

# PREVENTING DEATHS FROM PESTICIDE SELF-POISONING IN RURAL ASIA



Healthy crops are vital to the rural economy

In the early 1990s, Sri Lanka had one of the world's highest suicide rates, at around 52 per 100,000 per year, up from around 8 per 100,000 in 1955. Much of this rise can be traced to the introduction of pesticides into poor rural homes from the late 1960s, during the Green Revolution, making them accessible for self-poisoning. The rate has since fallen to 17 per 100,000 in 2012, thanks largely to the Sri Lankan Registrar of Pesticides and a group of Sri Lankan and international researchers that was established by Professor Michael Eddleston, Professor of Clinical Toxicology at the University's Queen's Medical Research Institute.

## SAVING LIVES THROUGH A RANGE OF APPROACHES

Professor Eddleston and his colleagues' research focused on ways to prevent deaths from self-poisoning, through clinical and public health interventions. Their innovative methods and findings have inspired improved medical management and revised policies on the composition of pesticides and their availability within small rural communities, as well as changes to poisoning treatments.

His group reported on the reduction in suicides in Sri Lanka that followed the Registrar of Pesticides banning the most toxic insecticides used in agriculture, saving tens of thousands of lives.



## A NEW APPROACH

The World Health Organisation recommended that suicide prevention strategies focus on the identification and treatment of people with mental disorders. However, as impulsive self-poisoning is often not associated with mental illness, this is not necessarily the most effective approach for rural Asia.

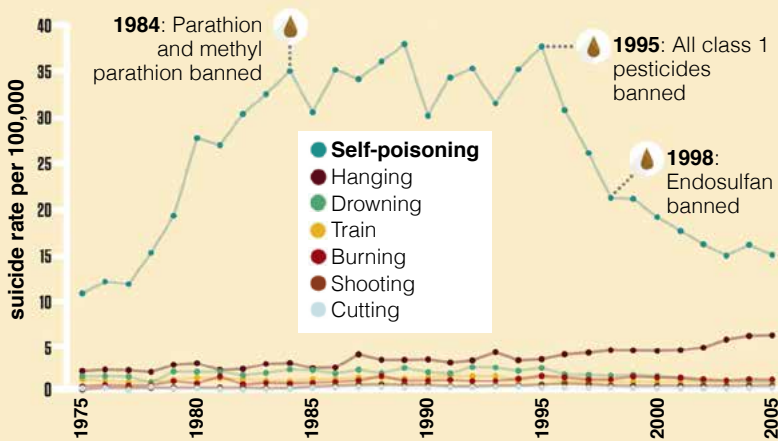
Professor Eddleston's research looked at clinical and community-based approaches to reducing deaths from pesticide poisoning. In their early research, he and his collaborators produced the first description of the clinical presentation and outcome of poisoning with many pesticides, showing very different clinical syndromes and lethality, despite the pesticides having the same WHO toxicity classification according to their lethality in rats. Professor Eddleston led a series of studies dissecting the roles of specific organophosphates, their hydrocarbon solvents, and treatments in deaths following self-poisoning.



Research has influenced treatment



## Suicides by method, Sri Lanka, 1975-2005



This success story has been recognised and followed throughout Asia. More recently, data on the most problematic pesticides for poisoning has resulted in a further three being banned, with an additional reduction in suicide.

Professor Eddleston's work has been directly responsible for saving the lives of thousands of Sri Lankans every year. His findings have influenced the World Health Organisation's decision, for example, to exclude the antidote pralidoxime from its Essential Drugs List in 2009. In addition, the 2009 WHO guidance for preventing deaths from pesticide poisoning was heavily based on research by Professor Eddleston: all six publications cited in its summary were from his group.

These important findings have also made an impact on pesticide poisoning guidelines internationally, with guidance on treatment of organophosphate-poisoned patients now having changed across Asia. For example, the 2010 national guidelines for Indian clinicians demonstrate by citation the importance of this work, while an independent trial in Bangladesh to test the group's recommendations on the use of atropine was shown to reduce deaths by 60%.

A WHO meeting led by Professor Eddleston and his colleagues resulted in publication of guidance for triaging and treating patients with acute pesticide poisoning. This led to the WHO Mental Health Gap Action Programme (mhGAP) integrating pesticide poisoning into its assessment of patients. Based on 350,000 deaths from pesticide self-poisoning across Asia every year, the team's findings on the use of the antidotes, and the bans of three toxic pesticides in Sri Lanka, are estimated to be saving 10,000 lives a year.



During this time, he set up the first cohort of patients with acute self-poisoning in the developing world. The cohort continues today and now contains information on more than 60,000 patients.

A current community based trial has recruited more than 220,000 people in 53,000 households to a randomised study of improved household storage to reduce intentional and accidental poisoning.

Following this work, Professor Eddleston and his colleagues are now modelling pesticide poisoning in their laboratories to study, among other things, the mechanism of the failure of nerve muscle function that occurs in many poisoned patients and causes them to require days or weeks of mechanical ventilation to support their breathing.

Better understanding of this problem could result in new treatments that may save tens of thousands of lives every year across Asia.

The group's findings thus far have led to two pilot clinical trials that are currently under way in Sri Lanka and Bangladesh.

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