Intervention research to promote work participation: Should we focus on changing people or their environment?

Prof. Han Anema, MD PhD
Disclosure

• Supported through a Professorship in Insurance Medicine from the Dutch Social Security Agency
• Shareholder & senior consultant Evalua Ltd.
• Chair of the research institute of Insurance Medicine AMC, UMCG, UWV, VUmc
• Consultant & ambassador for IkHerstel Ltd.
• Chair of the ICOH committee WDPI
• Editor of Handbook for Work disability Prevention & management
Low back pain 1

What low back pain is and why we need to pay attention

Jan Hartvigsen*, Mark J Hancock*, Alice Kongsted, Quinette Louw, Manuela L Ferreira, Stéphane Genevay, Damian Hoy, Jaro Karppinen, Glenn Pransky, Joachim Sieper, Rob J Smeets, Martin Underwood, on behalf of the Lancet Low Back Pain Series Working Group†

Low back pain 2

Prevention and treatment of low back pain: evidence, challenges, and promising directions

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Low back pain: a call for action

Rachelle Buchbinder, Maurits van Tulder, Birgitta Öberg, Luciola Menezes Costa, Anthony Woolf, Mark Schoene, Peter Croft, on behalf of the Lancet Low Back Pain Series Working Group*
Low back pain 1

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LOW BACK PAIN
NO.1

Global 1-year prevalence and burden in disability-adjusted life-years (DALYs)

60.1 M daly; 54% increase

Hartvigsen et al. Lancet 2018
• Disability highest in working age populations
  • In high-income countries ca. 80% of the costs are due to work disability

• In low-income countries, low back pain disability might contribute to the cycle of poverty
  • Limited possibilities for job modification
  • loss of independence and social identity
Low back pain 2

Prevention and treatment of low back pain: evidence, challenges, and promising directions

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What is the problem?

HCP

• Medicalised approach for LBP
• Ineffective & harmful practices despite evidence/guidelines
  • Over-reliance on medication and other passive treatments
  • Overuse of invasive treatments

Industry & reimbursement systems
• Promoting ineffective practises like medication and invasive treatments for LBP

Public
• Misconceptions about towards medical investigations and treatment for LBP

Foster et al. Lancet 2018
Lancet series

“A major challenge will be to stop the use of harmful practices while ensuring access to effective and affordable health care for people with low back pain.”

Series on low back pain

Buchbinder et al. Lancet 2018
Promising New Directions

✓ Public health system

• Social/compensation system

• Work system

• Healthcare system
Misconceptions among the public

- **Mismatch**
  - General public’s beliefs & behaviours about medical investigations and treatment for LBP
  - Best practises in HCP guidelines: advice to stay active and at work

- **Need to educate the public**
  - in line with the concept ‘positive health’ regarding *their beliefs & behaviours of non-specific low back pain* (Huber, BMJ 2011)
<table>
<thead>
<tr>
<th>Setting</th>
<th>Australia “Back Pain: Don’t Take it Lying Down”</th>
<th>“Working Backs” Scotland</th>
<th>Canada “Back Active”</th>
<th>Norway “Active Back”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main medium</td>
<td>TV adverts in prime time</td>
<td>Radio adverts</td>
<td>Website, radio adverts</td>
<td>Local TV, radio/cinema ads</td>
</tr>
<tr>
<td>Other media</td>
<td>Radio, billboard, print ads, posters, seminars, visits by well-known personalities to workplaces, publicity articles and publications</td>
<td>Professional education campaign, leaflets, clinical guidelines, Back Book, book on Managing Back Pain in the Workplace, posters</td>
<td>Website, posters, pamphlets, bus and billboard ads, public and industry news publications. TV announcements</td>
<td>Website, posters with the messages of the campaign at healthcare clinics and information papers sent to all households</td>
</tr>
<tr>
<td>Intensity and frequency</td>
<td>Intense for 12 months, then less intense for 12 months and then final intense campaign for 3 months.</td>
<td>1777 15-second ads on all 15 radio stations in Scotland during a 4 week period. Heard by 60% of adults</td>
<td>Continuous website. Radio ads during peak listening months only. Heard by 49%</td>
<td>Website throughout the period, 4 one-month campaign periods during the total period</td>
</tr>
<tr>
<td>Main messages</td>
<td>Back pain not serious; Positive attitudes important; Continue usual activities; Continue exercising; Remain at work if possible; X-rays are not useful; Surgery may not be the answer; Keep employees at work</td>
<td>Stay active; Try simple pain relief; If you need it, get advice. Don’t take back pain lying down; There’s a lot you can do to help yourself; Prognosis is good</td>
<td>The key to feeling better sooner when you have back pain is to stay active</td>
<td>LBP rarely dangerous; X-rays rarely reveal cause; Moving = improve faster; Work with your back; Return to work as soon as possible; Only a few people with back pain need surgery</td>
</tr>
<tr>
<td>Campaign messengers</td>
<td>Australia “Back Pain: Don’t Take it Lying Down”</td>
<td>“Working Backs” Scotland</td>
<td>Canada “Back Active”</td>
<td>Norway “Active Back”</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>International back pain experts, sports personalities who had successfully managed back pain, actors, comedians, healthcare professionals, Minister for Health</td>
<td>Support from a well-known Scottish sports personality produced extensive (free) press and television news cover</td>
<td>Local healthcare professionals and organizations, Olympic Gold Medalist</td>
<td>Animation figure (humorous)</td>
<td></td>
</tr>
<tr>
<td>Overall cost</td>
<td>USD $7·6 million</td>
<td>~USD $400,000</td>
<td>USD $934,500</td>
<td>USD $1·1 million</td>
</tr>
<tr>
<td>Results</td>
<td>Improvements in back pain beliefs in Victoria (Back Beliefs Questionnaire scores 26·5,28·4,29·7), v control (26·3,26·2,26·3).</td>
<td>Significant change in back pain beliefs, from ~55% rest versus 40% staying active to ~30% rest versus 60% staying active (p &lt; 0·001)</td>
<td>Proportion agreeing with statement about staying active increased from 56% to 63% (p=0·008) with no change in control (consistently ~60%).</td>
<td>Improvement in beliefs, eg. beliefs about the use of X-rays and importance of remaining active and at work.</td>
</tr>
<tr>
<td></td>
<td>Reduction in number of claims (15%), medical payments for claims for back pain (20%) and rate of days compensated</td>
<td>No effect on sickness absence or new awards of social security benefits for back pain</td>
<td>No effect on healthcare use (imaging or visits to health professionals or work disability claims)</td>
<td>No corresponding change in healthcare utilization (imaging or surgery for back pain)</td>
</tr>
</tbody>
</table>
Australian PH campaign

- Changes in back beliefs
- Change in claim behaviours
More personalised targeted approach

- Netherlands
- Inspired by the Australian campaign
- 779 patients
- 53 GPs
- Stepped wedge RCT

- Multidisciplinary training for professionals (GPs, PTs & OPs)
- Website & social media with videomessages for LBP patients
Results

Multifaceted strategy

58% of GPs attended the training

Guideline adherence (n = 5130 contacts)
- referrals to neurologists
- referrals to other specialists
- referrals diagnostic imaging
- collaboration in primary care

Clinical outcomes (n = 779 patients)
- Back Beliefs
- Functional Status
- Work status

healthcare costs
productivity loss costs

55% of patients used website/ social media/ videomessage
<table>
<thead>
<tr>
<th>Cost category</th>
<th>Mean costs (SEM) in €</th>
<th>Δ Costs (95%-CI) in €</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td><strong>Direct costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary care</td>
<td>340 (26)</td>
<td>405 (26)</td>
</tr>
<tr>
<td>Secondary care</td>
<td>478 (228)</td>
<td>229 (42)</td>
</tr>
<tr>
<td>Alternative care</td>
<td>742 (218)</td>
<td>322 (55)</td>
</tr>
<tr>
<td>Medication</td>
<td>29 (7)</td>
<td>44 (9)</td>
</tr>
<tr>
<td>Intervention</td>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td><strong>Indirect costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absenteeism</td>
<td>1034 (242)</td>
<td>1547 (235)</td>
</tr>
<tr>
<td>Presenteeism</td>
<td>5735 (681)</td>
<td>6342 (537)</td>
</tr>
<tr>
<td>Unpaid productivity</td>
<td>4000 (887)</td>
<td>5047 (616)</td>
</tr>
<tr>
<td><strong>Total societal costs</strong></td>
<td>8444 (820)</td>
<td>8979 (619)</td>
</tr>
</tbody>
</table>
Key message: Public health strategies

Promising PH strategies include:
• Replication Australian mass media campaign in other countries
  • Focus on change of behavior

• More targeted & personalized approach using multimedia & ehealth

• the concept of ‘positive health’ in LBP campaigns: Self manage and adapt
Promising New Directions

• Public health system
✓ Social/Compensation system
• Work system
• Healthcare system

Foster et al. Lancet 2018
Compensation systems

Substantial differences between compensation systems in

- **LBP-related claim rates** for disability benefits
  - USA 60 times higher than Japan (Volinn et al. 2005)
  - claims in Brazil 5-6 times higher in more developed states (Vieira et al. 2011)

- **Claim duration**
  - Change from a fault-based to no fault-based system (Cassidy 2003; Elbers 2016; Souza 2012)
Canada:

Change from fault to no fault compensation system

- LBP Claim rate after Traffic Collisions decreased from 256 -> 177/100,000 adults (-32%)
- Median LBP Claim duration decreased 505 days -> 210 days (-58%)

Figure 1. Kaplan–Meier estimates of time to claim closure for claimants with low back pain (n = 3,232). No-fault 1 denotes claimants from the first 6 months of the no-fault insurance period, and no-fault 2 denotes claimants from the second 6 months of the no-fault insurance period.
Australia:

Claim duration in different compensation systems

Victoria: 13.2 weeks
Tasmania: 7.2 weeks
Key message: social system strategies

Compensation systems have an influence on claim rate and duration.

Promising strategies in the social system include:
• Changes from fault to no fault systems.
Promising New Directions

• Public health system
• Social system
✓ Work system
• Healthcare system
Fit the job to the worker
Multinational Cohort study (n=2825) on chronic LBP in 6 countries:

- Initiated by the ISSA
- Study impact of system factors on RTW

Cross national analysis

- Identical inclusion criteria: > 3mths sick listed due to LBP
- Pooled international dataset
Six country study
- N=2865 compensation claimants with chronic LBP
- 22% RTW in Germany vs 62% in Netherlands
- Differences explained by work interventions

Anema et al 2009 JOR
Reform of the Dutch system as an example

New laws:
- make a return-to-work plan agreed by employer & employee
- penalties when RTW plan was inadequate or not executed by employer
- pay 70-100% wages to their sick employees for 2 years
- Medical assessments for work disability benefits postponed to 2 years
Effects of the policy reforms on LBP compensation claims

Lancet 2018 reproduced from Lambeek et al. 2011
Effect work interventions for LBP on RTW

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>UC</th>
<th>SD</th>
<th>Total</th>
<th>Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Musculoskeletal disorders</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anema/Steenstra 2007</td>
<td>135.1</td>
<td>95.6</td>
<td>100</td>
<td>108.4</td>
<td>76.8</td>
<td>96</td>
<td>14.0%</td>
<td>26.70 [2.47, 50.93]</td>
<td></td>
</tr>
<tr>
<td>Amelt 2003</td>
<td>197.9</td>
<td>118.8</td>
<td>72</td>
<td>144.9</td>
<td>65</td>
<td>12.9%</td>
<td>53.00 [17.12, 88.88]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Busch 2011</td>
<td>525.5</td>
<td>417.5</td>
<td>16</td>
<td>585.5</td>
<td>410.3</td>
<td>49</td>
<td>1.8%</td>
<td>-60.00 [-296.62, 176.62]</td>
<td></td>
</tr>
<tr>
<td>Busch 2011</td>
<td>525.5</td>
<td>417.5</td>
<td>16</td>
<td>466.5</td>
<td>353.9</td>
<td>63</td>
<td>2.0%</td>
<td>-59.00 [-163.46, 281.48]</td>
<td></td>
</tr>
<tr>
<td>Busch 2011</td>
<td>525.5</td>
<td>417.5</td>
<td>16</td>
<td>531.5</td>
<td>405.4</td>
<td>54</td>
<td>1.9%</td>
<td>-8.00 [-237.39, 225.39]</td>
<td></td>
</tr>
<tr>
<td>Büttmann 2009</td>
<td>134.8</td>
<td>90.4</td>
<td>47</td>
<td>88.7</td>
<td>76.4</td>
<td>66</td>
<td>13.3%</td>
<td>46.10 [14.36, 77.84]</td>
<td></td>
</tr>
<tr>
<td>Lambeek 2010</td>
<td>197.63</td>
<td>15.68</td>
<td>68</td>
<td>129.44</td>
<td>14.52</td>
<td>66</td>
<td>15.0%</td>
<td>68.19 [63.08, 73.30]</td>
<td></td>
</tr>
<tr>
<td>Verbeek 2002</td>
<td>134</td>
<td>126</td>
<td>49</td>
<td>114</td>
<td>113</td>
<td>50</td>
<td>11.7%</td>
<td>20.00 [-7.18, 67.18]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>384</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 377.41; Chi² = 17.83, df = 7 (P = 0.01); I² = 61%
Test for overall effect: Z = 4.23 (P < 0.0001)

<table>
<thead>
<tr>
<th>Mental health problems</th>
<th>UC</th>
<th>SD</th>
<th>Total</th>
<th>Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van Oostrom 2010</td>
<td>141</td>
<td>12.9</td>
<td>72</td>
<td>140.9</td>
<td>13.2</td>
<td>73</td>
<td>15.1%</td>
<td>0.10 [-4.15, 4.35]</td>
<td></td>
</tr>
<tr>
<td>Vlasveld 2012</td>
<td>210</td>
<td>124</td>
<td>61</td>
<td>190</td>
<td>120</td>
<td>65</td>
<td>12.2%</td>
<td>20.00 [-22.65, 62.65]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>133</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.00; Chi² = 0.83, df = 1 (P = 0.36); I² = 0%
Test for overall effect: Z = 0.14 (P = 0.89)

Total (95% CI) | 517 | 647 | 100.0% | 31.76 [-2.24, 65.75] |

Heterogeneity: Tau² = 1983.87; Chi² = 406.93, df = 9 (P < 0.00001); I² = 98%
Test for overall effect: Z = 1.83 (P = 0.07)
Test for subgroup differences: Chi² = 17.00, df = 1 (P < 0.0001), I² = 94.1%

Effective for MSD, but not mental disorders

Cochrane review, Vilsteren.. Anema; 2015
Key message: work system strategies

Promising strategies in the work system include
• changes from passive benefit systems and legislation towards work accommodation promoting systems (OECD recommendations)
• accommodate the workplace with the support of the employer for RTW for MSK
Promising New Directions

• Public health system
• Social system
• Work system
✓ Healthcare system
Integrating occupational health in health care

• UK example in primary care
• Netherlands example in secondary care
UK example: stepped primary care pathway

**Step 1:** Telephone contact with the VA
- Initial assessment of beliefs about work and health and obstacles to remaining in/returning to work.
- Discuss date for return to work.

**Step 2:** Face to face meeting with the VA
- Assessment of obstacles to work.
- Develop strategies to tackle these.
- Develop return to work plan.

**Step 3:** Further face to face meetings with the VA
- Targeted advice.
- Contact workplace and other services (as required).
- Set new date for RTW.

*Figure 1. Model of stepped care provided by the vocational advisor (VA). RTW, return to work.*

Wynne-Jones et al., 2018
## Results

<table>
<thead>
<tr>
<th>Cost analysis</th>
<th>Intervention arm; n = 109</th>
<th>Control arm; n = 131</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD) NHS cost (£)</td>
<td>528.34 (1110.49)</td>
<td>480.29 (938.77)</td>
</tr>
<tr>
<td>Adjusted mean difference (95% CI) [P-value]*</td>
<td>48.04 (−209.58 to 305.68) [0.715]</td>
<td></td>
</tr>
<tr>
<td>Mean (SD) health care cost (£)</td>
<td>568.10 (1127.39)</td>
<td>553.32 (976.58)</td>
</tr>
<tr>
<td>Adjusted mean difference (95% CI) [P-value]*</td>
<td>14.78† (−249.76 to 279.33) [0.913]</td>
<td></td>
</tr>
<tr>
<td>Total indirect costs (Benefit) (£)</td>
<td>1636.69 (3671.02)</td>
<td>2257.56 (5233.29)</td>
</tr>
<tr>
<td>Adjusted mean difference (95% CI) [P-value]*</td>
<td>−748** (−2278.45 to 781.44)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effectiveness analysis (work-related outcomes)</th>
<th>Intervention arm; n = 109</th>
<th>Control arm; n = 131</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD) days off work</td>
<td>20.26 (40.63)</td>
<td>24.34 (50.67)</td>
</tr>
<tr>
<td>Adjusted days off work; mean difference (95% Cls) [P-value]*</td>
<td>−6.67 (−23.55 to 10.20) [0.438]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost effectiveness and cost–benefit analyses</th>
<th>Intervention arm; n = 109</th>
<th>Control arm; n = 131</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICER NHS perspective</td>
<td></td>
<td>−£7.2 per sick day avoided</td>
</tr>
<tr>
<td>ICER health care perspective</td>
<td></td>
<td>−£2.2 per sick day avoided</td>
</tr>
<tr>
<td>Net societal benefit</td>
<td></td>
<td>£733 (£748* −£15†)</td>
</tr>
<tr>
<td>Return on investment (per £1 invested)</td>
<td></td>
<td>£49 (£733/£15†)</td>
</tr>
</tbody>
</table>
Dutch example: Integrated care pathway for chronic back pain

- Team: OP, orthopedic surgeon, neurologist, PT, OT
- RTW = a shared treatment goal
- Graded activity & workplace intervention

Lambeek et al. BMJ 2010
Chronic back pain patients sicklisted ½ yr

• sustainable full RTW: 4 mnths earlier
• functional status in private life improved
• Very satisfied patients (mean >8)
Pooled mean total effects and costs

<table>
<thead>
<tr>
<th>Pooled variables</th>
<th>Mean total effect (SD)</th>
<th>Mean difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Integrated care (n=66)</td>
<td>Usual care (n=68)</td>
</tr>
<tr>
<td>Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD) total effect:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days until sustainable return to work</td>
<td>129 (117)</td>
<td>197 (129)</td>
</tr>
<tr>
<td>QALY</td>
<td>0.74 (0.19)</td>
<td>0.65 (0.21)</td>
</tr>
<tr>
<td>Costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD) total costs (£):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total direct costs*</td>
<td>1479 (1133)</td>
<td>1262 (1094)</td>
</tr>
<tr>
<td>Primary care costs</td>
<td>1251 (700)</td>
<td>857 (758)</td>
</tr>
<tr>
<td>Secondary care costs</td>
<td>124 (416)</td>
<td>247 (425)</td>
</tr>
<tr>
<td>Direct non-healthcare costs</td>
<td>104 (225)</td>
<td>159 (325)</td>
</tr>
<tr>
<td>Total indirect costs</td>
<td>11 686 (12 553)</td>
<td>17 213 (13 416)</td>
</tr>
<tr>
<td>Total costs†</td>
<td>13 165 (13 600)</td>
<td>18 475 (13 616)</td>
</tr>
</tbody>
</table>

*Direct healthcare costs added to direct non-healthcare costs.
†Total direct costs added to indirect costs.

ROI 1:26
Promising example educational & reimbursement strategy

Example USA

- HCP received education on OH best practices and incentive pay for following best practices
- Results (n=15322 LBP patients)
  - RR of being off work and on disability due to LBP at 1 year was 37% lower for COHE patients compared to comparison patients
  - Reduction of LBP disability claim costs of $542 per claim for COHE patients (p<.0001)
Key message: health care system strategies

Promising strategies in the health care system include
• redesign of clinical pathways towards integrated health and occupational care with focus on SAW/RTW
• Change reimbursement from pay for service towards pay for performance
Promising directions for work participation

- Invest in public health strategies and campaigns to change public’s beliefs and behaviours
- Change compensation and disability policies towards more employment promoting systems
- Work interventions are most effective
- Change clinical pathways for low back pain by integrating occupational health interventions
- Change reimbursement system towards pay for performance with work participation as a goal

Foster et al. 2018, Lancet
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