BEYOND THE BOARDS

FROM INJURY TRENDS TO EMERGENCY CARE- A LOOK INTO PROFESSIONAL WOMEN'S HOCKEY

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OUTLINE & OBJECTIVES

- Identify injury trends in professional women's hockey and how it compares to college and NHL data
- Recognize key components and roles in an Emergency Action Plan
- Describe unique challenges that surface and equipment present when executing care during emergency situations
- Discuss the interdisciplinary approach to medical care rink side

I HAVE NO CONFLICTS OF INTEREST

I do not have any financial ties to products that may appear throughout this presentation.

BACKGROUND

- RAISED IN MINNESOTA
- BEEN A PLAYER, MANAGER, COACH, AND ATHLETIC TRAINER
- FORMER EMT
- COVERED ICE HOCKEY FROM MINI MITES TO PROFESSIONAL LEVEL
  - High school 5 years
  - Junior hockey 2 years
  - Profession women's hockey 4 years
- BEEN A LEAD ON PRESEASON PLANNING AND EMERGENCY TRAINING FOR 7 YEARS
- HUSBAND IS AN OFFICIAL
- BOTH KIDS ARE INVOLVED IN HOCKEY AND SKATING

OVERVIEW OF THE PWHL

- Founded in 2023
- Singer owner league – Mark Walter Group and Billie Jean King Enterprises
- 207 players 2025-2026 season
  - 9 countries
  - 61 players representing at the Olympics
- 30 Game Regular Season
- Playoffs -two rounds, each is best of 5
- Unique Rules
  - Jailbreak Goals
  - No Escape Rule
  - Gold Plan System

ORIGINAL SIX

- Boston
- Minnesota
- Montreal
- New York
- Ottawa
- Toronto

SEASON 3

- Seattle
- Vancouver

SEASON 4

- Detroit
- Hamilton
- Las Vegas
- San Jose

FROST MEDICAL TEAM

- Chief Medical Officer (League Level)
- Team Medical Direction – Lead Physician – PCSM
- Orthopedic Surgeon
- Sports Neuropsychologist
- Athletic Trainer
- Physical Therapist
- Chiropractor
- Massage Therapist
- Sports Dietitian
- Sports Psychologist
- Mental Performance Coach
- Strength and Conditioning Coach
- Game Day Only Staff
    - Emergency Physicians
    - Paramedics/EMT's
- On Call Staff
    - Dentist
    - Ophthalmologist
    - OBGYN

INJURY DATA IN ICE HOCKEY

NCAA ICE HOCKEY 14-15 TO 18-19

WOMEN'S

- Competition > Practice
- Overall Injury Rates
  - Preseason – 6.67/1000 AE
  - Regular Season – 3.32/1000 AE
  - Post Season – 1.48/1000 AE
- Most common MOI = contact with players and equipment
- Most common injuries
  - Concussions
  - Groin and Hip Strains

MEN'S

- Competition > Practice
- Overall Injury Rates
  - Preseason – 7.93/1000 AE
  - Regular Season – 7.22/1000 AE
  - Post Season – 5.35/1000 AE
- Most common MOI = contact with players and equipment
- Most common injuries
  - Concussions
  - Acromioclavicular Sprains
  - MCL Tears

Chandran et al. & Boltz et al.

NCAA INJURIES BY BODY PART

WOMEN'S

Overall	Games	Practice
Head/Face 15.22%	Head/face 18.75%	Hip/groin 16.67%
Knee 13.15%	Knee 14.65%	Trunk 12.01%
Shoulder 12.93%	Shoulder 13.67%	Shoulder 12.01%
Hip/Groin 11.52%	Trunk 10.35%	Knee 11.27%
Trunk 11.09%	Hand/Wrist 9.57%	Hand/wrist 11.03%

MEN'S

Overall	Games	Practice
Shoulder 16.13%	Shoulder 18.65%	Hip/groin 19.72%
Head/face 15.2%	Head/Face 17.36%	Trunk 11.54%
Hip/Groin 12.10%	Hand/wrist 12.05%	Shoulder 10.36%
Hand/wrist 11.53%	Knee 9.97%	Hand/wrist 10.36%
Knee 9.16%	Hip/groin 8.77%	Head/Face 10.26%

Chandran et al. & Boltz et al.

NCAA INJURIES BY DIAGNOSIS

WOMEN'S

Overall	Games	Practice
Contusions 18.91%	Contusions 20.51%	Strains 22.55%
Strains 18.7%	Sprains 18.36%	Other 20.83%
Other 16.74%	Strains 15.63%	Contusions 16.91%
Sprains 15.54%	Concussions 14.06%	Sprains 12.01%
Concussions 11.85%	Other 13.48%	Concussions 9.07%

MEN'S

Overall	Games	Practice
Contusions 25.89%	Contusions 28.41%	Strains 23.87%
Sprains 19.07%	Sprains 22.24%	Contusions 20.12%
Strains 16.10%	Strains 12.69%	Other 15.38%
Concussions 9.61%	Concussions 11.36%	Sprains 11.83%

Chandran et al. & Boltz et al.

INJURY TRENDS

NCAA MEN'S

Competition Injury Rates

- Preseason – 31.85/1000 AE
- Regular Season – 20.65/1000 AE
- Post Season – 17.95/1000 AE

Most Common Body Parts Injured in Competition

- Shoulder – 18.65%
- Head & Face – 17.36%
- Hand & Wrist – 12.05%

NHL

Competition Injury Rates

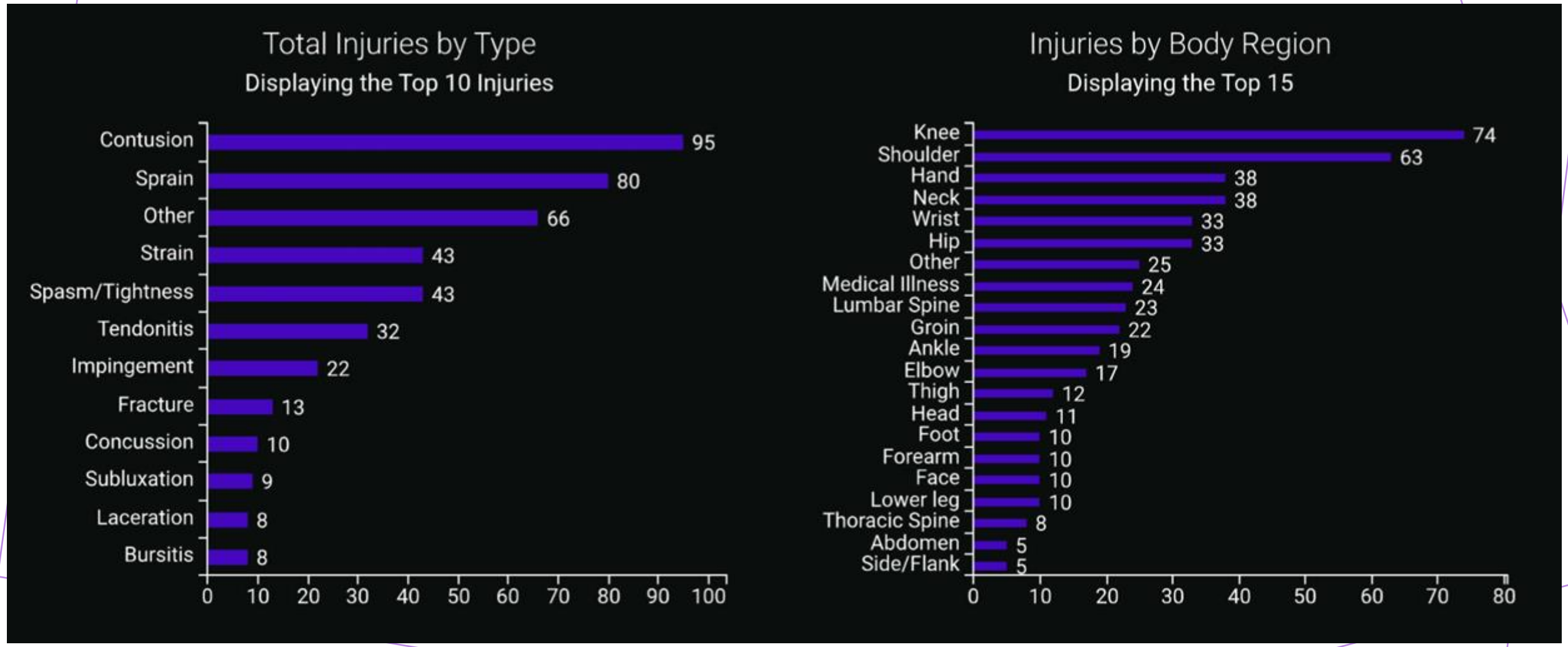
- Preseason – 50.2/1000 AE
- Regular Season – 51.3/1000 AE
- Post Season – 67.9/1000 AE

Most Common Body Parts Injured in Competition

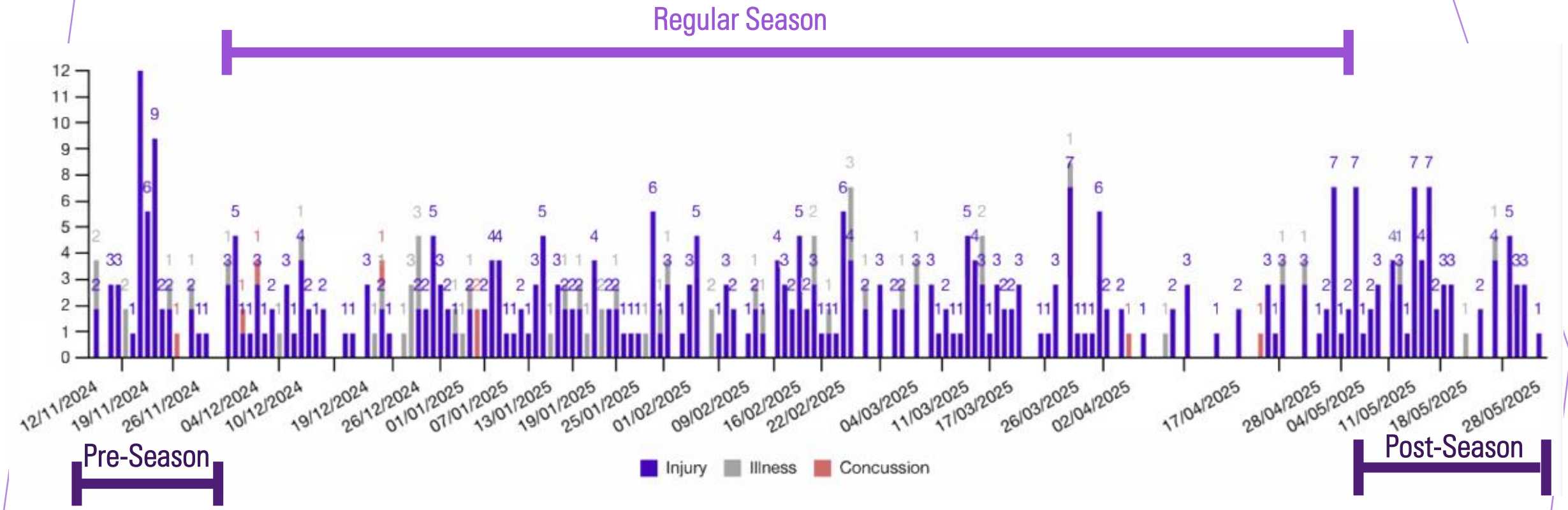
- Head & Face – 21.2%
- Hand & Wrist – 12.9%
- Groin & Hip – 9.6%

Boltz et al. & Knapik et al.

INJURIES IN THE PWHL



Atkinson, 2026



INJURIES IN PWHL

INJURY TRENDS

WOMEN'S NCAA

Most Common Types of Injuries

- Contusions
- Strains
- Other
- Sprains
- Concussions

Most Common Body Parts Injured Overall

- Face/head
- Knee
- Shoulder
- Groin/Hip
- Trunk

PWHL

Most Common Types of Injuries

- Contusion
- Sprain
- Other
- Strain
- Tightness/Spasm

Most Common Body Parts Injured Overall

- Knee
- Shoulder
- Hand/Wrist
- Neck
- Hip

CURRENT LIMITATIONS & AREAS OF GROWTH

- Only have one season of data
- Have not been tracking athlete exposures
- MOI's have not been tracked
- Need consistent definition and tracking procedures for:
  - Injuries
  - Days lost

EMERGENCY ACTION PLANS & ICE HOCKEY

WHY DO WE PREPARE?

WHAT IS AN EAP?

- Is a written document indicating the preparations and onsite emergency response for any type of catastrophic injury in the prehospital setting
- Is developed to respond to any type of catastrophic situation and should not be injury or illness specific
  - Policies, procedures, and protocols can detail out management of specific injuries/illnesses
- Venue Specific
  - Possibly event specific

Scarneo-Miller et al.

COMPONENTS OF AN EAP

- **Personnel and Roles** – Who responds when an EAP is activated and what are their roles
  - Establish scene safety and immediate care of the athlete
  - Activation of EMS
  - Equipment retrieval
  - Direction of EMS to the scene
- **Communication** – What devices are being used? Where are they located? What number to call in an emergency, specific information and directions to the venue to provide to EMS
- **Equipment** – Location of equipment should be clearly listed and easily accessible.
- **Medical Emergency Transportation** – List of destinations in the area, name, address, distance
- **Venue Directions with a Map** – Should be specific to the venue; include instructions for access
- **Emergency Action Plan for Non-Medical Emergencies** – Fires, Active Shooter, Severe Weather, etc
  - Typically developed by building or public safety personnel

ADDITIONAL COMPONENTS

Reviewed annually with stakeholders (i.e. medical staff, coaches, admin)

Practiced annually with medical staff and local EMS

Document rehearsal – who, where, when, what scenarios

Perform a "medical time out" before games

When an EAP is activated, conduct a Critical Incident Stress Debriefing

When an EAP is activated, review implementation/execution of EAP and identify strategies for improvement, if needed.

Scarneo-Miller et al.

Minnesota Frost Emergency Action Plan – GAME
Season 2025-2026

Grand Casino Arena
Loading Dock and Ice Level Entrance
310 Eagle Street, St Paul, MN

Contact Information:

Head Athletic Trainer - Katie Homan .....
Assistant Athletic Trainer – Christina Neville .....
Team Medical Director/Head Team Physician – Dr. Heather Bergeson .....
Orthopedic Physician – Dr. Caitlin Chambers .....
Emergency Medicine Physician – Dr. Alex Taylor .....
– Dr. Jessie Nelson .....
Team General Manager – Melissa Caruso .....
Local PWHL Security Lead – Sheila Lambie .....
PWHL Game Day Director of Operations – Clarie Bjerke .....
Venue Contact – Sara Petersen .....
League Chief Medical Officer – Dr. Tina Atkinson .....

Location of Paramedics: In Zamboni Tunnel

Location of Physicians: Seat on the glass to left of Zamboni Entrance, Section 123 Rows 1 & 4, seats 1-4

Location of Emergency Equipment:

- *AEDs –*
  - *With paramedics*
  - *In purple bag in tunnel behind home bench*
  - *On wall across from home medical room*
- *Airway management –*
  - With paramedics in Zamboni Tunnel
  - In purple bag in tunnel behind home bench
- *Stretcher & Gurnee* – With paramedics in Zamboni Tunnel
- *Vacuum Splints – In tunnel behind home bench*
- *Hemostatic Dressings and Tourniquets –*
  - In AT sling bag
  - In purple bag in tunnel behind home bench
- *Additional Emergency Equipment with Paramedics*

Emergency Communication:

- ***FIST IN AIR -*** activates the EAP.
- Finger wave - bring out additional AT and team physician only.
- Radios provided to communicate needs if off ice emergency occurs

Medical Facilities:

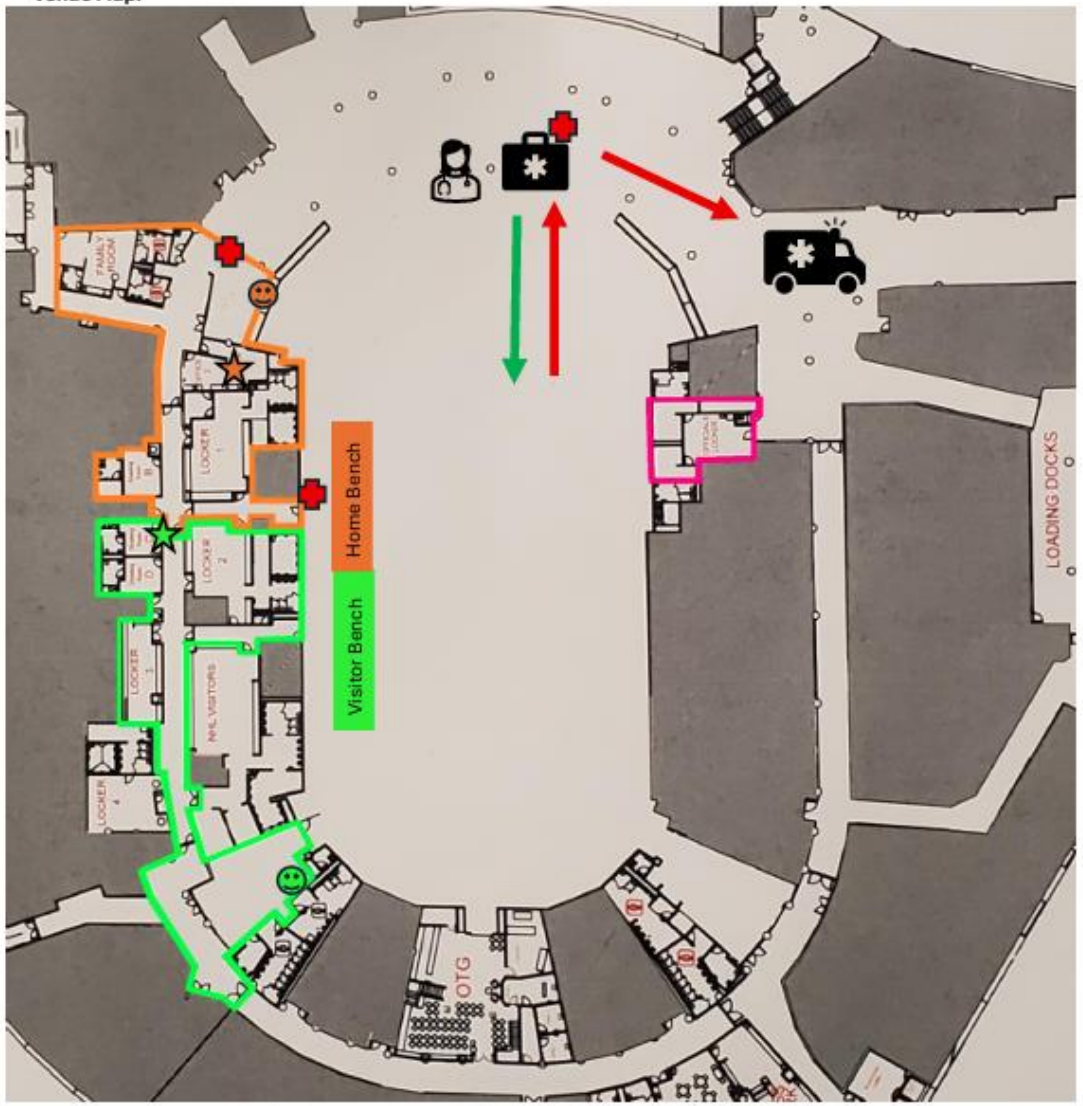
Level I Trauma Center – Regions Hospital – 640 Jackson Street, St Paul, MN 55101

Emergency Action Plan-

1. Athletic trainer/therapist attends to injured individual and assesses the situation.
   a. If emergency is on the bench, extract the individual to the ice.
2. Activate the emergency action plan.
   a. Emergency **on ice - raising fist in the air.**
   b. Emergency **off ice – use radio** to notify EMS and physicians.
3. Team physicians, paramedics and athletic trainers/therapists will arrive with emergency gear and begin assisting in care management. Emergency Physician will take medical lead of the situation dictating care and transportation.
4. Exit ice through the Zamboni doors.

FROST

Venue Map:



KEY

Home Space
Visitor Space
Officials Space
Medical Rooms
AED
Paramedics
Physicians
Dryland Space
Ambulance
EMS Entrance to Ice
EMS Exit Route

FROST

EMERGENCY PROTOCOLS

CARDIAC ARREST		VASCUAL INJURY	
AT 1	• Assess patient • Activate EAP • Start compressions • Assist with patient lift	AT 1	• Assess patient • Activate EAP • Apply and maintain direct pressure
AT 2	• Cut and remove equipment • In charge of stretcher	AT 2	• Cut and remove appropriate equipment • Apply tourniquet if appropriate • Assist with patient lift
Emergency MD 1	• Assume charge person role and dictate care • Assist with patient lift	Emergency MD 1	• Assume charge person role and dictate care • Step in if direction pressure adjustment needed
Emergency MD 2	• Insert airway and provide ventilations	Emergency MD 2	• Assist with patient lift
Primary Care MD	• Assist with patient lift • Calls League Chief Medical Officer	Primary Care MD	• Assist with patient lift • Calls League Chief Medical Officer
Ortho MD	• Assist with compressions • Assist with patient lift	Ortho MD	• Assist with patient lift
Paramedic 1	• Apply/operate AED • Assist with patient lift	Paramedic 1	• Assist with patient lift
Paramedic 2	• Apply/operate LUCAS device • Assist with patient lift	Paramedic 2	• In charge of stretcher
PWHL Security	• Notify arena security to prepare for additional ambulance arrival and transport	PWHL Security	• Notify arena security to prepare for additional ambulance arrival and transport
Equipment Staff	• Coordinate privacy barrier • Equipment removal from ice	Equipment Staff	• Equipment removal from ice

EMERGENCY PROTOCOLS

SUSPECTED SPINAL INJURY		COMPROMISED AIRWAY	
AT 1	• Assess patient • Activate EAP • Stabilize C-Spine (remains at head throughout) • Coordinates patient lifts/rolls	AT 1	• Assess patient • Activate EAP • Help keep patient calm
AT 2	• Cut and remove equipment • Assist with helmet removal • Assist with patient lift	AT 2	• Cut and remove appropriate equipment as needed
Emergency MD 1	• Assume charge person role and dictate care • Assist with patient lift	Emergency MD 1	• Assume charge person role and dictate care
Emergency MD 2	• Assist with patient lift	Emergency MD 2	• At the direction of EM 1
Primary Care MD	• Assist with patient lift • Calls League Chief Medical Officer	Primary Care MD	• At the direction of EM 1 • Calls League Chief Medical Officer
Ortho MD	• Assist with equipment removal as needed • Assist with patient lift	Ortho MD	• At the direction of EM 1
Paramedic 1	• Apply c-collar and blocks • Assist with patient lift	Paramedic 1	• At the direction of EM 1
Paramedic 2	• In charge of long board and stretcher	Paramedic 2	• In charge of stretcher
PWHL Security	• Notify arena security to prepare for additional ambulance arrival and transport	PWHL Security	• Notify arena security to prepare for additional ambulance arrival and transport
Equipment Staff	• Equipment removal from ice	Equipment Staff	• Equipment removal from ice

NOT ALL MEDICAL TEAMS ARE THE SAME

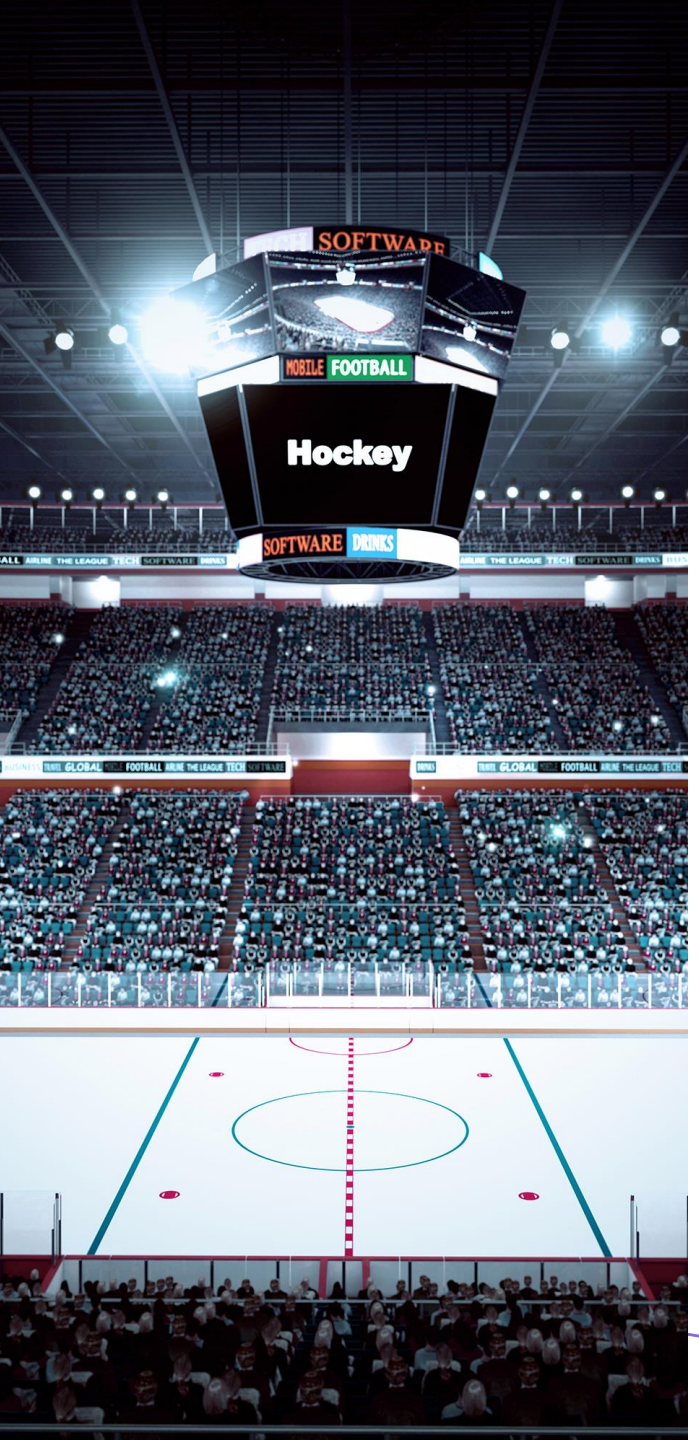
NHL	PWHL	Juniors	High School
• PCSM Physician • Orthopedic Surgeon • Emergency Med. Physician • Dentist • Maxillofacial Surgeon • Ophthalmologist • ENT Physician • Neurologist/Neuropsychologist • Athletic Trainer • Physical Therapist • Chiropractor • Massage Therapist • Sports Dietitian • Sports Psychologist • Mental Performance Coach • Strength and Conditioning Coach • Paramedics/EMT's – 2 crews	• PCSM Physician • Orthopedic Surgeon • Emergency Med. Physician • Sports Neuropsychologist • Athletic Trainer • Physical Therapist • Chiropractor • Massage Therapist • Sports Dietitian • Sports Psychologist • Mental Performance Coach • Strength and Conditioning Coach • Paramedics/EMT's	Athletic Trainer Physician* Paramedics/EMTs*	• Athletic Trainer

TEAM APPROACH TO EMERGENCY CARE – ROLE OF CHIROPRACTORS

- Activating EMS
- Assist with equipment removal
- Emergency equipment retrieval
- Direct EMS to scene
- Assist with patient assessment - vitals, myotomes, dermatomes
- Assist with medical interventions – chest compressions, rescue breathing, using AED
- Assist with lifts and rolls

TEAM APPROACH TO EMERGENCY CARE

- Know Your Role
- Know your comfort level
- Have a plan and practice
- Communication and Discussion
  - Before
  - During
  - After
- Put the patient's well being first and foremost



UNIQUE CHARACTERISTICS OF ICE HOCKEY

- Environmental Factors
  - Enclosed playing surface
  - Rigid boards
  - Access to benches and playing surface
  - Ice
- Equipment & Players
  - Blades – sticks and skates
  - Goalies vs Players
  - Ill fitting equipment

ACCESS & ASSIBILATE

- Where do you position yourself for games?
- Your access point to an injured athlete on ice or bench?
- EMS access to an injured athlete on ice or bench?
- Where is the emergency care equipment?

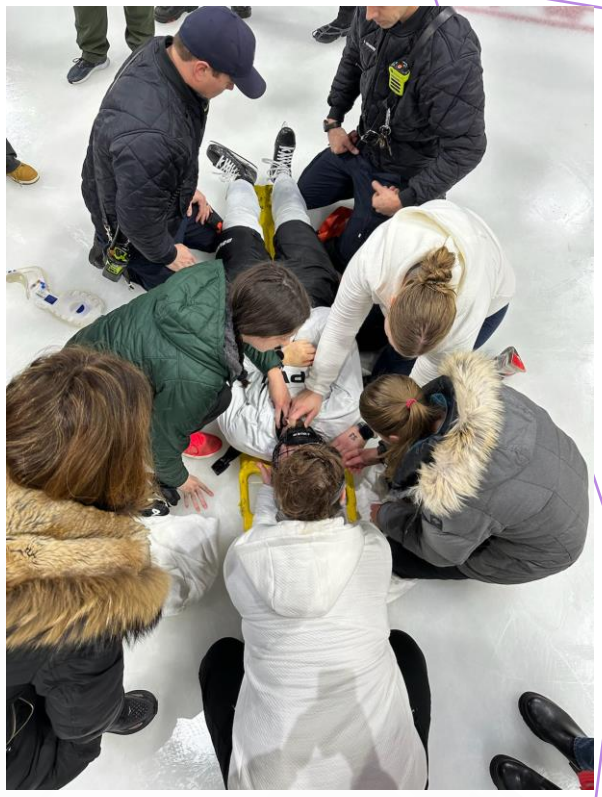
ICE CONSIDERATIONS

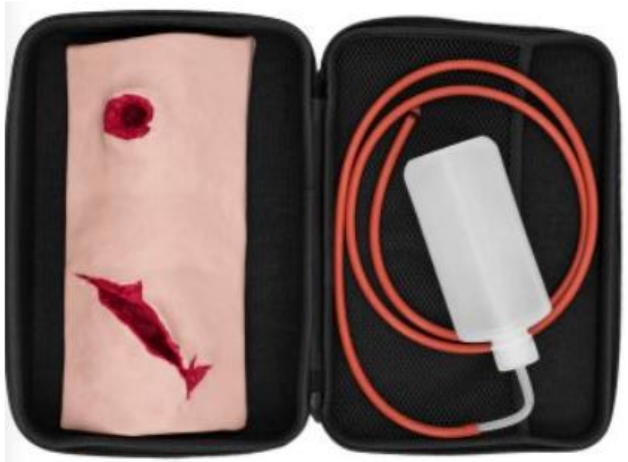
- Fresh ice vs used ice
- Quickest and safest means to get to an injured athlete
  - Utilize officials, players, & boards
  - Consider additional traction footwear
- Ice can melt and refreeze
  - Towels, Towels, Towels & Water Bottles

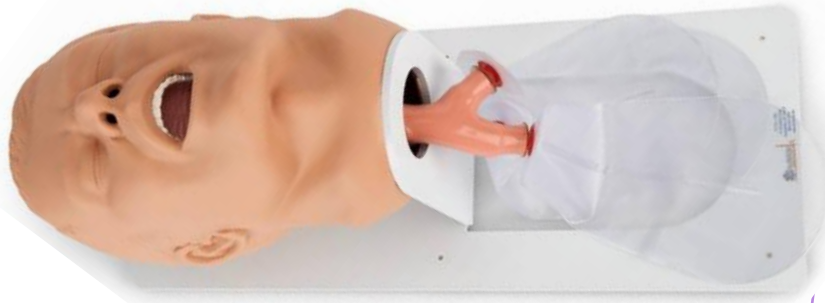
EQUIPMENT REMOVAL

Key
Cut
Velcro/Snap
Screw

PRACTICE! PRACTICE! PRACTICE!







CLINICAL PEARLS

- Collaboration is Key!
- Set Egos Aside
    - We are here for the patient's needs, not our own validation
    - Identify your role, execute your expertise in that role
- Incorporation and Integration in the Medical Space
- Post Game Adjustments
- Always Double Check Supplementation


CHAMPIONS
CHAMPIONS
CHAMPIONS
CHAMPIONS
CHAMPION
MINNESOTA FRIE
20 25

THANK YOU

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