So what is safety?

- condition of being protected against undergoing or causing harm, injury or loss

So what is design?

- a process of developing purposeful and innovative solutions that embody functional and aesthetic demands

And.. what is innovation?

- Something new, original and more effective

Today’s Outline

- Historical perspectives
- Key determinants
- Open source
- Innovation dimensions
- Challenges
- Cheaper Better Safer

EMS Risk and Design needs

- Transport Medicine

Very Important Principle

Ambulance transport safety is part of a SYSTEM, the overall balance of risk involves the safety of all occupants and the public

How does design happen in EMS

- Tradition
- Experience
- Vision
- Interdisciplinary
EMS Safety's frontier -
- the interface of disruptive new tech and operational practice at all levels of the EMS system and across disciplines

Gartners Hype cycle 2017

1980’s Then….

And NOW!…

USA 1980’s Then….

And 2019…

Safety in EMS is MULTIDISCIPLINARY
clinical practice
public health
automotive safety
impact biomechanics
human factors
fleet safety

Ambulance Transport Safety IS Complex AND Multidisciplinary

Joe Bourgraf, President, Ferno Group
- “To create an innovative and model EMS system, we must engage in a collaborative and cross-functional conversation among the many contributing partners in the EMS industry. EMS suppliers should embrace and drive new innovation, to improve the process and efficiency of delivering service, while advancing the level and outcome of emergency care”

Safe Systems Approach

Joe Bourgraf, President, Ferno Group
- “To create an innovative and model EMS system, we must engage in a collaborative and cross-functional conversation among the many contributing partners in the EMS industry. EMS suppliers should embrace and drive new innovation, to improve the process and efficiency of delivering service, while advancing the level and outcome of emergency care”

Vision Zero
A conscious decision to eliminate death and serious injuries

Source: Road Safety Branch, Infrastructure and Regional Development, Department of Infrastructure, Transport, Regional Development and Local Government, Australia.
Safety of the...
- Provider
- Public
- Patient

Safety is a tool to save
- Lives
- Time
- Money
must be evidenced based

Key elements to transport safety
- Impact Biomechanics
- Transport Ergonomics
- Fleet Safety

PREDICTABLE PREVENTABLE and NO ACCIDENT

So ambulance design technical science.... Not really a new issue

If you were to survey for what would enhance safety and efficiency
- Likely “more rest stations”
- Not likely – “the combustion engine”

1864 Ambulance Design Patent re: safety of ambulance design > 150 years ago

EMS Safety timeline
- Didn’t know it was an issue – 60’s-70’s
- Knew it was an issue – but didn’t really know what to do – 80’s-90’s
- Safety technical data rolls out – past 10 years
- Change and adoption challenges – we are here now
Safety Dimensions we know
- Safe systems – CRM / transport system safety
- Risk perception
- Fleet and operations management
- Vehicle design safety
- Scene safety
- Patient Handling
- Health and wellness
- Hours of service

USA Absence of safety performance standards and oversight
- Challenges in identifying best practice
- Myriad of unregulated commercial products
- No system safety performance standards
- Absent national safety oversight

In the USA there are more safety standards for moving cattle than for moving patients
The Laws of Physics Prevail..
Equipment hard to reach
Interior design exposes EMS to unnecessary automotive and ergonomic hazards

Science of Safety Design

The result of the frequency analysis, green dots mark equipment used every time the ambulance is driven, orange is used every day, red every week and so on

Testing the real world

Work Smarter NOT Harder

The old expensive and not versatile and the new... Rapidly and game changing technology and cheaper, better, very versatile.

Learning from our international colleagues www.Rettmobil.com
Some new aspects

- Vehicles – smarter, sleeker, safer – CHEAPER!
- Operations – new technology tools
- Interdisciplinary infrastructure – new global platforms

Ambulance Safety Innovation
Design Module 1.0
www.INDEMO.info
the future concepts you can have right now!!!
Better, safer and cheaper

Configurable!

Integration of new technology
- Fleet management tools
- Vehicle design
- Visibility
- The cloud
- The crowd
- AI
- AR
- VR

Telematics
- How much technology and data and of what type do you need to improve fleet safety performance
Fleet telematics tools

- Drones
- Voice activated commands
- Mixed reality
- Advanced Smart phone technology
- Connected health
- Wireless patient monitoring
- Health Information Exchange (HIE) Applications

Next is now!

Fleet Mix?

The Motorcycle Medics

Virtual Reality First Aid/EMS

- Real First Aid VR and VR training options
- Virtual Reality CPR training
- Virtual Reality Defibrillator training
- Virtual Reality MCI training
- Virtual Reality First Aid training

Virtual Reality Patients - EMS

VR – CPR training

http://dualgoodhealth.com/info/
VR EMS violence training

- Ambulance Vic.
  - Feb 2017, Virtual Reality training for all Ambulance Victoria paramedics to better protect them from violence as they respond to medical emergencies.
  - Ambulance Victoria is using Virtual Reality to help paramedics manage violence and aggression in the workplace.
  - www.globalfrontline.com.au
  - https://www.youtube.com/watch?v=QhyELtFjtvE

VR MCI - RealResponse.com.au

Performance score card

Virtual Reality
A new design tool
Exploring the inside of a virtual ambulance

AI and EMS Dispatch

AI and Dispatch
AI that detects cardiac arrests during emergency calls will be tested across Europe this summer.
AI EMS Dubai 10X

Wearable tech..

http://www.visimobile.com/visi-product-info/

CAD - Crowd and the Cloud

Integrated crowd sourcing

Unmanned Ambulance drones

Manned Drones

? The ambulance of the future

First passenger drone makes its debut at CES

- Clean-air propulsion
- Live streaming
- Conducts medical examinations
- Can reach remote areas
Very Important Principle

Ambulance transport safety is part of a SYSTEM, the overall balance of risk involves the safety of all occupants and the public.

Things can go wrong – but when there are sound safety policies and technologies in place, and the system is well prepared, you can minimize harm.

Technical Collaboration is key

- We are NOT the experts in this science
- We cannot afford to play the silo game here, it is costing lives, time and money
- We MUST have a meaningful evidenced based approach to design, operations and policy
- We must be outcomes driven

Conclusion

- Major advances in EMS safety research, New technologies, infrastructure and practice over the past 5 years
- Safety must be inherent to operational process design
- An understanding of the complex interplay between patient, provider and public safety from a systems perspective is key to addressing effective and safe operational EMS performance
- Engagement of appropriate interdisciplinary expertise in systems design, transport safety human factors and safety analysis is essential
- Development of substantive EMS safety standards is a necessity and a reality
- EMS is still way behind the state of the art in vehicle safety and occupant protection

Your electronic handout/resource link with all text slides

Or if you are > 45 years

www.objectivesafety.net/PDFHO.htm