Firefighter down cardiac arrest drill (FDCAD) **- a new approach**

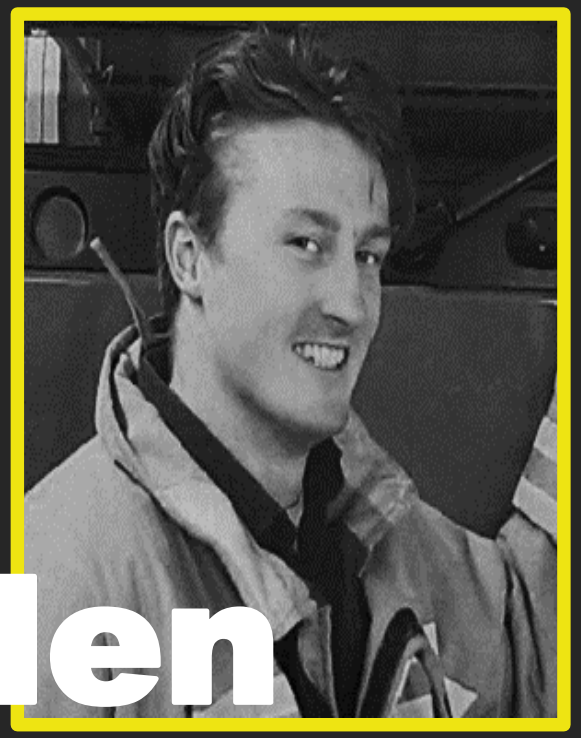
Glen Beasley

Quote Chicago fire dept.

“Our department makes 1,120 calls every day. Do you know how many of those calls the public expects perfection on? 1,120. Nobody calls the fire department and says, ‘send me two dumb-ass firemen in a pick up truck’. In three minutes they want five brain-surgeon decathlon champions to come out and solve all their problems.”

Chief John Eversole

Hello and thankyou for coming, and thankyou for the time and energy you have put in to respective rolls protecting the community within emergency response and management.



Glen Beasley

who

- Firefighter
- Paramedic
- Aspiring researcher

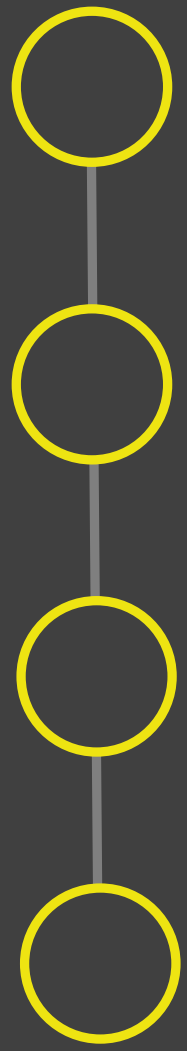
what

A small Proof of concept study in methods of Firefighters CPR.

Acknowledgment: Leland Fire Dept. NC, USA Fire-fighters Christopher Watford, Michael Herbert, Fire and Rescue NSW. Region west 2 management and fire fighters.

agenda

What is a fire-fighters cardiovascular risk profile, and if the worst happens how can we give our brother and sister fire-fighters the very best chance of survival?



Risk

Cardiovascular risk associated with firefighting activities.

CPR & Fire-Fighter's

What is good CPR, and why is difficult to deliver to down fire-fighter's

What we looked at

- How was the study comprised?
- What were our assessable measures?

Result's

- What have we found?
- What does it mean?

9

Firefighter cardiovascular risk.

65% of on-duty deaths are attributed to heart attacks

Environmental risks

- Dark, loud environments
- Faster and hotter burning of construction & furnishing materials
- Faster structural collapse times
- Increased production of toxic gases
- Particulate matter
- Shift work

Physiological changes

- Electrolyte imbalances
- Haemolytic changes
- Increased histamine response
- Hypoxic changes
- Catecholamine dump
- Changing demographic
- Ranging levels of fitness

02

CPR & **Firefighter**

What is good CPR, and why is this a problem for fire-fighters.

Chain of survival

Call for Help

The faster you call the quicker the advanced care will arrive.

Early CPR

- Hand placement
- Rate 100-120
- Depth 1/3
- Rebound
- Minimal hands off chest time

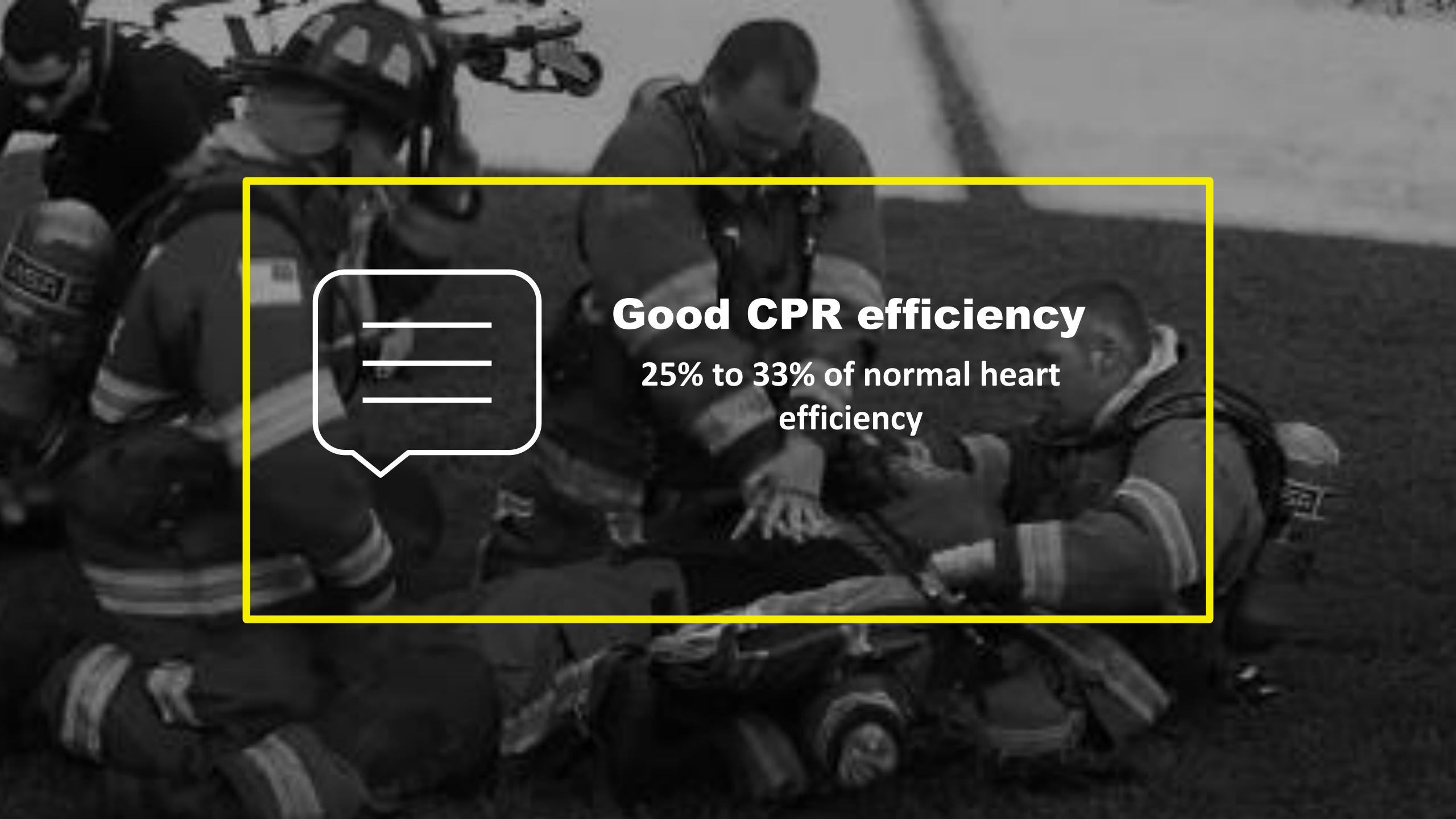
Early defibrillation

Early / as needed.

Early advanced care

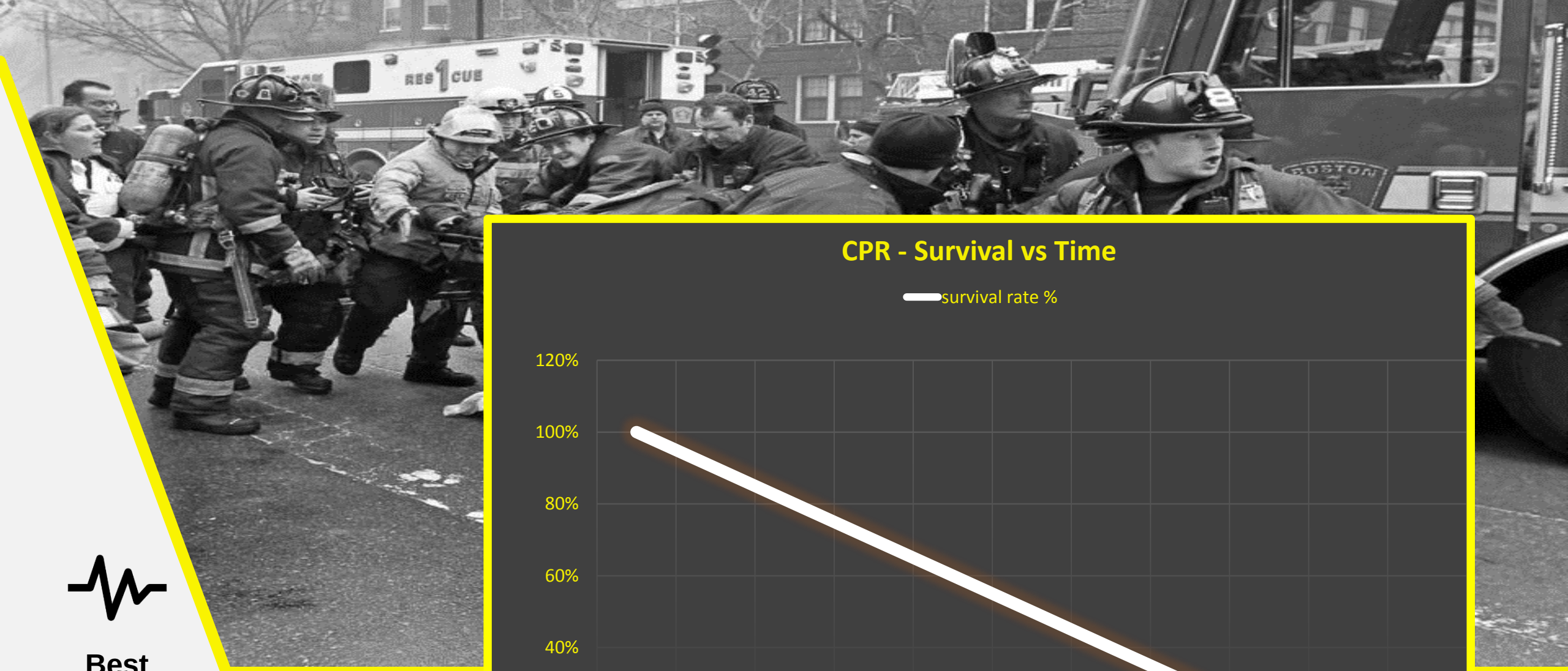
- Advanced intervention
- Transport to hospital

Basic live support saves life’s



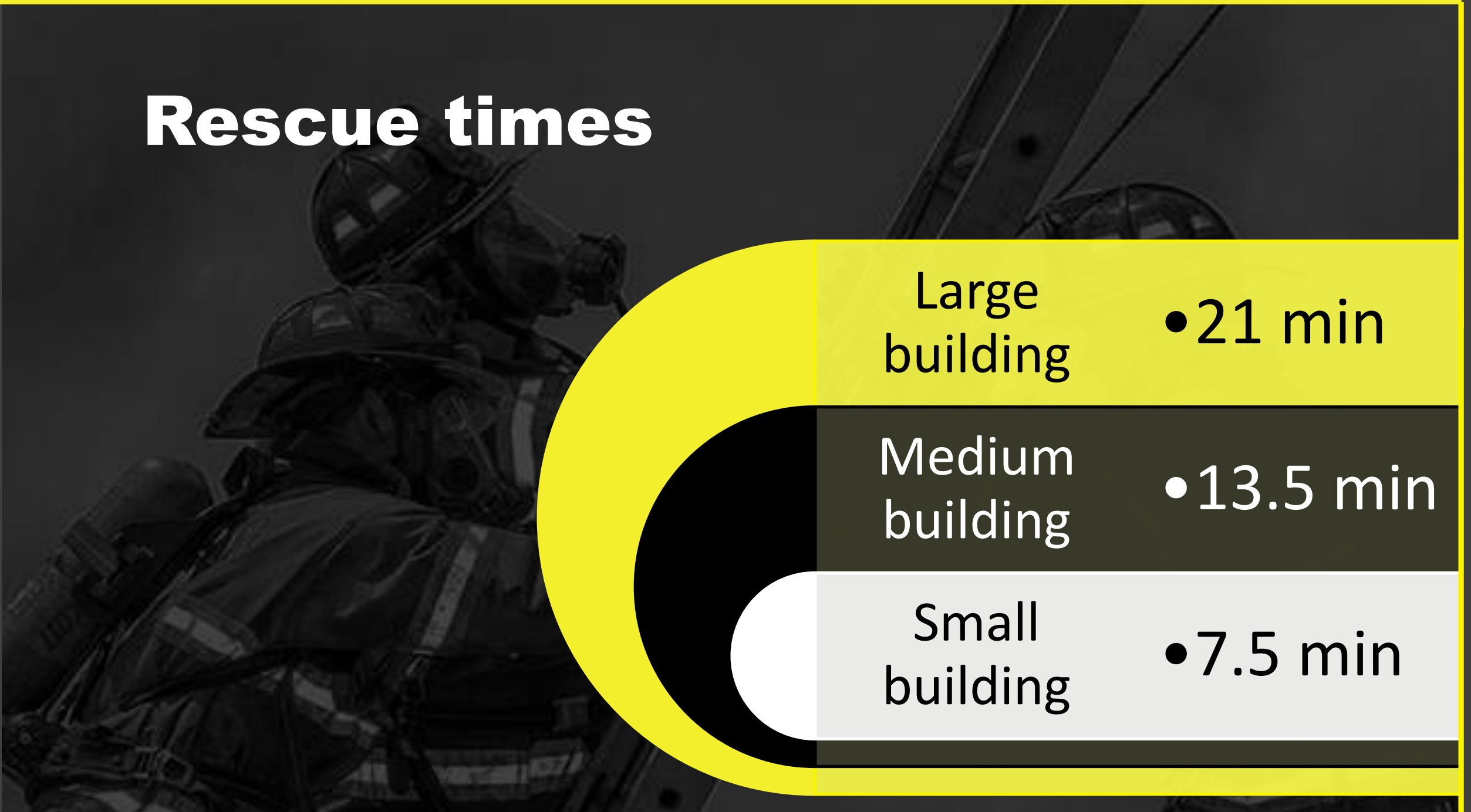
Good CPR efficiency

25% to 33% of normal heart efficiency



Best survival percentage for fire-fighters is 25%

Rescue times



Large building	•21 min
Medium building	•13.5 min
Small building	•7.5 min

Challenge of fire-fighter resuscitation

Extended rescue time

Time to rescue firefighter often exceeds survival scale times.

Limited resources

Regional fire stations often don’t have the resources to conduct rescue & resuscitation.

Turnout gear / SCBA

Disrobing a fire-fighter traditional takes between 1.40 - 5.00 min.

Resuscitation confidence

Fire-fighters basic life support confidence is often low compared to other fire-fighting skills.

03

Focus of **Study**

How was the study set out, and what measures where assessed.

Mission & vision

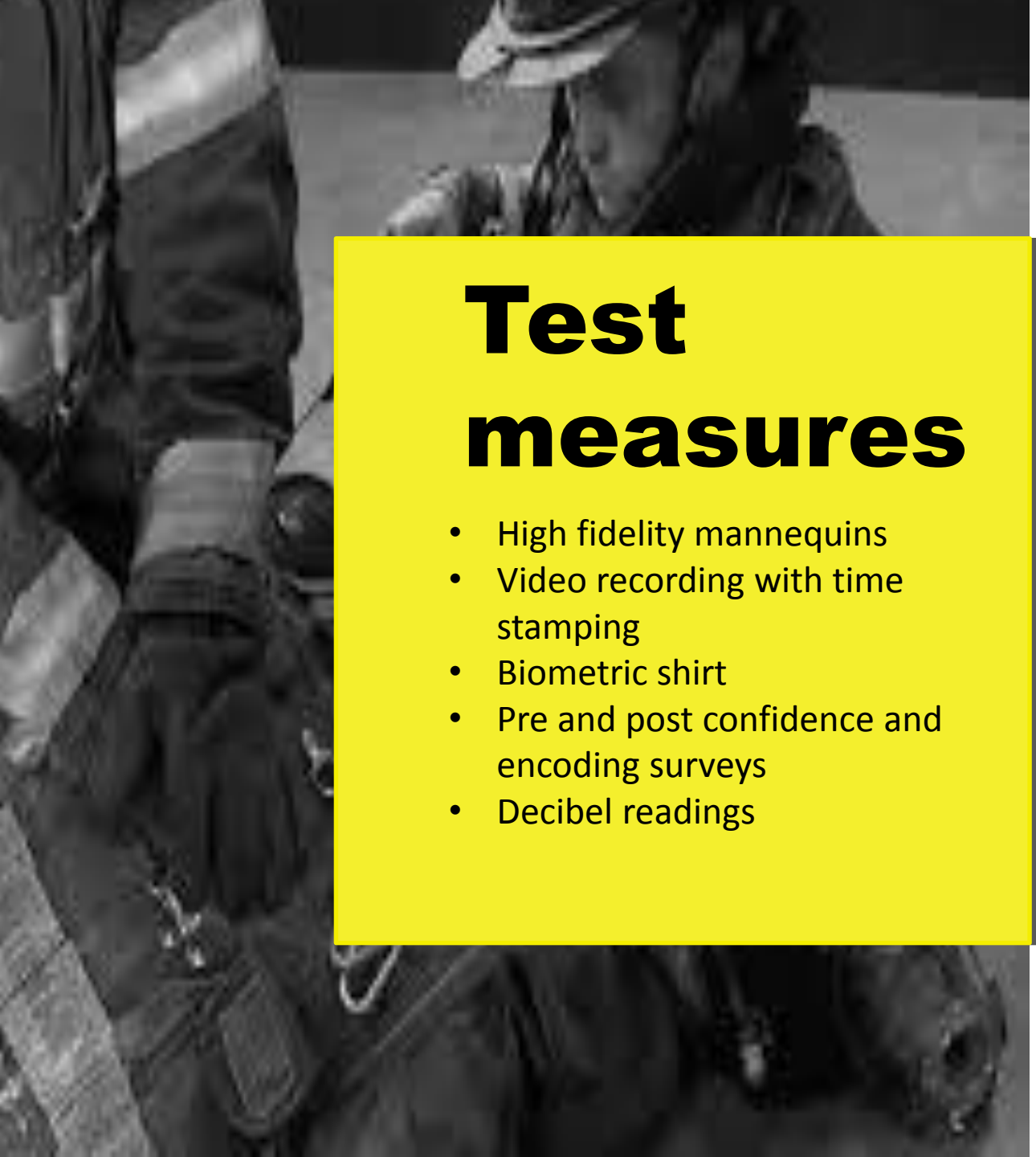
To identify the most efficient CPR drill for a down fire-fighter in a given comparison group to improve survival.

How

By measuring physiological data, time and survey data of a quantitive nature.

Study limitations

- Small sample size
- Unable to holistically replicate fire ground environment.



Test measures

- High fidelity mannequins
- Video recording with time stamping
- Biometric shirt
- Pre and post confidence and encoding surveys
- Decibel readings

Time video stamping

- Time to first compression
- Time to AED placement
- Time to gear removal
- Time to first ventilation

Manikin data

- Compression score
- Ventilation score
- Hand placement
- Ventilation volume
- Hands off chest time
- Depth/rebound
- Total CPR score

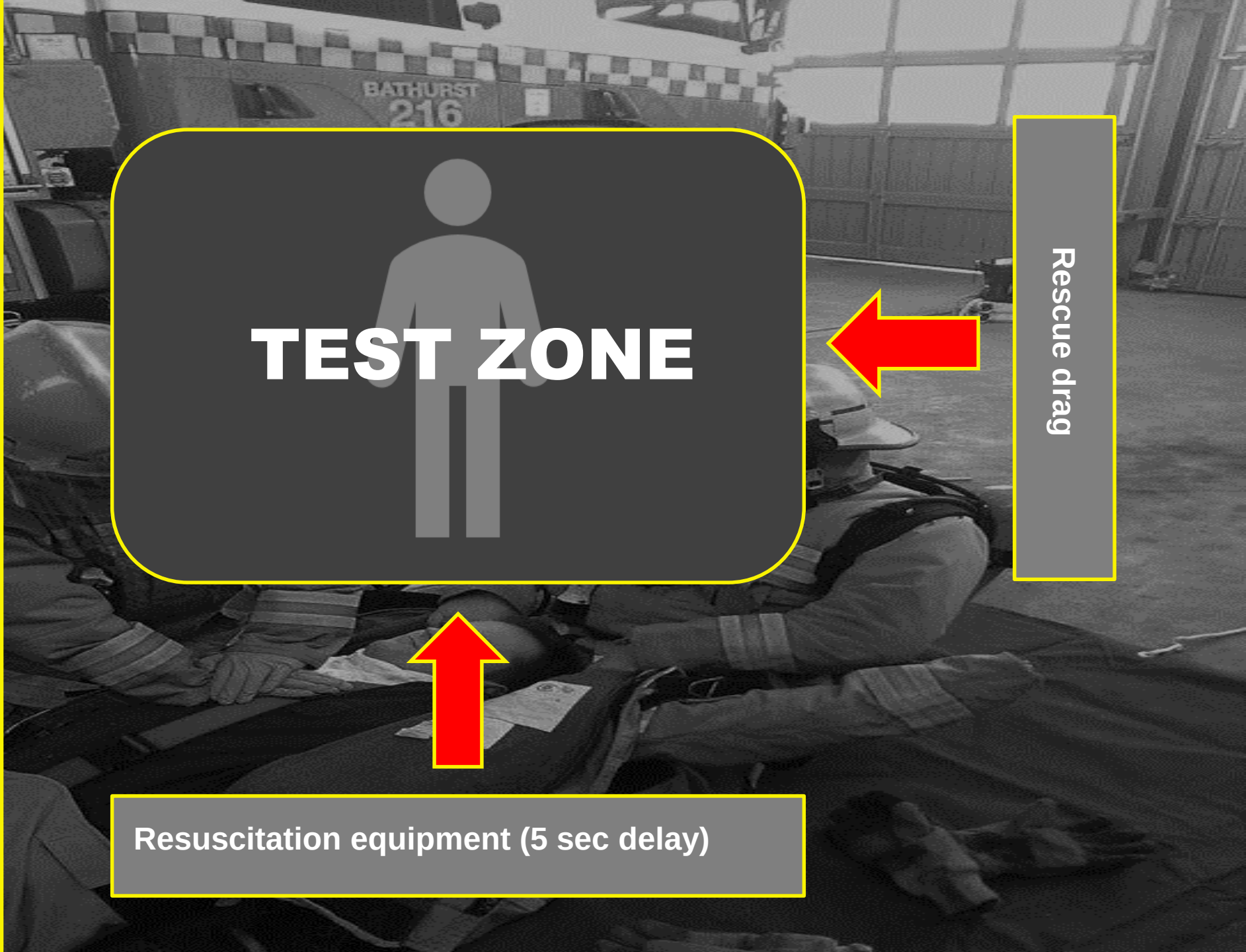
Survey data

- Confidence
- Encoding

Other

- Decibel readings
- Bio-metric shirt

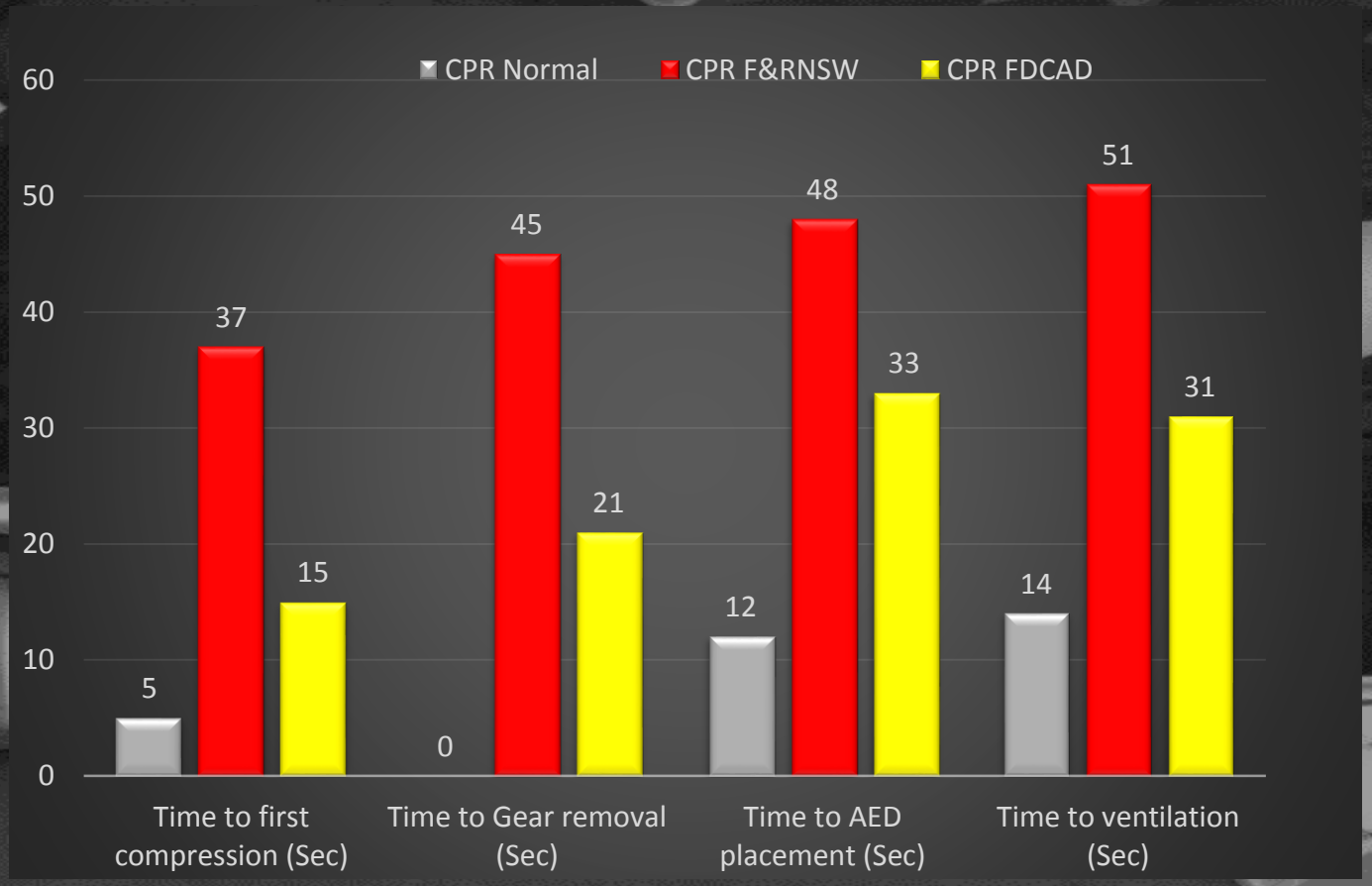
- **Normal arrest drill**
- **Fire & Rescue arrest drill**
- **FDCAD arrest drill**



//04 Results

dB reading

	No breathing apparatus		Breathing apparatus	
Restricted respirations	25dB	whisper	36dB	liberally quiet
At rest respirations	30dB quiet	liberally	66dB	conversation
Exerted respirations	47dB quiet	liberally	80dB	loud music
Baseline reading no respirations	25dB	whisper	25dB	whisper



Time dependent data

59% decrease in time taken to start CPR

Quality of CPR tested

- **100% hand placement**
- Compression depth over 5cm
- **Compression rate over 100per/ min**
- 34-68% chest rebound

Manikin data

CPR score

- **(Normal) 74 %**
- (F&R standard) 34 %
- **(FDCAD) 49%**

Compression score

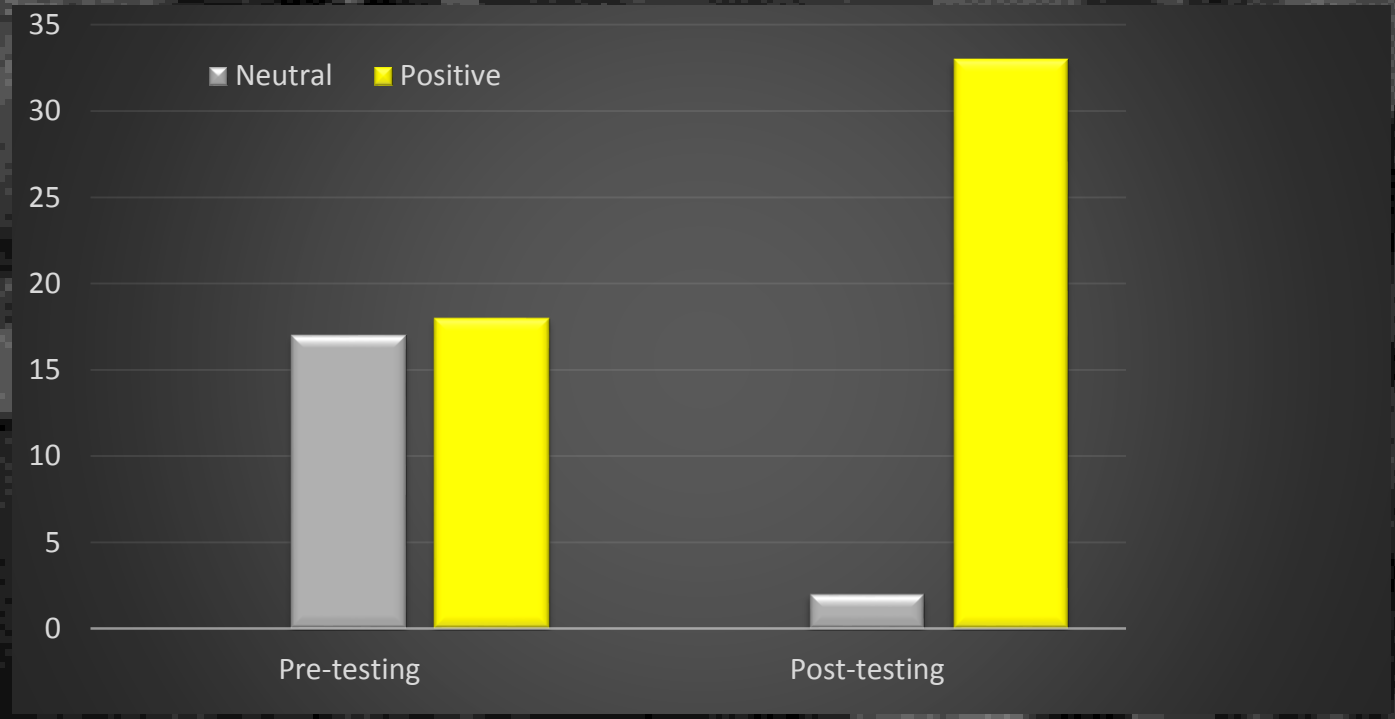
- **(Normal) 67%**
- (F&R standard) 93%
- **(FDCAD) 85%**

Ventilation score

- **(Normal) 93%**
- (F&R standard) 93%
- **(FDCAD) 0%**

confidence and encoding

42% positive increase



We must continue our creative & innovative traditions, by merging our operational and academic abilities. This well allow us find the best possible practices.

Thankyou.

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