(ROPS) and seatbelts effectively reduce tractor overturn deaths. However a large proportion of tractors in use in American agriculture are older tractors without ROPS and seatbelts. This manuscript describes the tractor-related responses from participants in a population-based study conducted in Keokuk County, Iowa. This study was designed to measure rural and agricultural adverse health and injury outcomes and their respective risk factors. Questionnaires were partially developed from well-documented national surveys. Questions about agricultural machinery use, presence of safety equipment on the machinery, work practices, and attitudes about farm safety were included. Study participants on farms who owned tractors had an average of 3.1 tractors with an average age of 27 years. Only 39% of the 665 tractors had ROPS. Tractor age was associated with the presence of ROPS_84% of tractors manufactured after 1984 were ROPS-equipped whereas only 3% of tractors manufactured before 1960 were ROPS-equipped. ROPS-equipped-tractors were significantly more common on larger farms and households with higher income. Only 4% of the farmers reported that their tractors had seatbelts and they wore them when operating their tractors. The results of this study support the findings of other studies which indicate that many older tractors without ROPS and seatbelts remain in use in American agriculture. Until a dramatic reduction in the number of tractors in the United States operated without ROPS and seatbelts is achieved, the annual incidence of 120 to 130 deaths associated with tractor overturns will persist.

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ENDOTOXIN EXPOSURE AND RESPIRATORY OUTCOMES AMONG DAIRY, FEEDLOT, AND GRAIN ELEVATOR WORKERS IN COLORADO.

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Gram-negative bacterial endotoxins play a key role in respiratory disease affecting more than one million U.S. agricultural workers. This project uses a novel Recombinant Factor C (rFC) assay and GC/MS to evaluate the role of endotoxin exposures and genetis in respiratory outcomes among agricultural workers. Pre-work shift measurements included spirometry, symptoms, and blood collection for TLR4 genotyping. Personal samples were collected using IOM inhalable samplers during the workshift. Spirometry and symptoms were remeasured after the workshift, and nasal lavage fluid was collected for cytokine measurement. Results from the first 55 participants are reported here. Overall inhalable dust levels ranged from 0.59 to 76 mg/m^3; endotoxin levels ranged from 62 to 34,808 EU/m^3. At grain elevators (n = 20) dust and endotoxin exposures averaged 12 mg/m^3 and 2,803 EU/m^3. Exposures averaged 4.9 mg/m^3 and 5,646 EU/m^3 at cattle feedlots (n = 24), 2.7 mg/m^3 and 1,807 EU/m^3 at dairies (n = 11). 3-hydroxy fatty acid components of endotoxin varied by operation. Baseline FEV1 was lowest for dairy and grain workers. The mean cross shift change in FEV1 was -3.1% to -3.8% for all groups. The cross shift change in FVC was greatest for dairy workers (-3.8), then grain workers (-2.1%) and feedlots (-1.8). The most common symptoms reported included eye irritation (18–42%), nose irritation (18–50%), mucous (18–42%), and cough (16–30%). Symptom rates were higher among grain workers, and lowest among dairy workers. Most participants were homozygous wildtype at the TLR4 299 and 399 loci. Exposure, cross shift changes in pulmonary function, and symptoms differed by type of operation. Exposures to dust and endotoxin were extremely high in some cases. Data collection for an additional 200 workers is planned to further evaluate the relationships among respiratory outcomes and exposures in this population.

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