Benefits and drawbacks of strict regulation on chemicals

Michael Eddleston

Pharmacology, Toxicology & Therapeutics, University of Edinburgh

National Poisons Information Service - Edinburgh

South Asian Clinical Toxicology Research Collaboration - SACTRC
Pesticide self-poisoning kills about 150-200,000 people every year

WHO: major global means of suicide
Household use of aluminium phosphide, north India

Singh & Tyagi 1999

Number of deaths

- Aluminium phosphide
- All poisoning death
What is the consequence of pesticide self-poisoning?
A distorted global burden of fatal intentional self-harm
Occupational poisoning
Occupational poisoning

But WHO Toxicity Class is important – not a major problem with relatively less toxic Class II pesticides
CKDu
Solutions to this very real problem?
Hazard Reduction or Harm Minimisation

William Haddon, Jr
Head of the US National Highway Traffic Safety Admin

Invented the Haddon Matrix for risk reduction in 1970
- Pre-event
- Event
- Post-event
Harm minimisation to reduce deaths from pesticide poisoning

1. Improving medical care

2. Administrative controls

3. Engineering controls
Improve medical care
Organophosphorus insecticides
But resource implications are too large

• worldwide, 3-6,000 people are currently being ventilated
Clinical care can be useful - identifying high risk chemicals
Bedside observation -> toxicological stratification

Eddleston et al, Lancet 2005
Harm minimisation to reduce deaths from pesticide poisoning

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3. Engineering controls
Administrative controls – agriculture extension
Administrative controls – agriculture extension
Harm minimisation to reduce deaths from pesticide poisoning

1. Improving medical care

2. Administrative controls

3. Engineering controls
Administrative controls – “Safe Storage”

IASP 2005:
“Recently, experience has shown that providing for safer storage of pesticides may be a particularly effective method [of preventing pesticide poisoning deaths].”

Bayer 2015:
“Reduced access to [pesticides] – keeping them locked with limited access – helps avoid many poisonings and deaths”
Recruitment:

223,857 individuals
53,379 households
Three studies from Sri Lanka and India suggest that 15-20% of pesticides are purchased from a shop specifically for the act.

Improved storage might make things worse, as household pesticides became less accessible.
Vendor interventions may be an important approach
Harm minimisation to reduce deaths from pesticide poisoning

1. Improving medical care

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3. Engineering controls
In parts of the developing world, pesticide poisoning causes more deaths than infectious diseases. Use of pesticides is poorly regulated and often dangerous; their easy availability also makes them a popular method of self-harm. In 1985, the UN Food and Agriculture Organisation (FAO) produced a voluntary code of conduct for the pesticide industry in an attempt to limit the harmful effects of pesticides. Unfortunately, a lack of adequate government resources in the developing world makes this code ineffective, and thousands of deaths continue today. WHO has recommended that access to highly toxic pesticides be restricted—where this has been done, suicide rates have fallen. Since an Essential Drugs List was established in 1977, use of a few essential drugs has rationalised drug use in many regions. An analogous Minimum Pesticides List would identify a restricted number of less dangerous pesticides to do specific tasks within an integrated pest management system. Use of safer pesticides should result in fewer deaths, just as the change from barbiturates to benzodiazepines has reduced the number of deaths from pharmaceutical self-poisoning.
Engineering controls – might these work?

Suicide rates in Sri Lanka 1880-2005

Gunnell et al Int J Epi 2009
Regulation of Highly Hazardous Pesticides

Reducing access to highly lethal means will reduce deaths from suicide
Agricultural yield in South Asian countries between 1980 - 2005

Yes, fine, but this will cause food shortages!!

Manuweera et al EHP 2009
Paddy production in NCP 1990-2005

Manuweera et al
EHP 2009
Hasn’t this only happened in Sri Lanka – Unique Case?

Previously:
- Jordan
- Samoa

Estimates for pesticide suicides have fallen from
- 180,000 in 1995-2000 to
- 55,000 now
The FAO Pesticide Registration Toolkit is a decision support system for pesticide registrars in developing countries. It will assist registrars in the evaluation and authorization of pesticides. The Toolkit can best be considered as a web-based registration handbook intended for day-to-day use by pesticide registrars.

Registration staff can use the Toolkit to support several of their regular tasks, including: finding data requirements, evaluating technical aspects of the registration dossier, choosing an appropriate pesticide registration strategy and procedures, reviewing risk mitigation measures and getting advice on decision making.

The Toolkit also links to many pesticide-specific information sources such as registrations in other countries, scientific reviews, hazard classifications, labels, MRLs and pesticide properties. 
International Code of Conduct
on Pesticide Management

Guidelines on Highly Hazardous Pesticides
Chemicals regulation works as a highly effective intervention to reduce risks from use of chemicals.

As is apparent from our experience of public health interventions, engineering controls are going to be the most effective approach.