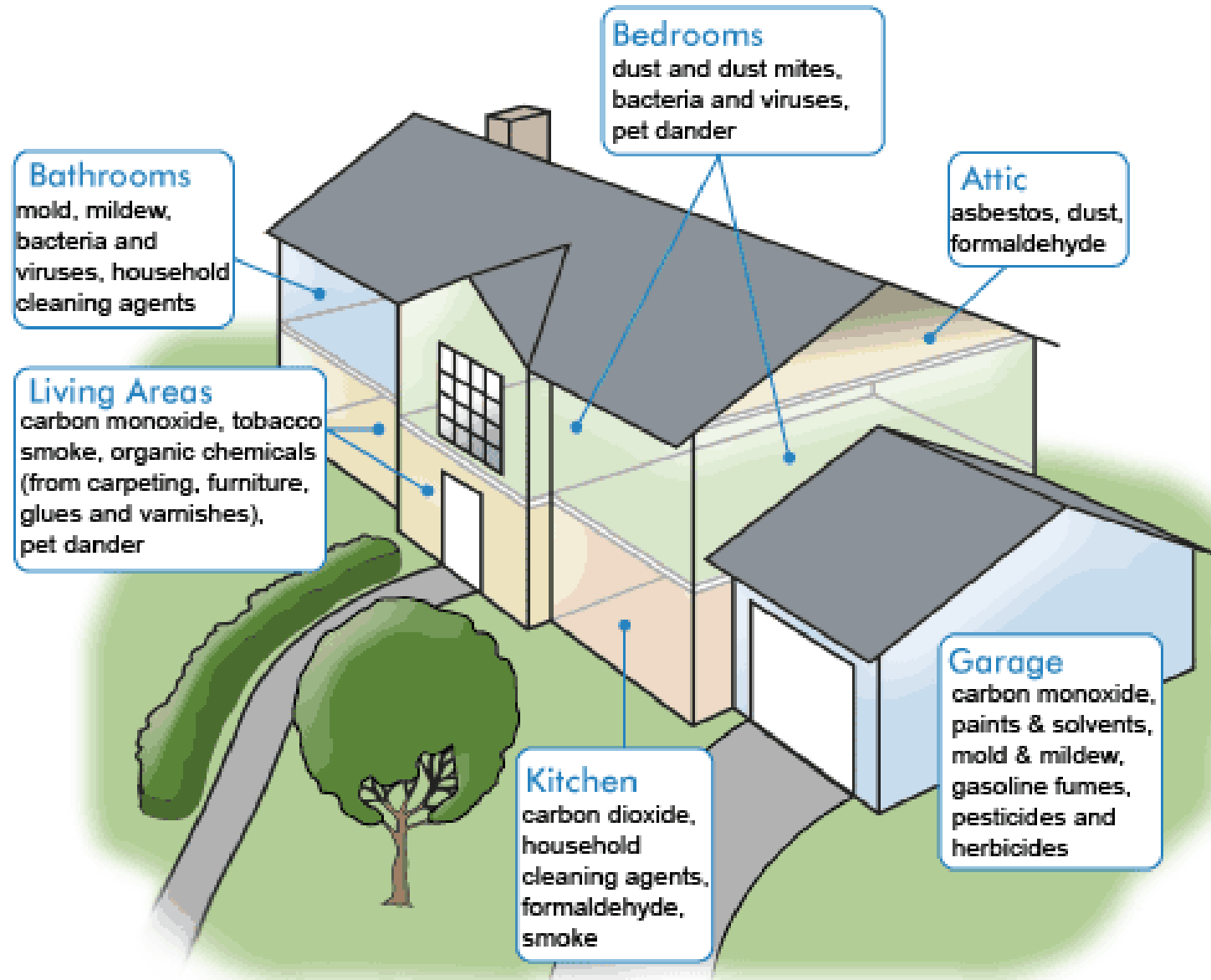
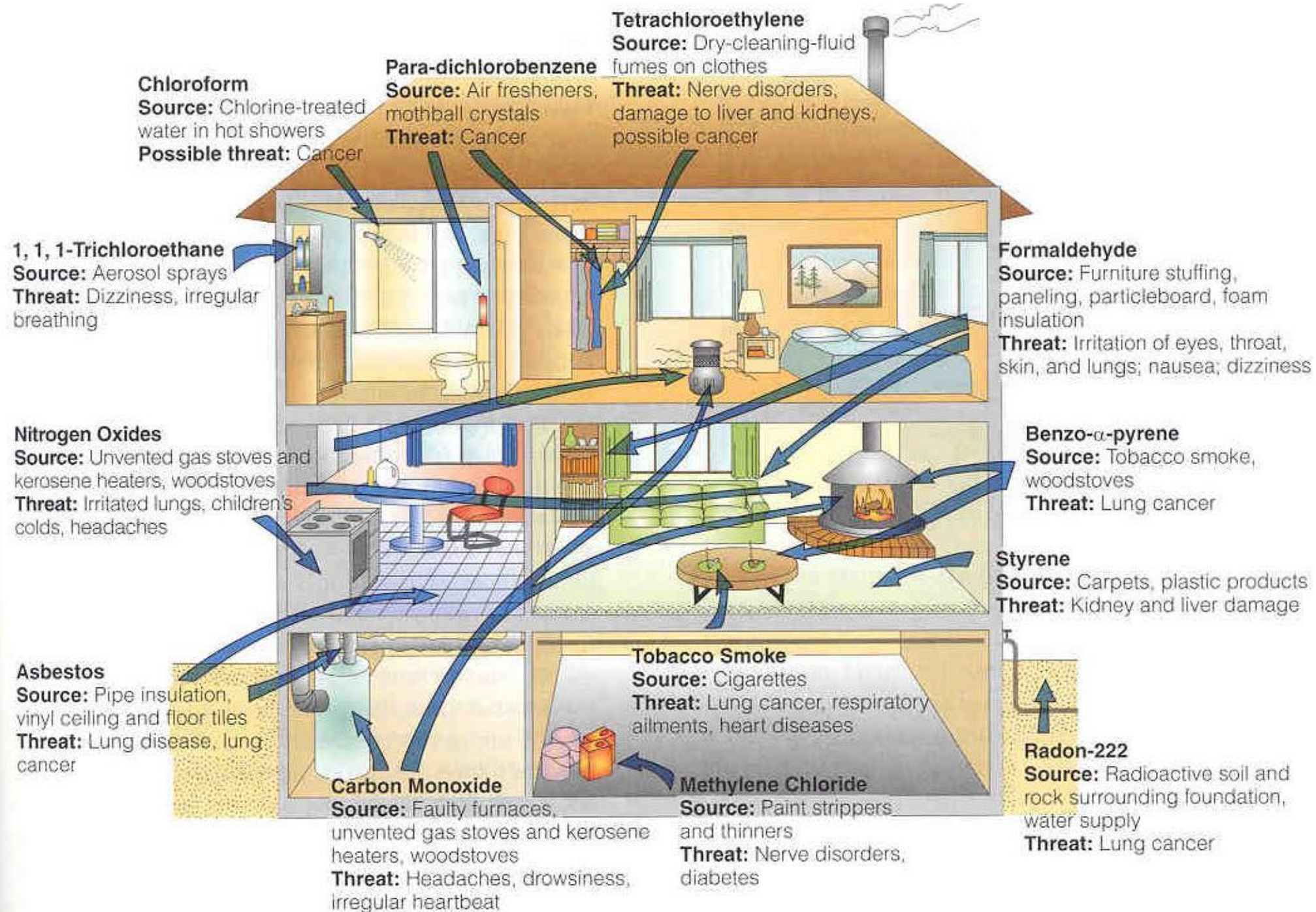


Category	Source	Emitted pollutants
Agriculture or Haze	Open burning	SPM, CO, VOC
Mining and quarrying	Coal mining	SPM, SO ₂ , NO _x , VOC
Industries	Food, beverages and tobacco	SPM, CO, VOC, H ₂ S
	Textiles and leather industries	SPM, VOC
	Wood products	SPM, VOC
	Paper products, printing	SPM, SO ₂ , CO, VOC, H ₂ S, R-SH
	Chemicals	SPM, SO ₂ , CO, VOC
Petroleum refineries	Miscellaneous products of petroleum and coal	SPM, SO ₂ , NO _x , CO, VOC
Transport	Automobile vehicle exhaust	NO _x , CO, CO ₂ , PM, Hydrocarbons
Power generation	Electricity, gas and steam	SPM, SO ₂ , NO _x , CO, VOC, SO ₃ , Pb
Indoor	Printing machines, Building Materials	VOC, HCHO, O ₃ , biological contaminants, CO, CO ₂

Indoor Air Pollution Sources





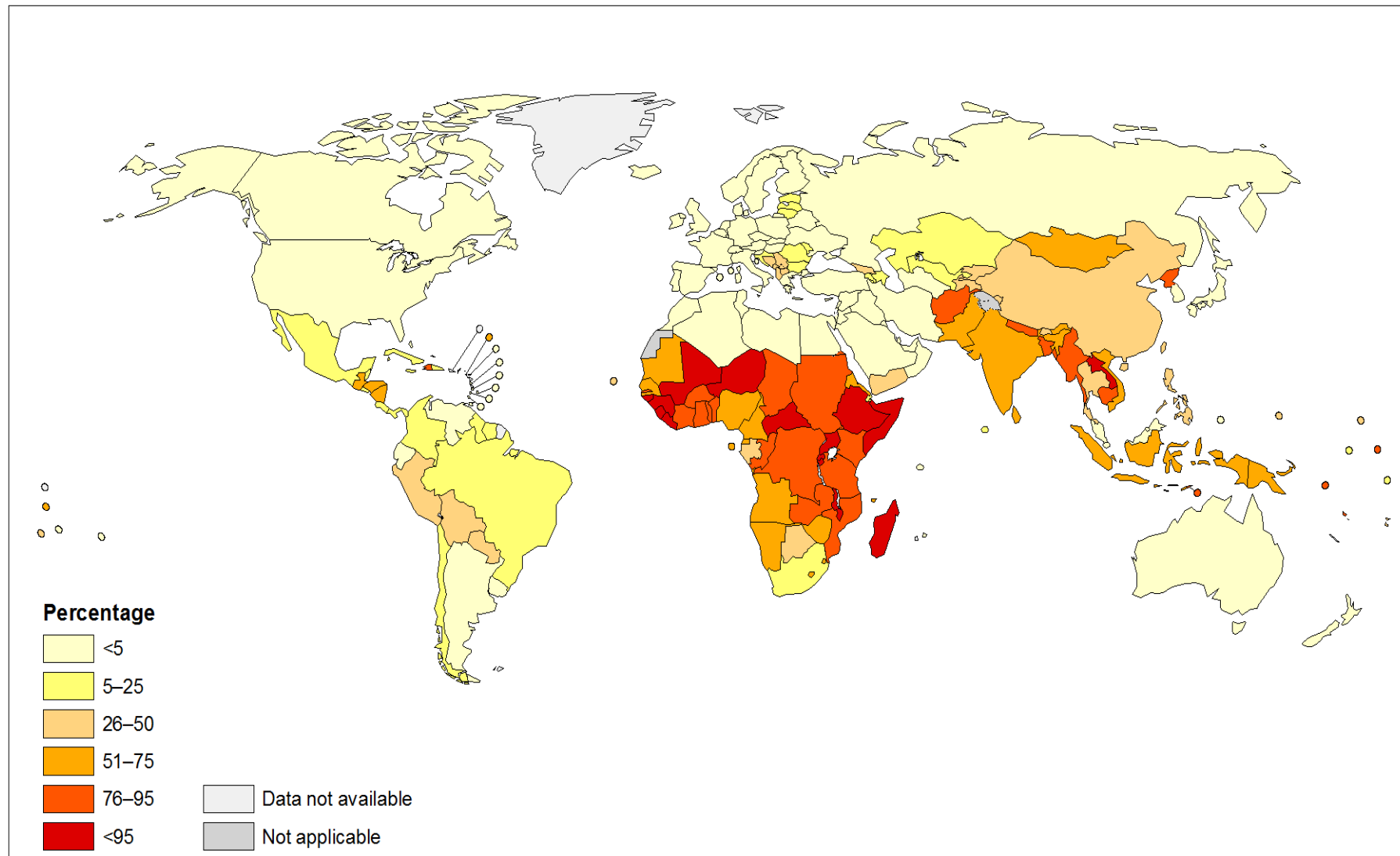
Control

Pollutant	Ventilation	Exclusion & Removal	Product Selection	Maintenance
Radon	✓ ☐	✓ ☐		
Cigarette Smoke	✓ ☐	✓ ☐		
Asbestos		✓ ☐	✓ ☐	✓ ☐
Toxic Chemicals	✓ ☐	✓ ☐	✓ ☐	
Inorganic Bases	✓ ☐			✓ ☐
Micro-organisms				✓ ☐

Reference: Dubeck et al, "A world View of environmental Issues", Saunders College Publishing, 2nd Ed. , 1998

Population using solid fuels (%), 2010

Total



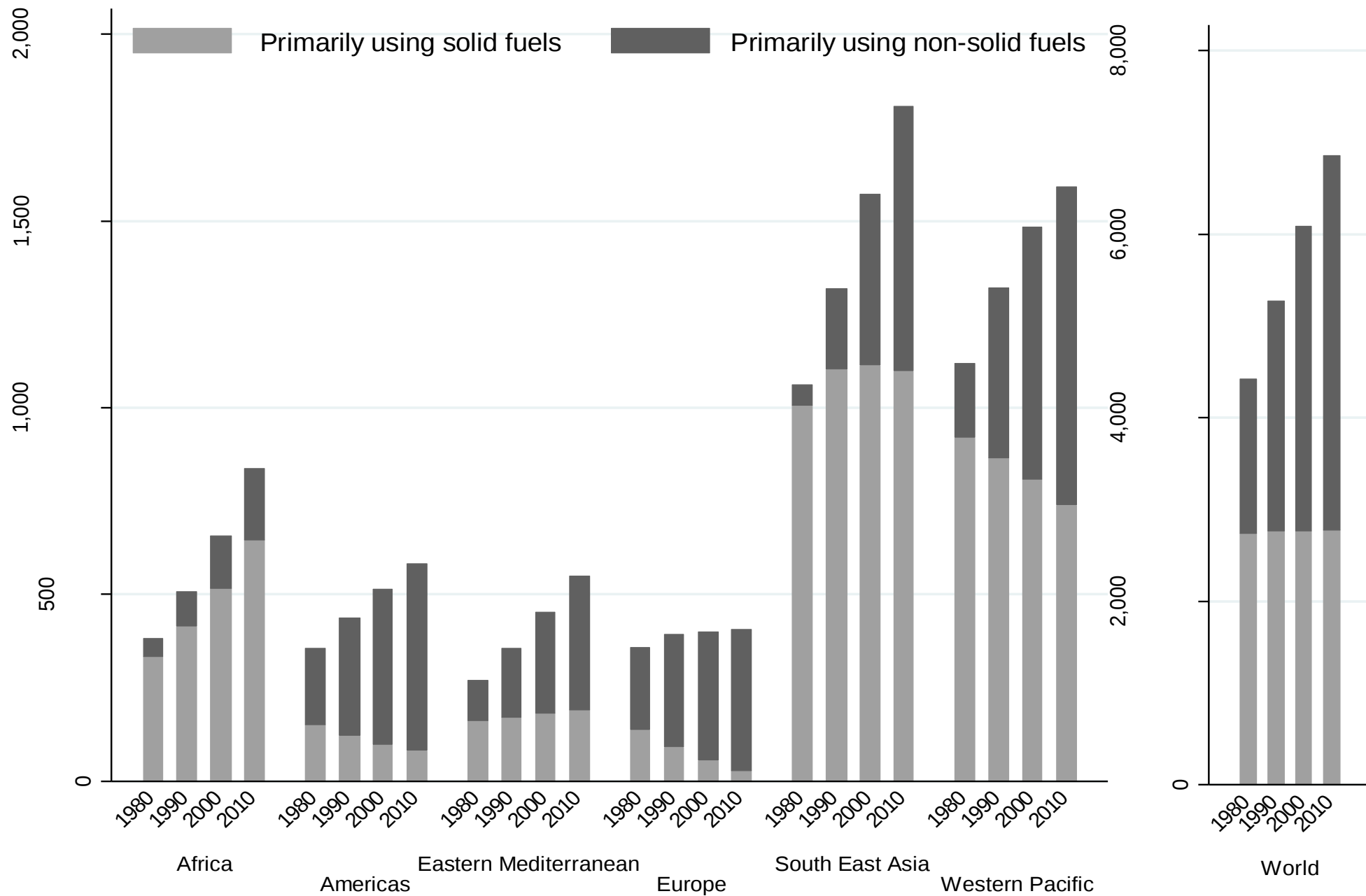
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information
and Geographic Information Systems (GIS)
World Health Organization



**World Health
Organization**

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Mixed fuels



Woodsmoke is natural – how can it hurt you?

Or, since wood is mainly just carbon, hydrogen, and oxygen, doesn't it just change to CO_2 and H_2O when it is combined with oxygen (burned)?



Reason: the combustion efficiency is far less than 100%

A Toxic Waste Factory!!

Typical biomass cookstoves convert 6-20% of the fuel carbon to toxic substances

Wood: 1 kg
15.3 MJ
Traditional Stove

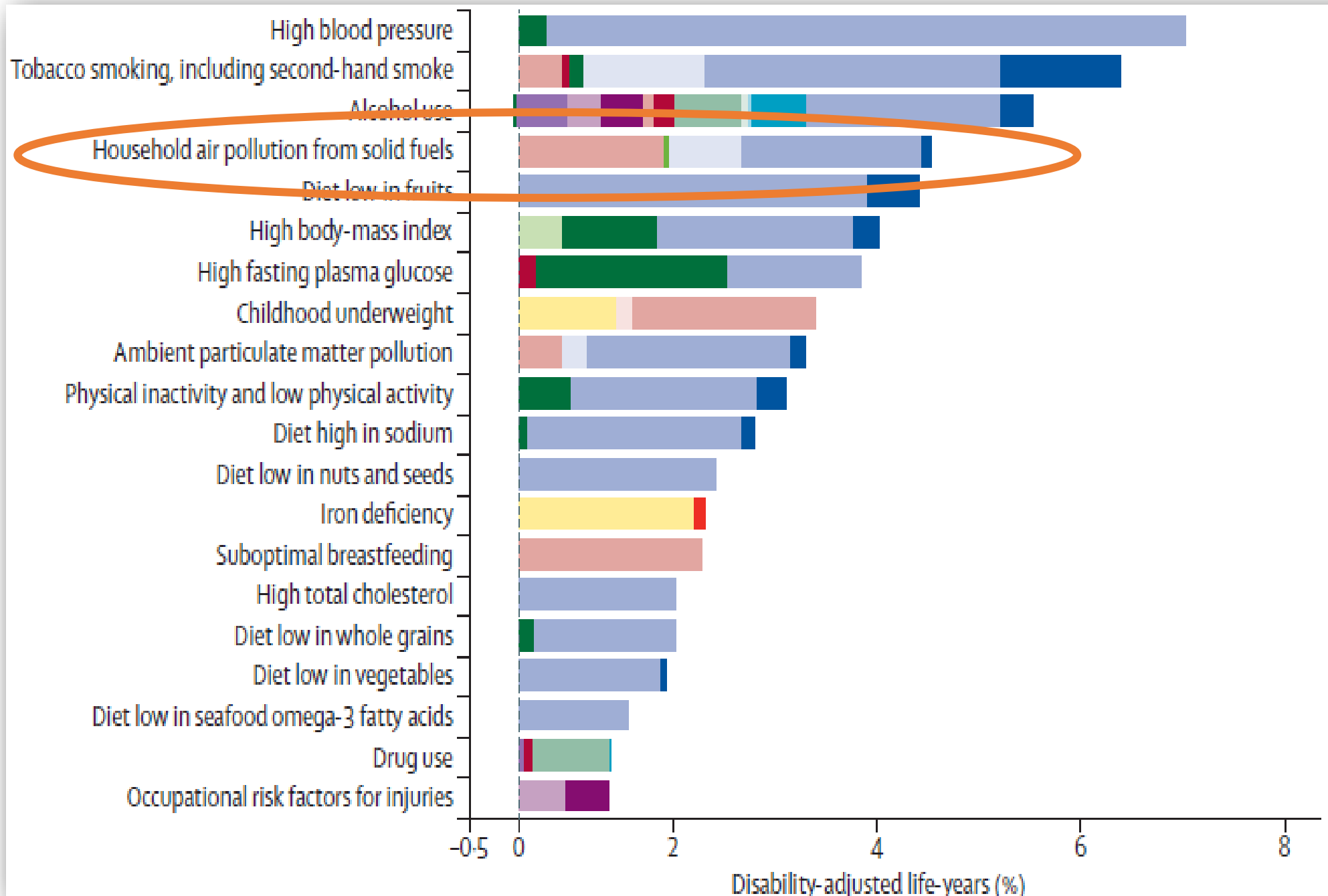
Into Pot
2.8 MJ
18%

In PIC
1.2 MJ
8%

Waste Heat
11.3 MJ
74%

PIC = products of incomplete combustion = CO, HC, C, etc.

Source:
Smith, et al., 2000



Burden of disease attributable to 15 leading risk factors in 2010, expressed as a percentage of Laos DALYs

