How effective are public information programs in preventing poisoning?
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Introduction: Poisoning is a major cause of morbidity and mortality. The majority of poisonings are unintentional and seemingly, they should be preventable or 'controllable' events as the term 'poison control' implies. The epidemiological model (victim [human/animal] + agent [poison] + environment [conducive setting to bring the victim and agent together] = injury [poisoning]) requires that three parameters or conditions must be met for a poisoning to occur. Any strategy that interferes with the interaction between or among the three parameters should result in successful poison prevention. Primary poison prevention education promotes avoidance of risk by eliminating the poison or the conducive environment that brings the victim into contact with the poison. Secondary education assumes that a poisoning exposure has occurred and seeks to reduce morbidity and mortality by utilizing the services of a poison center. Most poison prevention programs combine aspects of both primary and secondary education. In other words, the general purpose of 'public information programs in preventing poisoning' is to create avoidance of exposure to poisons and enhance awareness of the poison center in the event that an exposure has occurred. How effective are these efforts? While there is evidence that temporary behavior changes can occur following directed poison prevention education activities, there is no evidence that demonstrates that primary education is effective.
Discussion: Theoretically, primary education should be effective, but does it change outcomes and is that measurable? Poison avoidance would be a good indicator of primary education and reduced poison center exposure call volume might be a reflection of effectiveness. Conversely, increased call volume may be an indicator of the success of secondary poison prevention education strategies. Since most poison prevention education endeavors combine both primary and secondary education messages, the specific effectiveness of primary education cannot be measured. Ultimately, improved patient outcome is the desired goal. However, there is no evidence that public education programs result in improved patient outcome. A review of the American Association of Poison Control Centers National Poison Data System for the last five years failed to reveal any changes in patient outcome (positive or negative). The data also show a pattern of slow but continued growth in the number of exposure calls and precipitous growth in the volume of information calls (a reflection of the effectiveness of secondary education?). While the effectiveness of primary education cannot be validated, the impact of secondary education on enhancing the awareness of the poison centers is impressive. As evidence, the national toll-free Poison Help telephone number (800-222-1222) was implemented in January, 2002. Calling the universal number will connect the caller with the nearest regional poison center in the United States and U.S. territories. From October, 2006 through September, 2007 3,448,412 exposure and information calls were directed to US regional poison centers via the national toll-free Poison Help telephone number—from no calls at inception to over three million calls in 6.5 years! An estimated

80% of the calls now originate on the Poison Help toll-free number. It is evident that poison center awareness education (secondary education) has been successful, but the question still remains: is primary education effective? According to the Haddon Matrix which goes beyond the traditional epidemiological model, injury prevention can be achieved only through a multifaceted approach that includes both voluntary (e.g., public poison prevention education) and involuntary initiatives. The integral components of effective programs incorporate six elements: education, environmental/engineering modifications, enactment/enforcement, economic incentives, empowerment and evaluation. Poison centers can educate and empower the public with regard to poison prevention within their service region. With the exception of demonstrating enhanced poison center awareness through secondary education, poison center evaluation of the effectiveness of primary education is nearly nonexistent. The most significant poison prevention measure to date in the United States was not a primary education strategy but an involuntary intervention that incorporated the engineering, enactment and enforcement components of Haddon's Matrix. In 1970 the Poison Prevention Packaging Act was passed to protect children from unintentional poisoning due to prescription and nonprescription medications as well as chemicals such as methanol and corrosives. Following implementation of the PPPA, pediatric fatalities plummeted. Poison centers reinforce the importance of utilizing child-resistant closures properly in their primary education programs. However, it is clear that the PPPA, an involuntary measure, has had the greatest impact on preventing morbidity and mortality due to poisoning in children. Conclusions: Primary poison prevention is time-consuming, expensive and has not been validated. The 2004 Institute of Medicine report on Forging a Poison Prevention and Control System reported that "…public education efforts are necessary but not sufficient to accomplish primary or secondary prevention of poisoning." Furthermore, the IOM report recommended that the primary and secondary poison prevention education efforts should be separated so that the evaluation of primary education initiatives can occur. It is incumbent upon poison centers to examine the cost-effectiveness of education programs and invest in those aspects that produce the greatest benefit. Poison center awareness activities are successful. While primary education interventions have theoretical benefit and emotional justification, emphasis on poison center awareness (secondary education) may be the most appropriate public education strategy until there is evidence to support the value of education that stresses primary prevention. Primary poison prevention efforts have focused on the pediatric population where most exposures have minimal consequences. Poison prevention education should be refocused to address the impact of interventions that target high risk groups (and that can be evaluated) such as senior citizens and those at risk of being exposed to highly toxic agents instead of expending a disproportionate amount of resources to address pediatric exposures.