Stratified care, psychological approaches and patient outcomes

Dr Jonathan Hill
NIHR Senior Lecturer in Physiotherapy
Keele University UK
Has risk stratification worked?

The STarT Back Screening Tool

- Referred leg pain
- Comorbid pain elsewhere
- Disability
- Fear avoidance
- Anxiety
- Catastrophising
- Depression
- Overall impact

Advice, reassurance, & medication. Avoid over treatment & investigation

“Right person, right place, right time”

Combined physical & psychosocial treatment with more time & skills

Evidence based conservative approaches

www.keele.ac.uk/startback
Research overview

- Hill et al 2008 (n=500) - Validated prognostic tool
- Hill et al 2011 (n=851) - Proof of principle RCT
- Foster et al 2014 (n=922) - GP implementation & Qualitative research
- NICE 2016 - NICE recommended National roll out
Trial Design 2007-2010

 Adults with low back pain invited to a physio clinic
(n = 2793)
  - identified in 10 general practices
  - attended a back pain triage clinic

 Consent and eligibility
Randomisation
(n = 851)

(n = 568)
Stratified care
  - Low-risk Minimal care
  - Medium-risk Referral to PT
  - High-risk Referral to PT

(n = 283)
Control group
  - Self-manage Minimal care
  - Referral to PT

Adults with low back pain invited to a physio clinic
(n = 2793)
- identified in 10 general practices
- attended a back pain triage clinic

Consent and eligibility
Randomisation
(n = 851)

Stratified care
(n = 568)
- Low-risk Minimal care
- Medium-risk Referral to PT
- High-risk Referral to PT

Control group
(n = 283)
- Self-manage Minimal care
- Referral to PT
At 4 and 12 months there were significant improvements in:

- disability (RMDQ) between-group differences
  1.8 (95%CI 1.1, 2.6) at 4 months
  1.1 (95%CI 0.3, 1.9) at 12 months

- fear avoidance beliefs
- time off work
- global improvement ratings
- patient satisfaction
- quality of life

Targeted treatment was significantly cheaper: saving £34
How did it work?

- It improves the pathway by changing “who gets what treatment and when”
- It promotes self-management and prevents over-treatment of low risk patients
- It fast-tracks ‘at risk’ individuals to get more treatment
- It ensures distressed patients get a combined physical & psychological approach
- It improves efficiency within the back pain pathway and is cost-effective
Do we need psychologically informed practice?

High-risk patients only

Distress involving:
- Fear avoidance
- Pain catastrophising
- Anxiety
- Low mood

Dr Gemma Mansell
Mediation analyses


Overall effect = 0.3
Mediating path = 0.25
Significant mediator!

Through support from the AHSN over 20 services in the West Midlands have had their physiotherapists trained in a psychologically informed approach
Post STarT Back

Validated prognostic tool
Hill et al 2008 (n=500)
Published validation & translation studies
Brazilian & Portuguese Portuguese, Children's version, Danish, Finnish, French, German, Iranian, Japanese, Mandarin, Persian, Spanish, Swedish, Osteopaths, Chiropractors.

Proof of principle RCT
Hill et al 2011 (n=851)
Funded replication RCTs
Susan Murphy – Ireland
Dan Cherkin – Seattle USA
Tony Delitto – 5 Centres across USA
Lars Morsoe – Southern Denmark
Sharon Henry – Vermont, USA
Portugal – Australia - New Zealand

Implementation & Qualitative research
Foster et al 2014 (n=922)
Implementation research planned
Simon French – Canada
Martin Jensen – Denmark
Sven Karstens – Germany
Jaro Karpinnen - Finland

Problems in A&E + Private care
Not easy to do
Payment of physiotherapists is a major barrier
Influence of episode duration on outcome

Data from Emily Karlen, Fairview, Minnesota, USA

Do we like American model of fast access, greater inefficiency & over-treatment or do we like our streamlined NHS care with poor access & under treatment?
The STarT MSK Trial:
Risk stratification for common musculoskeletal conditions

Dr Jonathan Hill
on behalf of the study team

This research is funded by the NIHR Programme Grants for Applied Research programme (Grant reference number: RP-PG-1211-20010). The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.
Can the STarT Back stratified care approach be extended to other MSK conditions?

Talk by Nadine Foster: (give time and date here)
“Refinement & validation of the Keele STarT MSK Tool© for musculoskeletal pain in primary care”
Cluster Trial Design (n=1800)

24 practices to be randomised.

12 intervention practices (new approach)
- GPs complete STarT MSK Tool
  - Low risk GP manages
  - Medium risk Physiotherapy
  - High risk Enhanced PT

12 control practices (usual practice)
- Usual GP care for MSK patients
  - Referred for physiotherapy if GP thinks this is appropriate

1. Postal questionnaires (initial & 6 months later)
2. Monthly text or postcards about their pain, distress and self-efficacy
3. Medical record review to examine GP behaviour changes (e.g. referrals)
4. Clinical and cost-effectiveness analysis
5. Process evaluation: Interviews with patients & clinicians, + mediation analysis
3 month Pilot: early findings
3 month Pilot: early findings

<table>
<thead>
<tr>
<th>Count of Patient Details</th>
<th>Column Labels</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row Labels</td>
<td>Back</td>
<td>22</td>
<td>11</td>
<td>12</td>
<td>11</td>
<td>62</td>
<td>143</td>
<td>77</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>Knee</td>
<td>39</td>
<td>11</td>
<td>24</td>
<td>6</td>
<td>36</td>
<td>28</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Multisite</td>
<td>10</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>28</td>
<td>23</td>
<td>13</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>Neck</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>19</td>
<td>39</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Shoulder</td>
<td>38</td>
<td>11</td>
<td>8</td>
<td>8</td>
<td>11</td>
<td>80</td>
<td>52</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Incomplete data</td>
<td>16</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>?Escaped without using</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Pain site only</td>
<td>15</td>
<td>5</td>
<td></td>
<td></td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>vulnerable pt</td>
<td>10</td>
<td>15</td>
<td>1</td>
<td>3</td>
<td>26</td>
<td>13</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>not trial specific pain site</td>
<td>13</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>25</td>
<td>34</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Suspected serious pathology</td>
<td>2</td>
<td>5</td>
<td></td>
<td></td>
<td>4</td>
<td>2</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>No time</td>
<td>127</td>
<td>98</td>
<td>8</td>
<td>47</td>
<td>125</td>
<td>63</td>
<td>185</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Patient not present</td>
<td>130</td>
<td>24</td>
<td>5</td>
<td>94</td>
<td>72</td>
<td>124</td>
<td>72</td>
<td>521</td>
</tr>
<tr>
<td></td>
<td>No time - Subsequent invited</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Patient not present - subsequent invited</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No time - subsequent not trial pain site</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Patient not present - subsequent vulnerable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Patient not present 2nd - subsequent invited</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>not trial specific pain site</td>
<td>2</td>
<td>4</td>
<td>14</td>
<td>5</td>
<td>7</td>
<td>3</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Grand Total</td>
<td>431</td>
<td>196</td>
<td>67</td>
<td>91</td>
<td>432</td>
<td>547</td>
<td>667</td>
<td>396</td>
<td>2827</td>
</tr>
</tbody>
</table>

Pink = GPs completed the template  n=1140 (41%)
Light and dark blue = GPs failed to complete the template  n=1394 (50%)
Yellow = GPs excluded patient  n=240 (9%)

GP engagement with tool in intervention practices 42%, in control practices 54%
### GP Intervention Treatments

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advice - verbal</td>
<td>226</td>
</tr>
<tr>
<td>Advice – written</td>
<td>247</td>
</tr>
<tr>
<td>Advice - OTC meds</td>
<td>91</td>
</tr>
<tr>
<td>GP follow up in 6 weeks if no better</td>
<td>76</td>
</tr>
<tr>
<td>refer to physiotherapy</td>
<td>99</td>
</tr>
<tr>
<td>refer to MSK interface clinic</td>
<td>47</td>
</tr>
<tr>
<td>Refer to Occupational Health</td>
<td>18</td>
</tr>
<tr>
<td>refer to pain management service</td>
<td>4</td>
</tr>
<tr>
<td>personalised exercise programme</td>
<td>6</td>
</tr>
<tr>
<td>prescribe atypical analgesia</td>
<td>70</td>
</tr>
<tr>
<td>Address comorbidity, distress &amp; frailty</td>
<td>15</td>
</tr>
<tr>
<td>Refer for surgical opinion</td>
<td>14</td>
</tr>
<tr>
<td>Prescribe opioid</td>
<td>11</td>
</tr>
<tr>
<td>Refer to Rheumatology</td>
<td>3</td>
</tr>
<tr>
<td>Corticosteroid injection</td>
<td>5</td>
</tr>
<tr>
<td>Refer to peer support group</td>
<td>2</td>
</tr>
<tr>
<td>Signpost/refer to lifestyle interventions</td>
<td>2</td>
</tr>
</tbody>
</table>

38% were low risk........... 2% over-treated  
52% were medium risk... 76% appropriately referred/treated  
10% were high risk............. 51% appropriately treated  
(~30% were under treated)

GP engagement with matched treatment for medium and high = 69%
Stratified care: future directions

Back-Up: Personalised Prognostic Models to Improve Return to Work After Neck and Back Pain

What is the individual’s likely outcome? How long before they are back at work?

1. Supported self-management, SUPPORT Back and Self-Back
2. Conservative Treatment
3. Combined Physical and psychological
4. Radiculopathy – SCOPiC algorithm
5. Struggling at work – early vocational rehab
6. Low health literacy – peer group mentoring
Empowering patients in their MSK care using the Musculoskeletal Health Questionnaire (MSK-HQ)

(ARUK funded project Starting in April 2017)

Jonathan Hill, Steven Blackburn, Jo Protheroe, Martyn Lewis, Alan Rawlings, Andrew Price, Krysia Dziedzic, Gail Sowden, Elizabeth Gibbons, Georgina Craig, Toby Knightley-Day, Kay Stevenson, Ajit Menon, Elaine Hay
MUSCULOSKELETAL HEALTH QUESTIONNAIRE (MSK-HQ)

This questionnaire is about your joint, back, neck, bone and muscle symptoms such as aches, pains and/or stiffness. Please focus on the particular health problem(s) for which you sought treatment from this service.

For each question tick (✓) one box to indicate which statement best describes you over the last 2 weeks.

1. Pain/stiffness during the day
   How severe was your usual joint or muscle pain and/or stiffness overall during the day in the last 2 weeks?
   Not at all  Slightly  Moderately  Fairly severe  Very severe
   □ 4  □ 3  □ 2  □ 1  □ 0

2. Pain/stiffness during the night
   How severe was your usual joint or muscle pain and/or stiffness overall during the night in the last 2 weeks?
   Not at all  Slightly  Moderately  Fairly severe  Very severe
   □ 4  □ 3  □ 2  □ 1  □ 0

3. Walking
   How much have your symptoms interfered with your ability to walk in the last 2 weeks?
   Not at all  Slightly  Moderately  Severely  Unable to walk
   □ 4  □ 3  □ 2  □ 1  □ 0

4. Washing/Dressing
   How much have your symptoms interfered with your ability to wash or dress yourself in the last 2 weeks?
   Not at all  Slightly  Moderately  Severely  Unable to wash or dress myself
   □ 4  □ 3  □ 2  □ 1  □ 0

5. Physical activity levels
   How much has it been a problem for you to do physical activities (e.g. going for a walk or jogging) to the level you want because of your joint or muscle symptoms in the last 2 weeks?
   Not at all  Slightly  Moderately  Very much  Unable to do physical activities
   □ 4  □ 3  □ 2  □ 1  □ 0

6. Work/daily routine
   How much have your joint or muscle symptoms interfered with your work or daily routines in the last 2 weeks (including work & jobs around the house)?
   Not at all  Slightly  Moderately  Severely  Extremely
   □ 4  □ 3  □ 2  □ 1  □ 0

7. Social activities and hobbies
   How much have your joint or muscle symptoms interfered with your social activities and hobbies in the last 2 weeks?
   Not at all  Slightly  Moderately  Severely  Extremely
   □ 4  □ 3  □ 2  □ 1  □ 0

8. Needing help
   How often have you needed help from others (including family, friends or carers) because of your joint or muscle symptoms in the last 2 weeks?
   Not at all  Rarely  Sometimes  Frequently  All the time
   □ 4  □ 3  □ 2  □ 1  □ 0

9. Sleep
   How often have you had trouble with either falling asleep or staying asleep because of your joint or muscle symptoms in the last 2 weeks?
   Not at all  Rarely  Sometimes  Frequently  Every night
   □ 4  □ 3  □ 2  □ 1  □ 0

10. Fatigue or low energy
    How much fatigue or low energy have you felt in the last 2 weeks?
    Not at all  Slight  Moderate  Severe  Extreme
    □ 4  □ 3  □ 2  □ 1  □ 0

11. Emotional well-being
    How much have you felt anxious or low in your mood because of your joint or muscle symptoms in the last 2 weeks?
    Not at all  Slight  Moderate  Severe  Extremely
    □ 4  □ 3  □ 2  □ 1  □ 0

12. Understanding of your condition and any current treatment
    Thinking about your joint or muscle symptoms, how well do you feel you understand your condition and any current treatment (including your diagnosis and medication)?
    Completely  Very well  Moderately  Slightly  Not at all
    □ 4  □ 3  □ 2  □ 1  □ 0

13. Confidence in being able to manage your symptoms
    How confident have you felt in being able to manage your joint or muscle symptoms by yourself in the last 2 weeks (e.g. medication, changing lifestyle)?
    Extremely  Very  Moderately  Slightly  Not at all
    □ 4  □ 3  □ 2  □ 1  □ 0

14. Overall impact
    How much have your joint or muscle symptoms bothered you overall in the last 2 weeks?
    Not at all  Slightly  Moderately  Very much  Extremely
    □ 4  □ 3  □ 2  □ 1  □ 0

Physical activity levels
In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your heart rate? This may include sports, exercise and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that is part of your job.

None  1 day  2 days  3 days  4 days  5 days  6 days  7 days
□ 4  □ 3  □ 2  □ 1  □ 0

Thank you for completing this questionnaire.

The MSK-HQ total score is the sum of items 1-14, using the response values provided.

MSK-HQ – Questionnaire for joint, back, neck, bone and muscle symptoms
Any and all copyright © for the MSK-HQ rests in Oxford University Innovations 2014. The authors acknowledge the kind support of Arthritis Research UK in the development of the MSK-HQ.
Health domains measured by the MSK-HQ

- Pain
- Mobility
- Physical activity
- Sleep
- Social interference
- Work/Daily routine
- Independence
- Understanding of condition & treatment
- Confidence to manage symptoms
- Washing/dressing
- Fatigue
- Overall impact
What is the MSK-HQ minimal important change?

MIC for the MSK-HQ, overall and by each cohort (dichotomising the global change into much better/a little better vs. same/a little worse/much worse)

<table>
<thead>
<tr>
<th>Cohorts</th>
<th>Optimal cut-point</th>
<th>AUC (95% CI)</th>
<th>Sensitivity at cut-point</th>
<th>Specificity at cut-point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>9.5</td>
<td>0.85 (0.81, 0.89)</td>
<td>0.72</td>
<td>0.87</td>
</tr>
<tr>
<td>Hip</td>
<td>13.5</td>
<td>0.94 (0.90, 0.99)</td>
<td>0.79</td>
<td>1.00</td>
</tr>
<tr>
<td>Knee</td>
<td>4.5</td>
<td>0.91 (0.85, 0.97)</td>
<td>0.83</td>
<td>0.88</td>
</tr>
<tr>
<td>Physio</td>
<td>5.5</td>
<td>0.76 (0.68, 0.84)</td>
<td>0.71</td>
<td>0.71</td>
</tr>
<tr>
<td>Shoulder</td>
<td>11.5</td>
<td>0.74 (0.56, 0.92)</td>
<td>0.48</td>
<td>1.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Baseline SD</th>
<th>SEM</th>
<th>MDC_{95}</th>
<th>MDC_{90}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>10.4</td>
<td>4.17</td>
<td>11.55</td>
<td>6.88</td>
</tr>
<tr>
<td>Hip</td>
<td>8.3</td>
<td>3.31</td>
<td>9.16</td>
<td>5.45</td>
</tr>
<tr>
<td>Knee</td>
<td>9.0</td>
<td>3.61</td>
<td>10.01</td>
<td>5.96</td>
</tr>
<tr>
<td>Physio</td>
<td>9.6</td>
<td>3.83</td>
<td>10.60</td>
<td>6.31</td>
</tr>
<tr>
<td>Rheum</td>
<td>11.8</td>
<td>4.73</td>
<td>13.10</td>
<td>7.80</td>
</tr>
<tr>
<td>Shoulder</td>
<td>10.4</td>
<td>4.16</td>
<td>11.53</td>
<td>6.87</td>
</tr>
</tbody>
</table>
How does MSK-HQ compare to condition specific measures?
Need for better care planning

- Patients often do not get to talk about what matters to them
- It can be hard in busy clinics to deliver patient centred care
- Health care planning is not done well in MSK clinics

1. “You never really get a chance to say what you want to say in a consultation.”

2. “It would be great to have a clearer starting-point for the consultation”

3. “I’d like more opportunities to discuss the things that are important to me”

3. “The patient is the only constant - it’s my journey and I should be in charge.”
Vision for our MSK-HQ project intervention

1. **Consultation Preparation:** through MSK-HQ assessment and creating a clinic agenda

2. **Discuss:** digital dashboard to shape clinic conversation

3. **Document Summary Action Plan:** action plan made with signposting to information

4. **Tracker:** Follow-up to monitor progress at 2 weeks & 3 months using MSK-HQ charts and optional Goal Setting and Motivation module

Designed to be co-created with the MSK clinic - but then patient owned long-term
Transform MSK

Improving care by sharing outcome comparisons of musculoskeletal physiotherapy providers

- Over 200 license requests given since October
- Opportunity to collect PROMs data across the UK
- Urgent need to sort out case-mix adjustment
- Need to collect consistent data (e.g. Bs + 3m FU)
- Need to set national Benchmarks (e.g. 65% achieve MIC, after case-mix adjustment)
- Identify best practice and poor performance
- Work out how to present data for Quality Improvement purposes and not competition
Thank you for listening

Jonathan Hill email j.hill@keele.ac.uk