# An Ergonomics Guide for Kitchens in Healthcare

OHSAH
Occupational Health and Safety Agency for Healthcare in BC

# An Ergonomics Guide for Kitchens in Healthcare

**2003 edition**

National Library of Canada Cataloguing in Publication Data
Main entry under title:
An ergonomics guide for kitchens in healthcare. — 2003 ed.—

Irregular.
ISSN 1708-3192 = Ergonomics guide for kitchens in healthcare

1. Kitchens — Safety measures. 2. Health facilities — Safety measures. 3. Health facilities — British Columbia — Safety measures. I. Occupational Health and Safety Agency for Healthcare in British Columbia.

TX655.E73 643'.3'0289 C2003-960184-6

## Acknowledgments

OHSAH is grateful to everyone who contributed to the development of *An Ergonomics Guide for Kitchens in Healthcare* through focus-group meetings or through other input, feedback, and recommendations.

### BC handbook review participants

- Darren Buckler — Regional Safety Officer, Vancouver Island Health Authority
- Michael Colussi — Manager, Occupational Health and Safety Services, Vancouver Island Health Authority
- Clarence Friesen — Safety Advisor, Vancouver Island Health Authority
- Linda Gould — Regional Safety Officer, Vancouver Island Health Authority
- Stephanie Hennessy — Director, Occupational Health and Safety Services, Providence Health Care
- Industry Services Department — Prevention Division, Workers' Compensation Board of BC
- Brian Kossey — Safety and Ergonomics Advisor, Vancouver Island Health Authority
- Tracy Larsen — Occupational Health and Safety Advisor, Vancouver Island Health Authority
- Waqar Mughal — Ergonomist, Fraser Health Authority
- Judi Murakami — Regional Safety Officer, Vancouver Island Health Authority
- Ana Rahmat — Health and Safety Advisory Committee, Hospital Employees' Union
- Dan Robinson — Robinson Ergonomics Inc.
- Carole Taylor — Director, Workplace Health and Safety, Interior Health Authority
- Judy Village — Ergonomist, Judy Village and Associates, UBC
- Lisa Wherry — MSIP Advisor, Occupational Health and Safety, Interior Health Authority
- Natasha White — MSIP Advisor, Children's and Women's Health Centre of British Columbia

## Special thanks

- Aberdeen Hospital, Victoria
- Ashcroft and District General Hospital, Ashcroft
- Eagle Park Health Care Facility, Qualicum
- Enderby Hospital, Enderby
- Matsqui-Sumas-Abbotsford (MSA) General Hospital, Abbotsford
- Ponderosa Lodge, Kamloops
- Saanich Peninsula Hospital, Saanichton
- St. Vincent's Hospitals, Langara

Thanks also to the National Institute for Occupational Safety and Health (NIOSH) for permission to use source material for the graphics on pages 22 and 23.

## Focus group participants

Thanks to Fair Haven United Church Homes (Burnaby and Vancouver), Menno Hospital (Abbotsford), and St. Paul's Hospital (Vancouver) for making the following individuals available to participate in focus groups for this guide:

- Anita Aggarwa
- Nick Albanese
- Dale Barnett
- Jeremy Brockington
- Lynn Burrill
- Rick Carlos
- Linda Dela Costa
- Bonnie Drummond
- John Ferreira
- Gail Festing
- Mathew Fleming
- Ellie Friesen
- Erna Ginter
- Luke Kung
- Yolanda Martin
- Sharan Mattu
- Jocelyn Mirador
- Balwinder Mutti
- Raminder Sandhawia
- Adrian Sartor
- Melinda Soeten
- Ramona Starks
- Todd Sutherland
- Ben Tsui
- Kathleen Turner
- Carol Vass
- Susan Viray
- Caroline Weetman
- Gail Wise
- Michael Wright
- Adrienne Young

### OHSAH main contributors

- Chris Engst — Ergonomics Program Manager
- Rick Hall — Ergonomist
- Aaron Miller — Ergonomics Project Coordinator
- Justin LoChang — Ergonomics Project Coordinator
- Sarah Manske — Co-op Student
- Dr. Annalee Yassi — Founding Executive Director

# Who should read this guide

*An Ergonomics Guide for Kitchens in Healthcare* is for anyone who needs practical information on how to make a healthcare kitchen a safer place to work. Employers will find information that will help them work through the ergonomics process, detecting potential musculoskeletal injury (MSI) risks and implementing effective control measures to prevent injury in healthcare kitchens. Workers will find specific health and safety information that will help them carry out their day-to-day tasks safely and efficiently.

Look for opportunities to manage the risk of MSI in your facility whenever you:

- design new kitchens
- renovate old kitchens
- purchase new equipment
- respond to kitchen incidents
- develop and implement a proactive risk management program

**Kitchen statistics**

- From 1994 to 1998, food preparation and kitchen workers accounted for 12% of all time-loss claims in healthcare facilities.
- Of those time-loss claims, 33% resulted from overexertion related to manual materials handling.
- From 1996 to 2000, the WCB paid out $13,610,018 for kitchen-specific healthcare claims.

Many of the recommendations in this guide have been developed and implemented successfully in collaboration with kitchen departments throughout BC. You can photocopy and use material from the appendices (the checklists, tools, and templates) as working copies at your facility.

# What's inside

This guide is divided into seven parts:

**Part 1: Introduction** summarizes key points and defines a few terms.

**Part 2: Musculoskeletal Injury (MSI)** provides information on MSI, including common signs and symptoms, stages, risk factors, and how to determine if there is a risk of MSI in your kitchen.

**Part 3: General Kitchen Controls** describes methods for minimizing general risk factors, including force, repetition, awkward postures, static postures, and contact stress.

**Part 4: Controls for Meal Preparation** describes risk factors and potential controls for meal preparation tasks. It includes sections on chopping and cutting, buttering bread and toast, puréeing meals, using mixers and mixing bowls, using ovens and steamers, and preparing soup.

**Part 5: Controls for Meal Service** describes risk factors and potential controls for meal service tasks. It includes sections on general cafeteria controls, portioning food, dispensing beverages, tray lines, installing an automated tray line, and using carts.

**Part 6: Controls for Cleanup and Storage** describes risk factors and potential controls for cleanup and storage tasks. It includes sections on scraping dishes, soaking and pre-rinsing dishes and pots, sorting and loading dishes, washing pots, storing dishes and pots, busing, general cleanup, washing dish lines and carts, removing waste, storing food and dishes, and environmental hazards.

**Part 7: Implementation and Evaluation** provides information on implementing and evaluating a successful MSI prevention program in your kitchen.

This guide also contains **Appendices,** including a signs and symptoms survey, a risk factor identification checklist, a summary of the WCB ergonomics requirements, an implementation guideline, a stretching routine, and a reference list.

Throughout this guide you will also find "OSHTips," occupational safety and health tips that will help make your workplace safer and more efficient.

The information in this guide is based on:

- ergonomics risk assessments done in healthcare kitchens throughout BC
- published material from other occupational health and safety agencies
- peer-reviewed literature

# Contents

## Part 5: Controls for meal service



## Part 6: Controls for cleanup and storage



## Part 7: Implementation and evaluation



## Appendices

# 1 Introduction

This part includes the following sections:

- Key points
- Terms

# Key points

Here is a summary of the key points that are covered in more detail throughout this guide:

- *Ergonomics* is designing jobs to fit workers to minimize the risk of injury.
- Basic ergonomics risk factors include force, repetition, awkward postures, static postures, and contact stress.
- *Musculoskeletal injury (MSI)* includes injuries or disorders of the muscles, tendons, ligaments, joints, nerves, blood vessels, or related soft tissue, including sprains, strains, or inflammation that may be caused or aggravated by work.
- Common signs and symptoms of MSI include redness, swelling, pain, tenderness, tingling, weakness, and clumsiness.
- Risk factors may be present in a number of different tasks, including:
  - ~ meal preparation
  - ~ meal service
  - ~ dish and pot washing
  - ~ cleanup
  - ~ storage
- It is important to identify high-risk tasks and the risk factors associated with those tasks.
- Identifying problems and solutions is only part of the process; implementing solutions is also an important part of the process.
- Reduce as many of the risk factors within a task as possible.
- Solutions can be simple and inexpensive; they do not have to be elaborate or costly.
- Consider a solution's effects on other risk factors and other parts of the body.
- Evaluation and worker consultation are important to ensure that implemented control measures work and have a positive impact on kitchen workers.

# Terms

### Ergonomics

*Ergonomics* is the science that plans and designs tasks to fit workers. Ergonomics deals with human characteristics, expectations, and behaviours in the design of the tasks people use in their work and everyday lives.

### Ergonomics risk factors

Workstations, work areas, tools, machines, and appliances are often designed without considering the people who will be using them. This can lead to problems such as improper work surface heights, awkward working postures, and tools poorly designed for the intended task. Such problems are termed *ergonomics risk factors* because they can cause injury.

### Musculoskeletal injury (MSI)

The WCB's Occupational Health and Safety Regulation defines *musculoskeletal injury (MSI)* as "an injury or disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissue including a sprain, strain and inflammation, that may be caused or aggravated by work." Work-related MSIs can make normal work routines uncomfortable and even painful. This can lead to stress or dissatisfaction at work, reduced productivity, the inability to perform some or all work duties, and even difficulty with activities at home.

Kitchen work generally involves pushing, pulling, lifting, and carrying materials. These activities may be repetitive or require forceful exertions or awkward postures, and may result in acute or chronic injuries.

### Acute injuries

*Acute injuries* are injuries that occur immediately as a result of a single traumatic event. Examples of incidents that could cause acute injuries include:

- slipping on a wet floor and twisting your ankle
- lifting a heavy bag of flour and straining your low back

### Chronic injuries

*Chronic injuries* are injuries that occur over time as a result of repeated trauma or overuse of a body part. Symptoms develop in the affected part and the injury may lead to recurring discomfort if not treated properly. Examples of chronic injuries that may develop over time include:

- back pain resulting from repetitively lifting and carrying heavy dish racks
- shoulder tendinitis resulting from repetitive dish sorting on a high shelf

The worst-case scenario is an injury that leaves the worker unable to perform his or her everyday duties and tasks, both at the workplace and elsewhere.

# Musculoskeletal injury (MSI) 2

This part provides information on musculoskeletal injuries (MSIs). It includes the following sections:

- Common signs and symptoms of MSI
- Stages of MSI
- Understanding MSI risk factors
- Is there a risk of MSI in your kitchen?

# Common signs and symptoms of MSI

Knowing the common signs and symptoms of MSI can help prevent injuries. *Signs* are things you can see, such as swelling or redness. *Symptoms* are things you can feel but cannot see, such as numbness, tingling, or pain.

*Table 2.1 Typical MSI signs*

| Sign | Description or observation |
|---|---|
| Redness | Does the skin look red? |
| Swelling | Does the area look swollen? |
| Loss of normal joint movement | Do you have less range of motion than you normally would? |

*Table 2.2 Typical MSI symptoms*

| Symptom | Description or observation |
|---|---|
| Pain (sharp, shooting, or dull) | Pain, the most common feeling, may be present at rest or may occur when you try to use the injured body part. |
| Tenderness | The area may be painful or sensitive to touch. |
| Heat or burning | The injured area may feel warmer than normal. You may feel a burning sensation. |
| Tingling, pins and needles, or numbness | You may feel a tingling sensation along the injured area. You may also lose feeling at or around the injured area. |
| Heaviness | The injured body part may feel as if it weighs more than normal. |
| Clumsiness or weakness | You may be dropping items frequently or finding it difficult to grasp or hold onto objects. You may find it hard to hold onto things that are normally easy for you. |
| Cramping or spasm | The muscle may stay in a contracted state or contract and relax on its own. |

# Stages of MSI

Recognizing the signs and symptoms of a developing MSI and responding to them are key steps in preventing injury. MSI signs and symptoms tend to follow the stages described in Table 2.3.

*Table 2.3 Stages of MSI*

| Early stage |
| --- |
| • Aching or fatigue may be present during work but lessens or disappears with rest (for example, during breaks, overnight, or on weekends).<br>• No effects on work performance are usually noticed.<br>• This stage may last for weeks or months. |

| Middle stage |
| --- |
| • Pain, aching, and fatigue may be present at work and at home.<br>• Visible signs of MSI may also be present.<br>• Signs and symptoms may not disappear with rest.<br>• Performance of activities may be somewhat affected.<br>• This stage may last for several months. |

| Late stage |
| --- |
| • Pain, aching, and fatigue may be present all the time, even when the affected body part is rested.<br>• Performance of activities and sleep are significantly affected. Even light work duties are difficult.<br>• This stage may last for months or years. |

**OSHTip:**

Early detection and reporting of MSIs is crucial.

Injuries in the early and middle stages have a better chance of healing properly if adequate rest is taken or tasks are modified to reduce stress on the affected body part. In the late stage, injuries may not heal completely but effects can be minimized if dealt with properly.

Some MSIs can progress from early to late stages within a week. If you feel early signs and symptoms of MSI, report your injury to your supervisor immediately and fill out an injury or incident report form. For a signs and symptoms survey, see Appendix I.

# Understanding MSI risk factors

Understanding risk factors and identifying where they might occur can help prevent MSI. When assessing the degree of risk, it is important to ask three basic questions:

1. What is the intensity or magnitude of the risk factor (how much)?
2. What is the frequency of exposure to the risk factor (how often)?
3. What is the duration of exposure to the risk factor (how long)?

If a task presents high levels of any one risk factor or presents multiple risk factors the risk level increases greatly. This section describes the following risk factors:

- force
- repetition
- awkward postures
- static postures
- contact stress

Part 3 describes general controls for each of these risk factors.

## Force

Physical effort that places a high load on the muscles, tendons, ligaments, and joints increases the body's energy demands and the possibility of injury. For example, lifting heavy bags of flour requires forceful exertion. Even light loads may present a risk of injury if held statically or for a long duration. Whenever possible, ask for help when lifting heavy objects.

## Repetition

Repetitive tasks are tasks that use the same muscle groups repeatedly. Muscles and tendons do not have enough time to rest, which leads to fatigue and possibly muscle damage. For example, scraping and scrubbing dishes or pots can be repetitive tasks.

**Power grips vs. pinch grips**

A power grip involves the entire hand. A pinch grip uses the fingertips only. A power grip is preferable because it takes less muscular effort than a pinch grip to provide the same amount of force. For illustrations of a power grip and a pinch grip, see page xx.

## Awkward postures

Awkward postures occur when the body has to work in a position that is not "natural." For example, placing dishes on high shelves stresses the shoulders more than working with the hands at waist level (because the muscles, tendons, and ligaments must work harder to do the same amount of work).

## Static postures

Static postures are body positions held without movement for more than 20 seconds. Muscles tire quickly in static postures because blood flow is restricted. For example, kitchen workers may stand for prolonged periods on hard surfaces. Workers may also lean over counters for long periods (for example, when washing pots), which puts the low back in a static bent position.

## Contact stress

Contact stress occurs when body parts come into contact with hard or sharp objects. Contact stress can result in injury to nerves and tissues beneath the skin. For example, kneeling on hard surfaces can cause contact stress on the knees.

# Is there a risk of MSI in your kitchen?

Employers should follow this seven-step ergonomics process to prevent MSI in kitchens.

### Step 1. Consultation

During each step of your MSI prevention program, consult with your joint health and safety committee (or worker health and safety representative).

### Step 2. Education

Educate workers about identifying work-related risk factors, recognizing early signs and symptoms of MSI, and knowing their potential health effects.

### Step 3. Risk identification

Identify the tasks that pose a risk of MSI and identify the risk factors associated with those tasks.

### Step 4. Risk assessment

Assess identified risk factors to determine the degree of risk to workers. Consult with affected workers and a representative sample of other workers who perform similar tasks.

### Step 5. Risk control

Implement control measures to eliminate or minimize the risk factors. Implementation may include:

- elimination or substitution (for example, automating a task)
- engineering controls (for example, using lifting devices)
- administrative controls (for example, using task rotation or work techniques)
- personal protective equipment (for example, wearing knee pads)

### Step 6. Training

Train workers to use the control measures to make their jobs safer.

### Step 7. Evaluation

Evaluate control measures and the entire program at least once a year to determine their effectiveness at minimizing the risk of MSI.

# Risk factors

**Forceful exertion**

**Repetitive motion**

**Awkward posture**

**Static posture**

**Contact stress**

# 3 General kitchen controls

This part provides information on MSI control measures for your kitchen. It includes the following sections:

- Force
- Repetition
- Awkward postures
- Static postures
- Contact stress

# Force

Good body mechanics can help lessen the muscular force necessary to carry out tasks, which will reduce the risk of MSI.

## Lifting, lowering, and carrying loads

Consider the following general recommendations for lifting, lowering, and carrying loads:

- Before lifting, test the load to determine if it is light enough to lift. Heavy loads should be labelled to indicate to workers the weight of the load.
- Plan your route before lifting and carrying the load.
- Instead of carrying one heavy load, separate it into smaller, lighter packages and make multiple trips, use a cart or trolley, or ask a co-worker for help.
- Purchase items in lighter weight containers. For example, purchase flour in 10-kg bags rather than 20-kg bags.
- Use equipment such as hoists, dollies, or conveyors to do the work whenever possible.
- Put wheels on containers (for example, on garbage cans or flour bins) so you can push rather than carry them. Ensure that the wheels are kept free of grime so they will move easily on the floor.
- Instead of moving containers of liquids, use siphon systems and automatic tipping mechanisms.
- Avoid reaching below mid-thigh height and above shoulder height.
- Place or store heavy items at mid-body height to make retrieval easier.
- Do not lift objects that are slippery, too hot, or unevenly balanced.
- When handling a heavy or unbalanced load, lift from a standing position rather than a sitting position.
- Make sure you can fit through narrow spaces and that your fingers are out of the way when you set the object down.

Consider the following techniques for lifting, lowering, and carrying loads:

- Keep your arms and the load as close to your body as possible.
- Bend with your knees and let your legs and hips do most of the work.
- Do not arch your back.
- Tighten your stomach and trunk muscles and breathe out as you lift.
- Keep your feet shoulder width apart.
- Use small steps when walking with a heavy load.
- Point your toes in the direction you are facing to avoid twisting your back.
- Do not use fast or jerky movements when lifting, especially when lifting heavy objects.

## Pushing and pulling

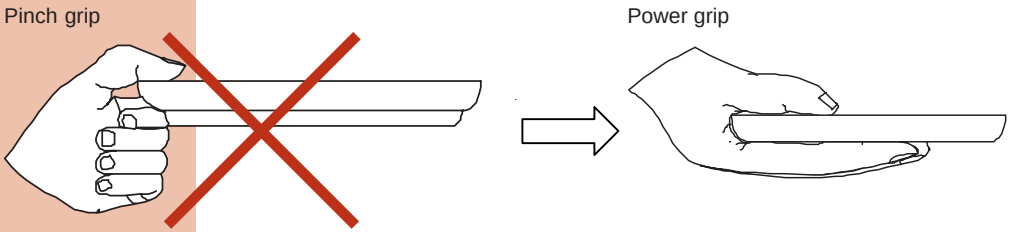
Consider the following recommendations for pushing and pulling:

- Push whenever possible. Pushing is generally safer than pulling.
- Always use two hands when pushing or pulling. Do not pull with one arm extended behind your body.
- Ensure that good visibility is possible without awkward motions such as twisting or stretching. If your vision is blocked when pushing a cart from the back, move to the front corner of the cart to push.
- Ensure that handles are between waist and shoulder height.
- Keep your upper arms against your rib cage with your elbows in. Keep your hands at or slightly above waist level. Keep your feet shoulder width apart.
- Bend your knees slightly and move the load by shifting your weight. For example, with one leg in front of the other, bend your knees and move the load by shifting your weight from your back leg to your front leg.
- Take small steps when turning corners to avoid twisting your back.

## Gripping

Consider the following recommendations for gripping:

- Hold the load with a firm grip and check for slipping.
- Use power grips rather than pinch grips whenever possible. Grasp objects or utensils with your whole hand, not just your fingertips.




- Use tools and other hand implements that are designed to be operated with the whole hand, not just one finger and thumb (for example, an ice cream scoop with a power grip release).
- When purchasing knives, serving spoons, whisks, and other utensils, avoid those that have straight or sharp-edged handles. These can be painful or uncomfortable to grip. Instead purchase rounded, soft-handled utensils.
- If you need gloves, make sure they fit well. They should not be loose or bunch up and should offer some surface friction to improve grip.
- Hang or suspend frequently used items (for example, ladles, whisks, or the sprayer in the dishwasher area).
- Use lightweight utensils whenever possible.

# Repetition

Minimizing repetitive motions will help reduce the risk of MSI. Consider the following recommendations:

- Use mechanical or automated devices (for example, food processors, potato peeling machines, and electric mixers) to assist with highly repetitive tasks.
- Alternate working positions to avoid overusing any single muscle or group of muscles. For example, periodically move to the opposite side of the tray line.
- Try to combine or eliminate tasks. For example, combine scraping and sorting to reduce the number of times dishes are handled.
- Alternate hands to perform tasks.
- Pace yourself when performing repetitive tasks.

Other prevention methods include job rotation, stretching, rest breaks, and micro-pauses.

## Job rotation

In kitchens the same body parts are used for many tasks. Rotating workers through different tasks or duties helps vary postures, reduce exposure to stressful tasks, and prevent boredom. Consider the following job rotation recommendations:

- Vary different tasks such as meal preparation, meal delivery, dishwashing, and cleanup throughout the day.
- When planning menus, try varying food preparation and serving activities. For example, do not plan a meal where every food item must be stirred by hand for long periods. Instead, vary serving activities to include a scoop, tongs, and flipper.
- Alternate between standing and sitting-standing positions (using sit-stand stools), where it is safe to do so.

## Stretching

Stretching circulates blood through the muscles, relieves muscle tension, develops flexibility, and increases body awareness. You should stretch not only when you feel discomfort, but also on a regular basis throughout the day. It is preferable to stretch before you start to feel any muscle tension or discomfort (especially when holding a static posture). For a stretching routine, see Appendix V or look for the OHSAH stretching poster, which may be displayed in your kitchen.

Consider the following stretching recommendations:

- To make stretching easier, warm up first by slowly swinging your arms and moving your legs for about 20–30 seconds.
- Stretch for a few minutes before starting work to prepare your muscles for the task at hand.
- Hold each stretch for 20–30 seconds without bouncing.
- Stretch muscles that are being used for a particular job or task.
- Only stretch as far as is comfortable.
- If you feel pain, stop the stretch. If the pain persists, consult with your facility's first aid attendant or your doctor.

## Rest breaks and micro-pauses

Take rest or pause breaks to prevent fatigue and to give your muscles a chance to recover. Take frequent micro-pauses of 10–15 seconds. During micro-pauses, change your posture and stretch briefly. A micro-pause stretch is shorter in duration than a normal stretch but is still beneficial. Take rest or pause breaks when you feel fatigued or your muscles are sore.

# Awkward postures

Good body mechanics can help minimize awkward postures, which will reduce the risk of MSI. Consider the following recommendations to minimize awkward postures:

- Move your body closer to the object or move the object closer to you. Do not extend your reach beyond the point of comfort.
- Store items between knee and shoulder height whenever possible.
- Face the object you are working with at all times. Point your toes in the direction you are facing to avoid twisting your back. For example, if an object is behind you, do not twist and reach behind your body to grab or move the object. Instead, shift your feet to face the object.
- Keep your elbows as close to your body as possible.
- If the work area is too high, lower the work area or stand on a platform, footstool, or ladder (as long as it does not create a tripping or falling hazard). For more information, see "Footstools" on page 25.
- Sit on a stool or chair rather than squatting, kneeling or bending over while you work.
- Use tools and other hand implements that are designed to keep your wrists straight (for example, grill flippers with bent, raised handles).

## Workstation characteristics

The height of working surfaces and the locations of items on and around them can affect posture.

### Height of working surfaces

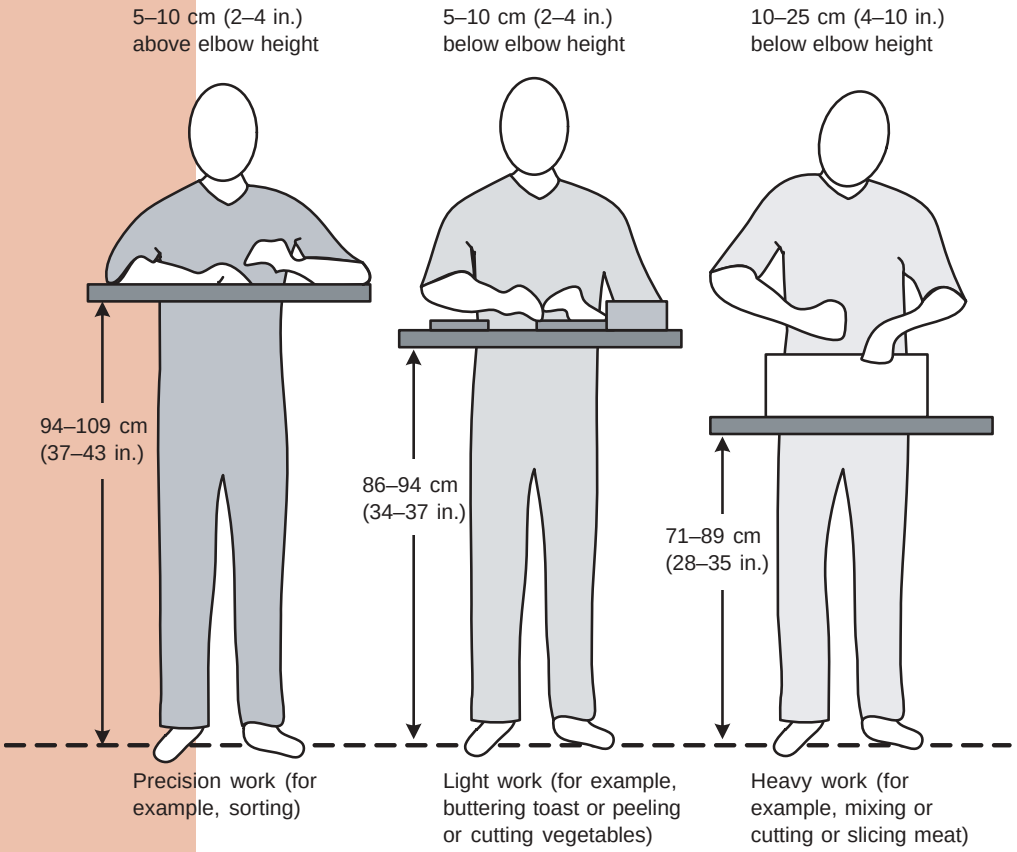
Working surfaces that are too high lead to awkward shoulder postures. Working surfaces that are too low (below waist height) lead to awkward back postures. The counter height should be a few centimetres below the worker's elbow height (86–94 cm, or 34–37 in., is usually acceptable), unless equipment such as a meat cutter is on the counter. If such equipment is used, the counter height needs to be lower to

compensate for the height of the equipment. If there is a wide range in the height of your workers, provide two or more workstations of different heights to allow for height variations.

For shorter workers who stand in one spot, consider using a platform to raise them to the appropriate height. Ensure that the platform is stable, wide, and long enough so there is no risk of the workers falling or tripping.

For taller workers, consider placing a raised surface such as a thicker cutting surface on the counter to raise the working height.

*Working heights for specific tasks*



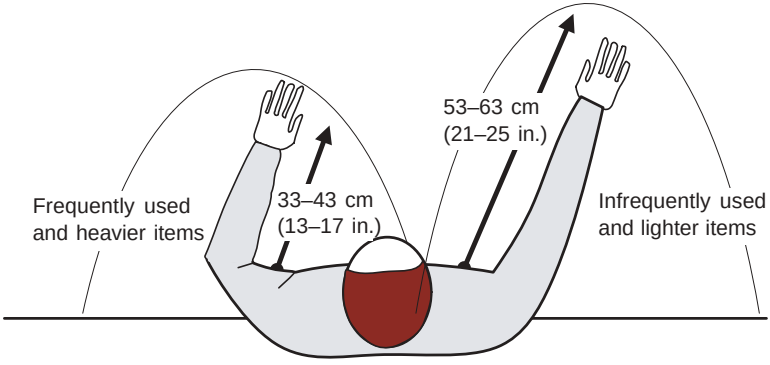
### Shelf heights

Shelf heights should not be higher than the shoulder height of the shortest worker. Provide stepstools for shelves that are higher than shoulder height. If a table or counter is between the workers and the shelf, lower the height of the shelf to prevent awkward or excessive reaching.

### Locations of items

Frequently used items should be placed in the most accessible locations. Place frequently used and heavier items 33–43 cm (13–17 in.) from workers. Place infrequently used and lighter items 53–63 cm (21–25 in.) from workers.

*Recommended reaching distances for workers*




Place frequently used and heavier items on shelves between knee and shoulder height, as close as possible to waist height. Place lighter items on the lowest and highest shelves.

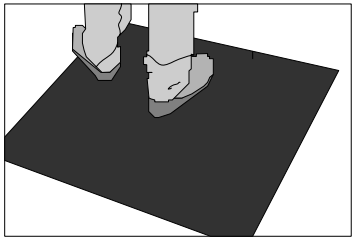
Wherever possible, move obstacles out of the way to minimize awkward postures and reduce the risk of tripping or collisions. Carts, boxes, or trash should not obstruct aisles or block exits.

# Static postures

Reducing the stress associated with static postures can help reduce the risk of MSI. Prevention methods described in this section include anti-fatigue matting, footstools, sit-stand stools, and footwear. Other prevention methods for static posture include task rotation, stretching, rest breaks, and micro-pauses. For more information, see "Repetition," on pages 19–20.

## Anti-fatigue matting

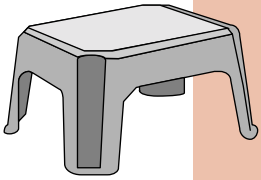
Anti-fatigue matting provides a softer surface to stand on, reducing the fatigue associated with standing for long periods. Place anti-fatigue matting in areas such as tray line stations. Use non-slip surfaces on anti-fatigue matting to prevent slipping on kitchen floors. Matting should always be kept dry and clean to maintain its cushioning properties.



When purchasing anti-fatigue matting, consider where it will be used. Solid matting is good for locations where water drainage is not an issue. Meshed matting allows for water drainage. A disadvantage of meshed matting is that food particles may get caught in the mesh and it may require cleaning more frequently. If the matting requires frequent cleaning, consider using smaller sections of matting with interlocking pieces to allow for ease of transport. (If your dishwashing machine is large enough, you may be able to pass the matting through for cleaning.) Purchase anti-fatigue matting with bevelled edges to allow carts to roll over the edges easily and to minimize tripping hazards.

## Footstools

Footstools or footrails allow workers to raise one foot up, which helps shift body weight and reduce stress on the low back and legs when standing for long periods. From time to time, workers should switch feet on the stool or rail. Footstools should be stored out of the way when they are not in use so they do not create a tripping hazard.



## Sit-stand stools

Consider using sit-stand stools so workers can alternate easily between sitting and standing positions. Sit-stand stools are most appropriate when the worker does not have to move around much, is not handling anything heavy, and does not have to reach far. If suitable, use sit-stand stools to reduce stress on the low backs and legs of workers who stand for long periods.

## Footwear

Footwear should provide enough cushioning to relieve stress on the back and legs. Footwear should fit properly and have anti-slip soles. When deciding on footwear for kitchen work, ask the following questions:

- Does the footwear provide enough grip?
- What type of flooring is in the kitchen?
- Is the footwear durable?
- Is there adequate ankle protection?
- What is the range of temperatures in the kitchen?
- What types of foot protection are needed (for example, puncture, moisture, fatigue, or burn protection)?

**OSHTip:**

Adjust workstations so there is enough space to change working positions.

**OSHTip:**

For more information on footwear, see OHSAH's brochure *What Makes Good Footwear for Work?*

### Tips for buying footwear

Consider these guidelines when buying footwear:

- Buy footwear late in the afternoon when your feet are swollen and at their maximum size.
- Bring along an old pair of work shoes to compare with.
- If you wear orthotics, bring them along and try them on with the shoes.
- If your feet are different sizes, buy shoes to fit the larger foot.
- Shoes should fit snugly without being too tight. There should be about 1.5 cm (½ in.) of room between your big toe and the end of the shoe.

### Wear and tear

The frequency with which footwear needs to be replaced depends on how fast wear and tear occurs. The slip resistance of the outsoles may start to decline after the shoes are worn for the first time. Over time, the outsoles will deteriorate and the midsoles will break down and lose their cushioning capabilities.

# Contact stress

Consider the following recommendations to minimize contact stress:

- Add padding to sharp edges or metal edges (for example, on knife handles, scissors, carts, and bins) to reduce contact stress on your hands.
- Avoid leaning against sharp edges or metal edges.
- Bevel or round off sharp edges on tables, ledges, and shelves.
- Use personal protective equipment such as knee pads.

# Controls for meal preparation 4

Meal preparation includes preparation of food items for cooking or baking (for example, chopping and cutting vegetables, making dough, and preparing meats). This part includes the following sections:

- Chopping and cutting
- Buttering bread and toast
- Puréeing meals
- Using mixers and mixing bowls
- Using ovens and steamers
- Preparing soup

# Chopping and cutting

Workers often report stress on their hands, wrists, and shoulders as a result of chopping or cutting food.

## Risk factors

- repetitive motions of hands, wrists, and shoulders
- awkward wrist postures
- forceful gripping
- cuts or lacerations

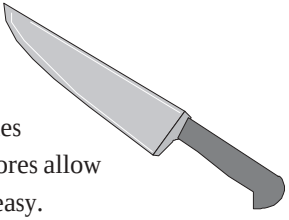
## Controls

### Knife handles

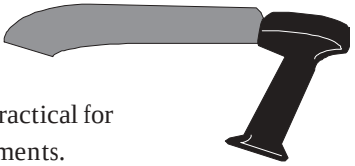
**OSHTip:**

Handles with rounded edges and larger diameters promote power grips rather than pinch grips.

Provide knives with various handle sizes for larger and smaller hands. Handles with larger centres and slimmer ends make gripping more comfortable while chopping or cutting. Handles with soft rubber-like surfaces and hard inner cores allow an optimal grip if the knife handle is wet or greasy.



Ergonomic knives with angled handles help keep the wrists in a neutral posture for specific cutting tasks. However, such knives may be impractical for cutting tasks that require irregular movements.



### Knife blades

Shorter blades increase the force applied. Longer blades, on the other hand, increase the speed of the cutting action. Ensure that workers have appropriate knives to choose from and that they use the appropriate knife for the task. The steel in the blade should be easy to sharpen and should be regularly maintained to ensure that cutting takes minimal force and repetition.

### Meat slicing machines

Meat slicing machines can eliminate the need to manually cut meats. Ensure that machines are placed at the correct height to minimize awkward postures of the wrists and shoulders. Also ensure that workers follow appropriate meat slicing safety procedures, including using guards and proper cleaning techniques.

### Vegetable chopping machines

Purchase a chopping machine that can be used with vegetables so workers do not have to chop manually. The chopping machine can be used to cut hard items such as carrots, potatoes, onions, and lettuce.

### Pre-chopped vegetables

To minimize the amount of chopping, order pre-chopped vegetables from the food distributor. This will not only decrease the amount of chopping required in the kitchen, but will also save time during meal preparation.

# Buttering bread and toast

Bread and toast buttering can be a repetitive task when large quantities are involved (for example, on sandwich days). Typically, workers use large kitchen knives to spread butter with forward and backward wrist motions.

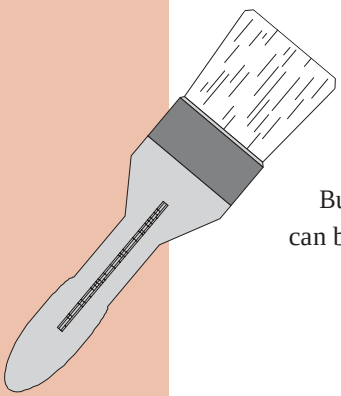
## Risk factor

- repetitive wrist motions

## Controls

### Whipped butter

Whip butter before using it to reduce the force required for buttering. Whipped butter is softer and easier to spread. Mixers or blenders make whipping quick and easy.



### Pastry brushes

Melt butter and apply it with a pastry brush.

### Buttering machines

Buttering machines that automatically feed and butter bread can be used for large quantities.

# Puréeing meals

Food is often puréed for patients or residents who are unable to eat solid foods. Cooks use a machine to purée cooked food items (for example, turkey, soup, or mashed potatoes). Often the purée bowl is heavy and workers use static, awkward postures of the shoulders and wrists, holding the bowl with one hand while using the other hand to scoop out food. A high counter can compound these risk factors.

## Risk factors

- static, awkward shoulder and wrist postures
- forceful lifting of purée bowls

## Controls

### Purée smaller amounts

Purée less food per bowl to decrease the weight of the bowl and the amount of force required to lift it.

### Use blenders

In smaller facilities, use a blender to purée food. Blenders are lighter and easier to handle than purée machines.

### Use support stands

Use a support stand, countertop, or wooden block with a non-slip surface to rest the purée or blender bowl on its side while pouring out its contents. This will reduce awkward shoulder and elbow postures and minimize the force required to hold the bowl.

### Order pre-puréed food

Where possible, order pre-puréed food from the food distributor. This can minimize or even eliminate the need to purée foods manually.

# Using mixers and mixing bowls

Large mixers and mixing bowls are used for mixing a variety of food items. If mixers are positioned on the floor, workers may have to use awkward back postures to place or remove mixing bowls.

## Risk factors

- awkward bending and twisting of the back
- forceful lifting and carrying of heavy mixing bowls

## Controls

### Adjust the mixer height

Ensure that the mixer is placed at a height that allows access to the mixing bowl handles between knuckle and elbow height. This will reduce awkward bending at the waist. If the mixer is on a raised platform, ensure that the platform is strong enough to handle the weight of the mixer. Larger mixers tend to vibrate excessively — the platform will need to be fixed to the floor and the mixer will need to be fixed to the platform to prevent it from falling off.

### Use dollies

Use dollies designed for mixing bowls to transport heavy bowls from the mixer to other areas of the kitchen. Dollies should have handles for pushing and be high enough so workers do not have to bend over excessively to reach the mixing bowl. Two workers should lift and lower the bowl, one on each side holding the handles.

# Using ovens and steamers

Many food items are cooked in ovens or steamers. Ovens and steamers may present risks to workers because of the height of the equipment and shelves inside.

## Risk factors

- awkward bending and twisting of the back
- awkward reaching
- forceful lifting and carrying of hot items

## Controls

### Use side-hinged oven doors

Use ovens with side-hinged doors rather than the bottom-hinged doors that are found in most home ovens. Side-hinged doors allow easier access to items in the oven.

### Use middle racks

Wherever possible, use oven racks between waist and elbow height to minimize awkward postures.

### Drill drainage holes in trays

When cooking food on trays, especially in steamers or convection ovens, hot water collects inside the trays and makes them heavy. Drill a small hole in the bottom of each tray to allow water to drain. This will make it easier to lift trays out of ovens or steamers.

### Decrease cooking quantities

Cook meals in smaller quantities and containers to decrease the weight of the food. For example, cut large roasts in half and cook them in two pans.

# Preparing soup

Preparing soup and stew involves stirring, lifting, and carrying large, heavy pots.

## Risk factors

- awkward forward bending of the back when stirring, reaching, and tipping soup kettles
- repetitive wrist and arm motions when stirring soup
- forceful lifting and carrying of pots

**OSHTip:**

Soup kettles are often positioned in troughs to allow for liquid drainage. These troughs often extend outward, increasing the reaching distance for workers to stir soup and grab kettle handles. When purchasing new soup kettles, look for systems that minimize trough size to minimize awkward shoulder reaches.

## Controls

### Extended handles

Soup kettles with extended handles make it easier to tip the kettle when pouring soup into smaller containers and also help keep the back more upright. Your maintenance department may be able to add handles to existing kettles so you do not have to purchase new kettles.

### Whisks

To reduce the force required to stir soups, use whisks rather than large spoons or paddles. Use long-handled whisks for two-handed stirring and short-handled whisks for one-handed stirring.

# 5 Controls for meal service

This part includes the following sections:

- General cafeteria controls
- Portioning food
- Dispensing beverages
- Tray lines
- Installing an automated tray line
- Using carts

# General cafeteria controls

Cafeteria service is a common feature of many healthcare kitchens. Kitchen design varies considerably, but following general principles can reduce the risk of injury for workers.

Self-service cafeterias decrease worker congestion and reduce workloads. Consider the following guidelines:

- Place cold drinks in refrigerators where residents or customers can access them.
- Provide self-service salad bars or soup stations instead of having workers serve portions.
- Provide self-service baskets for bagels, doughnuts, and breads.
- Have residents or customers select pre-cooked breakfast items such as bacon, sausages, hard-boiled eggs, and toast. This reduces the short-order cook's work.
- Have customers self-serve vegetables and condiments for freshly made sandwiches.
- Use precooked foods (for example, precooked hamburger patties) to reduce cooking times and help prevent long lineups.
- Implement a system that encourages residents or customers to sort dirty dishes into different bins when leaving the cafeteria. This helps eliminate a step for workers in the dish room.
- Use wheeled carts wherever possible to reduce the need for workers to carry bins loaded with dishes.

# Portioning food

Many tray line positions require food or soup to be scooped onto dishes or into bowls, usually with ice cream scoops. Portioning often requires repetitive, sometimes forceful hand and forearm motions, especially when many meals must be served.

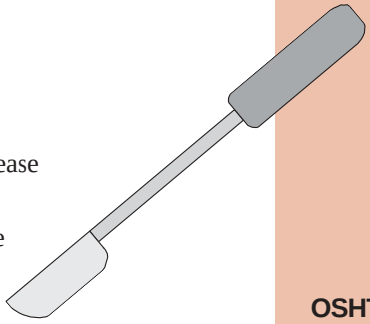
## Risk factors

- repetitive rotating of forearms when scooping food
- repetitive, awkward wrist postures
- repetitive pinch grips when using ice cream scoops

## Controls

### Spoodles

Spoodles are shallower, wider ladles that help decrease forearm rotation. Portion sizes are labelled on the handles, which helps workers select the appropriate spoodle and avoid scooping more than once.



### Utensil handles

Handles with soft rubber-like surfaces and hard inner cores allow an optimal grip if the handle is wet or greasy. Handles with rounded edges and larger diameters promote power grips rather than pinch grips.

### Power grip releases

Food portioning utensils with power grip releases use the whole hand, not just one finger and thumb. This helps reduce the grip force required and alleviates thumb stress.

### Serving without utensils

Workers can serve some food items without utensils by using non-latex gloves and serving with their hands. Foods such as baked potatoes can be served using a gloved hand.

**OSHTip:**

If possible, adjust the consistency and temperature of food items for ease of handling (for example, thaw ice cream slightly before scooping).

# Dispensing beverages

Various beverages are served with each meal, including coffee, tea, juice, milk, and liquid medicine.

## Risk factors

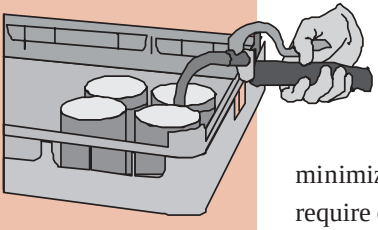
- repetitive, awkward shoulder postures
- awkward wrist postures
- forceful wrist exertions when pouring from large pitchers

## Controls

### Industrial coffee dispensers

Industrial coffee dispensers help eliminate the awkward shoulder posture (raising the arm out to the side) used to pour coffee. Consider the following guidelines:

- Position the dispenser on a counter with enough space between the nozzle and the counter to accommodate a tray of mugs.
- Limit the tray size to avoid workers carrying heavy trays of full mugs.
- Use self-serve coffee dispensers so residents or customers can get their own coffee.



### Hand-held beverage dispensers

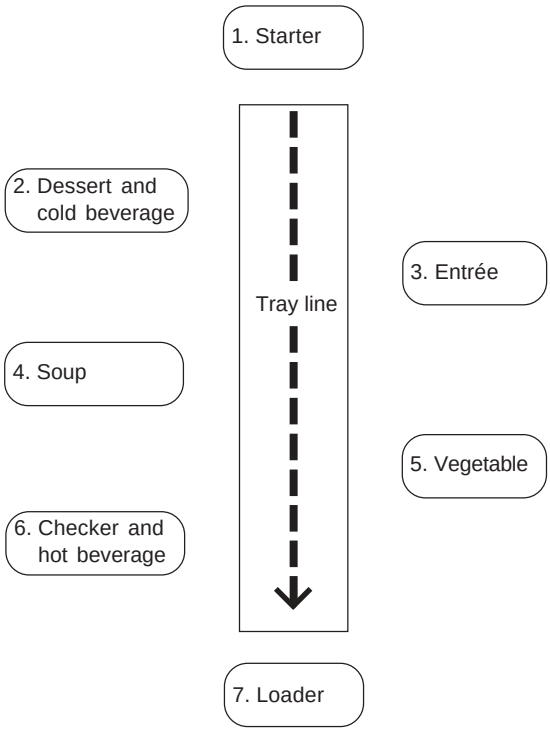
Hand-held beverage dispensers help reduce awkward shoulder postures and help increase the speed of the task, allowing time for other tasks. Ensure that the height of the working surface minimizes awkward shoulder postures and that the handle does not require excess force to squeeze.

Concentrate or syrup boxes for juice dispensers are often heavy and workers need to carry them to replace empty boxes. Ask suppliers to provide half-size boxes to minimize the weight.

# Tray lines

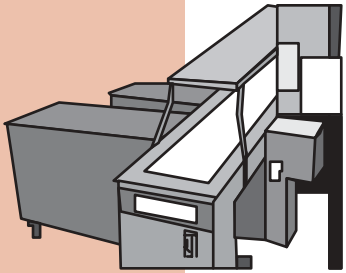
Tray lines are used to prepare individual meals at breakfast, lunch, and dinner. Tray lines typically consist of manual or automated lines with several workers located at different stations, including: starter, dessert, vegetable, entrée, soup, hot and cold beverage, checker, and loader. Some of these stations may be combined or eliminated, depending on the meal being served, the number of trays being prepared, and the size of the kitchen.

*Tray line stations — example*




## Manual versus automated tray lines

Tray lines are either manual or automated. Manual tray lines require workers to manually push trays along the tray line surface, which may or may not have rollers. Manual tray lines are typically used in smaller facilities serving a limited number of patients or residents.



Automated tray lines consist of power rollers or a conveyor belt that automatically moves trays from one end to the other. Automated tray lines are typically used in larger facilities serving a greater number of patients or residents. For information on automated tray line installation, see "Installing an automated tray line," on pages 46–47.

## Risk factors

- repetitive motions of the shoulders, elbows, and wrists to transfer food and condiment items from racks and shelves to food trays
- awkward postures of the neck, shoulders, low back, and wrists to reach items and use serving tools
- repetitive pinch grips

The risk factors associated with tray line tasks depend on the:

- number of trays prepared
- rate of preparation
- positions of stations and food to be loaded onto the trays
- utensils

## Controls

### Prepare stations before starting the tray line

Ensure that workers spend enough time preparing stations so they do not have to rush once the tray line starts moving.

### Position meal carts strategically

Meal carts are placed around the tray line and workers transfer food from the carts to the trays. Position the carts to ensure efficient transfers and minimize awkward body postures. Carts positioned behind workers will cause them to use repetitive, awkward reaches every time a food item is grasped. Position meal carts to minimize awkward reaches as much as possible. Workers should avoid using shelves above shoulder height or below knee height. Follow the guidelines for working table heights and locations of items (see "Workstation characteristics," on pages 21–23).

### Load full trays onto meal carts safely

Place meal carts a short distance from the tray line so workers have to take at least one step to place trays on the meal carts. This will help prevent workers from twisting their backs excessively.

Workers often have to do a lot of bending to place trays on lower shelves. Ensure that workers follow basic body mechanics guidelines for reducing forceful exertions (see "Force," on pages 16–18). If possible, they should avoid using shelves that are below knee height or above shoulder height on carts to avoid awkward back and shoulder postures.

### Make items easily accessible at the starter position

Condiment shelves should be easily accessible to minimize awkward reaches. Use lowerators to store empty trays and dishes. Lowerators use springs to force trays and dishes up to waist level. This eliminates the need for awkward bending.

### Check items visually

Workers should visually inspect items instead of grasping each item for verification. Repeated grasping of items can lead to highly repetitive movements and increased risk of injury. Predetermined locations for each tray item will help encourage visual inspection.

### Increase the font size on menu cards

Increase the font size to at least 12 points on menu cards and place the cards as close as possible to workers to reduce eye fatigue and minimize the mental demands of the tray line. Pick fonts that are easier to read and use good colour contrasts. For example, use a black font on a white or yellow background instead of a black font on a dark background.

Consider using a colour code for special diets, special orders, or specific individuals. Remember to use colours that are easily visible such as black, dark blue, or dark red. Avoid colours that are difficult to read such as yellow or light blue.

### Use appropriate utensils

Wherever possible, use straight serving spoons (not ladles) to reduce awkward wrist postures. Use longer-handled utensils for food in deeper bins.

### Use anti-fatigue matting

Place anti-fatigue matting with bevelled edges at each of the tray line positions. This will help alleviate some of the stress associated with standing in one position for extended periods.

### Use footstools or footrails

Use footstools or footrails to shift body weight and reduce stress on the low back and legs of workers who are standing for long periods. Workers should periodically alternate the foot they have on the stool or rail.

### Provide protective arm clothing

For positions that serve hot food, consider protective arm clothing to protect against burns from hot metal surfaces.

### Use good body mechanics

Workers should push trays along the counter rather than lifting or pulling when passing them to the next station. Follow the guidelines for proper body mechanics (see “Force,” on pages 16–18).

### Use power grips rather than pinch grips

Workers should use power grips rather than pinch grips (see the illustrations on page 18) and should grasp at the midpoint of the tray rather than at its front edge. When pulling the tray off the tray line, workers should slide the tray toward their bodies so they can grasp it in the middle. This will help reduce the strain on fingers and wrists.

### Rotate workers and carts

Rotate workers through as many positions as possible to allow for variations in hand use and postures. Occasionally move meal carts to the other side of the tray line to allow workers to use the opposite side of their bodies when loading. This will help reduce the strain on any one area of the body.

### Stretch regularly

Implement a three-minute stretching routine immediately before and after tray line activities. Workers can stretch together as a group. If the tray line stops for any reason (for example, for product replenishment or correction of a mistake) workers should take advantage of this opportunity to take a stretch break. For a stretching routine, see Appendix V or look for the OHSAH stretching poster, which may be displayed in your kitchen.

### Use non-powered rollers (manual tray lines only)

Non-powered rollers reduce the amount of force required to move trays between stations and do not pressure workers to keep up with the speed of an automated tray line.

### Determine an optimal tray line speed (automated tray lines only)

The speed of the tray line can greatly affect kitchen workers. Speeds that are too fast often increase the risk of injury and mistakes because workers do not have enough time to rest or use proper body mechanics. On the other hand, slow tray lines can cause stress if the workers are behind on other tasks and need to work faster. Determine a tray line speed that will give workers enough time to place items from their stations onto trays and keep them on schedule. After determining the speed, mark lines on the conveyor belt that indicate the frequency of tray line placement on the belt.

**OSHTip:**

Slowing down a fast tray line by even 1–2 seconds per tray will help relieve worker stress and reduce errors without significantly increasing the total tray line time.

# Installing an automated tray line

The needs and requirements of the facility should be considered carefully before installing an automated tray line.

## General guidelines

- Include workers in the planning process.
- Carefully consider the positioning of every item around the tray line. One of the key risk factors of automated tray lines is repetitive motion.
- Implement a job rotation schedule immediately upon installing the tray line so workers will become accustomed to it.

## Available space

Facilities that serve more patients or residents generally require a longer tray line. Consider the distance between stations and the time needed to place items on the tray line at each station. For example, hot food stations may require extra portioning time. If a long, straight space is difficult or not possible, consider a circular or U-shaped tray line.

Consider how the station equipment will fit around the tray line. Ideally, both sides of the tray line should be used for stations. Stations that require several carts will need room to place the carts around the worker so awkward postures are minimized.

## Tray line maintenance

Automated tray lines require maintenance of electrical and mechanical components such as ball bearings, gears, motors, and belts. Belts and stainless steel frames also require frequent cleaning. Some automated tray lines include belt scrapers and crumb catchers.

## Tray line features

Consider the following features when selecting a tray line:

- height of the tray line
- length of the tray line
- distance to reach across the work surface
- speed of the conveyor belt (speed controller and range of variability)
- tray stop sensor
- portability of the tray line (for example, wheels, castors, and brakes)
- electrical requirements
- technical support (for example, for electrical power and outlets)
- ease of cleaning
- hot and cold food receptacles
- shelving above and below the tray line
- number of trays that need to be prepared
- number of workers operating the tray line

# Using carts

Workers use carts to hold and transport various items, including food, dishes, pots, and garbage. In facilities that do not use tray lines, workers typically serve meals from steam carts. Workers place food in metal bins to keep it warm in the steam cart. Steam carts are often pushed to the wards where the food is served.

## Risk factors

- awkward postures to place or remove food container bins
- forceful pushing of carts

## Controls

### Do not overload carts

Overloading carts can increase the pushing force required, hinder manoeuvrability, and increase the risk of tipping or spilling accidents. Load a reasonable amount of material and make a second trip if necessary.

### Keep cart heights below field of vision

Ensure that carts and their loads are low enough to allow a full field of vision when moving the cart. The top of the load should be between waist and shoulder height of the shortest worker. Also, avoid storing items above shoulder height or below knee height to prevent excessive reaching and awkward postures.

### Use good body mechanics

- Push carts rather than pulling them.
- Bend your knees.
- Stagger your feet, one foot forward and one back.
- Use your legs to push rather than your back.

### Add handles to carts

Add handles to all carts to allow workers to push with their hands between waist and shoulder height. Vertical handles are usually better than horizontal handles. Vertical handles allow workers to adjust the height of their hands and maintain their forearms in a neutral posture. A disadvantage of vertical handles is that they only allow for a fixed shoulder width. No matter which type of handles you use, they should be padded with a rubber-like surface to reduce contact stress and improve gripping ability.

### Add handles to metal food inserts (on steam carts)

Provide handles on the top edges of metal food inserts to make lifting easier and to ensure that workers can get a good grip. When there are no handles, workers can use a spatula or spoon to pry one side of the metal food insert out of the trough and make it easier to pick up.

### Use larger wheel diameters

Larger wheel diameters generally make it easier to push carts and can improve the stability of carts on rough ground.

### Inspect carts regularly

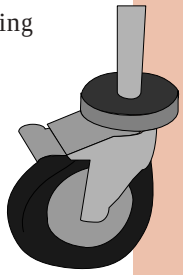
Conduct regular cart inspections to ensure that they are in good working order and suitable for the tasks for which they are intended. Inspections may include examining the handles, wheels, and castors for cracks and proper rotation.

### Maintain wheels and castors

Maintenance includes cleaning and lubricating wheels and castors regularly. Wheels and castors can get dirty and start to stick, making pushing and steering difficult.

Castors can have two types of bearings:

- Sealed precision ball bearings roll easily and require little maintenance.
- Roller bearings are common but require regular lubricating.



**OSHTip:**

Tag equipment that does not work "Out of service" and report it immediately to your supervisor or maintenance person. Such equipment should be repaired before being used again.

Harder or softer wheels are available:

- Harder materials (for example, nylon) roll easily on hard, smooth surfaces but are more difficult to roll over floor cracks or elevator gaps.
- Softer wheels (for example, rubber or polyurethane) roll more easily on rough surfaces but are harder to push on hard, smooth surfaces.

### Use appropriate castor configurations

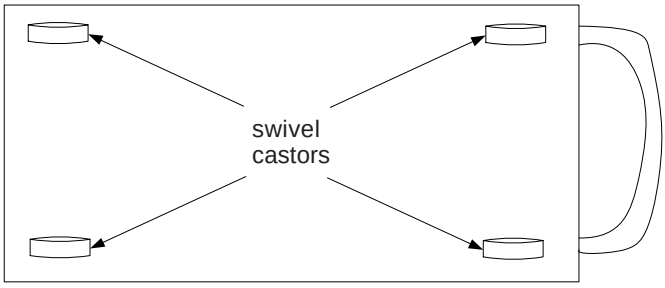
Carts can be difficult to steer through hallways and around obstacles. Choose the best castor arrangement for your situation.

*Busy or small spaces — Use four swivel castors*

Swivel castors provide the most steering freedom and are best in busy or small spaces. Carts with four swivel castors, however, are not very good for long distances. They are more difficult to keep moving in a straight line and tend to swivel off in one direction if not held steady.

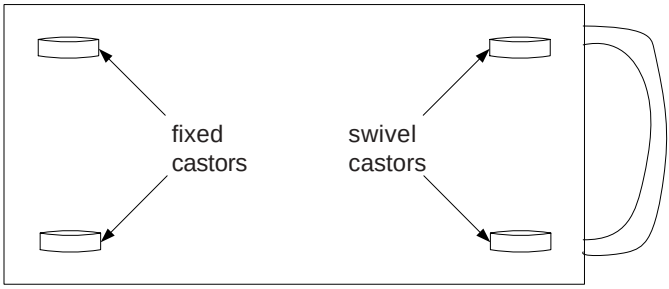
**OSHTip:**

If possible, fit carts with three swivel castors and one lockable directional castor. Lock the directional castor for long-distance pushing and unlock it in tighter areas. Purchase castors that are locked by foot rather than by hand.




*Long-distance pushing — Use two fixed castors and two swivel castors*

A configuration of two fixed castors and two swivel castors is best for long distances because workers can push from behind and steer easily. However, these carts are not as easy to steer in busy or small spaces.



# Controls for cleanup and storage

# 6

This part includes the following sections:

- Scraping dishes
- Soaking and pre-rinsing dishes and pots
- Sorting and loading dishes
- Washing pots
- Storing dishes and pots
- Busing
- General cleanup
- Washing dish lines and carts
- Removing waste
- Storing food and dishes
- Environmental hazards

# Scraping dishes

Typically, workers remove dishes from meal carts and scrape them in a dish room. Scraping dishes requires highly repetitive motions. Depending on the volume of dishes, one or more workers may be scraping dishes. The number of workers affects the arrangement of tray unloading and dish scraping.

## Risk factors

- forceful lifting of dishes and cutlery buckets
- repetitive twisting and bending of the back when retrieving trays from meal carts
- repetitive, awkward reaching
- repetitive pinch grips when grasping dishes
- slippery floors

Many of the risk factors associated with the dish line depend on the type of dishes the kitchen uses.

## Controls

### Use power grips rather than pinch grips

Use power grips rather than pinch grips (see the illustrations on page 18) and grasp at the midpoint of the tray rather than at its front edge.

### Use good body mechanics

- Bend your knees to reach for low trays, dish racks, or dish bins.
- When lifting and carrying trays, dish racks, or dish bins, keep them as close to your body as possible.
- Avoid using meal cart shelves that are below knee height or above shoulder height when you are reaching for dirty dishes. This will prevent awkward postures of the back and shoulders.

**OSHTip:**

Use plastic rather than ceramic or metal dishes to reduce forceful exertions.

- Avoid stacking full trays or dish racks on top of each other to carry.
- Limit the number of utensils in the cutlery bucket. Fill the bucket only halfway or use a smaller bucket.
- Use two hands to carry each tray.
- Follow the guidelines in "Lifting, lowering, and carrying loads," on pages 16–17.

### Garbage disposals

Garbage disposals help reduce the amount of waste in waste bins, which reduces the amount of waste that workers have to manually lift and carry.

### Scraping and sorting machines

Scraping and sorting machines use high-speed water flow to increase scraping speed and reduce the repetitive motions that manual scraping requires. Rinsing can be combined with scraping to decrease the number of times workers handle the dishes.

### Slippery floors

- Clean up spills immediately.
- Wear slip-resistant footwear.
- Use signage to indicate that floors may be wet and slippery.

# Soaking and pre-rinsing dishes and pots

Before loading dishes into dishwashing machines and washing pots, items should be soaked and pre-rinsed to remove as much food as possible.

## Risk factors

- forceful exertion and awkward bending at the waist when lifting items from soak sinks
- awkward postures when pre-rinsing

## Controls

### Soaking

- Use false bottoms in deep sinks to reduce awkward bending at the waist.
- Do not place full dish racks into soak sinks because lifting or lowering racks into sinks may strain the low back or shoulders.
- Do not remove items that have any amount of water in them from soak sinks because the water will increase their weight substantially.

### Pre-rinsing

- Lower rinse nozzles to waist level to reduce your reach and use a power grip rather than a pinch grip (see the illustrations on page 18).
- When rinsing dishes, spray directly in front of your body to prevent awkward shoulder postures.

# Sorting and loading dishes

Many different systems are available for loading dishwashing machines. Generally, workers load dishes into racks and either push the racks along counters or send them along rollers to the dishwashing machine. A common problem is that the shelves are too high, causing workers to reach excessively to place items in dish racks (see the illustration, at right).

## Risk factors

- repetitive, awkward reaching
- repetitive pinch grips when grasping dishes
- awkward, static back and neck postures
- forceful pushing of full dish racks

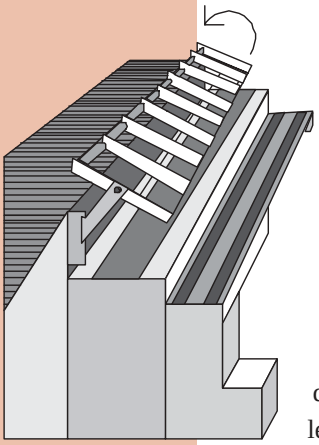
## Controls

### Rollers or conveyors

Rollers or conveyors can significantly reduce or eliminate the force required to push dish racks toward the dishwashing machine. For example, gravity assisted rollers, which are higher at one end than the other, use the effects of gravity to move dish racks along the rollers toward the dishwashing machine.

### Trough conveyor systems

A trough conveyor system consists of a set of belts or rollers positioned directly over a trough with a space in the middle for scraping dishes and a conveyor directly behind the trough. The belts or rollers allow several workers to move dish racks along the trough so they can sort different items into the racks without having to change positions along the trough. Once the dish racks are full, workers can push them onto the conveyor with minimal effort and reach.



### Cantilever shelves

A cantilever shelf is an upper shelf that rotates around a pivot point so workers can push dish racks onto an upper set of rollers using minimal force. When installing a cantilever shelf, ensure that the height and depth of the shelf will not cause workers to use awkward reaches. The highest point of the shelf should not be higher than shoulder height for the shortest worker (approximately 120 cm, or 47 in.) and the forward reaching distance to the rear of the shelf should not be greater than arm's length for the shortest worker (approximately 71 cm, or 28 in.).

### Rotate workers

If possible, rotate workers through different sorting and loading positions.

### Limit the amount of dishes in each rack

Load fewer dishes in each dish rack so the racks will require less force to move. To reduce the number of dishes per rack, purchase smaller dish racks or ensure that workers only fill dish racks halfway. Dishwashers that accommodate one large dish rack will also accommodate two half-size dish racks. The smaller racks will be easier to move yet allow for the same amount of dishes to be washed.

**OSHTip:**

Keep the area around the dish line clear of storage carts and other items to help reduce awkward reaching and tripping hazards.

### Pack cutlery loosely

Cutlery can be difficult to clean if it is packed too tightly into cutlery bins. Soak cutlery and pack it loosely to reduce the weight of cutlery bins and avoid having to send it through the dishwashing machine twice.

### Sort dishes strategically

Rack heavier items such as dishes closest to your body to decrease awkward reaching. Sort dishes by type and ward — the more organized the dishes are, the easier it will be to store them later.

### Wear gloves

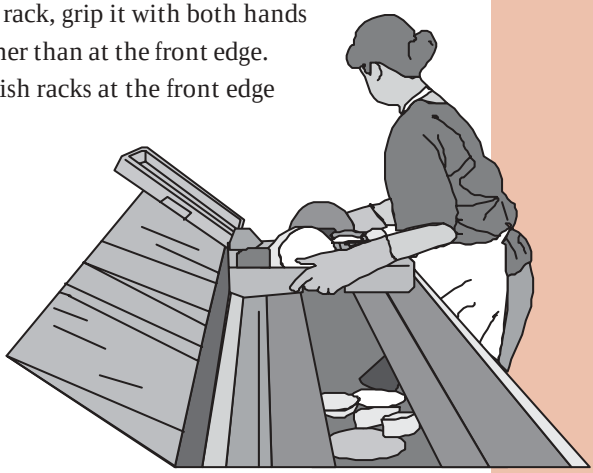
Wear gloves that fit properly and have high-friction palms and fingertips to reduce the gripping force needed to handle greasy dishes.

### Use power grips rather than pinch grips

Use power grips to grasp dishes rather than pinch grips (see the illustrations on page 18).

### Grip full dish racks at the midpoint

If you need to move a full dish rack, grip it with both hands at the midpoint of the rack rather than at the front edge. Gripping full or partially full dish racks at the front edge can stress wrist joints.



**OSHTip:**

Avoid carrying full dish racks. Push them along the counters or rollers toward the dishwashing machine.

# Washing pots

Typically, workers clean pots manually in large sinks. Pots may be heavy and workers usually soak them before washing to loosen baked-on food.

## Risk factors

- repetitive wrist and shoulder motions when scrubbing pots
- repetitive reaching
- awkward back and wrist postures
- contact stress on hips when leaning into sink
- forceful arm exertions when scrubbing pots

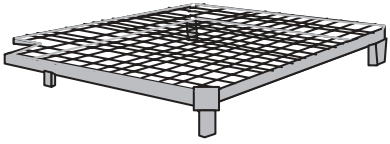
## Controls

### Use pot washing machines

Pot washing machines automate washing and help minimize most of the risk factors associated with washing pots. Pot washing machines use hot water under high pressure to remove food particles stuck to pots and pans. Workers can place most items into the machine without soaking or pre-rinsing. The machine door should be counterweighted to minimize the force needed to open it. Workers should use good body mechanics when loading and unloading pot washing machines (see "Lifting, lowering, and carrying loads," on pages 16–17).

### Install false bottoms or ledges

Install false bottoms or ledges in sinks to raise working heights. This reduces the awkward back postures workers may use to reach into low sinks.



### Use long-handled cleaning brushes

Use long-handled cleaning brushes to prevent awkward reaching into soup kettles and pots.

### Use strong-bristled brushes for scrubbing

Use strong-bristled brushes to remove baked-on food stuck to pots. Strong-bristled brushes help reduce the amount of force required. Replace cleaning tools frequently so they work well.

### Use your arms for support

Rest your free arm on top of the flat surface of the pot to reduce the gripping force.

Place your free hand on the sides of soup kettles to support your upper body and reduce stress on your low back.

### Keep items close to your body

When washing large-diameter pots, move them as close as possible to the front of the sink and rotate them as you are washing to reduce reaching across the pot.

### Wear gloves

Wear gloves that fit properly and have high-friction palms and fingertips to reduce gripping forces. Gloves should be properly insulated to protect skin against hot water.

### Lift and carry pots safely

- Keep pots close to your body when lifting and avoid bending your back.
- Point your toes in the direction you are reaching to avoid twisting your back.
- When moving pots from carts to sinks, slide the pot along the cart until it is as close as possible to your body, then lift it.
- Avoid lifting pots with any amount of water in them.
- Watch for slippery floors when lifting and carrying pots.

### Drink plenty of fluids

Pot washing areas may become hot and humid because of the amount of hot water and steam. Drink plenty of water to prevent muscle cramping and fatigue associated with heat stress.

### Rotate workers

Frequently rotate workers washing pots to reduce their exposure to risk factors associated with the task. Limit continuous pot washing to 30 minutes.

### Use anti-fatigue matting

Use anti-fatigue matting to reduce stress on the legs and low back when standing in one position for extended periods. Matting should include an anti-slip surface.

### Use footrails

Use footrails to shift body weight and reduce stress on the low back and legs when standing for long periods. From time to time, alternate the foot you have on the rail.

### Wear earplugs

If the pot washing machine is noisy, consider wearing earplugs to reduce noise exposure.

# Storing dishes and pots

Once dishes have been cleaned, workers remove them from dish racks and move them to the appropriate areas. This task may vary in different kitchens depending on the size and number of items that need to be washed for each meal. The more dishes and pots are organized, the less workers need to handle them to complete this task.

## Risk factors

- repetitive, awkward reaching
- forceful lifting of full dish racks

## Controls

### Keep dishes between knee and shoulder height

Avoid storing items below knee height or above shoulder height to decrease awkward postures. Use spring-loaded dish dispensers to keep dishes at a constant height for stacking and later use.

### Use carts

Use carts to transport clean dishes to storage areas rather than carrying full dish racks. This significantly reduces the amount of force required to transport dishes.

### Follow safe lifting guidelines

- Never lift more than one dish rack at a time.
- Use good body mechanics when transporting dish racks or pots manually (see "Lifting, lowering, and carrying loads," on pages 16–17).
- Grip racks at the midpoint rather than the front edge to reduce stress on wrist joints.

**OSHTip:**

Use plastic rather than metal or ceramic dishes to decrease lifting forces (especially when the dishes are stacked).

# Busing

Workers remove dishes and cutlery from tables and move them to the dish room where they are scraped and sorted. Busing can be repetitive and may require forceful exertions when lifting heavy bins as well as awkward postures. Workers also clean tables after removing dishes and cutlery.

## Risk factors

- forceful lifting of dish bins and cutlery buckets
- repetitive twisting and bending of the back
- repetitive, awkward reaching
- repetitive pinch grips when grasping dishes

## Controls

- Avoid filling bins completely — try to fill them only halfway to limit their weight.
- Limit the number of utensils in the cutlery bucket. Fill the bucket only halfway or use a smaller bucket.
- When lifting and carrying trays or dish bins, keep them as close to your body as possible.
- Use power grips rather than pinch grips (see the illustrations on page 18) to grasp dishes, trays, and bins.
- Use two hands to carry trays and bins and grip them at the midpoint rather than the front edge.
- Avoid using transport cart shelves that are below knee height or above shoulder height when placing items on the cart. This will prevent awkward postures of the back and shoulders.
- When cleaning tables, move to the opposite side instead of reaching across.
- Follow the guidelines in “Lifting, lowering, and carrying loads,” on pages 16–17.

### Slippery floors

- Clean up spills immediately.
- Wear slip-resistant footwear.
- Use signs to indicate that floors may be wet and slippery.

# General cleanup

General cleanup tasks include scrubbing kitchen and dish areas and sanitizing. These tasks may involve forceful exertions and awkward postures to access hard-to-reach areas. See page 65 for specific guidelines for washing dish lines and carts.

## Risk factors

- forceful exertion
- awkward shoulder and back postures
- contact stress

## Controls

### Rinse before cleaning

Rinse carts, dish lines, and other areas that need to be cleaned to reduce the time and effort spent scrubbing and washing.

**OSHTip:**

Ask for help if you need it.

### Use appropriate cleaning tools

Use long-handled brushes where reaching is required to minimize awkward postures. Choose cleaning tools that have soft rubber-like handles to reduce gripping forces.

### Use good body mechanics

When cleaning items that are higher than shoulder level, use platforms of adequate size to minimize excessive reaching. Keep both feet flat on the platform at all times.

When cleaning items low to the ground, place one knee on a padded surface and use your opposite hand for support to reduce the amount of contact stress on the knees. Alternatively, sit on a low stool while cleaning low areas. Do not lean forward excessively while seated because this will stress the low back.

# Washing dish lines and carts

Once all the dishes have gone through the dishwashing machine, workers typically use power washers to wash the dish line. Workers often need to reach well above their heads to spray the entire area.

Workers typically wash carts near the dish line, either manually with power washers and brushes or automatically with a cart-washing machine. For manual washing, workers rinse carts first with power washers to remove adhered food particles, then clean them thoroughly with long-handled, bristled brushes.

## Risk factors

- forceful and static gripping to squeeze the trigger
- awkward shoulder postures

## Controls

- Alternate hands if one hand begins to feel tired.
- If necessary, use two hands to reduce the grip force required to depress the power washer trigger.
- Use anti-vibration tape or gloves if the trigger vibrates excessively.
- Use footstools or platforms of adequate size to avoid awkward shoulder postures when reaching high sections of the dish line. Keep both feet flat on the platform at all times.

# Removing waste

## Risk factor

- forceful exertion to lift garbage bags

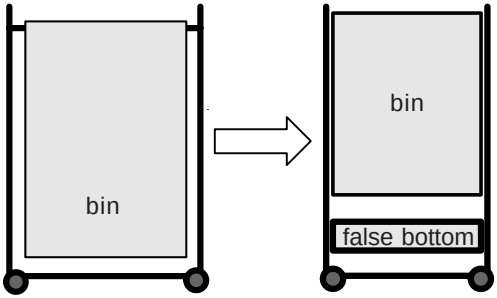
## Controls

### Separate liquid waste

Keep liquid waste out of garbage bags to reduce the weight of the bags. Dispose of liquid waste in the garbage disposal or use specialized containers to separate it from solid waste. You can use old containers such mayonnaise buckets (with handles) for liquid waste.

### Limit bag weight

Use false bottoms in garbage bins to decrease the amount of garbage placed in them or use smaller bags or garbage bins to keep the weight of each bag down.




**OSHTip:**

Implement a policy on overfilling. Post signs near garbage cans to remind workers not to overfill.

### Use garbage carts for transport

Use carts to transport bags of waste to collection bins rather than carrying the bags. Mount garbage bins on wheels for easy transportation.

### Dump garbage from platforms or docking bays

Place a small platform of adequate size by large bins to make lifting garbage bags into them easier. Alternatively, situate garbage bins at the ends of docking bays, if available, to allow for easier deposits into the bins. Keep both feet flat on platforms at all times.

# Storing food and dishes

Workers store food and dishes on shelves in dry storage and cold storage areas.

## Risk factors

- awkward back postures to reach lower shelves
- awkward shoulder postures to reach higher shelves
- forceful lifting of heavy items

## Controls

- Store frequently used, heavier items between knuckle and elbow height to allow for easy storage and retrieval.
- Store frequently used, lighter items between elbow and shoulder height.
- Label storage locations on shelving for pots, pans, and dishes to ensure that frequently used items are placed between knuckle and shoulder height. This will make it easy to locate items and minimize awkward postures.
- Store infrequently used items on lower and upper shelves.
- Use a stepstool to access top shelves. Keep both feet flat on the stepstool when reaching for items.
- Where possible, lower the top shelves of storage racks to the shoulder height of the shortest worker.
- Use good body mechanics (see "Lifting, lowering, and carrying loads," on pages 16–17).

### Use carts

Depending on the size of the kitchen, you should have one or two carts that can be used for retrieving storage items. Using carts may decrease lifting, carrying, and the number of trips needed to pick up items for meal preparation. Inspect carts regularly, paying particular attention to castors and handles.

### Make sure bulk goods are manageable

Food purchasing is often done in bulk packaging. Consider weight and ease of handling as well as prices. Ask suppliers if bulk items come in smaller or easier-to-handle sizes.

### Store items in bins or carts

Store items that do not fit on shelves in large plastic bins or carts for easy access (for example, flour, sugar, and spices). Place these items directly under the counter so they are easily accessible yet out of the way when not needed. Store items on carts for easy movement.

### Keep storage areas clear

Make sure that transport carts fit in storage areas to minimize repeated carrying of items. Keep floor space clear to allow cart access.

### Use rotating or pullout racks in cupboards

Use rotating or pullout racks for easy access to storage cupboards. These types of racks are ideal for maximizing storage space. Store items such as spices, pasta, cereals, and other canned goods together.

### Use gravity feed racks

Use gravity feed racks to minimize reaching. Gravity feed racks are usually designed with rollers and placed at a downward angle so items roll into place when one item is removed. This keeps items directly in front of workers.

### Use footstools or ladders

Use footstools or ladders to reach light, easily handled items. Keep both feet flat on footstool or ladder surfaces when grasping items. Keep the floor clear so footstools or ladders can be placed near any shelf in the storage area. When using ladders, always follow the requirements in the WCB's Occupational Health and Safety Regulation and the manufacturer's instructions.

Footstools are only intended to be used as a temporary assist for reaching areas that are otherwise too high — do not use footstools for prolonged periods or when handling heavy or bulky items. Store heavier items within easy reach (between knuckle and elbow height) while standing on the floor.

### Keep floors dry and in good repair

Flooring maintenance is extremely important in kitchen areas. If anything is spilled, immediately place a "Wet floor" sign in the area to alert people to the slipping hazard and promptly clean it up. Report any floor damage to your supervisor or maintenance workers as soon as possible. The kitchen should have adequate floor drainage throughout for water and other liquids. This is especially important in the dish area, where water can accumulate.

# Environmental hazards

## Air quality

Ensure that all hoods over cooking areas function properly and are cleaned and serviced regularly.

## Loud noise

Dishwashers and vents or hoods can be noisy, especially if they are not regularly maintained.

### Controls

- Test noise levels to determine if workers need hearing protection.
- If necessary, ensure that workers use earplugs and earmuffs to reduce exposure to loud noise.
- During noisy cycles, assign workers to tasks outside of the kitchen (for example, delivering meals to patient wards).

## Heat stress

Kitchens and dish rooms can be hot, especially in the summer. Many kitchens and dish rooms are small and have poor ventilation. High humidity can contribute to heat stress.

### Hazards

- increased risk of fatigue
- increased risk of accidents

### Controls

Educate workers on the signs and symptoms of heat stress. Signs and symptoms of heat stress include:

- heavy sweating or dehydration
- nausea or dizziness

- headaches
- weakness or fatigue
- loss of coordination or impaired judgment

In addition to education, consider the following controls:

- Workers should drink a large glass of water before entering a hot environment and drink a glass of water every 20 minutes that they work in the hot area. Workers should not wait until they feel thirsty before drinking; they may be dehydrated before they feel symptoms.
- Use fans and open doors to circulate airflow. Air conditioning allows workers to control the room temperature.
- Reduce cooking during the day. Workers should use microwave ovens whenever possible, especially in the summer.

## Cold stress

Kitchen workers may be exposed to cold stress when they store or retrieve food supplies in large, walk-in freezers.

### Hazards

- increased fatigue
- increased risk of accidents
- hypothermia

### Controls

Educate workers on the signs and symptoms of cold stress. Signs and symptoms of cold stress include:

- shivering
- pale skin
- slurred speech
- lack of coordination, clumsiness, or impaired judgment

In addition to education, consider the following controls:

- Keep personal protective equipment such as gloves and jackets readily available for workers who must work inside freezers.
- Workers should make sure their clothes are dry before entering freezers. Wet clothes can accelerate the development of cold stress.
- Workers should avoid tight clothing. Loose clothing provides better ventilation.
- Implement a freezer safety policy so workers are never left alone for long periods. For example, use a buddy system where the staff work in pairs so they can watch each other for signs of cold stress. If workers must be alone, have another worker check on them every 5–10 minutes.
- Ensure that all freezer doors have a non-locking mechanism on the inside so workers can easily escape if accidentally trapped inside.

## Slipping hazards

Floors in kitchens and dish rooms may be slippery because of water, grease, flour, or other foods on the floor.

### Controls

- Ensure that floors are non-slip or have a non-slip coating. Avoid tiles and linoleum surfaces because they are often slippery, especially when wet.
- Minimize the number of different floor types in the kitchen. Moving from one type of surface to another can increase tripping hazards and make transporting carts difficult. Try to use one floor type for the entire kitchen.
- Implement policies for cleanup of spills to ensure that spills are dealt with promptly and effectively.
- Use signs in high-risk areas or areas where there are spills or wet floors.
- Incorporate anti-slip matting into anti-fatigue matting to reduce the risk of slipping and increase comfort.
- Ensure that workers wear appropriate footwear at work.

For more information on appropriate footwear, see pages 25–26 as well as OHSAH's brochure *What Makes Good Footwear for Work?*

# 7 Implementation and evaluation

This part provides information on implementing and evaluating control measures in your kitchen. It includes the following sections:

- Implementation
- Evaluation

# Implementation process

After you have identified the potential risk factors and appropriate control measures for your kitchen, the next step is to implement those control measures. Implementation consists of two basic steps: creating a working group and completing an implementation guideline.

## Create a working group

**OSHTip:**

To avoid roadblocks, involve everyone who will be affected by the control measures.

Create a working group to oversee the implementation process. Include the following individuals:

- managers
- kitchen workers
- maintenance workers
- a safety professional (for example, an ergonomist, occupational health and safety professional, MSI prevention coordinator, occupational therapist, or physiotherapist)

## Complete an implementation guideline

Discuss the control measure options and come to a consensus about which measures should be implemented. Write down all the control measures you want to implement (see the implementation guideline in Appendix IV). Include reasons for decisions, actual dates for implementation, and names of individuals who will oversee the implementation process.

Once your implementation guideline is finalized, give each working group participant a copy. Post a copy in the kitchen for easy reference and check off control measures as they are implemented. If a recommendation is not in place by a specific deadline, you can be assured that at least one person will bring attention to it.

# Evaluation

Evaluating the success of implemented recommendations is important and can be a simple process. Evaluations allow you to see what works and what does not. An evaluation consists of the following four steps.

## Step 1. Determine what you are trying to evaluate

What risk factors were the control measures intended to address?

## Step 2. Evaluate if the risk of MSI has decreased

Has the risk of MSI decreased as a result of implemented controls? In the risk management process, your evaluation should:

- re-evaluate the risk factors that you intended to eliminate or minimize
- determine if the controls have created new risk factors

Use one or more of the following three tools to evaluate whether or not the risk of MSI has decreased.

### Tool 1: Signs and symptoms survey

A signs and symptoms survey (see Appendix I) helps determine if workers are currently experiencing signs and symptoms of MSI. Make copies and survey workers during the risk identification stage, before controls are implemented. Survey workers again three months after controls have been implemented. Signs and symptoms should decrease with the new control measures.

### Tool 2: Interviews

Interviews allow for open discussion and can sometimes provide more information than surveys. Schedule individual meetings with workers. Let workers know that you are evaluating the control measures, not their performance.

### Tool 3: Incident reports

Analyze incident report forms, going back 1–3 years before any changes were made and again 1–3 years afterwards. How often did incidents occur in the past? Did they decrease after changes were made? Use this tool in combination with one of the other two tools. Workers may still have signs or symptoms even though few incidents are, or have been, reported.

## Step 3. Compile your results

Keep your results and the ergonomics assessment for future reference.

**OSHTip:**

Make MSI reduction a continuous, ongoing practice.

## Step 4. Understand the results

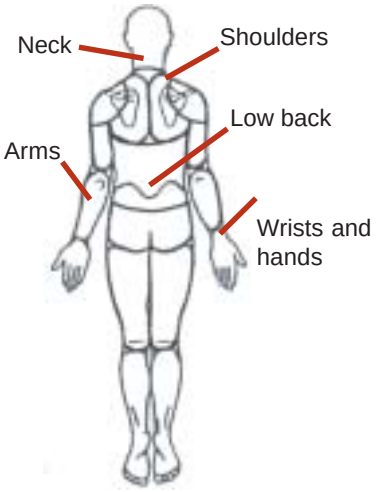
Determine whether or not the control measures were helpful, *and whether or not the new procedures or new equipment are being used*. If the new control measures were not effective, review the risks and develop new solutions. Gather the working group together immediately and try another control measure or modify the control measures currently in place.

# Appendices

This section provides additional information that will help you improve health and safety in your kitchen. It includes the following appendices:

- Appendix I: Signs and symptoms survey
- Appendix II: Risk factor identification checklist
- Appendix III: WCB ergonomics requirements
- Appendix IV: Implementation guideline
- Appendix V: Stretching routine
- Appendix VI: References

# Appendix I: Signs and symptoms survey




Date: _____

Department: _____

Job or task: _____

Comments: _____

_____

Thinking back over your last week of work, please rate your average level of discomfort while at work for each of the following body parts. Circle a number on the scale from 0 to 5 to represent your discomfort for each body part. The number 0 represents no discomfort, while 5 represents extreme discomfort.

| | No discomfort → | | | | | Extreme discomfort |
|---|---|---|---|---|---|---|
| 1. Neck | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. Shoulders | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. Low back | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. Arms | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. Wrists & hands | 0 | 1 | 2 | 3 | 4 | 5 |

# Appendix II: Risk factor identification checklist

Use this checklist to identify potential risk factors for MSI in your kitchen. Before filling out the checklist, familiarize yourself with the tasks performed in the kitchen. Checking "Yes" for items indicates that potential risk factors may be present. For help determining control measures for the identified risk factors, refer to Parts 3–6 of this guide.

Observer: _____

Date: _____

| Potential risk factor | Yes | No | N/A |
|---|---|---|---|
| *Chopping and cutting* | | | |
| Do workers use forceful exertion to grip knives while cutting? | | | |
| Are knives dull or not sharp enough? | | | |
| Do workers experience marks or depressions on their palms or fingers as a result of contact stress? | | | |
| Do workers use awkward wrist postures while chopping or cutting? | | | |
| Do workers bend excessively at the neck to look down while chopping or cutting? | | | |
| Do workers bend excessively at the waist while chopping or cutting? | | | |
| Are chopping countertops too high (above elbow height) or too low (below waist height)? | | | |
| *Puréeing meals* | | | |
| Are the purée bowls heavy? | | | |
| Do workers hold the bowls in the air (in other words, unsupported) to pour puréed food? | | | |
| Do workers hold or carry purée bowls with only one hand? | | | |
| *Using mixers and mixing bowls* | | | |
| Do workers have to reach below knee height or bend excessively at the waist to insert or remove mixing bowls when using the mixer? | | | |
| Do workers have to lift or carry heavy mixing bowls? | | | |

| Potential risk factor | Yes | No | N/A |
|---|---|---|---|
| *Using ovens and steamers* | | | |
| Do workers reach excessively to access ovens or steamers? | | | |
| Do workers reach above shoulder height to access ovens or steamers? | | | |
| Do workers reach below knee height or bend excessively at the waist to access ovens or steamers? | | | |
| Do workers use forceful exertion to lift hot items in or out of ovens or steamers? | | | |
| Do the ovens or steamers have bottom-hinged doors (doors that open downward, as opposed to sideways)? | | | |
| *Preparing soup* | | | |
| Do workers bend excessively at the waist or reach while stirring or pouring soup? | | | |
| Do workers use only one hand to stir with long-handled whisks? | | | |
| Do workers lift heavy soup pots? | | | |
| *Portioning food* | | | |
| Are the serving spoons or ladles sharp or difficult to grip? | | | |
| Do workers reach excessively to access food? | | | |
| Do workers use awkward wrist postures to portion food? | | | |
| Do workers use forceful exertion to scoop food? | | | |
| *Dispensing beverages* | | | |
| Do workers use awkward shoulder postures to dispense beverages? | | | |
| Are work surfaces above elbow height or below knee height? | | | |
| *Manual tray lines* | | | |
| Do workers reach excessively for trays or food? | | | |
| Do workers twist their upper bodies excessively to remove items from carts? | | | |
| Do workers bend excessively at the waist to remove items from carts? | | | |
| Are the serving spoons or ladles sharp or difficult to grip? | | | |
| Are the menu cards difficult to read? | | | |

| Potential risk factor | Yes | No | N/A |
|---|---|---|---|
| *Automated tray lines* | | | |
| Is the tray line too fast? | | | |
| Do workers reach excessively for trays or food? | | | |
| Do workers twist their upper bodies excessively to remove items from carts? | | | |
| Do workers bend excessively at the waist to remove items from carts? | | | |
| Are the serving spoons or ladles sharp or difficult to grip? | | | |
| Are the menu cards difficult to read? | | | |
| | | | |
| *Using meal carts and steam carts* | | | |
| Are the carts difficult to push or control? | | | |
| Are the carts missing handles? | | | |
| Are the steam trays heavy to lift? | | | |
| Do workers use pinch grips or awkward postures to remove metal food inserts from steam carts? | | | |
| Do workers twist their upper bodies excessively to remove items from carts? | | | |
| Do workers bend excessively at the waist to remove items from carts? | | | |
| | | | |
| *Dish line preparation (scraping, soaking, and pre-rinsing)* | | | |
| Do workers lift heavy dish bins or buckets from below knee height? | | | |
| Do workers lift more than one dish rack at a time? | | | |
| Do workers fill dish or cutlery buckets more than half full? | | | |
| Do workers bend excessively at the waist to remove items from soak sinks? | | | |
| Do workers lift full dish racks from soak sinks? | | | |
| Do workers lift and carry items that have any amount of water in them from soak sinks? | | | |
| | | | |
| *Sorting and loading dishes* | | | |
| Do workers reach excessively to sort dishes? | | | |
| Do workers lift and carry full dish racks to the dish line? | | | |
| Do workers carry partially full or full dish racks by holding onto the front edge of the rack rather than the middle? | | | |
| Are full dish racks difficult to push along the dish line? | | | |
| Do workers use awkward shoulder postures to sort dishes? | | | |
| Do workers bend excessively at the waist to sort dishes? | | | |
| Is the area around the dish line congested with carts or other items? | | | |

| Potential risk factor | Yes | No | N/A |
|---|---|---|---|
| *Washing pots* | | | |
| Do workers bend excessively at the waist to wash pots? | | | |
| Do workers use forceful exertion to scrub pots? | | | |
| Do workers lift and carry pots that have any amount of water in them? | | | |
| Do workers twist their upper bodies or bend excessively at the waist to lift and carry pots from carts to pot sinks? | | | |
| Do workers hold their arms out in front of them to lift pots (in other words, do they not hold pots close to their bodies)? | | | |
| Do workers lean against sinks or ledges while washing pots (causing contact stress on the stomach or hip areas)? | | | |
| *Storing dishes and pots* | | | |
| Do workers lift and carry full dish racks? | | | |
| Do workers lift and carry more than one rack at a time? | | | |
| Do workers carry partially full or full dish racks by holding onto the front edge of the rack rather than the middle? | | | |
| Do workers reach excessively to remove dishes from the clean end of the dish line? | | | |
| Do workers reach excessively to put away dishes or pots? | | | |
| Do workers lift or lower full dish racks below knee height or above shoulder height? | | | |
| Do workers twist their upper bodies or bend excessively at the waist to store items or remove them from the clean end of the dish line? | | | |
| *Busing* | | | |
| Do workers lift full dish bins? | | | |
| Do workers carry partially full or full dish racks by holding onto the front edge of the rack rather than the middle? | | | |
| Do workers lift or lower heavy dish bins below knee height or above shoulder height? | | | |
| Do workers twist their upper bodies or bend excessively at the waist to remove items from tables or store them on carts? | | | |
| Do workers hold their arms out in front of them to lift dish bins (in other words, do they not hold bins close to their bodies)? | | | |

| Potential risk factor | Yes | No | N/A |
|---|---|---|---|
| *General cleanup* | | | |
| Do workers use awkward shoulder postures while cleaning? | | | |
| Do workers bend or twist their backs excessively while cleaning? | | | |
| Do workers kneel on hard surfaces while cleaning? | | | |
| Do workers use only one hand to lift and carry heavy items such as garbage bags? | | | |
| Are garbage bags heavy to lift and carry? | | | |
| Do garbage bags contain excess amounts of liquid waste? | | | |
| Do workers lift garbage bags above shoulder level to place them into garbage bins? | | | |
| *Storing food and dishes* | | | |
| Do workers store heavy items below knee height or above shoulder height? | | | |
| Are storage areas congested with carts and other items that limit access to storage shelves? | | | |
| Are footstools and carts available in storage areas so workers can reach higher shelves and transport heavy items? | | | |
| *Environmental hazards* | | | |
| Is the kitchen temperature too hot? | | | |
| Do workers experience signs or symptoms of heat stress while washing pots? | | | |
| Is the kitchen cluttered or overfilled with items such as carts and equipment? | | | |
| Is the floor slippery (especially when wet)? | | | |
| Do workers stand on hard surfaces for long periods? | | | |

# Appendix III: WCB ergonomics requirements

Under the authority of the *Workers Compensation Act*, the WCB has adopted and implemented ergonomics requirements, detailed in the Occupational Health and Safety Regulation, Sections 4.46 to 4.53 (reprinted in this appendix). These requirements represent the minimum standards that must be complied with at workplaces that fall under WCB jurisdiction and within the scope of the *Act*.

## Ergonomics (MSI) requirements

The purpose of sections 4.46 to 4.53 is to eliminate or, if that is not practicable, minimize the risk of musculoskeletal injury to workers.

**Note:** The WCB provides publications to assist with implementing the Ergonomics (MSI) Requirements. *Preventing Musculoskeletal Injury (MSI): A Guide for Employers and Joint Committees* provides a seven-step process to assist with the application of the ergonomics requirements along with procedures to investigate incidents of MSI and a table of common control measures. *Understanding the Risks of Musculoskeletal Injury (MSI)* is intended to help employers with the requirements of section 4.51(1) to educate workers in risk identification, signs and symptoms of MSI, and their potential health effects.

### 4.46 Definition

In sections 4.47 to 4.53 (the Ergonomics (MSI) Requirements)

> *"musculoskeletal injury" or "MSI"* means an injury or disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissue including a sprain, strain and inflammation, that may be caused or aggravated by work.

### 4.47 Risk identification

The employer must identify factors in the workplace that may expose workers to a risk of musculoskeletal injury (MSI).

### 4.48 Risk assessment

When factors that may expose workers to a risk of MSI have been identified, the employer must ensure that the risk to workers is assessed.

### 4.49 Risk factors

The following factors must be considered, where applicable, in the identification and assessment of the risk of MSI:

(a) the physical demands of work activities, including
  (i) force required,
  (ii) repetition,
  (iii) duration,
  (iv) work postures, and
  (v) local contact stresses;

(b) aspects of the layout and condition of the workplace or workstation, including
  (i) working reaches,
  (ii) working heights,
  (iii) seating, and
  (iv) floor surfaces;

(c) the characteristics of objects handled, including
  (i) size and shape,
  (ii) load condition and weight distribution, and
  (iii) container, tool and equipment handles;

(d) the environmental conditions, including cold temperature;

(e) the following characteristics of the organization of work:
  (i) work-recovery cycles;
  (ii) task variability;
  (iii) work rate.

### 4.50 Risk control

(1) The employer must eliminate or, if that is not practicable, minimize the risk of MSI to workers.

(2) Personal protective equipment may only be used as a substitute for engineering or administrative controls if it is used in circumstances in which those controls are not practicable.

(3) The employer must, without delay, implement interim control measures when the introduction of permanent control measures will be delayed.

### 4.51 Education and training

(1) The employer must ensure that a worker who may be exposed to a risk of MSI is educated in risk identification related to the work, including the recognition of early signs and symptoms of MSIs and their potential health effects.

(2) The employer must ensure that a worker to be assigned to work which requires specific measures to control the risk of MSI is trained in the use of those measures, including, where applicable, work procedures, mechanical aids and personal protective equipment.

### 4.52 Evaluation

(1) The employer must monitor the effectiveness of the measures taken to comply with the Ergonomics (MSI) Requirements and ensure they are reviewed at least annually.

(2) When the monitoring required by subsection (1) identifies deficiencies, they must be corrected without undue delay.

### 4.53 Consultation

(1) The employer must consult with the joint committee or the worker health and safety representative, as applicable, with respect to the following when they are required by the Ergonomics (MSI) Requirements:

  (a) risk identification, assessment and control;

  (b) the content and provision of worker education and training;

  (c) the evaluation of the compliance measures taken.

(2) The employer must, when performing a risk assessment, consult with

  (a) workers with signs or symptoms of MSI, and

  (b) a representative sample of the workers who are required to carry out the work being assessed.

# Appendix IV: Implementation guideline

Date: _____

Working group: _____

_____

_____

| Control | In place by (date) | In place on time? (Y/N) | If no, why not? |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Who is responsible for implementing the controls?

Comments

# Appendix V: Stretching routine

# Appendix VI: References


Bobjer, O. 1989. Ergonomic knives. In Mital, A., ed. *Advances in industrial ergonomics and safety I*. London: Taylor & Francis, 291–98.

Bergamasco, R., C. Girola, and D. Colombini. 1998. Guidelines for designing jobs featuring repetitive tasks. *Ergonomics* 41 (9): 1364–83.

Bernard, B., ed. 1997. *Musculoskeletal disorders (MSDs) and workplace factors: A critical review of epidemiologic evidence for work-related musculoskeletal disorders of the neck, upper extremity, and low back*. Cincinnati: NIOSH Publication No. 97-141.

Canadian Centre for Occupational Health and Safety (CCOHS). 2000. *Food service workers safety guide*. 3rd ed. Hamilton: CCOHS.

Chaffin, D. B., and G. B. J. Andersson. 1984. *Occupational biomechanics*. Toronto: John Wiley and Sons. 437.

Chaffin, D. B., and J. A. Ashton-Miller. 1991. Biomechanical aspects of low-back pain in the older worker. *Journal of Experimental Aging Research* 17 (3): 177–88.

Evanoff, B. A. Ergonomic training for workers and supervisors. St. Louis: Washington University School of Medicine.

Grandjean, E. 1982. *Fitting the task to the man: An ergonomic approach*. London: Taylor & Francis.

Grieco, A., G. Molteni, G. De Vito, and N. Sias. 1998. Epidemiology of musculoskeletal disorders due to biomechanical overload. *Ergonomics* 41 (9): 1253–60.

Hsiang, S., R. McGorry, and I. Bezverkhny. 1997. The use of Taguchi's methods for the evaluation of industrial knife design. *Ergonomics* 40 (4): 476–90.

Kroemer, K. H. E. 1999. Engineering anthropometry. In Karwowski, W., and W. S. Marras, eds. *Occupational ergonomics handbook*. Boca Raton, Fla.: CRC Press. 139–65.

Marras, W. S. 2000. Occupational low back disorder causation and control. *Ergonomics* 43 (7): 880–902.

National Institute for Occupational Safety and Health (NIOSH). 1997. *Elements of ergonomics programs: A primer based on workplace evaluations of musculoskeletal disorders*. Cincinnati: NIOSH Publication No. 97-117.

Occupational Health and Safety Agency for Healthcare (OHSAH) in BC. 2003. *An ergonomic guide to hospital laundries*. Vancouver: OHSAH.

Occupational Health and Safety Agency for Healthcare (OHSAH) in BC. 2001. *Musculoskeletal injury prevention program: Implementation guide*. Vancouver: OHSAH.

Pheasant, S. 1991. *Ergonomics, work and health*. London: Macmillan.

Silverstein, B. A., L. J. Fine, and T. J. Armstrong. 1987. Occupational factors and carpal tunnel syndrome. *American Journal of Industrial Medicine* 11:343–58.

Snook, S. H., and V. M. Ciriello. 1991. The design of manual handling tasks: Revised tables of maximum acceptable weights and forces. *Ergonomics* 34 (9): 1197–1213.

Snook, S. H., D. R. Vaillancourt, V. M. Ciriello, and B. S. Webster. 1995. Psychophysical studies of repetitive wrist flexion and extension. *Ergonomics* 38 (7): 1488–1507.

Woodson, W. E., B. Tillman, and P. Tillman. 1992. *Human factors design handbook*. 2nd ed. New York: McGraw-Hill.

Victorian WorkCover Authority. 1999. *Occupational health and safety information manual for supervisors in the NSW hospitality industry*. WorkCover.

Workers' Compensation Board (WCB) of BC. 1999. Occupational Health and Safety Regulation (BC Regulation 296/97, as amended by BC Regulation 185/99). Vancouver: WCB of BC. <www.healthandsafetycentre.org>.

Workers' Compensation Board (WCB) of BC. 2000. *Health care industry: Focus report on occupational injury and disease*. Vancouver: WCB of BC.