

## **A conversation with Professor Michael Eddleston and Dr. Leah Utyasheva, May 3, 2017**

### **Participants**

- Professor Michael Eddleston – Professor of Clinical Toxicology, Pharmacology, Toxicology and Therapeutics Unit, University/BHF Centre for Cardiovascular Science, University of Edinburgh; Consultant Physician, National Poisons Information Service, Edinburgh unit, Royal Infirmary of Edinburgh
- Dr. Leah Utyasheva – Human Rights Expert, RUSMPI – Institute on Migration Policy
- Elie Hassenfeld – Co-Founder and Executive Director, GiveWell
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Note: These notes were compiled by GiveWell and give an overview of the major points made by Professor Michael Eddleston and Dr. Leah Utyasheva.

### **Summary**

GiveWell spoke with Professor Michael Eddleston of the University of Edinburgh and Dr. Leah Utyasheva of RUSMPI – Institute on Migration Policy to investigate the possibility of making a GiveWell Incubation Grant to enable Professor Eddleston and Dr. Utyasheva to create the Centre for Pesticide Suicide Prevention (CPSP). Conversation topics included updates on CPSP, opportunities for projects in India and Nepal, other possible projects CPSP has considered, and possible sources of funding for CPSP's work.

### **Centre for Pesticide Suicide Prevention updates**

Professor Eddleston and Dr. Utyasheva are creating the Centre for Pesticide Suicide Prevention (CPSP) to reduce the incidence of suicide via pesticide poisoning by gathering data on the prevalence of pesticide suicide, the particular pesticides responsible, and working with governments to regulate highly hazardous pesticides. Suicide is an impulsive act that takes place during a crisis that can last between minutes and days, and people who survive the crisis typically go on to live successful lives. Data from South Korea, Bangladesh, and Sri Lanka show that banning highly hazardous pesticides reduces the incidence of suicide by increasing the likelihood that people survive the period of crisis.

### **Setting up the organization as a charity**

Professor Eddleston and Dr. Utyasheva have received approval from the University of Edinburgh to set up CPSP as a charity within the university and for Professor Eddleston to spend some of his time working on CPSP. It has not yet been decided whether this work will be funded by the charity or as part of his current position at the university. Currently, Professor Eddleston's work on CPSP is paid by the university and Dr. Utyasheva's work is unpaid. Professor Eddleston is in discussions

with the university about administrative details (including creating a board through the university), which he expects to be completed soon.

### **Study on safe pesticide storage in Sri Lanka**

Professor Eddleston recently completed a cluster randomized controlled trial (RCT) in Sri Lanka that tested whether improved household pesticide storage methods could reduce the rates of pesticide self-poisoning. The study included 235,000 people from 53,000 households and cost about £1.5 million over 7-8 years. The results will likely be published in the next month or so.

Preliminary results have suggested a lack of effect. CPSP plans to focus its work on pesticide regulation rather than on improving storage methods.

### **Planning CPSP's initial projects**

As of six months ago, Professor Eddleston and Dr. Utyasheva were planning to start by creating a small program in Nepal or Laos and gradually expanding it. However, over the past 1-2 months, it has come to their attention that the Indian government is interested in working on preventing pesticide suicides and that it may be possible for CPSP to help the government do this work more effectively. CPSP's initial work will likely include at least one of the following:

- Gathering data on pesticide suicide in multiple rural areas of India to get an up-to-date picture of the problem across the country, in particular identifying the pesticides responsible for most deaths and severe poisoning.
- Potentially running a community-based cluster RCT in India on the effects of banning the pesticides that it identifies as the most commonly used in pesticide suicides.
- Working with pesticide regulators in Nepal to assess the scale of the national problem, set up sentinel systems via hospitals and police to allow tracking of the effect of any intervention on pesticide suicides, and ban highly hazardous pesticides.

It may be plausible for CPSP to work in Nepal for 1-1.5 years while simultaneously gathering data in India.

### **Possible work in India**

There is little available data on the prevalence of pesticide suicide in India, particularly in rural areas, though it is estimated to cause between 10,000-100,000 deaths annually. If CPSP decides to work in India, it will begin by doing exploratory visits to 2-3 states and meet with government officials at the state and federal levels to get an understanding of their needs. Once baseline data are collected, CPSP would then decide in discussion with government regulators whether to conduct a large RCT or to collect data on a smaller scale.

### **Gathering baseline data in rural areas**

Professor Eddleston has been working with the Christian Medical College (CMC) in Vellore, Tamil Nadu, India. CMC works with a network of more than 100 missionary hospitals across India. CPSP would like to work with 10-20 hospitals in this network and 2-3 researchers over six months to investigate several questions, possibly including:

- Which pesticides are available in shops (including whether pesticides that have been banned are still available in shops).
- Which pesticides were used by people who present at hospitals after attempting suicide by ingesting pesticides.
- The likelihood that pesticide bans scheduled for 2017-2019 are likely to result in changes in which pesticides are available in shops. This would involve asking pesticide sellers whether they believe that the bans will be implemented and whether they plan to change which pesticides they sell.

After six months, CPSP would likely have good data on these questions. If it finds that pesticide suicide is still a problem in rural areas and identifies which pesticides are involved, it will spend the following six months starting discussions with policymakers in India about whether these pesticides should be banned and what kind of support policymakers would need to make this decision. If the preliminary data is not sufficient for the Indian government to decide to ban the pesticides, CPSP may decide to run a community-based cluster RCT to get more definitive data on the effect of removing these pesticides. It would be able to design and cost the study using data from its preliminary data collection.

## **RCT**

### *Goals of the study*

The two goals of the study would be to find out whether removing certain pesticides from shops leads to a reduction in suicides and to find out what effect this would have on agriculture, with an ultimate goal of presenting definitive evidence to the Indian government of the health and agricultural effects of banning certain highly hazardous pesticides. While there is available data on which pesticides are hazardous, Professor Eddleston believes that it would be difficult to convince the government to ban them unless there is good data on the effects of banning these pesticides. This is particularly important in countries with a local pesticide manufacturing industry, since the industry may not be keen to ban pesticides and governments tend to support local industry.

### *Likelihood of policy change in response to an RCT*

It seems likely that the Indian government would be interested in gaining information on the incidence of pesticide suicide and would be willing to engage with the results of such a study, particularly if CPSP is able to engage with its existing contacts in the Indian government before initiating the study. Part of CPSP's work will include networking with decision makers to increase understanding of the problem and the

likelihood that the results of its data collection and possible cluster RCT will be used to guide policy.

Professor Eddleston recently spoke with several people who may be interested in working with CPSP on pesticide regulation in India, including:

- A consultant within the Directorate of Plant Protection Quarantine & Storage, Department of Agriculture & Cooperation, Government of India, who has been heavily involved in pesticide regulation for India.
- The director of Pesticide Action Network India, who would be interested in working with CPSP in rural areas of India to collect data on the prevalence of suicide and which pesticides are used.
- Representatives of the Food and Agriculture Organization of the United Nations (FAO).

In December 2016, the lower house of India's Parliament proposed banning 18 out of 68 hazardous pesticides; it plans to ban 12 in 2017 and six in 2019. India does not yet have plans to ban the pesticides that were banned in Sri Lanka following Professor Eddleston's work there. In addition, the effects of previous bans over the last ten years are not clear.

#### *Study design*

The study would be a three-year cluster RCT in one or two high-risk states in India, which Professor Eddleston believes would produce fairly definitive data. The study would likely be modeled after a small pilot study in Sri Lanka in which bans of two pesticides were studied comparing two large similar rural areas with a population of between 500,000-700,000 people. Two pesticides that had been identified as the ones most commonly used for suicide in Sri Lanka were removed from one of the areas, which resulted in a short-term reduction in pesticide-related deaths in hospitals in that area until other lethal pesticides were introduced 2-3 years later. The study showed proof of principle and how such a study might be done; however, it was strongly limited by the use of just two areas (or clusters). By contrast, the recent household pesticide storage cluster RCT had 180 clusters, giving it great power as a study design.

In the India study, replacement pesticides would have to be chosen carefully to ensure that the problem does not recur; there is now enough known about pesticides to be able to do this well.

A large cluster RCT in India would include a population of about 10 million people broken into at least 60 clusters. The study would involve:

- Working with the agriculture ministry to instruct pesticide sellers in a randomly selected 50% of the clusters to stop selling certain pesticides and to sell others that are less hazardous. It may be necessary to give them a financial incentive to do so, such as reducing the price of the less hazardous pesticides.

- Working with hospitals in CMC's hospital network to find out how many people come to hospitals with pesticide poisoning in each area.
- Working with coroners to find out how many people die from pesticide poisoning in hospitals (or before they arrive at a hospital).
- Talking to people in villages to get information on people who have died from pesticide poisoning but did not go to hospitals or make contact with police.
- Working with people in agriculture to find out the impact on the cost of different crops in the area.

Gathering this data would allow CPSP to track the number of deaths over time, identify which pesticides are responsible for the majority of deaths from pesticide suicide, and identify where people are getting these pesticides. It would also allow the agricultural consequences of the bans to be carefully measured and factored into the analysis.

One possible challenge with the cluster RCT design would be making sure that the clusters are large enough that people in one cluster aren't able to easily cross into another cluster to buy pesticides there.

## **Possible work in Nepal**

Nepal has a high incidence of suicide among young women. About two years ago, Professor Eddleston was contacted by a clinical pharmacologist in Kathmandu inviting him to help improve hospitals' management of patients who have been poisoned, which was the initial fundamental approach he took to reducing pesticide suicides. Professor Eddleston worked with this clinician to make national guidelines for improved hospital management of poisoned patients. However, the impact of this approach is limited because once someone has ingested pesticides, it is often too late to help them.

Professor Eddleston has since shifted to focus on reducing pesticide suicides by working with pesticide regulators to remove highly toxic pesticides from the market. With the help of the clinical pharmacologist, Professor Eddleston contacted Nepal's pesticide regulator, who requested help with writing legislation and gathering baseline data on pesticide suicide rates and which pesticides are being used. The pesticide regulator and the clinical pharmacologist have both expressed interest in working with CPSP.

## **Approximate timeline**

CPSP's current plan would be to spend the first 6-12 months on several main activities:

1. Establishing an institutional framework to ensure that the government has the capacity to continue collecting data in the future, so that if a new pesticide emerges as a common means of suicide, the system will be able to identify it. This would include working with the pesticide regulator to conduct a needs assessment to determine what

would need to be done to enable the Nepalese government to monitor and regulate pesticide management. The needs assessment would aim to identify any problems (such as importation of illegal pesticides that are not registered in Nepal, sale of pesticides that have been banned, or non-reporting of pesticide poisoning incidents) and to identify gaps in institutional capacity that may be allowing these things to happen.

2. At the same time, collecting baseline data from hospitals and using demographic surveillance systems in villages to identify pesticide self-poisoned patients. This would include recruiting and training researchers to gather the data and setting up and maintaining several sentinel hospital sites. These data would later be shown to regulators to demonstrate which pesticides people are using to commit suicide in Nepal. Of the pesticides available in Nepal, CPSP would also tell regulators which are used for suicide in other countries and which are listed as hazardous by FAO.
3. Developing a concrete work plan for the country with a clear timeline. This would happen in parallel with data collection. CPSP would update its work plan as it gains more information. It would also engage with stakeholders and civil society members, to the extent that this seems necessary and useful, though CPSP's approach in Nepal would rely most heavily on the pesticide regulator to implement pesticide bans.
4. Working with a consultant at FAO to help the pesticide regulator to use FAO's Pesticide Registration Toolkit to inform decisions regarding the logistics of pesticide regulation.

After the first 6-12 months, CPSP would work with FAO and the pesticide regulator to determine what support is needed to get legislation drafted. This support could be provided by FAO or by Dr. Utyasheva, who has experience drafting legislation. CPSP hopes to begin the process of drafting legislation by the end of the first year.

### **Criminalization of suicide**

Suicide is criminalized in Nepal, which likely leads it to be under-reported and may make it difficult for CPSP to collect data. It may be possible to overcome this challenge by hiring local people who have a good understanding of the situation, working within local customs, and designing the program with input from local communities. Ultimately, decriminalization of suicide is likely to be one part of the effort to reduce suicides in Nepal.

### **Identifying problematic pesticides**

#### *Asking patients to identify which pesticide they used*

In order to regulate the sale of hazardous pesticides, it is necessary to know which pesticides are being used for suicide in a given country. In Bangladesh, Professor Eddleston and his colleagues made posters with pictures of each brand of pesticides that is available in each country. Patients in hospitals who had attempted suicide by

ingesting pesticides were asked to point to the brand of pesticide they ingested. This allowed hospitals to collect data on which pesticides were most commonly used for suicide.

In Sri Lanka, a book was published listing all brands and products in the country. It is in widespread use and is in every medical ward in the country, helping correct identification of the pesticide ingested and the treatment needed. Data collection in Sri Lanka started about 20 years ago, and it is now known which pesticides tend to be a problem. CPSP's main goal in collecting this data in new countries is to demonstrate to the government which pesticides are problematic, and data from Sri Lanka can be used to predict what consequences can be expected if these pesticides are banned.

### *Demographic surveillance*

Several countries have demographic surveillance systems in place through which they can conduct verbal autopsies to learn about people who die in villages and do not make it to hospitals. Such a system could be used in Nepal. Some potent pesticides kill people before they make it to a hospital, especially in Nepal, where it is often necessary to travel a long distance to get to a hospital.

## **Main differences between potential work in India and Nepal**

### **Scale of operation**

Nepal has a single pesticide regulator who is under-resourced, whereas CPSP would need to work with many government officials in India. In Nepal, only 5-10 sentinel hospital sites would be needed to get a representative sample of the country, whereas many more sentinel sites (perhaps 30 spread in representative rural regions around the country) would be needed to do this in India.

### **Pesticide industry**

#### *Nepal*

The government of Nepal is keen to start work on banning highly hazardous pesticides. Nepal does not have a pesticide industry, which would likely make it easier to ban pesticides there.

#### *India*

The pesticide industry in India may lead to complications in banning pesticides there due to industry pushback on proposed bans. The likelihood of pushback from the pesticide industry increases the importance of having data to demonstrate the effects of removing certain pesticides.

For the study in Sri Lanka, Professor Eddleston had industry, academic, and non-governmental organization (NGO) representatives on the advisory board who were able to comment on the protocol and sign off on the study design before the study was conducted, increasing acceptability of the study and its results. If CPSP decides to run a cluster RCT in India, it would want to use a similar model of engaging with

multiple opinion leaders from across the spectrum to increase the likelihood that the results of the study will be widely accepted.

### **Other possible projects**

- Professor Eddleston and Dr. Utyasheva considered working in Laos. They did not pursue this option because a) they did not have a clinical contact there and b) the government was interested in collecting pesticide samples for environmental reasons rather than in working to reduce the incidence of pesticide suicide.
- The government of Zambia has expressed interest in working with CPSP.
- Professor Eddleston has worked closely with the Chinese pesticide regulator to try to get a better understanding of the incidence of pesticide suicide in China, about which there is little available data. The suicide rate seems to be falling significantly, but the reasons for this are not understood. CPSP would like to work in China, and recently began working with clinicians from the Hong Kong Poison Information Centre to investigate pesticide suicide data from China.
- CPSP would like to publish information on its website about the results that different countries have experienced after banning certain pesticides to provide information for other countries that may be interested in doing similar work.

### **Possible sources of funding**

Professor Eddleston has been looking for funding for this work for about 15 years and has struggled to find funders:

- He approached fundraising staff at the University of Edinburgh four or five years ago, but they were not able to find funding.
- Professor Eddleston and Dr. Utyasheva have approached the United Kingdom's Department for International Development (DFID), but have not received a response yet.
- It is possible that academic funders would be interested in funding the cluster RCT. Professor Eddleston wrote a funding proposal several years ago that he did not submit (because he submitted a different one instead), and could submit this now, though he expects that it would take at least a year for a successful proposal to receive funding.

Professor Eddleston believes that the work that CPSP hopes to do is attractive from the perspective of effective altruism because he believes this work to be highly cost-effective, and the problem to be both neglected and highly tractable (as shown in Sri Lanka, Bangladesh, and South Korea).

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