The True Impact of Injuries & Violence: Are Our Programs Equal to this Challenge?

AIPN 2017, 15 November 2017, Ballarat

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Tampere Declaration of the 12th World Conference on Injury Prevention and Safety Promotion, 18-21 September 2016, Finland

- Develop multisectoral **national action plans** to implement policy, programmes and legislation for injury and violence prevention and control, with clear targets and monitoring mechanisms.
- Designate focal points and **create units for injury and violence prevention** within the Ministry of Health, and other ministries as relevant to the national context, for example the Ministry of Transport, Ministry of Interior, Ministry of Labour; strengthen the capacity of relevant ministries to work across sectors in a collaborative and coordinated manner.
- **Invest** in injury prevention and safety promotion and develop innovative funding mechanisms.
- Adapt, implement and monitor **proven strategies** at national and local level to reduce risk factors and prevent injuries and violence, including but not limited to legislation, regulation, enforcement, environmental modification, and safety equipment and standards.
- Ensure universal access to essential pre-hospital and facility-based **emergency care services**.
Tampere Declaration of the 12th World Conference on Injury
Prevention and Safety Promotion, 18-21 September 2016, Finland

• Promote expanded access to medical, legal and psychosocial support services and to rehabilitation for the injured and their families, and expanded access to services for those at risk of injury or violence.

• Raise awareness and improve health literacy by improving communication and dissemination of information on the impact of injuries and violence, and effective prevention and control strategies. Integrate injury and violence prevention into other health and safety advocacy platforms.

• Build community capacity to identify local injury and violence priorities and to take effective action to prevent injuries and violence and improve outcomes.

• Develop local platforms to engage multiple stakeholders in dialogue and advocacy, such as those created through the Safe Communities movement.

• Strengthen standardised national and community- and facility-based data collection on fatal and non-fatal injuries and violence, in order to reveal the true magnitude and allow more effective development and monitoring of prevention and control initiatives. Collect and disaggregate data sufficiently, and use it to analyse gender, socioeconomic and other inequities that underlie patterns of injury and violence.

• Encourage improved external cause of injury (in addition to diagnosis) coding, utilisation of standard core data sets for injury. Fund research that expands the scientific evidence base for both prevention and improved outcomes for the injured, including research on risk factors and underlying causes.
Tampere Declaration of the 12th World Conference on Injury Prevention and Safety Promotion, 18-21 September 2016, Finland

• **Strengthen capacity for injury prevention and safety promotion**, including education, training and professional development to facilitate effective research, policy development, provision of care, system organisation and coordination, advocacy and data collection.

• **Encourage the participation of civil society** and the private sector in injury and violence prevention.

• **Review actions of industry** to ensure they promote injury and violence prevention consistent with current evidence.

• **Take action** to implement existing global and regional injury-related commitments, such as United Nations General Assembly resolutions, World Health Assembly resolutions and the plan of action for the Decade of Road Safety 2011 to 2020.
Taking Action

• Burden of injury and violence
• Flow-on effects of injury and violence
• Systemic change versus systematic change
• Political climates and our response
Taking Action

• Burden of injury and violence
• Flow-on effects of injury and violence
• Systemic change versus systematic change
• Political climates and our response
Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016

Summary
Background Measurement of change in health across locations is useful to compare and contrast changing epidemiological patterns against health system performance and identify specific needs for resource allocation in research, policy development, and programme decision making. Using the Global Burden of Disease, Injuries, and Risk Factors Study 2016, we draw from two widely used summary measures to monitor changes in population health: disability-adjusted life-years (DALYs) and healthy life expectancy (HALE). We used three measures to track trends and benchmark progress compared with expected trends on the basis of the Socio-Demographic Index (SDI).

Methods We used results from the Global Burden of Disease, Injuries, and Risk Factors Study 2016 for all-cause mortality, causes-specific mortality, and nonfatal disease burden to derive (DALYs and HALE) for each of 195 countries and territories from 1990 to 2016. We calculated DALYs by summing years of life lost and years of life lived with disability for each location, age group, sex, and year. We estimated HALE using age-specific death rates and years of life lived with disability per capita. We explored how DALYs and HALE differed from expected trends when compared with the SDI, the geometric mean of income per person, educational attainment in the population older than 15 years, and total fertility rate.

Findings The highest globally observed HALE at birth for both women and men was in Singapore, at 27-2 years (95% uncertainty interval 26-2-27-3) for females and 27-3 years (26-3-28-3) for males. The lowest for females was in the Central African Republic (15-3 years [14-8-15-8]) and for males was Solomon Islands (15.1 years [14-7-15-6]). From 1990 to 2016, global HALE increased by an average of 2-57 (95% CI 2-54–2-59) years for both sexes combined. Global HALE increased by 4-06 years (4-04–4-07) for females and 4-44 years (4-42–4-46) for males. At the same time, the global average age at which DALYs were first ever incurred increased by 1-78 years (1-76–1-79) for males and 1-94 years (1-92–1-95) for females. Total global DALYs remained relatively stable from 1990 to 2016 (1-9–1-92). Global DALYs increased by 1-8 (1-9–1-7) with increasing communicable, maternal, neonatal, and nutritional (CMNN) diseases DALYs offset by increased DALYs due to noncommunicable diseases (NCDs). The example, calculated as the five lowest values of observed to expected age-standardized DALY rates in 2016, were Nicaragua, Costa Rica, the Maldives, Peru, and Israel. The leading causes of death globally were ischemic heart disease, cerebrovascular disease, and lower respiratory infections, comprising 31-3% of all DALYs. Total DALYs and age-standardized DALY rates due to most CMNN cause decreased from 1990 to 2016. Conversely, the total DALY burden rose for most NCDs, however, age-standardized DALY rates due to NCDs declined globally.

Interpretation At a global level, DALYs and HALE continue to show improvements. At the same time, we observe that many populations are facing growing functional health loss. Rising DALY was associated with increases in cumulative years of life lived with disability and decreases in CMNN DALYs offset by increased NCD DALYs. Relative contribution of morbidity highlights the importance of continued health interventions, which has changed in most locations in pace with the economic development. People's attitude towards the SDI and their relationship to SDI represents a robust framework with which to benchmark locations specific health performance. Country-specific drivers of disease burden, particularly for causes with high-age-standardized DALYs should inform health policies, health system improvement initiatives, targeted prevention efforts, and development assistance for health, including financial and research investments for all countries, regardless of their level of socioeconomic development.

Health impacts of countries that substantially benefit from progress globally compared with low SDI countries. so, while there is an expansion of morbidity as life expectancy increases, there is a relative improvement of morbidity less time spent with illness at a country becomes richer.

Funding Bill & Melinda Gates Foundation.

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Life, death, and disability in 2016

In this week’s issue of The Lancet, we publish the latest global, regional, and national estimates and analyses from the Global Burden of Diseases, Injuries, and Risk Factors Study 2016 (GBD 2016), covering the period 1990 to 2016. The GBD is a Herculean effort that annually tracks disease burden across countries, time, age, and sex. In 2016, there were an estimated 128·8 million livebirths and 547·7 million deaths. The good news is that globally, mortality rates have decreased across all age groups since 1990. For the first time, the GBD has revealed the estimated number of deaths in children under 5 years fell below 5 million, and there were 236 000 maternal deaths. Deaths from communicable diseases have largely decreased, apart from disease with increased deaths, when deaths increased by 8.8% since 2006 to 27·8% in 2016. There were an estimated 170·1 million deaths, 1·1 million tuberculosis deaths, and 723·8 million malaria deaths.

However, an estimated 62·3% (95% million) of all deaths in 2016 were from non-communicable diseases. Since 2000, deaths from ischemic heart disease (IHD) have increased by 15% globally. The Socio-Demographic Index (SDI) is a metric that measures a country’s development. HALE is the leading cause of premature mortality in all 555 causes included in the GBD and is also a key measure of a country’s development. In 2016, low-income countries fell below 50 years, and deaths continued to rise worldwide. Smoking and poor diet remain leading risk factors of IHD. In reality, the largest increase in deaths from injuries was from conflict and war. Deaths from firearms were the largest single cause of proportion of overall interpersonal violence. Sadly, the prevalence of mental health conditions globally also showed a significant increase since 1990. Indeed, major depressive disorders ranked in the top ten causes of ill health in all but four countries worldwide in 2016.

Overall, the findings show that the world is becoming healthier, but progress is uneven. People are living longer, but with more disease. As SDI rises, the gap between healthy life expectancy and life expectancy (i.e., the healthy life years) is less for high SDI countries compared with low SDI countries. So, while there is an expansion of morbidity as life expectancy increases, there is a relative improvement of morbidity less time spent with illness at a country becomes richer.

This year, each paper contains a vast amount of new data and analyses. The study showcases exemplary nations, such as Ethiopia, the Maldives, Nepal, Niger, Peru, and Portugal, where observed life expectancy was greater than expected life expectancy based on their SDI. It will be important to learn the reasons for progress in these countries. In the first-year analysis of country progress towards meeting the health-related Sustainable Development Goal 3, no countries are projected to meet more than 1 of the 21 targets by 2020. Singapore, Ireland, and Sweden were the top three performers, the Central African Republic, and Afghanistan were the poorest.

In 2011, the core message from the Lancet Commission on children’s health in a world of finite resources was that the world has a unique opportunity to end preventable mortality in a single generation. The report argued that a grand convergence in mortality and life expectancy, where rich and poor countries converge to being the same in 2035, is possible. But when one looks at the estimates from GBD 2016, the picture is mixed. There is some evidence of convergence in mortality. But in some areas, there has been a relative divergence—for example, in men and women aged 30-54 years. The Commission must review and reflect on these findings in its future work.

One message from these papers is that there are certain health issues that need specific attention in different age groups. Life expectancy at age 65 years

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Global DALYs for 2016, by percent change since 1990.

DALY=Disability-Adjusted Life-Year

http://vizhub.healthdata.org/gbd-compare
• Cancer, cardiovascular diseases, mental & substance use disorders, musculoskeletal conditions, and injuries were the disease groups that caused the most total burden in 2011

• Mental & substance use disorders and injuries were the main causes of burden in younger people

Strengths & Limitations -- Burden of Disease Studies

**Limitations**
- Estimates
- Large numbers lack context
- People’s stories of loss are important, too
- Value systems of authors implicit

**Strengths**
- Empirical basis for monitoring trends
- Basis for prevention investments
- Underscore importance of injury/violence
Limitations of Injury Burden Studies

Limitations to Methods

• Injuries occur at young age
  – Loss of potential contribution to society not fully captured by numerical metrics

• Caregiver support not fully captured
  – Care of dependent with disability may extend for decades

• People’s stories of loss are important, too
  – Violation of trust associated with sexual and physical assault

• Flow-on effects from injury to other conditions not captured
Flow-on effects from injury to other conditions

• Sports/Rec Injury and
  – Concussion and neuro-health
  – Joint Injuries and musculoskeletal conditions

• Violence has Enormous Impact
  – Witnessing Partner Violence as a Child
  – Transmission and Norm-Setting
  – Racial Violence and Hate Crimes
Flow-on effects from injury to other conditions

- **Sports/Rec Injury and**
  - Concussion and neuro-health
  - Joint Injuries and musculoskeletal conditions

- **Violence has Enormous Impact**
  - Witnessing Partner Violence as a Child
  - Transmission and Norm-Setting
  - Racial Violence and Hate Crimes
Remember the good old days when we played sports and never worried if we got concussions?
Junior Seau and the disturbing NFL suicide trend

The tragic death of the 43-year-old former linebacker reignites concerns over the link between head trauma and suicide. Can anything be done?

POSTED ON MAY 3, 2012, AT 12:26 PM

The suicide of former NFL linebacker Junior Seau Wednesday at age 43 is once again raising questions about the links between violent NFL play, head trauma, mental illness, and suicide. After Seau's girlfriend discovered the former star at his southern California home Wednesday morning with a gunshot wound to the chest, police are investigating the incident as a suicide. If that's the case, Seau would be the second retired NFL player to commit suicide in recent weeks. Here's what you should know:

Dementia in former star athletes has galvanized intense public attention – but scientific underpinning of some work remain questionable
Early cross-sectional studies had an enormous impact, despite methodologically-weak cross-sectional design


test

# Sports-Related Concussion Prospectively Associated with Depression

<table>
<thead>
<tr>
<th>Concussions during professional career</th>
<th>Post-retirement diagnosis of depression</th>
<th>Total former players</th>
<th>Adjusted Risk Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3 (2.0%)</td>
<td>154</td>
<td>1.0 (ref)</td>
</tr>
<tr>
<td>1 to 2</td>
<td>22 (8.2%)</td>
<td>267</td>
<td>3.6 (1.1, 11.8)</td>
</tr>
<tr>
<td>3 to 4</td>
<td>28 (13.7%)</td>
<td>204</td>
<td>5.1 (1.6, 16.7)</td>
</tr>
<tr>
<td>5 to 9</td>
<td>26 (19.3%)</td>
<td>135</td>
<td>6.4 (1.9, 21.0)</td>
</tr>
<tr>
<td>10 or more</td>
<td>19 (26.8%)</td>
<td>71</td>
<td>8.9 (2.6, 30.0)</td>
</tr>
<tr>
<td>Total</td>
<td>98 (11.8%)</td>
<td>831</td>
<td></td>
</tr>
</tbody>
</table>

- More rigorous prospective study – *but was deemed to be “old news”*
- Former professionals with 10+ professional-era concussions, who had never been depressed prior to 2001, had *9 times the risk of clinical depression*, relative to those with no professional-era concussions
Flow-on effects from injury to other conditions

- **Sports/Rec Injury and**
  - Concussion and neuro-health
  - Joint Injuries and musculoskeletal conditions

- **Violence has Enormous Impact**
  - Witnessing Partner Violence as a Child
  - Transmission and Norm-Setting
  - Racial Violence and Hate Crimes
Traumatic Knee Injuries: ACL

- Tears and ruptures of anterior cruciate ligament (ACL)
  - General incidence: 1 ACL injury per 2,200 people/year
  - 15-19 year olds: 1 per 750 people/year
  - Higher in athlete populations, up to 1 per 20 people / year

*Am. Acad. Ortho. Surgeons; OA Action Alliance*
Knee Osteoarthritis (OA)

• Clinical Presentation
  – reduced knee function
  – pain in morning
  – swelling following exercise

• Radiographic Indications
  – Joint space narrowing
  – Bony osteophytes
  – Cartilage loss

Am. Acad. Ortho. Surgeons; OA Action Alliance
Pain

Normal joint space

Loss of joint space
Pain

In the knee when I turn my leg in a certain way.
I’ve stopped going at the pictures because after 2 hours when you have to stand up, it’s awful”

“Like an alien moving in your body”
“A slow moving lava flow”

“Like tearing something, you can’t trust your muscles anymore, as if I had bones only.”

“I already stayed trapped by it 3 hours long in my bathtub because I couldn’t get up

“As if I were on the grill. Two grills inside, on both sides of my hips. That’s what I feel right now; a deep burning. The pain is deep inside; I don’t move much.”

“I stay in the dark, a small pillow under the neck. My head aches but at the back of my head”

Knee Osteoarthritis (OA)

- Global prevalence of ~4%
  - ~5% in women
  - ~3% in men
- At age 60 years:
  - ~15% in women
  - ~10% in men
- Associated with high levels of disability

Prevalence of Arthritis

**Figure 1** — Age-specific prevalence of arthritis (x-axis not to scale)

Data on U.S. Males is from the National Health Interview Survey, United States, 2001

“....the young patient .... with an old knee....”


Injury and Violence problems ARE Different.

They are bad endpoints, PLUS they are a CAUSE of other bad endpoints.

http://vizhub.healthdata.org/gbd-compare
Possible Framework of Post-Traumatic Knee OA Pathobiology

Modified from: Andriacchi & Mundermann, 2006
Major joint injury is a known risk factor for OA

Improving muscle strength and balance will help reduce the number of falls and joint injuries that can lead to OA.

The Osteoarthritis Action Alliance is committed to elevating osteoarthritis (OA) as a national health priority and promoting effective policy [systems and environmental] solutions that address the individual and national toll of OA.
**Flow-on effects from injury to other conditions**

- **Sports/Rec Injury and**
  - Concussion and neuro-health
  - Joint Injuries and musculoskeletal conditions

- **Violence has Enormous Impact**
  - Links Between Different Types of Violence
  - Shared Risk and Protective Factors
  - Racial Violence and Hate Crimes
Connecting the Dots: An Overview of the Links Among Multiple Forms of Violence
Different Forms of Violence

Child Maltreatment:
- physical, sexual, emotional, neglect

Suicidal Behavior

Teen Dating Violence

Sexual Violence

Peer Violence:
- youth violence, bullying, gang-related violence, fights

Intimate Partner Violence

Elder Abuse

Source: Centers for Disease Control and Prevention, Division of Violence Prevention
Examples of Potential Strategies for Addressing Multiple Forms of Violence

- **Community/Societal level**
  - Norms change strategies
  - Strategies/activities that enhance community support & connectedness
  - Coordinated services

- **Relationship level**
  - Strategies that support families under stress
  - Strategies that connect youth with supportive adults, pro-social peers, and their schools

- **Individual level**
  - Strategies that build youth and families’ skills in solving problems non-violently
  - Substance abuse prevention strategies
For More Information

Connecting the Dots: An Overview of the Links Between Multiple Forms of Violence
http://www.cdc.gov/violenceprevention/pub/connecting_dots.html

CDC’s Division of Violence Prevention
http://www.cdc.gov/violenceprevention/
Strengthen capacity ...for injury prevention and safety promotion, including education, training and professional development to facilitate effective research, policy development, provision of care, system organisation and coordination, advocacy and data collection.

Encourage the participation of civil society and the private sector in injury and violence prevention.

Review actions of industry to ensure they promote injury and violence prevention consistent with current evidence.

Take action to implement existing global and regional injury-related commitments, such as United Nations General Assembly resolutions, World Health Assembly resolutions and the plan of action for the Decade of Road Safety 2011 to 2020.
Ballarat Declaration

• ....??????
Ballarat Declaration

- **Demand decent wi-fi** at future conference venues, including the Mercure Ballarat.
Ballarat Declaration

• People Have a Right to Live to Their Full Potential free of the damaging effects of injury and violence
Taking Action

• Burden of injury and violence
• Flow-on effects of injury and violence
• Systemic change versus systematic change
• Political climates and our response
Everything Matters

The tasks that have been entrusted to us are often difficult. Almost everything that matters is difficult, and *everything matters*.

— Rainer Maria Rilke, *Letters to a Young Poet*. 1903
Injury prevention as social change

R J McClure, K Mack, N Wilkins, T M Davey

INTRODUCTION
We will not solve the public health problem of injury simply by educating individuals about the nature of injury risk, improving their risk assessment and providing these individuals with information to enable them to reduce the level of risk to which they are exposed. Substantial improvement in the societal injury burden will occur only when changes are made at the societal level that focus on reducing the population-level indicators of injury.1,2 The shift from an individual to a population perspective has substantial implications for the way we perceive, direct, undertake, and evaluate injury prevention research and practice. The analogy of ‘the population as patient’ provides a clear illustration of the foundational truths that underpin the preferred public health approach to the prevention of injury.

Society is the system within which populations exist. Sustained change made at the societal level to reduce population-level indicators of injury morbidity and potential solutions can be pegged, decisions made and societies held accountable. Perhaps the most compelling benefit of the ‘population as patient’ approach is that it provides a clear scope for injury prevention and a means by which prevention goals can be achieved. While we may not know enough to cure a disease, we do know enough to at least shift the health of the least healthy populations to match that of the healthiest.7 All countries of the world have access to the same evidence base to support technical and behavioural solutions for RTC injury, yet the RTC death rate in some populations is 10 times the rate in others.6,7 When setting out to halve the global road toll,6 the first step is to recognise that the occurrence of disease and injury reflects the circumstances of society as a whole.6,7 There is tremendous opportunity for reduction in RTC injury that can be achieved by bringing the road transportation system of the highest risk populations into line with transport systems already existent in populations of lowest risk. Public health approaches to unintentional injury and violence prevention should not be merely educating individuals about their own individual risk, but instead should focus on putting in place changes to the system that are required if lives are to be saved.
Injury prevention as social change

R J McClure,¹ K Mack,¹ N Wilkins,¹ T M Davey²

Shift away from current **systematic** approaches & towards **systemic** approaches
“...the efficacy of seat belts, speed limits or roadside crash barriers, can be quantified in research settings, but these countermeasures can never comprise a motor vehicle safety solution on their own...”

“...These components can only influence population-level road traffic crash mortality and morbidity if incorporated into a larger intervention that includes a strong public demand for change, committed societal leadership, a climate of safety, an appropriate infrastructure, cooperation and coordination between all stakeholders, and a long-term perspective from all....”
Core Competencies for Injury and Violence Prevention Professionals

- Describe & explain injury and/or violence as a major social and health problem
- Access, interpret, use, and present injury and/or violence data
- Design & implement injury and/or violence prevention activities
- Evaluate injury and/or violence prevention activities
- Build & manage an injury and/or violence prevention program
- Disseminate information related to injury and/or violence prevention to the community, other professionals, key policy makers, and leaders through diverse communication networks
- Stimulate change related to injury and/or violence prevention through policy, enforcement, advocacy, and education
- Maintain & further develop competency as an injury and/or violence prevention professional
- Demonstrate the knowledge, skills, and best practices necessary to address at least one specific injury and/or violence topic and be able to serve as a resource in that area
Injury People are GREAT Systems Thinkers & Adaptive Learners

Here’s a 6-minute Proof!

• 2 minutes: Think of a time when you were effective as a leader in achieving a goal of yours (can be unrelated to injury or public health)
• 2 minutes: Turn to the person next to you – share your story
• 2 minutes: Listen to their story (positive comments only please; no need to comment)
Concussion Disclosure Behaviors, Attitudes, Norms, and Knowledge in Civilian and Military Emerging Adults
PI: Johna Register-Mihalik
Develop and Test an Immersive Online Concussion Education Platform

**PHASE 1**
Determine factors associated with concussion disclosure

**PHASE 2**
Design an intervention platform to address factors and behaviors concerning disclosure

**PHASE 3**
Test the initial efficacy and implementation of the designed intervention
Why An Online Platform?

• Interactive, Scenario-based, Simulates real-world Roles
• Grounded in Behavioral Theory
• Reflects Leading Trends in Young Adult Learning & Leisure
A few plays later, your teammate goes up for a rebound. The referee blows his whistle and calls a foul on Player #30.
After the call, your teammate stumbles and struggles to get up.

**Decision Point**

As #5's teammate what would you do?

- Stop & Assess How #5's Doing
- Keep Playing with No Action
A Systemic Model for Concussion Non-Disclosure
Jackson’s Return Potential Model & Theory of Planned Behavior

**Institutional Norms**
- Norm Intensity
- Norm Crystallization
- Norm Power

**Individual and Behavioral Measures**
- Intentions
- Attitudes
- Subjective Norms
- Perceived Control
- Knowledge
- Perceptions and Beliefs

**Health Promotion (Interventional) Components**
*Education, Communication Programs, Organizational Change*
- Culturally relevant messaging
- Available training solutions (eg. IMI)
- Knowledge transfer (reach) and efficacy
- Compliance with concussion policies
- Adherence to NCAA & DOD regulations
- Stakeholder buy-in

**Behavior**
- Disclosure of concussion and concussion symptoms
- Removing self from participation when symptomatic
- Care-seeking

**Environment**
- Team and Coach Support
- Organizational support

**IMPROVED PREVENTION, DETECTION, AND CARE OF CONCUSSIONS**

Adapted from Green & Kreuter, 1999; Gielen & Sleet, 2003
Theory of Planned Behavior

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## Theory of Planned Behavior

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<th>NCAA</th>
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<td><strong>Beliefs (max=45)</strong></td>
<td>Mean (95%CI)</td>
<td></td>
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<tr>
<td></td>
<td>42.3 (41.9, 42.6)</td>
<td>43.5 (43.0, 44.0)</td>
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<tr>
<td><strong>Knowledge (max=35)</strong></td>
<td>Mean (95%CI)</td>
<td></td>
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<tr>
<td></td>
<td>32.1 (31.63, 32.47)</td>
<td>32.3 (31.6, 32.9)</td>
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<tr>
<td><strong>Attitudes (max=42)</strong></td>
<td>Mean (95%CI)</td>
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<td></td>
<td>30.8 (33.4, 34.2)</td>
<td>33.8 (33.2, 34.5)</td>
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<tr>
<td><strong>Control (max=7)</strong></td>
<td>Mean (95%CI)</td>
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<td></td>
<td>6.4 (6.4, 6.4)</td>
<td>6.5 (6.4, 6.6)</td>
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<td><strong>Intention (max=7)</strong></td>
<td>Mean (95%CI)</td>
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<td>5.9 (5.9, 6.1)</td>
<td>6.1 (5.9, 6.2)</td>
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*Data not yet published; confidential
Jackson’s Return Potential Model

IMPROVED PREVENTION, DETECTION, AND CARE OF CONCUSSIONS

Institutional Norms
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- Norm Crystallization
- Norm Power

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## Jackson’s Return Potential Model

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<th>Construct</th>
<th>Definition</th>
<th>Calculation</th>
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<td>Intensity</td>
<td>Overall approval rating of the behavioral norm</td>
<td>Mean approval score for that norm, standardized to -2 (strong disapproval), -1 (disapproval), 0 (neither approval nor disapproval), 1 (approval), 2 (strong approval)</td>
</tr>
<tr>
<td>Crystallization</td>
<td>Consensus of group around the norm</td>
<td>Absolute value of the intensity minus ¼ of the average variance of the items for that behavior</td>
</tr>
<tr>
<td>Power</td>
<td><strong>Combined strength of opinion and variability of opinion in a group</strong></td>
<td>Product of intensity x crystallization</td>
</tr>
</tbody>
</table>
Each One of Us is a Swamp of Pre-Conceived & Conflicting Ideas, Assumptions, & Beliefs
# Jackson’s Return Potential Model

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>Overall approval rating of the behavioral norm</td>
<td>Mean approval score for that norm, standardized to -2 (strong disapproval), -1 (disapproval), 0 (neither approval nor disapproval), 1 (approval), 2 (strong approval)</td>
</tr>
<tr>
<td>Crystallization</td>
<td>Consensus of group around the norm</td>
<td>Absolute value of the intensity minus ¼ of the average variance of the items for that behavior</td>
</tr>
<tr>
<td>Power</td>
<td><strong>Combined strength of opinion and variability of opinion in a group</strong></td>
<td>Product of intensity x crystallization</td>
</tr>
</tbody>
</table>
# JRPM Guides Identification of Intervention Targets

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Intensity</th>
<th>Crystallizatn.</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cadet</td>
<td>NCAA</td>
<td>Cadet</td>
</tr>
<tr>
<td>Praises: Teammate praises reporting a possible concussion</td>
<td>0.60</td>
<td>0.77</td>
<td>0.34</td>
</tr>
<tr>
<td>Criticizes: Teammate continuing to participate in physical activity while experiencing symptoms</td>
<td>0.39</td>
<td>0.16</td>
<td>0.06</td>
</tr>
<tr>
<td>Praises: Teammate removing self from activity while experiencing symptoms</td>
<td>0.73</td>
<td>0.81</td>
<td>0.43</td>
</tr>
<tr>
<td>Criticizes: Teammate reporting another teammates possible concussion</td>
<td>0.73</td>
<td>0.71</td>
<td>0.43</td>
</tr>
<tr>
<td>Praises: Teammate feeling they should take action when suffering a possible concussion</td>
<td>0.78</td>
<td>0.87</td>
<td>0.49</td>
</tr>
<tr>
<td>Criticizes: Teammate NOT reporting a possible concussion</td>
<td>0.62</td>
<td>0.53</td>
<td>0.38</td>
</tr>
<tr>
<td>Criticizes: Teammate NOT reporting another teammates possible concussion</td>
<td>-0.61</td>
<td>0.41</td>
<td>0.39</td>
</tr>
<tr>
<td>Criticizes: Teammate feeling they should NOT take action when suffering a possible concussion</td>
<td>0.56</td>
<td>0.44</td>
<td>0.34</td>
</tr>
</tbody>
</table>

*Data not yet published; confidential*
As #5's teammate what would you do?

Stop & Assess How #5's Doing  Keep Playing with No Action
Taking Action

• Burden of injury and violence
• Flow-on effects of injury and violence
• Systemic change versus systematic change
• Political climates and our response
Injury Research and Injury Prevention

- We have a responsibility to ensure our research is translated into tangible public health gains.
- Society needs us to be able to explain our research – and potential for injury prevention within society – to policy-makers and the public.
A Three Step Model of Research Study

1. Framing the Research Question
   - Reflects Investigator Values

2. Study Design & Methods
   - Reproducible, Objective, & Unbiased

3. Interpret Results & Disseminate Conclusions
   - Reflects Investigator Values
A Three Step Model of Research Study

Framing the Research Question

Study Design & Methods

Interpret Results & Disseminate Conclusions

Reflects Investigator Values

Reproducible, Objective, & Unbiased

Reflects Investigator Values

It's time to be more explicit about the role of our values in our research and actions.
The Implementation of Musculoskeletal Injury-Prevention Exercise Programmes in Team Ball Sports: A Systematic Review Employing the RE-AIM Framework

Potential years of life lost (PYLL) due to 31 causes of death in all 2015 US deaths and number of NIH funded R01 grants about the cause of death, stratified by black and white race


Solid black line shows predicted relationships from linear spline regression models with nodes at tertiles and 95% confidence limits shaded. Dotted red reference line shows hypothetical relationship if 1% increase in PYLL corresponded to a 1% increase in funded grants. Top 15 race-specific contributors to PYLL are labeled.
Potential years of life lost (PYLL) due to 31 causes of death in all 2015 US deaths and number of US Publications about the cause of death, stratified by black and white race


Solid black line shows predicted relationships from linear spline regression models with nodes at tertiles and 95% confidence limits shaded. Dotted red reference line shows hypothetical relationship if 1% increase in PYLL corresponded to a 1% increase in funded grants. Top 15 race-specific contributors to PYLL are labeled.
Echo chambers that resound with intolerance as we enter the post-truth era

- Polarized social media & news channels
- Post-truth era of political speech & action
- Increased use of violence as a political tool
- Rise of fake news, de-emphasizing research and empirical facts
- Higher distrust of others
- Less acceptance of rationality as basis for action
- Less acceptance of science as authority
Richard Collins III, 1994-2017. A few days before graduation, stabbed at a bus stop near campus by a member of Alt-Reich Nation.

Fatally injured on suburban Portland train after they defend two teenage girls on a train who were being verbally attacked by a white supremacist.

Rick Best, 1978-2017

Taliesin Meche, 1994-2017
Changing Times for Injury Prevention and Injury Research

Many Opportunities
• Many topics to research
• Many translation opportunities

Many Challenges
• How should we respond to the rising tide of intolerance & prejudice in the “developed” nations?
A Three Step Model of Research Study

Framing the Research Question
- Reflects Investigator Values

Study Design & Methods
- Reproducible, Objective, & Unbiased

Interpret Results & Disseminate Conclusions
- Reflects Investigator Values

It's time to identify the values that lead to reductions in injury and violence, and how to ensure those values are systemically strengthened in society.
What are Values that lead to Reductions in injury and violence?

We will need research to define those values.

But history has taught us the values that rapidly lead to INCREASED injury and violence.
As a society, over the past year, we have decided that one of these men is **unfit** for corporate leadership ....

...and one of them **is** fit for civic leadership

*Now can someone please explain that to me?*
Its because of Demographics, Simulations, and GIS
US Political Parties are Avid Consumers of Science

58th U.S. Presidential Election results (8th Nov, 2016) at the county level
Red=Trump; Blue=Clinton; Color gradients indicate +/- 10%

Popular Vote:
Clinton: 65,844,610 votes — 48%
Trump: 62,979,636 votes — 46%

County-level Vote (Relative to 2012 Election):
2,728 shifted toward Republican (88%)
383 shifted toward Democratic (12%)
Responding to the Rising Tide of Intolerance & Prejudice

• What do we foresee as the impact of the rise of new role models of sexual predation and racial hatred?
• What support should we provide to responses like #MeToo?
• Do we stand back and measure?
• Or do we know enough to act?
John Snow (1813–1858)

• Celebrated for his intelligent study design and meticulous methods, in combination with his willingness to press for public health action
Janet Elizabeth Lane-Claypon (1877–1967)

- English physiologist and physician (DSc 1905; MD 1910)
- Pioneer in methods, focused on clinically-relevant questions in MCH epi
- Cohort study comparing infant weight in cows-milk-fed and breastfed infants (1912)
- Designed and conducted a precursor to the modern case-control study, a multi-hospital study of 500 breast cancer cases and 500 clinic controls (1926)
- Study on cancer of uterus (1927)
- Survival following breast cancer surgery using lifetable methods (1928)


Morabia A. Commentary: Janet Lane-Claypon—Interphase Epitome. Epidemiology Vol. 21, No. 4 (July, 2010), pp. 573-576
Reflection

• What would Snow and Lane-Claypon think of us, if they came to this conference?
History won't judge us based on our challenges
History will judge us on how we rose to meet them
Acknowledgements

• Wonderful conference! Well-organized and well-run!
• Thanks to Caroline, Lauren, FedUni, and Ballarat for hosting
Come and visit us at the UNC Injury Center in Chapel Hill, North Carolina!