



2019 Annual Meeting  
& Educational Conference

# EVOLUTION & PROGRESS

The Physical Therapist's Role in Workforce Population Management

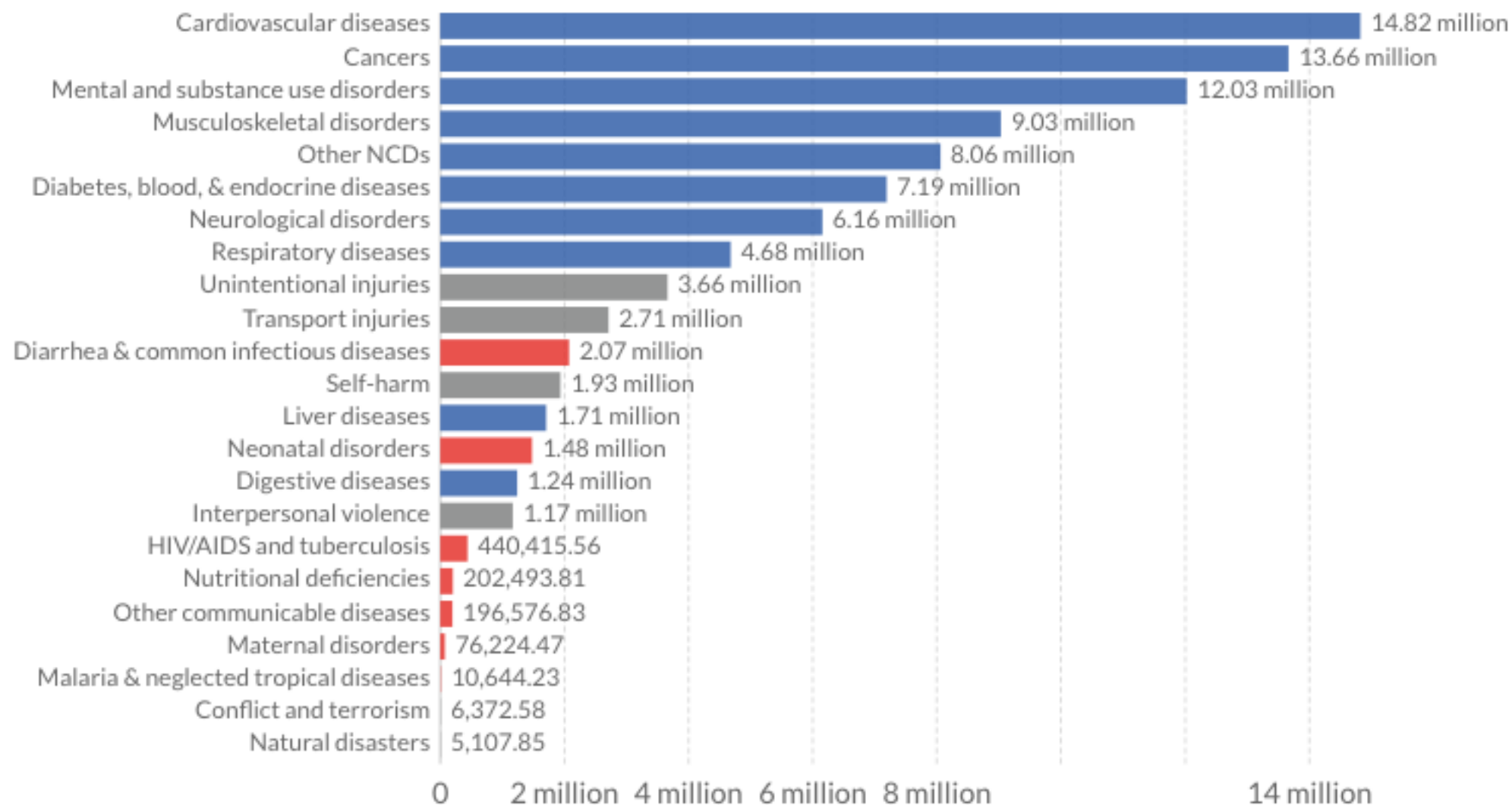
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**Mike Eisenhart, PT**



# 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.



**West:** Alaska, Hawaii, Nevada, Oregon, Arizona, Washington, California

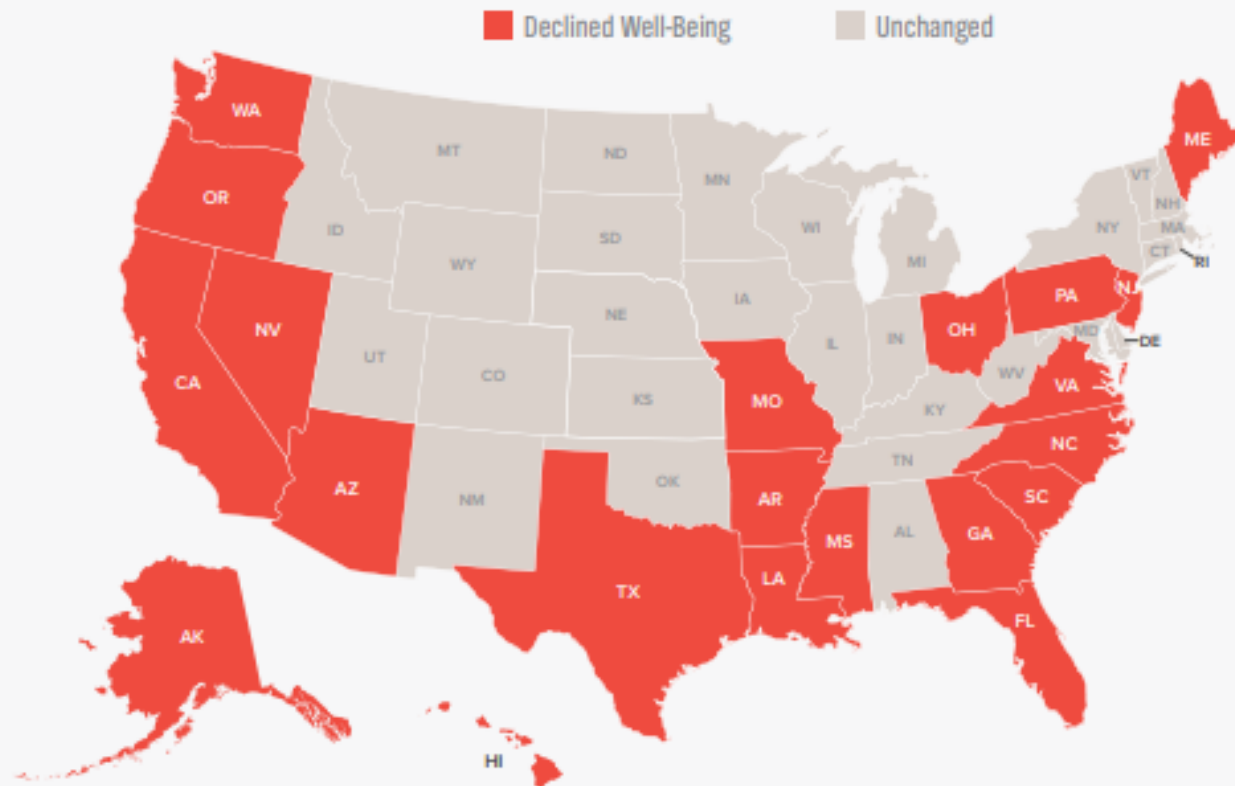
**South:** Louisiana, Mississippi, Arkansas, South Carolina, Georgia, Texas, North Carolina, Florida

**East:** Maine, New Jersey, Pennsylvania, Virginia

**Midwest:** Missouri, Ohio

The well-being scores of the remaining 29 states did not statistically decline from 2016 to 2017.

\*no states saw statistically significant improvements.



Many of the states showing declines in well-being scores in 2017 worsened on the same set of metrics. These common characteristics include:

- An increase in worry on any given day
- A sharp uptick in reporting "little interest or pleasure in doing things"
- An increase in clinical diagnoses of depression
- Elevated reports of daily physical pain
- A decline in perceiving "positive energy" from friends and family members
- A reduction in having "someone who encourages you to be healthy"
- A drop in reports of liking "what you do each day"
- A decrease in those who have a leader in their lives who make them "enthusiastic about the future"
- A decline in the percentage of respondents who report that they are reaching their goals
- Satisfaction with standard of living (compared to peers)

Subjective Wellbeing CRISIS

With roots in isolation and despair

Manifesting in pain

More deaths than Vietnam War

# DISEASES OF DESPAIR

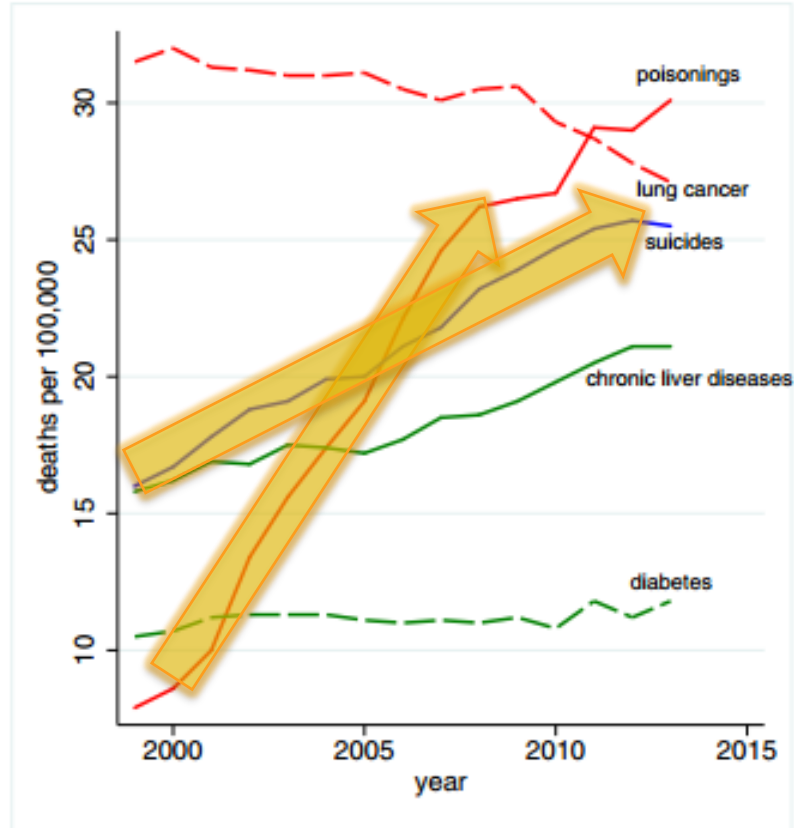
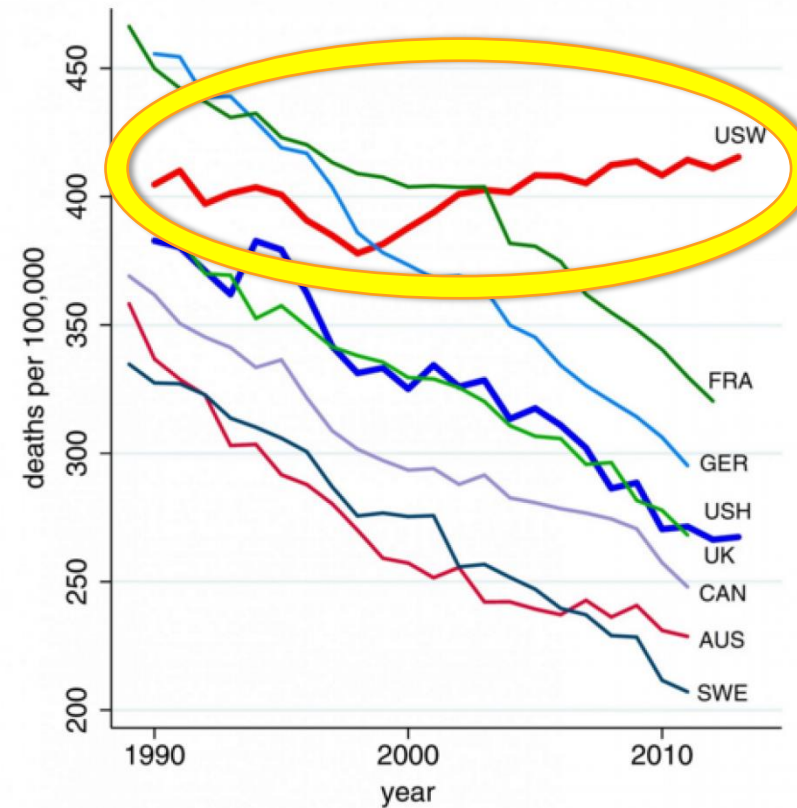
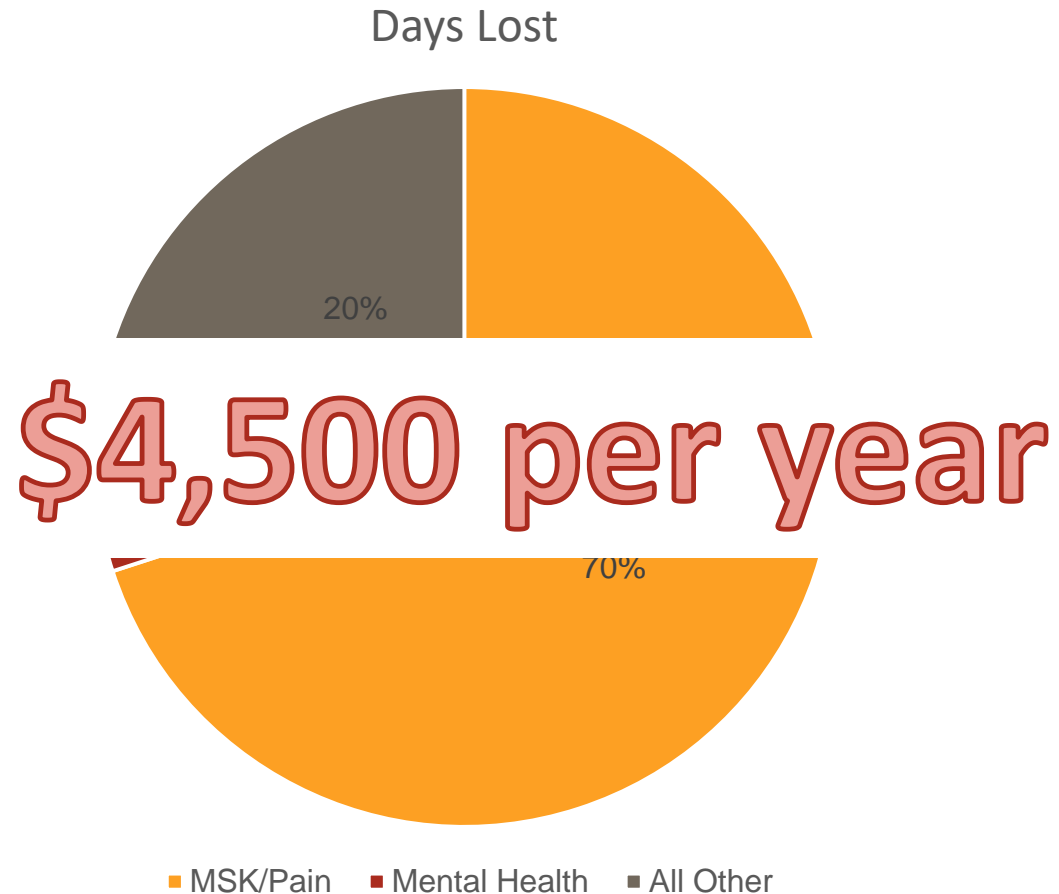


Fig. 2. Mortality by cause, white non-Hispanics ages 45-54.



Death rate for U.S. non-Hispanic whites (USW), U.S. Hispanics and six comparison countries, aged 45-54. (Source: Proceedings of the National Academy of Sciences.)

# BANKRUPTING AMERICANS & EMPLOYERS

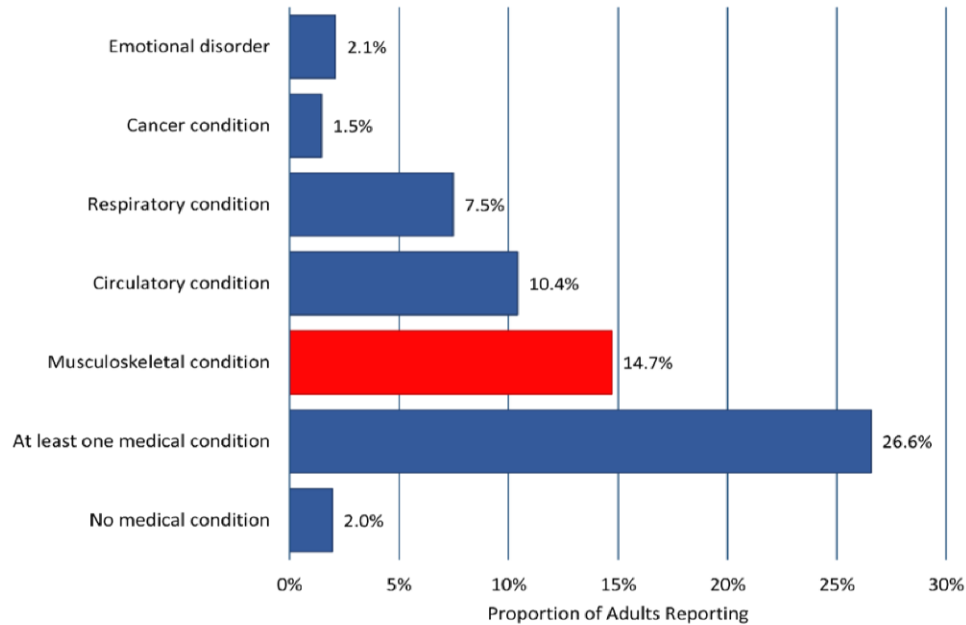


**Additional \$13K**

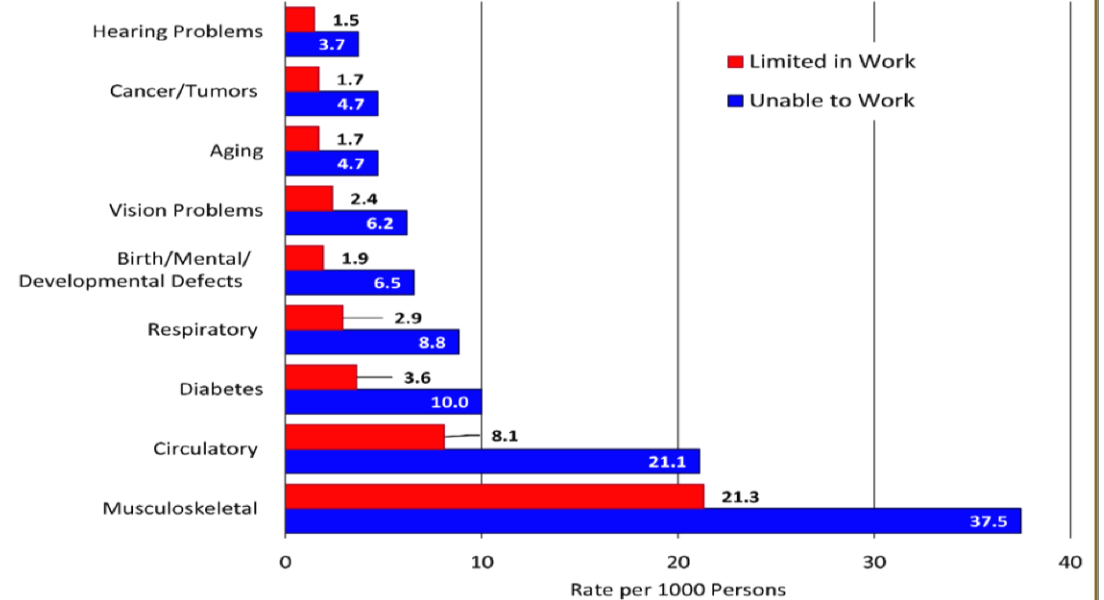
Agriculture	8.6	\$2,689
Mining	10.3	\$8,934
Construction	15	\$6,813
Manufacturing, nondurable	8	\$6,907
Manufacturing, durable	8.4	\$6,096
Transportation, utilities	7.5	\$5,123
Information, communications	9.7	\$13,534
Wholesale, durable	7.4	\$5,487
Wholesale, nondurable	10.6	\$4,024
Retail	9.8	\$5,815
Finance, insurance real estate	9.1	\$6,925
Professional, mgmt., admin	10.3	\$8,827
Education, health, social services	6.4	\$6,760
Entertainment, recreation, food	15.3	\$5,523
Public administration	5.7	\$5,573
Other services except publ. admin	8.7	\$7,264
Overall average	9.4	\$6,643

Table 9 JOEM Vol 59, Number 11, Nov 2017

**Proportion of Adults Self-Reporting  
Bed Days Due to Major Health Conditions, United States 2015**



**Prevalance of Self-Reported Work Limitations for Adults in the  
Work Force Due to Select Medical Conditions,  
United States 2015**



**33% of non-fatal injuries (BLS)**

**215 MILLION Lost Work Days/yr (WHO)**

**\$980 BILLION Total Loss (CDC)**



# WORSE, NOT BETTER (LANCET 2018)

## 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 Smets, 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—eg, 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, health-care 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.



Published Online  
March 21, 2018  
[http://dx.doi.org/10.1016/S0140-6736\(18\)30480-X](http://dx.doi.org/10.1016/S0140-6736(18)30480-X)  
See Online/Comment  
[http://dx.doi.org/10.1016/S0140-6736\(18\)30725-6](http://dx.doi.org/10.1016/S0140-6736(18)30725-6)  
See Online/Viewpoint  
[http://dx.doi.org/10.1016/S0140-6736\(18\)30488-4](http://dx.doi.org/10.1016/S0140-6736(18)30488-4)  
This is the first in a Series of two papers about low back pain

\*Joint first authors  
†Members listed at the end of the report

Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark (Prof J Hartvigsen PhD, A Kongsted PhD); Nordic Institute of Chiropractic and Clinical Biomechanics, Odense,

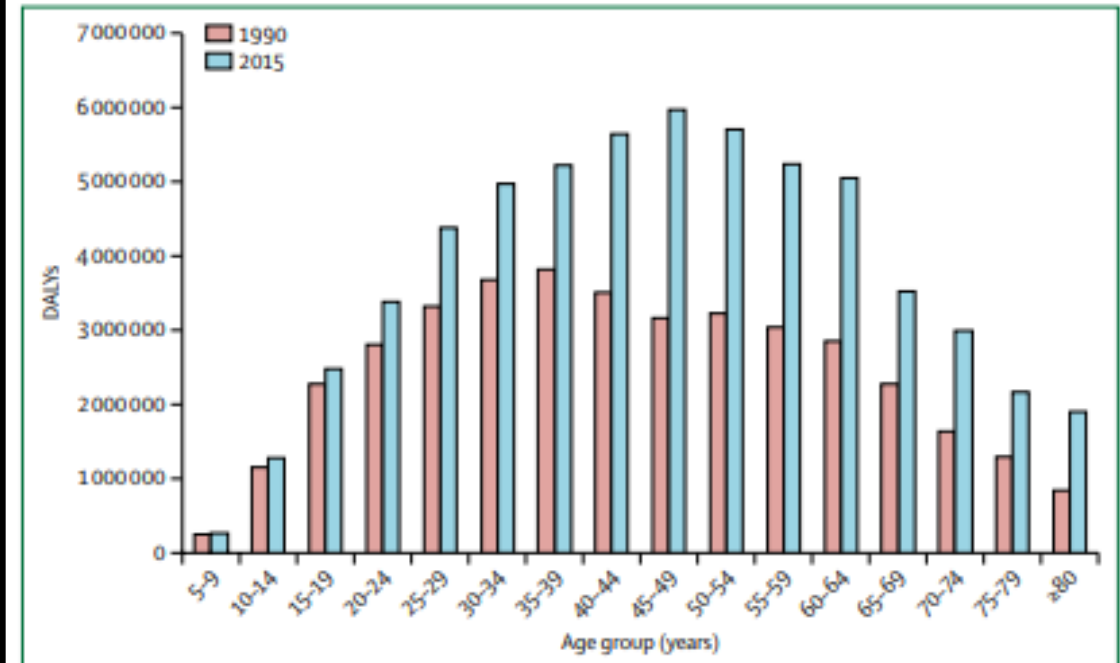


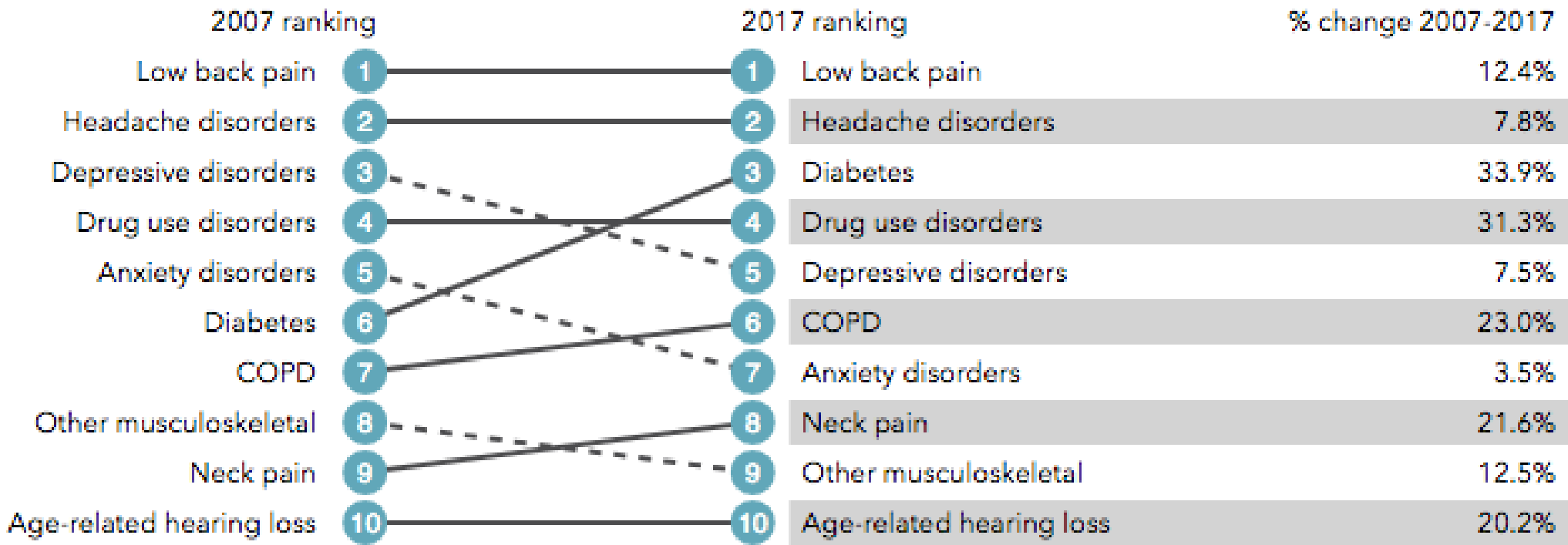
Figure 3: Global burden of low back pain, in disability-adjusted life-years (DALYs), by age group, for 1990 and 2015

Data are from the Global Health Data Exchange.



# What health problems cause the most disability?

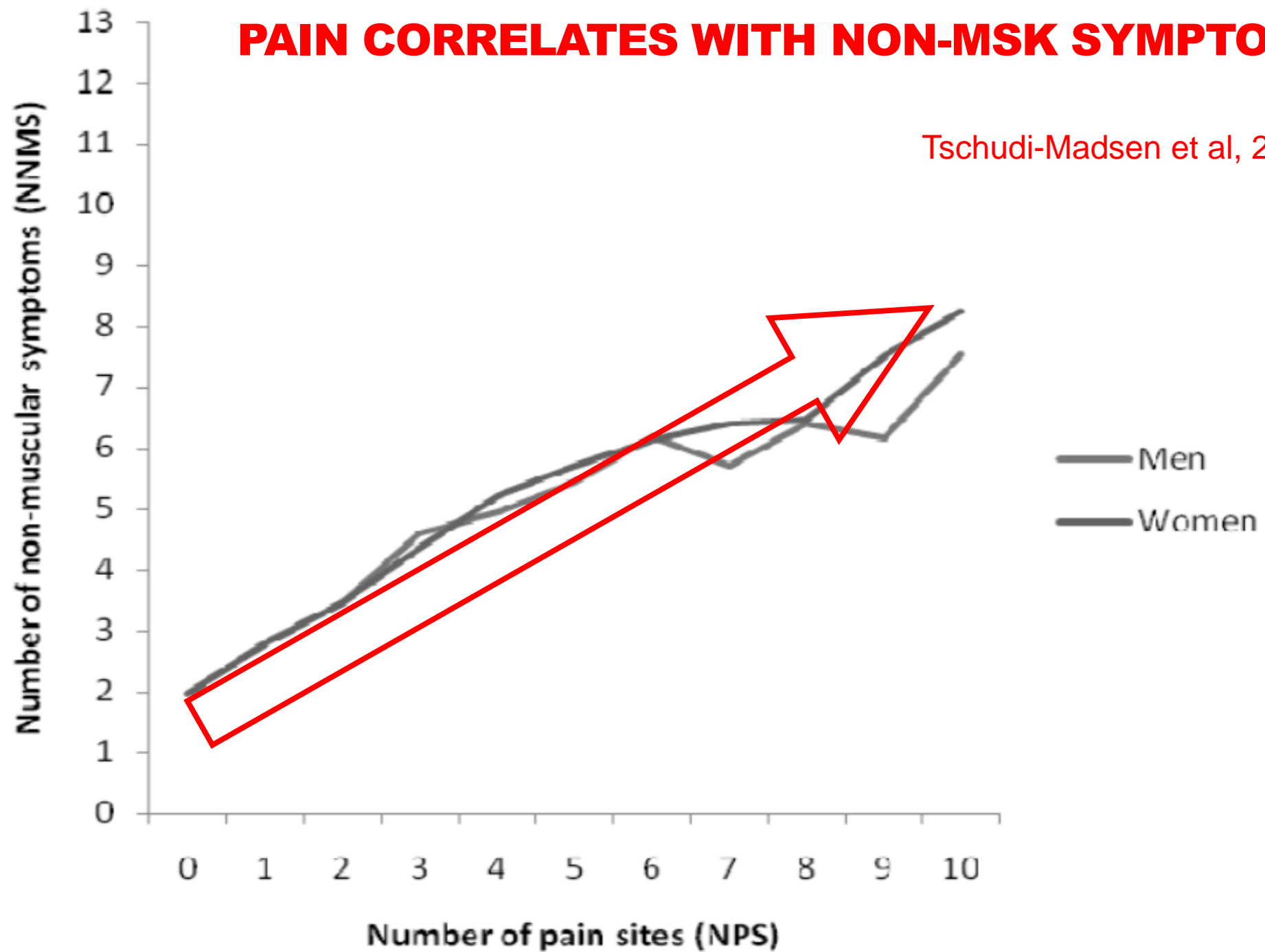
- Communicable, maternal, neonatal, and nutritional diseases
- Non-communicable diseases
- Injuries



Top 10 causes of years lived with disability (YLDs) in 2017 and percent change, 2007-2017, all ages, number

# PAIN CORRELATES WITH NON-MSK SYMPTOMS

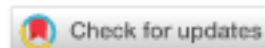
Tschudi-Madsen et al, 2011



# 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>

[Article information](#) ▾



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## 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







**Zombie-Whisperer**

**Est. 1998**



# ***“CLINICIANS APPEAR TO HAVE A STRONG INFLUENCE ON PATIENTS’ BELIEFS.”***

**Cultural Undertones**

**Attitudes & Beliefs**

**First HC Contact**

## **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

### **KEYWORDS**

Back pain;  
Attitude;  
Beliefs;  
Health personnel;  
Patients;  
Professional–patient  
relations;  
Health knowledge,  
Attitudes, Practice;  
Health communication

**Abstract** Patient beliefs 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

## RESEARCH REPORT

THOMAS R. DENNINGER, PT, DPT, OCS, FAAOMPT<sup>1</sup> • CHAD E. COOK, PT, PhD, FAAOMPT<sup>2</sup>  
COLE G. CHAPMAN, PhD<sup>3</sup> • TIMOTHY MCHENRY, MD<sup>4</sup> • CHARLES A. THIGPEN, PT, PhD, ATC<sup>5</sup>

### 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.<sup>16,29,35</sup> Approximately \$85 billion are spent annually on spine-oriented conditions,<sup>32</sup> and an additional \$10 to \$20 billion are attributed to economic losses

in productivity each year.<sup>33</sup> Per-patient costs have increased by 49% from 1997 to 2006, with outpatient expenditures showing the greatest increases.<sup>34</sup> From 1997 to 2005, the total estimated expenditures among respondents with spine problems increased by 65%, a higher rate than other non-spine-related health expenditures. Despite the rising costs, there has been no real improvement in terms of disability or reduction in the proportions of individuals who report back or neck pain.<sup>2</sup> The estimated proportion of persons with back or neck problems who self-report physical functioning limitations increased from 20.7% to 24.7% from 1997 to 2005, suggesting that current care models may be insufficient.<sup>32</sup>

This lack of notable improvement in patient outcomes and health expenditures may be due to the type and timing of care provided. First, practitioners commonly use treatment methods that provide nominal to no effect toward recovery and approaches that have been shown to be ineffective or, at best, marginally effective in recovery from spine-related pain.<sup>34-37</sup> Second, poor or delayed access to appropriate care may adversely impact resolution of spine conditions.<sup>38</sup> Traditional health care processes associated with treatment

Results: Patients who chose to enter care via the direct access physical therapy led

spine management

\$1543; 95% CI: \$51

Patients in both gro

measures, with imp

#### STUDY DESIGN: Retrospective study.

• **BACKGROUND:** Alternative models of care that allow patients to choose direct access to physical therapy have shown promise in terms of cost reduction for neck and back pain. However, real-world exploration within the US health care system is notably limited.

• **OBJECTIVES:** To compare total claims paid and patient outcomes for patients with neck and back pain who received physical therapy intervention via direct access versus medical referral.

• **METHODS:** Data were accessed for patients seeking care for neck or back pain (n = 603) between 2012 and 2014, who chose to begin care either through traditional medical referral or direct access to a physical therapy-led spine management program. All patients received a standardized, pragmatic physical therapy approach, with patient-reported measures of pain and disability assessed before and after treatment. Patient demographics and outcomes data were obtained from the medical center patient registry and combined with total claims paid calculated for the year after the index claim. Linear mixed-effects modeling was used to analyze group differences in pain and disability, visits/time, and annualized costs.

• **RESULTS:** Patients who chose to enter care via the direct-access physical therapy-led spine management program displayed significantly lower total costs (mean difference, \$1543; 95% confidence interval: \$51, \$3028; P = .04) than those who chose traditional medical referral. Patients in both groups showed clinically important improvements in pain and disability, which were similar between groups (P > .05).

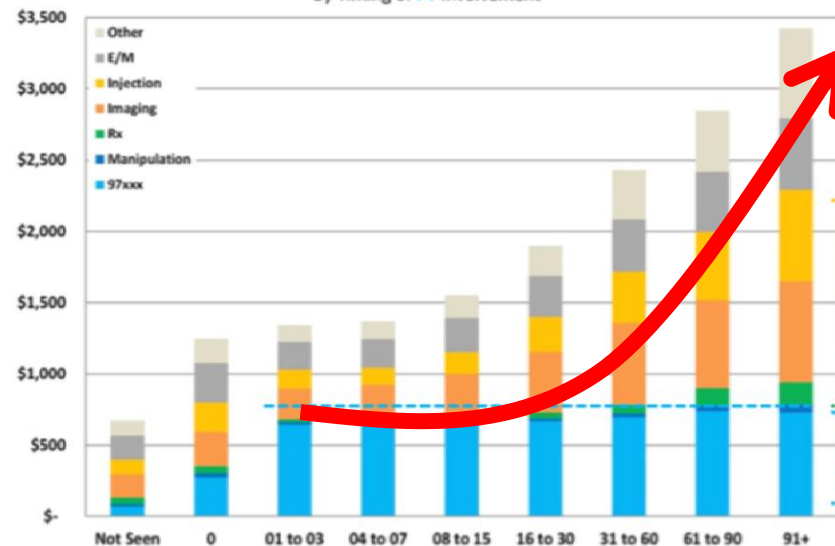
• **CONCLUSION:** The initial patient choice to begin care with a physical therapist for back or neck pain resulted in lower cost of care over the next year, while resulting in similar improvements in patient outcomes at discharge from physical therapy. These findings add to the emerging literature suggesting that patients' choice to access physical therapy through direct access may be associated with lower health care expenditures for patients with neck and back pain.

• **LEVEL OF EVIDENCE:** Economic and decision analyses, level 4. J Orthop Sports Phys Ther 2018;48(2):63-71. Epub 26 Oct 2017. doi:10.2519/jospt.2018.7423

• **KEY WORDS:** alternative payment model, direct access, low back pain, neck pain

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

Non-Surgical Spine Total Episode Cost - Starting With PCP  
By Timing of PT Involvement



Benefits of early conservative care

Rx, Imaging and injection costs grow with delayed PT involvement

PT related costs are consistent throughout of timing of PT involvement.

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



# WORKING BACKWARD: TERTIARY APPROACHES

## Paths to Recovery

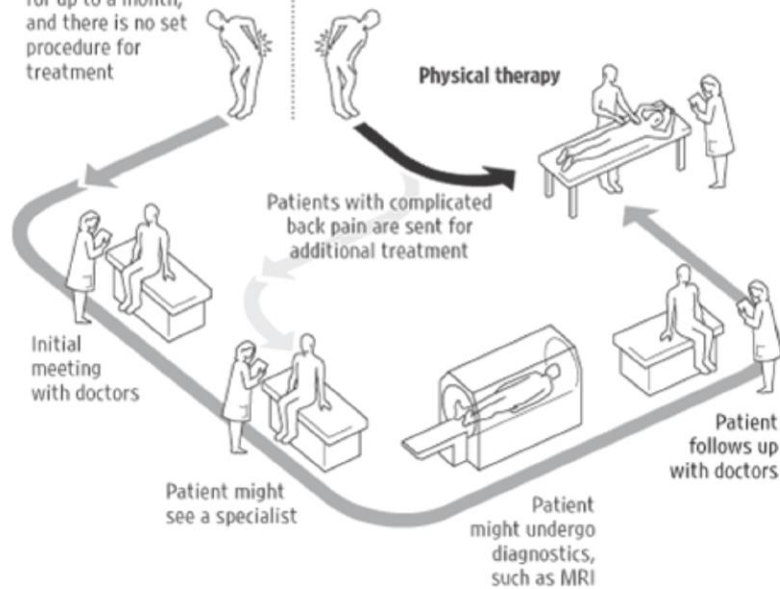
As Virginia Mason streamlined its approach to back-pain treatment, patients got in faster and employers and insurers saved money.

**Old approach**  
Average cost \$2,100–\$2,200

The initial meeting might not happen for up to a month, and there is no set procedure for treatment

**New approach**  
Average cost \$900–\$1,000

Immediately meets with doctor and therapist. Simple cases usually begin physical therapy



Source: Aetna; Virginia Mason Medical Center



## Intel Case Study

- High Per Capita Absenteeism Cost
- Could control provider pathway
- Higher SES & Skilled Employee (engineers, etc)

Replicated by Intel  
(HBR 2015)

# EARLY CONSULT CARE

FOX 31 2 NEWS

NEWS TRAFFIC ON TV CO BEST DEALS EVERYDAY CONTESTS COMMUNITY SPORTS DREAM HOME GIVEAWAY

WEATHER 55°

## Denver police physical therapist treats officers, saves city millions

POSTED 10:00 PM, MARCH 5, 2018, BY [DEBORAH TAKAHARA](#), UPDATED AT 10:01PM, MARCH 5, 2018

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MORE

DPD 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.

"That first month was a building phase, 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.


Ad



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## Denver police physical therapist treats officers, saves city millions

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MORE

"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."

"So our goal is try to increase his mobility and strength to give him optimal mobility function movement so he could get back to not only his job, but what he likes to do, jiu-jitsu, 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 side 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 dysfunction, 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."

hear.com LEARN MORE


LATEST NEWS




Famed American climbers Jeff Lowe, Tom Frost die on same day



Square Dancing



FreedomChoice



Man accused of serial dining-and-dashing, leaving dates to pay, faces multiple felonies

SUPER LABOR DAY SALE

WHAT DO YOU THINK?

Have any of your friends posted a tribute to John McCain on social media?

☐ Yes

☐ No

☐ Does not apply

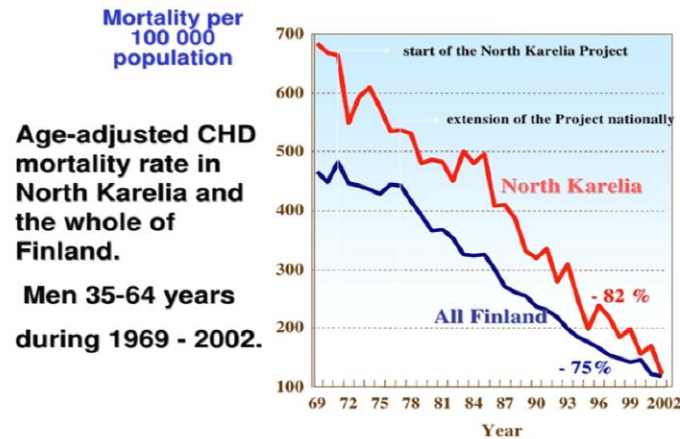
NEXT

**IMPENETRABLE WALL? SCARY GHOST  
STORY?**

**OR PREDICTIBLE OUTCOME...**



# 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**

## PRIMARY

Build Capacity

**Biomarkers,  
Movement Scores,  
Fitness**

## SECONDARY

Risk Monitoring

“Quantified Pop.” - CISRS  
[Allostatic Balance]  
**Risk Stratification &  
Scores**

## TERTIARY

Episode Mgt

**Elapsed time  
prior to visit,  
Return to  
Function**



Influences

Behaviors

Risk

Signs

Symptoms

Events

Cost

Invest in Healthy Culture – Choice Architecture  
**QOL, Wellbeing, Productivity**

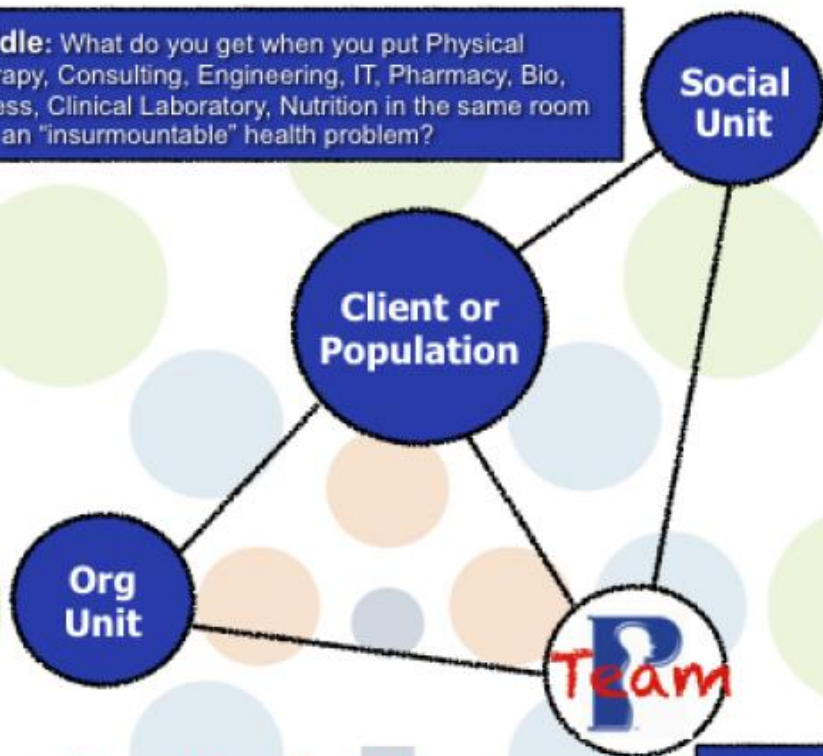
PRIMORIDAL



# Pro-Activity Prevention

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](mailto:meisenhart@pro-activity.com) for a link to the more detailed white paper

**Answer:** 15,000 (and growing) people moving toward personal health control, average ROI of >\$9:1, significant business growth & fair profit for providers.

**Discomfort**

↓ 30%

**Days Away**

↓ 22%

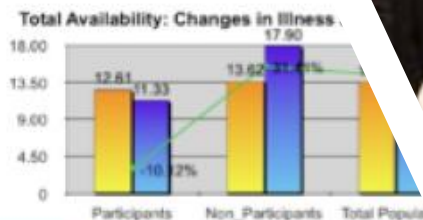
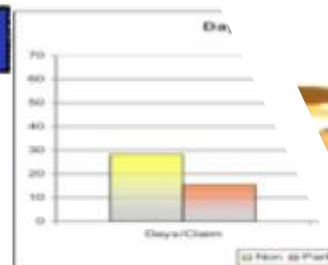
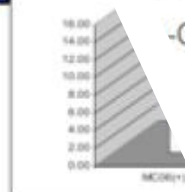
**Cost per case**

↓ 30%

**Illness Absence**

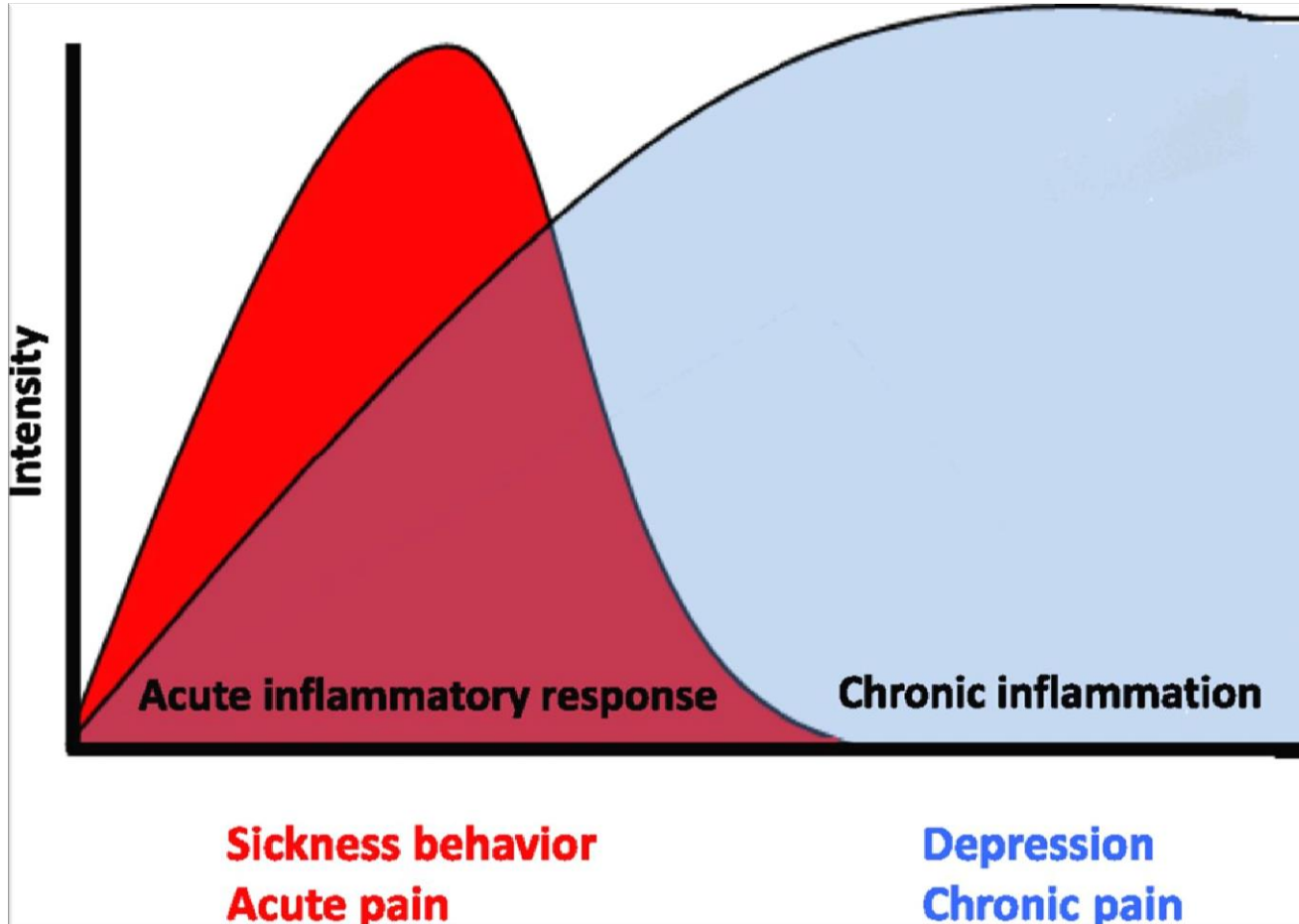
↓ 10%

- Michael Blings, PT, MS, CEEPT (Oregon Chapter)
- Andrea Branas, PT, MPT, MSE, CLT (Women's Health Section and Oncology Section)
- Allison Daly, PT, DPT (Louisiana Chapter)
- Michael Eisenhart, PT (New Jersey Chapter)**
- Jay Irrgang, PT, PhD, APT, FAPTA (Orthopaedic Section)
- Rich Larsen, PT, OCS (Wisconsin Chapter)
- Lebec, PT, PhD (Acute Care Section)
- Lindsay, PT (Pediatric Section)
- Moriarity, PT, OCS (South Carolina Chapter)
- Cave, PT, PhD, PCS (Pennsylvania Chapter)
- PT (Washington Chapter)
- anker, PT, GCS (Geriatric Section)
- T, DPT (Health Policy and Administration Section)



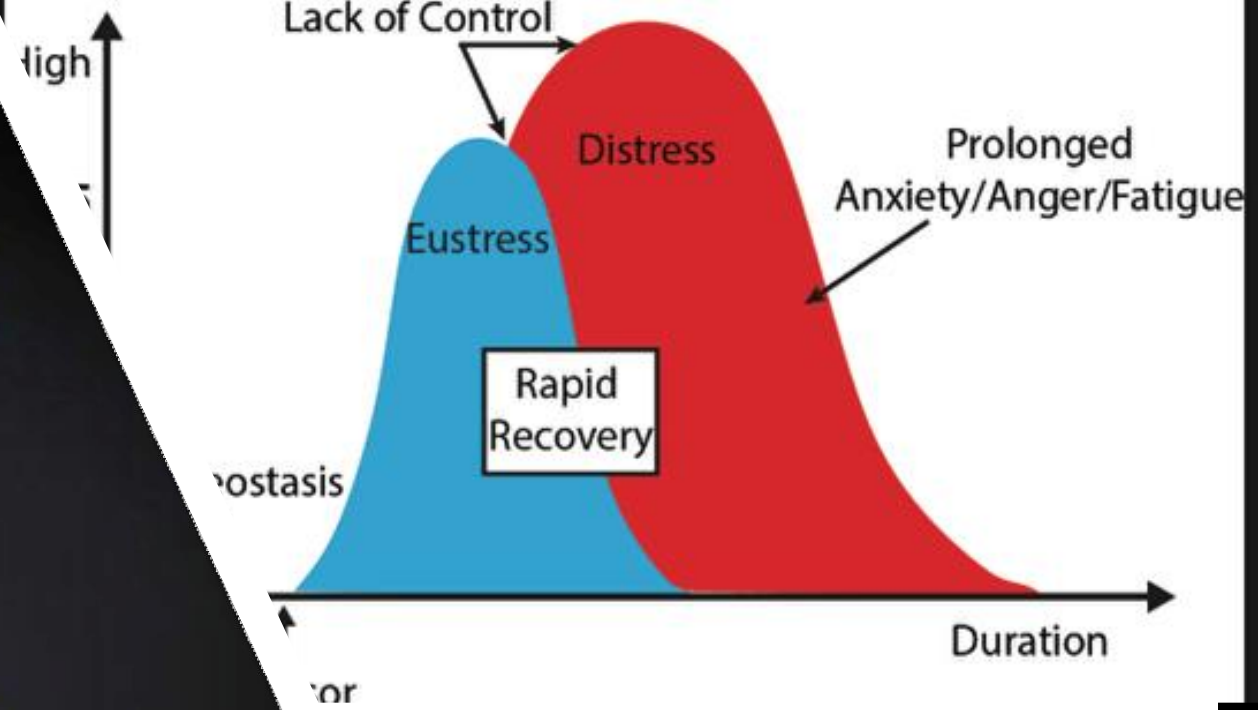
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# UNRESOLVED INFLAMMATORY RESPONSE

A. K. Walker et al. Pharmacol  
Rev 2014;66:80-101



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# LIFESTYLE DRIVEN: ELEMENTS

Association Between Cardiovascular Disease Risk Factors and Rotator Cuff Tendinopathy: Cross-Sectional Study.

Applegate, Kara Arnold; Thiese, Matthew S.; Merryweather, Andrew S.; [More](#)  
Journal of Occupational & Environmental Medicine ., Post Author Corrections: December 20, 2016

☐ Abstract

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 hand 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.

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PAIN. 157(1):70-79, JAN 2016

DOI: 10.1097/j.pain.0000000000000312,

PMID: 26230740

Issn Print: 0304-3959

Publication Date: 2016/01/01



Print

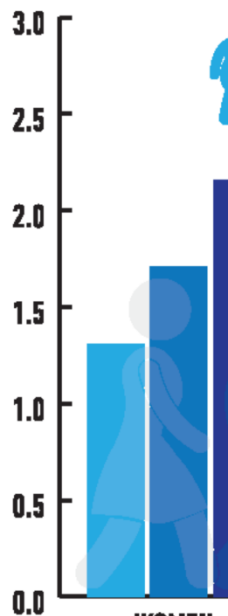
**Regular physical activity prevents chronic pain by altering resident muscle macrophage phenotype and increasing interleukin-10 in mice**

Audrey Leung; Nicholas S. Gregory; Lee-Ann H. Allen; Kathleen A. Sluka



# RISK OF ALL-CAUSE AND CARDIOVASCULAR MORTALITY IN SLOW WALKERS COMPARED TO BRISK WALKERS

Hazard ratio for slow walkers vs brisk walkers



WOMEN:  
all-cause  
mortality

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

Carlos A Celis-Morales,<sup>1</sup> Paul W  
Jana Anderson,<sup>2</sup> Stamatina Iliou,  
Jill P Pell,<sup>2</sup> Jason M R Gill,<sup>1</sup> Nave

### ABSTRACT OBJECTIVE

To investigate the association of grip  
disease specific incidence and mort  
grip strength enhances the predicti  
established office based risk score.

### 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 (all cancer, colorectal, lung  
prostate).

### RESULTS

## Grip Strength Is Associated With Cardiovascular Maintenance and Improvement

Mark D. Peterson, PhD, MSEd, Paul M. C

PlumX Metrics

DOI: <https://doi.org/10.1016/j.jped.2018.07.001>

Article Info

### Abstract

### Objective

To assess the effects of muscle strength, as  
adolescents.

### Study design

Risk variables included excess body fat, ele  
triglycerides, and low high-density lipoprote  
the odds of experiencing health maintenance  
improvement (presence of  $\geq 1$  baseline risk f  
The primary exposure variable was grip stre  
previous cut-offs were used to determine w

### Results

Adolescents who had low NGSs had a signi  
persistence as compared with those who w  
Moreover, adolescents who were strong had  
CI 1.80-6.97) and health improvement (OR 1  
mass index, cardiorespiratory fitness, and o

### Conclusions

Greater NGS is associated with longitudinal  
NGS could be used as a prognostic indicat  
benefit most from lifestyle interventions to ir

ENOUGH

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

Leonardo Barbosa Barreto de Brito<sup>1</sup>, Djalma Rabelo Ricardo<sup>1,2</sup>,  
Denise Sardinha Mendes Soares de Araújo<sup>3</sup>,  
Plínio Santos Ramos<sup>1,2</sup>, Jonathan Myers<sup>4</sup> and  
Claudio Gil Soares de Araújo<sup>1,5</sup>

### Abstract

**Background:** While cardiorespiratory fitness is strongly related to survival, there are limited data regarding musculo-skeletal 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) to and from the floor, which was scored from 0 to 5, with one point being subtracted from 5 for each support used (hand/knee). Final SRT score, varying from 0 to 10, was obtained by adding sitting and rising scores and stratified in four categories for analysis: 0–3; 3.5–5.5, 6–7.5, and 8–10.

**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 5.44 (95% CI 3.1–9.5), 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 21% 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 assessment tool such as SRT, which is influenced by muscular strength and flexibility, in general health examinations could add relevant information regarding functional capabilities and outcomes in non-hospitalized adults.

European Journal of Preventive

Cardiology

2014, Vol. 21(7) 892–898

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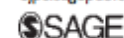
Cardiology 2012

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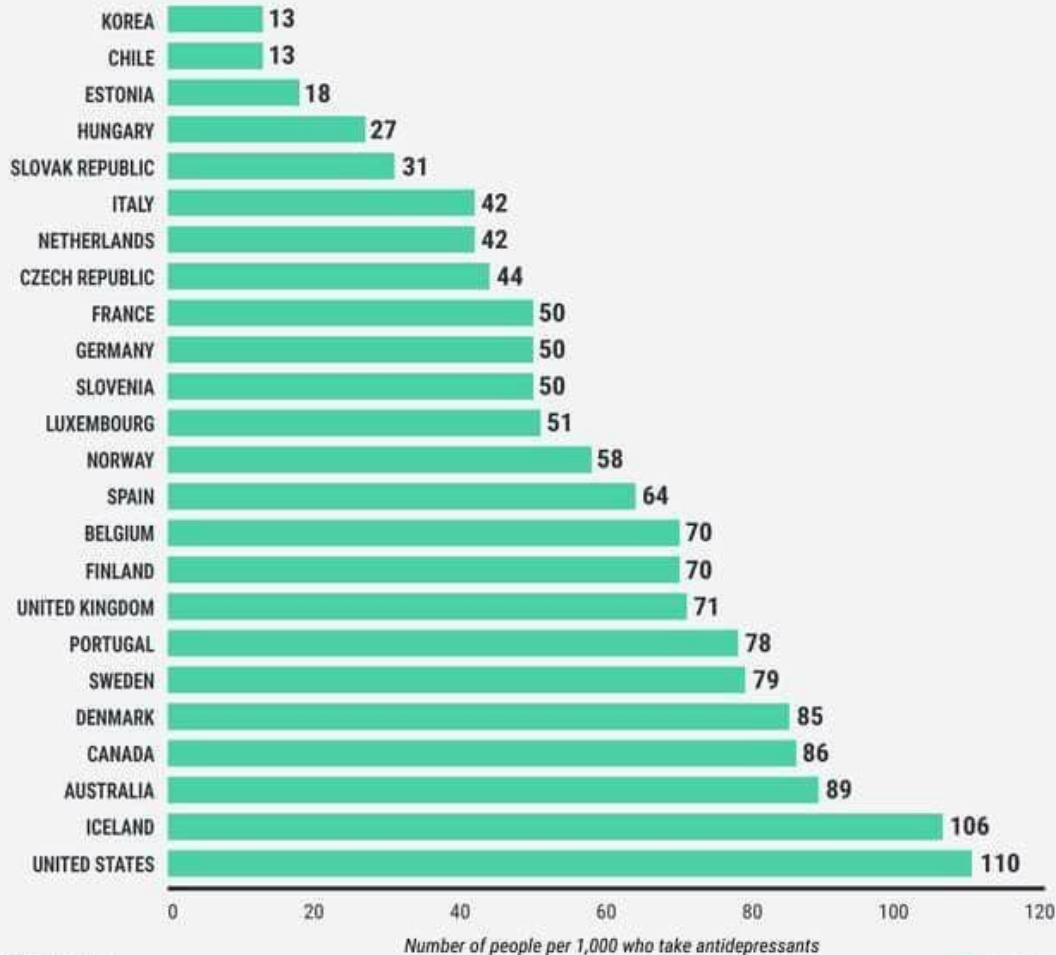
DOI: 10.1177/2047487312471759

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# FUEL.....20% OF DISEASE BURDEN

Global antidepressant users per 1,000 people

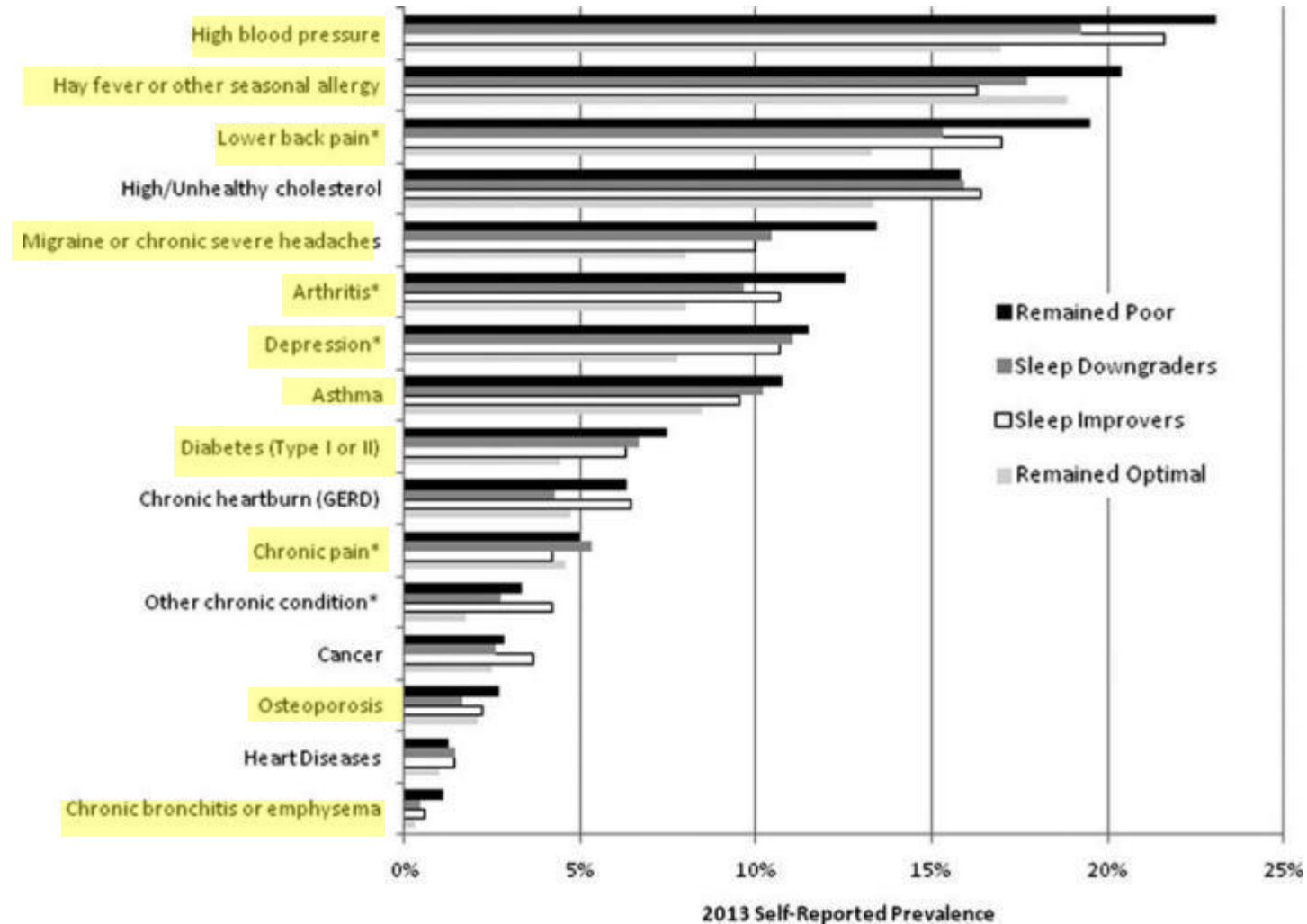


## Nutritional medicine as mainstream in psychiatry

*Jerome Sarris, Alan C Logan, Tasnime N Akbaraly, G Paul Amminger, Vicent Balanzá-Martínez, Marlene P Freeman, Joseph Hibbeln, Yutaka Matsuoka, David Mischaoulon, Tetsuya Mizoue, Akiko Nanri, Daisuke Nishi, Drew Ramsey, Julia J Rucklidge, Almudena Sanchez-Villegas, Andrew Scholey, Kuan-Pin Su, Felice N Jacka, 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



# WHAT ACTUALLY PREDICTS SUCCESS?

## RESEARCH ARTICLE

## Open Access



### Prediction of healthcare utilization following an episode of physical therapy for musculoskeletal pain

Trevor A. Lentz<sup>1\*</sup>, Jason M. Beneciuk<sup>2,3</sup> and Steven Z. George<sup>4</sup>

#### 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 (OSPRO) longitudinal cohort study that recruited individuals with a primary complaint of neck, low back, knee or shoulder pain in physical therapy ( $n = 440$ ). 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% ( $n = 106$ ) 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



SUMMARY

Fitness

87 CTL

Fatigue

93 ATL

Form

1 TSB

Duration

12:23 hms

Distance

157 mi

TSS

590 TSS

Swim

9569 yds

Bike

132 mi

Run

19.5 mi

El. Gain

10932 ft

SUMMARY

Fitness

93 CTL

Fatigue

124 ATL

Form

0 TSB

Duration

16:02 hms

Distance

221 mi

TSS

885 TSS

Swim

6830 yds

Bike

190 mi

Run

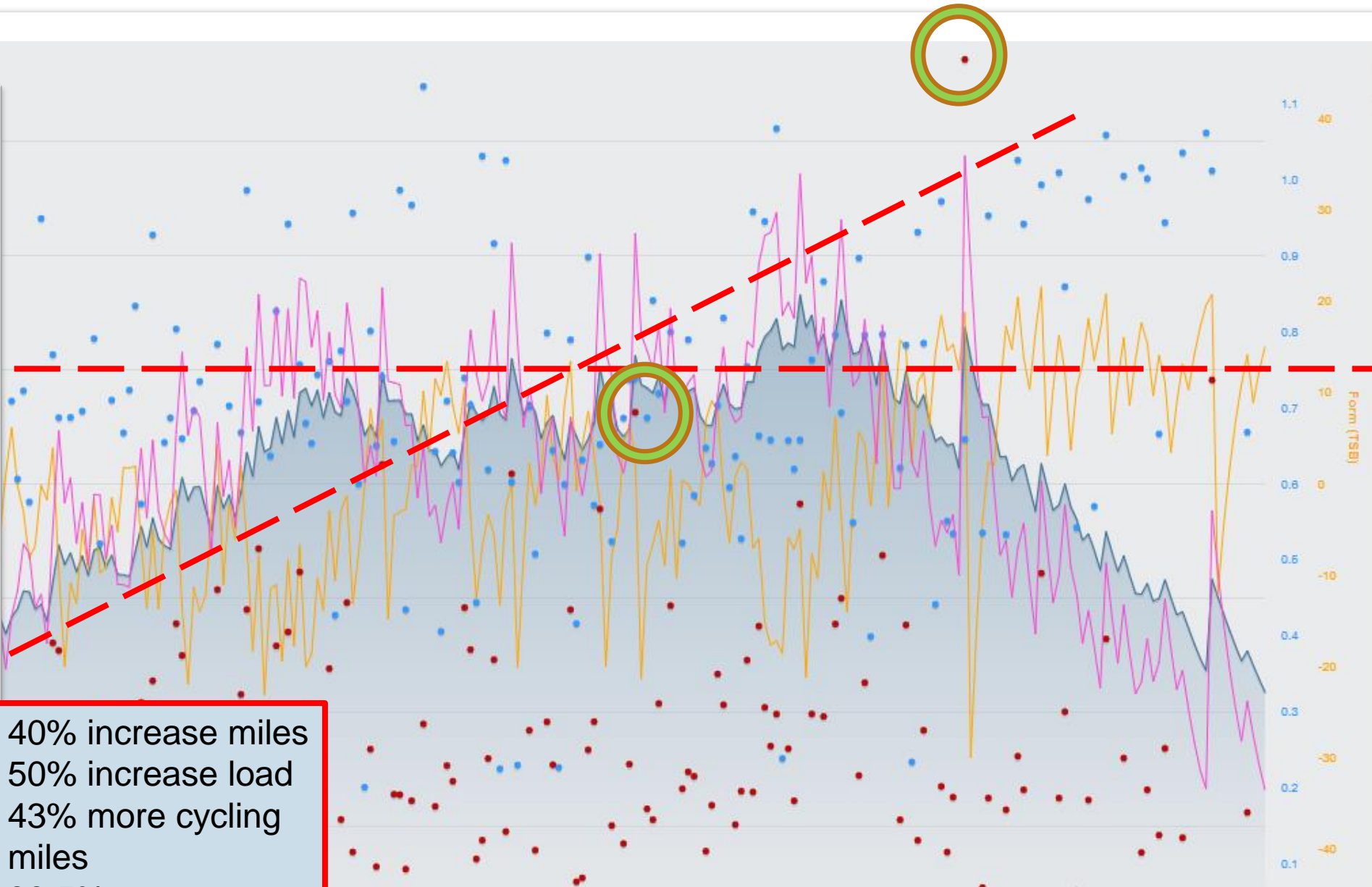
27.1 mi

Other

0.33 mi

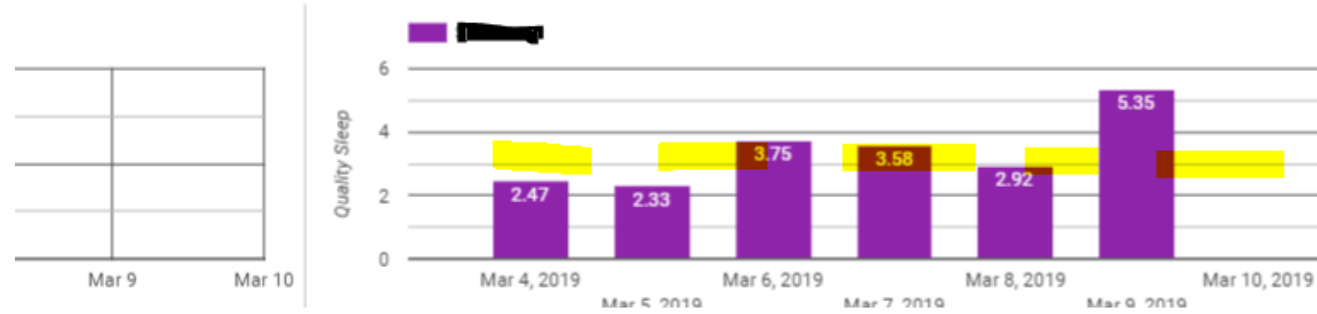
El. Gain

10039 ft

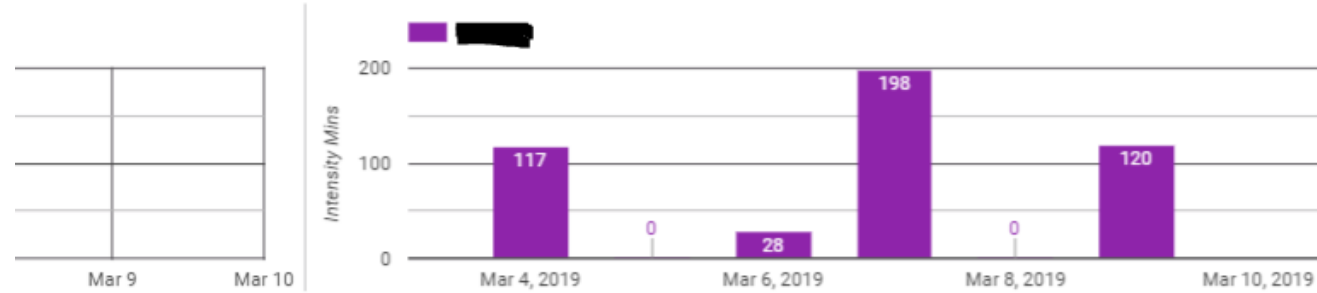


40% increase miles  
50% increase load  
43% more cycling  
miles  
39.5% more  
running

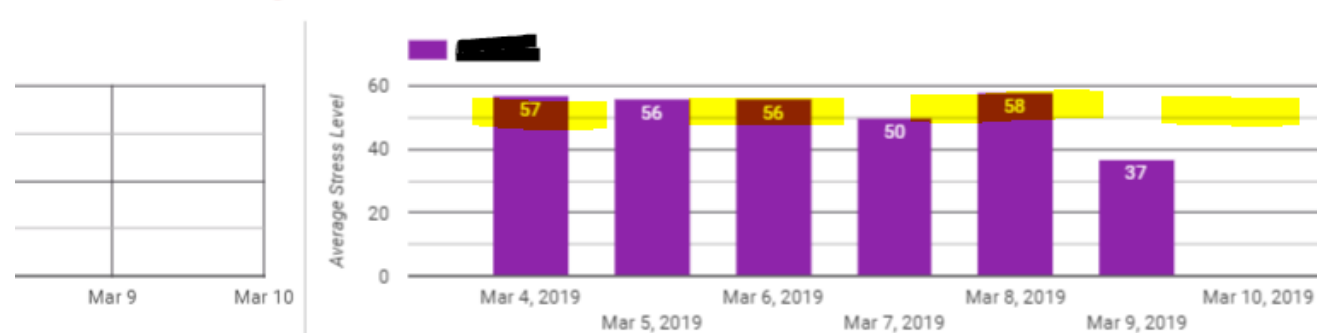
### Sleep Analysis Over Time



### Exercise Intensity Analysis Over Time



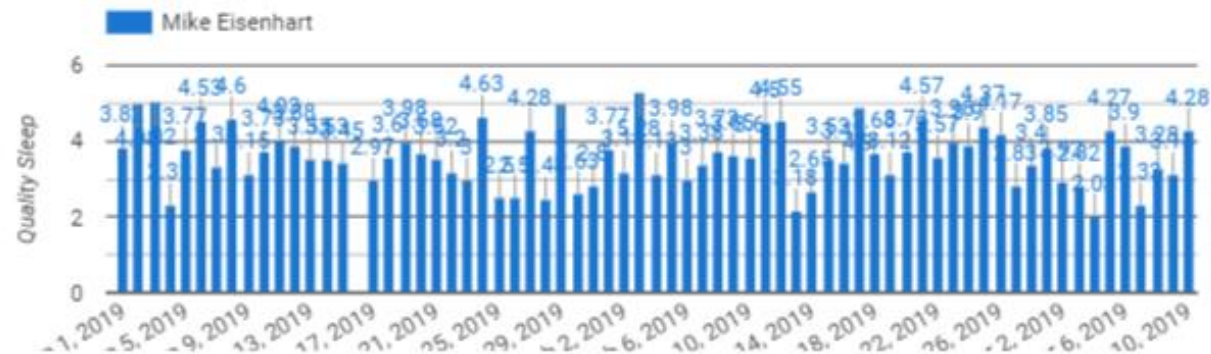
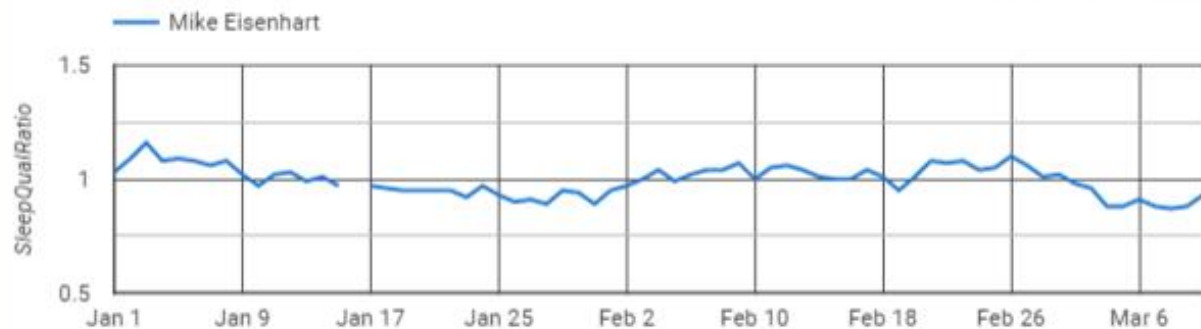
### Stress Analysis Over Time



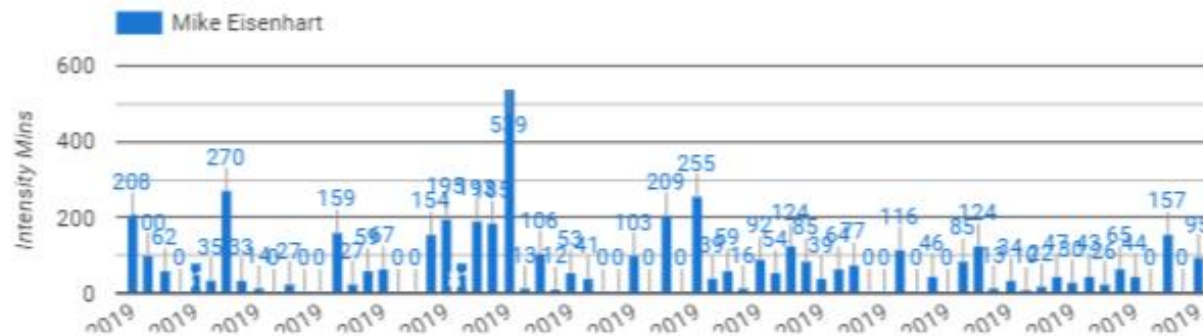
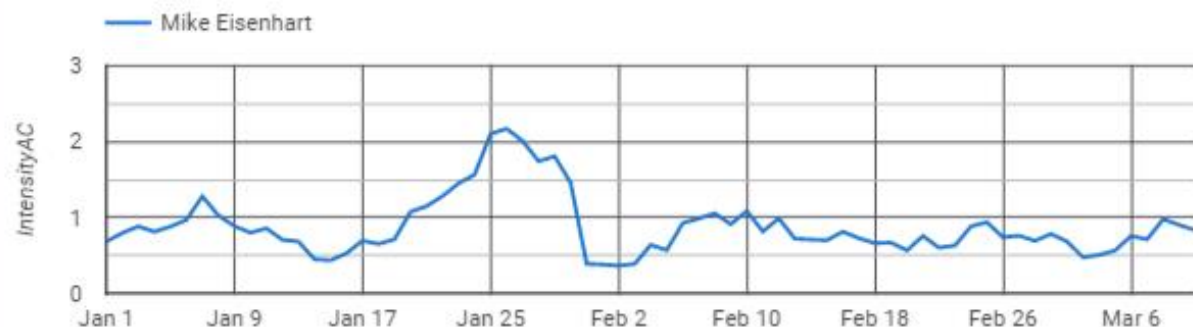
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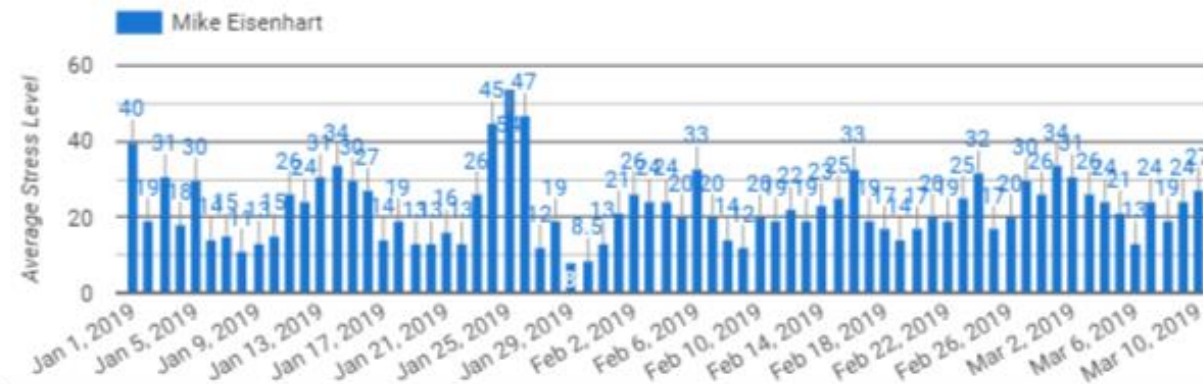
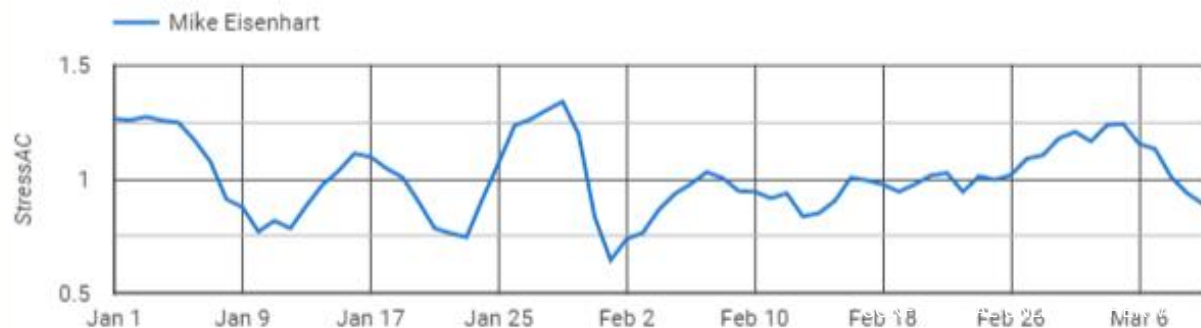
## Sleep Analysis Over Time



## Exercise Intensity Analysis Over Time



## Stress Analysis Over Time



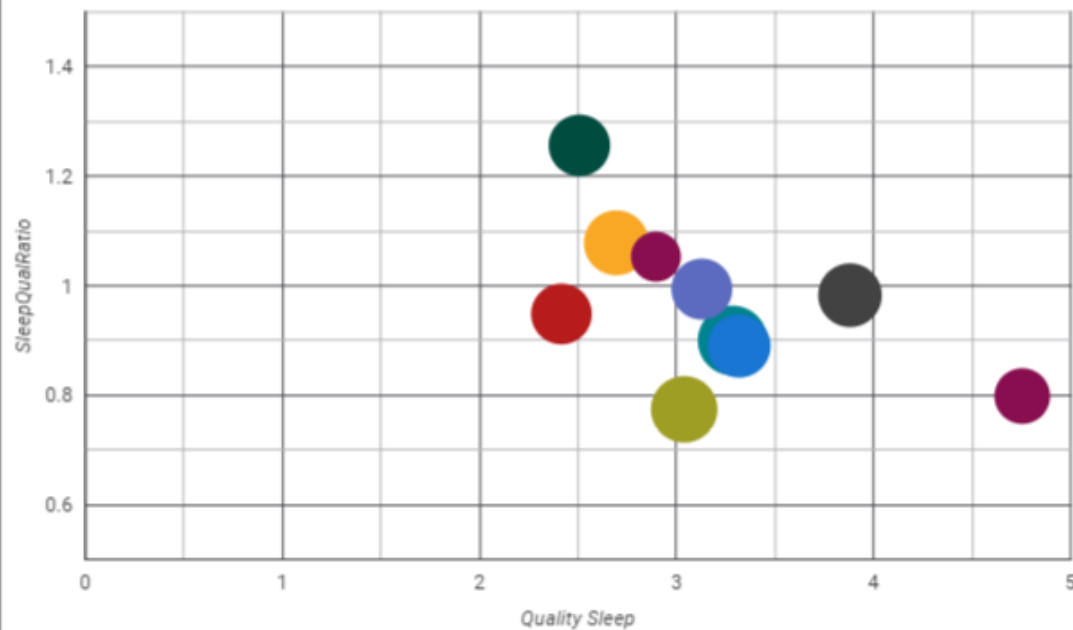
Mar 4, 2019 - Mar 10, 2019

Company

### RECOVERY METRICS:

Quality Sleep vs. Acute/Chronic Sleep Ratio

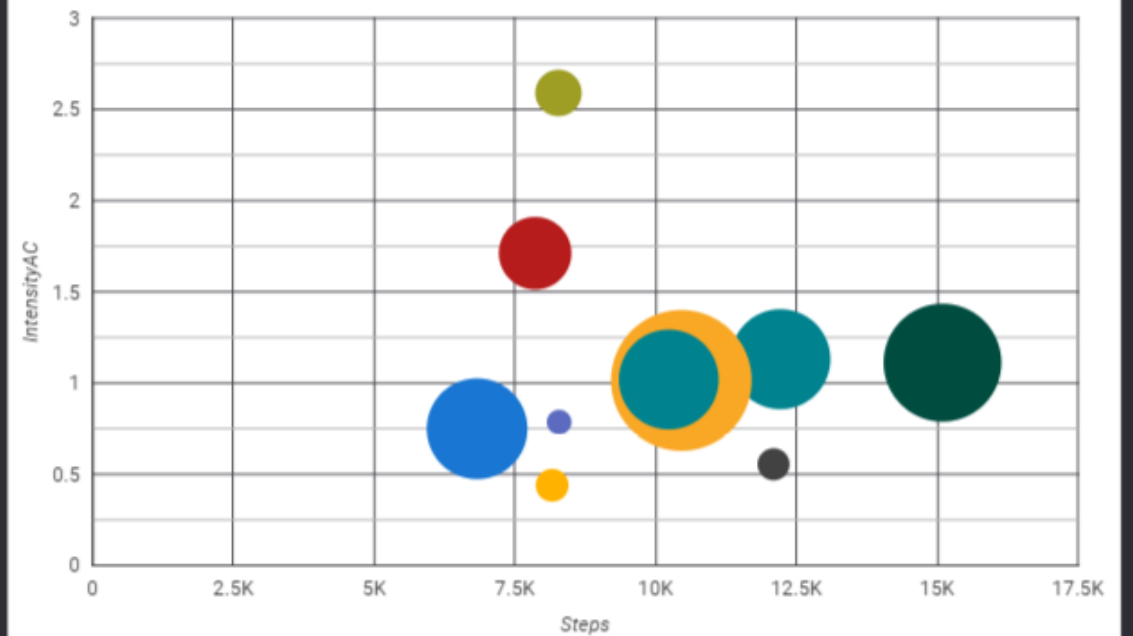
Bubble Size = Sleep Score - Larger --> Better



### ACTIVITY METRICS:

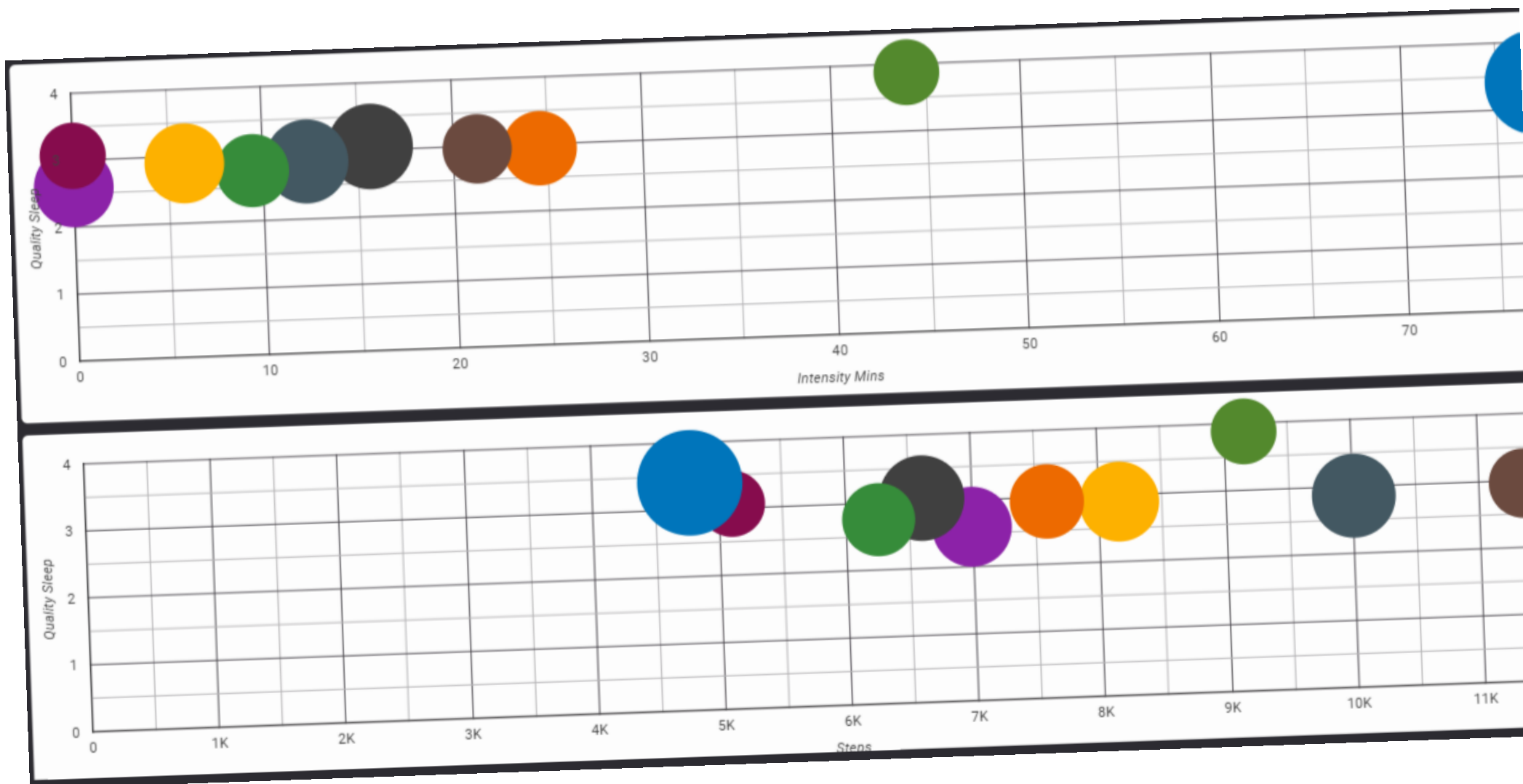
Steps vs. Acute/Chronic Intensity Minutes Ratio

Bubble Size = Intensity Minutes - Larger --> More Intensity



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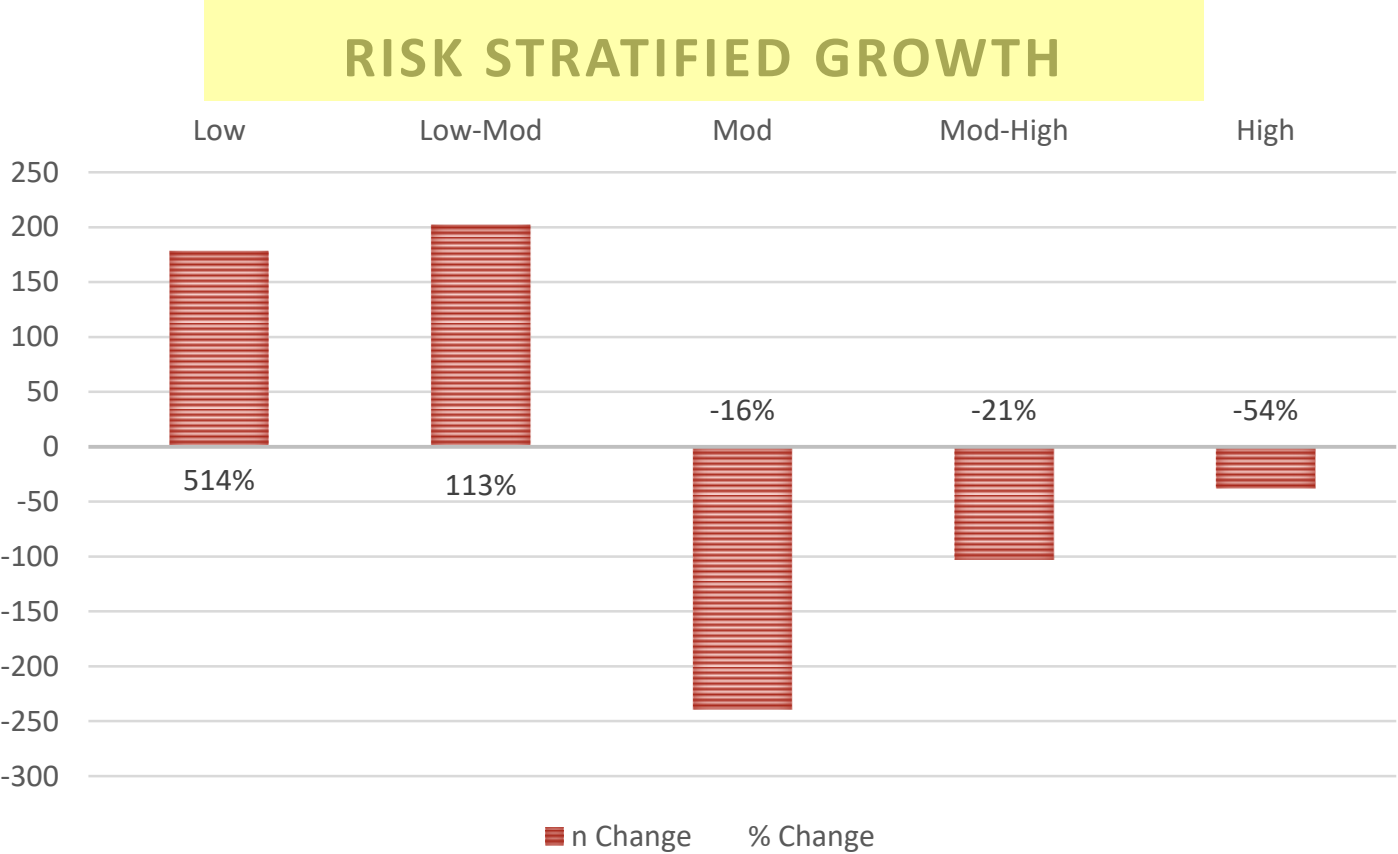


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**+23%**  
**POPULATION**  
**CHANGE**  
**(N=3500+)**

Ref: 20-21% risk = P.A. or Nutrition

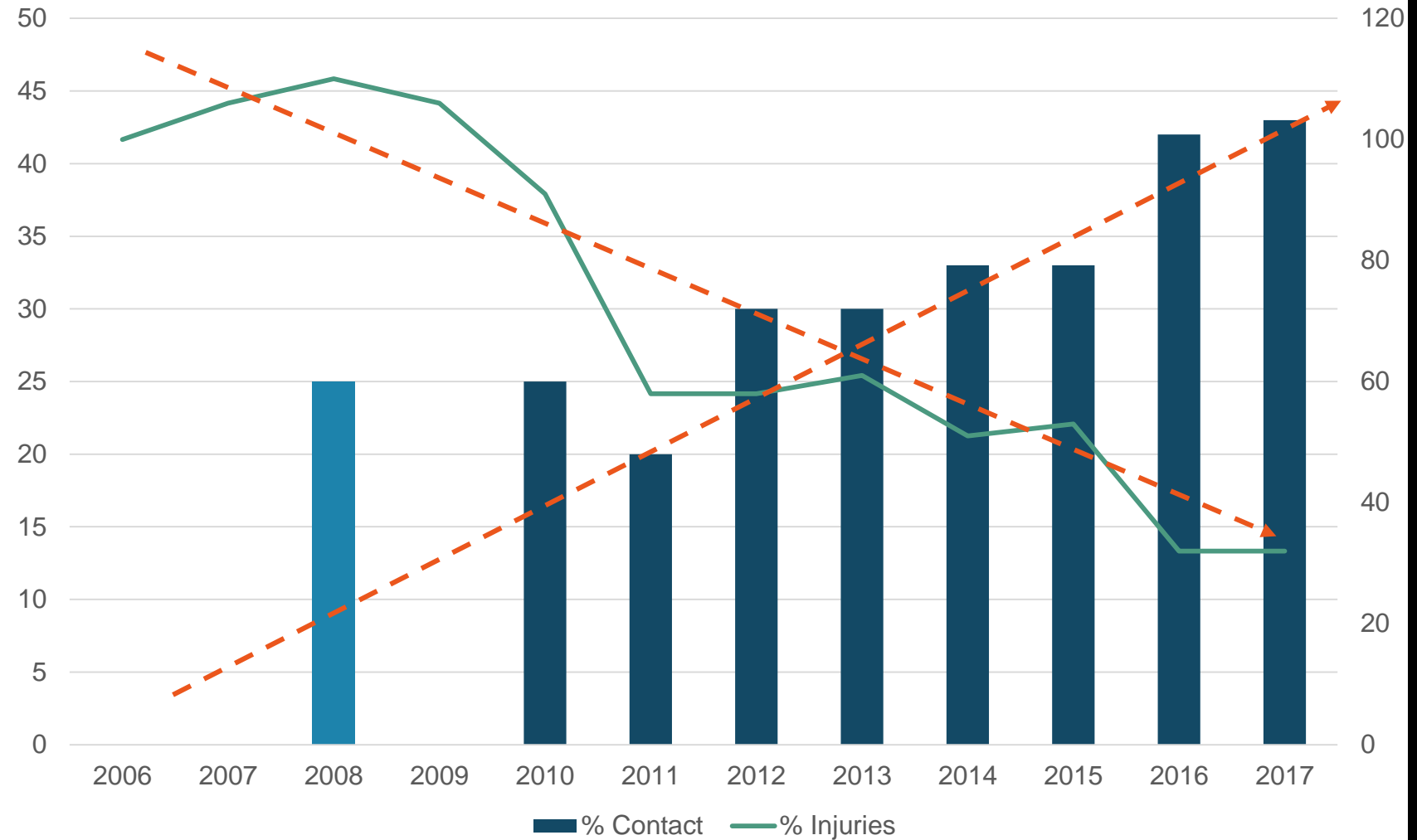




- 65%



## Movement Related Pain Syndromes



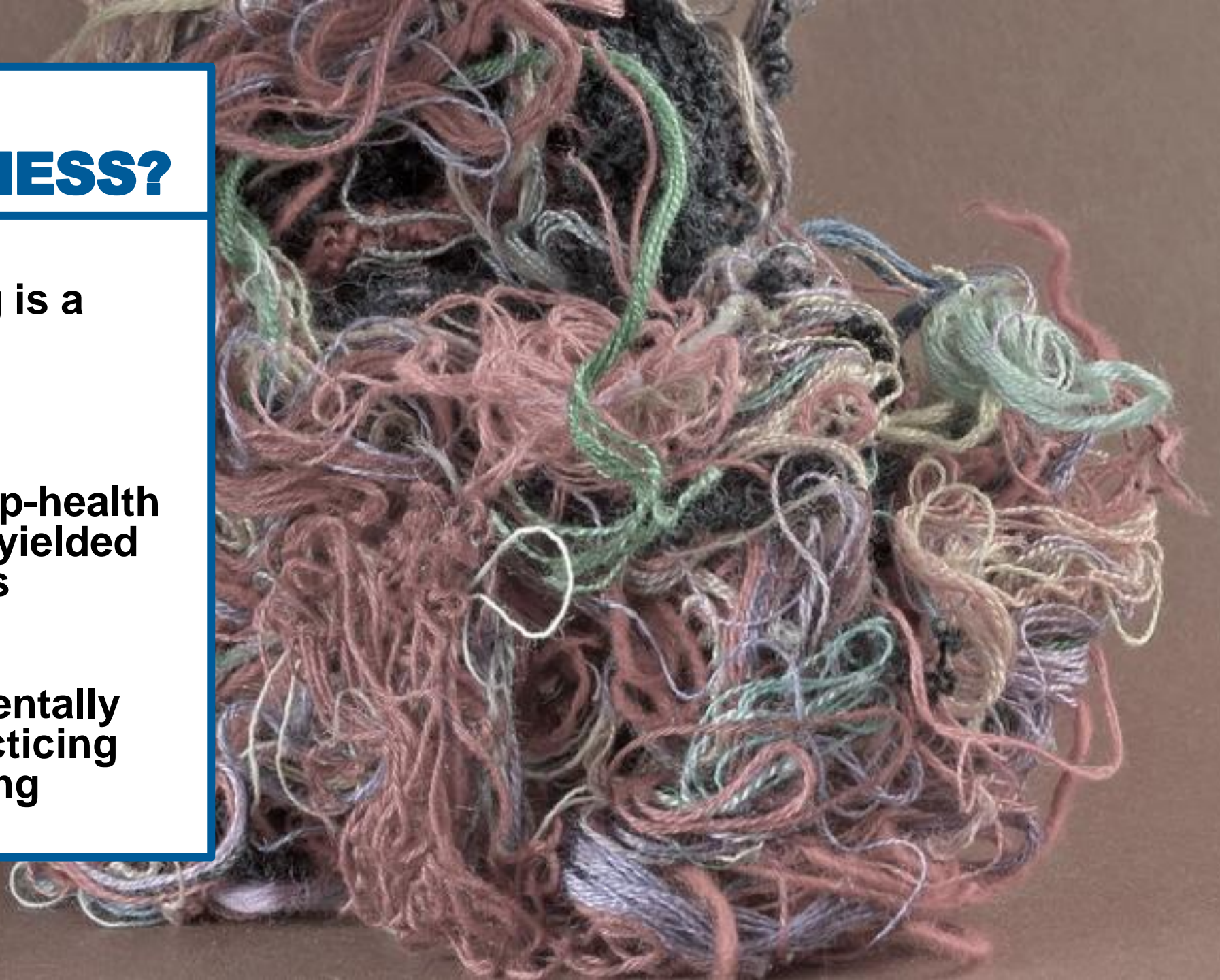


# **TANGLED MESS?**

**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



## [Step3]: Aggressive MSK Management

- Strive for same day evaluation by conservative care (preferably PT)
- Remove barriers to "consult level care"
- Embedded is gold standard

## [Step1]: Control the Narrative on Pain



- Normalize the pain conversation
- Special attention to at-risk "pre-pain"
- Movement is a window into future health



## [Step4]: Risk Monitoring System

- Help employees to think LESS about health data.
- Movement + Sleep + Stress



## [Step5]: Add Layers

- Build an ecosystem

## [Step2]: Invest in your "pain-chain"



- All people who influence pain perception
- Special attention to clinicians & family
- Movement is a window into future health



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TM