

## PUBLIC POLICY AND

# Health

## Public Health Scientific Advisory on the Prevention of Farm Injuries in Québec: Synthesis Report



### Background

This edition of the Public Policy and Health series is a synthesis of a public health advisory produced by Guillaume Burigusa, Serge André Girard, Mathieu Gagné and Pierre Maurice of the Institut national de santé publique du Québec (INSPQ).<sup>1</sup> The advisory looks at the state of knowledge about unintentional farm injuries<sup>2</sup> and formulates recommendations on measures likely to improve the safety of agricultural producers, their families, and agricultural workers. The advisory was submitted to the Ministère de la Santé et des Services sociaux of Québec for the purpose of implementing section 54 of the *Public Health Act* which assigns the Minister the role of advisor to the government on public health issues. It is part of a series of six reports published by INSPQ on agriculture and agri-food policy that deal with specific public health issues related to the agri-food sector.



This synthesis was produced by INSPQ's public policy team and is intended to facilitate knowledge transfer to a broad audience.

### Highlights

- Agriculture continues to dominate the primary industrial sector in Québec, but this field of activity is changing and must adapt to new socioeconomic realities such as pressure from open markets, numerous technological changes, declining farm incomes, farmers' high debt load, an aging farm population, and a shortage of young and beginning farmers. Another issue is the growing use of outside workers and migrant workers in this sector, where union representation is virtually non-existent and only 40% of farms are covered by the Commission de la santé et de la sécurité du travail du Québec (CSST).
- The farm is a place where people live as well as work. Therefore, among the issues to consider when developing agri-food policies, safety is of vital concern since it is likely to improve both living and working conditions in the sector.

<sup>1</sup> Readers who would like more details or full bibliographic references can consult the full report on the following Web site: [www.inspq.qc.ca/publications/default.asp?NumPublication=1302](http://www.inspq.qc.ca/publications/default.asp?NumPublication=1302).

<sup>2</sup> The advisory defines "injury" as a lesion to the body resulting from a sudden energy transfer in amounts that exceed the human body's resilience. It does not include musculoskeletal disorders from repetitive movements or intentional injuries from violence and suicide.

- In terms of the scope of injuries, agriculture is one of the economic sectors most at risk. In Canada, it ranks as the fourth most hazardous industry with respect to rates of fatal injury.
- The advisory documents risk factors specifically associated with farm injuries, that is, injuries associated with agricultural machinery, particularly tractors, as well as injuries associated with falls, animals and working in confined spaces. Effective measures to prevent such injuries (for instance, installing protective structures on tractors) are also discussed, as are certain laws and regulations.
- Recommendations on measures to implement to prevent farm injuries in Québec are proposed in the advisory.

## Social, Economic and Political Realities of Québec's Agricultural Sector

### An economic sector under pressure

Although agriculture is an industrial sector that is changing, it continues to be the dominant activity of the primary sector in Québec. In 2005, Québec's total gross farm receipts were \$7.4 billion. Over the years, the agricultural sector has had to review some of its practices and adapt to new socioeconomic realities, such as pressure from open markets, increasing consolidation, specialization and productivity, as well as numerous technological changes and collective adoption of values that are more respectful of the environment. To these we can also add concerns such as declining farm incomes, farmers' debt, increased costs of some financial assistance programs, the challenge of transferring farms to young and beginning farmers, to name only a few. Thus, the number of small farms has gone down considerably in Canada and Québec; it is estimated that 70% of gross farm income in 2001 came from only 19.8% of Québec farms. Average debt load (that is, debt divided by the value of farm capital) is higher in Québec (37%) compared with the Canadian average (24%). In 2005, 57% of Québec farmers worked more than 40 hours a week on their farm operations. Moreover, the income generated by agriculture is not always high enough, which may partly explain why 39% of farm operators in the province of Québec reported their main occupation as non-agricultural.

### Aging farm population and young farmers difficult to find

From 1996 to 2006, Québec's farm population declined 20.8%. The average age of this population rose from 44.3 in 1992 to 49.3 in 2006. The relative financial insecurity of agricultural producers not only slows young farmers' access to property but also keeps producers working longer. Indeed, young people face significant barriers to entering agriculture such as overcapitalization (\$5 in assets to generate \$1 of gross income), which limits their access to property.

### More outside workers and migrant workers

While labour needs have traditionally been filled by family members, the new dynamic (especially the growing size of farms) requires recruitment of outside workers. In 2007, there were over 5,000 migrant agricultural workers in Québec. We should note that the labour force is not composed of seasonal workers only, since migrant workers now work in agriculture all year round. For these workers, their temporary migratory status as well as being far from home and facing language barriers cause them to be under physical, emotional and psychological pressure; this can lead to health problems and, in some cases, safety problems. Working conditions are a significant issue in this sector. In Québec, the rate of unionization is 40%, but there are at most about 30 collective agreements in the agricultural sector.

### An economic sector where there is little workers' compensation coverage

The Commission de la santé et de la sécurité du travail du Québec (CSST) estimates that a maximum of 41.5% of establishments in the agricultural sector are registered with the CSST as employers or independent workers. This means that almost 60% of farm businesses are either insured privately (health, drugs, disability), or have no insurance and benefit very little from prevention initiatives proposed by this organization.

### Toward an agri-food policy that takes farm safety into account

Since the farm is a place where people live as well as work, safety is an important issue to consider for agri-food policies because it is likely to improve both living and working conditions in the sector. Indeed, neither the *Act respecting occupational health and safety* nor the *Act respecting industrial accidents and occupational diseases* deals specifically with the agricultural sector. In Québec, the CSST, the Union des producteurs agricoles (UPA) and the Réseau de santé publique en santé au travail work in

partnership to prevent agricultural injuries and health problems. It should be noted that, despite the involvement of multiple agricultural sub-sectors, no government body assumes leadership in all issues and solutions related to farm safety, nor are there other bodies that encourage deliberation on these issues.

## Scope of Farm Injuries in Québec

Agriculture is one of the economic sectors most at risk, in terms of scope of injuries. In Canada, it ranks as the fourth most hazardous industry with respect to rates of fatal injury, after the mining, forestry and construction sectors.

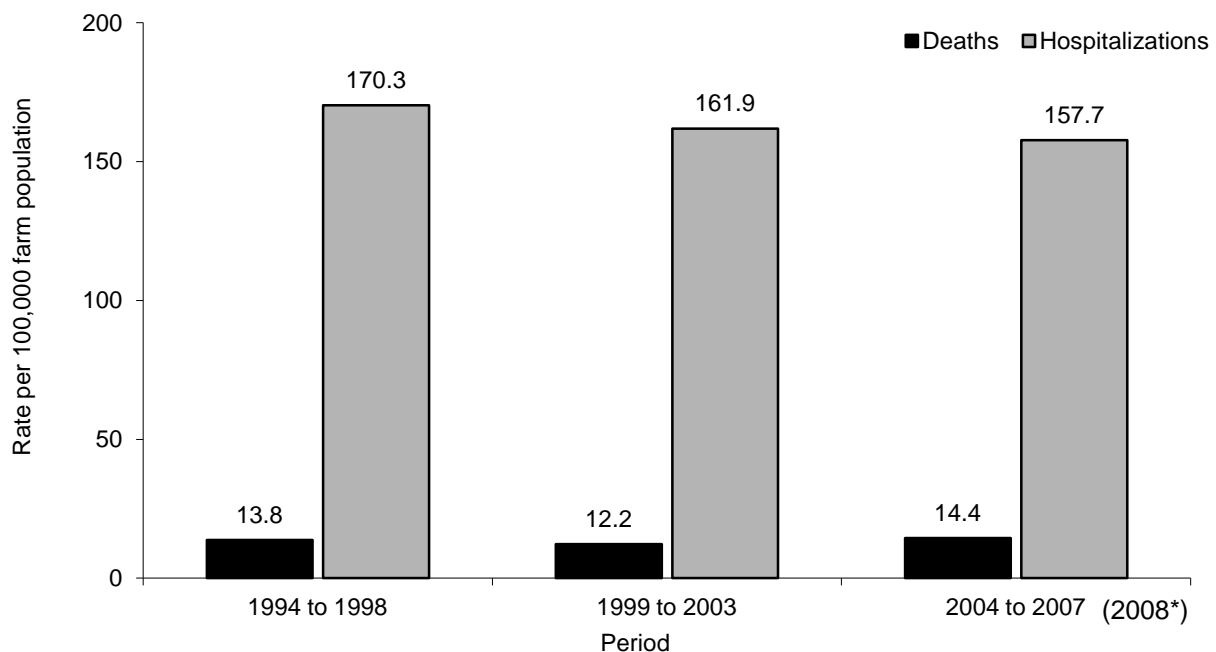
## Hospitalization rates and deaths due to farm injuries

### By period

In Québec, from 1994 to 2007, 201 deaths and 2,519 hospitalizations\* linked to farm injuries were recorded. Expressed as a population ratio, these figures correspond to 14 deaths and 168 hospitalizations annually per 100,000 people.

Although there has been improvement since the early 1990s, the rate of fatal farm injuries remained relatively stable between the 1994-1998 and 2004-2007 periods, going from 13.8 to 14.4 deaths per 100,000 (Figure 1). The hospitalization rate was 170.3 hospitalizations per 100,000 people in 1994-1998 and decreased to 157.7 per 100,000 people in 2004-2008 (Figure 1). However, this decline is not statistically significant.

**FIGURE 1 FATAL AND HOSPITALIZED AGRICULTURAL INJURIES RATES BY PERIOD, QUÉBEC, 1994-1998 TO 2004-2007\***



\* For the latter period, death data are for the years 2004 to 2007, whereas hospitalization data cover the years 2004 to 2008. Sources: MSSS, mortality database, 1994 to 2007. MSSS, Hospital separation data, 1994 to 2008. Statistics Canada, Census of Agriculture and Agriculture–Population Linkage Data.

### By age

In Québec, rates of hospitalizations and deaths due to agricultural injuries increase considerably starting from age 50, but are also high among children aged 1 to 4 years. In fact, the hospitalization rate among children aged 1 to 4 and adults aged 50 or over is higher in Québec than that observed for all other Canadian provinces.

### Occupational injury incidence rate

In 2006, the incidence rate of occupational injuries in farm workers was 10 injuries recognized by the CSST per 1,000 workers in this sector. Moreover, from 2003 to 2007, the CSST paid out an average of \$4,786,693 a year for occupational injuries in agricultural workers, 24% of whom worked in the dairy cow breeding sector and 18% in grain and plant production. Incidence is particularly high among workers aged 15 to 24, and

decreases with older age. The rate is significantly higher among 15- to 24-year-old workers (15.7 per 1,000 workers) and significantly lower among workers aged 50 to 59 and those 60 and over (7.0 and 2.8 per 1,000 workers, respectively). Lastly, incidence among migrant workers for occupational injuries recognized by the CSST is 15.6 injuries per 1,000 workers; this rate is significantly higher than that for all workers in the agricultural sector in 2006 (10.1 per 1,000 workers aged 15 and over).

### Main farm injuries

In terms of fatal injuries in Québec from 1994 to 2007 (Figure 2), the most common injuries were skull fractures and intracranial injuries (25.4%), multiple injuries (12.9%) and internal injuries of the chest, abdomen and pelvis (11.9%).

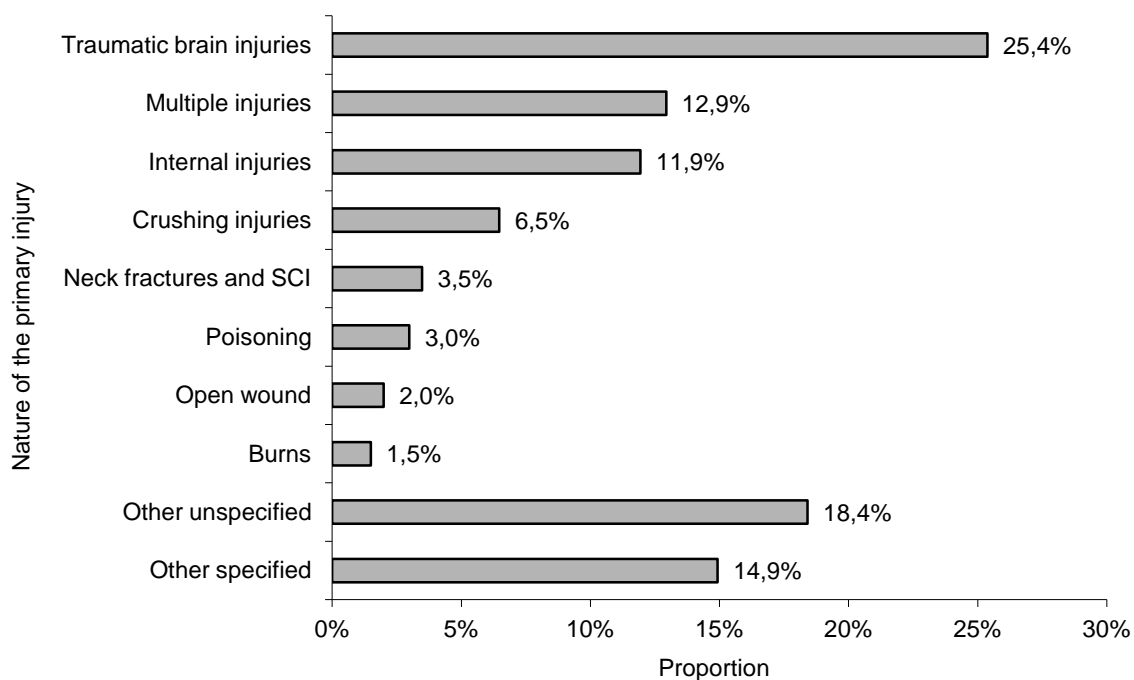
Over half of hospitalizations for agricultural injuries are attributable to fractures, and 15.4% to wounds. A significant proportion of occupational injuries in agricultural workers are attributable to bruises (21%), wounds and lacerations (20%) or sprains and dislocations (19%).

### Main circumstances surrounding farm injuries

Agricultural machinery is often involved in deaths and hospitalizations, especially in deaths among children (72%) and people aged 65 and over (69%). Tractors are involved in half of agricultural machine-related deaths, a considerable proportion of which are due to rollovers (54%).

For injuries that do not involve machinery, falls account for a significant proportion of deaths (17%) and hospitalizations (44%). As for occupational injuries recognized by the CSST, 20% are due to falls. Animal-related injuries are also relatively frequent and represent 4% of deaths and 9% of hospitalizations. These types of injuries represent 3% of all occupational injuries recognized by the CSST, over a third of which is from the services sub-sector (veterinary, animal production, animal reproduction, harvesting, repair and other services). Working in confined spaces is also a risk factor for injuries due to poisoning, suffocation, drowning and accidental burial. At least 10 deaths in confined spaces were identified for the period under study. Finally, in Québec, the greatest number of fatal agricultural injuries occur on public roadways. It should be noted that unlike the total number of deaths due to agricultural injuries, the number of fatal collisions with agricultural machinery on public roadways is not going down.

**FIGURE 2 DISTRIBUTIONS OF FATAL AGRICULTURAL INJURIES, NATURE OF THE PRIMARY INJURY, QUÉBEC, 1994 TO 2007**



Sources: MSSS, mortality database, 1994 to 2007.

## Risk Factors and Measures to Reduce Farm Injuries

A number of studies have been conducted in various countries to identify risk factors and preventive measures related to farm injuries among agricultural producers, their families, agricultural workers and migrant workers.

### **Injuries associated with agricultural machinery, particularly tractors**

Several studies have demonstrated that the absence of protective structures on tractors is a significant risk factor for injury in tractor overturns. For tractors with protective structures, not wearing a seat belt at the time of tractor overturn is also a significant risk factor for injury. Non-use of protective equipment on machinery as well as wear and tear of agricultural machines are other risk factors to consider.

Preventive measures identified in the literature pertain to rollover protective structures and safety equipment on machinery that prevent contact with moving parts. For instance, use of protective structures for tractors (safety frames and cabins) is very effective in reducing deaths and serious injuries. In addition, studies have shown that seat belt use is essential for maximum effectiveness of protective structures.

### **Fall-related injuries**

Several studies have shown that falls are one of the main causes of farm injuries. Among agricultural workers in general, falls from one level to another and falls from slipping or tripping are more numerous. Among children, falls on the same level, falls from a vehicle, and falls from a height are the most common.

No study on the evaluation of preventive measures in agricultural settings has been identified. However, experts appear to agree on some measures such as protective equipment (individual and collective). The CSST and UPA have published a fact sheet on prevention of falls from heights in the agricultural sector.

### **Animal-related injuries**

Animals present a significant risk for farm-related injuries. Numerous authors have reported that the presence of cattle or horses is associated with an increased risk of injury, especially among youth. Moreover, injuries involving animals are generally associated with severe head injuries.

Experts have proposed some physical environment planning measures, in particular installation of safety barriers to protect against bucking animals. Other measures advocate for better knowledge of animal behaviour.

### **Injuries linked to working in confined spaces**

Confined spaces (e.g. manure pits, silage silos) present a significant risk of poisoning by toxic gases. In addition, grain in silos can form a bridge which can collapse and provoke suffocation by asphyxiation.

Experts in this field have put forward several preventive measures, including ventilation, air analysis and use of protective respiratory equipment. The CSST and UPA, in collaboration with MSSS, have put together a fact sheet on confined spaces.

### **Some at-risk target groups**

Other risk factors are specific to certain target groups. Among children, limited cognitive and physical development, insufficient supervision by parents or other adults, especially during high production periods, and numerous existing dangers around farms are the main risk factors for injury. Experts propose a measure designed to separate children's play areas from spaces intended for agricultural production activities.

Among older farmers, physical, sensory and cognitive limitations that escalate with age, health problems, and frequent use of medications with side effects are factors that explain the increased risk of injury in this particular group.

Lastly, three studies have identified factors that make migrant workers more vulnerable to injuries: overwork, language barriers, inadequate knowledge of workers' rights, and fear of being fired. Some authors suggest focusing on measures such as health and safety information and training, and on rights that take into account the language skills of these workers.

**TABLE 1 FARM INJURY PREVENTION MEASURES**

Measures shown to be effective in the scientific literature	<ul style="list-style-type: none"> <li>• Installing protective structures on tractors</li> <li>• Installing and wearing seat belts in tractors</li> <li>• Using safety equipment on machinery</li> <li>• Certain laws and regulations and their application concerning increased use of technological protective equipment</li> </ul>
Measures proposed by expert panels	<ul style="list-style-type: none"> <li>• Measures advocated to reduce the risks of falls, poisoning in confined spaces, and those associated with animals</li> <li>• Measures to separate children's play areas from spaces intended for agricultural production</li> <li>• Educational interventions on adoption of safe behaviours (recommended by experts if implemented alongside legislative or development measures)</li> </ul>

## Legislative Environment and Prevention Organization

### A diverse legislative framework

At the constitutional level, agriculture is an area of shared jurisdiction between the federal and provincial governments. Aside from supporting the implementation of a pan-Canadian networking and coordination organization, there are few federal initiatives in this area. The Québec government is most involved in health and safety legislation, and in issues related to working conditions.

#### *Legislation regarding agriculture*

The **Farm Producers Act** (R.S.Q., chapter P-28) defines the agricultural sector, recognizes the right of producers to belong to a specialized syndicate, recognizes the right of these associations to represent producers as regards various authorities (e.g. Régie des marchés) and defines the sector's structure. The **Act respecting the École de laiterie and intermediate agricultural schools** (R.S.Q., chapter E-1) states that these schools shall be under the control and direction of the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation (MAPAQ). The Minister may make, amend or repeal regulations (R. S. 1964, c. 117, s. 2; 1973, c. 22, s. 22; 1979, c. 77, s. 21.). However, application of the measures under the Act has been transferred from MAPAQ to the Ministère de l'Éducation, du Loisir et du Sport (MELS), who is now entrusted with implementing this Act.

#### *Labour legislation*

Aside from legislation pertaining specifically to the agricultural sector, there is a range of labour laws and regulations concerning this sector. They are the **Act respecting labour standards**, the **Act respecting occupational health and safety** and the **Regulation**

**respecting occupational health and safety**, as well as the **Act respecting industrial accidents and occupational diseases**.

#### *Penal and criminal liability*

In addition to the legislation mentioned above, and regardless of the status and size of a company, some provisions of the *Criminal Code*, more specifically through Bill C-21, amend Canada's *Criminal Code* (Latulippe, 2010; Potvin, 2010). Certain provisions have an impact on occupational health and safety, and concern all contractors regardless of whether or not they are registered with the CSST.

#### *Standards for agricultural machinery*

There are some 40 CSA standards on agricultural machinery. They are not legally binding per se, but some standards are included in regulations (e.g. sections 277 and 278 of the **Regulation respecting the quality of the work environment**). The standards act as a reference that farmers are encouraged to follow for their own safety (<http://www.shopcsa.ca/onlinestore/GetCatalogDrillDown.asp?Parent=2871>).

### Organizing prevention

Prevention in the agricultural sector hinges on several actors and takes various forms, mostly because of the sector's structure. For instance, in Canada, the Canadian Agricultural Safety Association (CASA) is an umbrella organization for provincial bodies. It facilitates networking and coordination of agricultural health and safety prevention. The federal government has also implemented the Canadian Agricultural Injury Surveillance Program. In Québec, prevention of farm injuries is organized essentially around the UPA and CSST, within which there are also representatives of occupational health and safety teams from the public health network. Table 2 lists the

actors and authorities, and their mandates.

### **Training and information**

The Pronovost Commission's report indicates that training in the agricultural sector is increasingly promoted. Training for young farmers or future agricultural workers, continuing education for current farmers, and efforts made to raise awareness concerning children living on or visiting farms are all interesting aspects whose potential is seemingly underexploited.

The Québec City Protocol (AISS, 2003)<sup>3</sup>, coauthored by the MELS and the CSST, provides a framework for cooperation between institutions responsible for prevention of industrial accidents and occupational diseases, and those responsible for education. The CSST's Youth Action Plan includes a component that fosters integration of health and safety into vocational training programs.

This plan is intended to ensure that settings which take in and train young people participate in developing a culture of prevention.

In collaboration with the CSST, the UPA initiates different information activities targeting producers, their families and employees. The prevention in agriculture week is a recurring activity held each year in the spring.

Prevention workshops are organized in all regions of the province. The themes chosen are closely linked to risks identified in the literature, statistics on occupational injuries and CSST action plans.

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<sup>3</sup> The Québec City Protocol indicates that, to protect school staff and students, vocational and technical education institutions must ensure that the material, equipment and facilities satisfy recognized occupational health and safety standards and rules; training institutions must also develop projects designed to integrate occupational health and safety into educational activities.

**TABLE 2 MANDATES OF ACTORS AND AUTHORITIES IN QUÉBEC INVOLVED IN ISSUES RELATED TO FARM INJURIES**

<b>ACTORS</b>	<b>MANDATES</b>
<b>Commission de la santé et de la sécurité du travail du Québec (CSST)</b>	Administer the <i>Act respecting occupational health and safety</i> and the <i>Act respecting industrial accidents and occupational diseases</i> . One of its mandates is workplace accident and disease prevention.
<b>Local and regional occupational health teams</b>	Local and regional occupational health teams work on or participate in various projects designed to document certain issues as well as specific interventions or information and awareness building activities, and participate actively in prevention activities.
<b>Union des producteurs agricoles (UPA)</b>	Promote, defend and develop the professional, economic, social and moral interests of agricultural and forestry producers in Québec. The UPA helps to improve living conditions within rural communities in social, economic and cultural terms.
<b>UPA-CSST liaison committee*</b>	Analyse issues linked to interpretation or application of laws, regulations, CSST policies and programs related to the agricultural sector. Determine actions to take to reduce or eliminate the number of workplace accidents or diseases, and encourage the agricultural industry to move forward. Follow-up on recommendations included in serious or fatal accident investigation reports.
<b>Comité interministériel permanent sur la protection des travailleurs étrangers temporaires peu spécialisés</b>	Committee composed of representatives from the Ministère du Travail (MTRAV), Ministère de l'Immigration et des Communautés culturelles (MICC), MAPAQ, CSST, Commission des droits de la personne et des droits de la jeunesse (CDPDJ), Commission des normes du travail (CNT), Ministère de l'Emploi et de la Solidarité sociale (MESS) and Ministère des Relations internationales (MRI).  Promote information sharing and cooperation to increase the effectiveness of government action related to the protection of low-skilled temporary foreign workers.
<b>SAAQ-UPA-MTQ liaison committee</b>	Become aware of the various issues linked to agricultural vehicles used on public roadways, review the privileges and obligations of agricultural producers when they use these vehicles on public roadways and formulate recommendations.

\* The actions of this committee affect only a fraction of farm businesses registered with the CSST.



## Recommendations

Recommendations regarding the measures to implement to prevent farm injuries in Québec are formulated based on the interventions presented above and taking into account the risk factors and social and legislative contexts for agricultural activities. For a comprehensive reading of these recommendations, see the full public health advisory, which includes findings that justify the recommendations, and the conditions to consider to facilitate their implementation. Each recommendation is followed by a note indicating if the recommendation pertains to a measure whose effectiveness has been established in the scientific literature (evidence-based) or follows from opinions of experts in the field (expert opinion). In the report, recommendations are grouped under four categories: recommendations related to prevention organization; recommendations addressing specific problems; recommendations aimed at particular groups; and recommendations designed to encourage better integration of injury prevention in agricultural settings:

1. Develop a farm-injury prevention program for Québec's agricultural industry under the leadership of a government body (expert opinion).
2. Ensure that all tractors on Québec farms have rollover protective structures, including seat belts, and that all moving parts are protected (evidence-based).
3. The joint SAAQ-UPA-MTQ committee should pursue its work on road safety involving agricultural machinery using public roadways, especially regarding signals on these machines (expert opinion).
4. Promote implementation on Québec farms of the measures advocated by the CSST as part of its measures to prevent falls from heights in agricultural settings (expert opinion).
5. Promote the installation and use of protective equipment and better inform target populations, including those from the services sector, of precautions to take with regard to animal behaviours (expert opinion).
6. Promote implementation on Québec farms of the preventive measures advocated by the CSST in its guide entitled *Faites la lumière sur les espaces clos* (expert opinion).
7. Ensure that children are not exposed to the hazards of agricultural activities, particularly during periods of intense activity (evidence-based).
8. Ensure that children who perform agricultural tasks are assigned tasks that take into account their cognitive and psychomotor abilities and limits (evidence-based).
9. Ensure that older people who continue to work, whether by choice or by necessity, do not work alone, especially if they have health conditions, take medications or have substantial physical limitations (expert opinion).
10. In the spirit of recommendation 24 in the Pronovost commission's report<sup>4</sup> (2008) and in cooperation with its partners (UPA, CSST, FERME, TUAC, AGRICarières), the MAPAQ should enhance intake mechanisms for migrant workers and develop tools to help employers fulfil their responsibilities as outlined in section 51 of the *Act respecting occupational health and safety*<sup>5</sup> (expert opinion).
11. Integrate educational interventions proposed by various authorities (e.g. public health, MAPAQ, UPA, CSST, MELS) into a comprehensive prevention strategy that also includes initiatives related to technologies as well as to the physical, social and legislative environments. These interventions should include a practical component (expert opinion).
12. In terms of educational interventions for young people in rural settings, the public health network should integrate farm-related safety concerns into comprehensive, integrated health promotion approaches in schools, for example, Healthy Schools (expert opinion).
13. The MELS and the CSST and their main partners in vocational and technical education (Fédération des Cégeps, vocational training centres, MAPAQ, UPA and AGRICarières) should ensure that training programs accord a preponderant place to injury prevention, in the spirit of the Québec City Protocol (expert opinion).

<sup>4</sup> Recommendation 24 states the following: "That MAPAQ, in cooperation with the Ministère du Travail and the federal government, finalize protective measures for seasonal migrant workers so as to guarantee them lodging, working, and social conditions in accordance with their rights".

<sup>5</sup> *Act respecting occupational health and safety*, section 51, paragraph 9: "Every employer must take the necessary measures to protect the health and ensure the safety and physical well-being of his worker. He must, in particular, give the worker adequate information as to the risks connected with his work and provide him with the appropriate training, assistance or supervision to ensure that he possesses the skill and knowledge required to safely perform the work assigned to him."

For bibliographic references, see the full public health advisory at the following address:  
[www.inspq.qc.ca/publications/default.asp?NumPublication=1302](http://www.inspq.qc.ca/publications/default.asp?NumPublication=1302).

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