Burden of disease by cause, United States, 2016

Total disease burden, measured in DALYs (Disability-Adjusted Life Years) by sub-categories of disease or injury. DALYs are used to measure total burden of disease - both from years of life lost and years lived with a disability. One DALY equals one lost year of healthy life.

- Cardiovascular diseases: 14.82 million
- Cancers: 13.66 million
- Mental and substance use disorders: 12.03 million
- Musculoskeletal disorders: 9.03 million
- Other NCDs: 8.06 million
- Diabetes, blood, & endocrine diseases: 7.19 million
- Neurological disorders: 6.16 million
- Respiratory diseases: 4.68 million
- Unintentional injuries: 3.66 million
- Transport injuries: 2.71 million
- Diarrhea & common infectious diseases: 2.07 million
- Self-harm: 1.93 million
- Liver diseases: 1.71 million
- Neonatal disorders: 1.48 million
- Digestive diseases: 1.24 million
- Interpersonal violence: 1.17 million
- HIV/AIDS and tuberculosis: 440,415.56
- Nutritional deficiencies: 202,493.81
- Other communicable diseases: 196,576.83
- Maternal disorders: 76,224.47
- Malaria & neglected tropical diseases: 10,644.23
- Conflict and terrorism: 6,372.58
- Natural disasters: 5,107.85

Source: IHME, Global Burden of Disease
Subjective Wellbeing CRISIS

With roots in isolation and despair

Manifesting in pain

More deaths than Vietnam War
DISEASES OF DESPAIR

Fig. 2. Mortality by cause, white non-Hispanics ages 45-54.
BANKRUPTING AMERICANS & EMPLOYERS

$4,500 per year

Days Lost

- MSK/Pain: 20%
- Mental Health: 70%
- All Other: 10%

Additional $13K

<table>
<thead>
<tr>
<th>Industry</th>
<th>Average Days Lost</th>
<th>Average Cost</th>
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<td>Transportation, utilities</td>
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<td>Entertainment, recreation, food</td>
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<td>Public administration</td>
<td>5.7</td>
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<tr>
<td>Other services except publ. admin</td>
<td>8.7</td>
<td>$7,264</td>
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<tr>
<td>Overall average</td>
<td>9.4</td>
<td>$6,643</td>
</tr>
</tbody>
</table>

Table 9 JOEM Vol 59, Number 11, Nov 2017
33% of non-fatal injuries (BLS)

215 MILLION Lost Work Days/yr (WHO)

$980 BILLION Total Loss (CDC)
Low back pain 1

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

Jan Hornigren, 1, Mark J. Hancock, 2, Alice Kangsted, 3, Gabrielle L. Leaver, 4, Manuela L. Ferrari, 5, Stéphane Genevay, 6, Damien Hoy, 7, Sanna Kappinen, 8, Glenn Pirmanny, 9, Joachim Sigur, 10, Robi Smeets, 11, Martin Underwood, on behalf of the Lancet Low Back Pain Series Working Group

Low back pain is a very common symptom. It occurs in high-income, middle-income, and low-income countries and all age groups from children to the elderly population. Globally, years lived with disability caused by low back pain increased by 54% between 1990 and 2015, mainly because of population increase and ageing, with the biggest increase seen in low-income and middle-income countries. Low back pain is now the leading cause of disability worldwide. For nearly all people with low back pain, it is not possible to identify a specific nociceptive cause. Only a small proportion of people have a well understood pathological cause—e.g., a vertebral fracture, malignancy, or infection. People with physically demanding jobs, physical and mental comorbidities, smokers, and obese individuals are at greatest risk of reporting low back pain. Disabling low back pain is over-represented among people with low socioeconomic status. Most people with new episodes of low back pain recover quickly; however, recurrence is common and in a small proportion of people, low back pain becomes persistent and disabling. Initial high pain intensity, psychological distress, and accompanying pain at multiple body sites increases the risk of persistent disabling low back pain. Increasing evidence shows that central pain-modulating mechanisms and pain cognitions have important roles in the development of persistent disabling low back pain. Cost, healthcare use, and disability from low back pain vary substantially between countries and are influenced by local culture and social systems, as well as by beliefs about cause and effect. Disability and costs attributed to low back pain are projected to increase in coming decades, in particular in low-income and middle-income countries, where health and other systems are often fragile and not equipped to cope with this growing burden. Intensified research efforts and global initiatives are clearly needed to address the burden of low back pain as a public health problem.

Figure 3: Global burden of low back pain, in disability-adjusted life-years (DALYs), by age group, for 1990 and 2015

Data are from the Global Health Data Exchange.
What health problems cause the most disability?

- Communicable, maternal, neonatal, and nutritional diseases
- Non-communicable diseases
- Injuries

### 2007 Ranking vs. 2017 Ranking

<table>
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</thead>
<tbody>
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<td>Low back pain</td>
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<td>Depressive disorders</td>
<td>Diabetes</td>
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<td>Drug use disorders</td>
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<tr>
<td>Anxiety disorders</td>
<td>Depressive disorders</td>
<td>7.5%</td>
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<td>Diabetes</td>
<td>COPD</td>
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<tr>
<td>COPD</td>
<td>Anxiety disorders</td>
<td>3.5%</td>
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<tr>
<td>Other musculoskeletal</td>
<td>Neck pain</td>
<td>21.6%</td>
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<tr>
<td>Neck pain</td>
<td>Other musculoskeletal</td>
<td>12.5%</td>
</tr>
<tr>
<td>Age-related hearing loss</td>
<td>Age-related hearing loss</td>
<td>20.2%</td>
</tr>
</tbody>
</table>
PAIN CORRELATES WITH NON-MSK SYMPTOMS

Tschudi-Madsen et al, 2011
Social Support Exchange and Nurses’ Musculoskeletal Injuries in a Team Context: Anger as a Mediator

Chu-Hsiang Chang, Liu-Qin Yang, Taylor K. Lauricella

First Published February 20, 2019 | Research Article | https://doi.org/10.1177/0730888419826622

Abstract

Work-based musculoskeletal disorders (MSDs) are prevalent among health-care workers, particularly the nursing staff. The authors focused on the perceived social support exchange imbalance or the combination of higher perceived obligation to provide support to and lower perceived available support from the coworkers and examined the association between support exchange imbalance and nurses’ MSDs via anger. Using a sample of 410 nurses from 29 units across two hospitals, the authors found that when individual nurses reported higher support exchange imbalance, they experienced more anger, which in turn was associated with more severe MSD symptoms in low back and upper limbs. The association between support exchange imbalance and anger was exacerbated when nurses perceived that a similar level of support was available within their unit.
SYSTEM WIDE DISTRESS

- Panic & PTSD x4
- Hospitalization Rate x2
- Emergency Room Visit x4
- Mental Health Dx x3-7
US: SUBJECTIVE WELL-BEING CRISIS

Zombie-Whisperer
Est. 1998
Beliefs about back pain: The confluence of client, clinician and community

Ben Darlow*

Department of Primary Health Care and General Practice, University of Otago, Wellington, PO Box 7343, Wellington South 6242, New Zealand

Received 27 October 2015; revised 17 January 2016; accepted 19 January 2016

Abstract Patient belief's play an important role in the development of back pain and disability, as well as subsequent recovery. Community beliefs about the back and back pain which are inconsistent with current research evidence have been found in a number of developed countries. These beliefs negatively influence people's back-related behaviour in general, and these effects may be amplified when someone experiences an episode of back pain.

In-depth qualitative research has helped to shed light on why people hold the beliefs which they do about the back, and how these have been influenced. Clinicians appear to have a strong influence on patients' beliefs. These data may be used by clinicians to inform exploration of unhelpful beliefs which patients hold, mitigate potential negative influences as a result of receiving health care, and subsequently influence beliefs in a positive manner.

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CONSISTENT IN THE CLAIMS DATA

Results: Patients who chose to continue in the direct access physical therapy protocol experienced a $1543 benefit in costs ($26.2B Claims), with 95% CI: $543 to $2620.

Big Data: n = 16M ($26.2B Claims)

The Influence of Patient Choice of First Provider on Costs and Outcomes: Analysis From a Physical Therapy Patient Registry

Neck and back pain conditions are common in general medical practice, are associated with notable morbidity, and are the first and fourth conditions, respectively, leading to the greatest number of years lived with disability. Approximately $85 billion are spent annually on spine-oriented conditions, and an additional $10 to $20 billion are attributed to economic losses in productivity each year. Pre-service costs have increased by 10% from 2007 to 2010, with outpatient expenditures growing at a rate of 6.5%. This is higher than the increases in Medicare and Medicaid spending. In both groups, the increase is largely accounted for by total claims costs.

OBJECTIVES: This study assessed the effect of the direct access physical therapy spine management program on costs and outcomes by comparing a control group of patients who received spine care from traditional medical sources with patients who received care from direct access physical therapy sources. The study was conducted in a large tertiary care center in a major metropolitan area.

METHODS: Data were collected from patient registries of patients who received care for spine problems from 2007 to 2010. Patients were grouped by spine condition and by whether they received care from direct access physical therapy or traditional medical sources. Outcomes were assessed using a questionnaire that included questions about pain intensity, medication use, and functional status.

RESULTS: Patients who received care from direct access physical therapy had significantly lower costs and better outcomes compared to the control group. The mean cost of care was $1543 for patients in the direct access group, compared to $2620 for patients in the traditional medical group. The cost savings were due to a reduction in the number of visits to specialists and a decrease in medication use.

CONCLUSIONS: The direct access physical therapy spine management program led to significant cost savings and improved outcomes for patients with spine conditions. Patients who received care from direct access physical therapy had lower costs and better outcomes compared to those who received care from traditional medical sources. These findings add to the emerging literature suggesting that direct access physical therapy is an effective and cost-effective approach to spine care.


KEY WORDS: alternative payment models, direct access, low back pain, neck pain

For non-surgical spine episodes involving PT, total episode cost increases the longer it takes to introduce care.

Benefits of early conservative care

Rx, Imaging, and injection delays with delayed PT care

PT related costs are consistent throughout the timeline of care.
WORKING BACKWARD: TERTIARY APPROACHES

Virginia Mason Case
• Many simple claims
• Lower SES workforce
• Time to “conservative care” was critical factor
Replicated by Intel (HBR 2015)

Intel Case Study
• High Per Capita Absenteeism Cost
• Could control provider pathway
• Higher SES & Skilled Employee (engineers, etc)
Denver police physical therapist treats officers, saves city millions

DENVER – Police officers in Denver have a new way to get healthy if they are injured with a physical therapist on staff.

It’s an idea borrowed from the Denver Fire Department and one that has saved the city millions of dollars.

Daniel Jonte started treating officers in 2016 as part of a pilot program.

“Just last month we had 46 patients that first month,” Jonte said. “The next month, we had 135 patients. The word got out quickly.”

He now treats about 150 patients per month, and he has a waiting list of several weeks. In total, he has had 2,600 patient visits.

Jonte said getting and staying healthy are an important part of an officer’s job.

“Eric came to me about six weeks ago, he strained one of his rotator cuff tendons,” Jonte said. “When we first saw him, he had decreased range of motion, tightness through shoulder, limiting his mobility.

“His goal is to try to increase his mobility and strength to give him optimum mobility function movement so he could get back to not only his job, but what he likes to do, jujitsu, weightlifting, things like that.”

Jonte said Denver is one of the only cities he knows of offering this type of care. He said it is very forward thinking of city leaders.

These officers have to be in top physical shape to do their jobs.

“When we talk about first responders, these are guys that put themselves in harm’s way, their bodies in harm’s way for us,” Jonte said.

“It’s just good to give back to them to make sure they are strong and healthy and can do their jobs cause we need them.”

The director of the city’s health and wellness program said among the fire, sheriff and police departments, having in-house physical therapists has reduced workers compensation claims by $8 million over the past two years.

“We are decreasing time off from work or from injuries for work comp sides of patients,” Jonte said. “They are getting to work faster than if they went through private sector outsourced PT department.

“My approach to caring for them is giving them quality of time so that I can spend enough time with them to understand their dysfunctions, or other dysfunctions they’ve acquired along the way and make sure they are moving right.”

He has unique understanding of what these officers go through each day.

“Even casually, not on a call, they still have to wear 20-30 pound belt and equipment gear everything like that for an eight- to 10-hour shift,” Jonte said.

“We have to make sure they are stronger just to do that, I come from a background where by brother was an officer, so it means a lot to me. These guys do an incredible service for us, so it’s just a way to give back.”
NOTHING IS IMPOSSIBLE - FINLAND

World Happiness Report 2018
Executive Summary

The main focus of this year's report, in addition to its usual ranking of the levels and changes in happiness around the world, is on migration within and between countries.

The overall rankings of country happiness are based on the pooled results from Gallup World Poll surveys from 2015-2017, and show both change and stability. There is a new top ranking country, Finland, but the top ten positions are held by the same countries as in the last two years, although with some swapping of places.

Four different countries have held top spot in the four most recent reports- Denmark, Switzerland, Norway and now Finland.

Perhaps the most striking finding of the whole report is that a ranking of countries according to the happiness of their immigrant populations is almost exactly the same as for the rest of the population. The immigrant happiness rankings are based on the full span of Gallup data from 2005 to 2017, sufficient to have 117 countries with more than 100 immigrant respondents.

The ten happiest countries in the overall rankings also fill ten of the top eleven spots in the ranking of immigrant happiness. Finland is at the top of both rankings in this report, with the happiest immigrants, and the happiest population in general.
A FUNDAMENTALLY DIFFERENT WAY TO CARE
Invest in Healthy Culture – Choice Architecture
QOL, Wellbeing, Productivity
PRIMORDIAL
Chronic disease is both costly to treat and yet largely preventable with low-cost interventions. Pro-Activity’s Prevention Model was designed to make population health change (and thereby injury and disease prevention) both viable and affordable. More than a decade after the initial proof of concept, the model has been implemented with significant success.

Riddle: What do you get when you put Physical Therapy, Consulting, Engineering, IT, Pharmacy, Bio, Fitness, Clinical Laboratory, Nutrition in the same room with an “insurmountable” health problem?

Email “Prevention Model” to meisenhart@pro-activity.com for a link to the more detailed white paper.
UNRESOLVED INFLAMMATORY RESPONSE

LIFESTYLE DRIVEN: ELEMENTS

Abstract:

Objective: Recent evidence has found potential associations between cardiovascular disease (CVD) risk factors and common musculoskeletal disorders. We evaluated possible associations between risk factors and both glenohumeral joint pain and rotator cuff tendinopathy.

Methods: Data from WISTAH study participants (n = 1226) were assessed for associations between Framingham Heart Study CVD risk factors and both health outcomes.

Results: A strong association was observed between CVD risk scores and both glenohumeral joint pain and rotator cuff tendinopathy. Peak odds ratios (ORs) of the adjusted models were 4.55 (95% confidence interval [95% CI] 1.97 to 10.31) and 5.97 (95% CI 2.12 to 16.83), respectively. The results show a dose-response trend of increasing risk.

Conclusions: Individual risk factors were associated with both outcomes. Combined, CVD risk factors demonstrated a strong correlation with glenohumeral joint pain and an even stronger correlation with rotator cuff tendinopathy. Results suggest a potentially modifiable disease mechanism.
RISK OF ALL-CAUSE AND CARDIOVASCULAR MORTALITY IN SLOW WALKERS COMPARED TO BRISK WALKERS

Associations of grip strength with cardiovascular, respiratory, and cancer outcomes and all-cause mortality: prospective cohort study of half a million

Carlos A Cells-Morales,1 Paul V Jana Anderson,2 Stamatis Illo,3 Jill P Pell,2 Jason M R Gill,1,4

ABSTRACT

OBJECTIVE

To investigate the association of grip strength with cardiovascular disease and mortality in a large population-based cohort.

DESIGN

Prospective population based study.

SETTING

UK Biobank.

PARTICIPANTS

502,293 participants (54% women).

MAIN OUTCOME MEASURES

All-cause mortality as well as incident mortality from cardiovascular disease, chronic obstructive pulmonary disease, and cancer.

RESULTS

Adolescents who had low NRS had a significantly greater risk of all-cause mortality.

CONCLUSIONS

Grip strength is associated with mortality and can be used as a predictive tool for identifying individuals at risk of mortality.

Ability to sit and rise from the floor as a predictor of all-cause mortality

Leonardo Barbosa Barreto de Brito,1 Djimal Rabelo Ricardo1,2, Denise Sardinha Mendes Soares de Araújo1,3, Plínio Santos Ramos1,2, Jonathan Myers1 and Claudio Gil Soares de Araújo1,5

Abstract

Background: While cardiorespiratory fitness is strongly related to survival, there are limited data regarding musculoskeletal fitness indicators. Our aim was to evaluate the association between the ability to sit and rise from the floor and all-cause mortality.

Design: Retrospective cohort.

Methods: 2002 adults aged 51–80 years (68% men) performed a sitting-rising test (SRT) and from the floor, which was scored from 0 to 5, with one point being subtracted from 5 for each support used (hands/knees). The primary exposure variable was grip strength: previous cut-offs were used to determine whether individuals were at increased risk.

Results: Median follow-up was 6.3 years and there were 159 deaths (7.9%). Lower SRT scores were associated with higher mortality (p < 0.001). A continuous trend for longer survival was reflected by multivariate-adjusted (age, sex, body mass index) hazard ratios of 3.44 (95% CI 3.1–3.9), 3.44 (95% CI 2.0–5.9), and 1.84 (95% CI 1.1–3.0) (p < 0.001) from lower to higher SRT scores. Each unit increase in SRT score conferred a 2.7% improvement in survival.

Conclusions: Musculoskeletal fitness, as assessed by SRT, was a significant predictor of mortality in 51–80-year-old subjects. Application of a simple and safe test such as SRT, which is influenced by muscular strength and flexibility, in general health examinations could provide relevant information regarding functional capabilities and outcomes in non-hospitalized adults.
FUEL....20% OF DISEASE BURDEN

Nutritional medicine as mainstream in psychiatry

Jerome Sarris, Alan C. Logan, Tasnief N Akbaraly, G Paul Amringer, Vicent Balzarad-Martínez, Marlene P Freeman, Joseph Hibbeln, Yutaka Matsuda, David Mischoulon, Tetsuya Minobe, Atsuko Narr, Daitsuke Nishi, Drew Ramsey, Julia Rocktäschl, Almudena Sanchez-Villegas, Andrew Scholey, Kuan-Pin Su, Félice Naïja, on behalf of The International Society for Nutritional Psychiatry Research

Psychiatry is at an important juncture, with the current pharmacologically focused model having achieved modest benefits in addressing the burden of poor mental health worldwide. Although the determinants of mental health are complex, the emerging and compelling evidence for nutrition as a crucial factor in the high prevalence and incidence of mental disorders suggests that diet is as important to psychiatry as it is to cardiology, endocrinology, and gastroenterology. Evidence is steadily growing for the relation between dietary quality (and potential nutritional deficiencies) and mental health, and for the select use of nutrient-based supplements to address deficiencies, or as monotherapies or augmentation therapies. We present a viewpoint from an international collaboration of academics (members of the International Society for Nutritional Psychiatry Research), in which we provide a context and overview of the current evidence in this emerging field of research, and discuss the future direction. We advocate recognition of diet and nutrition as central determinants of both physical and mental health.
RECOVER....FOOT OFF THE ACCELERATOR

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<tr>
<td>Hay fever or other seasonal allergy</td>
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<td>High/Unhealthy cholesterol</td>
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<tr>
<td>Migraine or chronic severe headaches</td>
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<td>Arthritis*</td>
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<td>Depression*</td>
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<td>Asthma*</td>
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<td>Diabetes (Type 1 or II)</td>
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<td>Chronic heartburn (GERD)</td>
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<td>Osteoporosis</td>
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<tr>
<td>Heart Disease</td>
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<tr>
<td>Chronic bronchitis or emphysema</td>
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</table>

* Remained Poor
- Sleep Downgraders
- Sleep Improvers
- Remained Optimal
Prediction of healthcare utilization following an episode of physical therapy for musculoskeletal pain

Trevor A. Lenz, Jason M. Banetuk, and Steven Z. George

Abstract

Background: In the United States, value-based purchasing has created the need for healthcare systems to prospectively identify patients at risk for high healthcare utilization beyond a physical therapy episode for musculoskeletal pain. The purpose of this study was to determine predictors of pain-related healthcare utilization subsequent to an index episode of physical therapy for musculoskeletal pain.

Methods: This study assessed data from the Optimal Screening for Prediction of Referral and Outcome (OSPOR) longitudinal cohort study that recruited individuals with a primary complaint of neck, low back, knee or shoulder pain in physical therapy (n = 400). Demographics, health-related information, review of systems, comorbidity and pain-related psychological distress measures were collected at baseline evaluation, baseline to 4-week changes in pain intensity, disability, and pain-related psychological distress were measured as treatment response variables. At 6-months and 1-year after baseline evaluation, individuals reported use of opioids, injection, surgery, diagnostic tests or imaging, and emergency room visits for their pain condition over the follow-up period. Separate prediction models were developed for any subsequent care and service-specific utilization.

Results: Subsequent pain-related healthcare utilization was reported by 43% (n = 109) of the study sample that completed the 12-month follow-up (n = 246). Baseline disability and 4-week change in pain intensity were important global predictors of subsequent healthcare utilization. Age, insurance status, comorbidity burden, baseline pain, and 4-week changes in pain intensity, disability and pain-related psychological distress predicted specific service utilization.

Conclusion: In those completing follow up measures, risk of additional pain-related healthcare utilization after physical therapy was best predicted by baseline characteristics and 4-week treatment response variables for pain intensity, disability and pain-related psychological distress. These findings suggest treatment monitoring of specific response variables could enhance identification of those at risk for future healthcare utilization in addition to baseline assessment. Further study is required to determine how specific characteristics of the clinical encounter influence future utilization.

Keywords: Screening, Psychological distress, Multimorbidity, Value, Treatment monitoring

Baseline Pain
Pain Change (4 wk)
Baseline Health Status
Psychological Distress
40% increase miles
50% increase load
43% more cycling miles
39.5% more running
Sleep Analysis Over Time

Exercise Intensity Analysis Over Time

Stress Analysis Over Time

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**RECOVERY METRICS:**
Quality Sleep vs. Acute/Chronic Sleep Ratio
Bubble Size = Sleep Score - Larger → Better

**ACTIVITY METRICS:**
Steps vs. Acute/Chronic Intensity Minutes Ratio
Bubble Size = Intensity Minutes - Larger → More Intensity
Ref: 20-21% risk = P.A. or Nutrition

**Population Change (N=3500+)**

+23%
Movement Related Pain Syndromes

- 65%
TANGLED MESS?

Over-medicalizing is a serious threat

Small embedded Preventative & Pop-health approaches have yielded impressive results

Although fundamentally different, PTs practicing this way are making substantial gains
ROADMAP TO PREVENTION

[Step1]: Control the Narrative on Pain
- Normalize the pain conversation
- Special attention to at-risk “pre-pain”
- Movement is a window into future health

[Step2]: Invest in your “pain-chain”
- All people who influence pain perception
- Special attention to clinicians & family
- Movement is a window into future health

[Step3]: Aggressive MSK Management
- Strive for same day evaluation by conservative care (preferably PT)
- Remove barriers to “consult level care”
- Embedded is gold standard

[Step4]: Risk Monitoring System
- Help employees to think LESS about health data.
- Movement + Sleep + Stress

[Step5]: Add Layers
- Build an ecosystem
- Help employees to think LESS about health data.
- Movement + Sleep + Stress
- All people who influence pain perception
- Special attention to clinicians & family
- Movement is a window into future health

Build an ecosystem
Mike Eisenhart, PT
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meisenhart@pro-activity.com