



So What If It Happens?

Using Risk Quantification to Guide Accident Reduction

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Safety Dilemma

I'm willing to spend whatever it takes to prevent all accidents



I need to reduce risk in a manner that ensures we meet our organizational goals



Risk Defined

- Hazard /danger exposure
- Omni-present
- Dynamic – can increase or decrease
- Quantifiable
- Common components

Relative risk calculation

$$RR = \frac{a / (a + b)}{c / (c + d)} \quad \text{where}$$

		Cancer	
		✓	✗
Exposure	✓	a	b
	✗	c	d

Example

$$RR = \frac{354 / (354 + 143)}{293 / (293 + 511)} \quad \text{where}$$

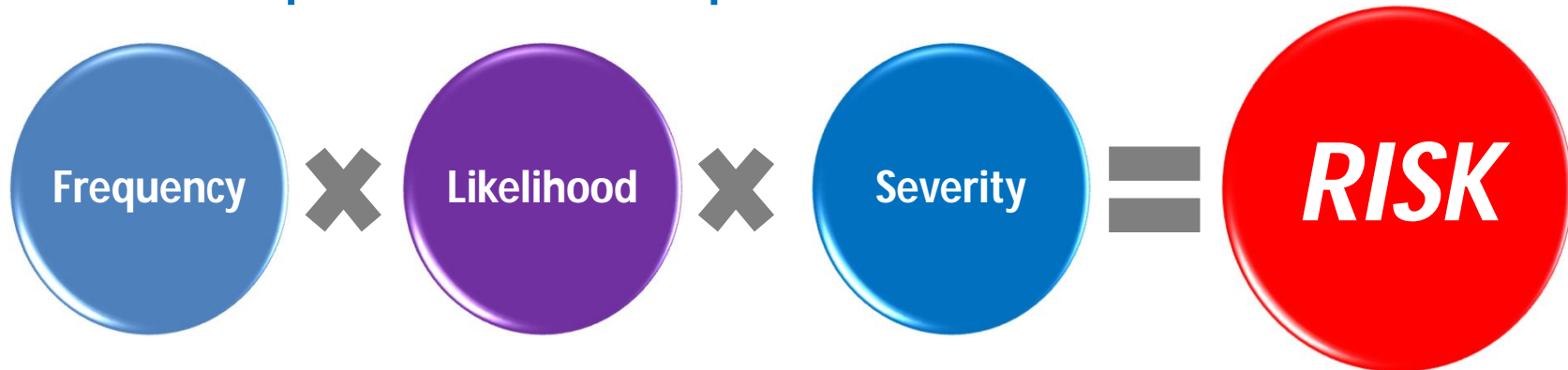
		Cancer	
		✓	✗
Exposure	✓	354	143
	✗	293	511

$$RR = 2.54$$

$$\text{Odds} = \frac{\text{probability of the event}}{1 - \text{probability of event}} = \frac{P}{1 - P}$$



ICW Group Risk Assumptions

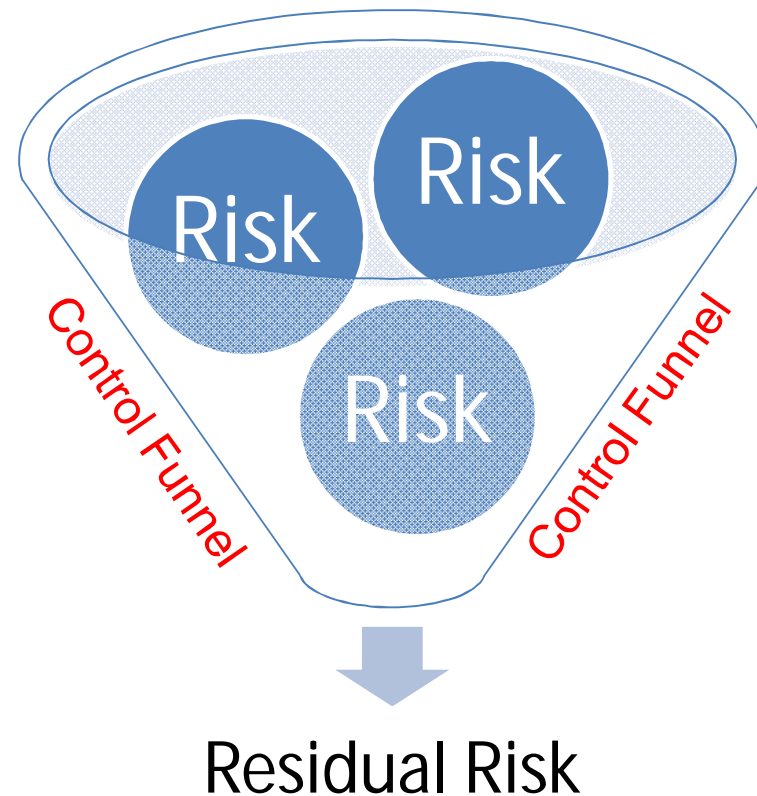


- **Frequency** – number of times exposed to hazard
- **Likelihood** – chance that severity will be realized
- **Severity** – consequences of hazard being realized
- Risk can't be eliminated
- Can be identified, quantified and reduced



Residual Risk

- Remains after hazard control measures are taken
- Present in every job task



Residual Risk and Acceptable Risk are not the same.



Residual Risk



Stairs Hazard Controls

- Building codes
- OSHA standards
- Handrails
- Mid rails
- Kick plates
- Anti-slip treads
- Rules & procedures

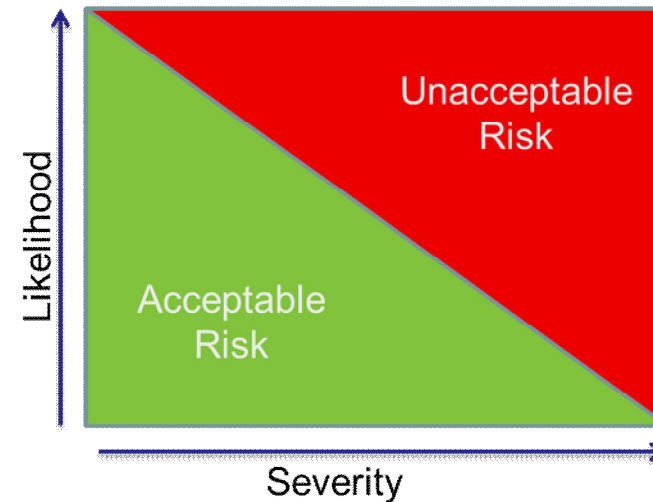
*ONLY way to eliminate risk is
to eliminate stairway!*



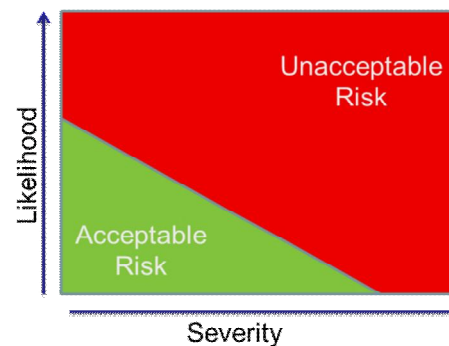
Acceptable Risk

- Organization establishes level of acceptable risk
- Lack of planning causes assumed risk by default
- Frequency of exposure to activities increases organizational risk

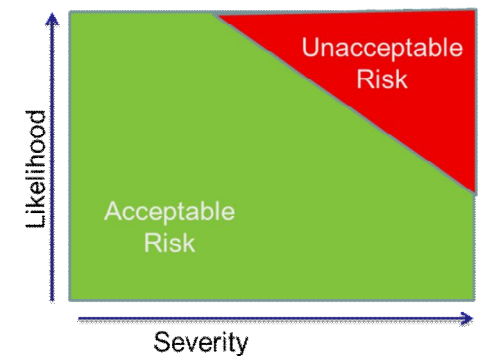
Acceptable Risk Model



Risk Adverse



Risk Taker





Assumed Risk

Individual

If **person** knows the consequences of a particular act and voluntarily accepts that risk, they are solely responsible for any resulting injury.

Based on maxim "volenti non fit injuria."

Organizational

If **organization** knows the consequences of a particular act or failure to act and voluntarily accepts that risk, they are responsible for any resulting loss.



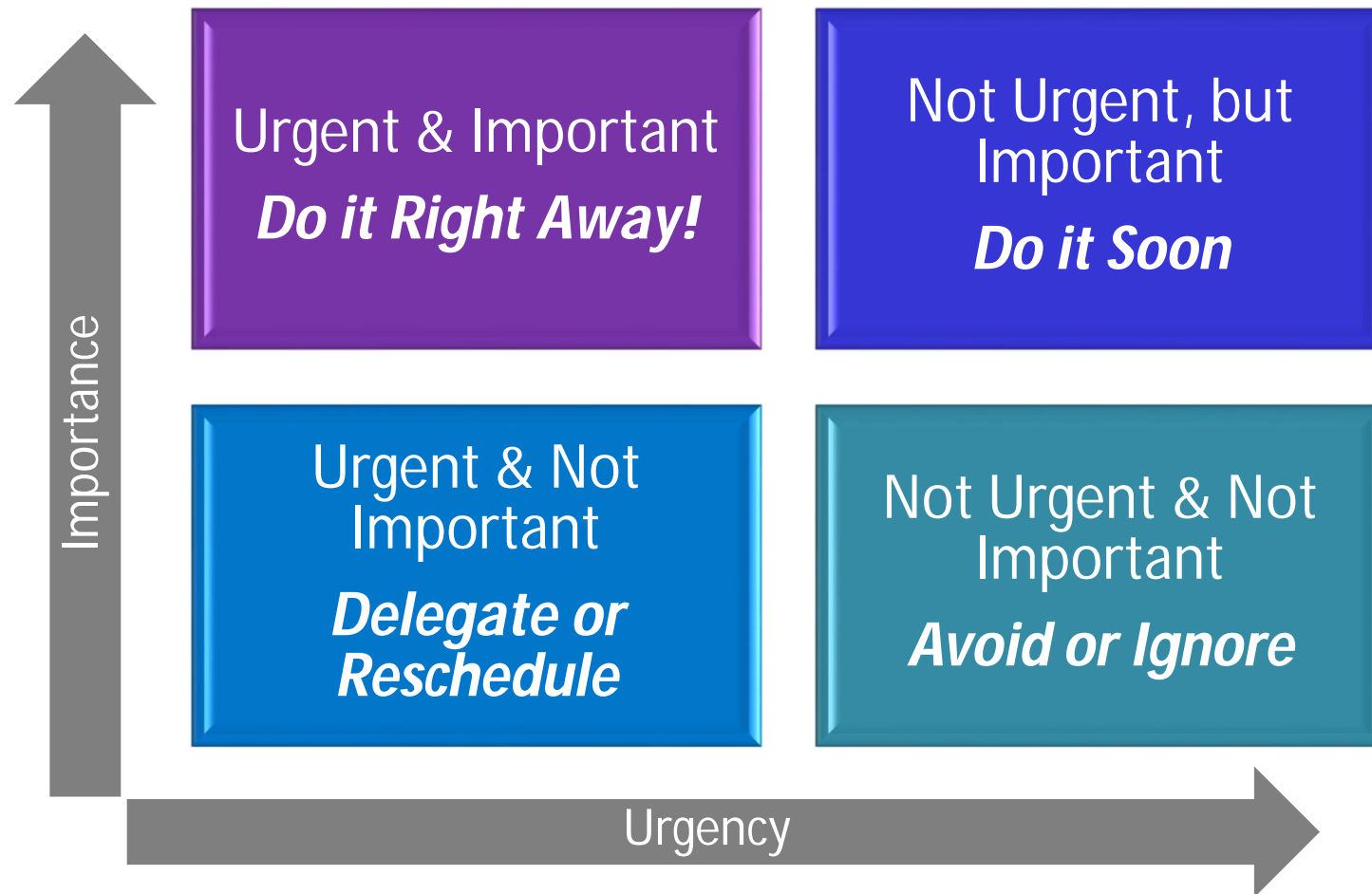
Acceptable Risk Decision Making

Risk Score	Accept	Evaluate	Reduce	Remove
<100	XXX			
<250	XXXX	XXXX		
<500		XXXX	XXXX	
<1000			XXXX	XXXX
<2500				XXXX
>2500				XXXX

- Determine acceptable organizational risk levels
- Create matrix for Risk-based decisions
- Develop and prioritize list using risk scores



Risk Prioritization

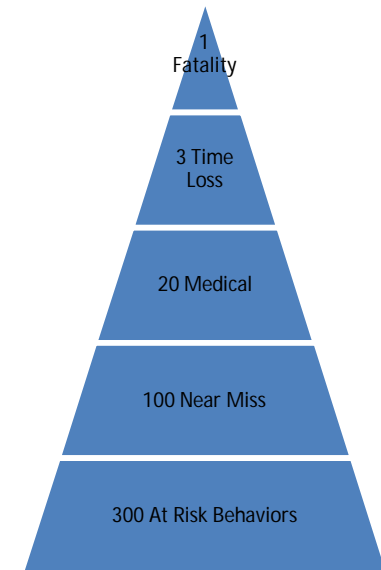
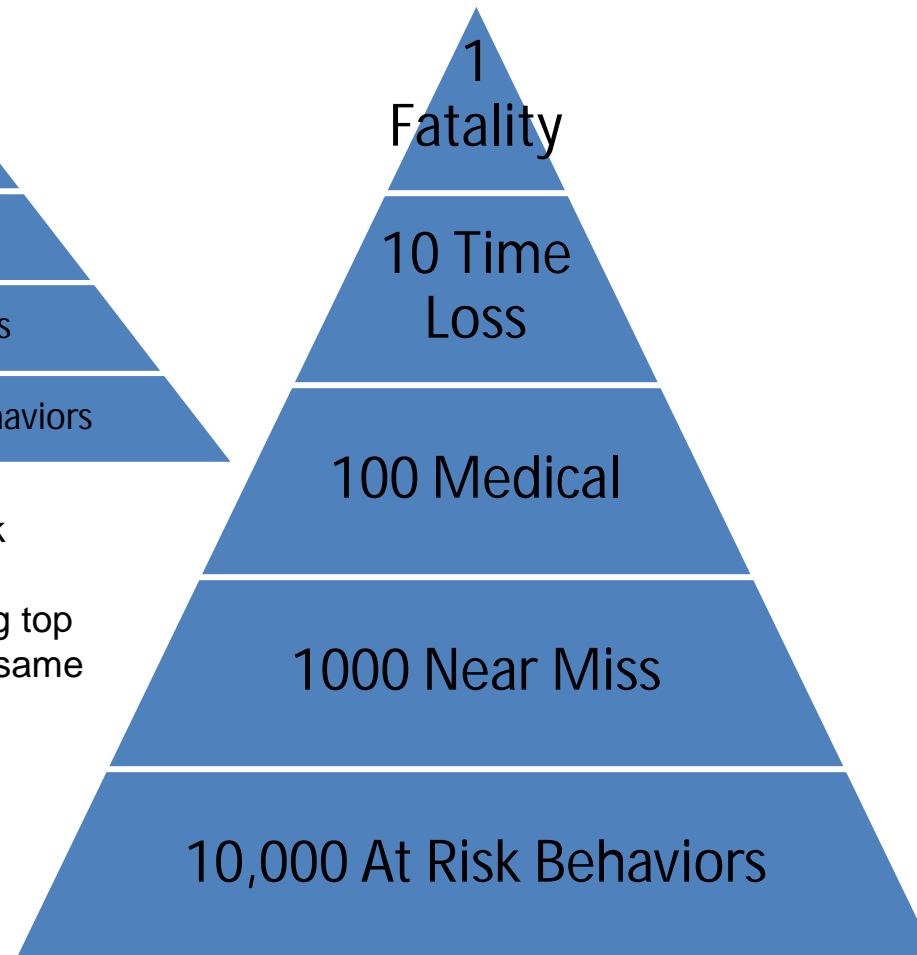




Accident Triangle – Prioritizing the Narrow Base



Wide base – lower risk
File cabinet crushing
someone from opening top
and bottom drawer at same
time



Narrow base – HIGH risk
Standing down hill of a
logger cutting down a
Douglas fir



ICW Group Risk Quantification Worksheet

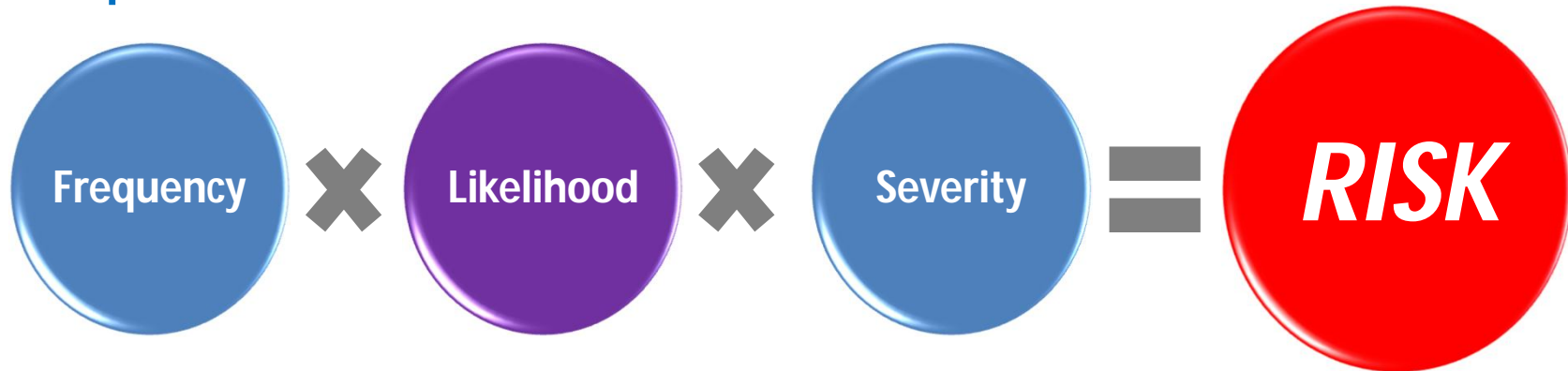
- Uses Peterson Risk Assessment Model criteria
- Weights scores by percentage of total FTE time related to exposure
- Scores can be used to prioritize

Location:				Date:	
Consultant:				# Emp	50
Contact:				# Units	
Weighted Score	-		Total Raw Score	495	

Risk Area	# of Employees	% of Total Time	Frequency	Likelihood	Severity	Score
Materials Handling	0	0%	Occasionally – from once per week to once per month	Would be remotely possible has been known to occur	Extremely Serious Injury (PPD), damage \$1000 - \$100,000	45
Comments						
Falls - Same Level	0	0%	Continuously (or many times a day)	Would be an unusual sequence or coincidence	Extremely Serious Injury (PPD), damage \$1000 - \$100,000	450
Comments						
Falls - Elevation	0	0%				0
Comments						
Struck By or Against	0	0%				0
Comments						
Exposure to Environmental	0	0%				0
Comments						
Cumulative Trauma	0	0%				0
Comments						
Occupational Disease	0	0%				0
Comments						
Caught in Under or Between	0	0%				0
Comments						
Motor Vehicle Accident	0	0%				0
Comments						
Hand Tools - Manual or Powered	0	0%				0
Comments						
Contact with Electrical	0	0%				0
Comments						
Workplace Violence or Misconduct	0	0%				0
Comments						
Litigation and Fraud	0	0%				0
Comments						



Components of Risk



Frequency

- Frequency
- People count
- Activities count
- Tasks completed

Likelihood

- Likelihood risk will be realized every time there is exposure

Severity

- Most likely outcome if risk is realized
- Severity



Workers Compensation Exposures

- Struck by/against exposure
 - Contact with exposure (chemical, heat, electrical)
 - Materials handling
 - Repeated trauma
 - Same level fall
 - Occupational disease or illness
- Fall from elevation
 - Manual/powered hand tools
 - Motor vehicle
 - Caught on/in/under or between machinery
 - Workplace violence or misconduct
 - Litigation and fraud



Risk Scoring – Peterson Scale

Frequency – The Hazard Event Occurs:	
Continuously (or many times a day)	10
Frequently – Approximately once a day	6
Occasionally – from once per week to once per month	3
Usually – from once per month to once per year	2
Rarely – it has been know to occur	1
Very Rarely – Not known to have occurred, but possible	0.5

Likelihood – for the accident to occur for each event	
Most likely and expected result if hazard event occurs	10
Quite possible, would not be unusual – 50/50 chance	6
Would be an unusual sequence or coincidence	3
Would be remotely possible- has been known to occur	1
Extremely remote but possible – has never happened	0.5
Practically impossible – the one in a million	0.1

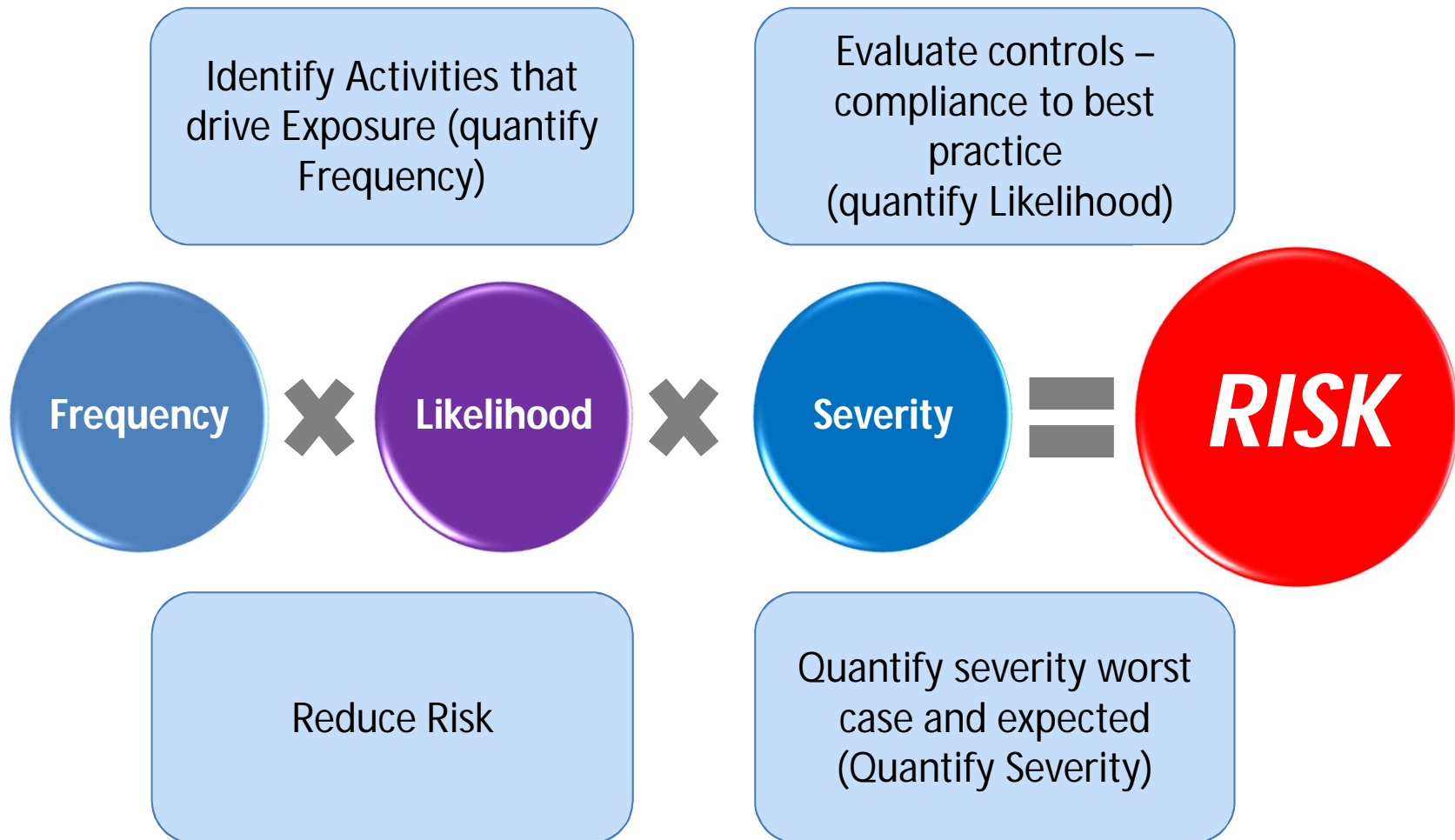


Risk Scoring – Peterson Scale

Severity – Most Likely Outcome if Hazard is Realized	
Catastrophic – Numerous Fatalities, extensive damage	100
Several Fatalities, \$500,000 - \$1,000,000 damage	50
Fatality, \$100,000 to \$500,000 damage	25
Extremely Serious Injury (PPD), damage \$1000 - \$100,000	15
Disabling injuries, damage to \$1000	5
Minor Cuts, Bruises, Bumps and minor damage	1

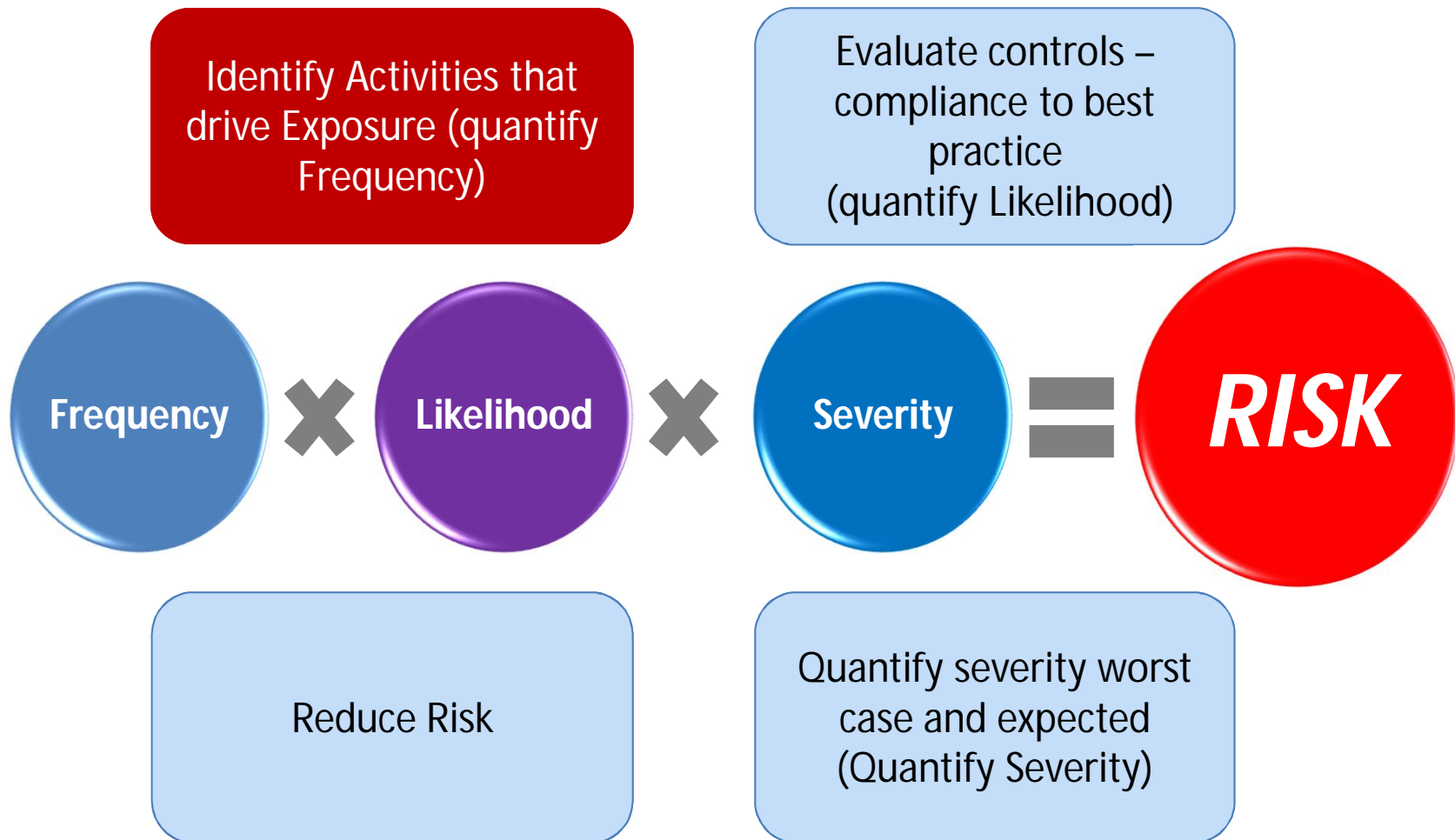


Using Risk Reduction to Impact WC





Using Risk Reduction to Impact WC





Identify Activities

Review losses, processes, staff experience, and rank:

- Where most accidents occur
- Common workers compensation exposure areas
- Where there are unexpected production stoppages and rank
- JHA Process

*More often activities are performed,
the higher the risk*





Reducing Risk - Frequency

Eliminate it

- Modify process to remove exposure activity
- Automate activity to prevent worker exposure
- Remove exposure activity entirely



Transfer it

- Subcontract activity
- Non – WC
 - Contractual transfer
 - Additional layers of insurance





Reducing Risk - Frequency

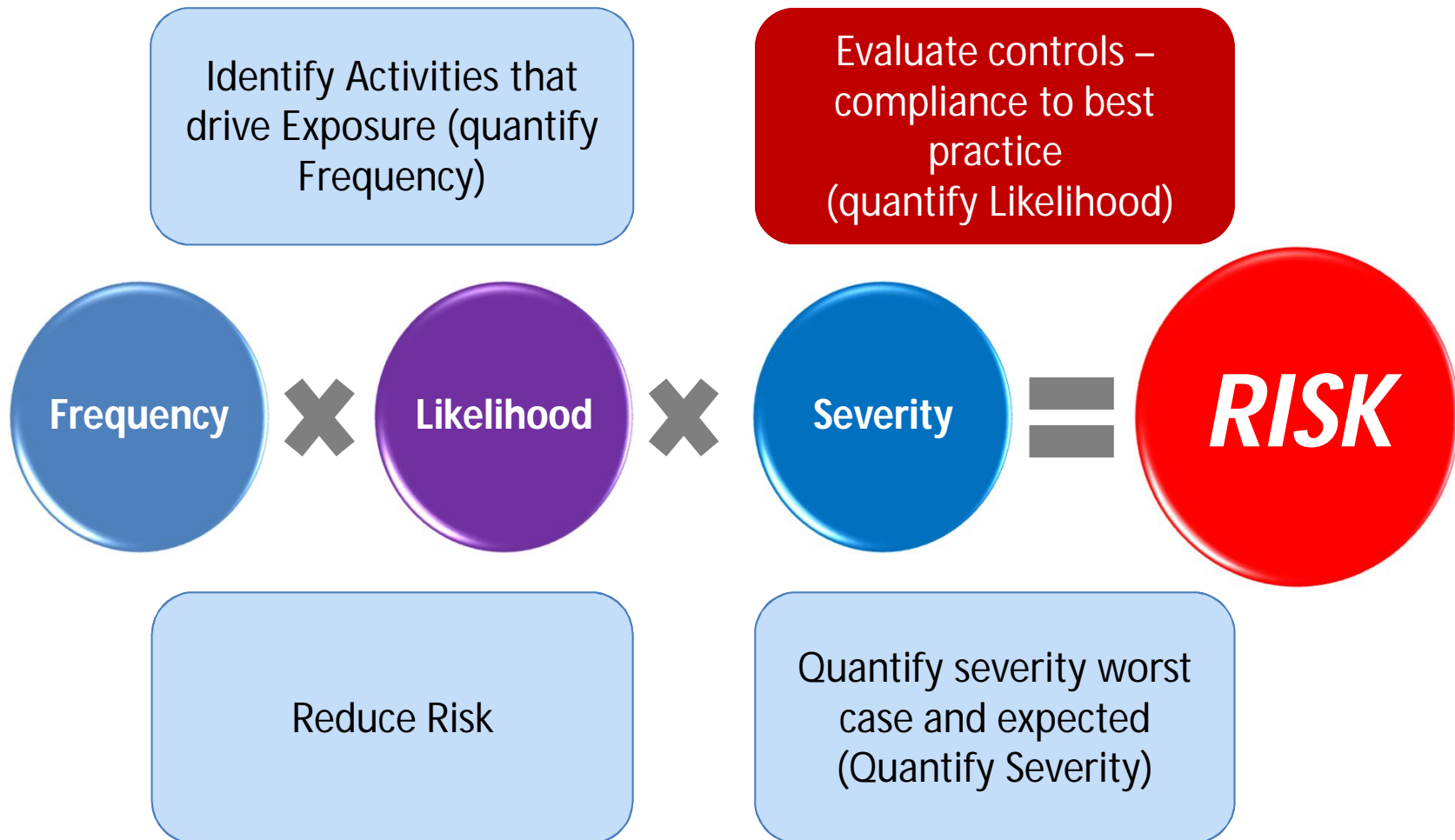


Treat it – Reduce it

- Reduce the number of times the activity is completed
- Apply lean concepts with risk activity being targeted for reduction
- Automate sub routines
- Reduce the cause/need for activity



Using Risk Reduction to Impact WC





Evaluate the Controls

Control	Examples
<i>Elimination</i>	<i>Redesign job to remove hazardous activity</i>
<i>Substitution</i>	<i>Substituting chemical with lower hazard</i>
<i>Isolation</i>	<i>Card key access to restricted area</i>
<i>Engineering Control</i>	<i>Point of operation guard on punch press</i>
<i>Administrative Control</i>	<i>Providing training on equipment and processes</i>
<i>Personal Protective Equipment</i>	<i>Providing gloves, mask and glasses to prevent exposure to blood and OPIM</i>

- Best practice/compliance/informal
- Higher up the ladder the better
- Include control items such as:
 - Compliance (OSHA programs and related procedures)
 - Behavioral safety and safety culture
 - Engineering
 - Administrative
 - PPE & training
 - Organizational



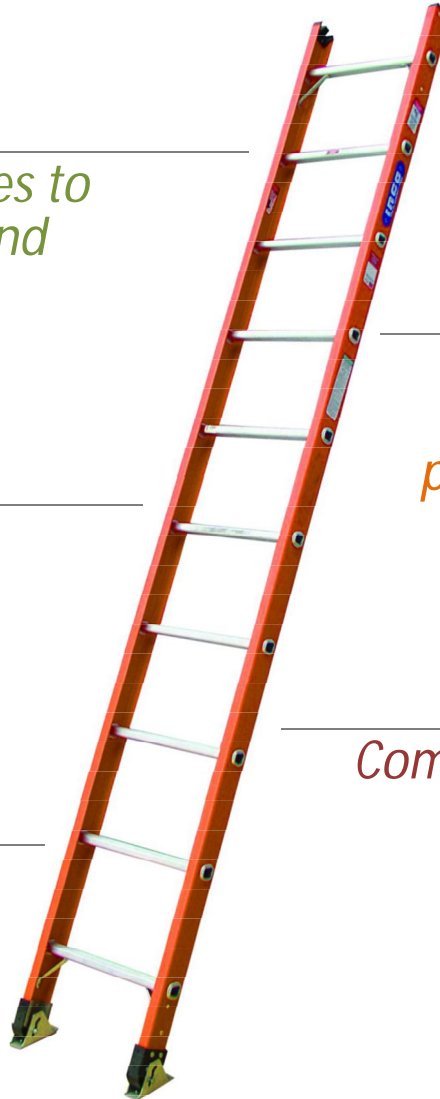
“Best in Class” Control Hierarchy

Falls from Elevation

Substitution of processes to reduce the frequency and likelihood of falls

100% Tie off when feet 6' off the ground

Limited controls – training only & PPE



Elimination of fall exposures

Installation of permanent anchorage points, fixed permanent work platforms

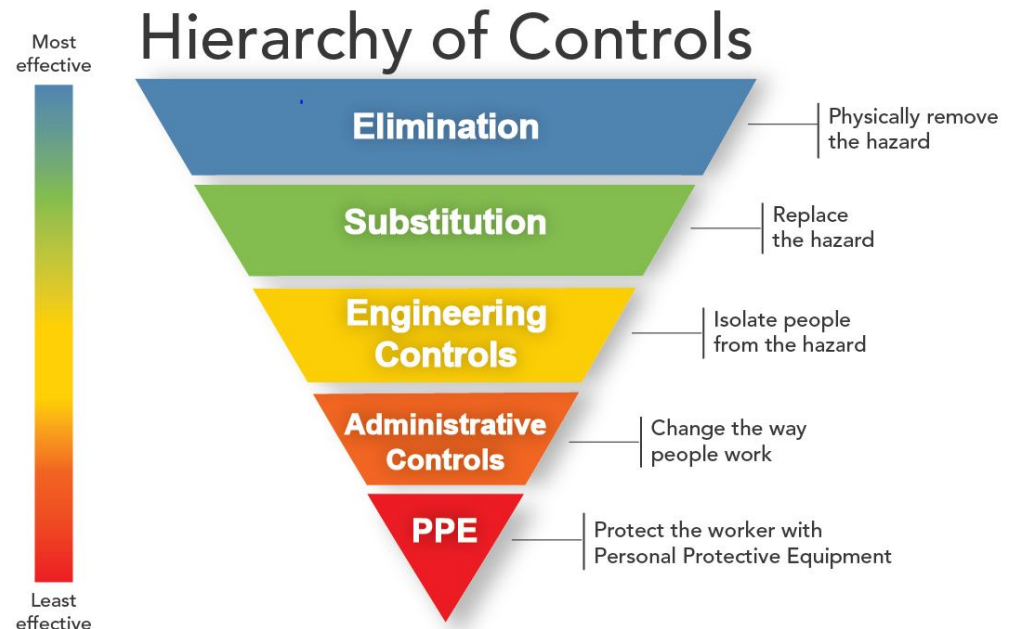
Compliance based – OSHA fall protection standard



Reducing Risk - Likelihood

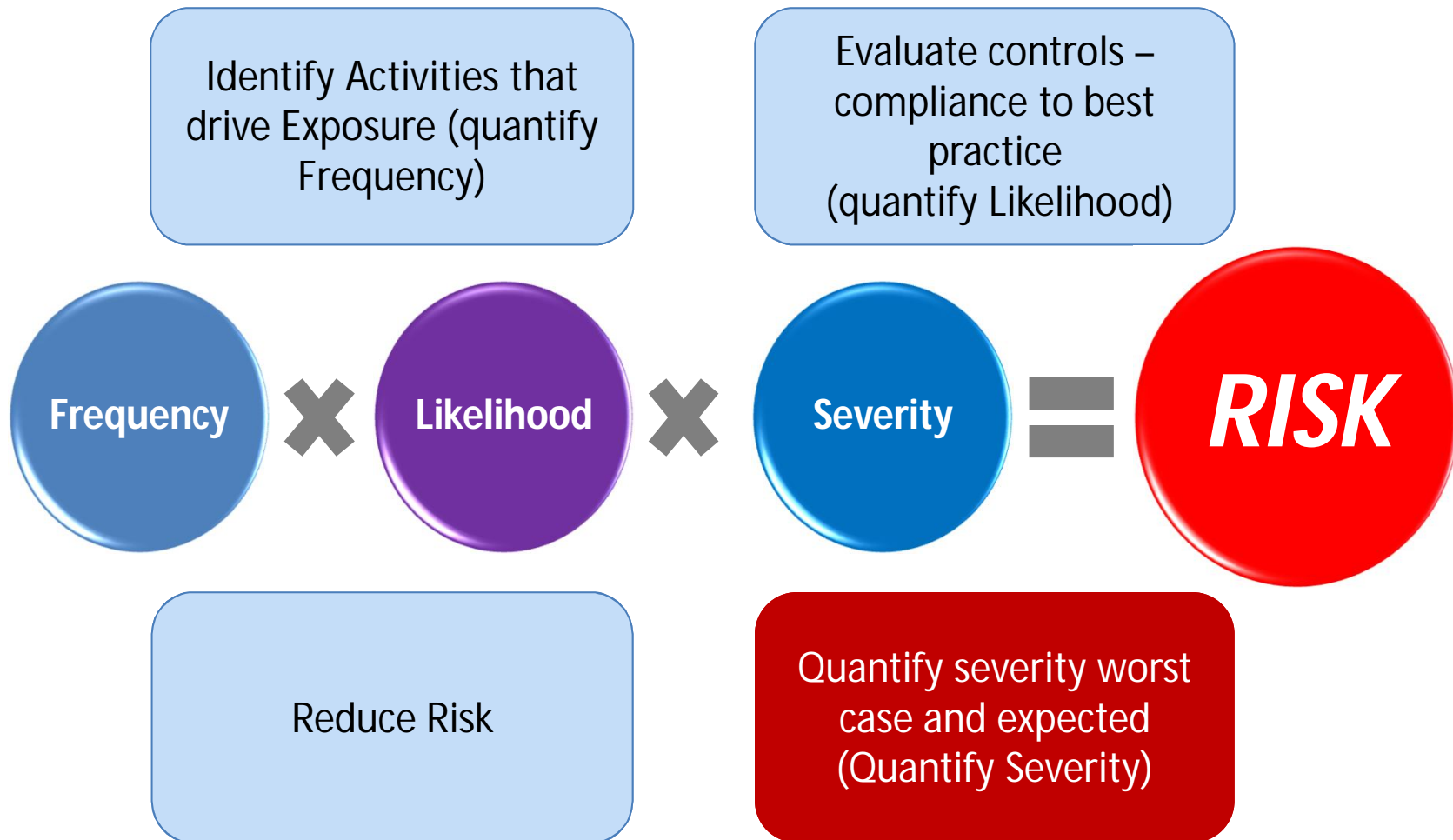
Implement Controls

- Compliance programs
- National & International Standards
- Operation specific
 - Engineering
 - Administrative
 - Training
 - Protective equipment





Using Risk Reduction to Impact WC





Quantify Severity

- Severity can be measured in in different ways
 - WC – Length of disability, dollar cost, loss of key workers (critical skills)
- Can be estimated based on experience
 - Insights from actual loss experience
 - Insights from industry loss experience
 - Subject Matter Experts
- Need to look at average cost & expected



Reducing Risk - Severity

Pre Accident

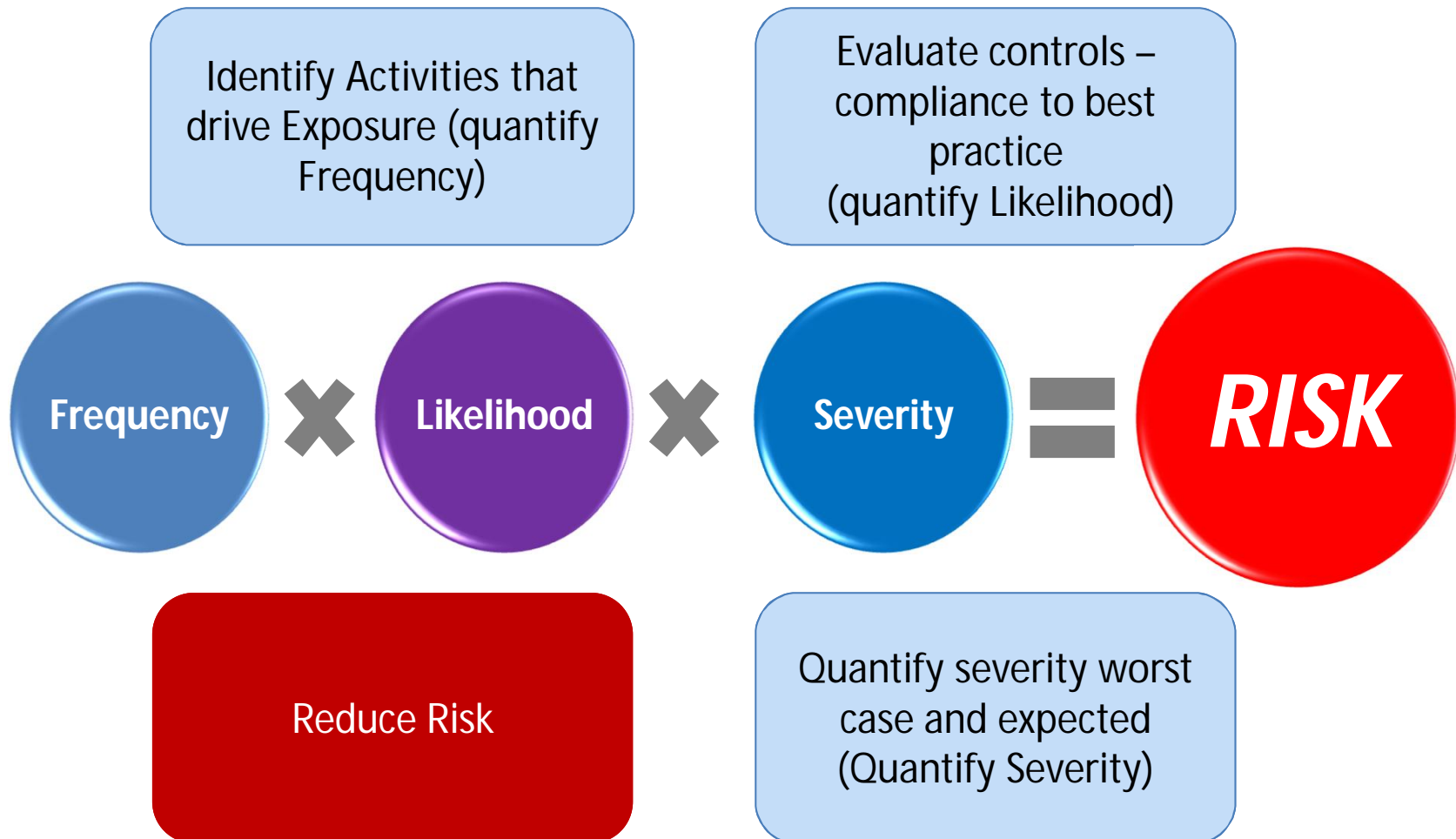
- Treat employees with dignity & respect
- Create strong culture
- Reduce “energy” to reduce severity of potential injuries
- Wellness programs

Post Accident

- Return to work programs
- Contact injured employee
- Quality medical treatment



Using Risk Reduction to Impact WC





Risk Reduction



Goal: Significantly reduce risk

- Number of times exposure activity completed
- Likelihood of accident occurring each time exposure activity completed
- Severity of injury or loss if accident does occur



Resources and Support

- Insurance agent or broker
- Your carrier can provide support
- State OSHA Organizations
- Risk & Insurance Management Society (RIMS)
- NIOSH & OSHA
- ICW Group



Thank you!

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