FROM EVIDENCE TO POPULATION IMPACT - Implementing a Sports Safety Program In Community Sport

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RESEARCH HIERARCHY

EFFICACY
• What is the overall impact of it in this relatively homogenous population?

EFFECTIVENESS
• Who benefits from it, and for how long, in more realistic settings?

IMPLEMENTATION
• Which strategies inform how it is delivered, increases its speed of implementation, the quality of its program delivery (fidelity), and the access or penetration of it?
Efficacy
• What is the overall impact of it in this relatively homogenous population?

Effectiveness
• Who benefits from it, and for how long, in more realistic settings?

Implementation
• Which strategies inform how it is delivered, increases its speed of implementation, the quality of its program delivery (fidelity), and the access or penetration of it?
IMPACT ON DIRECT PRACTICE

EFFICACY
• What is the overall impact of it in this relatively homogenous population?

EFFECTIVENESS
• Who benefits from it, and for how long, in more realistic settings?

IMPLEMENTATION
• Which strategies inform how it is delivered, increases its speed of implementation, the quality of its program delivery (fidelity), and the access or penetration of it?
Research alone is not sufficient to prevent sports injury

Dale Hanson,¹ John P Allegrante,²,³ David A Sleet,⁴ Caroline F Finch⁵
The incidence and burden of hospital-treated sports-related injury in people aged 15+ years in Victoria, Australia, 2004–2010: a future epidemic of osteoarthritis?

C.F. Finch †*, J.L. Kemp †*, A.J. Clapperton †

* All: 24% (9-41) ** ED: 28% (10-47) *** ADM: 16% (5-29)
Osteoarthritis and Cartilage

The incidence and burden of hospital-treated sports-related injury in people aged 15+ years in Victoria, Australia, 2004–2010: a future epidemic of osteoarthritis?

C.F. Finch †, J.L. Kemp †, A.J. Clapperton †

Reasons

- Few of the targeted participants adopt IPEPs
- Perceptions that IPEPs not relevant to all real-world implementation settings/contexts
- No appreciation that delivery agents and end users are different
IMPLEMENTATION IMPACT - The RE-AIM Model

Reach
- **People** need to know about it

Effectiveness
- **It** needs to work

Adoption
- **People** have to use/do **it**

Implementation
- **People** need to do **it** properly

Maintenance
- **People** need to keep doing **it**

See many papers by Glasgow, et al.
REPORTING OF RE-AIM ITEMS IN 52 TRIALS
(O’Brien & Finch, Sports Med, 2014)

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Reach</td>
<td>34%</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>58%</td>
</tr>
<tr>
<td>Adoption setting</td>
<td>1%</td>
</tr>
<tr>
<td>Adoption staff</td>
<td>7%</td>
</tr>
<tr>
<td>Implementation</td>
<td>37%</td>
</tr>
<tr>
<td>Maintenance individual</td>
<td>1%</td>
</tr>
<tr>
<td>Maintenance setting</td>
<td>0%</td>
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The Implementation of Musculoskeletal Injury-Prevention Exercise Programmes in Team Ball Sports: A Systematic Review Employing the RE-AIM Framework

James O’Brien · Caroline F. Finch
## THE WHAT, WHO AND HOW

<table>
<thead>
<tr>
<th>RE-AIM</th>
<th>DESIGN PHASE</th>
</tr>
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<tbody>
<tr>
<td>The intervention Itself – “the prevention product”</td>
<td>The implementation delivery plan – “the marketing of the product”</td>
</tr>
<tr>
<td>Reach</td>
<td></td>
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<tr>
<td>Effectiveness</td>
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<tr>
<td>Adoption</td>
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<tr>
<td>Maintenance</td>
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Towards a national sports safety strategy: addressing facilitators and barriers towards safety guideline uptake

Caroline F Finch, Belinda J Gabbe, David G Lloyd, Jill Cook, Warren Young, Matthew Nicholson, Hugh Seward, Alex Donaldson, Tim L A Doyle

IMPLEMENTATION SCIENCE

No longer lost in translation: the art and science of sports injury prevention implementation research

Caroline F Finch

Applying implementation science to sports injury prevention

Alex Donaldson, 1 Caroline F Finch 2

Recent commentary in the BJSM has argued that a key challenge for future sports injury prevention is to reduce the ‘research to practice’ gap. 1 Unfortunately, activities should not be attempted. Perhaps investigators should begin to report the challenges experienced when attempting to undertake system-wide implementation activities and to engage with other sectors as a reminder to the rest of us of the need to keep plugging away until we learn to do it better.

LEARNING FROM IMPLEMENTATION SCIENCE
AIMS of NoGAPS

1. Determine how evidence-based safety guidelines need to be developed, packaged and delivered to community sport

2. Identify factors that influence the translation of research evidence to population level impact

3. Provide evidence for the population level impact of an evidence-based LLI prevention exercise-training program in community AF
DEVELOPING AN EVIDENCE-INFORMED PROGRAM

• What injuries occur?
• What are the effective interventions?
• What should be the specific content of an exercise training program?
• What format should the program take?
• Do “expert” practitioners think it would work?
Stage I
- Collate evidence and develop a first version

Stage II
- Practitioner review of content and structure

Stage III
- Second version with expert-agreed content and design
PACKAGING THE PROGRAM FOR THE CONTEXT

• Can the program be fully understood by the end-users who will need to deliver it?

• How should the program be “packaged” for optimal uptake?

• What other documentation and support (e.g. training, policy, resources, etc.) is likely to be needed to disseminate the program?
APPROACH

Stage I

• Focus group consultation with community representatives
• Inform the design of a feasible delivery plan

Stage II

• Time and delivery trials with intended deliverers
• Lab trials and specific training to ensure delivery fidelity
• Interviews with intended end-users on program feasibility
• Refinement of the exercise guidelines
APPROACH cont.

Stage III

- Program badging - name and logo
- Production of resources appropriate for end-users and their needs
- Development of delivery plan
- Theoretical lens: Diffusion of Innovations theory
  - relative advantage (benefit over current practice)
  - compatibility (fit with current practice)
  - complexity (ease of implementation)
KEY LESSONS LEARNT

• Needs adaptability to different implementation contexts, even within a setting

• Fidelity whilst allowing modification for different participant capability

• Show that someone like me can do it

• Instructions on what not to do
Flow chart of steps to develop FootyFirst

- Confirmed nature and extent of the injury problem
- Identified potential evidence-based interventions
- Developed 1st draft of FootyFirst based on research and clinical experience of research team
- Gained expert consensus on proposed exercises and progressions
- Consulted coaches, players etc. about content, presentation and resource requirements
- Trialled proposed program with sample of coaches and players
- Evaluated content and presentation against Diffusion of Innovations attributes
- Engaged expert graphic designers and editors to produce program resources

Source: Donaldson et al, unpublished
Evidence, expert and context informed
Targeted at hamstring, groin, hip, knee and ankle injuries

• warm up + 5 progressive exercise levels
• performed 2 x 20 mins per week
• minimal equipment and skills required

Easy to understand and follow

• fits with usual practice
• similar to elite level
• common questions answered
FULLY SUPPORTED FOOTYFIRST IMPLEMENTATION PLAN

High profile launch

Opinion leader endorsement
• professional AFL coaches
• doctors, sports scientists & physiotherapists
• respected local coaches and fitness coaches

Communication strategy

Resources for coaches
• manuals
• posters
• CDs
• on-line video material

Coach training and mentoring

Audit and feedback
IMPLEMENTING AND EVALUATING FOOTYFIRST AND ITS DELIVERY

• Can community AF clubs implement the program?

• Does uptake depend on level of program support?

• Does FootyFirst work?

• Is it sustainable?
RANDOMISED ECOLOGICAL EVALUATION DESIGN

Region 1: Supported program (SP)  
Years 1+2

Region 2: Unsupported program (UP)  
Years 1+2

Region 3: Year 1=Control, Year 2=SP

>20 clubs, >40 teams, >1200 players per arm
RANDOMISED ECOLOGICAL EVALUATION DESIGN

Mode 1: Supported program (SP) Years 1+2
Mode 2: Unsupported program (UP) Years 1+2
Mode 3: Year 1=Control, Year 2=SP

>20 clubs, >40 teams, >1200 players per arm

<table>
<thead>
<tr>
<th>Region</th>
<th>Year 1</th>
<th>Year 2*</th>
<th>Year 1</th>
<th>Year 2*</th>
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</thead>
<tbody>
<tr>
<td>Region 1</td>
<td>SP</td>
<td>SP</td>
<td>REA I</td>
<td>REA IM</td>
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<tr>
<td>Region 2</td>
<td>UP</td>
<td>UP</td>
<td>REA I</td>
<td>REA IM</td>
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<tr>
<td>Region 3</td>
<td>-</td>
<td>SP</td>
<td>R</td>
<td>REA I</td>
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* Comparison of SP groups in Year 2, compares maintenance group with new adopters
RE-AIM EVALUATION DATA COLLECTION

- Mixed methods, pragmatic evaluation
  - online surveys and interviews
  - staff notes and records of participation in activities
  - direct observations
  - injury surveillance
  - prospective, self-reported implementation

- 2012, 2013 seasons

- Coaches, players, trainers, administrators
RE-AIM EVALUATION DATA COLLECTION

- Mixed-methods case
- Data sources collated on a per club basis
- Evidence was triangulated within RE-AIM dimensions

- For each club, each RE-AIM dimension independently scored by 2 raters
  - 0=no evidence of achievement
  - 1=evidence of partial achievement
  - 2=evidence of full achievement
EVALUATION OF SUCCESS OF FOOTYFIRST DELIVERY OVER 2-YEARS

(comparison of mean scores across groups p<0.011 for all RE-AIM dimensions)

Source, Donaldson et al, unpublished
IMPLEMENTING PROGRAMS IN COMMUNITY SPORT ALSO HAVE POPULATION IMPACT

State-wide hospital-treated injuries
- AF-related only
- Males
- April-September
- LLI injuries (ICD-coded)
- By region:
  - Region 1, 2, 3
  - All other parts of Vic

Interrupted time series
- GLS model
- Seasonally-adjusted monthly counts
- Trend
- Change in trend due to FootyFirst
- Change in trend due to change in admissions policy
TRENDS IN HOSPITAL-TREATED LLI BY DELIVERY ARM – 2-years

<table>
<thead>
<tr>
<th>Region</th>
<th>Year 1</th>
<th>Year 2</th>
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<tbody>
<tr>
<td>Region 1</td>
<td>SP</td>
<td>SP</td>
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<td>Region 2</td>
<td>UP</td>
<td>UP</td>
</tr>
<tr>
<td>Region 3</td>
<td>-</td>
<td>SP</td>
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</tbody>
</table>

Only Region 1, had significant decline p=0.01 post FootyFirst

Source: Finch et al, unpublished
### WHAT DOES THIS DIFFERENCE MEAN?

<table>
<thead>
<tr>
<th></th>
<th>Region 1 (SP, SP)</th>
<th>Region 2 (UP, UP)</th>
<th>Region 3 (Control, SP)</th>
<th>All other parts of the State</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average monthly number of hospital-treated LLIs pre 2012</strong></td>
<td>11.4</td>
<td>25.0</td>
<td>45.9</td>
<td>152.8</td>
</tr>
<tr>
<td><strong>Change in mean monthly number of hospital-treated LLI post-FootyFirst</strong></td>
<td><strong>19%↓</strong></td>
<td><strong>1%↑</strong></td>
<td><strong>14%↑</strong></td>
<td><strong>1%↑</strong></td>
</tr>
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The incidence and burden of hospital-treated sports-related injury in people aged 15+ years in Victoria, Australia, 2004–2010: a future epidemic of osteoarthritis?

C.F. Finch †*, J.L. Kemp †*, A.J. Clapperton †

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<tr>
<td>The healthcare burden of hospital-treated sports injury — overall, all lower limb injuries, and knee and lower leg injuries in people aged 15+ years, Victoria, Australia 2004–2010</td>
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<table>
<thead>
<tr>
<th>Frequency</th>
<th>N</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Knee/lower leg injuries</td>
<td>29,430</td>
<td>17.8</td>
</tr>
<tr>
<td>Lower limb injuries</td>
<td>59,399</td>
<td>35.9</td>
</tr>
<tr>
<td>All sports injuries</td>
<td>165,496</td>
<td>100.0%</td>
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<tr>
<th>Direct hospital costs</th>
<th>SAUD</th>
<th>Mean per case (SAUD)</th>
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<tbody>
<tr>
<td>Knee/lower leg injuries</td>
<td>$82,200,173</td>
<td>$2,273</td>
</tr>
<tr>
<td>Lower limb injuries</td>
<td>$110,264,776</td>
<td>$1,856</td>
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<tr>
<td>All sports injuries</td>
<td>$265,161,850</td>
<td>$1,510</td>
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</table>

<table>
<thead>
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<th>Hospital bed days (admissions only)</th>
<th>Total (N)</th>
<th>Mean per case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee/lower leg injuries</td>
<td>17,837</td>
<td>0.6</td>
</tr>
<tr>
<td>Lower limb injuries</td>
<td>38,210</td>
<td>0.6</td>
</tr>
<tr>
<td>All sports injuries</td>
<td>143,937</td>
<td>2.4</td>
</tr>
</tbody>
</table>

N = number; $AUD — Australian dollars (calculated August 2013).

$15,752,111 per year

19%↓ equates to $2,992,901 cost savings
CONCLUSIONS

Maximising injury prevention impact requires both:

• the right program content
• the right program delivery process

RE-AIM SSM is useful for planning and evaluation

Pragmatic evaluation needed

• use several, different but complementary data sets
• range of contributing sources
A partnership of researchers, government and non-government agencies, including peak sports bodies, was established in Australia in 2009:

Implementation partners:

Researchers:
Prof Caroline Finch, Dr Alex Donaldson (Federation University Aust); A/Prof Belinda Gabbe (Monash University); Prof David Lloyd (Griffith University); Prof Jill Cook (LaTrobe University)
References


