

EDITORIAL COMMENTARY

Do Poison Centers Save Money...? What Are the Data?

There has been a significant attrition in the number of poison information centers over the last 2 decades. In 1978, 661 centers served the US. By 1998, there were only 74 active centers. Considering the tumultuous recent events in health care, this erosion is not surprising. Although the number of centers may be approaching an absolute minimum, the remaining poison centers have become vulnerable due to the uncertainty of funding. Mistakenly, poison centers have been perceived by the public, medical establishment, and government to be part of the health care infrastructure—each thinking that the other is responsible for financial support. This misperception has left poison information centers on the brink of disaster. In response, there has been considerable activity by the poison center community that has resulted in pending federal legislation to stabilize poison information center funding. What aspect of poison center operations should be used to justify financial support of poison centers? A primary focus of this survival effort has been to demonstrate that poison centers save money. Given our current penchant for being an evidence-based culture, it is fortunate that there are considerable data to support the contention that poison centers save money.

THE EVIDENCE THAT POISON CENTERS SAVE MONEY

Cost-Analysis Research

Thought by some to be the definitive work on the cost analysis of poison centers, a paper by Miller

and Lestina examined the impact of poison center services on medical spending.¹ The authors took a macroscopic view of the financial benefits of poison center services by using benefit-cost analysis which requires the assignment of a dollar value to human life and the quality of life. It was demonstrated that each dollar spent on poison center activities saved \$6.50 in overall expenditures. Acknowledging the limitations of their analysis, the authors indicated that “at a minimum, poison control centers seem unlikely to worsen outcomes.” While the study was criticized for the use of nonevidence-based assumptions and 2 small studies, it was concluded that the benefit-cost analysis demonstrated that poison centers are an excellent societal investment.²

Harrison *et al.* used a variety of cost-analysis principles to determine if poison centers were economically justifiable.³ The model used an expert panel of medical toxicologists to evaluate the morbidity and mortality of 4 common poisoning exposures. When a poison center was used in the management of a poisoning, the cost per successful outcome was approximately 50% less than that achieved without the benefit of poison center services.

Poison Center Closure or Termination of Service

In Grand Rapids, Michigan, service was eliminated in 2 of 3 geographic regions by blocking access from those telephone area codes. In the area codes where service was lost, admissions secondary to poisoning increased by 16% and outpatient claims increased by 35%. In the remaining poison center

service region, there was no change in those parameters.¹

The poison center serving Louisiana closed for 9 months. Prior to closing, 25% of patients from Louisiana received medical treatment for poisoning. After closing, that number rose to 71.4%. The annual cost attributable to unnecessary utilization of outpatient medical services in Louisiana was estimated to be \$1.4 million—approximately 3 times the annual poison center appropriation from the state.⁴

Impact of Poison Prevention Education

Poison prevention education is a fundamental principle in the mission of poison centers. It is also one of the most vulnerable aspects of poison center services when financial resources become limited. A study evaluating the impact of a 4-year poison prevention effort introduced poison prevention into the curricula of preschools and elementary schools.⁵ The study demonstrated that each dollar expended on poison prevention saved \$3. Poisoning-related hospital admissions were reduced by 58.7% and emergency department visits decreased by 54.2%. During the same 4-year period, national statistics on those parameters remained unchanged.

Poison Center Surveys

Another commonly used technique to measure potential cost savings is to conduct surveys of individuals who have used poison center services. The Bonn poison center in Germany conducted a survey of 200 individuals (with nontoxic or low toxicity outcomes) who had contacted the poison center.⁶ They posed the question of what action the caller would have taken if the center had not been available. Medical attention would have been sought by 96% of the respondents. Projected annual savings of \$85,759–\$262,219 would be realized by contacting the poison center.

Kelly and colleagues measured poison center effectiveness by conducting a survey of prior poison center callers to determine the number of medical facility visits that were prevented by using a poison center.⁷ A total of 166 individuals were surveyed, 3% of whom were actually referred by the poison center for medical care (3.6% actually went to a health care facility). When asked what alternative they would have used in the absence of a poison center, 43% indicated that they would have sought

medical attention at a medical facility. This is particularly noteworthy since 96.4% were managed successfully in the home.

A survey was conducted of 589 public callers to a poison center who were managed at home without referral.⁸ The callers were asked what alternative action they would take if poison center services were unavailable. Seventy-nine percent (79%) responded that they would have sought assistance from local emergency medical services. Conservative charges for those services were calculated to be \$71,900 compared to \$13,547 spent by the poison center to provide service to the 589 individuals.

To determine the financial impact of poison center closings on the state government and health insurance providers, Mrvos *et al.* surveyed 1276 public callers to a poison center regarding their health insurance.⁹ It was determined that 73% had private health insurance, 20% were recipients of state medical assistance, and 7% had no medical coverage. All of the hospitals in the poison center's regions were surveyed about the customary emergency department charge for 3 common exposures. The average fee was \$227. Assuming the closing of a center with an annual exposure volume of 61,000 cases and that 60% of the patients would seek medical attention, the state would incur financial liability of up to \$2.2 million and private insurers would forfeit up to \$7.93 million. This considers only outpatient care for all of the patients. Hospital admissions would increase these sums dramatically.

All of these papers seemingly demonstrate significant cost savings. The cost savings are generally compared to the alternative—hospitalization. Keeping a patient out of the hospital saves money, and poison centers clearly prevent unnecessary hospitalizations. Poison prevention education has conditioned the public to be concerned about poisoning emergencies and to always call the poison center. This results in high consumer utilization and further apparent savings that perpetuate the cycle of supplier-induced demand. This may be an inherent bias that makes the true assessment of the economic benefit of poison centers a difficult task.

Another recurrent theme throughout the papers addresses the economics of consumer choice. What would they have done in the absence of a poison center? Clearly, calling a poison center instead of making an unnecessary visit to an emergency depart-

ment was a good economic choice, since the majority of the exposures were associated with little or no morbidity and did not merit referral (and the related costs). However, this reveals another issue—should the poison center have been called in these cases? A possible future strategy may be more aggressive education about the recognition of true poisoning emergencies, when to be concerned, and when not to call a poison center. Poison centers could then concentrate more on the actual poisoning emergencies and as a consequence become more cost-efficient. A potential mutually beneficial relationship with managed care should also be explored. Managed care could utilize regional poison centers as “gatekeepers” for all poisoning exposure inquiries. On behalf of managed care providers, poison centers could provide proper triage of poisoned patients and prevent unnecessary emergency department visits and hospitalizations (as they currently do). Managed care could assist with the proactive education of their prescribers as to when to utilize the services of a poison center, but also mandate contacting a specific poison center for treatment advice and referral approval. Poison centers could provide this service for a capitation fee and generate additional operational revenue. Managed care is a beneficiary of poison center services, but it has not contributed in any significant way to their operation. A small investment by managed care would allow poison centers to save them money through the proper utilization of resources.

The financial aspects of poison center services receive the majority of the attention. Lost in the mire of financial analyses and political arguments is the true mission of poison information centers—improving patient outcome. Do poison centers have an impact at the levels of the ICU, tertiary care, and the emergency department? Morbidity and mortality analyses must be conducted to determine if poison centers save lives as well as money.

Cost justification would be unnecessary if the positive impact of poison center services on patient outcome could be established as the least expensive way of obtaining that outcome. Then, only the cost-

efficiency of poison center operations would need to be precision-tuned so that maximum efficiency could be achieved.

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REFERENCES

1. Miller TR, Lestina DC. Costs of poisoning in the United States and savings from poison control centers. A benefit-cost analysis. *Ann Emerg Med* 1997;**29**: 239–245.
2. Williams RM. Are poison control centers cost-effective? *Ann Emerg Med* 1997;**29**:246–247.
3. Harrison DL, Draugalis JR, Slack MK, Langley PC. Cost-effectiveness of regional poison control centers. *Arch Intern Med* 1996;**156**:2601–2608.
4. King WD, Palmisano PA. Poison control centers: Can their value be measured? *South Med J* 1991;**84**: 722–726.
5. Van Buren J, Fisher LL. Monroe County poison prevention demonstration project: Final report to US Consumer Product Safety Commission. Albany, New York: New York State Department of Health, 1990.
6. Bindi L, Ruchardt J, Pfeiffer A, Kowalewski S, Lentze MJ. Effect of a German poison control center on health care cost reductions in harmless exposure cases. *Vet Hum Toxicol* 1997;**39**:48–50.
7. Kelly NR, Ellis MD, Kirkland RT, Holmes SE, Kozinetz CA. Effectiveness of a poison center: Impact on medical facility visits. *Vet Hum Toxicol* 1997;**39**: 44–48.
8. Kearney TE, Olson KR, Bero LA, Heard SE, Blanc PD. Health care cost effects of public use of a regional poison control center. *West J Med* 1995;**162**: 499–504.
9. Mrvos R, Dean BS, Krenzelok EP. Poison center funding—Who should pay? *J Toxicol Clin Toxicol* 1994;**32**:503–508.