



PUBLIC HEALTH ASSOCIATION
of Australia Inc

Public Health Impacts of Nanotechnology

This policy should be read in conjunction with the Environmental Health Justice Policy

The Public Health Association of Australia notes:

1. Nanotechnology is a broad term used to cover a variety of technologies that use materials at a 'nano' size. Nano refers to a nanometre(nm) which is a millionth of a millimetre or about one eighty thousandth the width of a human hair.¹
2. Some nanomaterials have been around for hundreds of years and many chemical processes have nanoscale features. Nanotechnology is currently used in the manufacture of computer chips, polymers, optical, electronic and magnetic goods, suntan lotions and cosmetics, clothing and antibacterial substances amongst other things. There are currently in the consumer market.²
3. The safety risks associated with nanotechnology appear to be principally associated with uses where the nanomaterial is not 'fixed' or etched onto a larger object (eg a component of a computer chip), and in the manufacturing process. Where nanoparticles are not fixed there is concern that free nanoparticles could be inhaled, ingested or enter the body through the skin.³
4. Nano technologies exploit the special behavioural properties of materials at this very small size. At the nano-scale particles become soluble, increasing absorption relative to the same material at a larger scale. A number of nanotoxicological studies have been conducted and the most common findings are:
 - materials have different properties at nanosize than they have at larger sizes
 - the particle size, surface area and surface chemistry are all key determinants of the adverse effects caused by particulate matter
 - inhalational exposure to high levels of nanomaterials results in inflammation and damage to the lungs.⁴
5. Currently, there is only very limited knowledge about the effects of inhaling nanoparticles or nanoconstructs, but it is thought that any hazard would be linked to large doses. This means that any current hazard applies mainly to workers and researchers involved in their manufacture.⁵ Consequently, the capacity to use engineering controls and personal protective equipment to protect nanotechnology workers should be an area of research interest.⁶
6. However, it is estimated that more than \$32 billion of nanotechnology enhanced products were sold to consumers in 2006, although this may be an underestimation as there is no current requirement for the use of nanotechnologies to be regulated,⁷ or listed as an ingredient. The rapid commercialisation of nanotechnology over the past decade has left regulatory agencies without:

- the means to assess the potential toxicity of different nanotechnology materials;
 - a surveillance system to oversee the use of nanotechnology in consumer products;
 - a surveillance system to monitor potential impacts on people as use of nanotechnology enhanced products become more common
 - baseline information nor a substantial body of research that explores the potential downstream effects of nanotechnology.
7. Current chemical regulatory processes in Australia are cumbersome and outcomes and standards can vary between States and Territories and across the use of one chemical for different purposes. Further it is now clear that there is a crucial gap across the entire regulatory framework in regard to the regulation of nanotechnology.⁸

The Public Health Association affirms the following principles:

8. Increasingly evidence is indicating that nanotechnology potentially poses significant health, safety and environmental hazards as well as social, economic and ethical challenges. To date research has concentrated on commercialisation of nanotechnology with little effort being placed into determining health and safety issues. Consequently, the PHAA affirms the following principles:
- a **precautionary approach** is a fundamental requirement for the oversight of the use of nanotechnologies. It must be applied to nanotechnologies because scientific research to-date suggests that exposure to at least some nanomaterials, nanodevices and products of nanobiotechnology is likely to result in serious harm to human health and the environment.
 - **mandatory regulation** must be provided immediately as current legislation provides inadequate oversight of nanomaterials. A regulatory system must be an integral aspect of the development of nanotechnologies. Further, because of their novel properties and the associated risks, nanomaterials must be classified as new substances for assessment and regulatory purposes.
 - oversight of **occupational health and safety** must be addressed immediately to prevent known and potential exposures to nanomaterials that have not been proven to be safe. Government funding for research in nanotechnologies must prioritise research on health and safety issues.
 - full **lifecycle assessments** of health, safety and environmental issues must be undertaken prior to commercialisation of any nanotechnologies. Government funding of health, safety and environmental research must be increased significantly and a risk strategy plan for the development/commercialisation of nanotechnologies delineated.
 - **transparency in decision-making** in regard to nanotechnology including the labelling of all consumer products that contain nanomaterials, workplace right to know laws and protective measures and public accessibility to health and safety information.

- **public education and meaningful participation** in the decision-making process must be facilitated. Social impact, ethical assessments, equity, justice and individual community preferences should guide the allocation of public policy development.
- **manufacturer liability** must be enshrined in the regulatory system ensuring all who develop and market nanoproducts are held accountable for liabilities incurred from their products.⁹

The PHAA recommends that:

9. That the Commonwealth and State and Territory governments develop a nanotechnology strategy and regulatory framework that:
 - are guided by the above principles
 - provide for uniformity of approach across medicines and medicinal products, food additives, contaminants and natural toxins, agricultural and veterinary chemicals, industrial chemicals and occupational health and safety regulation.

The Public Health Association of Australia resolves to undertake the following actions:

10. Write to all relevant health, agricultural, occupational health and safety agencies and all chemical regulatory authorities, at all levels seeking a commitment to the recommendation and the principles outlined above.
11. Develop a list of committees, advisory and other groups currently working in this area and seek their support for the recommendation and principles.
12. Find and maintain links to other authoritative sites on nanotechnology on the PHAA website.

¹ The Royal Society <http://www.royalsoc.ac.uk/page.asp?id=1211>, What is nanotechnology, accessed in August 2007

² The Royal Society <http://www.royalsoc.ac.uk/page.asp?id=2469>, How nanotechnologies are being used, accessed in August 2007

³ The Royal Society <http://www.royalsoc.ac.uk/page.asp?id=2469> Are nanotechnologies safe? Accessed August 2007

⁴ NanoSafe Australia Network, Current OHS Best Practices for the Australian Nanotechnology Industry, October 2006

⁵ The Royal Society <http://www.royalsoc.ac.uk/page.asp?id=2469> Are nanotechnologies safe? Accessed August 2007

⁶ NanoSafe Australia Network, Current OHS Best Practices for the Australian Nanotechnology Industry, October 2006

⁷ Centre on Nanotechnology and Society, Nanomaterials in consumer products: it's a small (and unregulated world) after all, 2006, accessed August 2007

⁸ NanoSafe Australia Network, Current OHS Best Practices for the Australian Nanotechnology Industry, October 2006

⁹ International Center for Technology Assessment, Principles for the oversight of Nanotechnologies and nanomaterials, 2007 <http://www.icta.org/nanotech/index.cfm>. Accessed August 2007

First Adopted 2007

Passed at the Public Health Association of Australia's Annual General Meeting 2007