

# On fireworks and finding ways to address drug-resistance in low- and middle-income countries – *by Ramanan Laxminarayan*

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*Every autumn the Diwali festival is celebrated with food, gifts and fireworks. Ramanan Laxminarayan, Chair of the Board of the Global Antibiotic Research and Development Partnership (GARDP) reflects on India’s efforts to reduce fireworks-related injuries, and what lessons can be applied to the efforts to address antibiotic resistance.*

I was recently asked if I thought behaviour change around antibiotics was possible, particularly in low- and middle-income countries (LMICs), which have historically had limited controls around the use of these drugs. My answer is a qualified ‘yes’. Behaviour

change is possible, provided it is evidence-based and with the understanding that meaningful transformation takes time. For a practical example of this, I often reflect on India's experience with public attitudes towards fireworks during the Diwali festival.

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Diwali, the five-day Hindu festival of lights, is celebrated throughout India with food, gifts, and copious amounts of fireworks. For much of my lifetime there was limited regulation on the manufacture, sale and use of fireworks used during this autumn festival. This both contributed to high levels of pollution and a high incidence of accidents and burns over the Diwali season<sup>1</sup>. In the early 1980s, a formative study across two Delhi hospitals found a single firework called the *amar*, a type of cone-shaped fountain, was responsible for 68% of fireworks-related burns. Only 5% of burn victims in the study reported using water as first aid before visiting the hospital<sup>2</sup>.

Studies such as these have motivated the authorities to implement a public education campaign on the safe use of fireworks, as well the importance of using cold water on burns. A follow-up epidemiological study on the impact of the campaign found a decrease in the number of fireworks burns and a marked increase in the number of people using water as first aid. A 10-year retrospective study of Diwali-related fireworks

injuries published in 2009 also found a decrease in burns which it attributed to aggressive awareness campaigns by government and non-government organizations.

## **Changing behaviour**

We know that new drugs alone are not enough to tackle the rising tide of drug resistance. A fundamental shift in how we use antibiotics is also required, including in LMICs where indicators point to a higher burden of resistance. So what do we know about knowledge and attitudes to antibiotics in LMICs? A recent survey of 2141 people in rural villages of Thailand and Laos<sup>3</sup>, found people generally had a high awareness of antibiotics (Thailand: 95.7%; Laos: 86.4%) and antibiotic resistance (Thailand 74.8%; Laos: 62.5%). However, there were important gaps in knowledge. Antibiotics were most commonly used to treat sore throats and were described as anti-inflammatory medicines. Some respondents reported using antibiotics to treat their plants, dogs and chickens.

A first step to addressing these knowledge gaps and changing behaviours will require LMICs to recognize drug-resistance as a priority public health issue. This is currently not the case. A WHO survey on antibiotic awareness campaigns found that, of the 55 countries that responded, 47 reported having run a campaign since 2010. Amongst these, only 16 were LMICs<sup>4</sup>.

Beyond the lack of awareness campaigns in LMICs, the WHO survey and study in South-East Asia point to another important consideration. Antibiotic resistance interventions must use accessible language and local terminology. While it is not necessary for every person to understand the science of bacteria and drug resistance, what is needed is easy to understand and compelling information and activities to support the appropriate use of antibiotics. In Sweden, the ban on antibiotics for growth promotion was the result of a newspaper article that drew attention to the fact that food animals were raised on antibiotics. The Swedish public was not responding to the problem of antimicrobial resistance – they just did not want their food to have been raised on antibiotics.

Behaviour change does not happen overnight, but as we have seen in India with fireworks, with political urgency and an empowered public, action is possible.

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