



OHCOW

Occupational Health Clinics
for Ontario Workers Inc.

Centres de santé des
travailleurs (ses) de l'Ontario Inc.

Ergonomics and Pregnancy

**Presented by: Melissa Statham, MSc, CCPE,
Andrew Flanagan MCISc, CCPE and
Jessica Montgomery, BSc.**

Presentation Overview

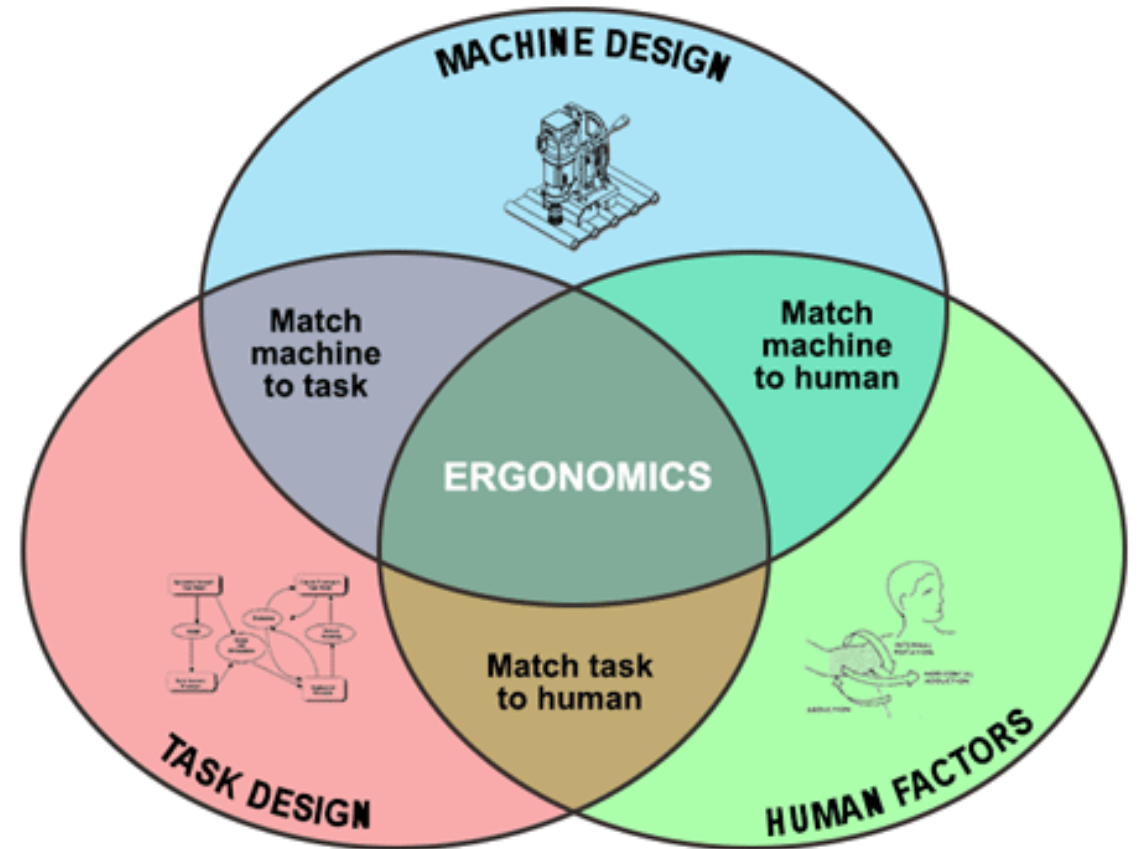
- Introduction
- Body changes that occur during pregnancy
- Common MSDs among Pregnant Workers
- Ergonomic risk factors contributing to MSDs
- Pregnancy outcomes associated with risk factors
- Workplace party responsibilities

Introduction

- What is Ergonomics?

“Fitting the job to the worker”

“Working smarter not harder”



Introduction

Why should pregnant workers be concerned about MSDs?

- Musculoskeletal disorder (MSD) is an umbrella term for injuries that effect our bones, joints, muscles, nerves and connective tissues
- Changes that occur in the body can put pregnant workers at a higher risk of sustaining a MSD
- Understanding these bodily changes, the risk factors for MSDs and your rights as a pregnant worker can reduce the risk of development of MSDs



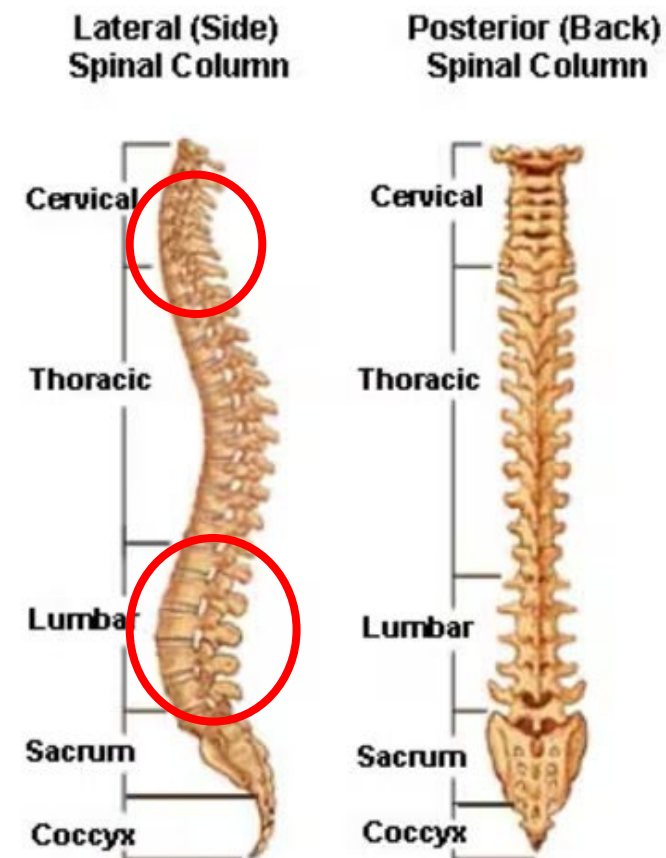
Tissue Changes Effecting the MSK System During Pregnancy

- Women can experience loosening and relaxing of muscles, ligaments, tendons and other connective tissues via hormones (relaxin, estrogen, progesterone, prolactin and oxytocin) [\[10,35\]](#)
- These changes can result in increased joint mobility. As a result, several joints may become less stable, such as the ankles and knees [\[35\]](#)

Changes in the MSK System During Pregnancy

- Spinal curvature

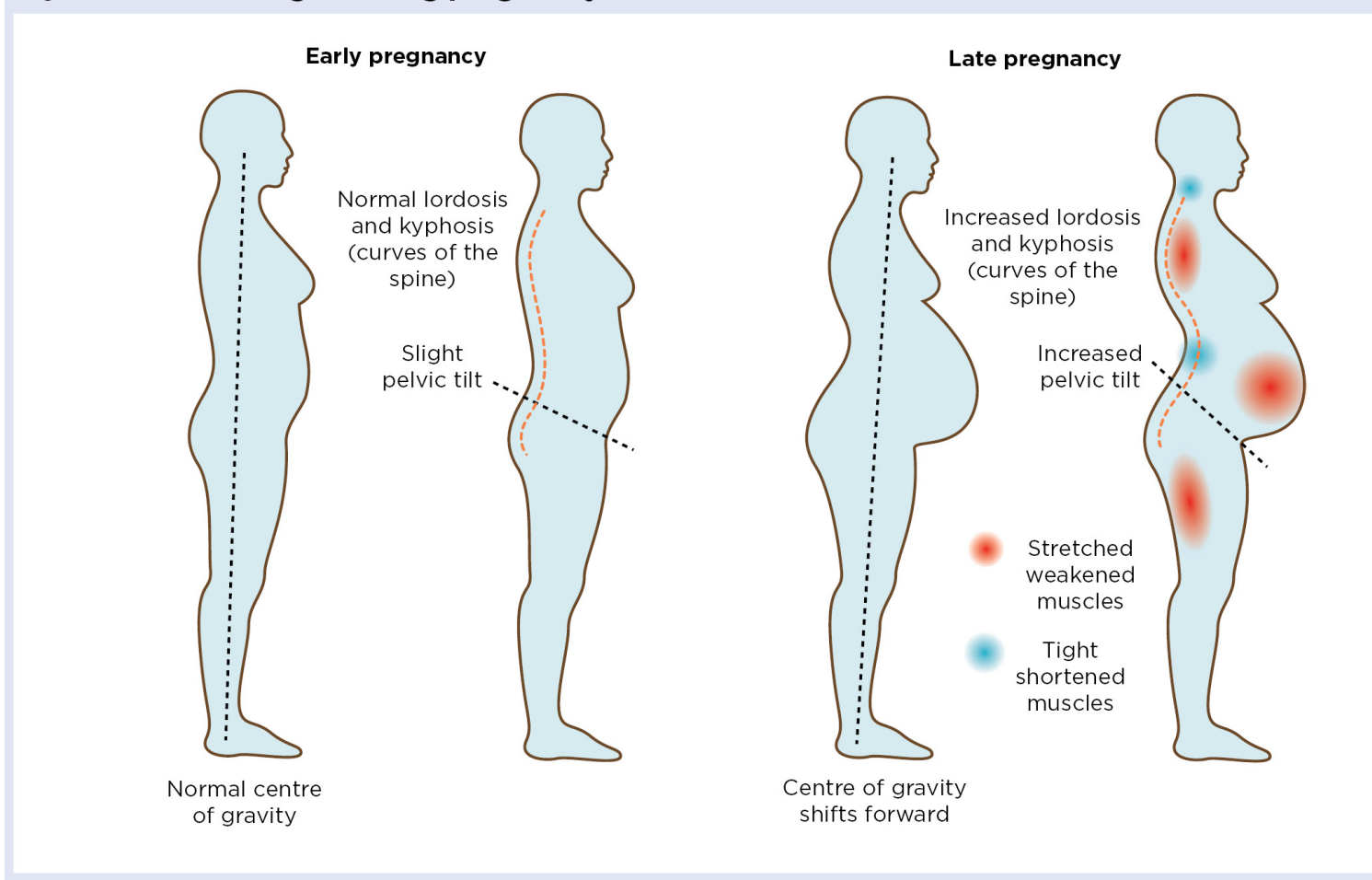
- Research indicates changes in spinal curvature vary depending on the individual [\[5\]](#)
- Some pregnant individuals may experience an increase in the lordotic and kyphotic angles of the spine
- Research is mixed, but some studies show pregnant women can experience anterior pelvic tilt in their third trimester which can result in instability or loss of balance
- Other research suggests weakened abdominal muscles may be responsible for an increase in anterior pelvic tilt [\[16\]](#)



(image source: Healthcentral.com/condition/back-pain/normal-curves-your-spine)

Changes in the MSK System During Pregnancy

Fig 2. Postural changes during pregnancy



Nursing Times. (2023, October 23). *Pregnancy 3: Effects on the musculoskeletal system and skin* (Figure 2: Postural changes during pregnancy).

Changes in the MSK System During Pregnancy

- Trunk range of motion
 - Research suggests that it is possible women increase their posterior trunk lean in an effort to reduce discomfort [\[5\]](#)
 - Lumbar flexion is reduced in a sitting posture [\[22\]](#)
 - No effect is observed in lateral bending [\[3, 16\]](#)
- Stability (static and dynamic)
 - Centre of mass shifts anteriorly throughout the pregnancy effecting stability and balance
 - Despite individual's ability to adapt, pregnancy has been shown reduce stability and balance in the third trimester for pregnant workers [\[5\]](#)

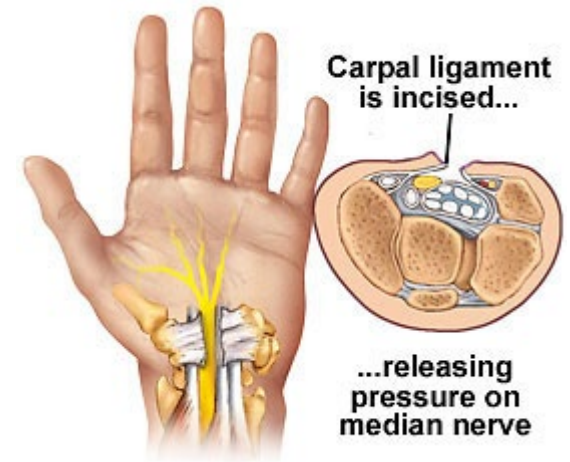
Changes in the MSK System During Pregnancy

- Gait
 - Pregnant women were found to take slower, shorter steps with longer pause between steps in comparison to non-pregnant women
 - These changes are believed to occur to reduce risk of falling and in some cases to reduce pelvic girdle pain [\[36\]](#)
- Anthropometric changes
 - Increase in total body mass (most significantly in the third trimester)
 - Increases observed in the breadth of the thorax, girth of the gluteals, girth of the calves, and biceps and tricipital skin folds during pregnancy
 - Trunk becomes longer and abdominal girth significantly increases
 - Increase in water retention is responsible for increased ankle and foot swelling [\[5\]](#)

MSDs Commonly Associated with Pregnancy

■ Carpal Tunnel Syndrome (CTS)

- CTS is a painful condition that occurs when the median nerve becomes compressed or squeezed at the wrist
- Swelling can occur in the hands, arms and legs during pregnancy due to hormonal interactions which can increase likelihood of developing CTS [\[13\]](#)
- The incidence of CTS will increase during the third trimester and usually diminishes within two months after childbirth as hormonal changes diminish
- Some symptoms include pain, tingling, numbness, and reduced hand strength
- Avoid risk factors for CTS such as repetitive forceful movements of the hand and wrist



Anatomy of the carpal tunnel.

Source: Mayo Clinic (2007).

MSDs Commonly Associated with Pregnancy

■ Back pain

- A 2023 systematic review and meta-analysis reported the global prevalence of back pain at work to be 40.5% during pregnancy [\[32\]](#)
- This could be a result of attempting to adapt to the changes of posture since the abdomen causes the centre of gravity to move forwards as previously described
- Other causes of back pain result from relaxation of connective tissue in the body, poor body mechanics, and muscle fatigue [\[31\]](#)
- There is evidence that pre-natal exercise decreases the severity of low back pain (LBP) during and following pregnancy but does not decrease the odds of LBP occurring [\[9\]](#)



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Risk Factors for MSDs

Force

Posture

Repetitive movement with inadequate time for recovery

Whole body vibration

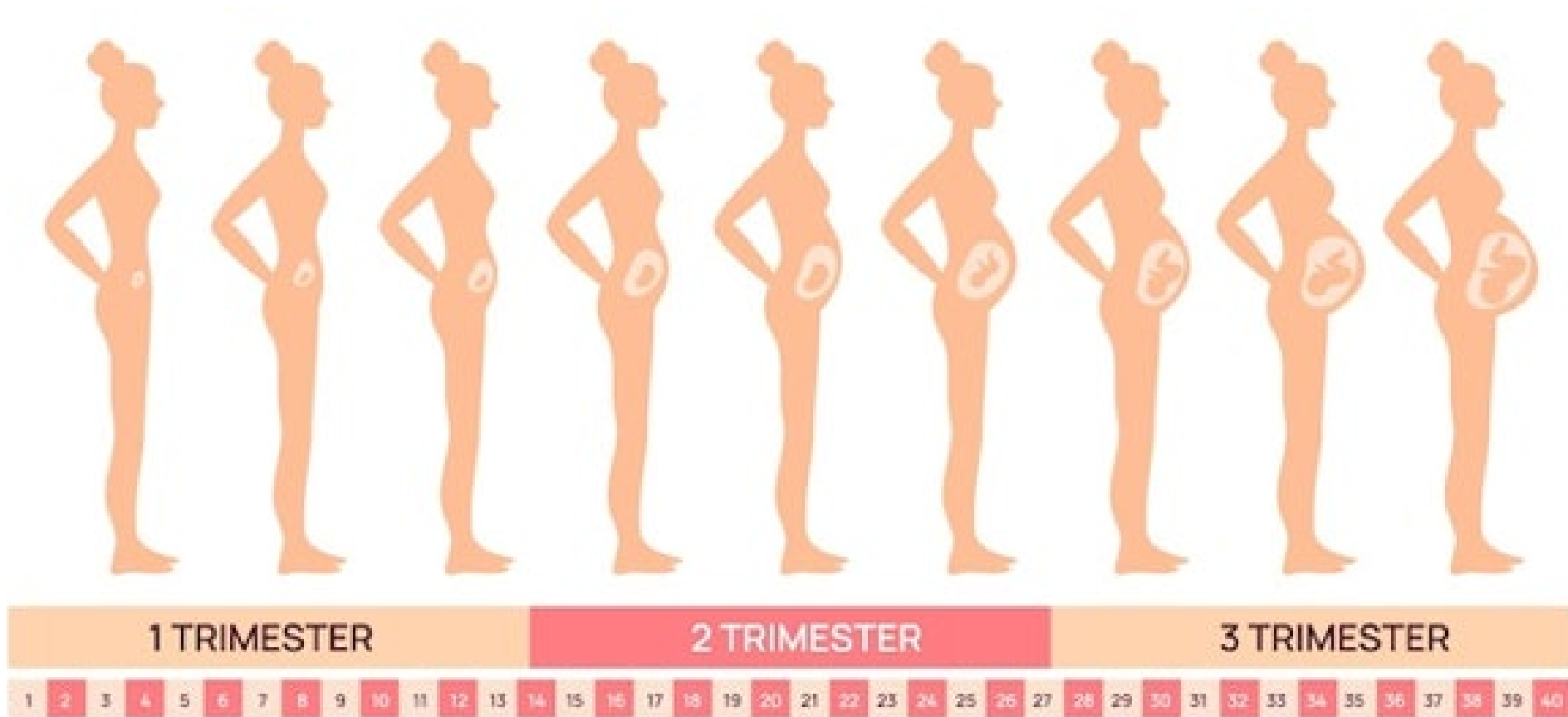
Noise

Heat/Cold Stress

Psychosocial Factors

Risk Factors for MSDs

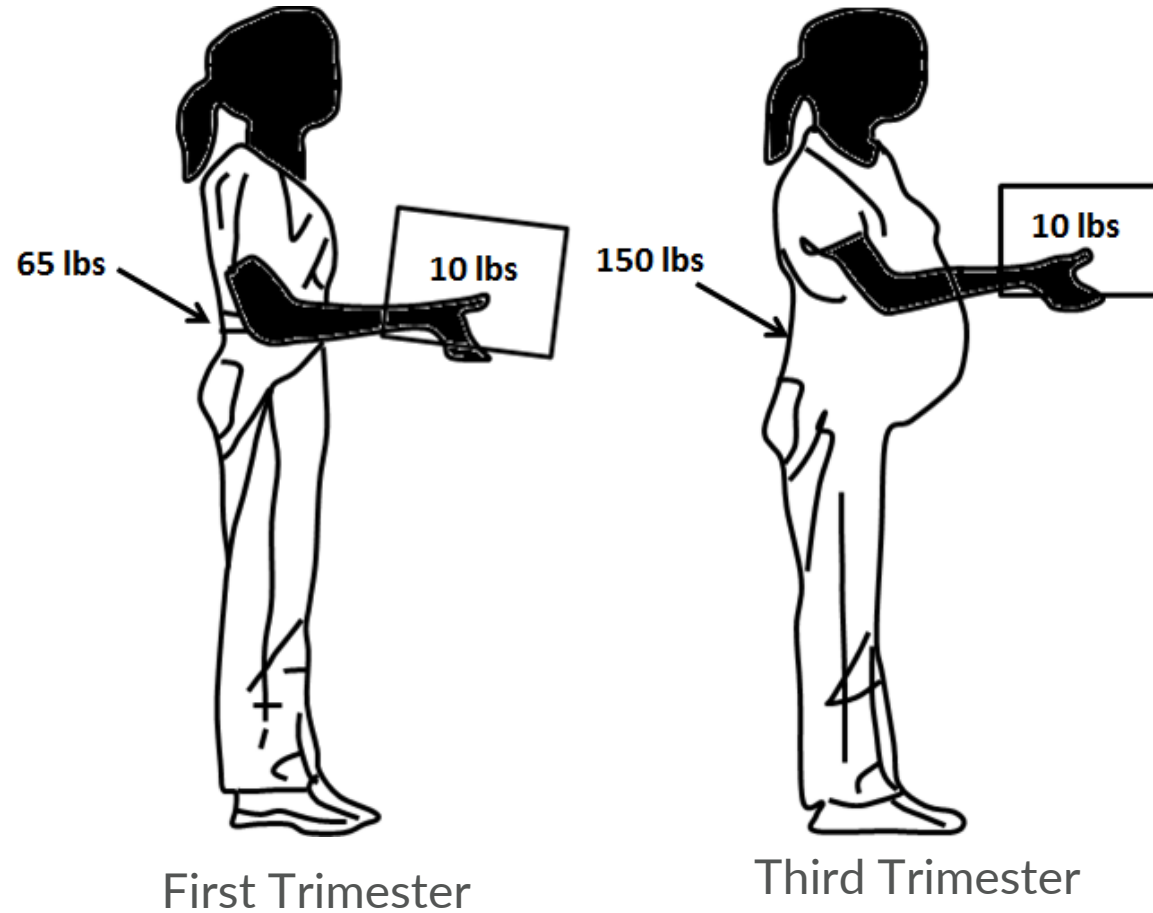
Force - Lifting, carrying



[12, 28]

Risk Factors for MSDs

Force - Lifting, carrying



[34]

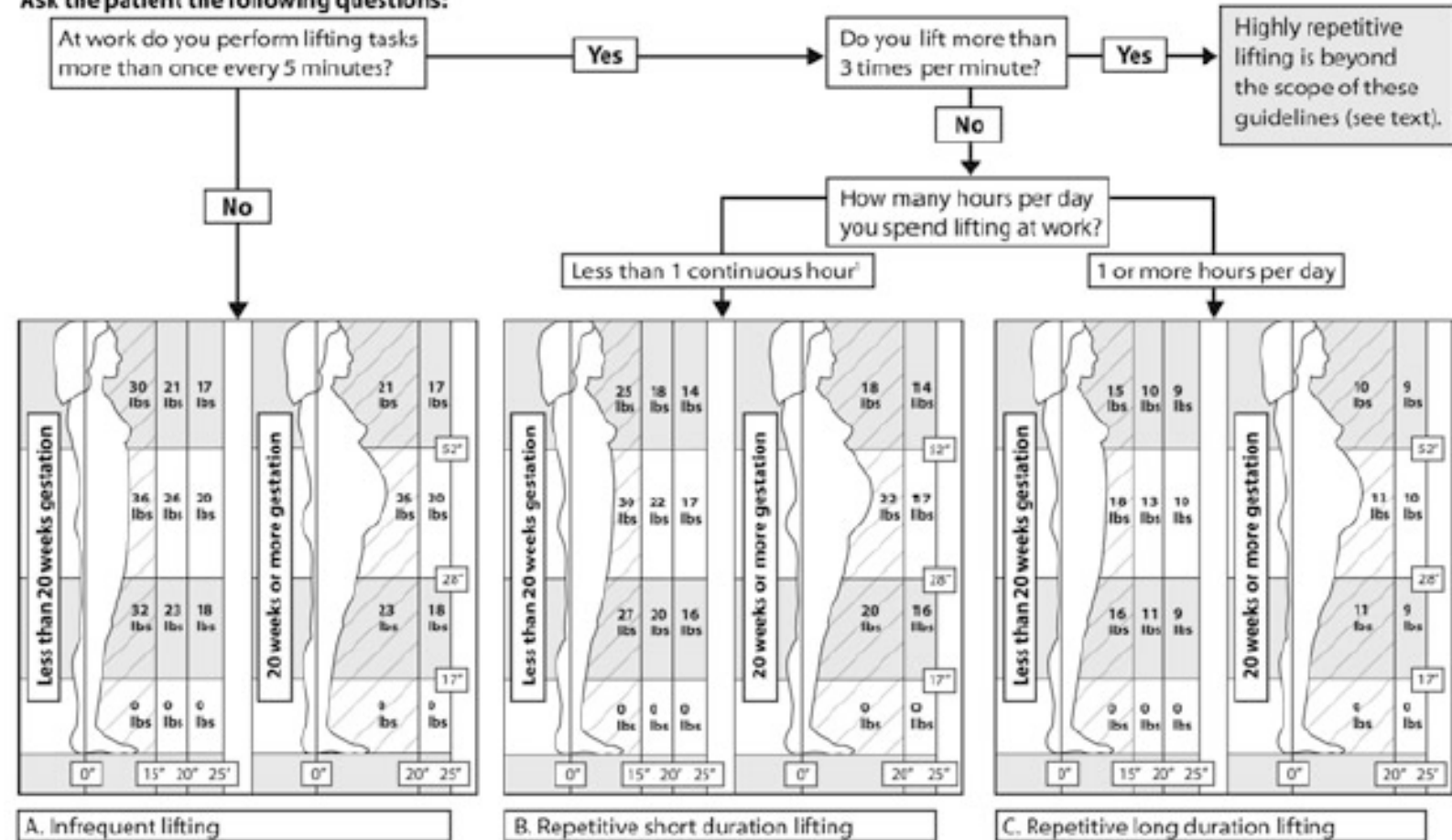
Risk Factors

Force - Lifting

Example:

- Lifts a 16 lb. box every minute
- Task is repeated for 2 hours
- Handle height 18" above floor
- Forward reach is 21"
- Worker is 22 weeks pregnant

Ask the patient the following questions:



Instructions for using graphic A, B, or C:

- 1) Select the left figure if gestation < 20 weeks; select the right figure if gestation ≥ 20 weeks.
- 2) Ask the patient to demonstrate the lifting motions to determine the lifting height from the floor and the distance in front of the body.
- 3) Select the numerical weight limit values along the entire path the object would travel. If the object crosses more than one weight limit category, select the lowest weight limit.
- 4) The number selected in step 3 above is the Recommended Weight Limit (RWL) for the gestation period.

¹Repetitive short duration lifting (Graphic B) can encompass multiple hours of lifting per day; however, each continuous lifting period should be less than one hour and followed by a minimum of one hour of non-lifting activity before the next continuous lifting period is initiated.

Important considerations: Work conditions not covered by the RNLE

Risk Factors

Force

- Lifting/lowering with one hand
- Lifting/lowering for over 8 hr
- Lifting/lowering while seated or kneeling
- Lifting/lowering in a restricted workspace
- Lifting/lowering unstable objects
- Lifting/lowering while carrying, pushing, or pulling
- Lifting/lowering with wheelbarrows or shovels
- Lifting/lowering with “high speed” motion (faster than about 30 in./s)
- Lifting/lowering with unreasonable foot/floor coupling (<0.4 coefficient of friction between the sole and the floor)
- Lifting/lowering in an unfavorable environment (temperature significantly outside the 66–79°F [19–26°C] range; relative humidity outside the 35%–50% range)
- (Highly repetitive lifting more than 3 times per minute)
- (Lifting/lowering from the floor with hands below midshin)
- (Lifting overhead)
- (Lifting more than 3 times per minute)
- (Travel distance of the object being lifted greater than 10 in. [25 cm])
- (Spinal rotation or asymmetry of 15° or more)
- (Poor hand coupling of the object)

Risk Factors

- Force – Lifting, carrying

WORKING DURING PREGNANCY



For most women with healthy pregnancies, it is safe to work until just before childbirth.

<https://www.pregnancyinfo.ca/your-pregnancy/healthy-pregnancy/working-during-pregnancy/>

Work tasks to discuss with your care provider:

- Lifting more than 23 kg (50 lbs) after the 20th week of pregnancy
- Lifting more than 11 kg (24 lbs) after the 24th week
- Needing to lift any heavy items after the 30th week

[33]

Risk Factors for MSDs

Force – Pushing/Pulling

Liberty Mutual Manual Material Handling Population Percentiles



<https://libertymmhtables.libertymutual.com/>

Risk Factors

■ Pushing/Pulling

Task Type
Push

System of Units(SI)
Imperial Units

Frequency Pushes / Hour

4


Initial Force (lb)
70

Sustained Force (lb)
25

Horizontal Distance (ft)
20

Vertical Hand Height (in)
40

Calculate



Population Percentage

MALE:	Initial: >90%, Sustain: >90%
FEMALE:	Initial: 47%, Sustain: >90%

<https://libertymmhtables.libertymutual.com/>

[29]

Risk Factors for MSDs

- Balance considerations while pushing/pulling



[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)

[8]

Risk Factors for MSDs

■ Force

- Pregnant workers should avoid lifting, pushing, pulling and carrying tasks that may expose a worker to an unpredictable load, such as patient handling, or emergency response tasks [\[28, 30, 35\]](#)



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Risk Factors for MSDs

Posture



[\[5, 16\]](#)

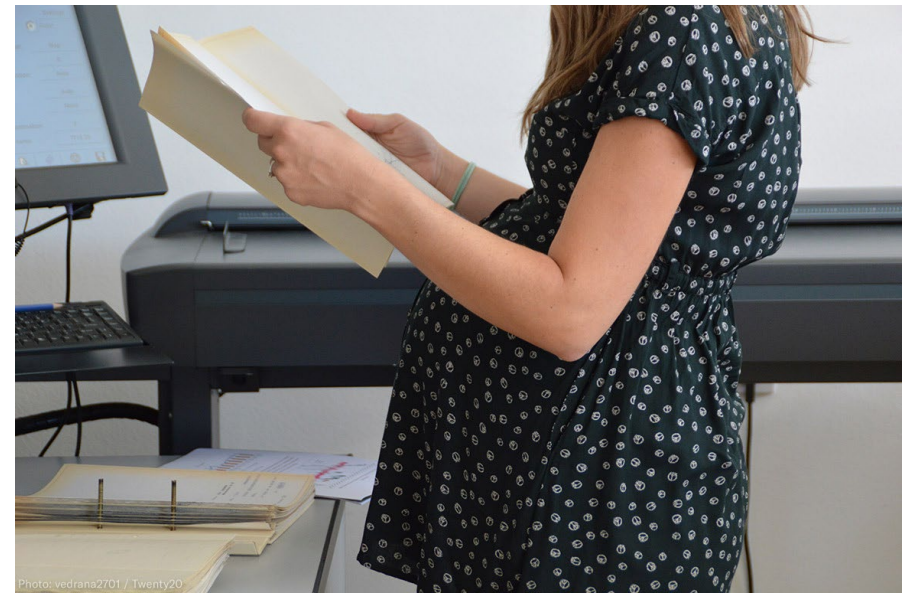
Risk Factors for MSDs

Posture - Static

- Static postures, involve holding a fixed body position for extended periods. This can result in increased muscular effort, inhibit blood flow, and lead to fatigue and/or injury



[This Photo](#) by Unknown Author is licensed under [CC BY-ND](#)



[4, 33]

Risk Factors for MSDs

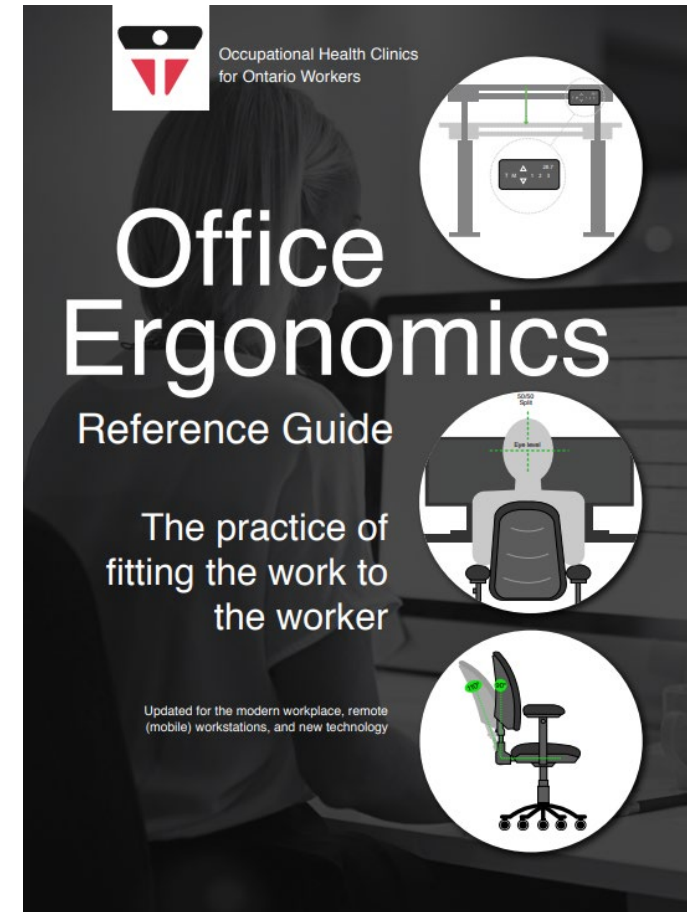
Posture - Static

- Office Ergonomics



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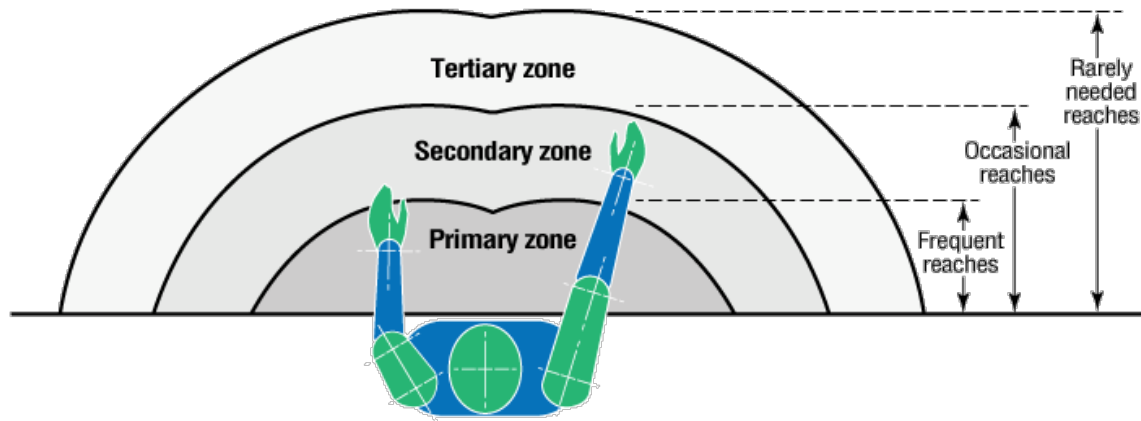
https://www.ohcow.on.ca/wp-content/uploads/2021/09/ergo_guide_print_FINAL.pdf



Risk Factors for MSDs

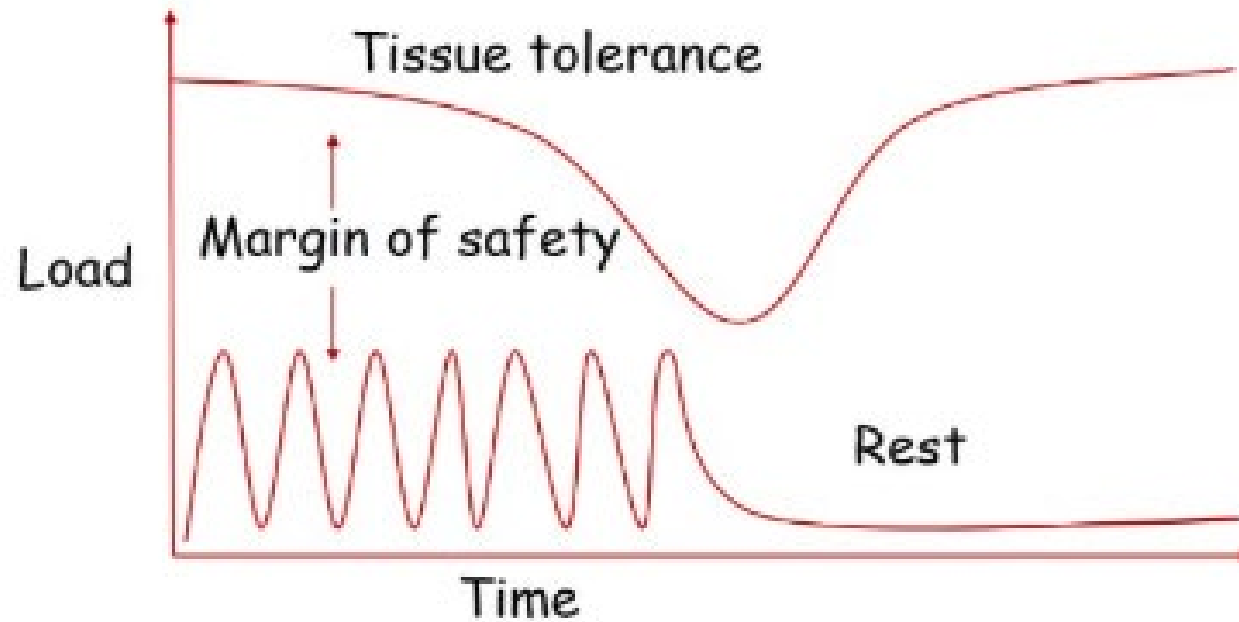
Posture - Dynamic

- Identify frequent tasks and adapt them to allow neutral postures
 - Keep forward reach as close to the body as possible
 - Keep reaches to the “power zone” between knees and shoulders
 - Avoid lifting from below knees or above shoulders



Risk Factors for MSDs

Repetition



Risk Factors

Whole Body Vibration (WBV)

Vibration magnitude of equipment

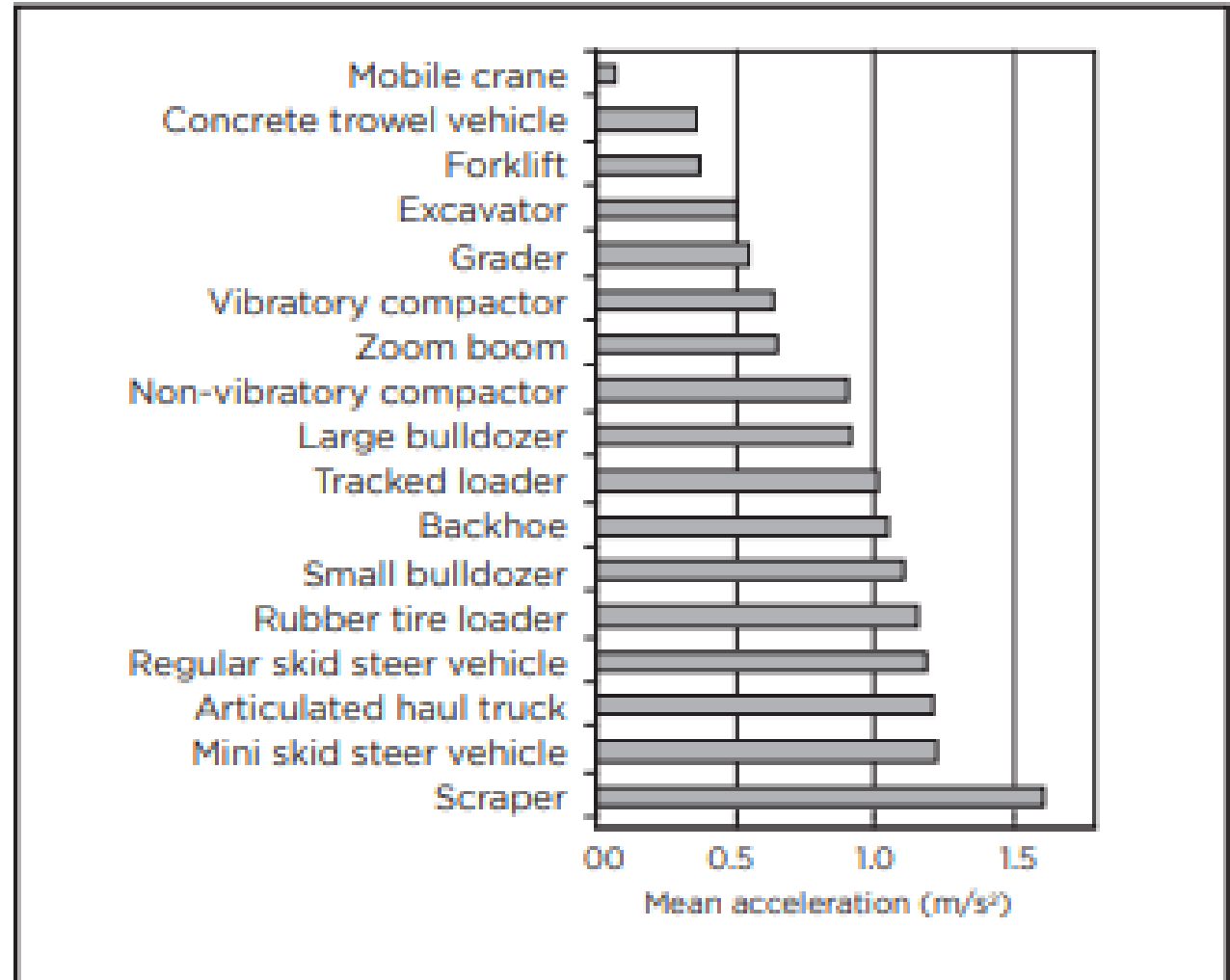


Image source: https://www.ihsa.ca/pdfs/safety_talks/whole-body_vibration.pdf

Risk Factors

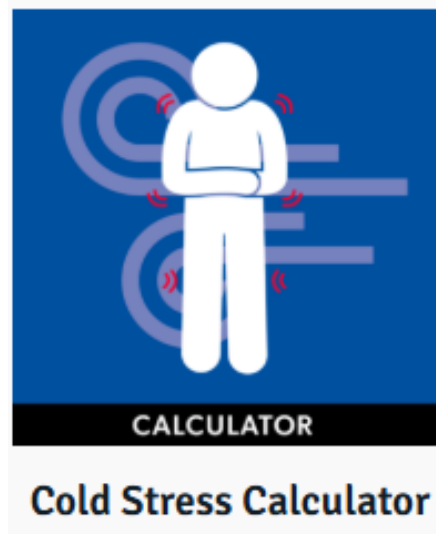
Noise Exposure

- Can increase blood pressure, heart rate and stress
- 85 dBA for more than 8 hours may lead to hearing impairment for worker and baby [\[21\]](#)



Risk Factors

Heat/Cold Exposure



Heat Stress Toolkit

Heat stress is a serious threat to workers. It occurs when the body is unable to get rid of excess heat, which causes the heart rate and core body temperature to increase, often leading to heat-related illness. The tools in this Heat Stress Toolkit will help you understand the heat conditions in your workplace, assess the risk of heat stress and take action to protect yourself or your workers.

A graphic for a Heat Stress Toolkit. It features a large thermometer with a red and yellow liquid level, set against a white background. Surrounding the thermometer are several circular icons: a smartphone, a document with a checklist, a line graph, a play button, a person at a computer, and an open book.

Resources:

- OHCOW's Heat Stress Calculator: <https://www.ohcow.on.ca/resources/apps-tools-calculators/heat-stress-calculator/>
- OHCOW's Cold Stress Calculator: <https://www.ohcow.on.ca/posts/cold-stress-calculator/>

Risk Factors

Psychosocial Factors

- High job demands
- Low job control
- Work pace
- Task variety
- High job strain
- Low job security
- Working hours



The screenshot shows the homepage of the StressAssess website. At the top, it says "Occupational Health Clinics for Ontario Workers" and "Centres de santé des travailleurs (ses) de l'Ontario". Below that is a navigation bar with "Home", "About", "Contact Us", and "Français". The main heading is "Welcome to StressAssess". Below this is a large banner with a grid of diverse people's faces. Text on the banner reads: "A survey of the psychosocial factors in your workplace". There are six circular icons representing different stressors: a group of people, a person running, a person falling, a person with a lightning bolt, a person with a gear, and a hand with a lightning bolt. Below the icons, it says: "This survey is based on the Copenhagen Psychosocial Questionnaire (COPSOQ) and has been adapted to address concerns within the Canadian workplace." There is a "MORE ABOUT" link with a red arrow. Below the banner, it says "Choose from two versions" and shows two options: "Personal Edition" (a woman's face) and "Workplace Edition" (three workers in hard hats). At the bottom, there is a "Contact Us" link, an award badge for "2018 Adobe Creativity Government Awards Finalist", and logos for "Mental INJURY", "CCOHS", and "COPSOQ INTERNATIONAL NETWORK".

www.StressAssess.ca

[18, 20]

Risk factors for pregnancy outcomes

- Some workplace MSD risk factors are associated with more common adverse pregnancy outcomes such as:
 - Preterm birth
 - Low birth weight
 - Spontaneous abortion
- Associations (not necessarily causation) have been reported with:
 - Prolonged standing (>3-4 hours/day) [\[24\]](#)
 - Heavy or repetitive lifting [\[14, 24\]](#)
 - Awkward or sustained postures [\[14\]](#)
 - High physical workload [\[17\]](#)
 - High psychosocial stress [\[18, 20\]](#)
 - Inflexible work conditions [\[17\]](#)
- Chances of adverse outcomes may increase when risk factors are combined
- **Speak with your health and safety representative, your employer and your prenatal care provider if you have concerns about the safety of your pregnancy at work**

Being Proactive

- Evidence suggests when women are provided specific physical activity recommendations in preparation for pregnancy, they may feel empowered and better prepared to face musculoskeletal issues that may arise both during and following pregnancy [\[23\]](#)



Workplace Parties Responsibilities Supporting Pregnant & Birthing Workers

Jessica Montgomery
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Disclaimer

This portion of the presentation provides information based on Ontario law and legislation. Participants joining from other provinces or countries should review the legislation that applies in their own areas as it may differ.

Legal Rights & Duty to Accommodate

Right to a safe
and healthy
workplace

Legal Requirement
Duty to Accommodate
during pregnancy and
postpartum

Accommodation
is required up to
undue hardship

Workplace Accommodations

- Modified work duties and tasks
- Flexible hours or scheduling
- Additional and flexible breaks
- Time off for medical appointments
- Transitions between sitting and standing positions
- Uniform or clothing modifications
- Proper, and well fitting Personal Protective Equipment

Worker Responsibilities

- Know your rights
 - Right Know, Right to Refuse, Right to Participate, and Duty to Accommodate
- Communicate needs and concerns
- Work within functional abilities
- Attend medical appointments
- Seek Medical if condition changes
- Use Personal Protective Equipment

WORKERS' HEALTH and SAFETY RIGHTS

Employers must protect your health and safety. It's the law.

As a worker, you have a right to:



Know



Participate



Refuse Unsafe Work

Right to Know

...anything at your work that could hurt you or make you sick.



Chemicals / Products you use or are around you



Tools / Equipment given to you to use



Jobs you are asked to do



Viruses that cause illness/disease

Your employer **must train** you about how to:



Do your job so you don't get sick or hurt



Use protective equipment



Report hazards



Use data sheets and labels for dangerous products (WHMIS)

Right to Participate

Every worker has a right to be included in workplace health and safety. This means you should be able to:



Ask questions / report hazards



Be part of discussions about health and safety hazards or problems in your workplace



Join a worker- employer health and safety committee*, be a health and safety representative

*unions choose workers; no union - workers choose

If there are **more than five (5) workers** in your workplace, there must be a worker health and safety representative or a joint (worker-employer) health and safety committee.

Right to Refuse Unsafe Work

You have the **right to refuse** if you think a job is dangerous for you or another worker.

There is a process to follow to refuse dangerous work. See our blue Right to Refuse poster for details



It is illegal

for your employer to:



Punish



Fire



Retaliate against you in any way

... if you:



Express your opinion regarding health and safety



Participate in health and safety activities



Refuse unsafe work

If you think this has happened to you – or you are worried that it might – get help from the organizations below:



OHCOV
OH Canada
1-877-817-0336
ask@ohcov.on.ca

Local Legal Aid Clinic
Find the nearest one:
1-800-668-8258*
www.legalaid.on.ca/legal-clinics/

Ministry of Labour, Training, Skills and Development (MLTSD)
Health and Safety Contact Centre
1-877-202-0008*
Press 1 for Work Referrals
srbhsa@ontario.ca

* Ask to speak to someone in your language.

Employer Responsibilities

- Employers have a **legal duty to accommodate** pregnancy related needs under the **Ontario Human Rights Code**
- Pregnancy is a protected ground, under the **Ontario Human Rights code** (sex / family status)
- Applies from the beginning of pregnancy through the postpartum period
- Take active steps to identify and remove barriers in the workplace for the pregnant person
- Provide reasonable, and meaningful modified work, and accommodations
- Individualize the accommodation based on the worker's functional abilities, and workers needs
- Continue with the accommodation up to the point of undue hardship

Union Responsibilities in Accommodation Process

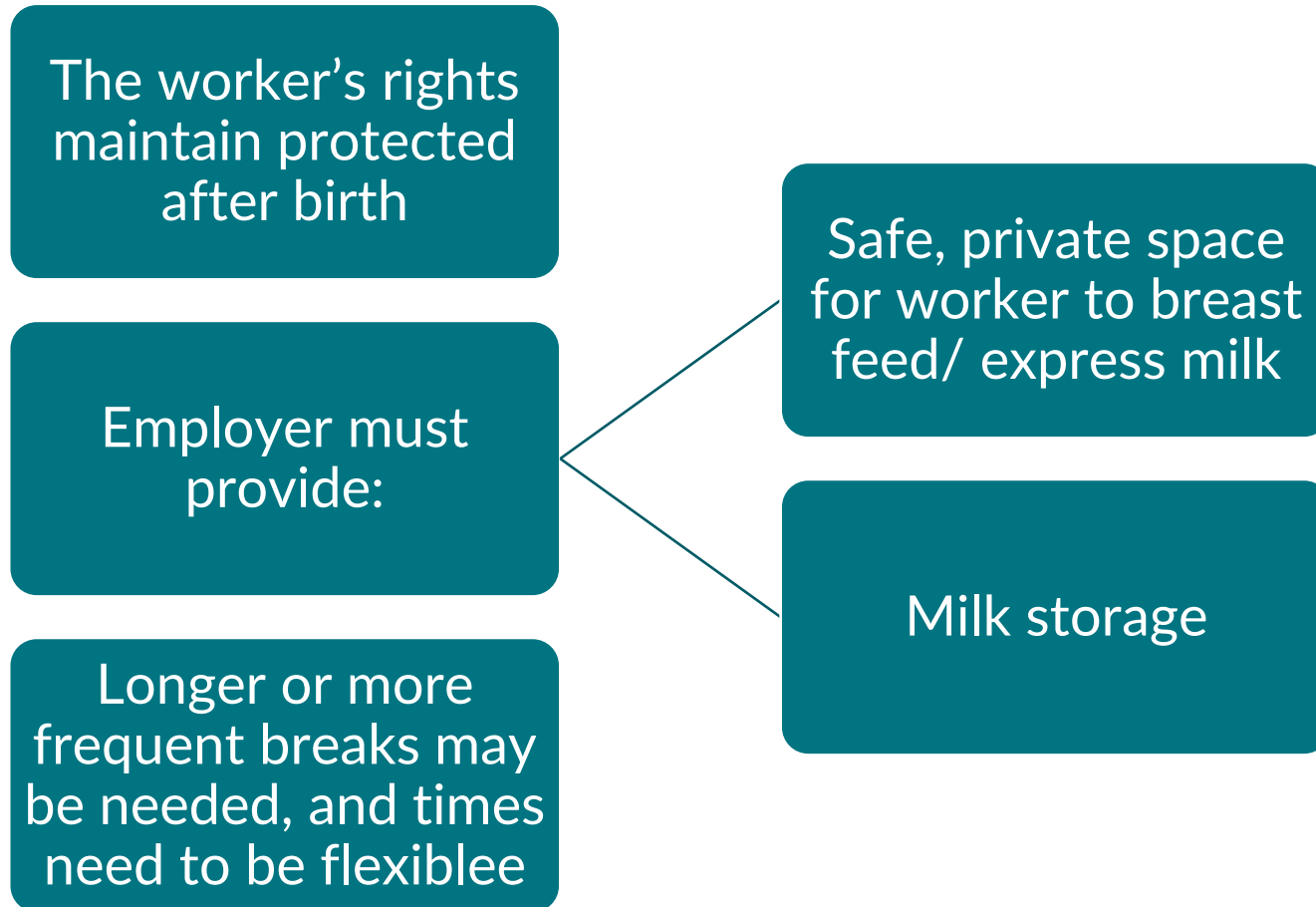
- Actively take part in the accommodation process as a Workplace Party
- Provide support and advocate for the pregnant worker's accommodation needs
- Cooperate with the employer to identify safe and suitable accommodations
- Ensure that the accommodations respects the collective bargaining agreement while prioritizing the worker's human rights
- Avoid actions that delay, block, or undermine accommodations
- Provide education to the pregnant worker, and other bargaining members about their rights and responsibilities in the accommodation process

Pregnancy & Parental Leave

- **Pregnancy & Parental Leave**
- Up to 15 weeks birth related leave
- Up to 40 weeks of standard parental leave
- Up to 69 weeks of extended parental leave
- **Job protection during leave**
- **Right to return to same or equivalent job**



Right to Breast Feed/ Express Milk



If Issues Arise



Report concerns to employer, supervisor or human resources



Contact union if applicable



External support available through:

Ontario Human Rights Commission
Human Rights Legal Support Centre

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Thank you.

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