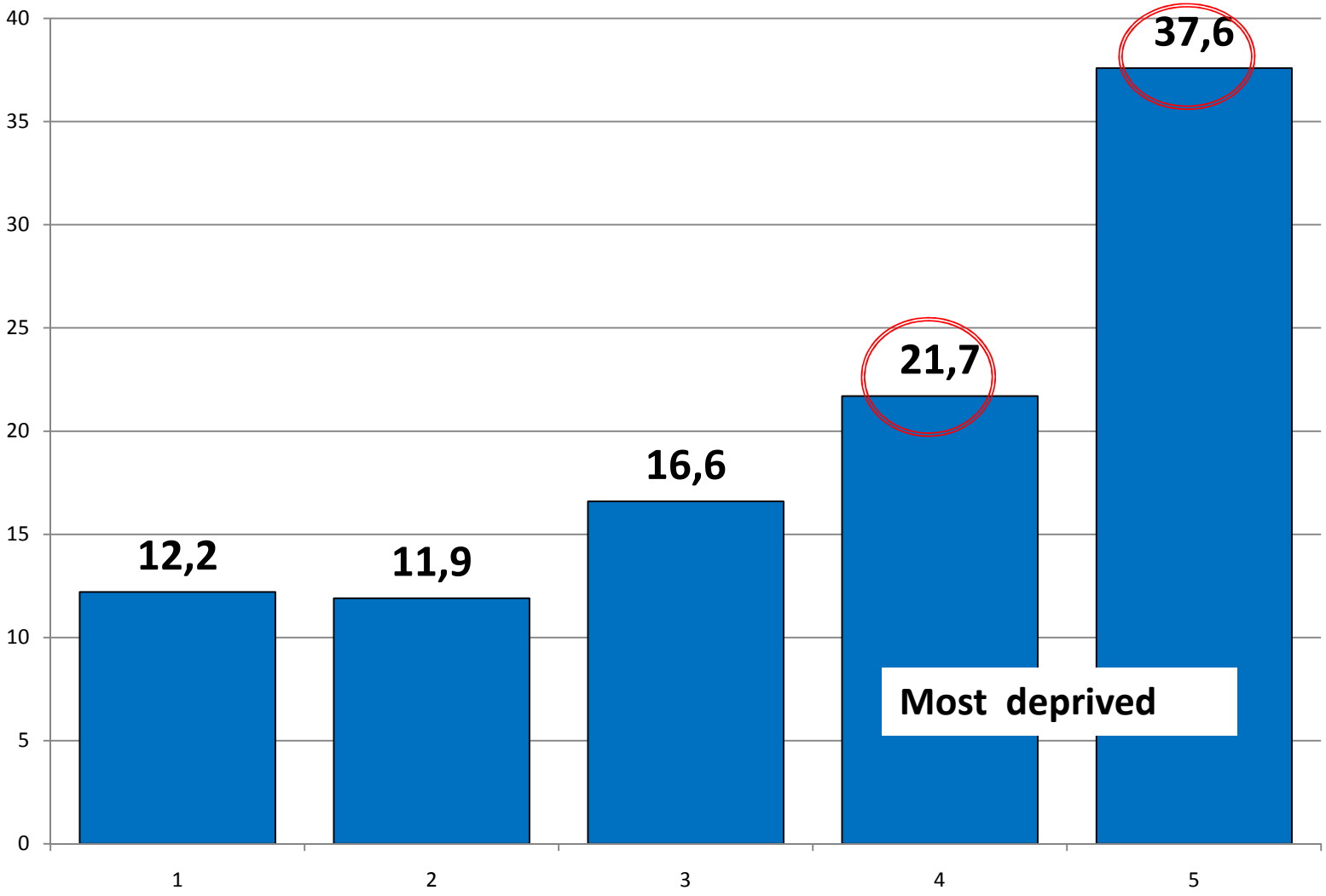
SENTIERI: Mortality in 44 Italian National Priority Contaminated Sites



http://www.ncbi.nlm.nih.gov/pubmed/22166296

Environmental and social inequalities in Italian NPCS

60% of the 300 municipalities included in 44 National Priority Contaminated Sites studied in SENTIERI Project belong to the highest deprivation groups (quintiles)



About 1 million children (< 20 years) live in these municipalities

Contaminated sites: environmental health inequalities

- Disadvantaged people often live in polluted areas, near industrial and waste dumping sites; poor-quality housing; limited access to green space
- Lifestyle risk factors
- Vulnerable groups (children, pregnant women, elderly people, ethnic minorities)
- Multiple agents, multiple stressors: often assumed not to interact
- A “bad environment”: how to study its health effects?
- Perceived risks, “soft” outcomes play an important role

R = H + O

- Sandman's formula: Perceived risk = Hazard + Outrage
- "Outrage" factor always high in contaminated sites

The 12 principal components of outrage (P Sandman, 2003).

	"Safe"	**"Risky"**
1.	Voluntary	Coerced
2.	Natural	Industrial
3.	Familiar	Exotic
4.	Not memorable	Memorable
5.	Not dreaded	Dreaded
6.	Chronic	Catastrophic
7.	Knowable	Unknowable
8.	Individually controlled	Controlled by others
9.	Fair	Unfair
10.	Morally irrelevant	Morally relevant
11.	Trustworthy sources	Untrustworthy sources
12.	Responsive process	Unresponsive process

Conclusions

- ICS are an important public health and sustainability issue
- Extent of health impacts not clear - literature is sparse
- Rich available methodology for analysis
- Integrate better across disciplines (eg, biomonitoring, exposome)
- Invest in more participatory HIA type approaches
- Strengthen international collaboration further

ICSnet.eu

COST Action IS1408

“Industrially Contaminated Sites and Health Network” (ICSHNet)

Domain *Individuals, Societies, Cultures and Health*

cost
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

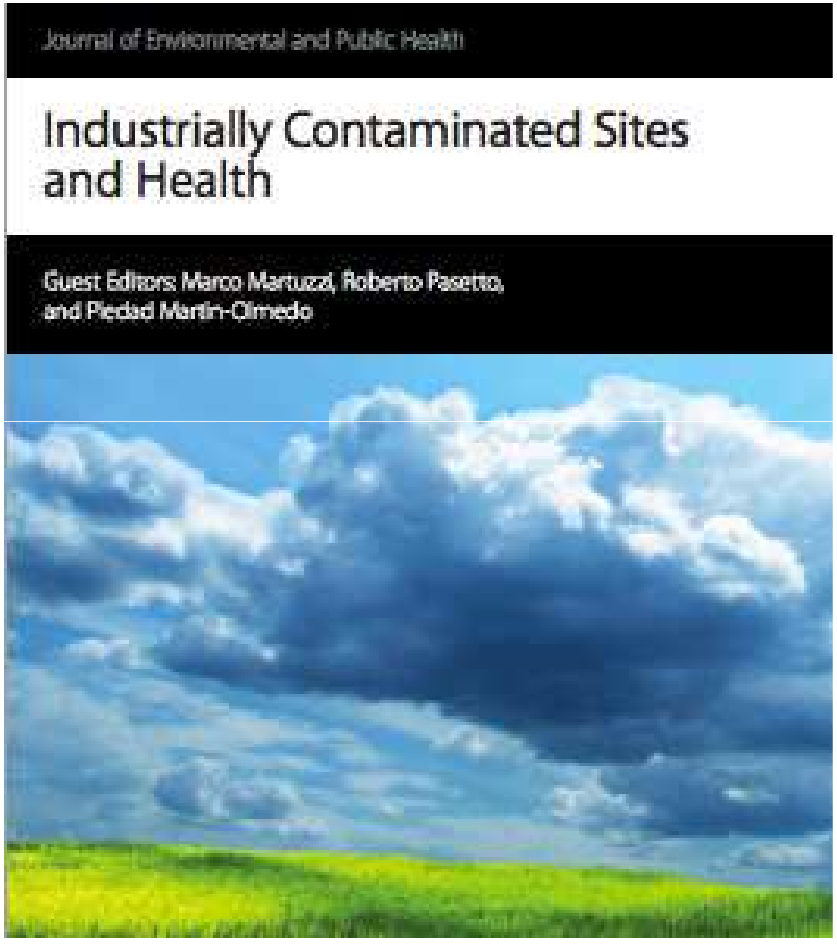
The Action is coordinated by the Italian Institute of Public Health (ISS) and was proposed by the WHO Collaborating Centre for environmental health in contaminated sites in force at ISS

WHO Collaborating Centre for Environmental Health in Contaminated Site

Current state of knowledge and research

- In Europe, earlier industrialization and poor environmental management practices have left a legacy of thousands of contaminated sites
- Past and current industrial activities can cause local and diffuse contaminations with possible human health impact
- Assessments exist, yet the overall impact of living in or close to a CS is still unclear
- Risk management and remediation challenging for health and environment

A issue of concern for
→ Public health
→ Sustainability



Special Issue. J Environ Public Health
http://www.hindawi.com/journals/jeph/si/480565/

Health 2020 and the life-cours

The trajectory of human life is affected by genetic, epigenetic and intrauterine legacies, by environmental exposures, by behavioural choices.

[…]

While inherited traits are important, new research shows that environmental stressors during intrauterine development play a key role in determining functional development and future disease risks.

[…]

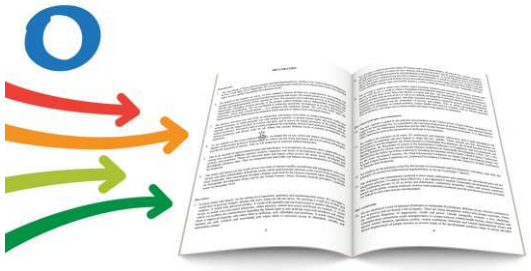
We recognize the new science that shows that these diverse and inequitable trajectories are strongly influenced by policies, environments, opportunities and norms created by society, and for which society bears responsibility. Policy changes can create long-term sustainable opportunities for health.

European Environment and Health Process

Initiated in 1989 to eliminate the most significant environmental threats to human health.

The EHP is the partnership of:

- **53 European Region Member States (health & environment)**
- **UN Economic Commission for Europe (UNECE)**
- **UN Environmental Programme (UNEP)**
- **NGOs, IGOs, Youth Coalition**
- **Secretariat: WHO Regional Office for Europe**



Transforming our world: The 2030 Agenda for Sustainable Development

World Health Organization
Europe

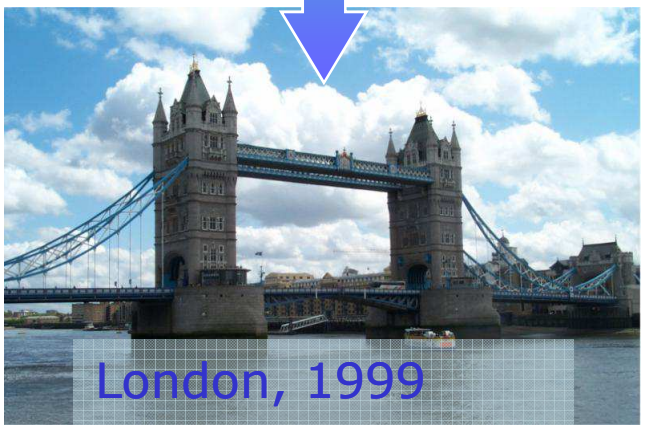
EUROPEAN ENVIRONMENT AND HEALTH PROCESS

European Ministerial Conferences on Environment and Health

highendfood.files.wordpress.com/2009/01/frankfurt_skyline.jpg

www.monocle.com/upload/Volumes/01/Issue05/m_06helsinki/article_large_06helsinki.jpg

www.sovranaviaggi.com/sito/files/images/Budapest1.jpg



www.craigr.com/images/London%20Tower%20Bridge.jpg

Panorama: Call for papers

- Public Health journal of WHO / Europe
- English and Russian
- Special issue on env and health, June 2017
- Submit by 31 Dec 2016

Towards 2017: Agenda

Broader assessments needed

Vulnerability to accidents

Exposure mixes

Economic dimension

Cross-sectoral work required

→Health impact assessment (HIA)

→ Strategic Environmental Assessment (SEA)

Health 2020

Overall public health framework of WHO - Europe

Investing in health through a life course approach and empowering people

Tackling Europe's major health challenges of non communicable diseases and communicable diseases

Strengthening people-centred health systems and public health capacities, and emergency preparedness

Creating supportive environments and resilient communities

Parma Ministerial Declaration

Signed at the Fifth Ministerial Conference on Environment and Health, Parma, March 2010

Commitment to Act from Ministers responsible for environment and health on various environmental health issues

Europe has identified action on major environmental risk factors

4 Regional Priority Goals

Photos left to right: © V. Taylor-Gee, Istockphoto, N. Di Tanno, Istockphoto

Regional Priority Goal I. **to prevent and significantly reduce the morbidity and mortality arising from gastrointestinal disorders and other health effects**, …. safe and affordable water and adequate sanitation for all children.

Regional Priority Goal II. **to prevent and substantially reduce health consequences from accidents and injuries** ….. by promoting safe, secure and supportive human settlements for all children.

Regional Priority Goal III. **to prevent and reduce respiratory disease due to outdoor and indoor air pollution, ….**an environment with clean air.

Regional Priority Goal IV. **to reduce the risk of disease and disability arising from exposure to hazardous chemicals** (such as heavy metals), **physical agents** (e.g. excessive noise) **and biological agents and to hazardous working environments** during pregnancy, childhood and adolescence.

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EUROPEAN ENVIRONMENT AND HEALTH PROCESS

Priorities from Parma Conference

We are committed to act on the key environment and health challenges of our time. These include:

(a) the health and environmental impacts of climate change and related policies;

(b) the health risks to children and other vulnerable groups posed by poor environmental, working and living conditions (especially the lack of water and sanitation);

(c) socioeconomic and gender inequalities in the human environment and health, amplified by the financial crisis;

(d) the burden of noncommunicable diseases, in particular to the extent that it can be reduced through adequate policies in areas such as urban development, transport, food safety and nutrition, and living and working environments;

(e) concerns raised by persistent, endocrine-disrupting and bio-accumulating harmful chemicals and (nano)particles; and by novel and emerging issues;

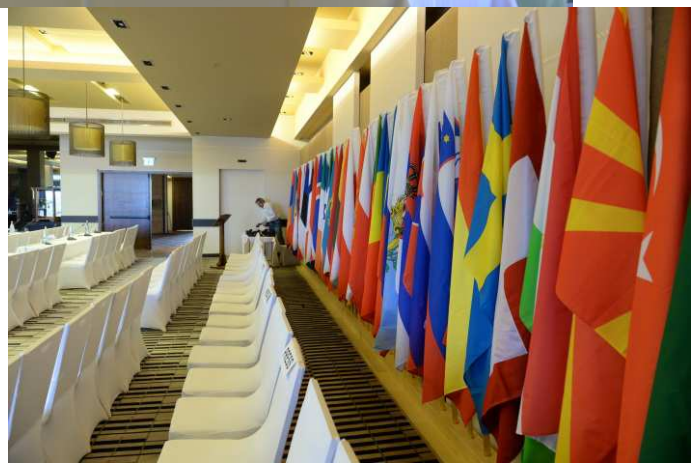
(f) insufficient resources in parts of the WHO European Region.

Commitment to act: Time-bound targets

- By 2020:
  safe water and sanitation in children's facilities
- By 2020:
  healthy and safe environments for physical activity for children
- by 2015:
  indoor environments free of tobacco smoke in children's facilities
- by 2015:
  environments free of toxic chemicals; and reduced identified health risks from carcinogens, mutagens and reproductive toxicants
- By 2015:
  developed National programs for the elimination of asbestos-related diseases

Mid-term Review Meeting in Haifa

- 28-30 April 2015, Haifa, Israel
- 37 Member States, 9 stakeholder organizations
- Assessed progress with Parma agenda
- Identified way forward to 6th Ministerial Conference, 2017



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Mid-term Review: progress?

MTR report

- *Improving environment and health in Europe: How far did we get?*

Background reports

- *Health Economics and Air Pollution*
- *Children's exposure to environmental hazards in schools*
- *Climate change and health messages from the latest IPCC*
- *Climate change and health survey*
- *Progress towards asbestos elimination*
- *Human biomonitoring: facts and figures*

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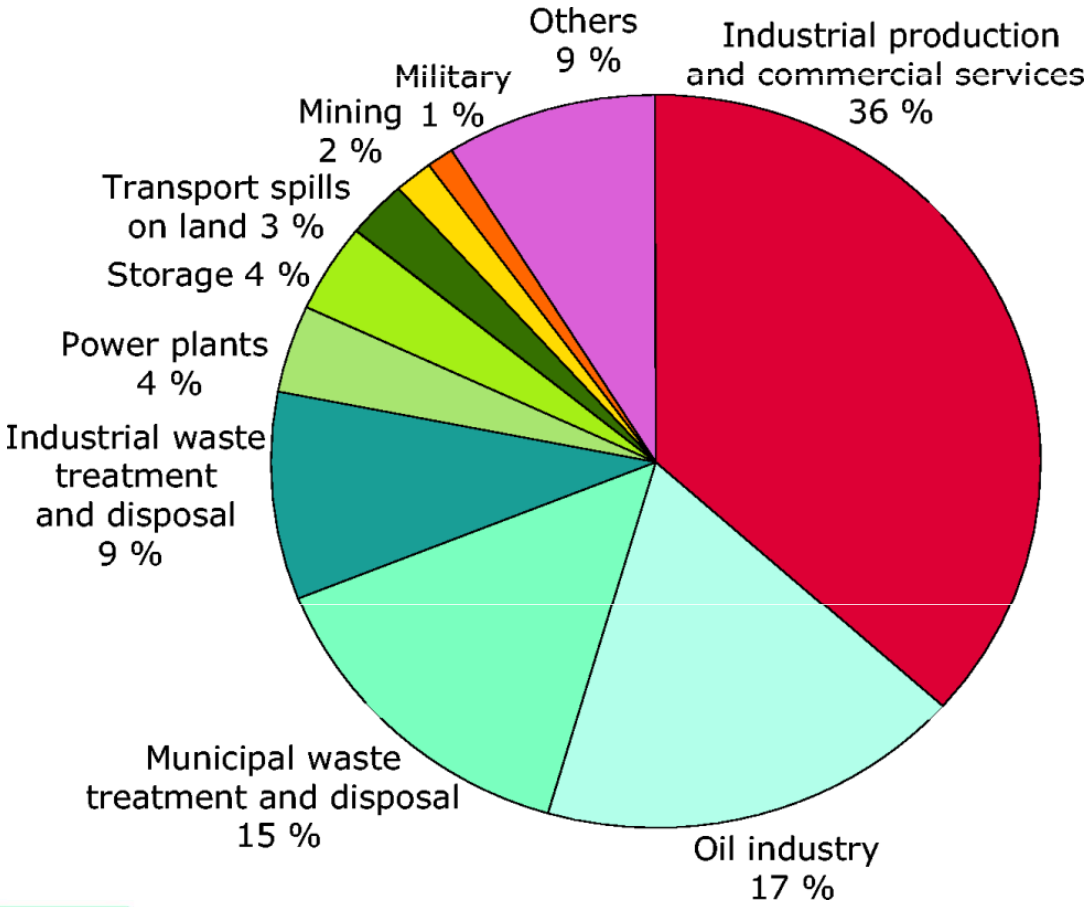
About 250,000 sites in European Environment Agency-EEA member countries are defined as requiring clean up (http://themes.eea.europa.eu/)

Sources of contamination in soil and water of European contaminated sites



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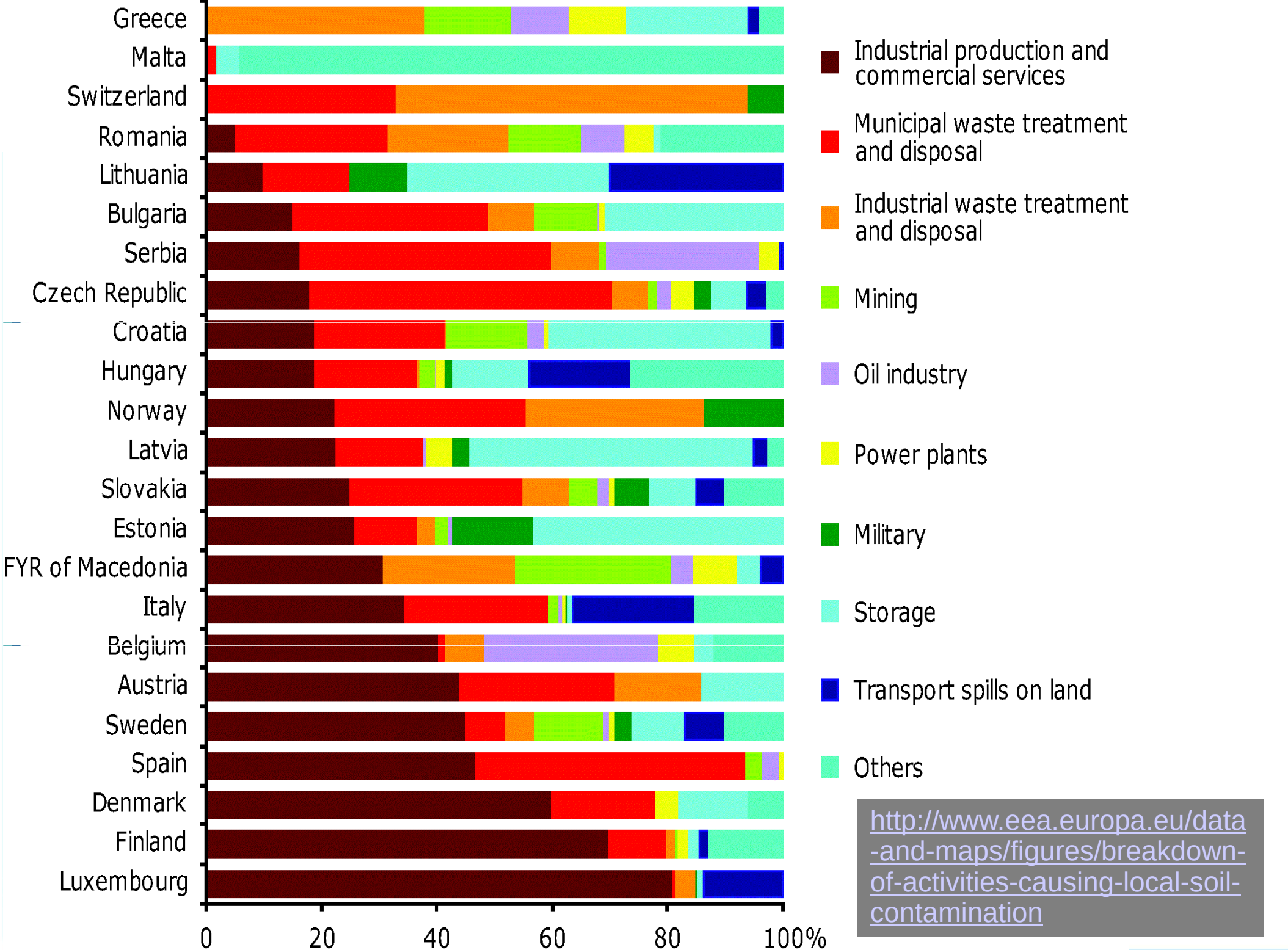

http://www.eea.europa.eu/data-and-maps/figures/breakdown-of-activities-causing-local-soil-contamination