

OBJECTIVES

The primary study objective was to estimate with a known degree of confidence the proportion of wells on Wisconsin Grade A dairy farms that contain detectable levels of the most commonly used pesticides and nitrate-nitrogen ($\text{NO}_3\text{-N}$). If possible, we also hoped to make acceptably confident statements about proportions of wells at the WASS Agricultural Statistics District level. Finally, we desired knowledge about the relative contributions of pesticide application versus mishandling to any detections in groundwater.

METHODS

Survey Design

Sampling Frame

The Wisconsin Agricultural Statistics Service (WASS) was charged with ensuring that the well sampling project would generate unbiased estimates of the proportion of wells on Wisconsin Grade A dairy farms that contained detectable levels of pesticides and nitrate-nitrogen ($\text{NO}_3\text{-N}$). Potential contamination from pesticides is not limited to dairy farms. Corn was planted on over three million acres in Wisconsin during 1988 and only a portion of this was planted on dairy farms. Funding limitations necessitated sampling from a readily available list of farming operations. Further testing of wells on non-dairy farms is necessary to determine if they contain similar pesticide and $\text{NO}_3\text{-N}$ concentrations.

The Brucellosis Ring Test list (WDATCP Animal Health Division, 24 May, 1988) served as the sampling frame for the project. Grade A milk producers are part of an ongoing inspection program and therefore can be visited for well water sampling in a cost-efficient manner. In addition, the list of Grade A producers is very complete and updated at regular intervals. The quality of the list was important and reduced the effect of non-response bias in the sampling procedure.

Some of the logistical challenges included the availability of staff for the water collection, laboratory analysis, and coordination of staff from several WDATCP divisions.

Further, there were only limited data from past water sampling on farms and some of the information useful in survey design was unavailable. Prior knowledge of historical estimates of means, proportions, and variances typically serves in determining sample size and sample allocation.