



# Musculoskeletal Health and Safety in Agriculture



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UNIVERSITY OF SASKATCHEWAN  
Canadian Centre for Health  
and Safety in Agriculture  
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## INTRODUCTION TO THE MUSCULOSKELETAL DISORDERS RESOURCE

Musculoskeletal Disorders (MSDs) are a widespread health problem that can result in long term pain and suffering. MSDs are extremely common in farmers and rural workers due to the physical nature of most of the tasks common to the farm including repetitive motions, awkward posture and heavy loads. Over 90% of farmers are expected to experience some type of MSD in their lifetime. Recent research at the Musculoskeletal Health and Ergonomics Lab at the Canadian Centre for Health and Safety in Agriculture (CCHSA) suggests that shoulder, lower back, and neck MSDs are the most frequently experienced MSDs in Saskatchewan farmers and rural workers. Compared to other industries, back and upper limb disorders are significantly more frequent in farmers and rural workers.

Worldwide, **91% of farmers** experience some type of MSD in their lifetime.

Few farmers consider the long-term effects of day-to-day lifting, kneeling, stooping, twisting, shoveling, and operating equipment. This resource will provide information on work exposures common to agriculture such as machinery vibration, awkward posture, and manual handling. In addition the new MSD resource offers prevention strategies for MSDs on the farm and treatments for existing MSDs.

### The GOALS of this RESOURCE include



- Increasing awareness of hazards on the farm that can impact a farmer's musculoskeletal health
- Educating farmers and rural workers on the ergonomic best practices, exercise and promotion of musculoskeletal health
- Preventing MSDs
- Improving quality of life of farmers and rural workers through decreasing pain and increasing strength
- Reducing costs due to injury and time away from work
- Increasing awareness of additional resources and treatments available





# What Are Musculoskeletal Disorders (MSDs)?

The World Health Organization (WHO) defines Musculoskeletal Disorders as being characterized by pain (often persistent) and limitations in mobility and dexterity which reduce an individual's ability to work and participate in society. The pain that results from MSDs is the most common form of non-cancer pain.

Many MSDs are chronic in nature, meaning they develop over time due to long use or repetition of movement (think about how often you bend or reach overhead). Repetitive motion, excessive force, awkward posture, and prolonged work can cause and worsen MSDs. These types of injuries are termed repetitive strain injuries (RSIs) or cumulative trauma injuries.

## Some examples of MSDs include:

- Rotator cuff muscle strains or tears
- Lower back pain
- Carpal tunnel syndrome in the wrist
- Plantar fasciitis in the feet

## Musculoskeletal Disorders can occur in any body part, but most frequently affect:

- Lower back from:
  - Stooped postures
  - Repeated lifting
  - Twisting
- Shoulder, upper arm and hand from:
  - Working with arms above shoulder level
  - Repeated grasping
- Knee or lower limb from:
  - Kneeling
  - Jumping off equipment
- Whole body from:
  - Vibrating equipment



## MUSCULOSKELETAL DISORDERS:

Any injury or disorder that affects the body's movement of the musculoskeletal system which includes muscles, tendons, ligaments, nerves, joints, cartilage, and spinal discs.



Repetitive strain injuries are very common in farmers!

In fact, up to

**85% of farmers and rural workers**

have reported chronic MSDs.

## Why Do We Care About Musculoskeletal Disorders?

- Often cause persistent pain that can be long lasting
- Interfere with abilities and work productivity
- For many farmers and rural workers it can be challenging to address, treat, recover and return-to-work from MSDs if they happen due to the lack of resources available in rural communities
- Not addressing pain or MSDs can lead to a bigger, longer-term injury
- The worsening of MSDs comes at a cost – to you, your farm and to the healthcare system

# CAUSES OF Musculoskeletal Disorders

In general, any work that is performed with high force, many repetitions or in awkward positions places you at risk of developing a musculoskeletal disorder.



The Saskatchewan Occupational Health and Safety Board identifies several **risk factors** for MSDs:

- 1. Repetitive motions:** how often you perform a movement
- 2. Forceful exertions:** how hard or how much force or effort you need to perform actions on the job
- 3. Vibration:** whole body (operating machinery) or hand-arm (operating power tools)
- 4. Mechanical compression:** external pressure on a body part
- 5. Sustained or awkward postures:** how you move or what position your body parts are in when completing tasks
- 6. Duration:** how long you hold a posture or perform an activity
- 7. Other ergonomic stressors:** include many factors such as speed demands, general stress, and activity limitations

## Symptoms of Musculoskeletal Disorders

MSDs are characterized by persistent pain and functional limitations such as:

- Pain with or without movement
- Swelling and tenderness
- Reduced range of motion and/or stiffness
- Tingling or numbness
- Burning or aching sensations
- Weakness or fatigue of the muscles or body part
- Can appear suddenly or gradually over time

**Ergonomics:** an applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely.



## COMMON TASKS Around the Farm that Can Lead to MSDs

Remember MSDs are caused by chronic exposure to physical stresses on the body:

- **FORCEFUL GRIPPING:** When operating power tools or manually fixing barbed wire fences
- **LIFTING:** Bags of grain or seed, moving bales of hay
- **BENDING:** Mucking stalls, harvesting vegetables, weeding
- **TWISTING:** Shovelling grain or other commodities
- **KNEELING:** Gardening, changing tires, servicing seeding equipment
- **VIBRATION:** Operating farm machinery such as a tractor or combine
- **REACHING:** Repairing equipment, fixing lighting, repairing fences, operating milking machines
- **REPETITION:** Lifting and stacking hay bales, attaching milking cups



## WHY DOES MOVEMENT MATTER?

The way that we move affects how strong we are, how fast we can move, and how easily we get tired, but can also lead to Musculoskeletal Disorders! When certain movement patterns are done **repeatedly** or **for a long time** or with **force exertion** they are known to cause injuries.

The effects of other MSD risk factors (repetition, duration, force) can be reduced if using good form and moving in a way that reduces demand on your body. Continue reading to learn more about tips on improving movement and posture during work to reduce your risk of MSDs!







# Tips for Prevention of Musculoskeletal Disorders

## 1 STAY ACTIVE

- ◆ Staying physically active is proven to reduce the likelihood of MSDs. Canada's Activity guide suggests being active for at least 2.5 hours a week or approximately 20 minutes a day.
- ◆ Do activities you enjoy! Walking, gardening, golfing (without an electric cart), skiing, curling, swimming, aquacise, etc – these and many others are good options for physical activity.

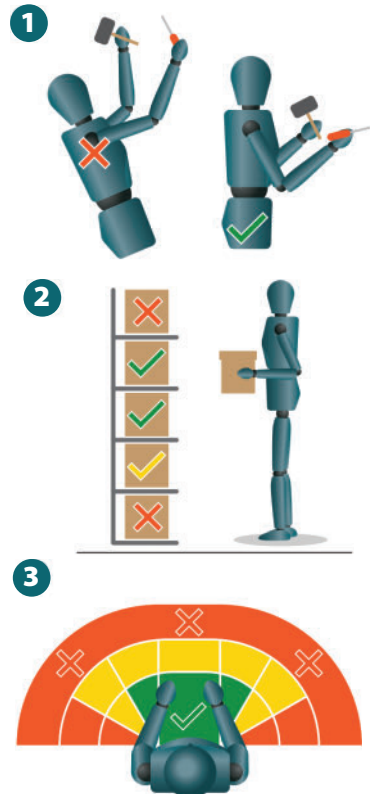


## 2 WORK SMART: Use Good Form

- ◆ **Lift with your knees:** Keep loads close to your body and crouch or kneel down to pick loads up.
- ◆ **Avoid** stooping and bending at the waist with straight legs.
- ◆ **Use the handles:** If an object has handles, use them! Reduce the load until you can comfortably lift, carry or move the load with the handles. Grab objects with both hands evenly.
- ◆ **Avoid** moving or using objects that are awkward shapes with no handles; change the container if you can!
- ◆ **Hands below head:** If the work you need to perform is shoulder height, use a ladder, platform, or stable stool whenever possible to bring your body up and make the work below shoulder height. Use tool extenders when possible and consider using lightweight tools to reduce overall loads. PIC 1
- ◆ **Store things off the floor:** Keep objects between knee and shoulder level to minimize bending and stooping. Use tables, work benches, stands or shelves. PIC 2
- ◆ **Keep things close:** Perform work close to and in front of your body. Move your body or arrange your work set-up to avoid stretching, leaning or twisting. Keep common items and tasks close to your body in your work area. PIC 3
- ◆ **Lighten Loads:** Move fewer objects at once. Don't load buckets or bags heavily to reduce the number of trips. Ask for help with lifting or carrying heavy objects.
- ◆ **Distance the length you have to move:** Use carts, trailers, or small vehicles to move objects and loads to your desired locations.
- ◆ **Take breaks:** Taking regular breaks is one of the easiest strategies to implement to prevent MSDs. A good rule of thumb is to take a 3-5 minute break every 2 hours. Whether you are operating machinery, doing maintenance, or feeding livestock, you have time to take a break!



### TIPS FOR PREVENTION



Images source:



Centre of Research  
Expertise for the  
Prevention of  
Musculoskeletal Disorder

Take a **3-5 minute break** for every **2 hours** of work!



# MSD Risk Factors by Body Posture



CREDITS | Human silhouettes graphics source: [www.physio-pedia.com/Rapid\\_Upper\\_Limb\\_Assessment\\_\(RULA\)](http://www.physio-pedia.com/Rapid_Upper_Limb_Assessment_(RULA))

## PREVENTION



Throughout your workday around the farm your body is put through many different postures some of which pose less of a risk to the development of Musculoskeletal Disorders while others can be considered high risk postures.

Use a **TRAFFIC LIGHT ANALOGY** in your body postures as you work and think of **GREEN** as go, **YELLOW** as proceed with caution and **RED** as stop. Think of the different postures above and which ones are common in your daily tasks on the farm are there tasks that are red indicating high risk of injury? If so are there changes you could make to your work environment or the way you are approaching the task to move the risk to green or safe?



# FOCUS on

**B**ack pain impacts so many of us and effects our quality of life and ability to carry out work and life activities! Use the tips and information in this section to learn more about causes of back pain and how to best manage tasks that can lead to back pain.

## Ergonomic risks for back pain on the farm include:

- 🚶 Lifting heavy and/or awkward loads
- 🚶 Prolonged seated positions when operating machinery
- 🚶 Whole body vibration from machinery operation
- 🚶 Bumps and jostles or driving any equipment hitting rough terrain that jerks takes a toll on the body
- 🚶 Machine idling may also cause a vibration affecting the body
- 🚶 Stationary joints: not moving for long periods of time in any position
- 🚶 Static postures are harder on the discs in your back including standing or sitting still for long periods of time
- 🚶 Combinations of these risks such as sitting for long periods in a vibrating seat are also a concern



**Every farming operation has a different set of risks.**

**Think about these 2 questions:**

- 1 What activities exist in your workplace that could cause back injury?
- 2 What can be done in your work to minimize risks for back injury?



## How to Manage Hazards to Our Back on the Farm?

1. Identify the hazards
2. See if you can reduce the safety hazard
3. If it is not possible to eliminate or substitute, change the design or change how you do the job.

Although the most effective control action is to eliminate the hazard, sometimes one must substitute a different method to decrease the hazard to your back. In some situations changing a piece of equipment or repairing it may be necessary.

## AVOID LIFTING HEAVY OBJECTS IF POSSIBLE!

Consider other equipment that you could use to take the brunt of the heavy lifting off your back. Perhaps one of the following would be an option:

- ▶ Wheelbarrow
- ▶ Utility carts
- ▶ Roller conveyors
- ▶ Front end loaders
- ▶ Rolling carts or dollies (rotating or with jacks)
- ▶ Overhead hoists
- ▶ Hand trucks
- ▶ Forklifts



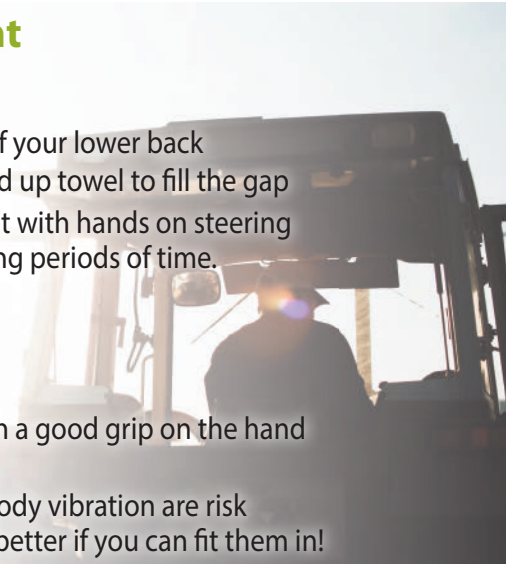


# Back Pain



## Back Pain Prevention: Posture When Driving Equipment

- Adjust the seat so that your knees are level with your hips
- Sit with your full back supported against the seat. Be sure to support the curve of your lower back
  - If there is a gap between your lower back and the seat use a cushion or rolled up towel to fill the gap
- Don't slouch. Sit up straight. Shoulders should not be rolled forward. Elbows bent with hands on steering wheel. Optimize seat supports and positioning to help maintain posture over long periods of time.
- You shouldn't have your arms fully extended to reach the steering wheel
- The top of the steering wheel should be below your shoulders
- Shift your position frequently – move arms, shift weight, etc.
- Always step down from a tractor or other large equipment facing the tractor with a good grip on the hand rails. Never jump down.
- Get out of your seat and take a walk break – both prolonged sitting and whole body vibration are risk factors. Aim to take a 3–5 minute break at least every 2 hours – more breaks are better if you can fit them in!



## Handling Animals on the Farm

Lifting or managing livestock on the farm is a common cause of back injuries particularly as animals can be unpredictable. Try to avoid lifting livestock such as pigs, calves or sheep whenever possible by installing drop gates in pens and hoists on the back of farm vehicles. If you need to lift livestock uses the following tips to help keep your back safe:

- Face animal away from you
- Sit it back on its haunches
- Squat down behind the animal
- Take hold of animals back legs
- Tip the animal against your body
- Make sure the animal can't turn its head and face you
- Keep your back straight and lift with your thigh muscles





### Protect Your Back: Practice Good Posture While Driving



For more information: [umash.umn.edu/](http://umash.umn.edu/)

# SAFE LIFTING GUIDELINES

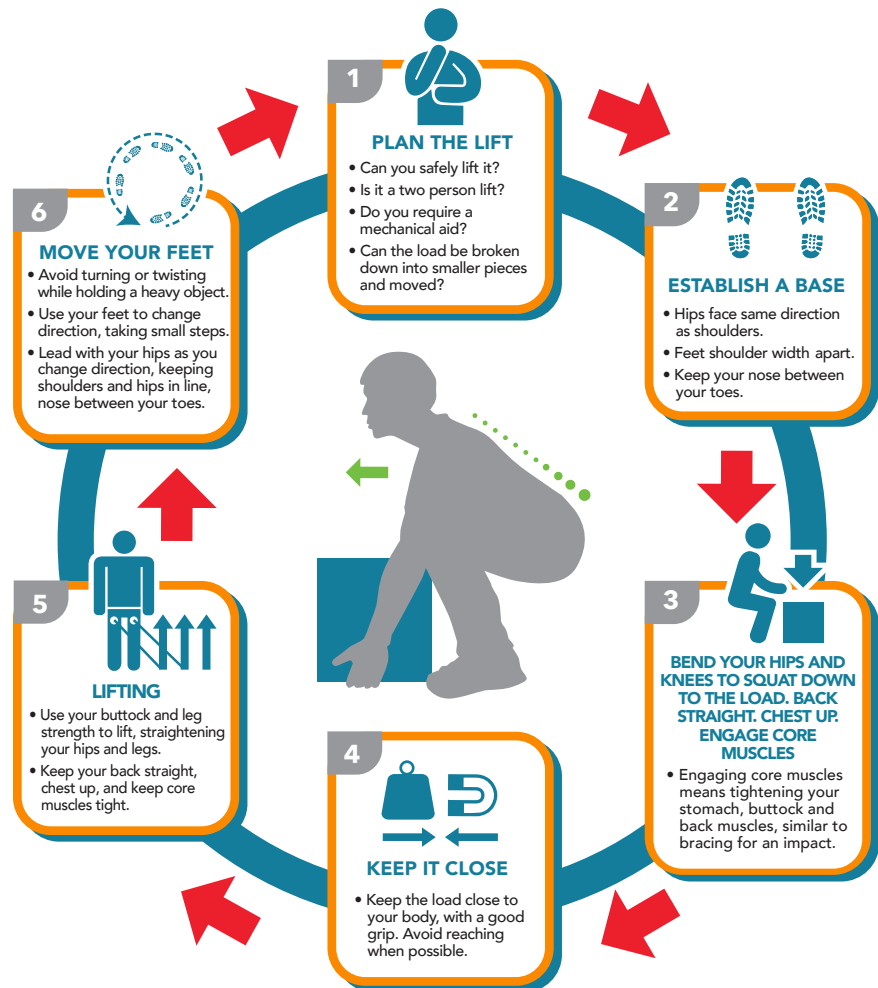
## WARM UPS

FOR A HEALTHY BACK



## PROPER LIFTING

THINK TWICE - LIFT ONCE



Lower objects the same way you lift them – knees bent, back straight, core muscles engaged.

## AVOID JUMPING DOWN FROM EQUIPMENT

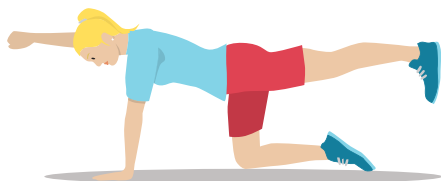
- Poses risk of slip and fall
- Long term damage to back and leg joints
- Force on your body when landing from a truck:
  - Seat level = at least 7 times body weight
  - Floor level = 5 – 6 times body weight
  - Bottom Step = 1 to 1.5 times body weight



# STRENGTH EXERCISES

## FOR A HEALTHY BACK

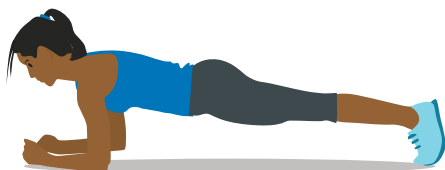
Strengthen your lower back and core 2-3 times per week.



### BIRD DOG

2 x 10 seconds each side

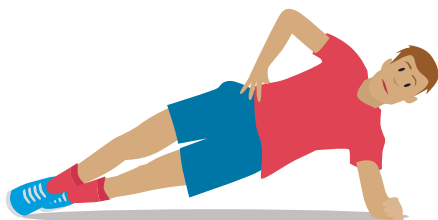
- Start with hands and knees on the floor, shoulder width apart. Hands under shoulders and knees under hips.
- Lift hand and foot, extend arm and opposite leg.
- Engage core muscles (tighten abdominal muscles as if bracing for impact).
- Keep shoulders & hips flat.
- Point nose to floor.
- Breathe slowly. Hold 10 seconds, then repeat.
- Lower the leg and hand. Repeat.



### PLANK

2 x 10 seconds

- Keep back and neck neutral.
- Elbows directly under shoulders.
- Squeeze your glutes and tighten your abdominals.
- Create a straight, strong line from head to toes.
- Breathe slowly, hold 10 seconds.



### SIDE PLANK

2 x 10 seconds per side

- Roll to side and onto your elbow.
- Legs out with top foot ahead of bottom foot.
- Engage core muscles, lift pelvis, maintaining a neutral spine and breathe, holding for 10 seconds.
- Keep knees on ground to make it easier if necessary.



### MODIFIED CRUNCH

2 x 10 seconds

- Bend one knee, other leg straight out.
- Place hands, palms down, under arch of low back.
- Lift elbows slightly off the ground.
- Engage core.
- Roll shoulder blades 1" off the floor.
- Imagine you are gently holding an apple under your chin to keep neck neutral. Breathe!

Reference: Dr. Stuart McGill, University of Waterloo.



Chiropractors'  
Association of  
Saskatchewan

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# WHOLE BODY VIBRATION

## WBV

Farmers are no strangers to long hours operating machinery such as tractors, combines, and sprayers which exposes them to whole-body vibration (WBV). Whole-body vibration (WBV) comes from machinery vibration that moves through the feet, legs or seat and can cause low back pain and muscle and joint soreness. Exposure to WBV is cumulative, meaning five or ten minutes of vibration exposure once in a while won't cause you any health problems. But if the intensity and the duration of exposure to vibration increases to 8 or 10 hours a day for several days, similar to what you may experience during busy times on the farm, you may be at risk for a vibration-related injury.

**WBV can be associated with back and hip disorders, and can also contribute to the risk of falls and collisions.**



### Health Effects of WBV:

- Speech interference
- Increased heart rate & blood pressure
- Muscle fatigue & cramping
- Reduced concentration
- Increased breathing rate
- Disruption of balance & perception
- Low back pain & damage to the spine
- Slower reaction times



Article by:  
Dr. Stephan Milosavljevic,  
University of Saskatchewan



## PREVENTION



As always the goal is to eliminate hazards on the farm, but it is impossible to remove the need to operate machinery for long periods of time during seeding and harvest. There are ways to reduce your risk when spending long days operating machinery.

- ▶ **Maintain your equipment:** Keep tires properly inflated and maintain vehicle suspension systems.
- ▶ **Adjust the seat:** Adjust seat suspension properly so seat doesn't bottom out during use and adjust seat to improve posture including use of backrests with lumbar support.
- ▶ **Be aware of terrain:** Slow down when travelling across rough terrain.
- ▶ **Stop and take breaks:** Something as simple as taking a break when operating machinery can help reduce the negative effect of WBV on the body.

### STRETCHING OR EXERCISE BREAKS:

- ▶ Provide the musculoskeletal system time to recover
- ▶ Help reduce some of the cumulative effects of vibration energy
- ▶ Easy to implement and your body will thank you!

Something as simple as taking a break for a brief walk or stretch break when operating machinery. For ideas check out the [Take a Stretch Break poster on page 18](#).

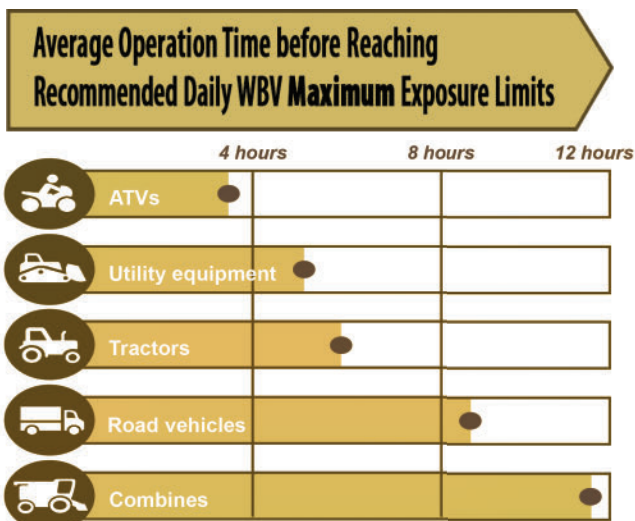


### When should I take a break?

Researchers recommend taking a break every 2-4 hours for 3-5 minutes when operating a tractor, combine or any large equipment. If possible take breaks more frequently.

For more information on Whole-Body Vibration check out the currently ongoing project [Take A Break from the Shake](#) at [www.agrivita.ca](http://www.agrivita.ca).

Reference: Great Plains Centre for Agricultural Health [www.gpcah.org](http://www.gpcah.org)



\* Each vehicle used during the day contributes to overall WBV exposure  
\*\*Recommendations based on exposure limits from the European Union





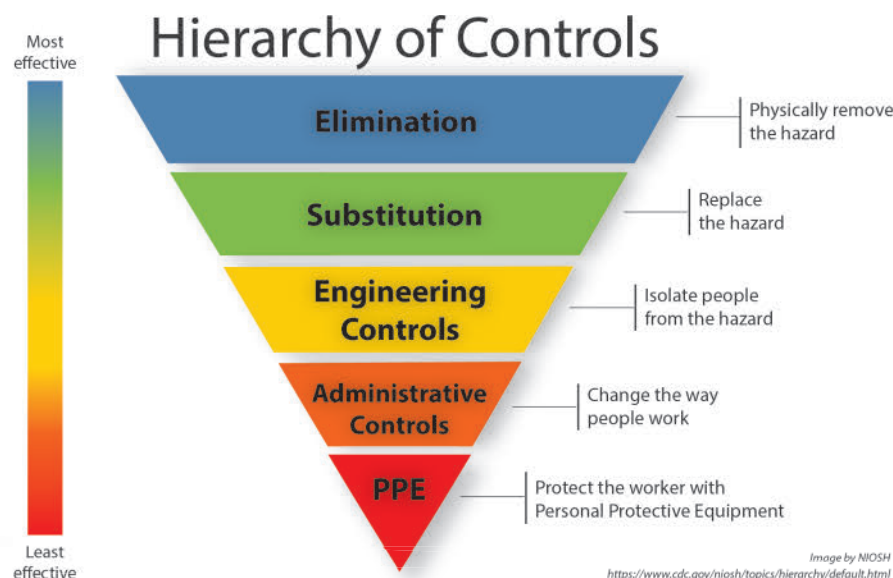
# BEST PRACTICES

## Lead by example!

One of the best ways to encourage safe practices on the farm that reduce the risk of **MSDs** is to implement and utilize ergonomic work practices. Acknowledge that there are various tasks around the farm that can cause or aggravate MSDs. Use a stepped approach to identifying and finding solutions for MSD risks on the farm.



- 1 **Conduct a Hazard Identification and Risk Assessment:** identify the tasks, tools, and equipment on the farm that may exposure you or workers on your farm to the risk of MSDs.
  - a. Physical demands of farm work – force, repetition, amount of time the body is stressed, and postures
  - b. Physical landscape of the farm – walking surfaces, working at heights, seating in equipment and vehicles, accessibility of materials, tools and equipment
  - c. Livestock, materials, tools and equipment size, shape and weight, and how they can be handled
  - d. Work schedules – hours of work, varying work tasks, work recovery cycles, etc
  
- 2 **Determine how to Eliminate or Reduce the Risk:** elimination of the MSD hazard is the best solution, but in many cases not possible. Instead look to reduce the risk through:
  - a. **Engineering Controls** – use of a tractor, skid steer or pallet jack for lifting materials, use of restraint cages for livestock
  - b. **Administrative Controls** – developing a safe job procedure, conducting assessments, using correct lifting techniques, taking breaks when operating machinery, organizing work and work schedules to reduce risk
  - c. **Personal Protective Equipment** – anti-vibration gloves or gloves that allow for better grip on materials, footwear with non-slip soles, knee pads, back brace, etc.





# TOOLS FOR FARMERS



Frequently re-assess the farm environment and tasks for MSD hazards.

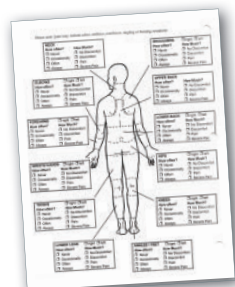
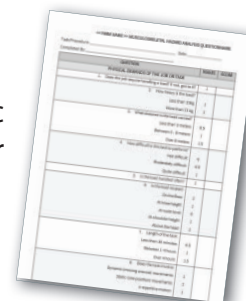
If you spend a day doing a task and notice that it requires a repetitive motion make note of the task and determine how to reduce the risk for next time.

The extended online version of the Musculoskeletal Health and Safety in Agriculture resource is available on the Agricultural Health and Safety Network website and includes practical checklists, incident investigation reports, and MSD prevention policies for use on your farm. Visit [www.aghealth.usask.ca](http://www.aghealth.usask.ca).



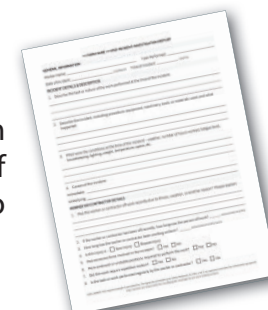
**MSD policy** – Outlines the farms commitment to preventing MSD injuries including definitions, roles, and responsibilities, risk factors, hazard identification and control, training and education, monitoring and evaluation as well as contractor involvement.

**MSD Hazard Analysis** – A system to rate the ergonomic risk of a particular farm task to prioritize the activity for ergonomic intervention.

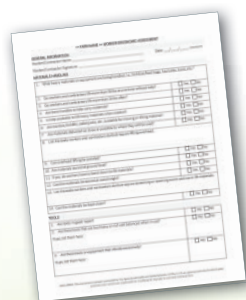


**MSD Symptom Survey** – A worker survey where the worker describes the type of work they do and how much time is spent on certain tasks. The form goes through a bit of personal information, work experience, level of fatigue, pain, and discomfort levels. The results are used to determine if tasks can be performed differently, work aids for prevention, and possible treatment protocols needed.

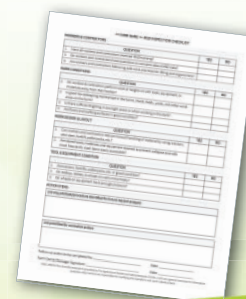
**MSD Investigation Report** – An incident report form that specifically records the MSD related details at the time of the incident to learn the workers and task ergonomic risk to implement a targeted prevention.



**Worker Ergonomic Assessment** – Detailed assessment of materials handling, tool use, repetitive tasks, awkward postures, sitting and standing, work/walk, surfaces, production pressures, training, MSD symptoms, and space to list possible solutions to risk of MSD.



**MSD Inspection Checklist** – A checklist to determine personal and work factors, work conditions, and repairs and updates made with space to add a to do list of what might still be needed.



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# TREATMENT OF MUSCULOSKELETAL DISORDERS

*Disclaimer the information here is not a substitute for professional medical advice. Please consult with your health care provider about treatment options of your musculoskeletal disorder.*

There is no one treatment that fits all for MSDs since these injuries can vary significantly in type and between individuals. However, getting treatment is important for recovery and the faster you recover will likely be the faster you feel well and the faster your recovery will likely be.

## At home treatments to reduce pain:

- Rest
  - Avoid activities or movements causing undue pain or discomfort
- Ice
- Heat
- Anti-inflammatories
- Compression
- Exercise and physical activity
  - Promotes circulation and reduces muscle tension; however, seeking expert advice from a health care provider, physiotherapist, or a chiropractor is recommended as stretching can aggravate MSDs.



## Physiotherapy:

Physiotherapy is a common treatment and management option for MSDs. Physiotherapists can provide you with a comprehensive assessment and recommendations for your specific injury and lifestyle. A physiotherapist will tailor a treatment plan to help you reduce pain and prevent future MSDs through specific exercises, manual treatment, and other approaches.

## Chiropractic:

A Doctor of Chiropractic will evaluate, diagnose, recommend and deliver a treatment plan for your specific needs to help relieve pain and improve the body's overall function. Chiropractors use various treatments depending on your needs including manual 'hands-on' adjustment techniques, soft tissue therapy, customized therapeutic exercise programs, self-management tools and techniques, advice and education, and prescribed rehabilitation and exercises.

## Questions to ask your health care provider:

- > Do you have extended hours?
- > Can I reach you over the phone/email if I have an issue and am unable to make it to an appointment?
- > Do you travel or make house calls?
- > Can I get a take home handout of my exercise to use for future reference?
- > How can I reduce aggravation to my injury while working?



## When to see a health care professional:

- ▶ Low back pain or pain from a MSD disrupts your sleep and daily routine
- ▶ When you are unable to manage your low back pain or pain caused by a MSD
- ▶ When you experience the following changes:
  - Sensation changes such as numbness, tingling, burning
  - Altered bowel and/or urinary control with or without low back pain
- ▶ Pain spreading away from the back into the legs and toes
- ▶ Morning stiffness that is present for over an hour



## Low Back Pain Management:

- Stay as active as you can tolerate
- Avoid bed rest – movement is good for your back
- Apply heat and/or ice for 10 – 15 minutes at a time
  - Avoid laying directly on heat or ice
  - Use a towel as a barrier between skin and heat/ice
- Stretch and move as often as you can throughout the day



Many small centres have physiotherapy services available through community health clinics and private practices. A number of rural physiotherapists will do house calls and/or have flexible hours to accommodate a variety of schedules.

To find a chiropractor near you visit the Chiropractors' Association of Saskatchewan website:

[www.saskchiro.ca/find-a-chiropractor](http://www.saskchiro.ca/find-a-chiropractor)

To find a massage therapist near you visit the Massage Therapist Association of Saskatchewan website:

[www.saskmassagetherapy.com](http://www.saskmassagetherapy.com)

To find a physiotherapist near you visit the following website:

[www.physiocanhelp.ca/find-a-physiotherapist/](http://www.physiocanhelp.ca/find-a-physiotherapist/)





# Take a Stretch Break!



Sitting or standing for a long time can tighten muscles. Take frequent breaks to stretch these muscles. Stretching shouldn't hurt. Move slowly and gently stretching each side twice. These exercises are physical therapist approved.

**CAUTION:** If you experience any pain, numbness or tingling, avoid that exercise and consult a health care professional.

**NECK** Stay within a comfortable range.



**SHOULDERS**  
Move arms slowly and hold.



**CHEST**  
Keep your thumbs up.



**WRISTS**  
Pull very gently on fingers.



**BACK**  
Place hands in back pockets and push hips forward.\*

\*This stretch may not work for everyone. If you feel pain, numbness, or tingling in the back or legs, avoid it and consult a health care professional.



**HIP FLEXORS**  
Think about bringing shoulders back and hip forward.

**Disclaimer:** These exercises should not be seen as a substitute for professional medical advice. Concerns about repetitive strain injuries or other medical conditions should be discussed with your doctor.

## PREVENTION OF AGRICULTURAL RELATED BACK STRAIN AND INJURY



**CCHSA** Canadian Centre for Health and Safety in Agriculture  
**CCSSMA** Centre canadien de santé et sécurité en milieu agricole



**UNIVERSITY OF SASKATCHEWAN**

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