



Leading Indicators: Where Should We Be Going and How Should We Get There?

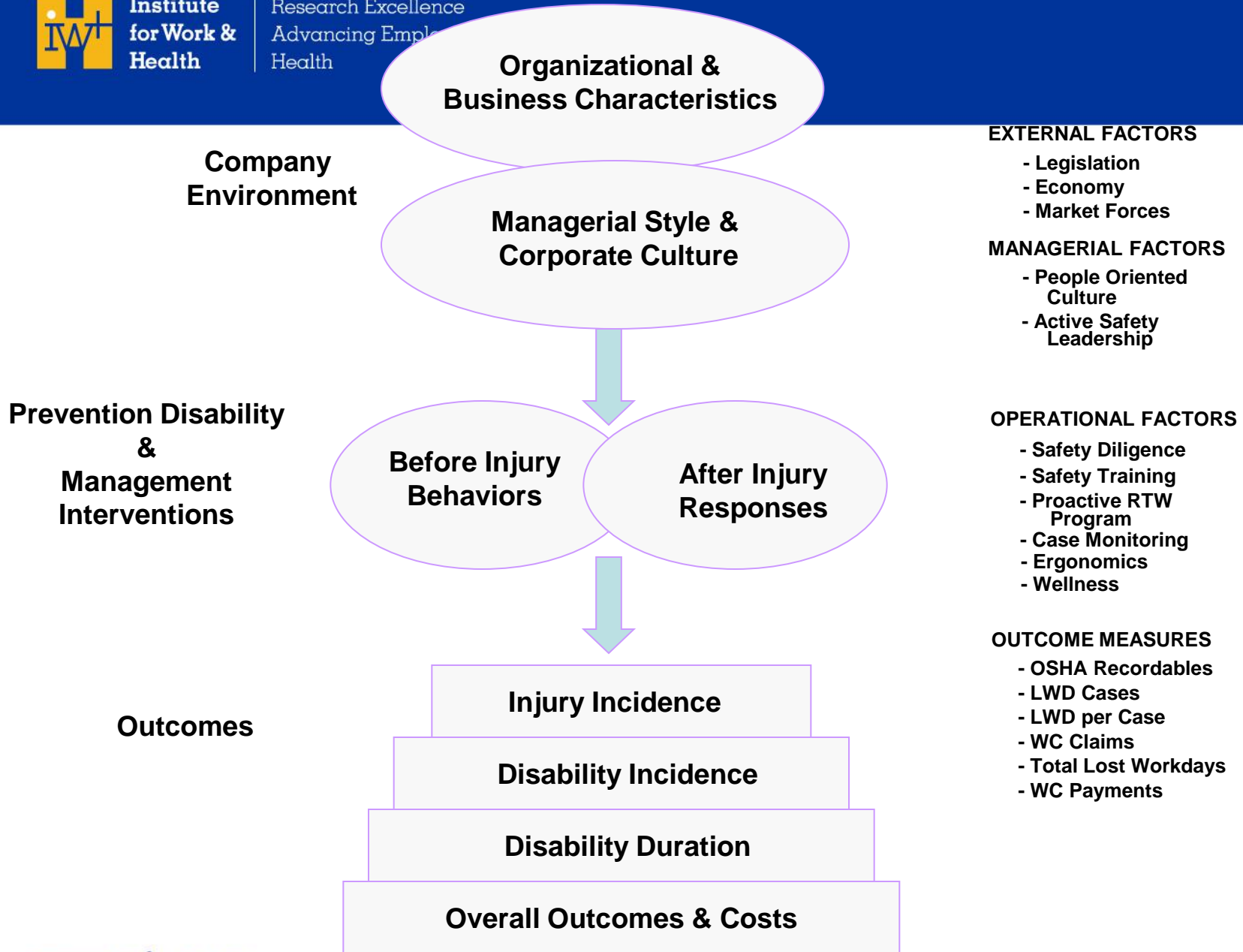
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IWH 2010, Toronto, Canada



This Morning I Will ...

- Briefly discuss the ‘idea’ of leading indicators
- Make a detailed presentation about the development of a practical tool for assessing organizational occupational health and safety performance
- Describe briefly current work on developing a provincial benchmarking database for leading indicators





Safety Metrics

Leading & Lagging Indicators

Do they add value to the practice of safety?

By Fred A. Manuele



Culture vs. Climate – What Gives?

- Culture is about values
- Climate is about norms
- Values are embedded
- Norms are observed
- Culture is experienced
- Climate is enacted
- Leadership expresses values
- Leadership supports norms



A Little Background on the Prevention System Project

- A team of Ontario prevention system partners was assembled to develop a leading indicator for the prevention system
- Research question
 - Can we develop a tool to predict firm injury experience, based on an assessment by workplace parties of workplace policies and practices?
- To answer the question we conducted a pilot project



Pilot Project Objectives

- Develop a survey to measure leading indicators of organizational health and safety
- Collect data to determine reliability and validity of the organizational indices metric
- Provide a tool for HSA consultants to measure organizational health and safety at workplaces



Pilot Project Process

- All 12 HSAs, MOL and WSIB approved the questions in the organizational indices questionnaire
- HSA consultants trained to administer the organizational indices questionnaire
- Employers assured data going to IWH not WSIB
- IWH had confidentiality agreements with all participating HSAs and WSIB
- HSAs targeted 'easy to get to' firms
- Goal 100 firms/HSA



What Do We Have?

- 808 questionnaires completed from 8 HSAs and OHCOW:
 - ESAO, IAPA, OSSA, E&USA, OFSWA, FSA, THSAO, OSACH
 - 4 HSAs did not participate: MHSA, MASHA, CSAO, PPHSA
- Using firm number, IWH linked WSIB data to survey data for 642 firms due to 166 firms with duplicate firm numbers



We asked a workplace party to ...

1. Tell us the amount of time their organization engaged in 8 practices

2. They could answer using 5 categories:
 - a) 80-100%
 - b) 60-80%
 - c) 40-60%
 - d) 20-40%
 - e) 0-20%



Our Eight Pilot Items

1. Formal safety audits at regular intervals are a normal part of our business.
2. Everyone at this organization values ongoing safety improvement in this organization.
3. This organization considers safety at least as important as production and quality in the way work is done.
4. Workers and supervisors have the information they need to work safely.
5. Employees are always involved in decisions affecting their health and safety.
6. Those in charge of safety have the authority to make the changes they have identified as necessary.
7. Those who act safely receive positive recognition.
8. Everyone has the tools and/or equipment they need to complete their work safely.



The Current Pilot Work

- Examines the validity and reliability of the survey by asking three questions:
 - Are all 8 items required to measure a leading indicator of organizational performance?
 - Are the 8 items related in expected ways to injury experience?
 - Are there important implementation issues to consider in collecting information on leading indicators?

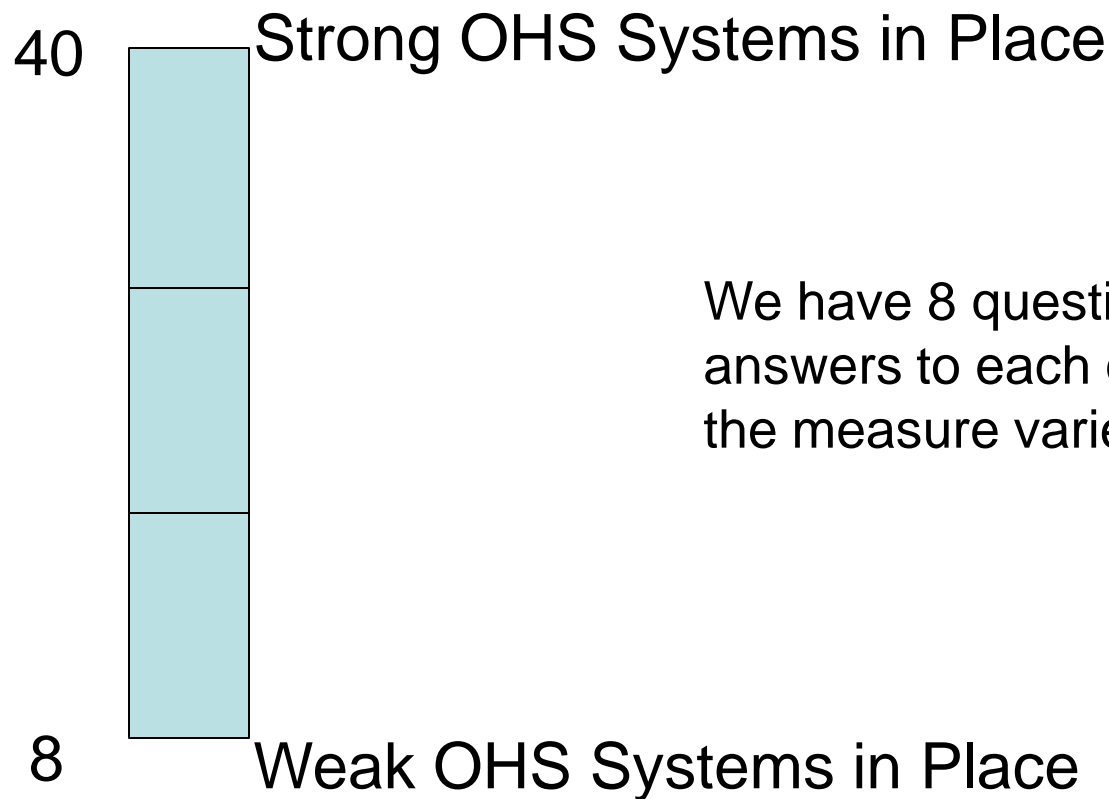


Are 8 Questions Required to Measure a Leading Indicator?

YES

- The 8 items hang together representing one single dimension
 - Supported by Cronbach's alpha (.82) and factor analysis
- No single question seems to be driving the scale – instead all 8 questions together are more important than any one
 - Supported by correlation analysis, item-to-scale correlation, and factor analysis
- Respondents will not just report they are doing well
 - Supported by distribution of responses on metric

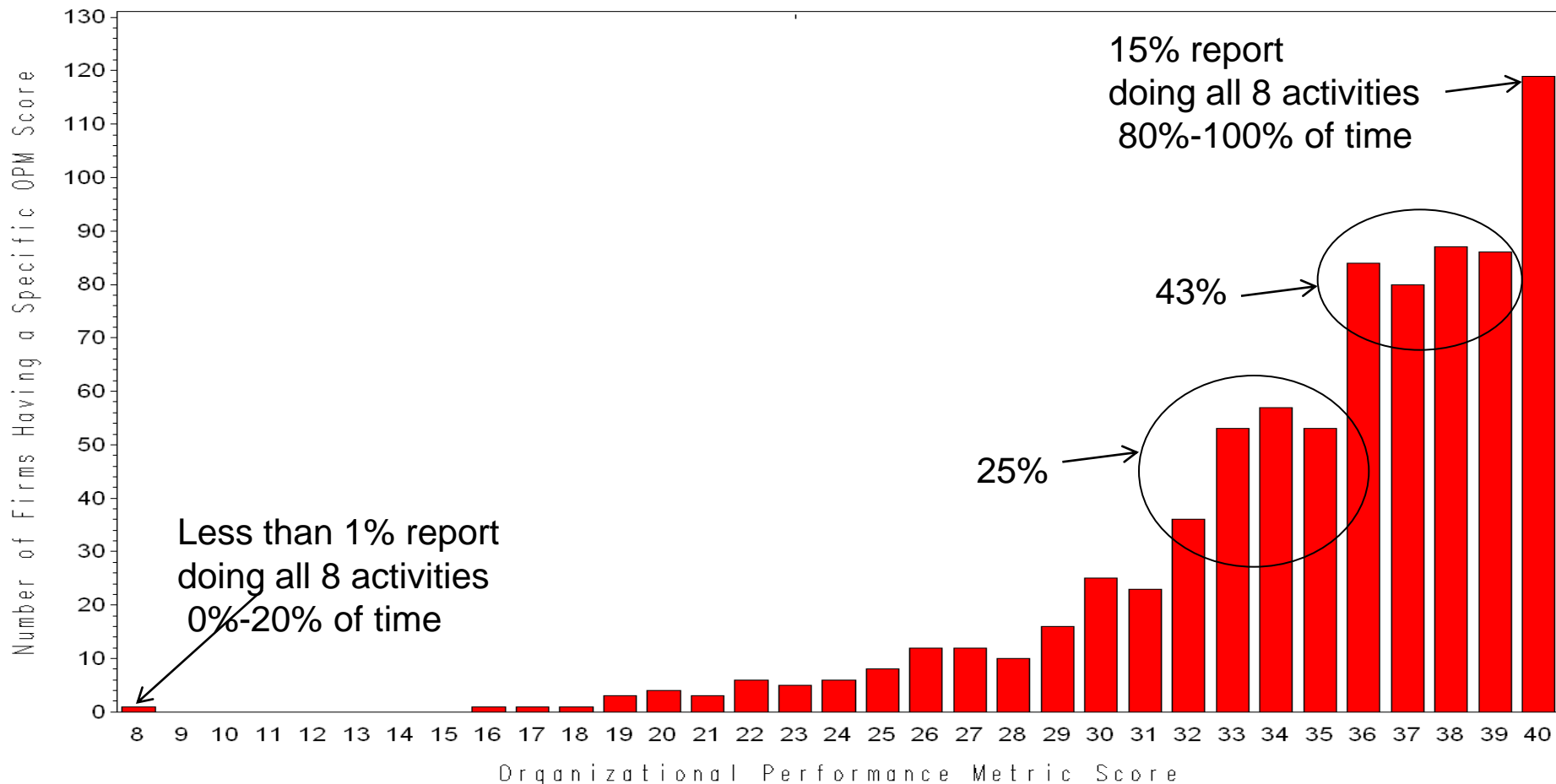
Because 8 Items Required We Built a Single Measure of Organizational Performance



We have 8 questions and 5 possible answers to each question (from 1-5) so the measure varies between 8 and 40.



The Organizational Performance Indicator Captures Very Good to Very Poor Performers





Are the 8 Items Related in Expected Ways with OHS System Indicators of OHS Performance?

Yes

- The organizational performance metric (OPM) is associated in expected ways with injury and illness claims rates
 - The relationship holds for total, lost time and no lost time claim rates after you consider the association between claims and firm size, HSAs and a written commitment to zero injuries
 - A written commitment to zero injuries is not associated with injury/illness rates after you take into account organizational performance, HSAs and firm size
- Organizations with good OPM scores have the lowest injury/illness claim rates and organizations scoring poorly have the highest claim rates
- On average for any firm, we estimate a change from lowest to highest score on the OPM is associated with a 25% change in the firms total injury/illness claim rate



The Organizational Performance Metric (OPM) is Statistically Related to Claims Reported in 2005-2009

	All Claims*			No Lost Time**			Lost Time**		
	DF	Chi-Square	Pr>ChiSq	DF	Chi-Square	Pr>ChiSq	DF	Chi-Square	Pr>ChiSq
OPM	1	5.18	0.0228	1	2.39	0.1220	1	3.87	0.0493
HSA(FirmSize)	42	73.82	0.0017	42	92.75	<.0001	42	96.72	<.0001
Written Commitment	1	1.21	0.2659	1	0.53	0.4661	1	0.07	0.7969

Note: A written commitment to zero is not related to claims experience in past 3.75 years

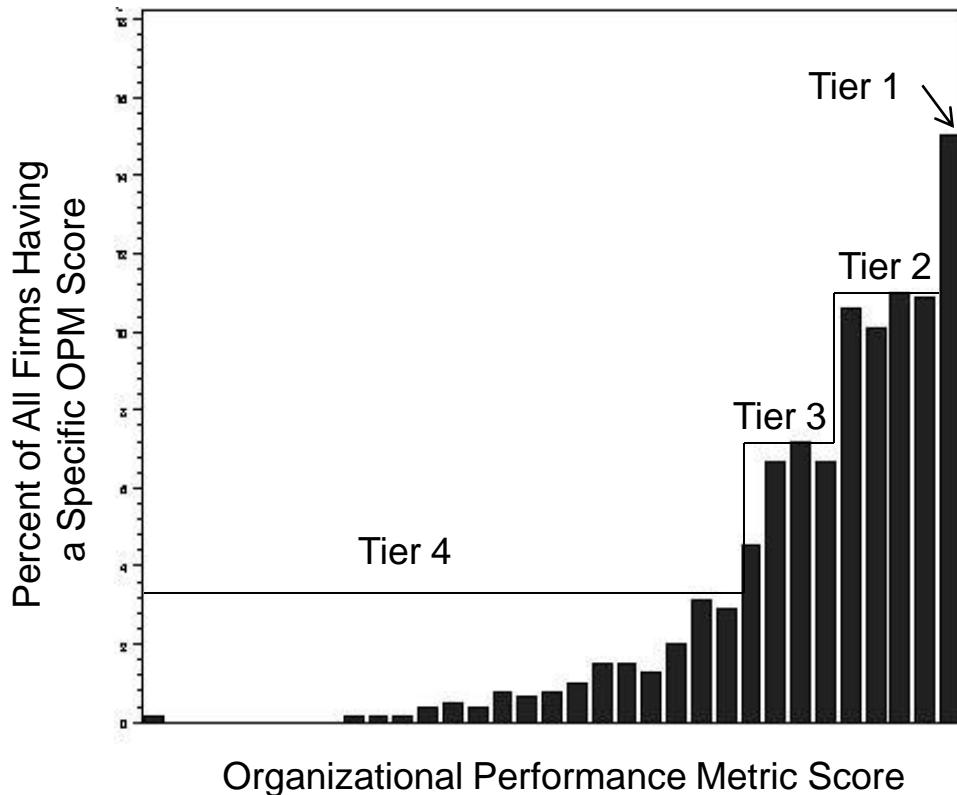
*All Claims includes claims allowed, pending, and denied/withdrawn.

** Includes only allowed and pending



How Do OPMs Relate To Claims?

Looking at percentage distribution of OPM scores we observe 4 Levels or Tiers



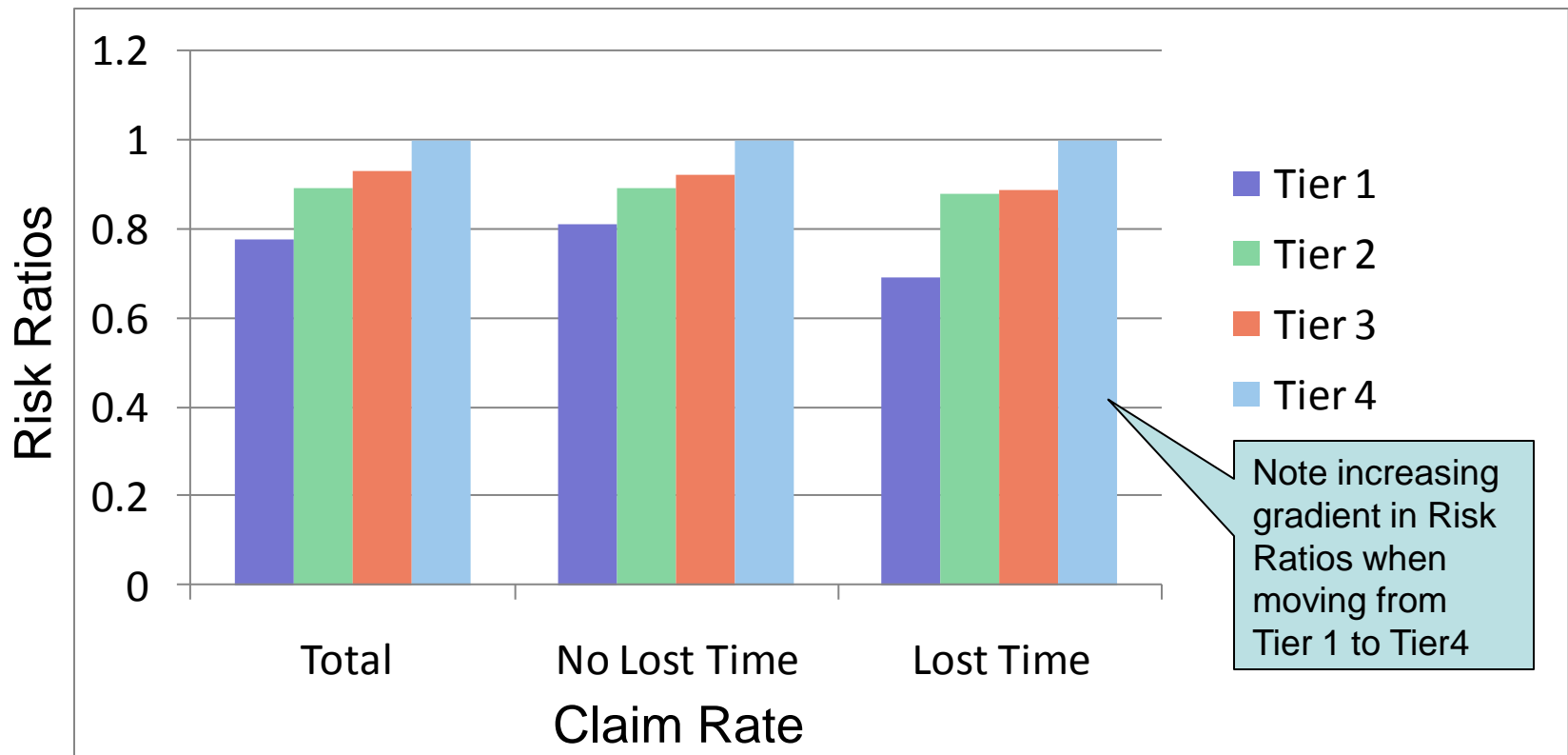
Tier 1: OPM Score of 40 – to achieve this score a person must indicate 80-100% for all 8 questions

Tier 2: OPM Score of 39 to 36 – person could indicate 80-100% for only 7 of the questions at most

Tier 3: OPM Score of 35 to 32 - person could indicate 80-100% for only 6 of the questions at most

Tier 4: OPM Score of 31 to 8 - person could indicate 80-100% for only 5 of the questions at most

Risk Ratios for Claim Rates by OPM Tier Levels with Tier 4 as Reference





Are there important implementation issues to consider in collecting information on leading indicators?

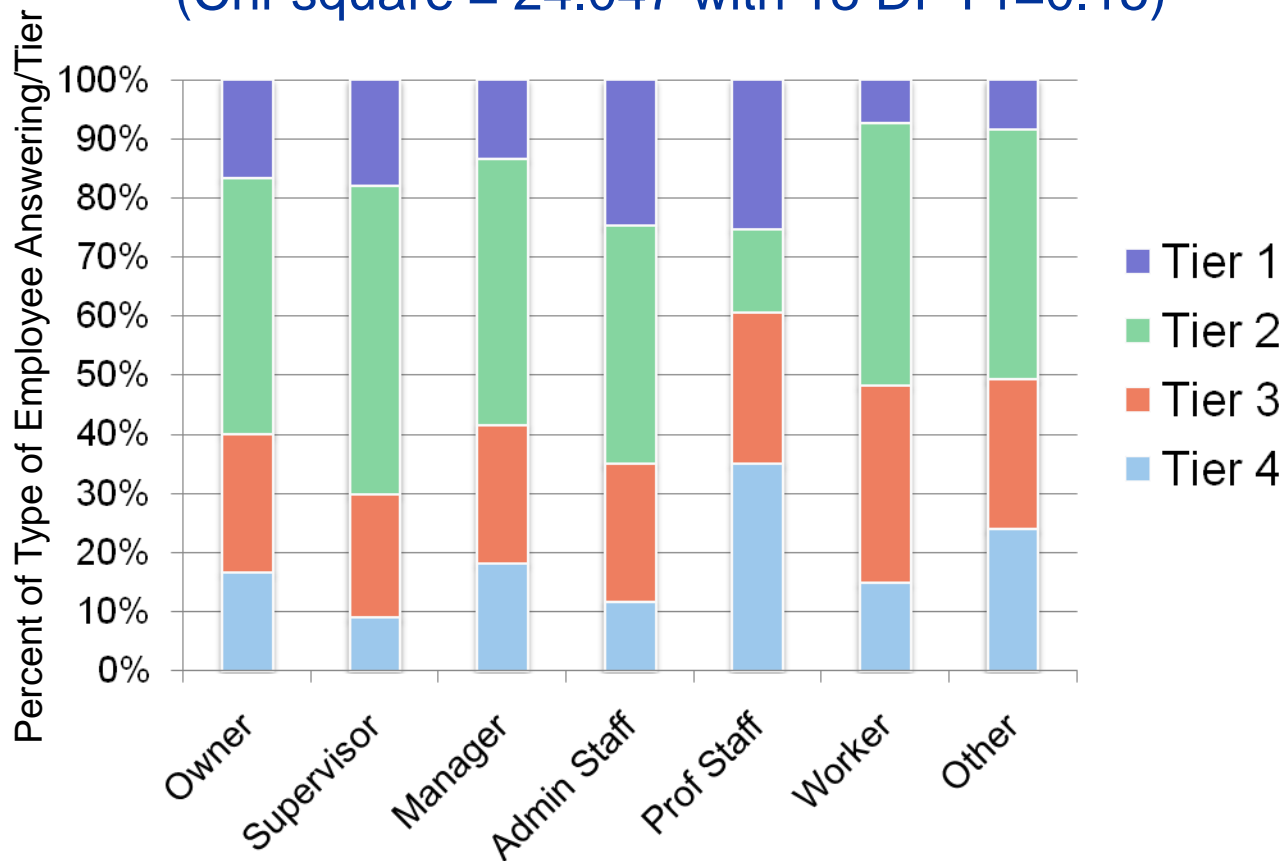
Yes & No

- It does not matter at what level of the organization you speak to
 - Any person is likely to give you the same score
- It is applicable to all firms
- However, the not so good news is ...
- It does appear to matter how you collect the data
 - Answers collected during meetings yielded lower OPM scores
- It matters whether the person is working as an OHS professional
 - The person could be more knowledgeable
 - The person could be positively reporting since this is how to measure his or her performance
- More work is needed on this to determine why



The OPM Score Does Not Depend On Organizational Level of Employee Answering the Survey

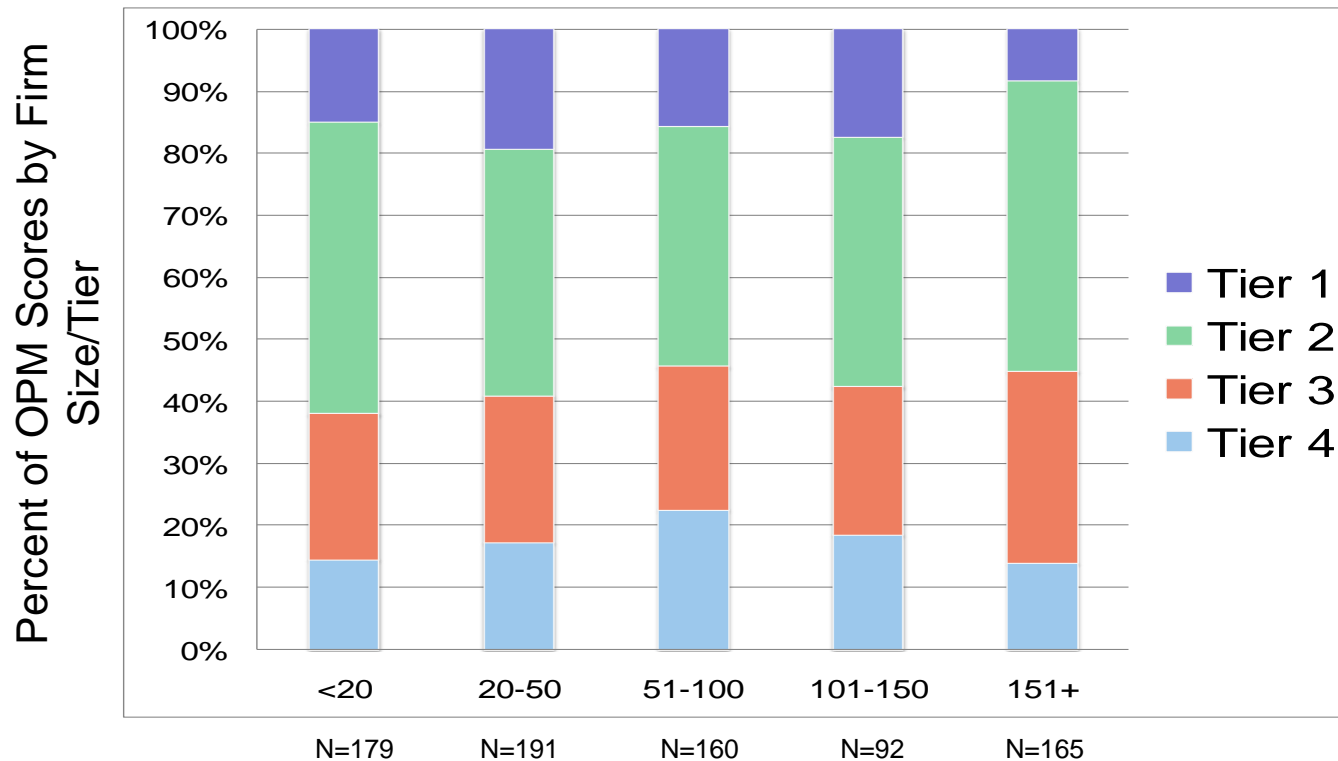
(Chi-square = 24.047 with 18 DF Pr=0.15)





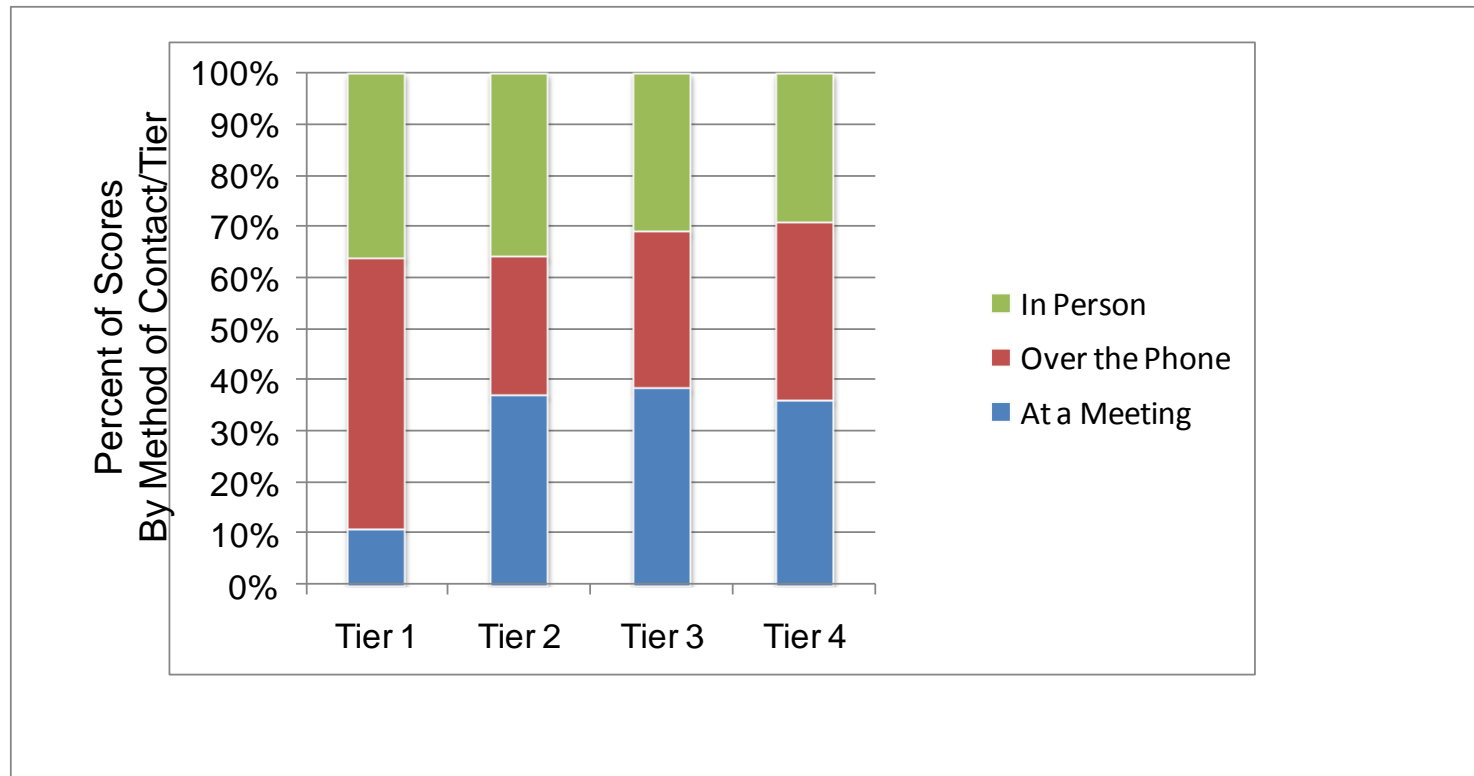
There Does Not Seem To Be a Relationship Between the Size of the Firm and the OPM Score

(Chi-square = 17.26 with 12 DF Pr=0.14)



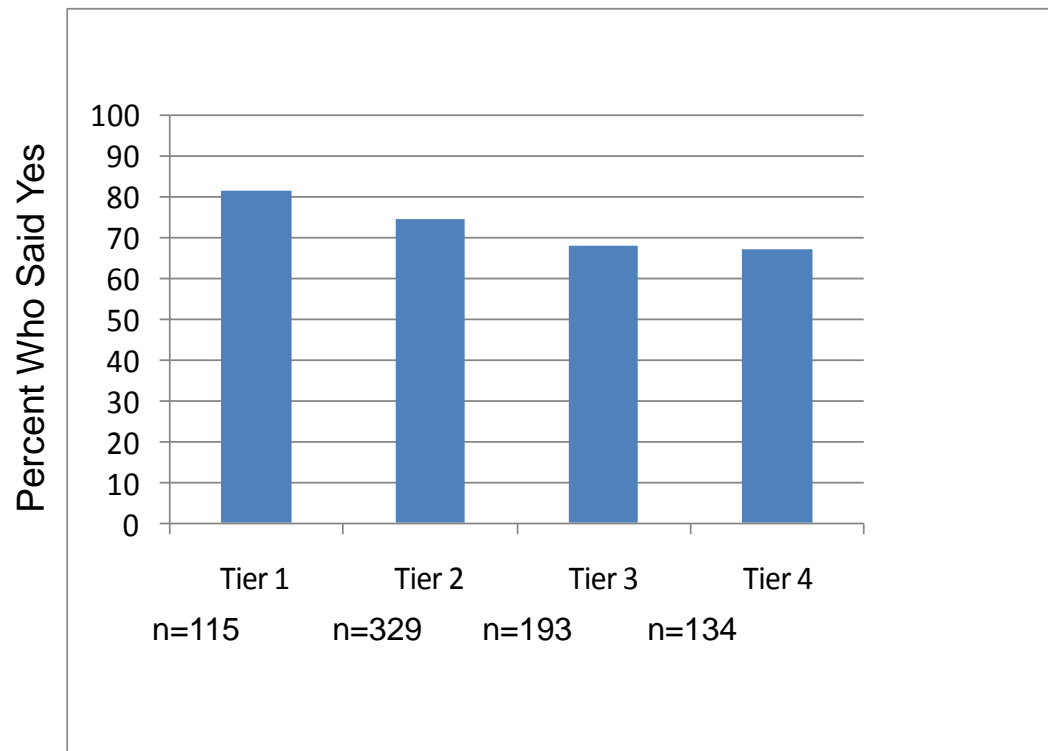


The Organization Is More Likely to Be in Tier 1 If Data Was Collected Over the Phone and Not in Meetings (Chi-square = 22.626 with 6 DF Pr=0.0009)





It Matters if You Are Working in the Organization as a Health & Safety Professional As Expected (Chi-square = 9.791 with 3 DF Pr=0.02)

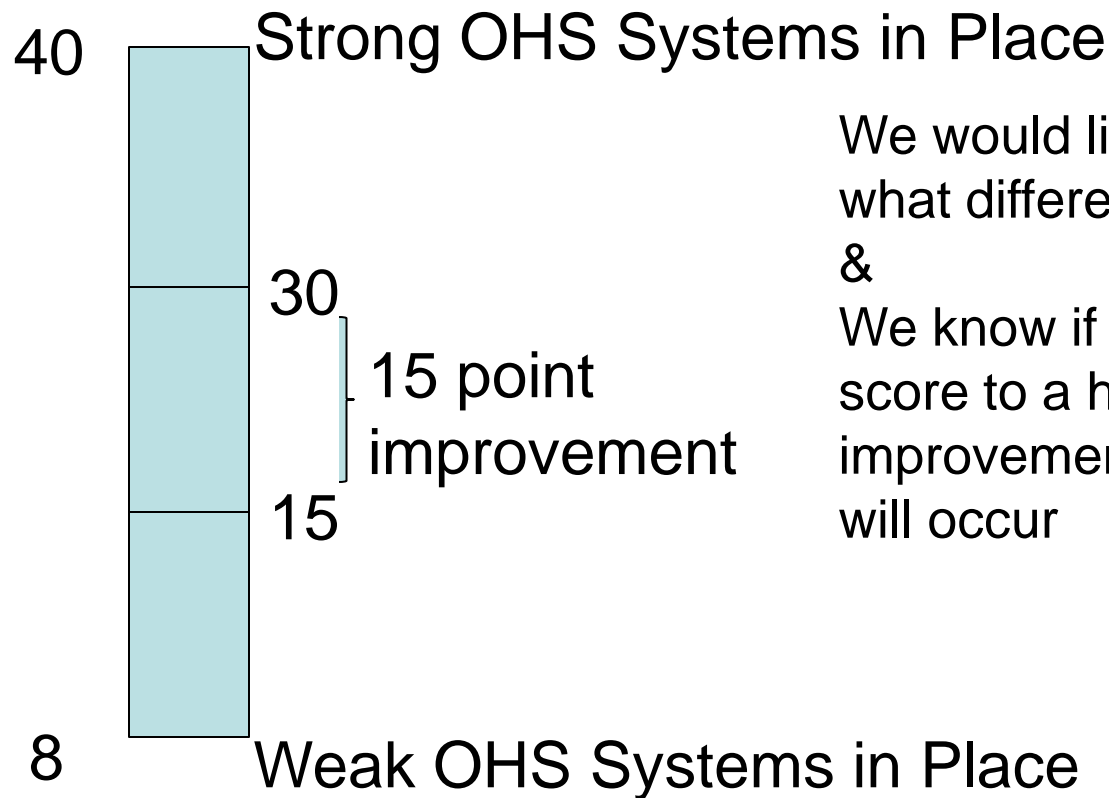




Overall This Pilot Work Shows

- The Organizational Performance Metric (OPM) is reasonable to use from the analyses conducted
- The OPM is psychometrically sound
- The OPM is associated with injuries and illness rates as expected
- The OPM is associated with firm characteristics in expected ways, except with firm size.
 1. This could be good – if it does not matter what size the firm is then this implies the OPM is relevant to all firms.
 2. However, this could be bad – if we expect larger firms to have more resources to commit to OHS then we may expect them to have better OPM scores
- Future work needs to look at whether current OPM
 1. Predicts future injuries
 2. Varies in important ways by firm size

As A Potential Tool for HSA Consultants We Must Better Understand What A Score Means

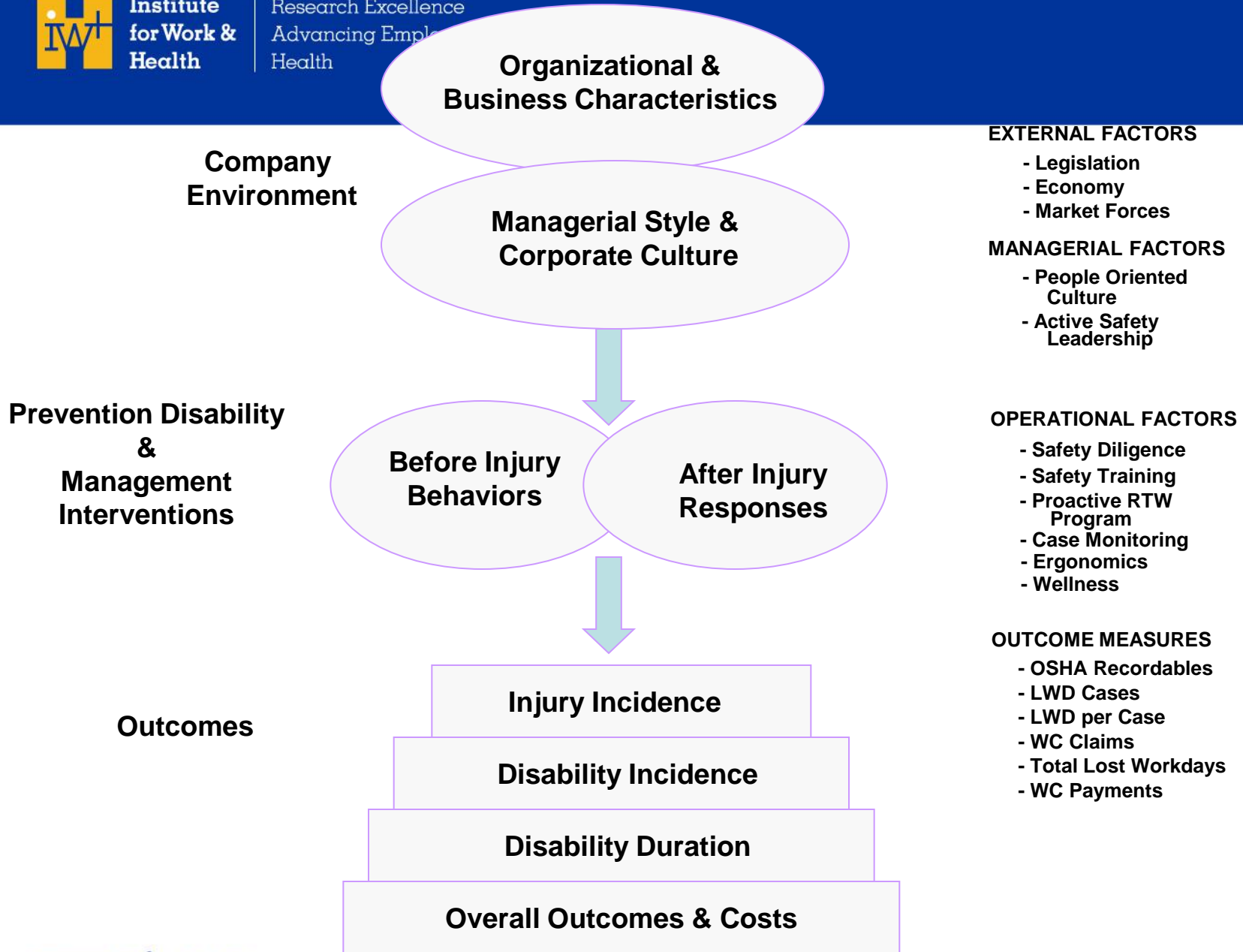


We would like one metric where we know what different scores mean
&
We know if you move a firm from a lower score to a higher score how much of an improvement in injuries and illness rates will occur



We May Need to Spend More Time Thinking About Tiers

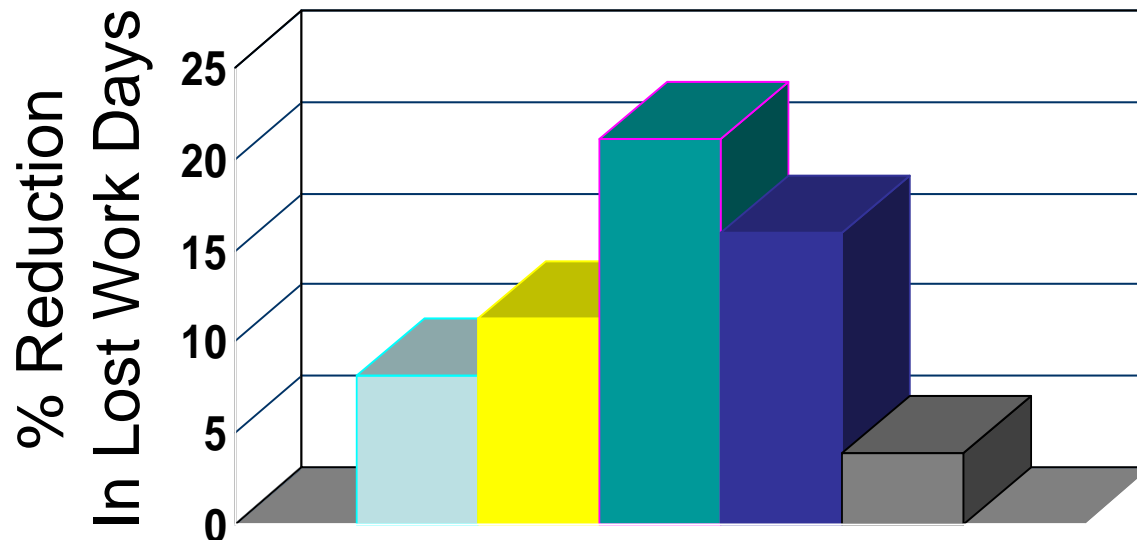
- We probably want tiers that are conceptually meaningful
 - That is, if I work with a firm and move them from Tier 4 to Tier 1 what is being accomplished?
 - How many Tiers do we need?
 - The challenge is that you can be in all Tiers except Tier 1 by answering multiple questions differently





What is the Impact of A 10% Change in an Organizational Indicator on Lost Work Day Cases/100 Employees in Manufacturing Firms in Michigan

- People Oriented Culture
- Active Safety Leadership
- Safety Diligence
- Return-to-WORK
- Wellness Orientation





Five Organizational Indicators of Organizational Policies and Practices In Ontario Employers* and Maine Employers Had Great Model Fit!

	Cronbach Alpha
Safety Diligence (5 items)	.80
Ergonomic Practices (4 items)	.80
Disability Management (6 items)	.88
Safety Leadership (7 items)	.87
People Oriented Culture (4 items)	.87



Next Steps with Employer Data

1. We are examining the predictive validity of the questions using Workplace Safety and Insurance Board (WSIB) of Ontario workers compensation data
2. Working on an audit version of the tool versus a short measurement version
3. Examining the OPPs in the context of other organizational measurement tools



New WSIB RAC Funded 5000 Firms In Ontario Study of Leading Indicators

- Examine whether different measures are needed – or are they all measuring the same thing
 - Organizational policies and practices
 - Occupational health and safety management system (CSA Z 1000)
 - Ontario Prevention Partners 8 questions
 - Joint Health and Safety Committee Functioning
 - US NIOSH Safety Climate
- Who is the best informant in an organization?
- Can we actually develop benchmarking data relevant to all firms in all sectors?



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Where We are Going is Not a Walk in The Woods





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It Is A Fast Moving Freeway





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How Can IWH Support Evidence-Based Action?





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