Occupational carcinogens
Where Australia ranks

Professor Lin Fritschi, School of Public Health, Curtin University

Australian Workplace Exposure Studies (AWES)

- Cross-sectional telephone survey of 5000 Australian workers
  - Ages 18 to 65
  - In work in the previous week
- Ask questions about what they do at work
- Assess exposure using OccIDEAS (www.occideas.org)
- Extrapolate to the Australian national working population

How many Australian workers are exposed to carcinogens at work?

Men 57%

Women 22%

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Exposure to carcinogens, males

Carey et al, 2014

	Population n and %	Most Common Occupational Groups
Solar ultraviolet radiation	1,738,000 **37%**	Farmer, Animal/Horticultural, Painter
Diesel engine exhaust	1,345,000 **29%**	Farmer, Heavy Vehicle Driver, Miner
Environmental tobacco smoke	1,164,000 **25%**	Painter, Plumber, Hospitality
Benzene	636,000 **14%**	Farmer, Animal/Horticultural, Automobile Driver
Silica	543,000 **12%**	Miner, Construction, Engineer
Lead	502,000 **11%**	Painter, Vehicle Worker, Plumber
Wood dust	449,000 **10%**	Carpenter, Painter, Handyperson

Exposure to carcinogens, females

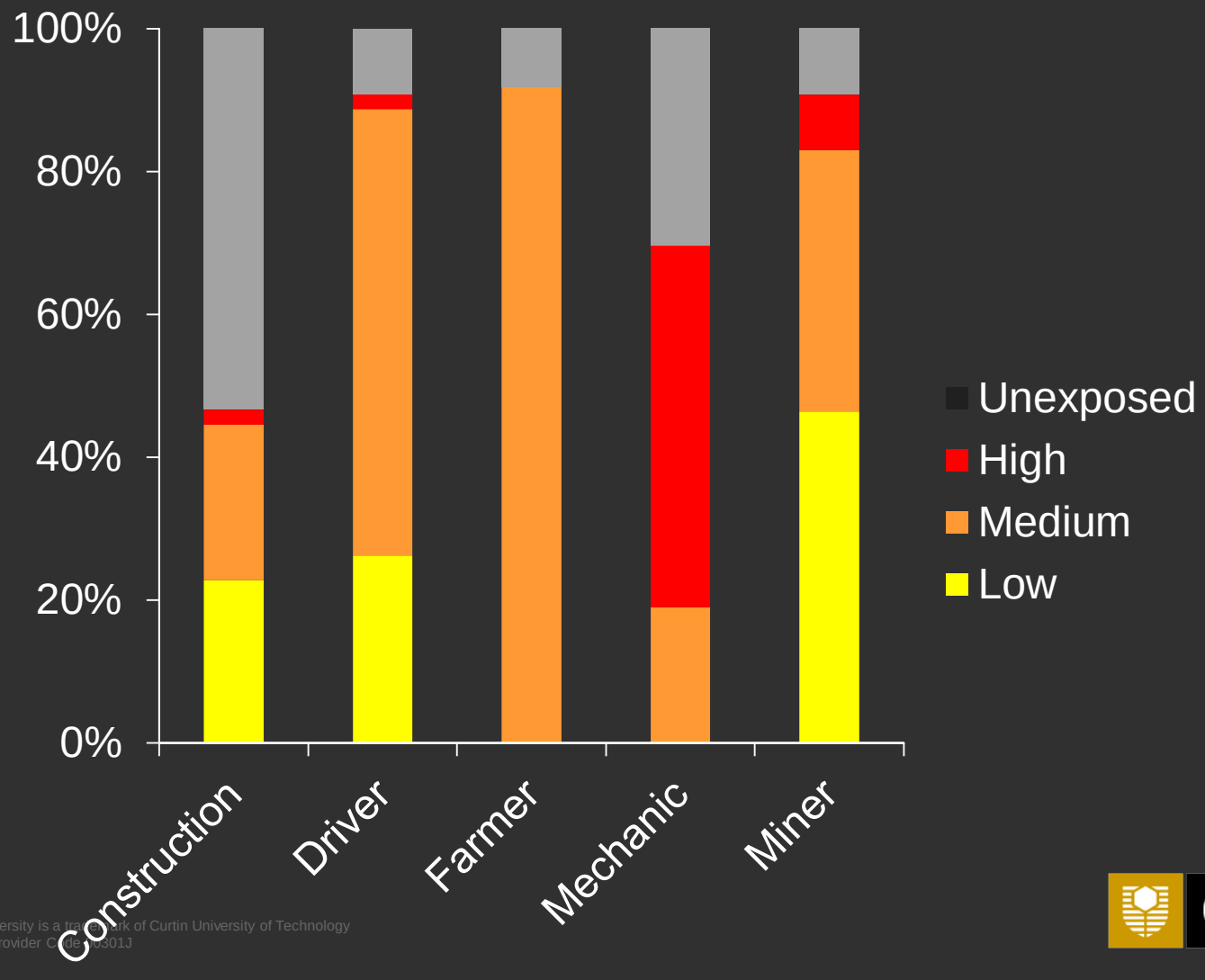
Carey et al, 2014

	Population n and %	Most Common Occupational Groups
Solar ultraviolet radiation	334 870 7.9%	Farmer, handyperson, automobile driver
Diesel engine exhaust	255 200 6.0%	Metal worker, heavy vehicle driver, miner
Shiftwork	192 730 4.5%	Passenger transport, emergency worker, nurse
Benzene	217 200 5.1%	Farmer, automobile driver, animal/horticultural
Environmental tobacco smoke	247 360 5.8%	Construction, miner, heavy vehicle driver
Ionizing radiation	99 940 2.3%	Health professional, scientist, nurse
PAHs	104 720 2.5%	Farmer, emergency worker, food service

Diesel engine exhaust

- 37% male workers
- 6% female workers

Diesel Exhaust – Most Common Jobs



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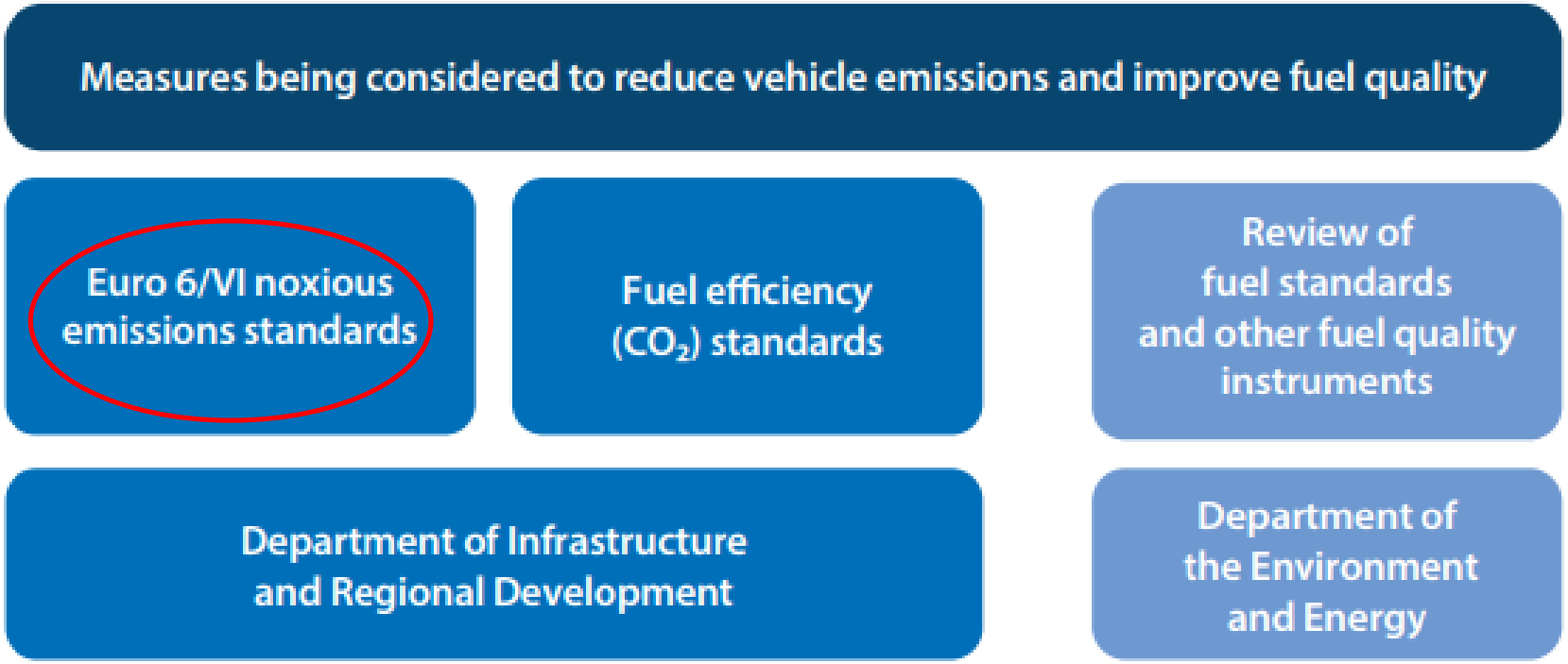
Why is diesel exhaust a problem?

- Exhaust contains gases (e.g. nitrogen oxide) particles, volatile compounds and PAHs.
- Associated with respiratory illness, cardiovascular disease and cancer.
- Australia has about 1500 deaths a year attributable to air pollution, with about half being due to road transport

What's happening in Australia?

Figure 1: Relationship between Australian Government motor vehicle emissions reduction activities



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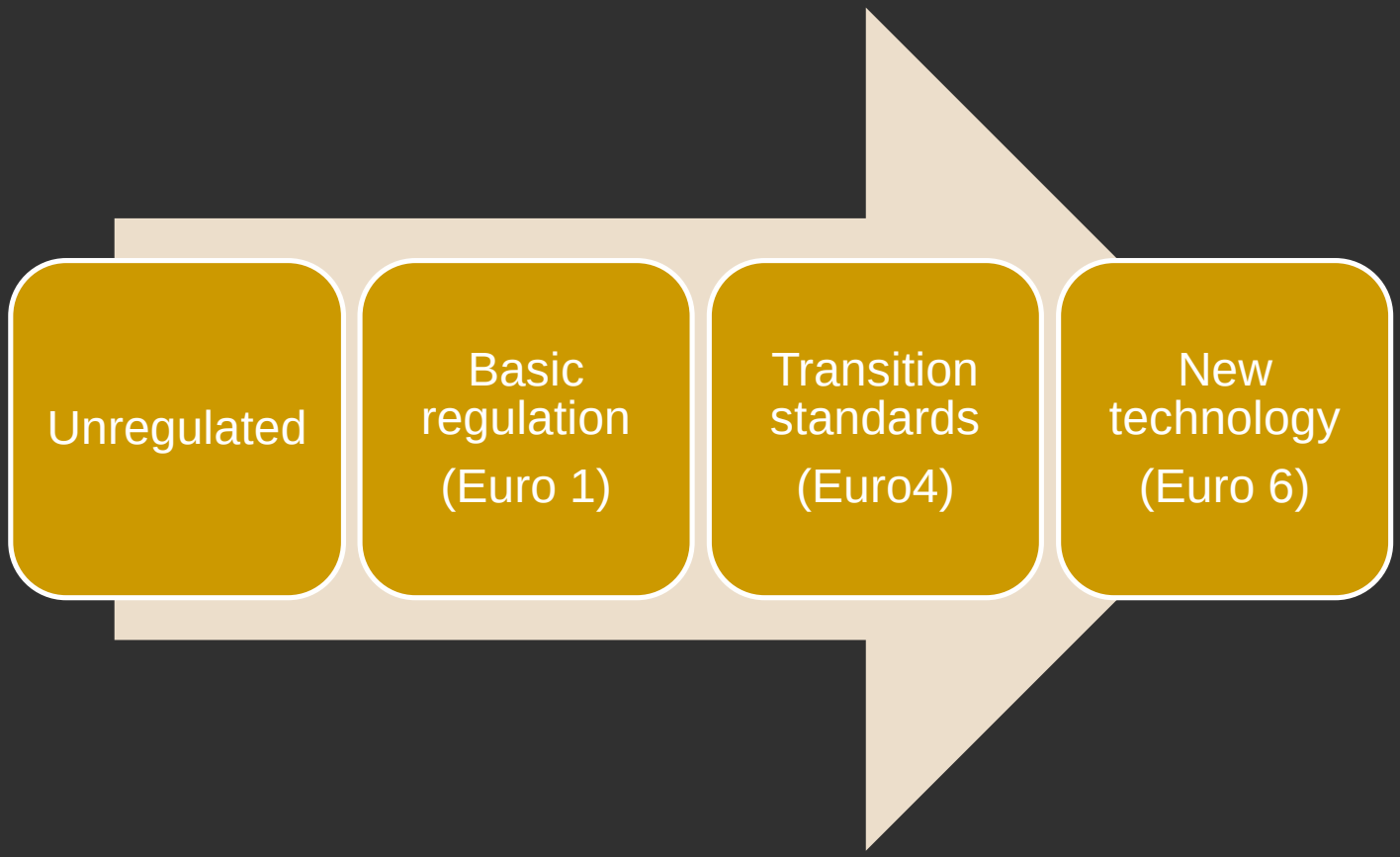
Standards (highly simplified!)



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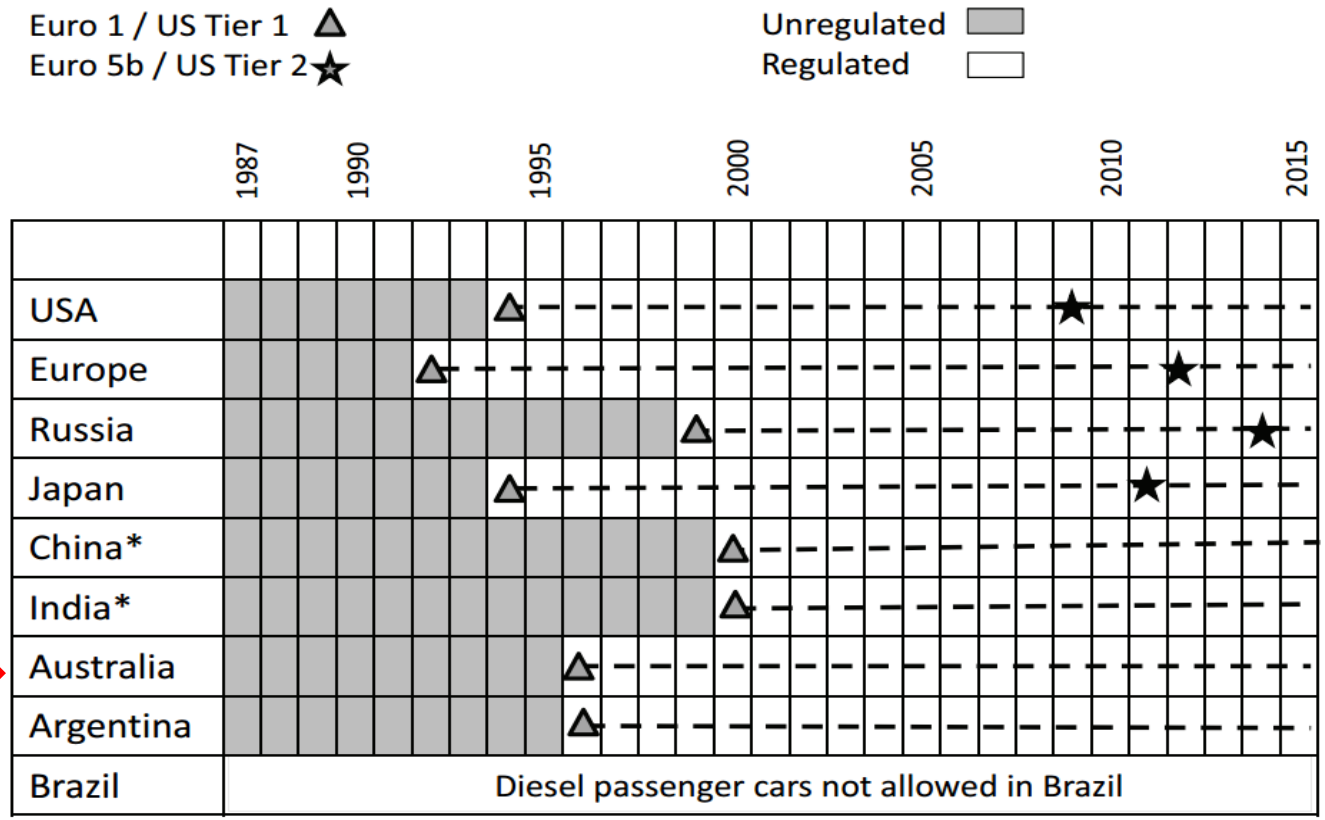
Emission standards – cars

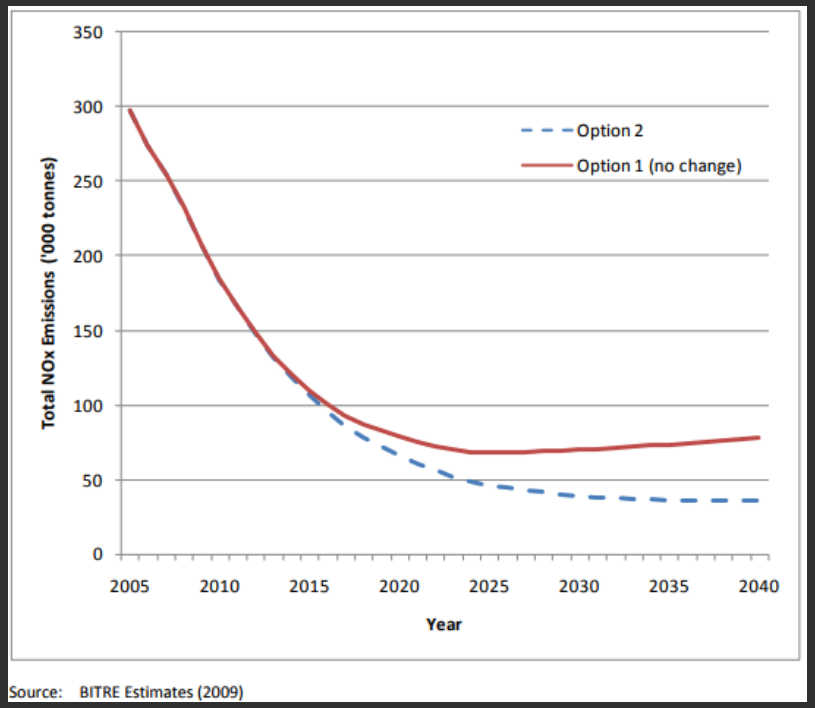
Fig. 1.13 Implementation schedule of passenger car diesel emission standards in selected countries



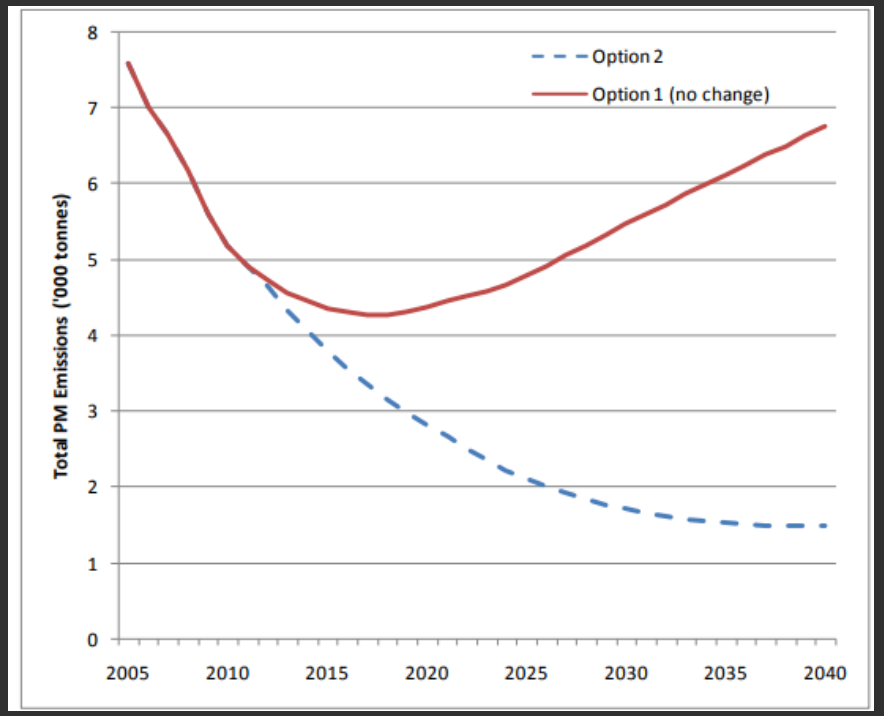
* Nationwide

Compiled by the Working Group

Introduction of Euro 6 for cars



Source: BITRE Estimates (2009)



Option 2: Introduction of Euro 5/6 on earliest practical timeframes

Regulation Impact Statement, 2010
Dept of Infrastructure and Transport

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Euro 6 for light vehicles under the Motor Vehicle Standards Act 1989

- net benefit of $411 million over the period from 2016 to 2040
- 55% reduction in the emission limits for Nox

- Vehicle emissions standards for cleaner air Draft Regulation Impact Statement Ministerial Forum on Vehicle Emissions December 2016

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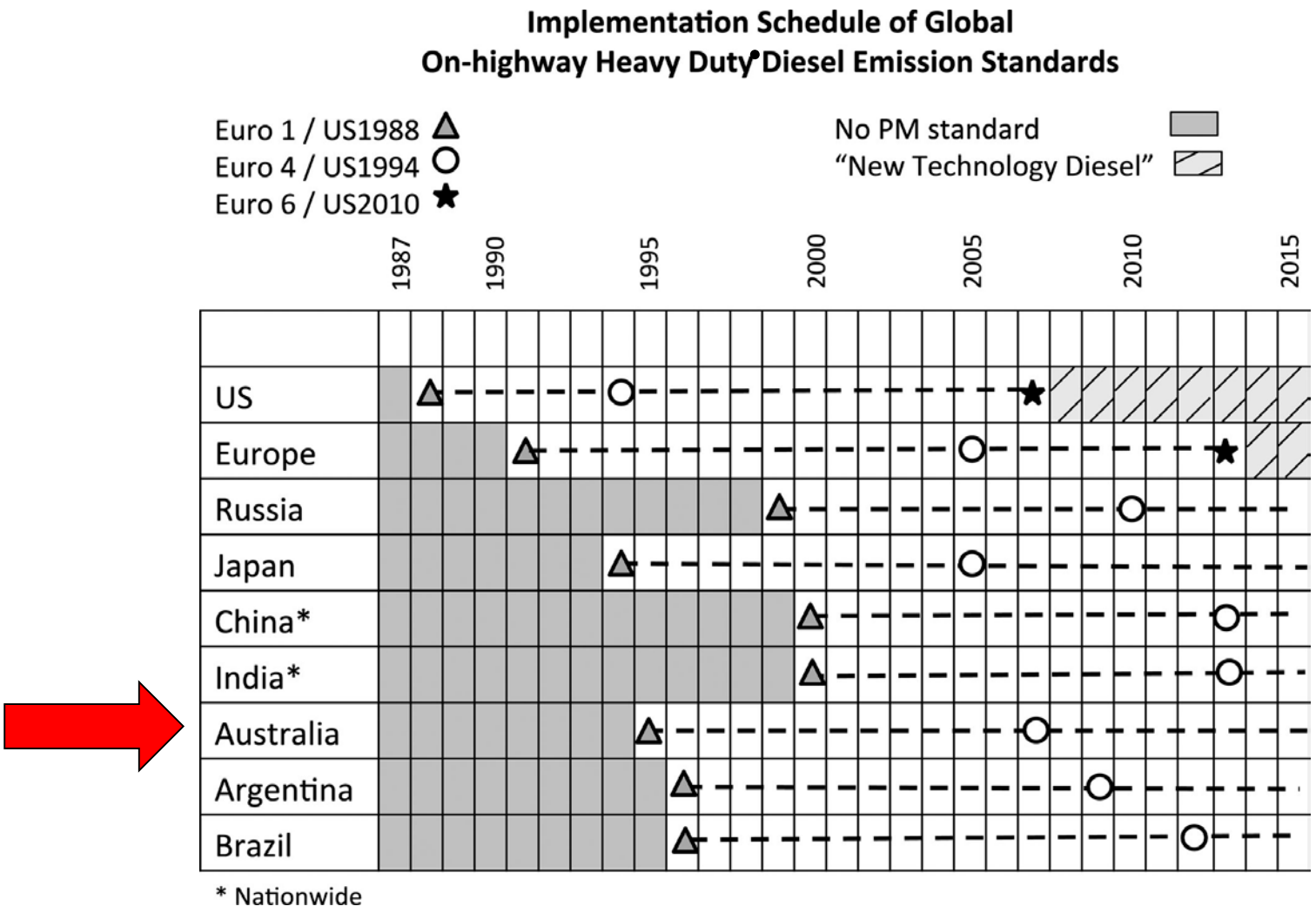
Implementation schedule of global on-highway heavy diesel duty diesel engine emission standards.



Paul T J Scheepers, and Roel C H Vermeulen Occup Environ Med 2012;69:691-693

Euro VI for heavy vehicles under the Motor Vehicle Standards Act 1989

- net benefit of $264 million over the period 2016 to 2040
- 70% reduction in emission limits for hydrocarbons
- 77-80% reduction in the emission limits for Nox
- 50-66% reduction in the mass emission limits for particulates

- Vehicle emissions standards for cleaner air Draft Regulation Impact Statement Ministerial Forum on Vehicle Emissions December 2016

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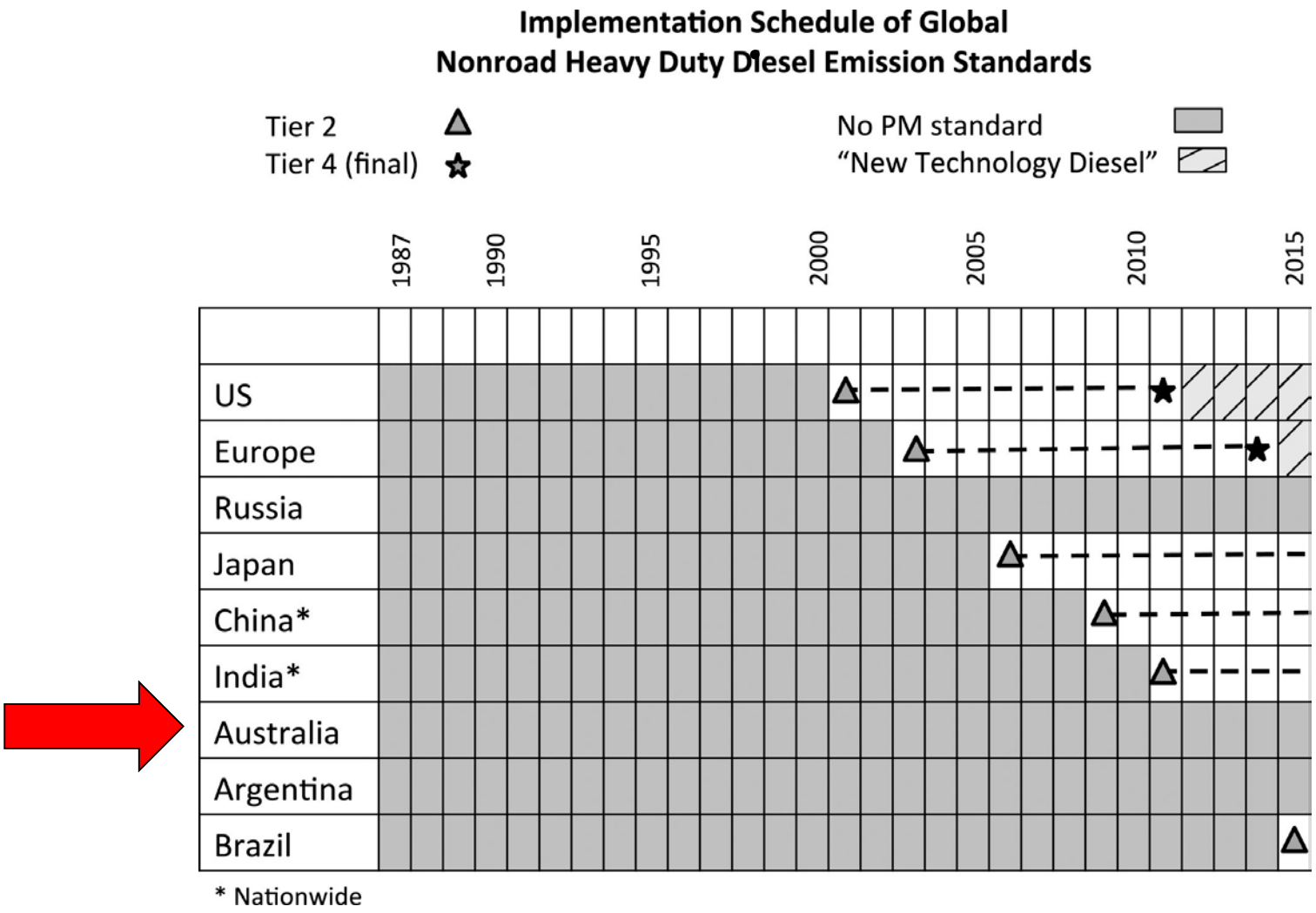
Implementation schedule of global nonroad heavy diesel duty diesel engine emission standards.



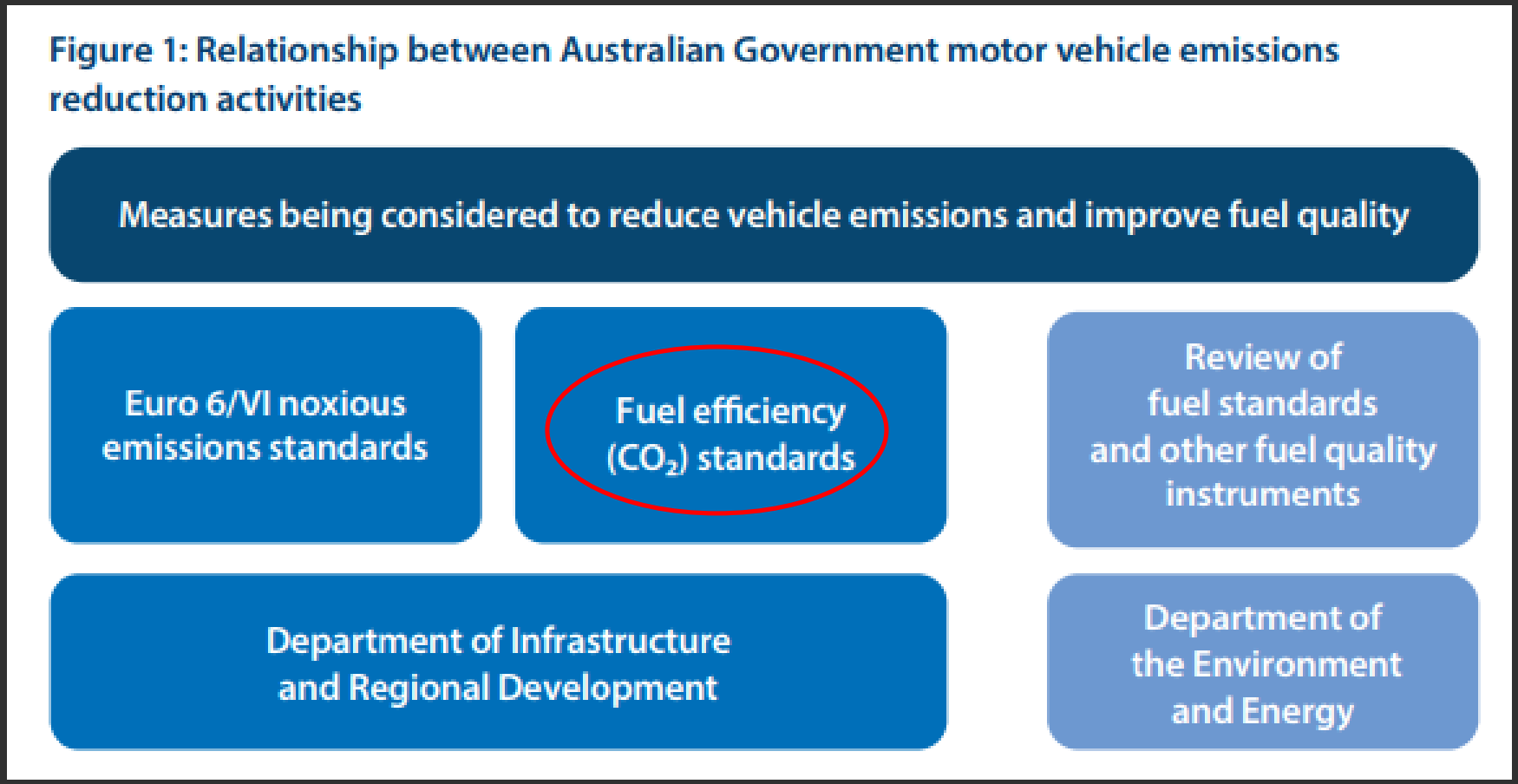
Paul T J Scheepers, and Roel C H Vermeulen Occup Environ Med 2012;69:691-693

Non-road diesel emissions

- No national regulations
- Department of the Environment and Energy
- Significant health benefits ($2.5 to $4.7 billion by 2030) could potentially be achieved by actions to reduce PM10 and nitrogen oxide emissions (Environ 2010)
- National Clean Air Agreement

  "The potential for a national approach to manage non-road diesel and marine engine emissions will be evaluated under the Agreement's priority setting process."

What are we doing in Australia?



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Proposed new 'carbon **tax' on cars** would raise prices by more than ...
dailytelegraph.com.au - 1 hour ago
The Turnbull Government has proposed a new 'carbon **tax' on cars** that will push up the price of **Australia's** most popular **cars** by more than ...

Australia's most popular **cars** to cost $5000 more under 'carbon **tax** ...
The Sydney Morning Herald - 4 hours ago

Car carbon **tax** 'as likely as Elvis comeback'
Sky News Australia - 4 hours ago

Mooted **car** carbon **tax** 'would push up prices'
The Australian - 12 hours ago

Car carbon **tax**? Elvis comeback more likely
NEWS.com.au - 2 hours ago

Improving the efficiency of new light vehicles
Draft Regulation Impact Statement Ministerial Forum on Vehicle Emissions
December 2016

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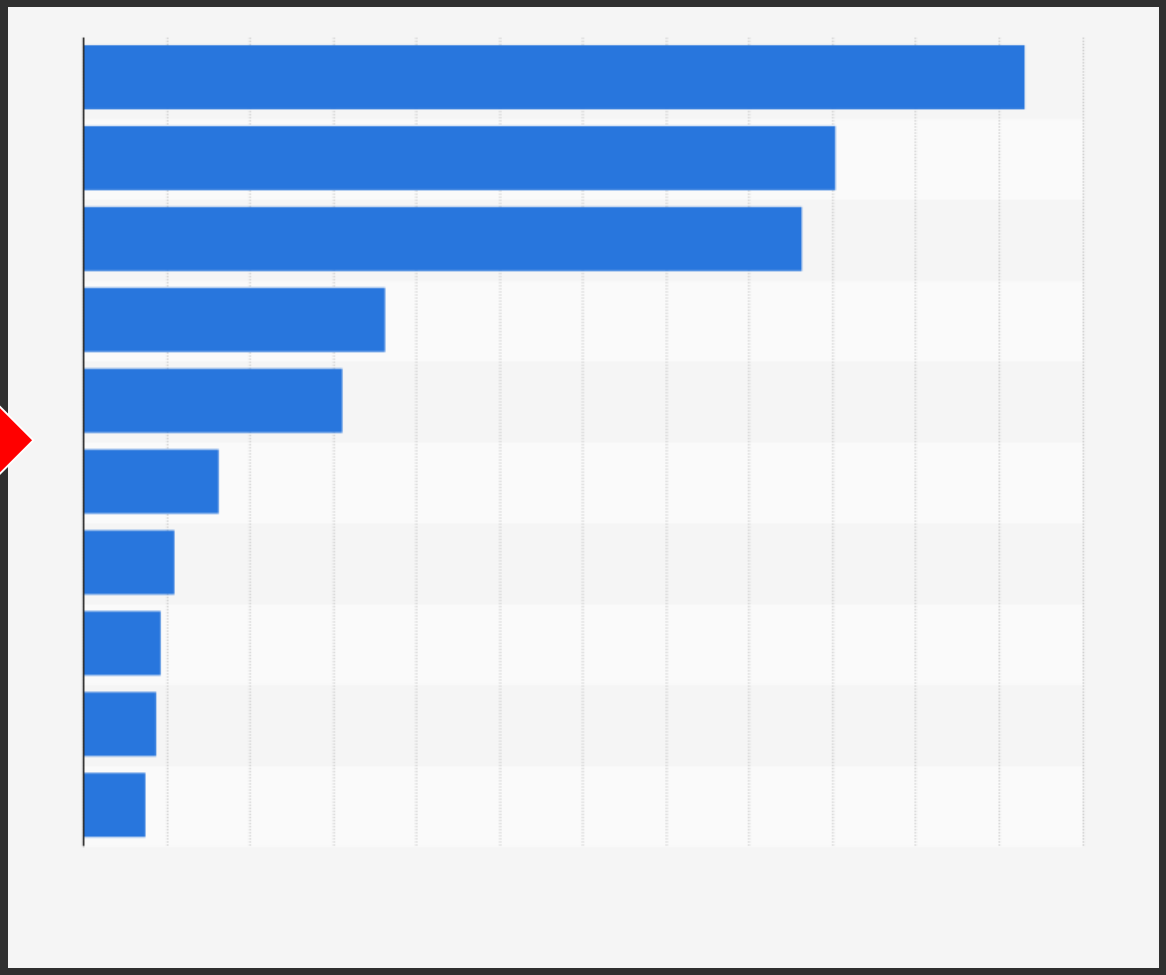
Diesel exhaust: where does Australia rank?



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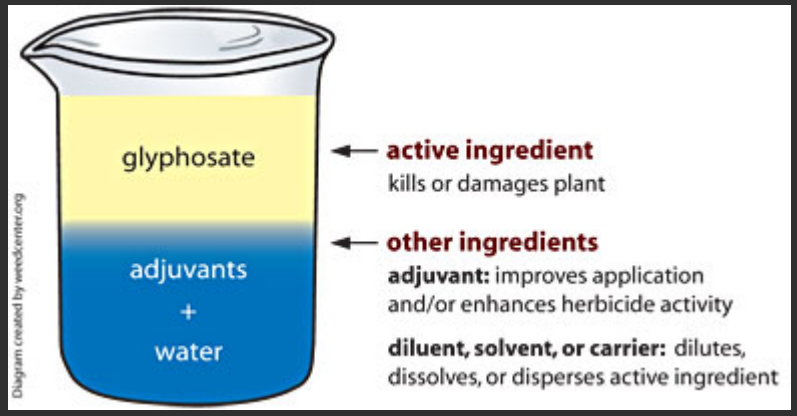
Glyphosate

- Most widely used herbicide in the world
  - Over 720 000 tonnes a year used
- Broad-spectrum, post-emergent, non-selective, systemic herbicide – effectively kills or suppresses all plant types
- Use expanded after GM crops were introduced



International Agency for Research in Cancer Working group, March 2015

- Experts
  - Exposure assessment
  - Epidemiology
  - Animal studies
  - Mechanisms
- Invited specialists
- Representatives of national and international health agencies
- Observers
- Secretariat

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Conclusion: Glyphosate is probably carcinogenic to humans

- Human evidence = limited
- Animal evidence = sufficient
- Mechanistic evidence = strong

International Agency for Research on Cancer

World Health Organization

20 March 2015

IARC Monographs Volume 112: evaluation of five organophosphate insecticides and herbicides

Lyon, France, 20 March 2015 – The International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization, has assessed the carcinogenicity of **five organophosphate pesticides**. A summary of the final evaluations together with a short rationale have now been published online in The Lancet Oncology, and the detailed assessments will be published as Volume 112 of the IARC Monographs.

What were the results of the IARC evaluations?

The herbicide **glyphosate** and the insecticides **malathion** and **diazinon** were classified as *probably carcinogenic to humans* (Group 2A).

The insecticides **tetrachlorvinphos** and **parathion** were classified as *possibly carcinogenic to humans* (Group 2B).

Press

Local councils still using weed killer glyphosate despite WHO warning it 'probably causes cancer'

By the National Reporting Team's Josie Taylor

Updated 16 Feb 2016, 11:46am

Stop Glyphosate

ission, the Food Safety Commissioner Vytenis Andriukaitis, and responsible States.

No more weed killer in our bodies. Decline the licence renewal of glyphosate, a poison commonly

In the news

Big Green ignores science in campaign against glyphosate

The Australian - 12 hours ago

One example shows how easy it is to subvert the **scientific** process. The **campaign against** glyphosate (Roundup) weedkiller, has resulted in ...

Will California declare glyphosate a carcinogen?

State agency has one year to decide

Todd Fitchette | *Western Farm Press* *Oct 29, 2015*

Toxicologist critical of 'dodgy science' in glyphosate bans

ABC Rural By Sarina Locke

Print Email Facebook Tweet More 202

Updated 27 May 2015, 6:34pm

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Pesticide manufacturers

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IARC's Report on Glyphosate

In March 2015, IARC convened a meeting to evaluate the potential carcinogenic risks to humans from several pesticides, including glyphosate, an active ingredient in many popular herbicides, including Roundup brand herbicides. After that meeting the IARC panel classified glyphosate in Category 2A, a category that also includes red meat.

Based on the overwhelming weight of evidence, Monsanto strongly disagrees with IARC's classification of glyphosate.

European Food Safety Authority

Glyphosate: EFSA updates toxicological profile

EFSA and the EU Member States have finalised the re-assessment of glyphosate, a chemical that is used widely in pesticides. The report concludes that glyphosate is unlikely to pose a carcinogenic hazard to humans and proposes a new safety measure that will tighten the control of glyphosate residues in food. The conclusion will be used by the European Commission in deciding whether or not to keep glyphosate on the EU list of approved active substances, and by EU Member States to re-assess the safety of pesticide products containing glyphosate that are used in their territories.

European Food Safety Authority report

Report structure and sections[17]	Confidentiality assessment
Study Title	Disclosed. Only Article 63(2) and personal data will not be disclosed
Introductory and administrative pages. GLP statements	Not disclosed in order to protect the economic investment of the study owners. Not relevant for an independent scrutiny of the EFSA assessment.
Table of content	Disclosed. Only Article 63(2) and personal data will not be disclosed
Summary	Not disclosed in order to protect the economic investment of the study owners. Not relevant for an independent scrutiny of the EFSA assessment as a sanitised summary and the EU study assessment are already published.
Introduction/Background	Not disclosed in order to protect the economic investment of the study owners. Not relevant for an independent scrutiny of the EFSA assessment as a sanitised summary and the EU study assessment are already published.
Material, experimental conditions, methods	Not disclosed in order to protect the economic investment of the study owners. Not relevant for an independent scrutiny of the EFSA assessment as these are guideline studies, for which the methodology is available and the relevant methodological details and deviations are included in the sanitised summary and the EU study assessment already published.
Other administrative GLP sections (e.g. archives)	Not disclosed in order to protect the economic investment of the study owners. Not relevant for an independent scrutiny of the EFSA assessment.
Results/Discussion/Conclusions	Not disclosed in order to protect the economic investment of the study owners. Not relevant for an independent scrutiny of the EFSA assessment as the section presents the views of the study authors, not EFSA views. The EU study assessment is already published.

EFSA vs IARC

	IARC	EFSA
Panel members names	Publically available	Anonymous
Conflicts of interests	Publically available	Not provided
Data used	Publically available	Including unpublished
Report format	Publically available	Heavily redacted

Australian Pesticides and Veterinary Medicines Authority

The APVMA has completed its assessment of the IARC report and other recent assessments of glyphosate and has concluded that the use of glyphosate in Australia does not pose a cancer risk to humans—see more information below.

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Chemical regulation in Australia

- Mulitple agencies
- Multiple Departments/Ministers
- State/Federal
- Overlapping and sometimes unclear responsibilities
- “User pays” models for some agencies

Thank you

NHMRC