Preventing Abuse: Incident Reporting & Data Analytics Tools

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www.IncidentAnalytix.com

Introduction

- Rick Curtis
- Pronouns: he, him, his
- Speaking to you from the traditional lands of the Lenni-Lenape people
- Director, Princeton University Outdoor Action Program: 39 Years
- Founder: **www.IncidentAnalytix.com**
- Full Disclosure Statement

Learning Objectives

- Learn how the **Safety I** framework and **Safety II** framework are complementary parts of an overall risk management plan
- Understand the **Systems Thinking Approach** to risk management
- Learn how a **Risk Management Information System (RMIS)** can provide rich data for implementing Safety I and Safety II principles
- Learn how to assess your program by building **AcciMaps** and **PreventiMaps**

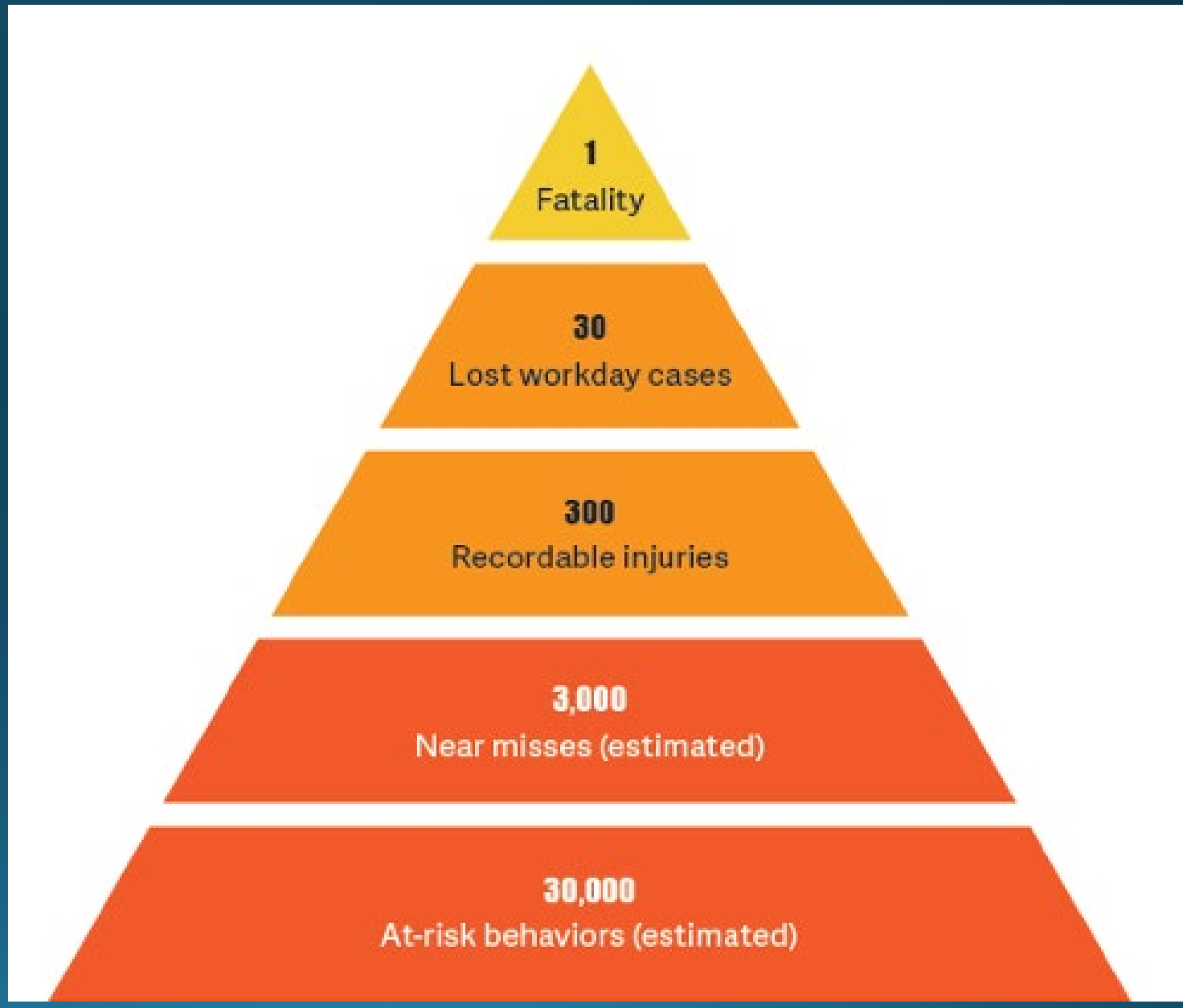
Questions for your program

- Does your program have a robust incident reporting culture?
- Does your staff know how to recognize an incident versus a close call and do they have the proper tools to report what they observe?
- Do you have the tools to transform collected data into actionable insights to ensure and promote youth safety?

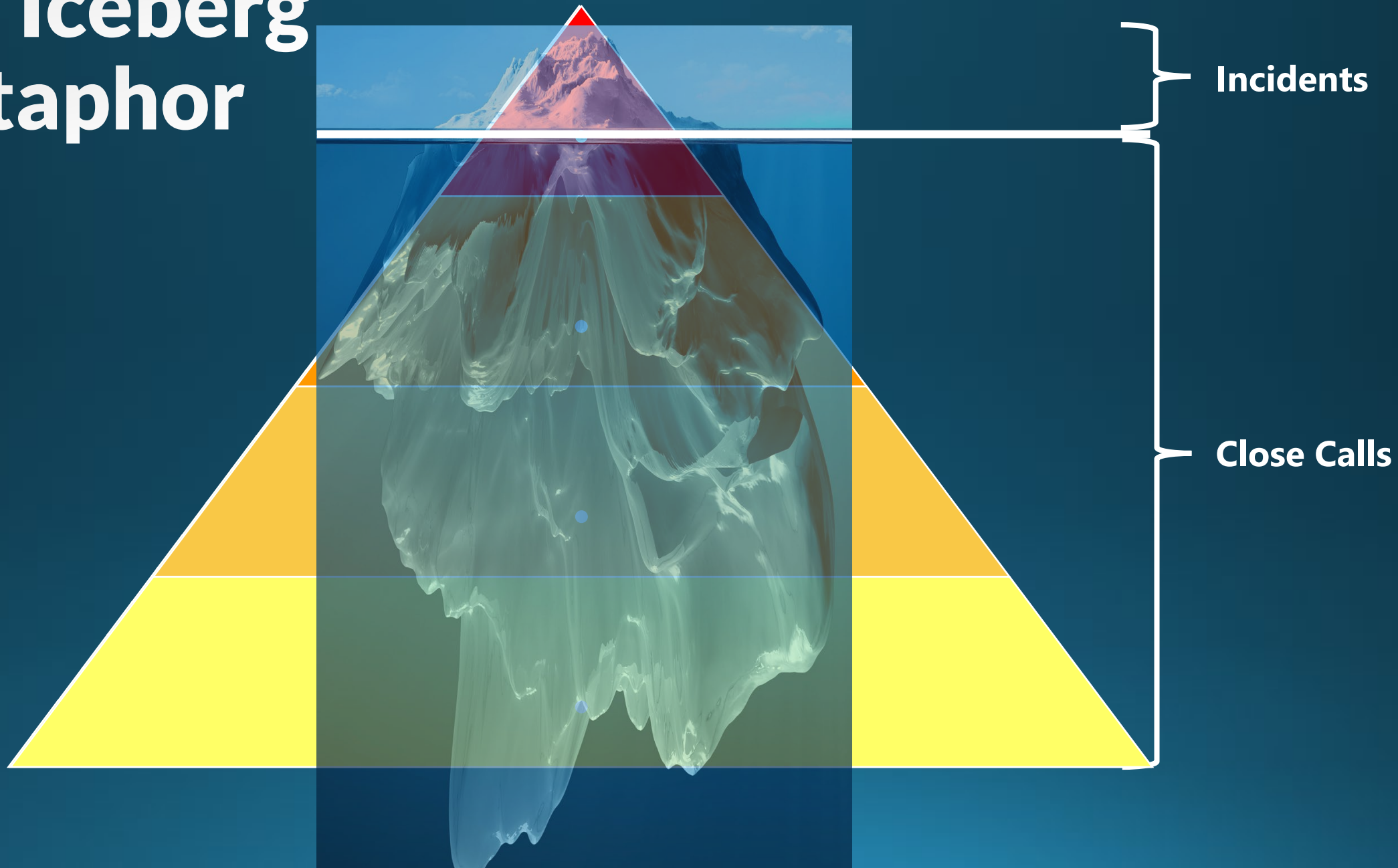
An Incident is either…

- Adverse Outcome
- Close Call/Near Miss

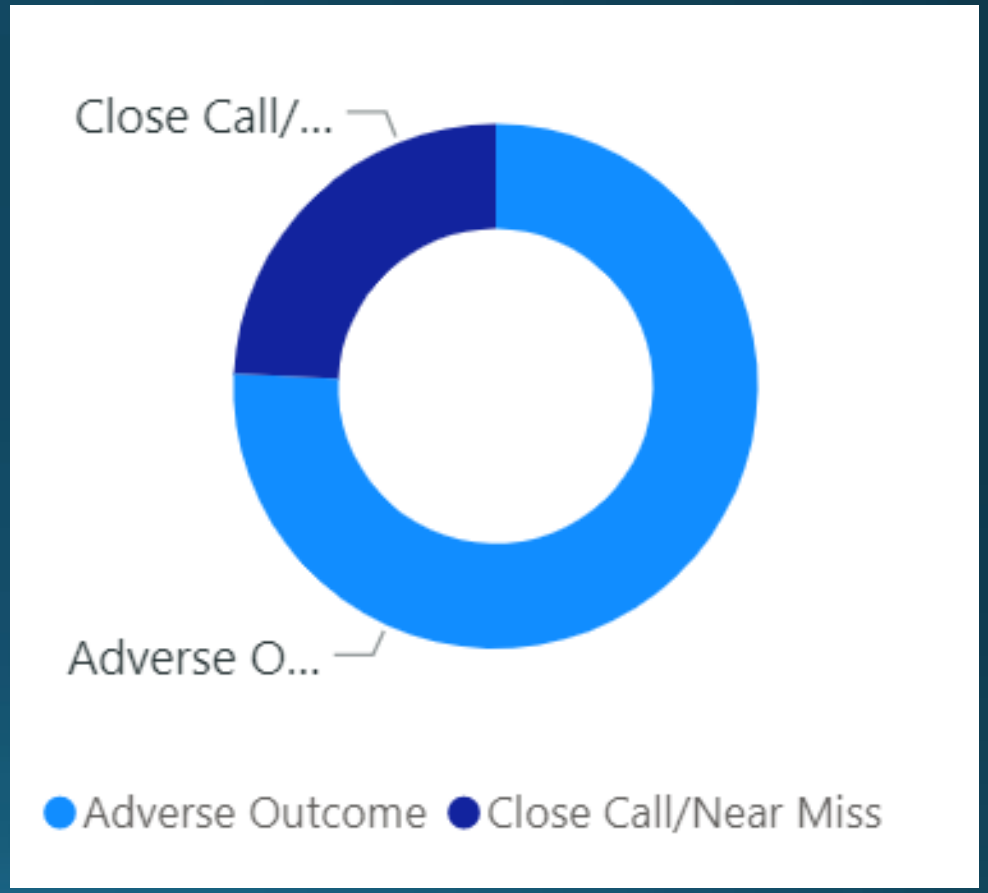
Accident Pyramid



The Iceberg Metaphor



How many Near Miss Reports are you getting?

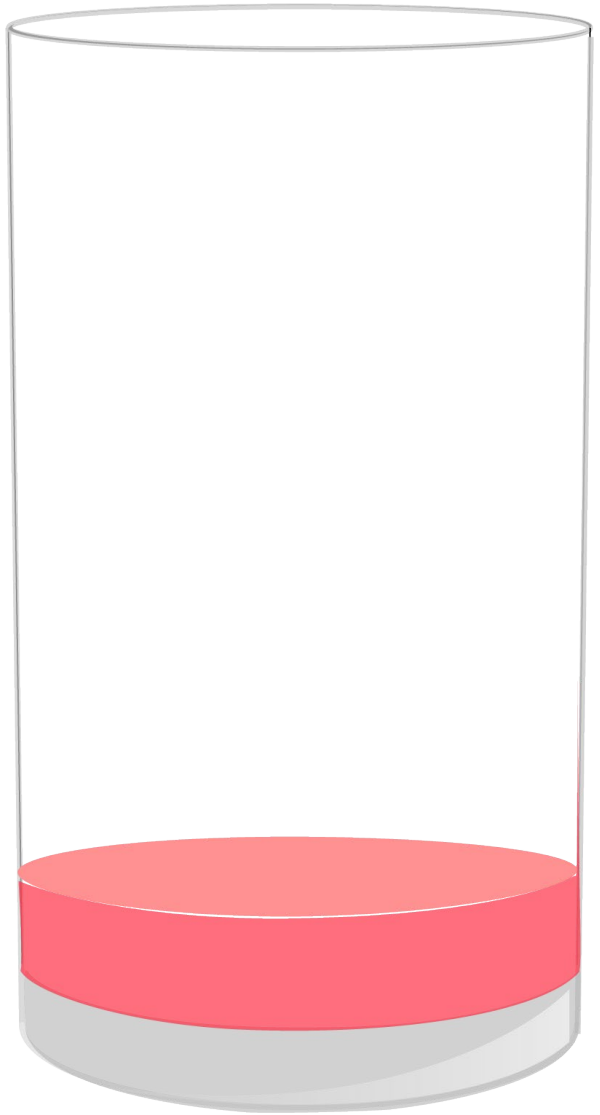


Safety I

What's Going Wrong?

We are safe if there is as little as possible of this…

Hollnagel, E. Hearns, R., Braithwaite, J. - *From Safety-I to Safety-II (A White Paper)*

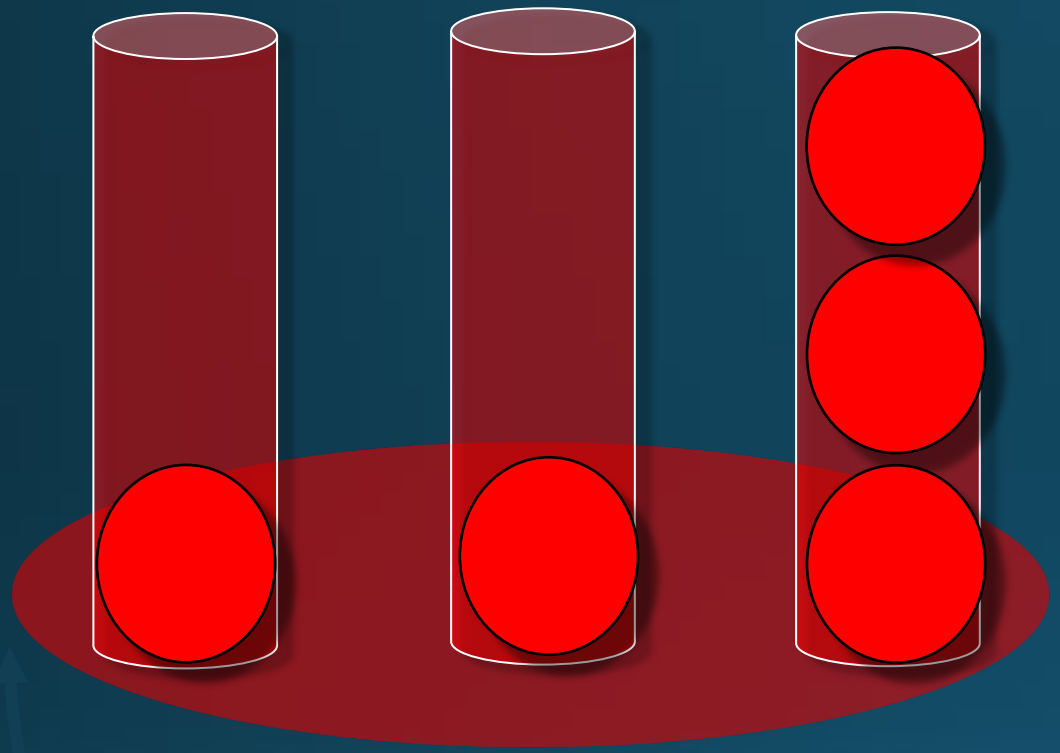


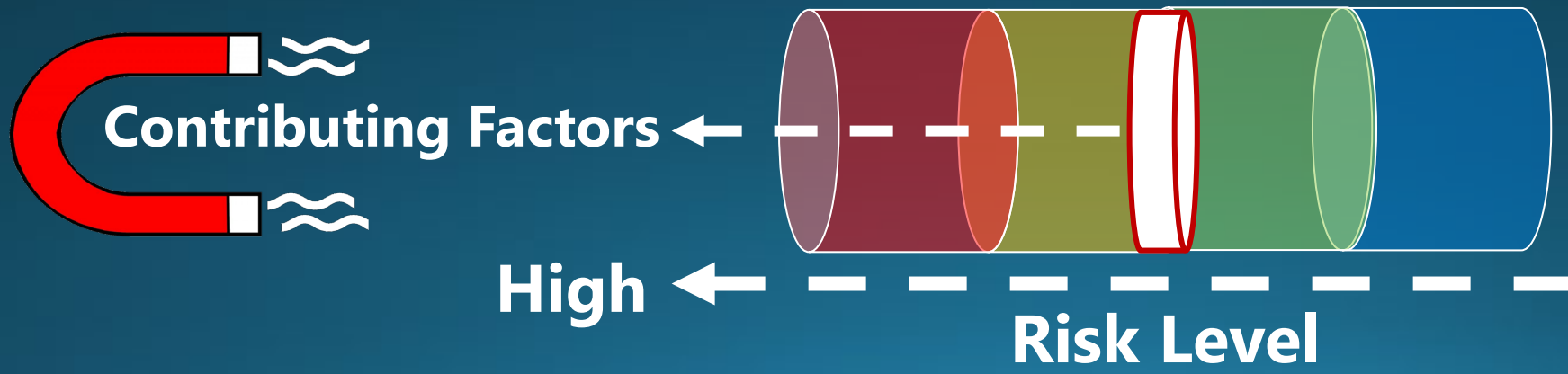
Safety I

	Safety I
Definition of Safety	As few things as possible go wrong
Safety Management Principle	Reactive, respond when something happens or is categorized as unacceptable risk
View of Human Factors	Humans are predominantly seen as a liability or hazard. They are a problem to be fixed.
Accident Investigation	Accidents are caused by failures and malfunctions. The purpose of an accident investigation is to identify the causes.

1. Hollnagel, E. Hearns, R., Braithwaite, J. - EUROCONTROL (2013). *From Safety-I to Safety-II (A White Paper)*. Brussels.

Contributing Factors





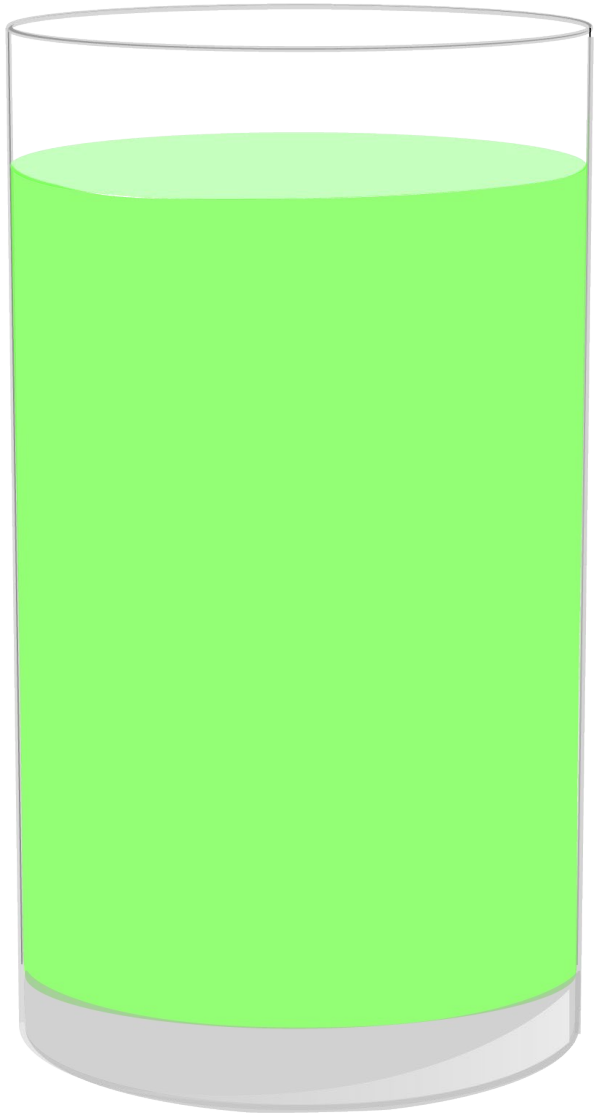
Safety II

What's Going Right?

We are safe if there is as much as possible of this…

"Trying to understand safety by only looking at incidents is like trying to understand successful marriages by only looking at divorces."

- Marit de Vos

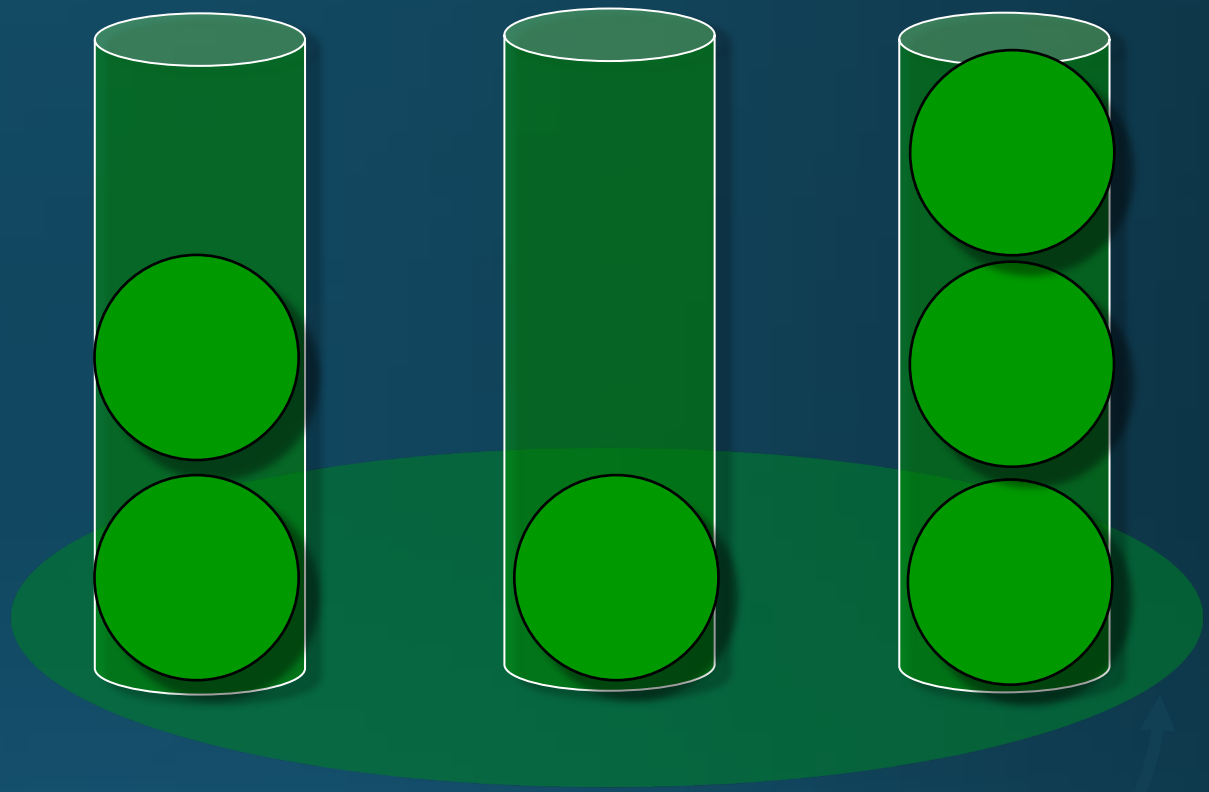


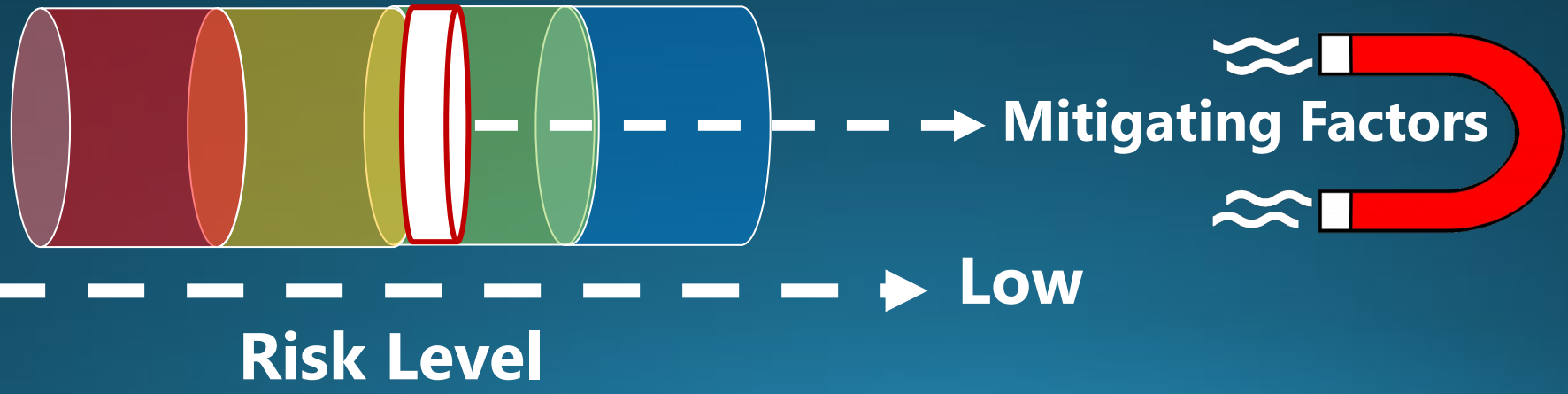
Safety II

	Safety II
Definition of Safety	As many things as possible go right
Safety Management Principle	Proactive, continuously try to anticipate developments and events
View of Human Factors	Humans are seen as a resource necessary for system flexibility and resilience. They provide flexible solutions to many problems.
Accident Investigation	Things basically happen in the same way regardless of outcome (positive or negative). The purpose of an investigation is to understand how things usually go right as a basis for explaining how things occasionally go wrong.

1 Hollnagel, E. Hearns, R., Braithwaite, J. - EUROCONTROL (2013). *From Safety-I to Safety-II (A White Paper)*. Brussels.

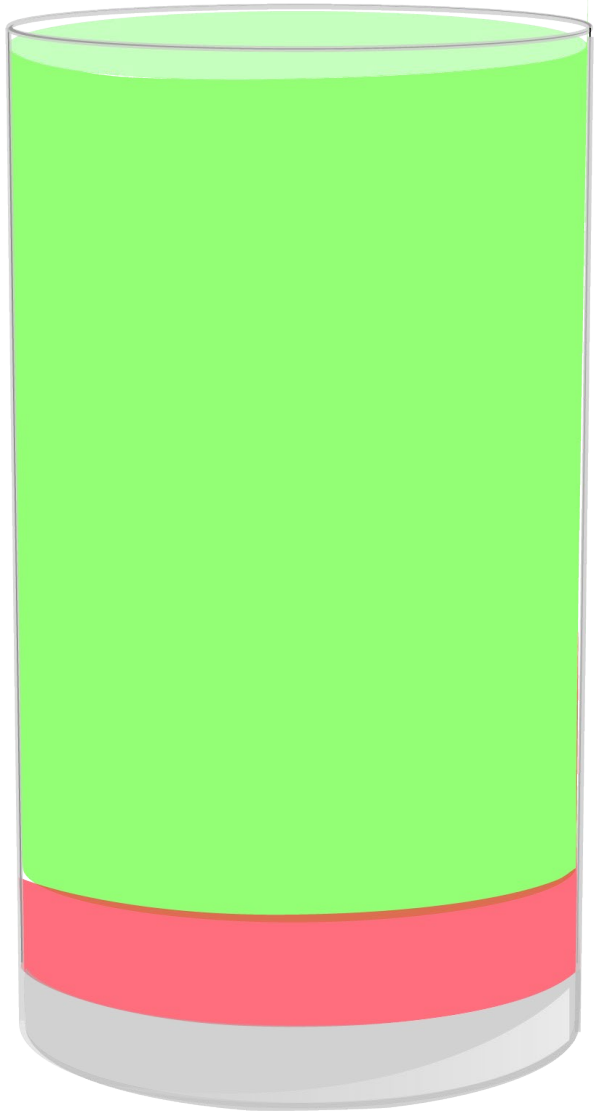
Mitigating Factors





Safety I & Safety II

- It is not Safety I **or** Safety II
- It is Safety I **and** Safety II



Safety I Approach

- Reduce number of adverse events
- Look for failures & malfunctions, try to eliminate causes and improve barriers
- Safety and core business compete for resources
- Learning only uses a fraction of the data available

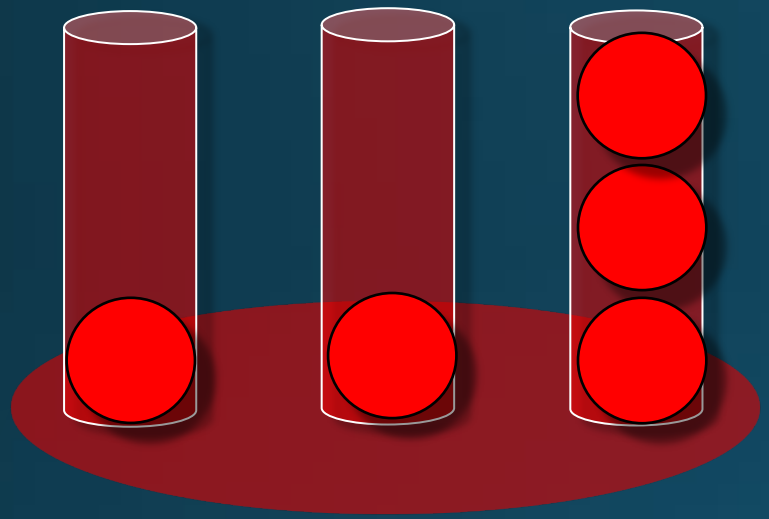
Safety II Approach

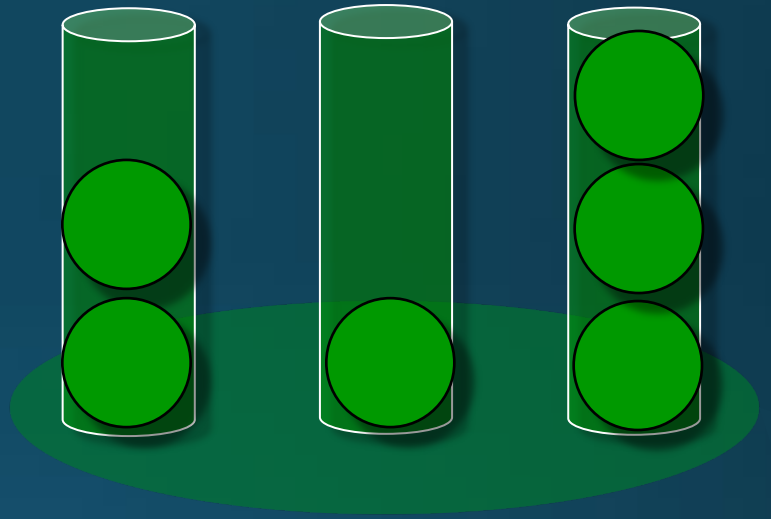
- Ability to succeed under varying conditions
- Use what goes right to understand everyday performance to do better and be safer
- Safety and core business help each other
- Learning uses most of the data available

1 failure in 10,000 events

9,999 non-failures in 10,000 events

RASM© – Safety I & Safety II





What is a Risk Management Information System (RMIS)?

A Database System for collecting and analyzing Incident and Close Call Data that allows you to apply Safety I & Safety II principles of causal analysis to inform your risk management process.

Generation 1: Paper

INCIDENT REPORT

This form should be completed under any of the following conditions:

- There is an injury or illness that requires treatment on a daily basis.
- If an injury or illness causes the person to miss some part of the trip (e.g. group has to wait for ½ day for the person to recover)
- If the person needs to be transported to a medical facility for examination and/or treatment.

Program Type_____

Staff_____ # Participants_____ # Program Days_____

Name _____(circle) Male/Female

Staff/Student_____Age _____

Incident Date _____ Time ___:___ AM/PM Day of course incident occurred_____

Geographical Location of Incident _____

_____

WEATHER at Time of Incident:

Temp (°F) _____ Precipitation: ❑ Rain ❑ Snow ❑ None
Wind (mph)_____ Visibility_____ (ft or miles)
Surface Condition(circle) wet dry snow ice trail rock uneven flat sloped

TYPE OF INCIDENT Check each applicable category:

Injury_____ Illness_____ Motivation/Behavior_____ Near Miss _____

Is this a Lost-Day case? _____NO _____YES If Yes, # of Days Lost_____

Did the victim leave the field? _____NO _____YES If Yes, on what date_____

Was a potential bloodborne pathogen exposure? _____NO ___YES

Evacuation method (circle) walk unassisted, litter, vehicle, helicopter, other_____

Did the victim visit a medical facility? _____NO _____YES If Yes, length of stay in days_____

Did the victim return to the course? _____NO _____YES If Yes, on what date_____

Was there damage to (circle all that apply) vehicle, equipment or property?

TYPE OF INJURY (check all that apply)

_____bruise, contusion or similar soft-tissue trauma
_____ligament sprain
_____muscle strain
_____frostbite
_____fracture
_____dislocation
_____head injury without loss of consciousness
_____head injury with loss of consciousness
_____near drowning or other submersion problem
_____immersion foot
_____tendonitis
_____eye injury
_____dental or tooth-related
_____burn
_____blister(s)
_____laceration
_____skin abrasions
_____sunburn
_____other _____

ANATOMICAL LOCATION OF INJURY(IES)

_____Head
_____Face
_____Eye
_____Neck
_____Shoulder
_____Upper Arm
_____Elbow
_____Forearm
_____Wrist
_____Hand/Fingers
_____Chest
_____Abdomen
_____Upper Back
_____Lower back
_____Pelvis
_____Hip
_____Thigh
_____Knee
_____Lower Leg
_____Foot
_____Ankle
_____Toe

TYPE OF ILLNESS (check all that apply)

_____allergic reaction
  _____mild or localized
  _____severe, generalized or anaphylaxis
_____altitude illness
  _____acute mountain sickness
  _____pulmonary edema
  _____cerebral edema
_____hypothermia (specify core temperature if known __°F/__°C
_____heat illness(specify core temperature if known __°F/__°C
  _____heat exhaustion
  _____heat cramps
  _____heat stroke
_____chest pain or cardiac condition
_____upper respiratory illness (runny nose, congestion, "cold")
_____upper respiratory illness (other)_____
_____abdominal or other gastrointestinal problem without diarrhea
_____diarrhea
_____apparent food-related illness
_____nonspecific fever illness
_____urinary tract infection
_____skin infection
_____eye infection
_____other_____

PROGRAM ACTIVITY (activity at the time of the incident)

____Backpacking
____Camp
____Canoe
____Caving
____Cooking
____Cycle
____Dog sledding
____Glacier travel
____Hike no pack
_____Horse
_____Initiative Game
_____Kayak
_____Mountaineering
_____Portage
_____Rafting
_____River crossing
_____Rappel
_____Other(explain)_____
____Ropes course
____Rock climbing
____Run
____Sail
____Service
____Ski w pack
____Ski w light pack
____Sea Kayak
_____Snow Climb
_____Snowshoeing
_____Solo
_____Sportyak
_____Swim/Dip
_____Unaccmp. Travel
_____Urban activity
_____Vehicle/Van

The Problem

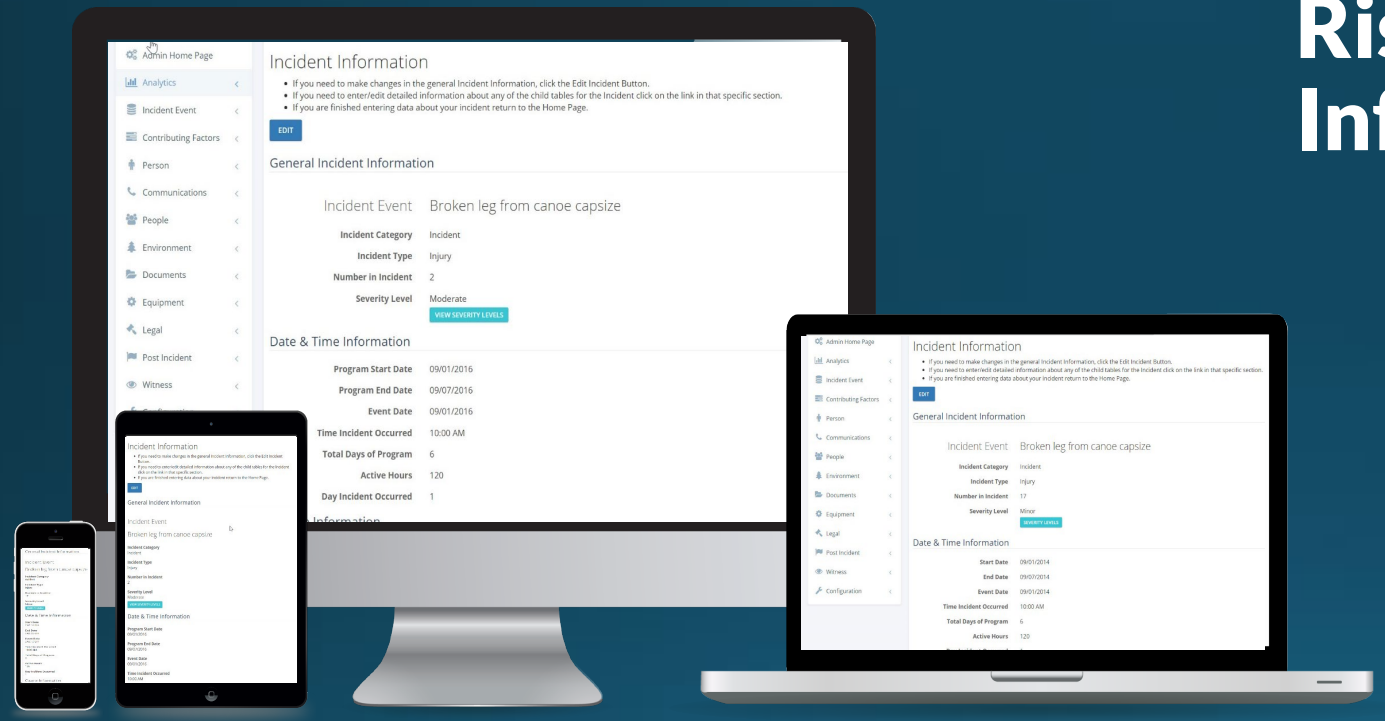
- A paper incident report is a single incident rather than a collection of data
- Read once then sits in a drawer
- Data collected is not consistent = no ability to compare
- How do you identify trends?
- Access Control Issues – who gets to see it?

Generation 2: Spreadsheet

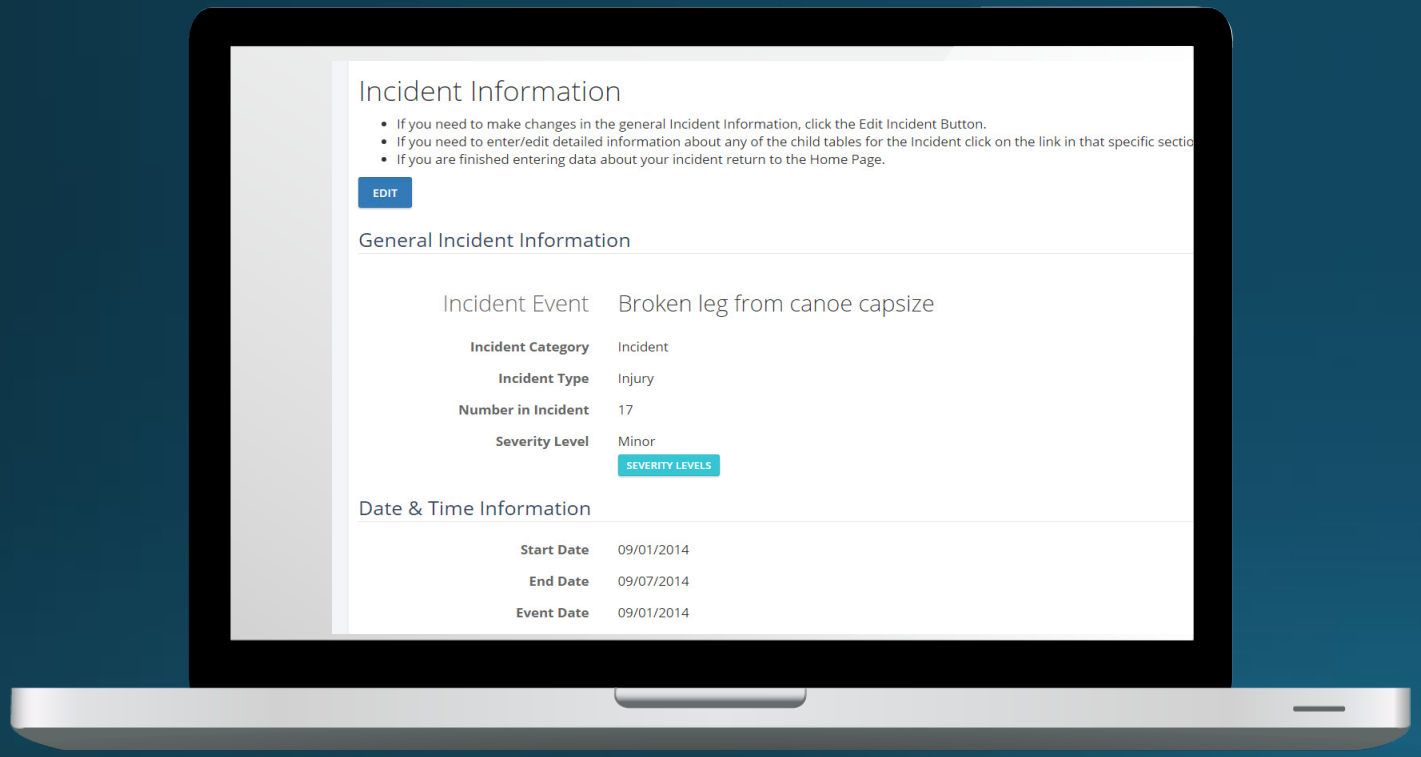
Id	Event	Type	Category	Activity
1	Bullying	Incident	Behavior	Tutoring Program
2	Sprained ankle	Incident	Injury	Basketball camp
3	Possible Sexting	Close Call	Behavior	Summer camp
4	Fall on challenge course	Close Call	Injury	High Ropes Course
5	Inappropriate touching	Incident	Behavior	Tutoring
6	Allergic Reaction to food	Incident	Illness	High School Program
7	Sexual Assault	Incident	Crime	Hiking
8	Migraine headache	Incident	Illness	Sports camp
9	Participant Exhaustion	Close Call	Illness	Sports camp

Generation 3: Risk Management Information System (RMIS)

Cloud-based Relational Database for Incident Data Tracking and Real-time Analytics



Benefits of an RMIS

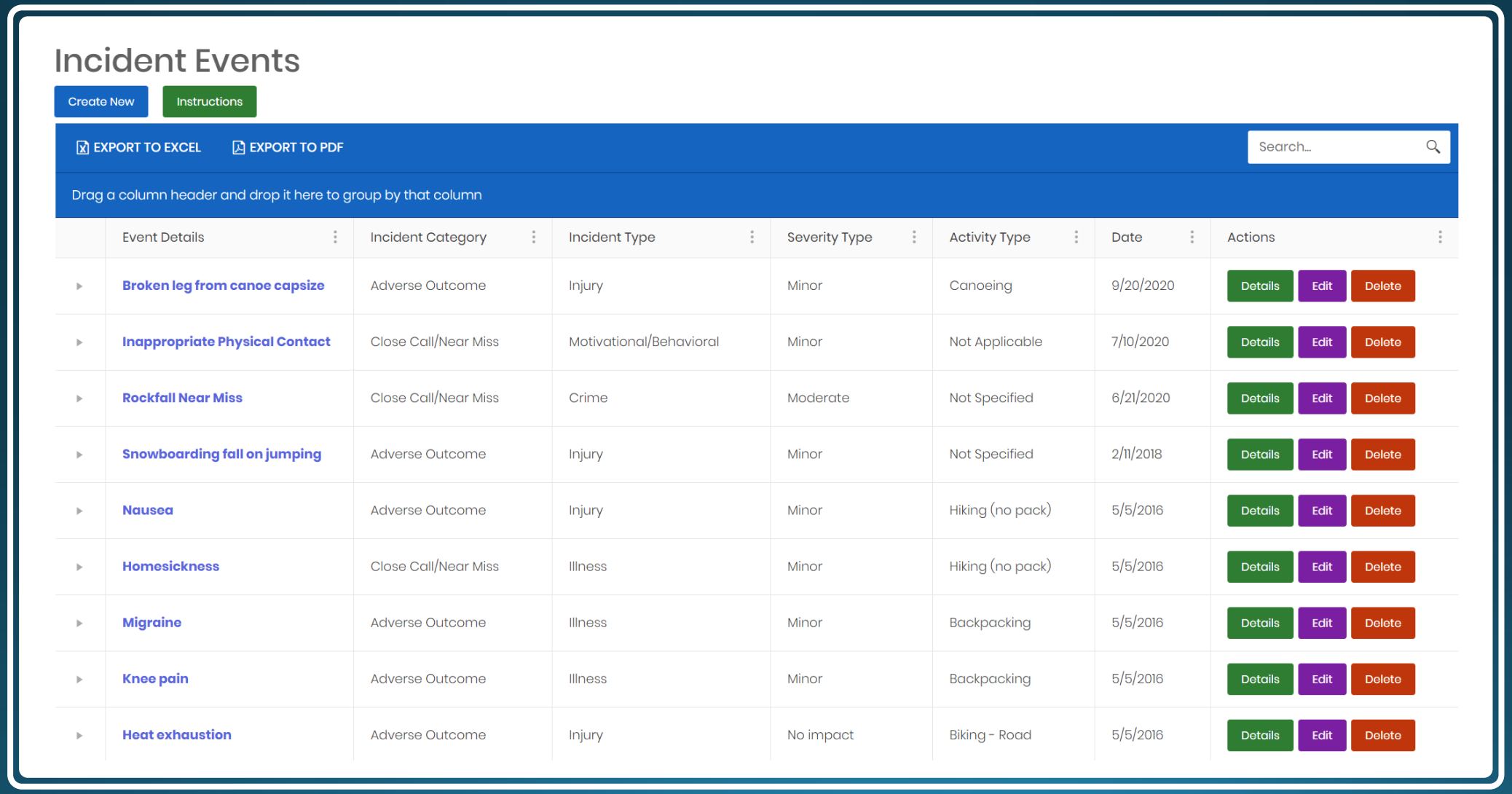


- **Comprehensive Incident Database Design**
- **Structured Database means Consistent Data Entry**
- **Real-time Drilldown Analytics providing insight**

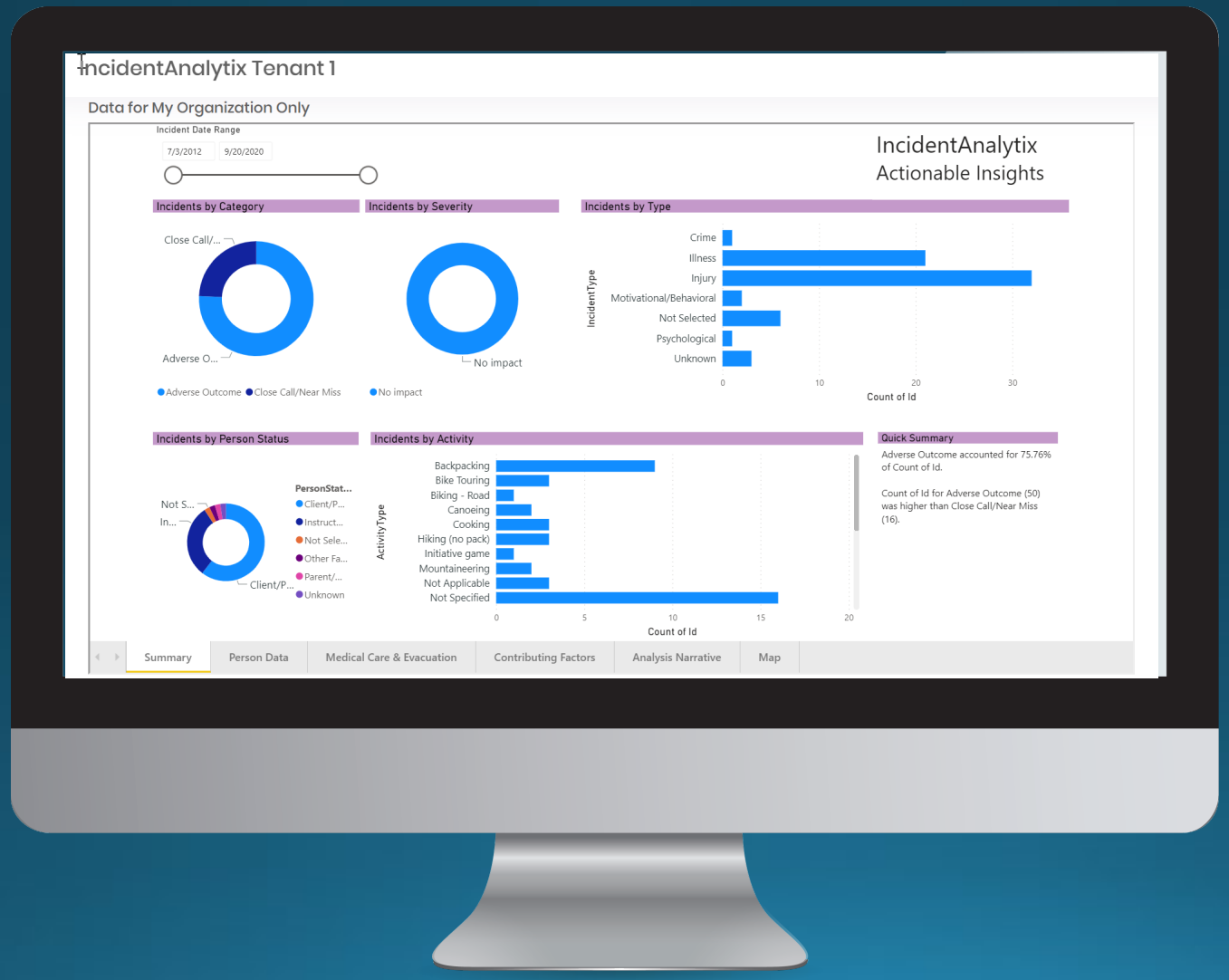
Data must be…

- Easy to collect
- Timely
- Consistent
- Complete
- Accurate
- Searchable, Filterable, Groupable
- Analyzable

All Incidents & Trends

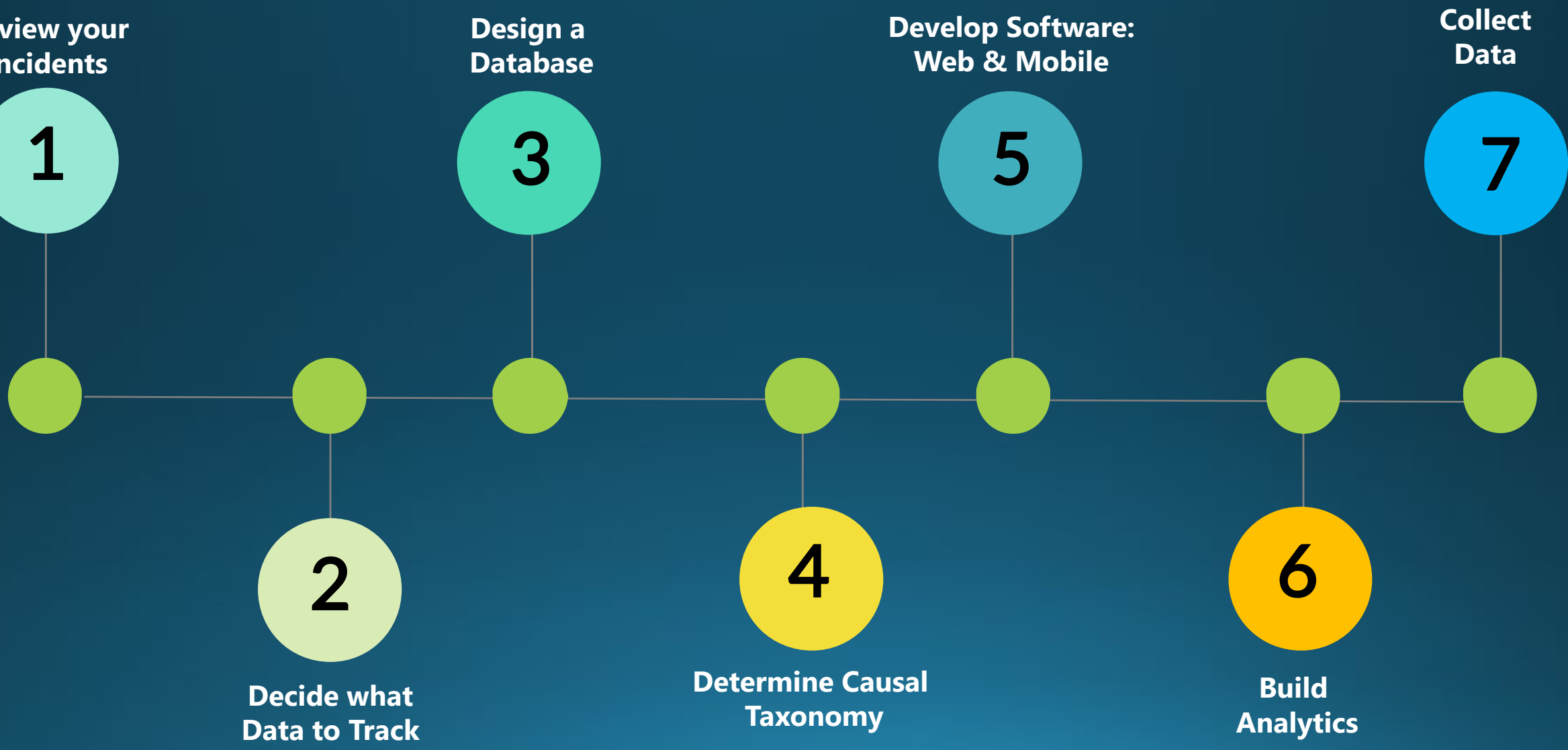


Real-time Analytics




Actionable Insights
Incidents by Category
Close Ca...
Adverse Out...
Adverse Outcome
Close Call/Near Miss
Incidents by Severity
Serious
Minor
No i...
Moderate
Minor
Moderate
No impact
Incidents by Type
Crime
Illness
Injury
Motivational/Behavioral
Not Selected
Psychological
Unknown
0
10
20
30
40
50
Count of Incidents by Type
Incidents by Person Status
Unknown
Not Sel...
Client/...
Instructor/S...
Incidents by Activity
Backpacking
Bike Touring
Biking - Road
Independent travel
Initiative game
Mountaineering
Quick Summary
Adverse Outcome accounted for 59.29% of Count of Id.
Count of Id for Adverse Outcome (67)
Intelligent Analytics

Developing an RMIS



What Data to Track?

- Start with an assessment of past incidents:
  - What are most common?
  - What are the most severe?
- What else could happen?
  - What incidents are commonly associated with that activity, population, etc. (even if it hasn't happened to you)
  - What has never happened that you need to be prepared for?
- What data will provide insight?

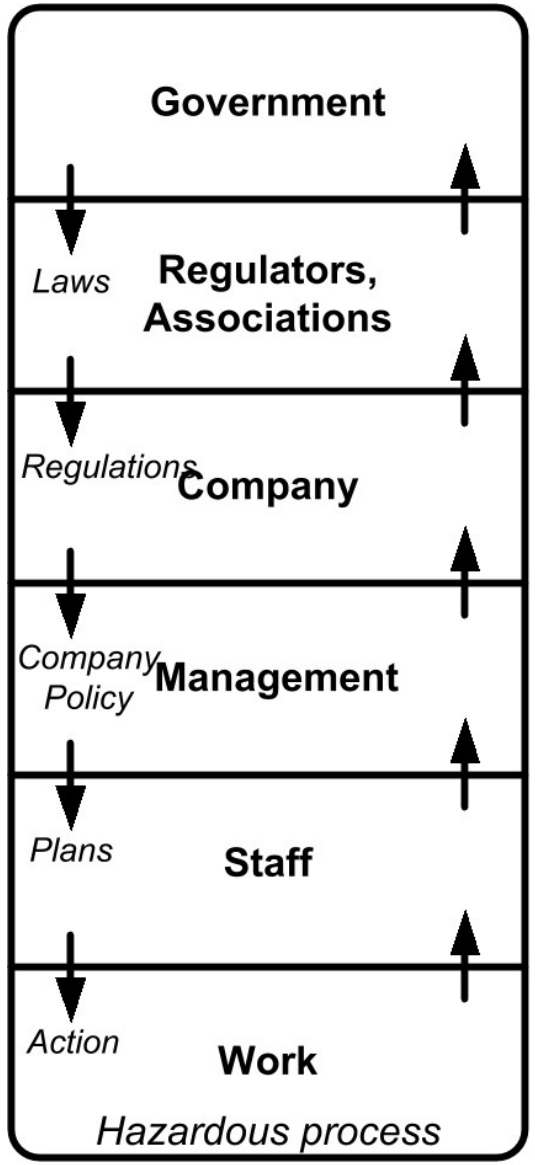
RMIS Data

- Data that will provide insights

Systems Thinking

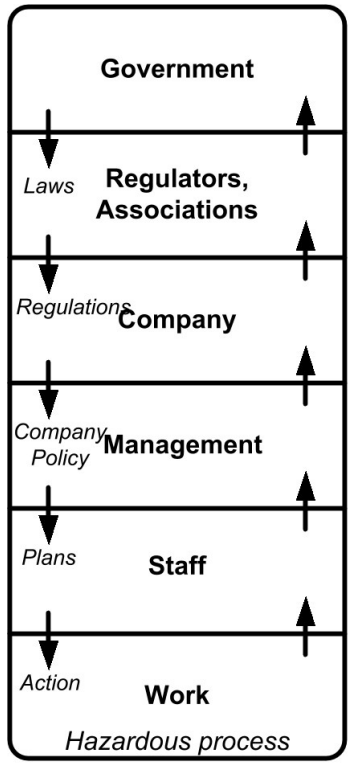
Risk Management in a Dynamic Society
Jens Rasmussen, Safety Science, 1997

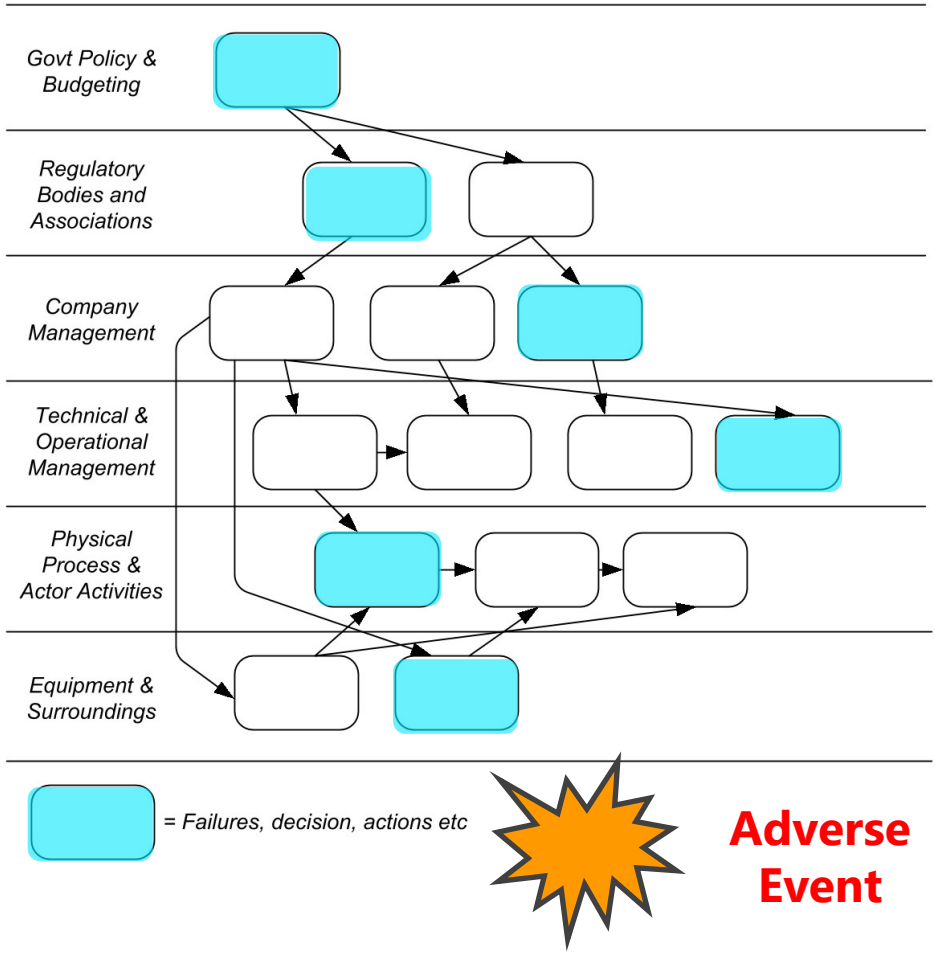
- Presented as a framework for Safety I
- Has been expanded into the Safety II framework



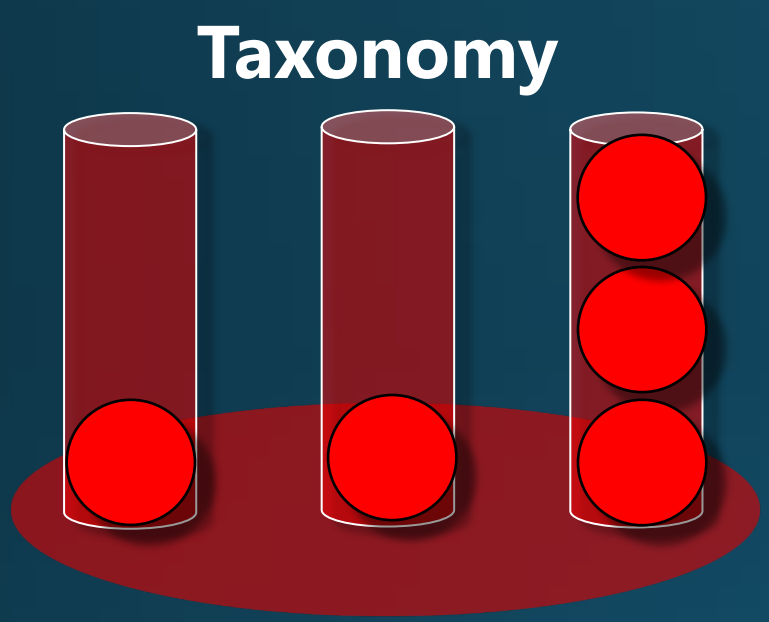
Safety I = AcciMaps

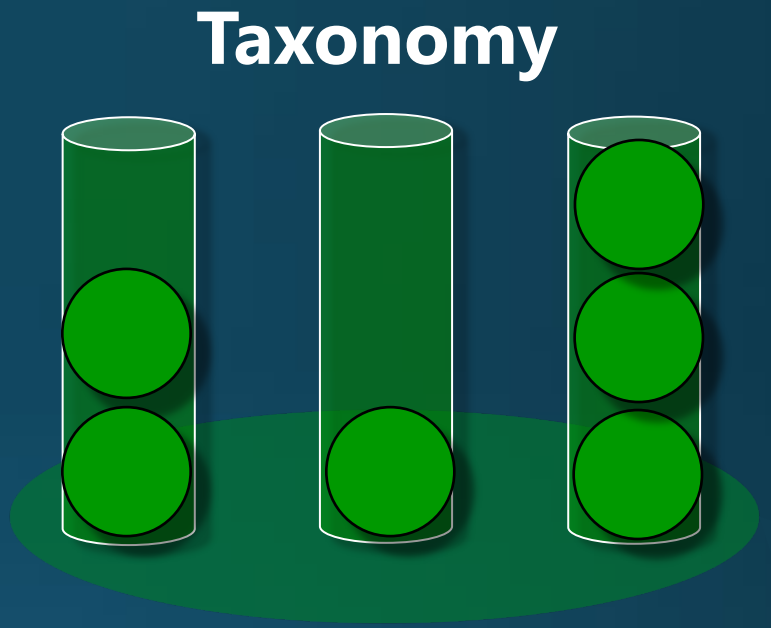
- Map of a Sociotechnical system
- Each level is a Causal Taxonomy
- Levels show factors contributing directly or indirectly to the adverse outcome
- Incidents are caused not only by the individual factors, but also through the relationship(s) between factors





Contributing & Mitigating Taxonomy

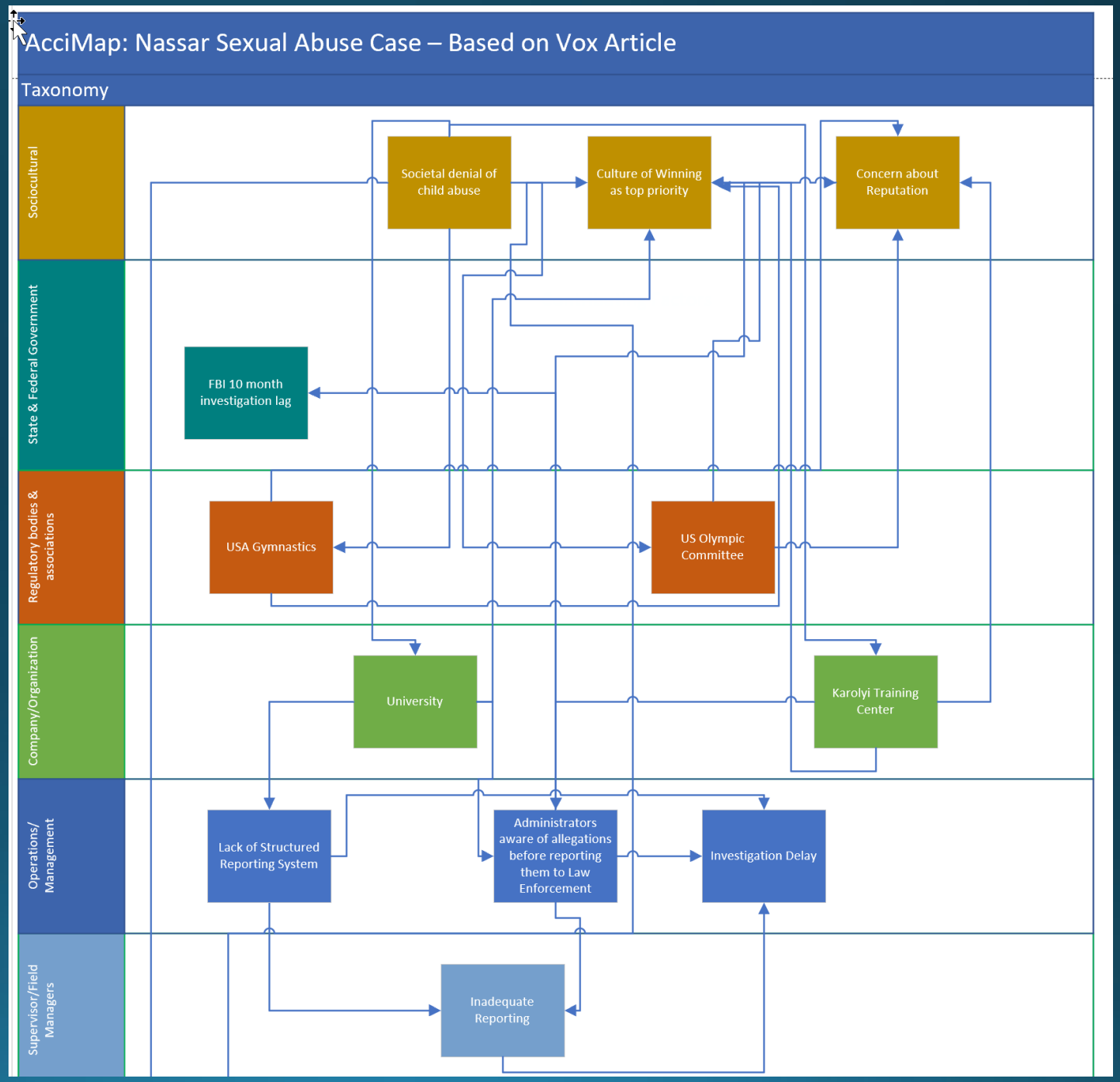


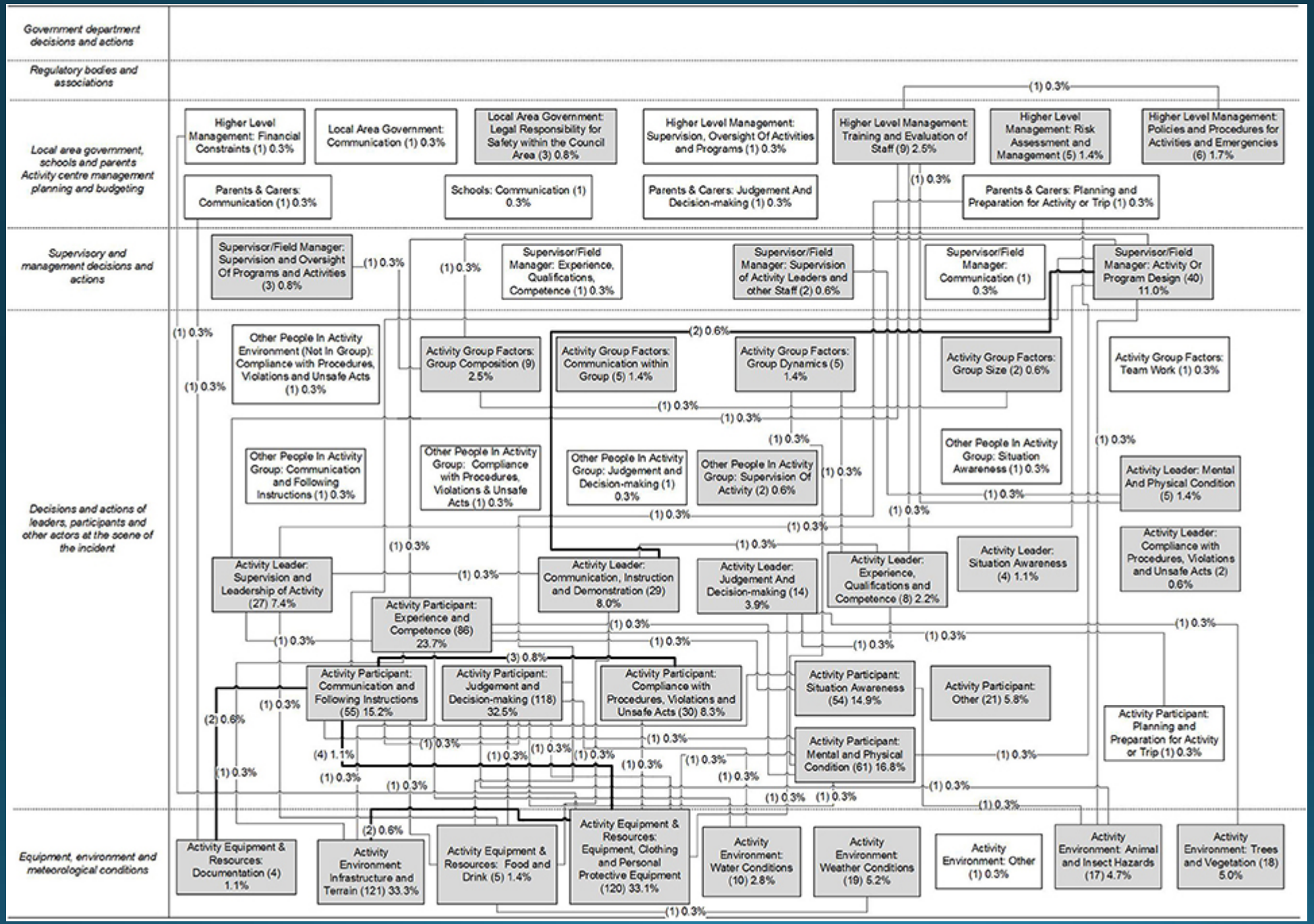


Causal Taxonomy for Youth Safety

Nassar Case

- AcciMap based on Rasmussen's Systems Thinking Model




Government department decisions and actions
Regulatory bodies and associations
Local area government, schools and parents Activity centre management planning and budgeting
Supervisory and management decisions and actions
Decisions and actions of leaders, participants and other actors at the scene of the incident
Equipment, environment and meteorological conditions
Higher Level Management: Financial Constraints (1) 0.3%
Local Area Government: Communication (1) 0.3%
Local Area Government: Legal Responsibility for Safety within the Council Area (3) 0.8%
Higher Level Management: Supervision, Oversight Of Activities and Programs (1) 0.3%
Higher Level Management: Training and Evaluation of Staff (9) 2.5%
Higher Level Management: Risk Assessment and Management (5) 1.4%
Higher Level Management: Policies and Procedures for Activities and Emergencies (6) 1.7%
Parents & Carers: Communication (1) 0.3%
Schools: Communication (1) 0.3%
Parents & Carers: Judgement And Decision-making (1) 0.3%
Parents & Carers: Planning and Preparation for Activity or Trip (1) 0.3%
Supervisor/Field Manager: Supervision and Oversight Of Programs and Activities (3) 0.8%
Supervisor/Field Manager: Experience, Qualifications, Competence (1) 0.3%
Supervisor/Field Manager: Supervision of Activity Leaders and other Staff (2) 0.6%
Supervisor/Field Manager: Communication (1) 0.3%
Supervisor/Field Manager: Activity Or Program Design (40) 11.0%
Other People In Activity Environment (Not In Group): Compliance with Procedures, Violations and Unsafe Acts (1) 0.3%
Activity Group Factors: Group Composition (9) 2.5%
Activity Group Factors: Communication within Group (5) 1.4%
Activity Group Factors: Group Dynamics (5) 1.4%
Activity Group Factors: Group Size (2) 0.6%
Activity Group Factors: Team Work (1) 0.3%
Other People In Activity Group: Communication and Following Instructions (1) 0.3%
Other People In Activity Group: Compliance with Procedures, Violations & Unsafe Acts (1) 0.3%
Other People In Activity Group: Judgement and Decision-making (1) 0.3%
Other People In Activity Group: Supervision Of Activity (2) 0.6%
Other People In Activity Group: Situation Awareness (1) 0.3%
Activity Leader: Mental And Physical Condition (5) 1.4%
Activity Leader: Supervision and Leadership of Activity (27) 7.4%
Activity Leader: Communication, Instruction and Demonstration (29) 8.0%
Activity Leader: Judgement And Decision-making (14) 3.9%
Activity Leader: Experience, Qualifications and Competence (8) 2.2%
Activity Leader: Situation Awareness (4) 1.1%
Activity Leader: Compliance with Procedures, Violations and Unsafe Acts (2) 0.6%
Activity Participant: Experience and Competence (86) 23.7%
Activity Participant: Communication and Following Instructions (55) 15.2%
Activity Participant: Judgement and Decision-making (118) 32.5%
Activity Participant: Compliance with Procedures, Violations and Unsafe Acts (30) 8.3%
Activity Participant: Situation Awareness (54) 14.9%
Activity Participant: Other (21) 5.8%
Activity Participant: Mental and Physical Condition (61) 16.8%
Activity Participant: Planning and Preparation for Activity or Trip (1) 0.3%
Activity Equipment & Resources: Documentation (4) 1.1%
Activity Environment: Infrastructure and Terrain (121) 33.3%
Activity Equipment & Resources: Food and Drink (5) 1.4%
Activity Equipment & Resources: Equipment, Clothing and Personal Protective Equipment (120) 33.1%
Activity Environment: Water Conditions (10) 2.8%
Activity Environment: Weather Conditions (19) 5.2%
Activity Environment: Other (1) 0.3%
Activity Environment: Animal and Insect Hazards (17) 4.7%
Activity Environment: Trees and Vegetation (18) 5.0%

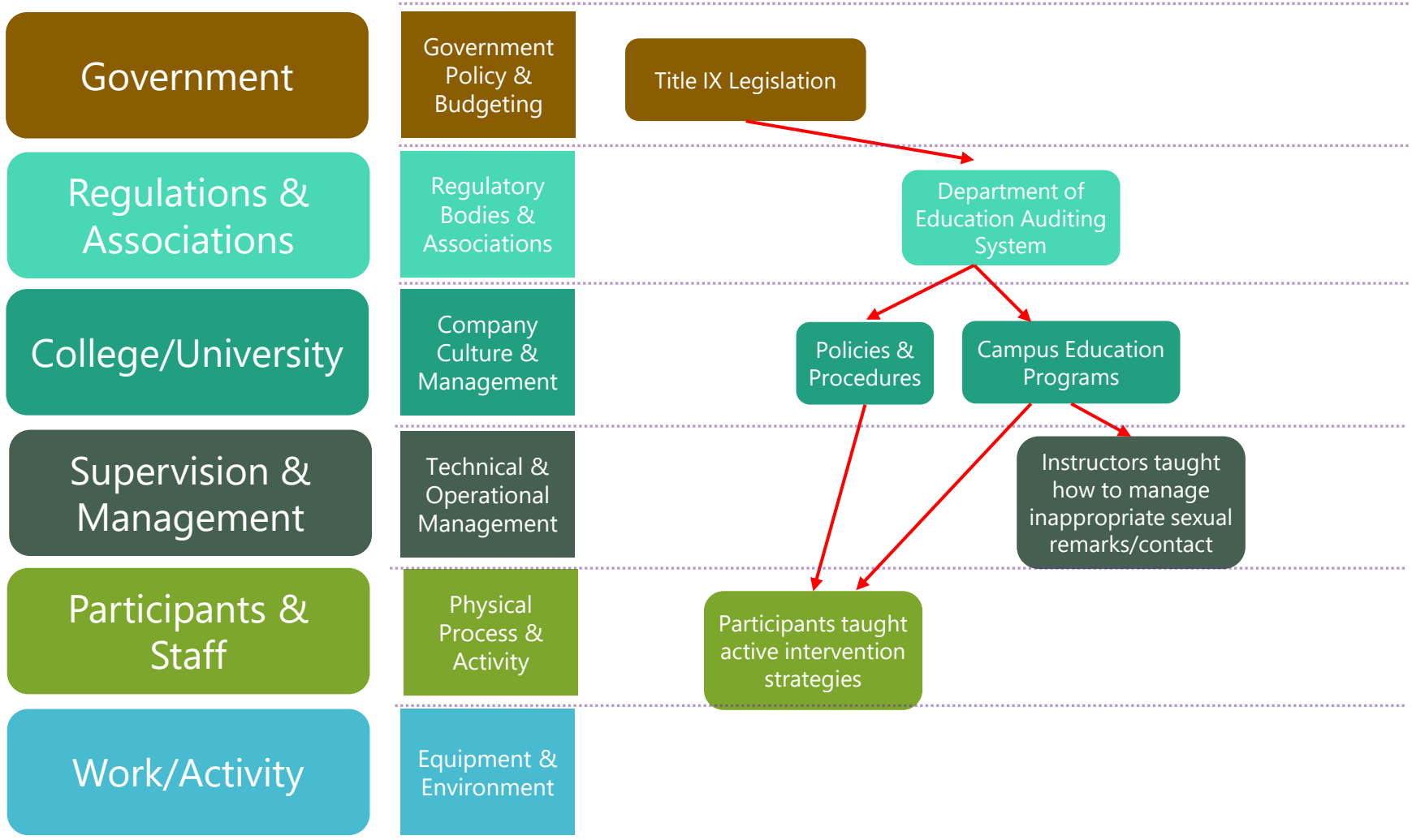
Safety II = PreventiMaps

- Safety I = AcciMaps (Contributing Factor analysis)
  "What went wrong?"

then

- Safety II = PreventiMaps (Mitigating Factor analysis)
  "What went right?"

PreventiMap: Title IX Implementation on Campus



Determining Scope

- Based on the Taxonomy you selected for your analysis, determine what things are:
  - In Scope
  - Out of Scope

In Scope Prioritization

- **Risk Mitigation Impact (RMI)**
  - What is the potential impact of doing nothing?
  - What will get you the greatest impact with the least amount of resources?
  - What is the single most important factor to address that would have a significant impact regardless of resources?
  - If the solution is resource intense, how will you make the case for getting those resources?
  - Who are your stakeholders and how can they help you?

Key Take Aways

- Safety I
- Safety II
- Taxonomy of Causation
- Systems Thinking
- Building AcciMaps – Safety I
  - Identifying In Scope vs Out of Scope
- Building PreventiMaps – Safety II
- Using an RMIS to collect Incident and Close Call Data

IncidentAnalytix is interested in partnering with colleges and universities to develop a research-based causal taxonomy for youth safety to build a common incident data analysis standard for higher education.

www.IncidentAnalytix.com

Resources

www.IncidentAnalytix.com

Demo available today 4:30 – 5:00 PM

Key Resources

- Risk Management in a Dynamic Society: A modeling problem – Jens Rasmussen (1997) - https://orbit.dtu.dk/ws/files/158016663/SAFESCI.pdf
- From Safety-I to Safety-II: A White Paper – Hollnagel E; Wears RL; Braithwaite J. (2015) - https://www.england.nhs.uk/signuptosafety/wp-content/uploads/sites/16/2015/10/safety-1-safety-2-whte-papr.pdf
- Translating Systems Thinking Into Practice: A Guide to Developing Incident Reporting Systems – Goode, Salmon, Lenne, Finch – Available at Amazon Books

Videos & Articles

- 1.5.5 Safety I vs Safety II - https://www.youtube.com/watch?v=WM0LVv9NrhM
- Doing Safety Differently – Sydney Dekker: https://www.youtube.com/watch?v=6gREMV6j2A4
- Safety II & Safety II – Erik Hoffnagel: https://vimeo.com/channels/1366431/89492241
- Perceiving what cannot be seen" - the practical side of Safety - II - Erik Hollnagel: https://vimeo.com/159498494
- A story of Safety II – Jeffrey Braithwaite: https://www.youtube.com/watch?v=gauR843rRNk
- Safety Differently | The Movie: https://www.youtube.com/watch?v=moh4QN4IAPg
- Sidney Dekker — Safety Differently Lecture: https://www.youtube.com/watch?v=oMtLS0FNDZs
- Sidney Dekker — Just Culture short course 1: https://www.youtube.com/watch?v=PVWjgqDANWA
- The New View of Safety with Todd Conklin: https://www.youtube.com/watch?v=IoYUQIWiRgc
- Dr. Todd Conklin speech "Risk Analysis is Fixed in Time - But Hazards Ebb and Flow: https://www.youtube.com/watch?v=X211fU39808

Videos & Articles

- Guidelines for AcciMap Analysis: https://openresearch-repository.anu.edu.au/bitstream/1885/20987/2/01_Branford_Guidelines_for_ACCIMAP_2009.pdf
- Webinar: An Introduction to “New Safety” (HOP, Safety II, and Safety Differently): https://www.youtube.com/watch?v=zqZVGaFIhyw
- FAA Safety Management Systems (SMS) Fundamentals: Policy: https://www.youtube.com/watch?v=j8N0PZx5YwM
- FAA Safety Management Systems (SMS) Fundamentals: Safety Risk Management Component: https://www.youtube.com/watch?v=b6dwxQ3oEAE
- Mangatepopo canyoning tragedy a decade on: 'I know they would be loving every minute of life’: https://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=12032068
- In a Flash TV Movie: https://www.tvnz.co.nz/shows/in-a-flash/episodes/s1-e1
- BBC NASA Challenger Disaster: https://www.youtube.com/watch?v=reM5fTo-6PI
- Challenger Disaster Governmental Report: https://www.govinfo.gov/content/pkg/GPO-CRPT-99hrpt1016/pdf/GPO-CRPT-99hrpt1016.pdf
- A Review of Accident Modelling Approaches for Complex Critical Sociotechnical Systems: https://www.semanticscholar.org/paper/A-Review-of-Accident-Modelling-Approaches-for-Qureshi/c3a597212068c27be45d84dec76e86baabd4cf90

Final Thoughts

The biggest mistake
about a mistake
is not learning from it.

Youth Safety comes from data-driven organizational change.