Morneau Shepell is a leading North American HR consulting and technology company.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 years of experience</td>
<td>4,000 employees</td>
</tr>
<tr>
<td>5 million+ plan members</td>
<td>20,000 clients</td>
</tr>
<tr>
<td>82% client satisfaction score</td>
<td>70% of our clients are on the TSX</td>
</tr>
<tr>
<td>23 offices across North America</td>
<td>Official Mental Health Partner of the Canadian Olympic Team</td>
</tr>
</tbody>
</table>
Developing interventions to prevent disability in older workers with, or at risk of developing, musculoskeletal disorders

Ivan Steenstra: istineenstra@morneaushepell.com
Agenda for the webinar

- Introduction to the team
- Introduction to intervention mapping
- Research methods
- Interactive quiz
- Results of the research
- Conclusion and attempt to translate the findings to practise
- Resources
OUR TEAM

• Ivan Steenstra: Morneau Shepell, IWH
• Kimberley Cullen; Emma Irvin; Dwayne Van Eerd; Dorcas Beaton; Monique Gignac; Quenby Mahood; Sara Macdonald: IWH
• Mohammad Alavinia: Khorashan Univerisity
• Judy Geary: PCU-WHS
• Doug Gross: University of Alberta
• Martine Puts: University of Toronto
• Heather Scott-Marshall: Mission Research
• Amin Yazdani: University of Waterloo
Our stakeholder team

• Judy Geary, Pacific Coast University Workplace Health Studies (PCUWHS)
• Graham Lowe, The Graham Lowe Group Inc.
• Greg McIntosh, CBI Health
• Jan Chappel, Canadian Centre for Occupational Health and Safety
• Bruce Cielen & Agatha Chandran, WCB Manitoba
• Marc White(CIRPD)
• Jodine Giacinti & Nancy Leslie, WSIB
• Judith MacBride-King & Karla Thorpe, Conference Board of Canada
• Ron Saunders, IWH
What is intervention mapping?

Intervention Mapping is a protocol for developing effective behavior change interventions.
- Interventionmapping.com
What is intervention mapping?

<table>
<thead>
<tr>
<th>Step 1: Logic Model of the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish and work with a planning group</td>
</tr>
<tr>
<td>Conduct a needs assessment to create a logic model of the problem</td>
</tr>
<tr>
<td>Describe the context for the intervention including the population, setting, and community</td>
</tr>
<tr>
<td>State program goals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2: Program Outcomes and Objectives; Logic Model of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>State expected outcomes for behavior and environment</td>
</tr>
<tr>
<td>Specify performance objectives for behavioral and environmental outcomes</td>
</tr>
<tr>
<td>Select determinants for behavioral and environmental outcomes</td>
</tr>
<tr>
<td>Construct matrices of change objectives</td>
</tr>
<tr>
<td>Create a logic model of change</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3: Program Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generate program themes, components, scope, and sequence</td>
</tr>
<tr>
<td>Choose theory- and evidence-based change methods</td>
</tr>
<tr>
<td>Select or design practical applications to deliver change methods</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 4: Program Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refine program structure and organization</td>
</tr>
<tr>
<td>Prepare plans for program materials</td>
</tr>
<tr>
<td>Draft messages, materials, and protocols</td>
</tr>
<tr>
<td>Pretest, refine, and produce materials</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 5: Program Implementation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify potential program users (implementers, adopters, and maintainers)</td>
</tr>
<tr>
<td>State outcomes and performance objectives for program use</td>
</tr>
<tr>
<td>Construct matrices of change objectives for program use</td>
</tr>
<tr>
<td>Design implementation interventions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 6: Evaluation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write effect and process evaluation questions</td>
</tr>
<tr>
<td>Develop indicators and measures for assessment</td>
</tr>
<tr>
<td>Specify the evaluation design</td>
</tr>
<tr>
<td>Complete the evaluation plan</td>
</tr>
</tbody>
</table>
Intervention mapping in a half day workshop

Describe the context for the intervention, including the population, setting, and community
Choose theory- and evidence-based change methods
Select or design practical applications to deliver change methods
Questions to guide the conversation

1. Discuss theory- and evidence-based change methods:
   • What works, in your experience/ to your knowledge?

2. Discuss the context for the intervention (worker population, setting, community)
   • Are interventions for workers with MSK different?
   • Does the setting/ community/ jurisdiction matter
Research methods
Steps of a Systematic Review/Stakeholder engagement

1. Develop question
2. Conduct literature search
3. Identify relevant articles
4. Quality appraisal
5. Data extraction
6. Evidence synthesis

Stakeholder as Reviewer

Involvement in Dissemination

(Irvin, et al. 2010; Keown et al., 2008)
Research Questions

1. What is the effectiveness of interventions aimed at \textit{return to work and/or stay at work} in aging workers?

2. Which factors are associated with \textit{return to work and/or stay at work} in aging workers?
Population

- Working adults 50 years and over
- Baby-boomers (1946-1964)
- Younger if research question was clearly focusing on aging workers or if from a physically demanding profession
Interventions of interest

- Workplace based
- Healthcare based
- Policy based
Outcomes of interest

Return to Work

*Include:*
- Time on sick leave
- Disability benefits

*Exclude:*
- Intention to RTW
- Work ability

Stay at Work

*Include:*
- Early retirement
- Permanent disability pension
- Days off work

*Exclude:*
- Intention to retire
- Work ability
## Evidence of Synthesis: Levels of evidence

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Minimum Quality</th>
<th>Minimum Quantity</th>
<th>Consistency</th>
<th>Strength of Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>High (H)</td>
<td>3</td>
<td>3H studies agree; If &gt;3 studies, ⅔ of the M + H agree</td>
<td>Recommendations</td>
</tr>
<tr>
<td>Moderate</td>
<td>Medium (M)</td>
<td>2H or 2M + 1H</td>
<td>2H studies agree or 2M + 1H agree; If &gt;3 studies, &gt; ⅔ of the M + H agree</td>
<td>Practice Considerations</td>
</tr>
<tr>
<td>Limited</td>
<td>Medium (M)</td>
<td>1H or 2M or 1M + 1H</td>
<td>1 H or 2 (M and/or H) studies agree; If &gt;2 studies, &gt; ½ of the M + H agree</td>
<td>Not enough evidence to make recommendations or practice considerations</td>
</tr>
<tr>
<td>Mixed</td>
<td>Medium (M)</td>
<td>2</td>
<td>Findings from M + H are contradictory</td>
<td></td>
</tr>
<tr>
<td>Insufficient</td>
<td></td>
<td></td>
<td>No high quality studies. Only medium quality studies that do not meet the above criteria</td>
<td></td>
</tr>
</tbody>
</table>
White paper on MSD and work participation in older workers

• Method: scoping review of the literature
• Building on IWH reviews: aging and return to work, return to work and upper extremity MSD prevention
• Lack of literature examining interventions or strategies related to older workers and MSD.
Interactive quiz, what do you think?
1. Important?
2. Or NOT!

Use ?? To make a selection
You have 10 minutes to answer the next 26 questions, so don’t overthink this! There are no wrong answers, but not all of these intervention components are supported by evidence.

To keep older workers in the work force either by getting them back to work (RTW) or keeping them at work (SAW):
1. Is Communication within workplace effective? YES / NO
2. Is Case management effective? YES / NO
3. Is Communication between workplace & HC provider effective? YES/ NO
4. Is Exercise Effective? YES / NO
5. Is Early Intervention effective? YES/ NO
6. Is Influenza Vaccination Effective? YES /NO
7. Is a Job Task Analysis Effective? YES /NO
8. Is Information to Patient and Family Doctor Effective
9. Is a Change in Medication Effective? YES / NO
10. Are Modified Duties / Modified Working Hours Effective? YES/ NO
11. Is Psychosocial Care Effective? Yes / NO
12. Is Participatory Ergonomics Effective? YES / NO
13. Is Making a RTW Plan Effective? YES / NO
15. Is Supernumerary placement Effective? YES / NO
16. Is Angioplasty More Effective than Heart Surgery? 
17. Is Tai Chi Effective? YES /NO
18. Is Vocational Counselling Effective? YES /NO
19. Is Worksite Accommodation Effective? Yes / NO
20. Is Worker Education/training Effective? YES / NO
21. Is a Worksite Assessment Effective? YES/ NO
22. Is Work Hardening Effective? YES / NO
23. Is a Workplace Wellness Program Effective? YES/NO
24. Is a combination of Yoga and a Workout Effective? YES /NO
Results of the quiz
Results of the reviews
Flowchart of studies in literature review

**Step 2: Literature Search:**
- Medline: n=7390
- EMBASE: n=5045
- Web of Sci: n=2192
- PsycInfo: n=1186
- ABI Inform: n=860
- Soc Abs: n=284
- H&S Sci Abs: n=148
- Central: n=59
- EconLit: n=37
- Other: n=4

**Step 3: Study Relevance:**
- Merge databases and remove duplicates: n=11690
- Apply inclusion criteria to studies identified in search (n=11690)
- Excluded non-relevant studies (n=11437)
- Excluded non-English studies (n=50)

**Step 4: Quality Appraisal:**
- Assess quality of relevant studies for inclusion (n=203)
- Intervention Studies: n=14
- PF Studies (general working population): N=69
- PF Studies (patient population): n=117

**Step 5: Data Extraction:**
- Extract data from relevant studies of sufficient quality (n=200)
- Intervention Studies: n=14
- PF Studies (general working population): N=69
- PF Studies (patient population): n=117

**Step 6: Evidence Synthesis:**
- Complete evidence synthesis, develop summary tables and report results and conclusions
- Conduct stakeholder workshops
Results: 14 Studies

Jurisdiction

- Canada: 1 study
- USA: 5 studies
- Finland: 1 study
- Germany: 1 study
- The Netherlands: 3 studies
- UK: 1 study
- International: 2 studies
<table>
<thead>
<tr>
<th>First author</th>
<th>Year</th>
<th>Country</th>
<th>Population</th>
<th>Interventions</th>
<th>Intervention Classification</th>
<th>Outcome</th>
<th>Direction of effect</th>
<th>Sample size</th>
<th>Quality %</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Allaire et al., 2003)</td>
<td>2003</td>
<td>USA</td>
<td>RA</td>
<td>Job retention vocational rehabilitation</td>
<td>Multi component</td>
<td>SAW</td>
<td>Positive</td>
<td>242</td>
<td>97</td>
<td>High</td>
</tr>
<tr>
<td>(de Boer et al., 2004)</td>
<td>2004</td>
<td>Netherlands</td>
<td>General</td>
<td>Occupational health programme for workers at risk</td>
<td>Multi component</td>
<td>RTW &amp; SAW</td>
<td>Positive</td>
<td>116</td>
<td>92</td>
<td>High</td>
</tr>
<tr>
<td>(Steenstra et al., 2009)</td>
<td>2009</td>
<td>Netherlands</td>
<td>MSD</td>
<td>Coordination of services and Participatory ergonomics</td>
<td>Multi component</td>
<td>RTW</td>
<td>Positive</td>
<td>196</td>
<td>80</td>
<td>Med</td>
</tr>
<tr>
<td>(Siukola et al., 2011)</td>
<td>2011</td>
<td>Finland</td>
<td>General</td>
<td>Senior programme</td>
<td>Multi component</td>
<td>SAW</td>
<td>Mixed</td>
<td>358</td>
<td>78</td>
<td>Med</td>
</tr>
<tr>
<td>(Dumont et al., 1999)</td>
<td>1999</td>
<td>Canada</td>
<td>Cardiac</td>
<td>Multidisciplinary cardiac rehabilitation program + structured RTW program</td>
<td>Multi component</td>
<td>RTW</td>
<td>Positive</td>
<td>38</td>
<td>75</td>
<td>Med</td>
</tr>
<tr>
<td>(Strijk et al., 2013)</td>
<td>2013</td>
<td>Netherlands</td>
<td>General</td>
<td>Vital@Work intervention (exercise &amp; coaching)</td>
<td>Exercise</td>
<td>SAW</td>
<td>No effect</td>
<td>730</td>
<td>100</td>
<td>High</td>
</tr>
<tr>
<td>(Palumbo et al., 2012)</td>
<td>2012</td>
<td>USA</td>
<td>General</td>
<td>Tai Chi</td>
<td>Exercise</td>
<td>SAW</td>
<td>Positive</td>
<td>14</td>
<td>89</td>
<td>High</td>
</tr>
<tr>
<td>(Mital et al., 2000)</td>
<td>2000</td>
<td>USA</td>
<td>Cardiac</td>
<td>Low intensity job simulated cardiac rehabilitation</td>
<td>Exercise</td>
<td>RTW</td>
<td>Positive</td>
<td>47</td>
<td>75</td>
<td>Med</td>
</tr>
<tr>
<td>(van Vollenhoven et al., 2010)</td>
<td>2010</td>
<td>Europe, North America, Australia</td>
<td>RA</td>
<td>MTX vs MTX and/or Adalimumab</td>
<td>Medication</td>
<td>SAW</td>
<td>Positive</td>
<td>664</td>
<td>89</td>
<td>High</td>
</tr>
<tr>
<td>(Borg et al., 1991)</td>
<td>1991</td>
<td>USA</td>
<td>RA</td>
<td>Auranofin medication</td>
<td>Medication</td>
<td>SAW</td>
<td>No effect</td>
<td>82</td>
<td>89</td>
<td>High</td>
</tr>
<tr>
<td>(Nichol et al., 2009)</td>
<td>2009</td>
<td>USA</td>
<td>General</td>
<td>Influenza vaccination</td>
<td>Medication</td>
<td>SAW</td>
<td>Positive</td>
<td>497</td>
<td>84</td>
<td>Med</td>
</tr>
<tr>
<td>(Pocock et al., 1996)</td>
<td>1993</td>
<td>UK</td>
<td>Cardiac</td>
<td>Angioplasty vs bypass surgery</td>
<td>Cardiac surgery</td>
<td>RTW &amp; SAW</td>
<td>Positive</td>
<td>1011</td>
<td>94</td>
<td>High</td>
</tr>
<tr>
<td>(Pfund et al., 2001)</td>
<td>2001</td>
<td>Germany</td>
<td>Cardiac</td>
<td>Information to patient and family doctor about RTW</td>
<td>Education</td>
<td>RTW</td>
<td>Positive</td>
<td>100</td>
<td>73</td>
<td>Med</td>
</tr>
</tbody>
</table>
Results: 14 Studies

Population of Interest

- Cardiac population: 4 studies
- General working population: 5 studies
- MSK Disorders: 1 study
- Rheumatoid arthritis: 3 studies
# Four Intervention Categories

## 1. Combined Interventions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Worksite assessment</td>
<td>Graded activity</td>
<td>RTW plan</td>
</tr>
<tr>
<td>Worksite accommodation</td>
<td>Work hardening</td>
<td>Case management</td>
</tr>
<tr>
<td>Job task analysis</td>
<td>Exercise</td>
<td>Communication workplace &amp; healthcare</td>
</tr>
<tr>
<td>Modified duties</td>
<td>Surgery</td>
<td>Worker education/training</td>
</tr>
<tr>
<td>Supernumerary replacement</td>
<td>Medication</td>
<td>Communication healthcare &amp; family</td>
</tr>
<tr>
<td>Modified working hours</td>
<td>Workplace wellness</td>
<td>Early intervention</td>
</tr>
<tr>
<td>Participatory Ergonomics</td>
<td>Psychosocial care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physiotherapy</td>
<td></td>
</tr>
</tbody>
</table>
Intervention Categories

- Medication (n=3)
- Vaccination (n=1)
- Surgery (n=1)
- Exercise (n=3)

- Healthcare
- Work Modification
- Combination
Outcomes

- Return-to-work: 3
- Stay-at-work: 9
- Both: 2
# Levels of Evidence

<table>
<thead>
<tr>
<th>Level of Evidence (direction of effect)</th>
<th>Intervention [# positive / # of studies]</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate (positive)</td>
<td>Multi-component interventions [2H +2M/ 5]</td>
<td>Consider implementing in practices if applicable to the work context</td>
</tr>
<tr>
<td>Limited (positive)</td>
<td>Medication use [1H +1M/3] Cardiac Surgery [1H]</td>
<td>Not enough evidence from the scientific literature to guide current policies/practices</td>
</tr>
<tr>
<td>Insufficient (Positive)</td>
<td>Exercise [1H +1M/3]</td>
<td></td>
</tr>
<tr>
<td>Insufficient (No effect)</td>
<td>Education [1M] Work accommodation (alone) [1M]</td>
<td></td>
</tr>
</tbody>
</table>
# Levels of Evidence

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Minimum Quality</th>
<th>Minimum Quantity</th>
<th>Consistency</th>
<th>Strength of Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>High (H)</td>
<td>3</td>
<td>3H studies agree; If &gt;3 studies, ⅔ of the M + H agree</td>
<td>Recommendations</td>
</tr>
<tr>
<td>Moderate</td>
<td>Medium (M)</td>
<td>2H or 2M + 1H</td>
<td>2H studies agree or 2M + 1H agree; If &gt;3 studies, &gt;⅔ of the M + H agree</td>
<td>Practice Considerations</td>
</tr>
<tr>
<td>Limited</td>
<td>Medium (M)</td>
<td>1H or 2M or 1M + 1H</td>
<td>1 H or 2 (M and/or H) studies agree; If &gt;2 studies, &gt;½ of the M + H agree</td>
<td>Not enough evidence to make recommendations or practice considerations</td>
</tr>
<tr>
<td>Mixed</td>
<td>Medium (M)</td>
<td>2</td>
<td>Findings from M + H are contradictory</td>
<td></td>
</tr>
<tr>
<td>Insufficient</td>
<td>Medium (M)</td>
<td>2</td>
<td>No high quality studies. Only medium quality studies that do not meet the above criteria</td>
<td></td>
</tr>
</tbody>
</table>

*High = >85% in quality assessment; Medium = 50-85% in quality assessment
## Multi component interventions

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Country</th>
<th>Methodology</th>
<th>Interventions</th>
<th>Outcome</th>
<th>Effect Size</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Allaire et al., 2003)</td>
<td>2003</td>
<td>USA</td>
<td>RA</td>
<td>Job retention vocational rehabilitation when at risk, HCP + workplace involved</td>
<td>Positive</td>
<td>242</td>
<td>High</td>
</tr>
<tr>
<td>(de Boer et al., 2004)</td>
<td>2004</td>
<td>Netherlands</td>
<td>General</td>
<td>Occupational health programme when at risk, OP+ workplace involved</td>
<td>Positive</td>
<td>116</td>
<td>High</td>
</tr>
<tr>
<td>(Steenstra et al., 2009)</td>
<td>2009</td>
<td>Netherlands</td>
<td>MSD</td>
<td>Coordination of services and Participatory ergonomics, OP + workplace involved</td>
<td>Positive</td>
<td>196</td>
<td>Med</td>
</tr>
<tr>
<td>(Siukola et al., 2011)</td>
<td>2011</td>
<td>Finland</td>
<td>General</td>
<td>Senior programme, workplace involved</td>
<td>Mixed</td>
<td>358</td>
<td>Med</td>
</tr>
<tr>
<td>(Dumont et al., 1999)</td>
<td>1999</td>
<td>Canada</td>
<td>Cardiac</td>
<td>Multidisciplinary cardiac rehabilitation program + structured RTW program, HCP+ workplace involved</td>
<td>Positive</td>
<td>38</td>
<td>Med</td>
</tr>
</tbody>
</table>
Results White paper scoping review

• Aging workforce is a reality
• Heterogeneity of older workers is greater than that of younger workers
• Individualized agreements (I-deals) key aspect of workplace policy to support healthy aging
• Healthy aging beneficial for productivity and society
• Feasible approaches to maintain older workers in the workforce (MSD or other health conditions)
• Adopting WHO strategies good start
• More research is necessary
• Link to White paper on CRE-MSD website
Conclusions

• Vast body of research on work participation of older workers
• Few high quality intervention studies
• Multi-component interventions could be considered to help improve work participation in older workers
• Healthcare professionals and workplace are both involved in effective interventions
• **Effective interventions focus on high risk cases!**
• Similar interventions seem effective among all populations (MSD, cardiac, general) (regardless of age).
Free online access: https://doi.org/10.1016/j.jsr.2016.12.004
Recommendations for practice

• Multi-component interventions could be considered for implementation by practitioners to help improve work participation in older workers.

• Multi component:
  • vocational rehabilitation
  • worker education/training
  • RTW plan, case management
  • communication between workplace and healthcare provider
  • modified work (hours, ergonomics, duties) after initial assessment

• **Focus on high risk cases** (ability to work in the near future/ until retirement)

• Where interventions in RTW are reactive, interventions in SAW can be proactive

• Lack of evidence is not absence of effect

• Creative evidence informed solutions are possible
Recommendations for practice White paper

• Enabling autonomy: increased autonomy can support older workers work longer
• Supporting healthy aging in policies: workplace policies that support accommodation and development are needed
• Combatting ageism: inconclusive evidence that MSD are more prevalent in older workers or that older workers are less productive
Evidence Informed Translation to Practise?

Manager training

self referral
manager referral
employee survey
absence tracking

high risk for premature retirement

low risk for premature retirement

4. caregiving
3. health
2. financial opportunity
1. retirement as usual

Employee Assistance Program
Fitness coaching + accommodation
EAP: financial planning
Some resources

- http://www.cdc.gov/niosh/topics/productiveaging/default.html
- http://www.agefriendlyworkplace.org/
- National Institute on Ageing (Canada): www.ryerson.ca/nia
- Aging Workers and the Employee-Employer Relationship, Editors: Bal, P. Matthijs, Kooij, Dorien T.A.M., Rousseau, Denise M.
- http://work.cochrane.org/
Keep up on evidence-based practices from IWH

Sign up online for our monthly e-alerts, our quarterly newsletter, event notifications and more: www.iwh.on.ca/e-alerts

Follow @iwhresearch on Twitter: www.twitter.com/iwhresearch

Connect with us on LinkedIn: www.linkedin.com/company/institute-for-work-and-health

Subscribe to our YouTube channel: www.youtube.com/iwhresearch


This document/slide is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License: http://creativecommons.org/licenses/by-nc-nd/4.0/.