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Influence of pesticide regulation on acute poisoning deaths in Sri Lanka;
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Abstract : Objectives To assess in a developing Asian country the impact of pesticide regulation on the number of deaths from poisoning. These regulations, which were implemented in Sri Lanka from the 1970s, aimed to reduce the number of deaths - the majority from self-poisoning - by limiting the availability and use of highly toxic pesticides. Methods Information on legislative changes was obtained from the Ministry of Agriculture, national and district hospital admission data were obtained from the Sri Lanka Health Statistics Unit, and individual details of deaths by pesticide poisoning were obtained from a manual review of patients' notes and intensive care unit records in Anuradhapura. Findings Between 1986 and 2000, the total national number of admissions due to poisoning doubled, and admissions due to pesticide poisoning increased by more than 50%. At the same time, the case fatality proportion (CFP) fell for total poisonings and for poisonings due to pesticides. In 1991-92, 72% of pesticide-induced deaths in Anuradhapura were caused by organophosphorus (OP) and carbamate pesticides - in particular, the WHO class I OPs monocrotophos and methamidophos. From 1991, the import of these pesticides was reduced gradually until they were banned for routine use in January 1995, with a corresponding fall in deaths. Unfortunately, their place in agricultural practice was taken by the WHO class II organochlorine endosulfan, which led to a rise in deaths from status epilepticus - from one in 1994 to 50 in 1998. Endosulfan was banned in 1998, and over the following three years the number of endosulfan deaths fell to three. However, at the end of the decade, the number of deaths from pesticides was at a similar level to that of 1991, with WHO class II OPs causing the most deaths. Although these drugs are less toxic than class I OPs, the management of class II OPs remains difficult because they are, nevertheless, still highly toxic, and their toxicity is exacerbated by the paucity of available facilities. Conclusion The fall in CFP amidst a rising incidence of self-poisoning suggests that Sri Lanka's programmes of pesticide regulation were beneficial. However, a closer inspection of pesticide-induced deaths in one hospital revealed switching to other highly

toxic pesticides, as one was banned and replaced in agricultural practice by another. Future regulation must predict this switching and bear in mind the ease of treatment of replacement pesticides. Furthermore, such regulations must be implemented alongside other strategies, such as integrated pest management, to reduce the overall pesticide availability for self-harm.