PURPOSE: to understand risk factors associated with agricultural injury, with the long-term goal of informing the development of prevention programs.

“This project is a major Canadian study, and its results could have an impact upon research and practice in farm populations in many parts of the world. I have especially valued the opportunity to work closely with my colleagues from the University of Saskatchewan. We are trying to honour the participants, and the people of Saskatchewan, by making the most of the information that they have so graciously provided”
~ Dr. William Pickett, Queen’s University

THE POPULATION HEALTH FRAMEWORK

A cohort is a group of people sharing a common factor such as, in this case, agriculture.

What drives the farm injury epidemic? Is it our work practices? Is it economics? Is it our longstanding farm traditions? Or is it simply the physical dangers of a very hazardous occupation?

Using a large cohort study, back in the winter of 2007, we asked farmers about themselves, their families and their farm operations. They provided us with a very detailed picture. We kept in touch with those farmers until 2009, and used their earlier information to predict their farm injury experiences over time. In doing so, we applied a new theory called the “Population Health Framework” to study what determines whether or not a farm person is injured. That theory would suggest that it is a combination of individual work exposures, and the type of farm environment they work in, that decides whether or not someone gets injured.

What we found was a bit surprising ... it certainly wasn’t predicted by the new theory. We found that what really drives the farm injury epidemic wasn’t financial, stress, or their traditions and views about farm safety. What was really important was much simpler than that ... it was the physical state of their farms, and the hours they were putting in that best predicted their injury experiences. This is really helpful information, in that it tells us what provides new evidence on what to emphasize in occupational health and safety campaigns on farms. The physical work environment matters a whole lot on farms. So does the fatigue associated with those long work hours. Other factors had less importance as determinants of farm injury experiences.

In the following pages you will discover interesting answers to a number of questions posed by the members of the research team. In each case the researchers have raised points for your consideration. The research team continues to develop questions that will be examined using the study data. The new information provided by the study will assist farmers, health and safety professionals, and policy makers in making the farm a safer place to live and work.
WHO PARTICIPATED?

Fifty-three rural municipalities (RMs) were randomly selected to participate in the study. During 2006 the research team met with each RM Council. We had terrific cooperation from 96% of the RMs that chose to participate.

MAIL SURVEY

During the winter of 2007 the main study survey was mailed to all of the active farms located in the 50 RM's. At the end of the survey 5,502 persons living on 2,422 farms had participated.

INJURY EXPERIENCES

Injuries were tracked on 2,043 farms for the 2 year period beginning in April 2007 and ending in March 2009. A total of 467 injuries occurred during the period.

- Persons most frequently injured were males between the ages of 40 and 69 years.
- Over 91% of injuries occurred during farm work.
- Treatment by a health professional was required for 64% of injuries and 6% required hospitalization.
- Machines were involved in 44% of injuries.
- Animals were involved in 28% of injuries.
- Falls were involved in 24% of injuries.

Researchers were interested in farm characteristics, safety practices, safety hazards, injury on the farm, and economic stress. Some of this research aimed to provide comprehensive information on important health questions suggested by farmers. One hope was to confirm or disprove common perceptions about the health of Saskatchewan farmers. The researchers also hoped to gain new knowledge about personal and operational factors that lead to injury. Specific research questions included:

- Does formal education help to reduce risks for injury on farms?
- How does economic strain affect the health and safety of farmers?
- What role does poor sleep play in causing injuries?
- How often do older farm people work, and how much does this vary over the farm seasons?
- Why are children exposed to so many hazards on the farm worksite?
- How much does machinery maintenance matter to the safety of farm workers?
- Could some new Population Health Theory be applied to the problem of farm injury?

PARTICIPATING FARMS

<table>
<thead>
<tr>
<th>By size – average acres</th>
<th>No.</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain crops</td>
<td>2012</td>
<td>800 ac</td>
</tr>
<tr>
<td>Forage crops</td>
<td>1222</td>
<td>180 ac</td>
</tr>
<tr>
<td>Pasture</td>
<td>1055</td>
<td>260 ac</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>By animals - %</th>
<th>No.</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef cattle</td>
<td>1259</td>
<td>52%</td>
</tr>
<tr>
<td>Dairy cattle</td>
<td>12</td>
<td>2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>By operating arrangement</th>
<th>No.</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual family farm</td>
<td>1558</td>
<td>67%</td>
</tr>
<tr>
<td>Partnerships</td>
<td>451</td>
<td>19%</td>
</tr>
<tr>
<td>Family corporation</td>
<td>301</td>
<td>13%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family lives on farm</th>
<th>No.</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>1602</td>
<td>66%</td>
</tr>
<tr>
<td>Some</td>
<td>420</td>
<td>17%</td>
</tr>
<tr>
<td>None</td>
<td>363</td>
<td>15%</td>
</tr>
</tbody>
</table>
RESEARCH CONCLUSIONS:

It appears that what is driving the epidemic of farm injury is the physical state of the farm and the exceptionally long hours producers are spending at work on the farm. Five major themes emerged from this research:

THEME 1  FATIGUE

- Farmers are working exceptionally long hours and the resulting fatigue puts them at higher risk for injury.
- Many farmers report insufficient sleep during peak seasons. Many also report diagnosed and undiagnosed sleep disorders. These too can lead to injury.

THEME 2  THE PHYSICAL ENVIRONMENT MATTERS

- The physical condition of machinery, vehicles and buildings is strongly related to farm injury experiences.
- Many teenage and older workers are operating older equipment without safety features.
- Interestingly, economic conditions were not strongly related to injury experiences.

THEME 3  OLDER FARMERS ARE VULNERABLE

- Farmers over the age of 75 average about 30 hours of farm work a week. This puts them at high risk for injury.
- Senior farmers report more hearing loss and double the rate of asthma compared to other Canadians of the same age.

THEME 4  CHILDREN AND TEENS ARE VULNERABLE

- The effects of long work hours put in by parents influence the health of their young children.
- Parents use many strategies to cope with child supervision issues. Some of these strategies put their children at risk.
- Teen workers are more frequently exposed to hazardous farm work when the owner-operator reports excessive hours.

THEME 5  EDUCATION ALONE IS NOT THE ONLY SOLUTION

- Education is a necessary component for safe farming.
- However, the evidence suggests that education alone is not enough to cause the change in behaviour that will result in safer farms.

SO WHAT?

FATIGUE:

- Injury prevention efforts should involve identifying agricultural work tasks associated with high levels of fatigue. Task specific fatigue management strategies should be developed.
- We need to evaluate methods to minimize the effects of fatigue on injury risks.
- Farmers with undiagnosed sleep disorders require clinical care.

PHYSICAL HAZARDS

Injury prevention programs need to focus on:

- Use of safety shields on machinery
- Importance of safe operational practices
- Enhancement of the physical safety of the farm environment

SENIOR FARMERS

- This is a unique occupational group that needs focused occupational health and safety programs.

CHILDREN AND TEENS

- Children continue to be exposed to increased hazards by parents choosing to keep their children with them, while parents are coping with long work hours.
- Teens are at greater risk when exposed to work hazards such as tractors without ROPS, old machinery and working at heights.

SAFETY EDUCATION

- The agricultural sector needs to include the full public health model in its prevention initiatives including education, engineering and regulation.
- Injury prevention efforts should focus on: occupational health and safety practices associated with long work hours, physical risks and hazards on farms and behavioural modifications to minimize occupational injury risks.

“Working together, we can prevent the epidemic of farm injuries.”

Dr. James Dosman
 WHAT’S NEXT?

- Members of the research team will continue to analyze the existing data from this cohort to look at other agricultural topics of interest.
- The College of Medicine at the University of Saskatchewan has undertaken a large and in-depth evaluation of the respiratory health status and the use of health services with rural Saskatchewan people.
- In the future we can look forward to the establishment of a similar children’s cohort.

CIHR IRSC
Canadian Institutes for Health Research

The study was funded by Canadian Institutes of Health Research (CIHR), the leading agency for supporting health research in Canada, for a five year period (2005-2010). CIHR is responsible for funding health research in Canada. The goal of CIHR is to create new health knowledge and to transfer that knowledge from research to real world application.

CCHSA CCSSMA
Canadian Centre for Health and Safety in Agriculture

The Canadian Centre for Health and Safety in Agriculture (CCHSA) has evolved its 20 years of leadership in agricultural health and safety into a national centre of excellence encompassing the field of agricultural safety, rural health, knowledge translation and the delivery of training programs. CCHSA will continue to focus resources on addressing public rural and agricultural health issues and link research to community and policy.

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