

Environmental risks: dealing with the known and the unknown

Mary Kay O'Rourke¹ and
Carlos C. Campbell¹

This issue of the *Revista Panamericana de Salud Pública/Pan American Journal of Public Health* highlights two special papers addressing environmental exposures along the border shared by Mexico and the United States of America. In one paper, Bass et al. (1) examine the use and storage of pesticides in households with young children in Douglas, a small Arizona border community; these pesticide practices reflect the risks as perceived by the Douglas residents. In the second paper, Byrd et al. (2) examine differing attitudes and beliefs about environmental hazards in three communities in and near the city of El Paso, Texas. The three El Paso communities vary in terms of income and density (urban vs. rural). Two of the three communities have predominantly Hispanic populations. Together, these two papers present an important contrast between the risks that individuals willingly take on in their own homes as compared to risks that people believe should be tolerated in the community.

People are exposed to pesticides through many pathways, in multiple locations each day. Bass et al. minimize these competing exposures by examining pesticide use and storage in a nonagricultural community, where most of the exposure is expected to occur within the home. Household pesticide use in the United States is reported as being in the range of 85% to 90% nationwide (3). According to Bass et al., the households in Douglas, Arizona, had lower than expected use (~70%) and an average of only 1.4 pesticide products found per home. By contrast, results from a Minnesota survey indicated pesticide was found in 97% of the sampled residences, with an average of 6.0 pesticide products per home (4). Insecticides were the dominant use-class reported in both the Minnesota and the Douglas, Arizona, studies. While repellent (e.g., DEET) was used commonly in Minnesota, its use is unreported in Douglas, Arizona. This difference may be due to aridity and reduced numbers of mosquitoes and biting flies in Douglas. However, the Mexico-United States border region is profoundly varied. Some parts have more standing water and numerous pests. These regions may require greater personal pesticide use and may reflect product inventories like those found in Minnesota. Other regions have less need, like Douglas.

The pesticide survey in Douglas is the first published account to evaluate cross-border pesticide transfer, with 7% of the pesticides coming from Mexico. As research on pesticide use continues in the Mexico-United States border region, assessing the variability in product purchases will be of interest. There are broad implications to the growth in commerce and other types of exchange coming from increased free trade. Just one example—this one of doubtful benefit to the community and to individual health—is a product imported from China called “Miraculous Insecticide Chalk.” While banned by the United States Environmental Protection Agency, it was nevertheless found in seven of the homes in Douglas.

The pesticide inventory conducted by Bass et al. in Douglas presented information regarding pesticide toxicity and location of use and storage. To date, few surveys consider the implications of product toxicity. In Douglas, residents did not consider the toxicity of substances when selecting a storage location. The most common pesticide storage location was the kitchen (45.3%). Further, most pesticides were stored within 4 feet

¹ Arizona College of Public Health, P.O. Box 245163, The University of Arizona, Tucson, Arizona 85724-5163, United States of America.

(1.22 m) of the floor, a height easily reached by young children. Residents reduced the potential risk by purchasing products with child-resistant caps (56.1%) or by locking the products away (37.2%). Such precautions may reduce overt poisoning events, but storage, particularly in the kitchen, promotes exposure.

Pesticides are semivolatile compounds. Pesticide storage in kitchen cupboards is common, as is also treatment of cupboards containing dishes or food—one of the practices reported in Douglas. People using pesticides inside cupboards either fail to consider the risk of secondary exposure or they consider the risk sufficiently low.

Professional pest control companies were used by one-third of the Douglas households, but none of the residents knew what chemicals the exterminators had applied. This lack of knowledge suggests either trust in the professional (“expert”) or a willingness to assume an unspecified risk. Would community residents be equally willing to accept a similar risk if it were posed by industry or by a governmental agency?

In their article examining attitudes and beliefs about environmental hazards in three communities in and near El Paso, Texas, Byrd et al. provide valuable insights about the willingness of various communities to trust experts, effect change, and assume risk. Low-income semirural and urban Hispanic communities had some attitudes similar to those in a more affluent, less Hispanic neighborhood, but at other times their views differed. In all three of the communities, trust in the government to resolve specific environmental problems was lacking. The two Hispanic communities appeared to trust “experts” to a greater extent than did their upper-income neighbors. The higher-income community’s members more strongly supported regulation to minimize risks.

People in the two predominantly Hispanic communities expressed greater concern about the impact of chemical exposure on health. They expressed more confidence in the ability of an individual to improve health through lifestyle changes. The low-income residents were more optimistic about the ability of people to effect environmental improvements within the region. The more affluent, less Hispanic community members were more willing to accept a hypothetical risk posed by a tiny amount of a toxic substance in their drinking water. This may indicate that the upper-income persons have a better understanding about the relationship between low-dose exposure and health.

Often the public does not understand how “experts” evaluate factors when reporting potential risks or making risk assessments. This lack of understanding feeds public mistrust of government and agencies. Byrd et al. conclude their article with practical suggestions for ways to improve communication with communities. These suggestions focus on community involvement, respect for the community, honesty with community members, and message consistency.

Risk communication with communities needs to be improved in a number of settings. One example is pesticide exposure in agricultural communities, where Fenske et al. (5) employ an interesting approach. Farming is a respected profession sometimes involving the use of pesticides to resolve production problems, and few in agriculture use this costly product without need. Before experts undertake exposure or risk assessment studies, the community should be involved. When possible, community members should be employed as part of the project staff. Respect for the community, not judgment, should be proffered. For community residents, the failure to feed, clothe, house, and provide medical care for a family is a greater public health risk—and a more immediate one—than long-term, low-dose pesticide exposure.

Clearly, reduction of long-term exposure is in everyone's best interest, and agencies and experts should respect the ability of the community to realize the importance of such reductions. These authorities should respect the community by providing frequent reports on project progress, especially when progress is slow. They should respect the community's ability to promote actions in its best interest. Authorities should be honest with the community about the nature of expected results prior to beginning the project, and communicate the results to individuals and community groups. Ambiguous results are the most difficult to communicate. For instance, biomarkers may indicate pesticide exposure within a community, and such results should be honestly reported. The exposure measurement may exceed recommended daily doses but still fall below any observable health-effect level.

"Experts" do not know if such exposure levels have any long-term health effects, whether the exposure comes from household pesticides or agricultural applications. There might, or might not, be such long-term effects, and only time and research will provide clear answers. Responsible officials and investigators should honestly state what is known and what is not known. Such individuals should also respect the community's ability to understand the concepts. They should be honest throughout the project about the nature and meaning of the results, even when the results are not definitive. Failure to provide honest information to the community is what compromises the "expert." The community can handle the unknown, and accept that the "expert" is not all-knowing. Can the "expert" handle it?

In this issue of the *Revista/Journal*, the papers by Bass et al. and by Byrd et al. convey important messages about exposure and the perception of exposure. In Douglas, Arizona, residents were willingly bringing products into their homes and taking on the risk without a great deal of thought. Assumption of risk through personal choice may be easier than being on the receiving end of a choice made by some "expert." When an "expert" believes low-level risk should be acceptable within a community, this small, expert-inflicted risk may appear more serious than the greater self-induced risks. When considered in concert, these two papers present us with much food for thought and, hopefully, for action.

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