

Poster: 0018

Unique Occupational Injury Surveillance: Identification of the Total Injury Burden and Risks on Agricultural Operations

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Agriculture has consistently been identified as one of the most hazardous occupations in the United States (U.S.); rates of morbidity and mortality greatly exceed those for all occupations combined. Currently, no systems exist that can provide accurate data on the incidence and severity of, and risk factors for agriculture-related injury, or how they change over time -- information integral to the ultimate control of this problem.

The purpose of this effort was to utilize a unique model for conducting surveillance among agricultural operation households that enabled monitoring for changes, between 1999 and 2001, in the incidence and consequences of both agricultural activity-related injuries and those incurred from other activities, by all ages. It also enabled identification of risk factors for agricultural activity-related injuries incurred by children less than 20 (<20) years of age, by comparing exposures between injured and uninjured children.

For each year, data were collected from the same base population, in an identical manner, using randomly selected cohorts in Minnesota, Wisconsin, North Dakota, South Dakota, and Nebraska (total n=16,000), from the U.S. Department of Agriculture (USDA), National Agricultural Statistics Service's (NASS), Master List Frame of Farming Operations. Data were collected for the two six-month periods of 1999 and 2001, using a specially designed computer-assisted telephone interview instrument, to identify all injury events and relevant demographics for all household members; data pertinent to numerous exposures of interest were collected for those <20 years of age, through the application of a simultaneous nested case-control study. Univariate and multivariate analyses were used; relevant adjustment methods addressed eligibility, non-response and other potential biases.

Response rates for both years were similar In 1999 and 2001, respectively: 8,288 (51.8%) and 8,652 (54.1%)

Abstracts

of operation households were not eligible, based on screening criteria; for each year, 4,402 (27.5%) and 4,408 (27.5%) were eligible, and 3,765 (85.5%) and 3,655 (82.9%) participated in the full studies. Respective refusal rates were 24.5% and 19.3%. For 1999 and 2001, respectively, 16,538 and 16,064 persons incurred 2,586 and 2,459 injury events; annualized injury rates per 1,000 persons for <20 and 20+ year age groups were: 146.0 and 176.0; 144.8 and 168.6. Primary sources of agriculture-related injuries, for each age group, by year, were: animals (41% and 32%; 32% and 37%) and falls (31% and 23%; 32% and 24%). These age groups, by year, identified >7 days of lost agricultural work time, associated with agriculture-related injuries (16% and 15%; 19% and 14%), and all other injuries (17% and 19%; 15% and 26%).

Based on multivariate analyses of case-control data, for those <20 years, risk factors for agricultural injury appeared to be similar for both 1999 and 2001; respective Odds Ratios [OR] and 95% Confidence Intervals [CI] are presented. Increased risks were identified in both years for operating or riding in a motor vehicle (OR = 3.7, CI = 2.2-6.2; OR = 2.8, CI = 1.7- 4.8) and riding on (OR = 1.8, CI = 1.2-2.6; OR = 1.3, CI = 0.9-1.9) or operating a tractor (OR = 1.6, CI = 1.02-2.5; OR = 2.0, CI = 1.2-3.1). Risk of injury was increased in 2001 for those who operated either large or small equipment (ORs and CIs = 1.6, 1.0-2.6 and 1.7, 1.1-2.7, respectively); ORs for these exposures were also elevated in 1999, but not to the same degree (1.5, 0.9-2.3; 1.4, 0.9-2.1). In both 1999 and 2001, increased risks were identified for those who worked with horses (2.3, 1.5-3.4; 2.0, 1.3-3.0), sheep (2.3, 1.2-4.3; 2.0, 1.2-3.3), and beef cattle (2.0, 1.4-2.9; 2.1, 1.4-2.9); exposure to dairy cattle also was associated with increased risks (1.4, 0.9-2.2; 1.5, 0.9-2.5). Risks associated with exposures to swine (1.6, 0.98-2.7; 1.4, 0.8-2.4) and poultry (1.2, 0.6-2.4; 2.7, 1.7-4.5) were more variable between these two years.

This effort enabled identification of the incidence and consequences of agricultural injuries, in concert with the burden of all injuries on the agricultural operation, for all household members, and the risk factors for agriculture-related injuries among children <20 years of age. This was accomplished through a unique surveillance application that incorporated a nested case-control design. Most importantly, these data serve as a basis for development of prevention and control strategies essential for the reduction of morbidity and mortality from injuries incurred by children and adults residing on agricultural operations.

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