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Future challenges and priorities for prevention

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What prevention measures will work to reduce priority exposures?

- British study showed that workplace cancers are a concern
- Current occupational cancer burden is caused by a relatively small number of agents
- Without action burden in the future will stay at **13000 new cancers annually**
- Action now will avoid occupational cancers in new workers
- **Focused** effort could ensure the occupational cancer burden becomes much less:
  - Small and medium sized companies, self employed workers, in addition to larger companies
  - Dusts, fibres, fumes, gases through inhalation e.g. asbestos, silica, wood dust, diesel exhaust, welding fumes
  - Solar radiation – encourage use of sunscreens and appropriate clothing
  - Shift (night) work

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Predicting Future Burden: testing effectiveness of potential interventions

- Changing balance between past and future exposure as we predict forward in time

Baseline scenario – no intervention, continuing pattern of past exposure

Interventions - can test, for example:

- Introduction exposure standards or reduction current limits
- Improved compliance to an existing exposure standard
- Different timings of introduction (2010, 2020 etc)
- Compliance levels e.g. according to workplace size (self-employed, 1-49, 50-249, 250+ employees)

Compare predicted numbers from baseline 'no change' with interventions

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Illustration of policy options: silica and lung cancer

Silica: current limit 0.1 mg/m^3, 33% compliance

794 newly occurring lung cancers in 2010

No action, annual numbers remains the same

- Reduce exposure limit in all workplaces to:
  - ➢0.05 mg/m^3 in 2010
  - ➢0.025 mg/m^3 in 2010
- Improve compliance from 33% to 90% in all workplaces
- Successively enforce a new limit, 0.05 mg/m^3, and improve compliance in workplaces of different sizes

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Predicted lung cancers in 2060 from silica exposure

Test scenarios	Forecast cancers	Avoided cancers
Base-line: Limit 0.1mg/m^3, compliance 33%	794	
Reduce exposure limit		
Exposure limit 0.05mg/m^3, compliance 33%	592	202
Exposure limit 0.025mg/m^3, compliance 33%	409	385
Reduce exposure limit AND improve compliance to 90%		
Exposure limit 0.1mg/m^3, compliance 90%	102	693
Exposure limit 0.05mg/m^3, compliance 90%	49	745
Exposure limit 0.025mg/m^3, compliance 90%	21	773
Reduce limit to 0.05%, improve compliance by workplace size		
90% 250+, 33% <250, self employed	499	295
90% 50+; 33% <50, self employed	451	344
90% all sizes employed; 33% self employed	261	533
90% all workplaces	49	755

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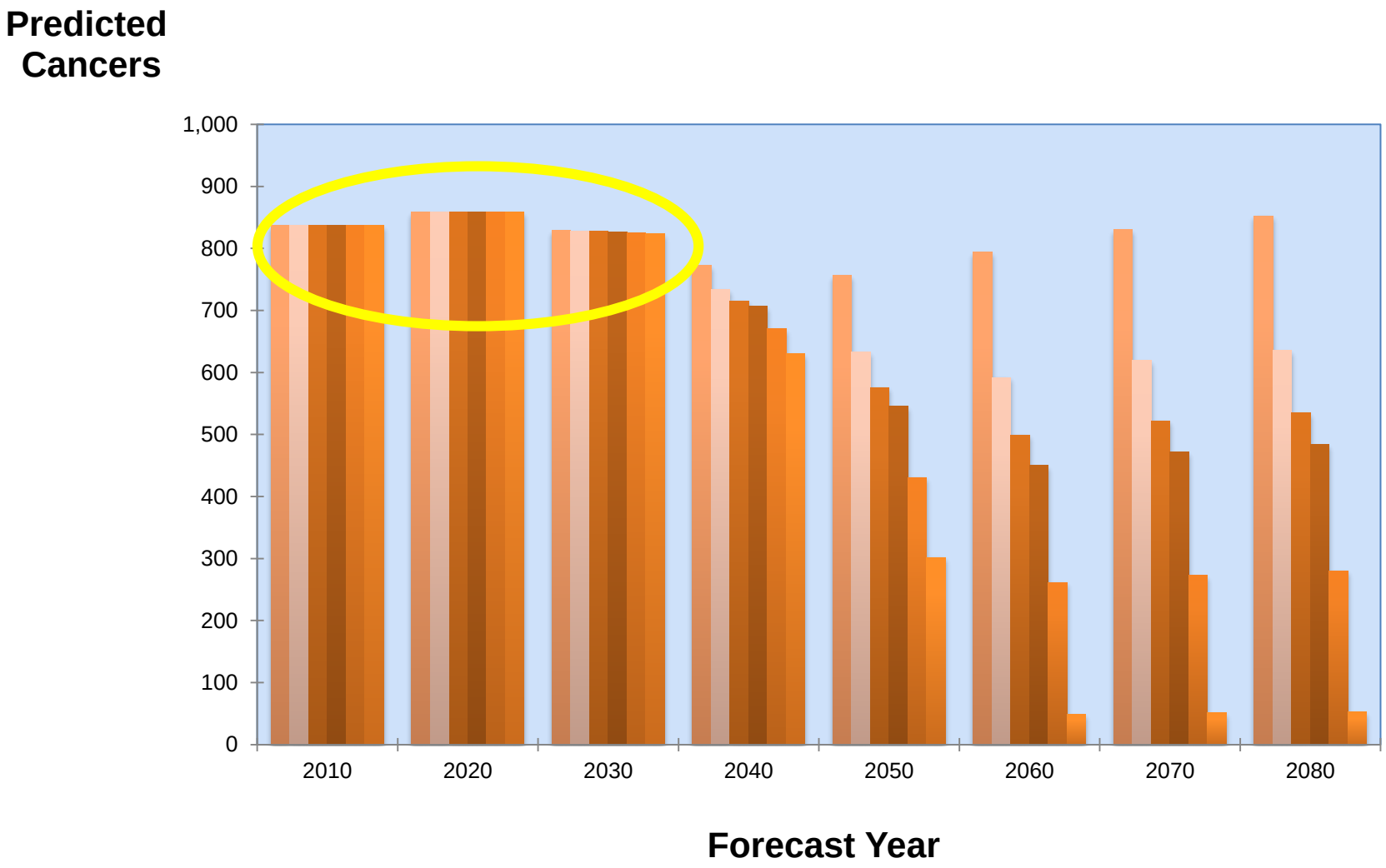
Predicted lung cancers from silica exposure:
Effect of improved compliance by workplace size



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Extension to include cost-benefit analysis – EU Study

- EC DG Employment funded project: to carry out a socioeconomic, health and environmental impact assessment of possible changes to the Carcinogens Directive
- 25 carcinogens: mixture of IARC Class 1, 2A, 2B
- Used the British methodology to model the effect of introduction and/or reduction of a workplace exposure limit
- Comparison of costs of predicted future cancers from these changes with costs to industry of implementation
- EU assumes 100% compliance
- Interested in whether any Member States are disproportionately disadvantaged

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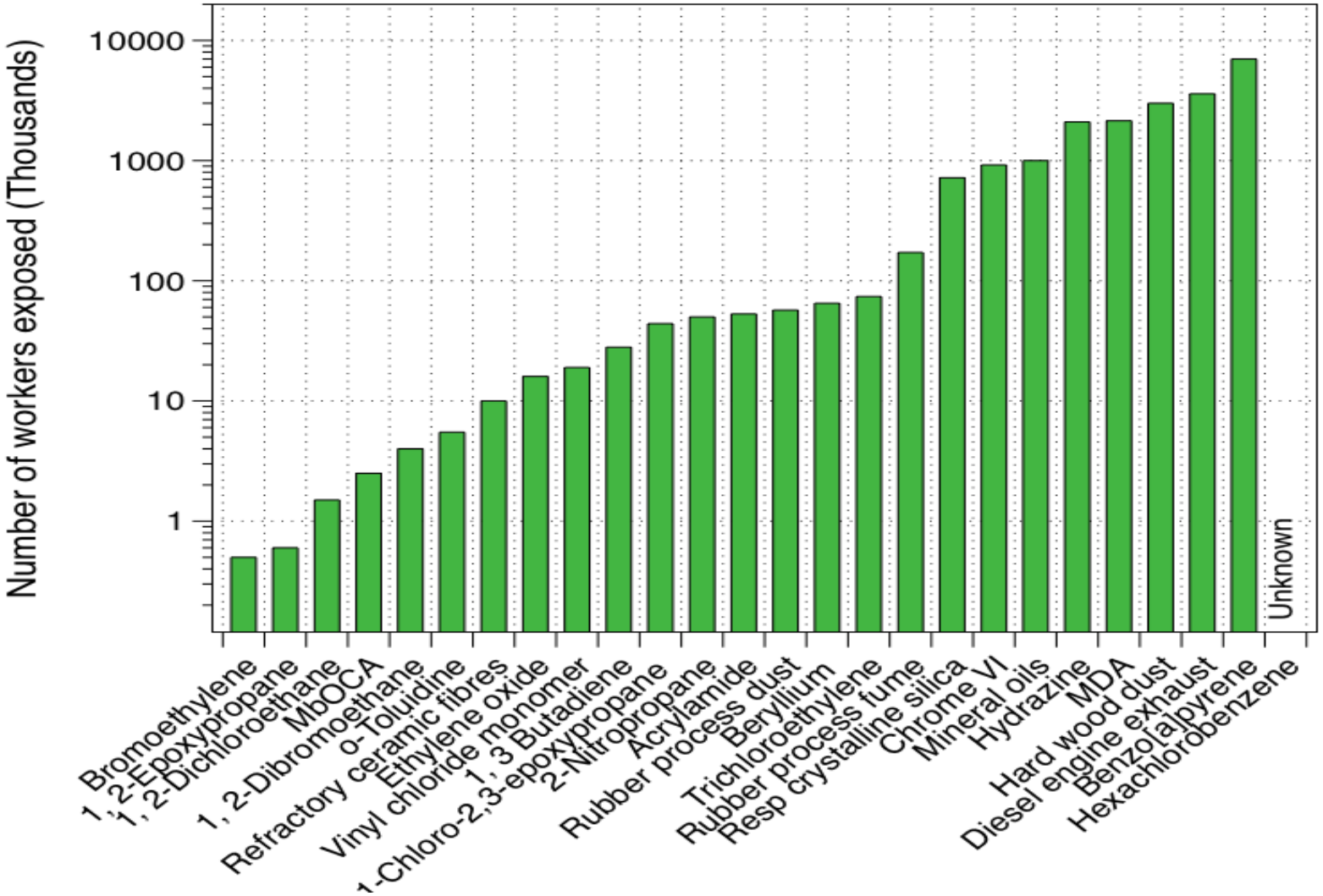
Number of people exposed...



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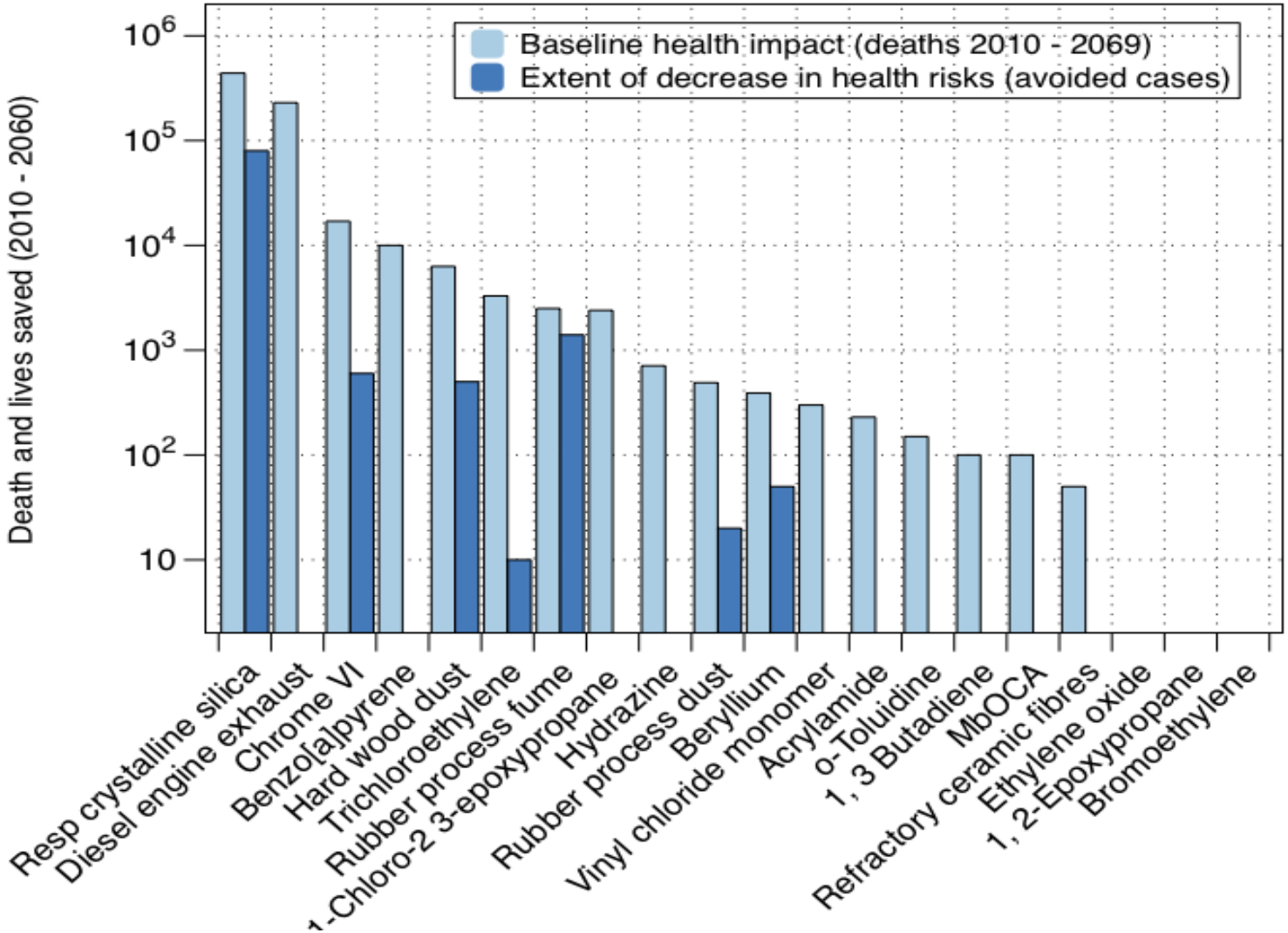
Lives saved...



Substance or mixture	OEL value (mg/m^3)	Extent of decrease in health risks (avoided cases 2010 to 2069)	Total compliance costs (€m)	Total health benefits (€m)	Benefit to cost ratio§
Respirable crystalline silica	0.2	80,000	€ 10,000	€21,000 - €56,000	**2.3 – 5.4**
	0.1	99,000	€ 19,000	€26,000 - €68,000	**1.5 – 3.5**
	0.05	110,000	€ 34,000	€28,000 - €74,000	**0.9 – 2.1**
Hard wood dust	3	500	€ 0	€11 - €51	-
	1	3,900	€3,800 - €8,600	€61 - €297	0.01 – 0.05
Chrome VI	0.1	600	€9,000 - €37,000	€159 - €456	0.006 – 0.03
	0.05	1,400	€18,000 - €67,000	€340 - €991	0.007 – 0.03
	0.025	1,800	€30,000 - €115,000	€461 - €1,327	0.006 – 0.03
Rubber process fume	0.6	1,400	€470 - €3,200	€580 - €1,200	0.25 – 1.5
Trichloroethylene	273	10	€61	€ 0	0
	50	580	€428	€120 - €430	0.3 – 1.0
Beryllium and beryllium compounds	0.002	50	€18,000 - €34,000	€11 - €30	0.0004 – 0.001
Rubber process dust	6	20	€55 - €280	€24 - €46	0.1 – 0.5

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Strength of evidence…

• Respirable crystalline silica • Chrome VI • Hardwood dust	Strong case
• Diesel engine exhaust • Rubber fume • Benzo[a]pyrene • Trichloroethylene	A case
• Hydrazine • Epichlorohydrin • O-Toluidine • Mineral oils as used engine oil • MDA	A limited case

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Challenges in burden estimation

- Choice of diseases and risk factors: magnitude depends on which and how many included
- Latency (risk exposure period):
  - Carcinogens, solid tumours 10-50 years; leukaemias 0-20 years
- Inclusion of short term workers?
- Data challenges:
  - Risk estimates: choice of studies, imprecision/HWE,
  - Risk estimate study exposure levels ≠ burden population exposure
  - Proportion exposed over REP: unknown for different exposure levels

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What next?

- Prediction of future burden under different policy options – build on UK FB study
- Extend to costs
- Other developments and trends:
  - Effects of outsourcing
  - Transient labour force
  - Migrant workforces (Singapore)
- Transfer of burden from developed to developing countries

Thank you