

A conversation with the Centre for Pesticide Suicide Prevention, January 30, 2019

Participants

- Professor Michael Eddleston – Director, Centre for Pesticide Suicide Prevention
- Dr. Leah Utyasheva – Policy Director, Centre for Pesticide Suicide Prevention
- James Snowden – Research Consultant, GiveWell

Note: These notes were compiled by GiveWell and give an overview of the major points made by the Centre for Pesticide Suicide Prevention.

Summary

GiveWell spoke with Professor Eddleston and Dr. Utyasheva of the Centre for Pesticide Suicide Prevention (CPSP) for an update on its work. In August of 2017, CPSP received a GiveWell Incubation Grant of \$1,336,409 (<https://www.givewell.org/research/incubation-grants/centre-pesticide-suicide-prevention/august-2017-grant>) to start work aimed at reducing deaths from deliberate ingestion of pesticides. Conversation topics included CPSP's progress in Nepal and India and other work it is conducting in Africa.

Progress in Nepal

Hospital data collection

Data collection staff have been trained, and data collection has been occurring in seven hospitals for about eight or nine months. Data collection in six additional hospitals has been delayed due to issues in obtaining ethical approval, but CPSP expects those issues to be resolved for the majority of those hospitals soon. These 13 hospitals are high-level provincial hospitals that should receive most patients who attempt pesticide suicide.

CPSP now has data on 1,146 cases of attempted pesticide suicide, of which approximately 5% were fatal. This data was obtained retrospectively from medical records kept by the hospitals. The study hospitals are tertiary hospitals that receive pesticide poisoning cases from smaller hospitals and directly from community. This is relevant because, on average, more serious cases tend to be referred. However, such cases are also at higher risk of dying before accessing the tertiary hospitals.

The data is of poor quality, which makes it difficult to judge the accuracy of the 5% case fatality. However, CPSP notes that a case fatality of 5-10% is plausible, as this was the approximate rate in Sri Lanka in the 2000s (where Professor Eddleston previously worked). It also notes that this rate does not include fatalities that occur out-of-hospital.

Poor data quality also makes it difficult to identify the most lethal pesticides. So far, CPSP has identified methyl parathion, aluminum phosphide, dimethoate, and

cypermethrin as pesticides being used in attempted suicide. Data from Sri Lanka indicates that approximately 50 cases per pesticide can offer suggestive evidence of that pesticide's case fatality and that several hundred cases can offer more conclusive evidence. These estimates can also be compared with the existing literature to check their plausibility.

Case fatality tends to correlate with a pesticide's direct animal toxicity, with case fatality increasing as toxicity increases. However, one challenge of using hospital records to estimate case fatality is that they do not capture the significant number of fatalities that occur out-of-hospital, lowering the apparent case fatality. This is particularly relevant for pesticides of high toxicity, such as methyl parathion, ingestion of which often results in fatality before the individual arrives at the hospital. Thus, highly toxic pesticides tend to have low in-hospital case fatality. Currently, CPSP is working with a police toxicology lab on accessing data on out-of-hospital fatalities.

However, it may be unnecessary to obtain precise case fatality estimates for each pesticide. Instead, if the data identifies the pesticides causing a relatively high proportion of fatalities, CPSP can target those pesticides to be banned. Once data collection occurs in all 13 hospitals, CPSP expects to have data on approximately 2,000 cases of attempted pesticide suicide. It hopes that within a year from this conversation, this data will identify the most lethal pesticides.

CPSP plans to revisit these hospitals to determine if its presence has influenced or potentially improved recording procedures. It also plans to work with study hospitals to develop a stronger and more sustainable prospective data collection system that can be implemented to improve future data collection.

Police records

CPSP will use police records to obtain data on out-of-hospital fatalities. While these records should mostly contain data on fatalities, they may also contain data on medical legal cases that did not result in fatalities. CPSP does not know whether these records identify which pesticide was used. It is possible that they note the pesticide brand, which is useful data and was often recorded in Sri Lankan police records, particularly when the brand used was one that had become associated with pesticide suicides.

CPSP has obtained permission from the police to access this data, and it will soon develop a plan for integrating it with hospital data. It hopes that this data will help it to identify the most lethal pesticides. It may also work with the police to improve data collection procedures, as it has in Sri Lanka, where police records sometimes now identify the precise pesticide used.

Stakeholder engagement

In the past, Nepal's Ministry of Agriculture and Livestock Development has made technical decisions about which pesticides to ban. Currently, political events and changing legislative and legal systems in Nepal make it difficult to know how and by

which institution pesticide bans will be enacted in the future. The government is currently drafting new pesticide legislation, but CPSP has not seen the draft.

CPSP has been working to engage the stakeholders who will be involved in future decision-making or can influence public opinion. It has assembled an Advisory Committee composed of these stakeholders. CPSP hopes that this will help it learn more about the decision-making process and that it will be able to share its findings with committee members. At a recent committee meeting, members advised CPSP to engage more stakeholders because legislation will only be enacted and enforced with significant stakeholder engagement and may even require broad social engagement. In response, CPSP plans to work with the committee to adapt its strategy to work in the Nepalese context and successfully act upon the results of its research.

Progress in India

Indian Council of Medical Research (ICMR) approval

CPSP's first application to ICMR was not approved, primarily due to questions around foreign involvement in the project. CPSP redrafted the application to include a response to those questions. In retrospect, CPSP believes that it and its collaborators in India should have anticipated those questions, but believes that its second application is much stronger. CPSP has employed staff and set up its data management system, so data collection is ready to begin once the project receives approval.

Regulation through courts

In August of 2018, a court decision was made to ban twelve pesticide compounds, four of which have been used in pesticide suicide (methyl parathion, fenthion, carbaryl, and diazinon). A decision was also made to ban four additional pesticide compounds used in pesticide suicide after two years (phorate, phosphamidon, dichlorvos, triazophos).

Once CPSP receives approval from ICMR and establishes data collection operations in its hospitals, it will be prepared to collect 24 months of prospective data as these bans are implemented, which should allow it to measure and demonstrate their effects. It expects that the pesticide suicide rate will fall both nationally and at the state level.

State-level work

Maharashtra is one of the states in India most impacted by pesticide suicides. After an incident of pesticide poisoning deaths in 2017, the state government addressed the problem. CPSP has established a memorandum of understanding with the Chief Minister of Maharashtra to work on a project with three elements:

1. **Educating doctors** — In late February of 2019, CPSP and another non-governmental organization will conduct workshops at two hospitals to educate doctors about improving medical case management and thereby reducing fatalities.

2. **Accessing data** — CPSP will review data held by the state government, particularly the toxicology department. This will allow CPSP to provide the government with the data and help analyze it to inform state government decisions.
3. **Enacting state-level legislation** — Currently, legislation from India's central government only allows states to ban pesticides temporarily. However, some states, such as Kerala, have enacted legislation that allows them to pass their own pesticide bans. CPSP will work with Maharashtra's state government to explore the state's needs and capacity for developing its own regulations, which may enable it to address the problem of pesticide suicide itself.

Analysis of past regulation and cost-effectiveness

Because suicide is considered a crime in India (at least according to the Indian Penal Code), data on pesticide suicide rate can be sourced from police records. CPSP believes that while the trends this data shows over time are likely to be accurate, the absolute numbers are unlikely to be accurate. The Million Death Study's estimate of the pesticide suicide rate in India is 30-40% higher than the rate suggested by police records, and a recent paper in *The Lancet Global Health* estimated the rate at 60-80% higher.

CPSP is using this data to write a paper that examines past examples of pesticide regulation enacted by both India's central and state governments and their impact on suicide rates. It has found that the pesticide regulation Kerala enacted in 2006 and 2011 is associated with a significant and rapid reduction of about 80% in pesticide suicides, which previously accounted for about 25% of overall suicides in Kerala.

In Sri Lanka, pesticide suicides were the primary contributor to the overall suicide rate. In contrast, in India, pesticide suicides contribute to about 40% of the total, with hangings contributing most of the remainder. Thus, banning the most lethal pesticides in India is unlikely to achieve reductions in the overall suicide rate as significant as those achieved in Sri Lanka, where the overall rate fell by about 75-80%. However, the data from Kerala suggests that banning the most lethal pesticides could achieve a reduction of about 10-30% in the overall suicide rate. This effect will be particularly significant in states where pesticide suicides are common, such as Maharashtra, Tamil Nadu, Telangana, and Andhra Pradesh.

Separately, CPSP is working with the World Health Organization and academics from Australia to analyze the cost effectiveness of pesticide bans in India. This analysis should be completed within the next few months.

Differences between India and Nepal

India is a large country where the decision-making process is complex. However, CPSP also benefits from India's highly engaged civil society, which shares CPSP's goal of banning highly hazardous pesticides and works toward that goal by bringing cases to the Supreme Court and advocating both the central and state governments.

Thus, CPSP has taken on a role in India to help that effort by providing it with research-based evidence.

In contrast, in Nepal, ongoing political events have prevented society from becoming as aware of pesticide suicide and from becoming as civically engaged. However, the possibility of CPSP's work successfully leading to change remains higher in Nepal because it is a smaller country with a more centralized decision-making process.

Work in Africa

CPSP has obtained access to suicide data from four to five sites in each of four East African countries. It will use this data to determine whether or not pesticide suicide is a significant problem there. Relatively little research on suicide has been conducted in Africa, so CPSP also hopes to improve global suicide data by publishing a paper that begins to quantify suicide in Africa. While this work will be useful, CPSP expects that it will continue to focus its efforts in Asia because of the potentially large impact it can have there.

*All GiveWell conversations are available at
<http://www.givewell.org/research/conversations>*