

High Performance CPR: Combining Technical and Non- technical Skills



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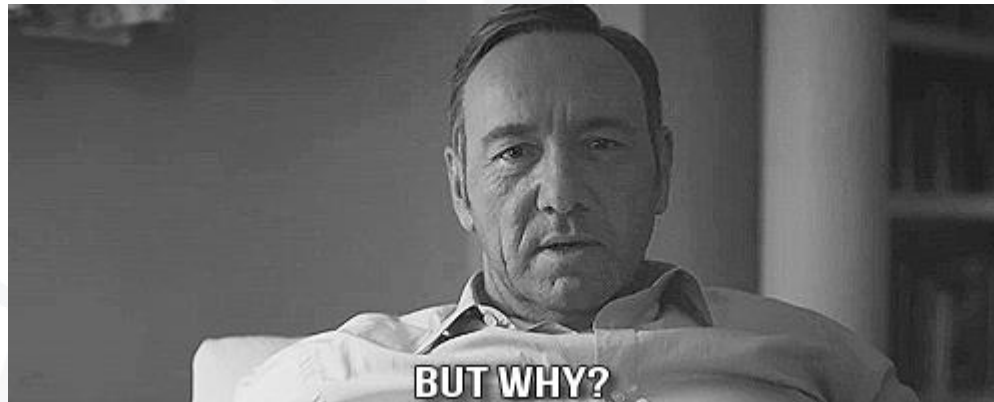
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MACN MACM MRAeS

Out Of Hospital Cardiac Arrest (OOHCA)

- 15,000 OOHCA every year in Australia.
- What do you think the survivability rate is (%)?
- 6% to 13% of cardiac arrest victims survive more than one year past the event
- Compared to over 50% of out-of-hospital cardiac arrest victims in the US city of Seattle



OOHCA In Your Cabin – Survival Rates?

What about the survivability of your PAX?

The rate of survival after cardiac arrest on a commercial airliner ranges from 14 to 55%, with the higher rates among patients with shockable rhythms (Peterson et al 2013 and Alves et al 2016).

In 42.1% of cases of cardiac arrest the flight was not diverted (Peterson 2013).

Category	All Emergencies	Aircraft Diversion	Transport to a Hospital [±]	Hospital Admission [±]	Deaths
					<i>no./total no. (%)</i>
All categories	11,920/11,920 (100)	875/11,920 (7.3)	2804/10,877 (25.8)	901/10,482 (8.6)	36
Syncopal or presyncopal	4463/11,920 (37.4)	221/4463 (5.0)	938/4252 (22.1)	267/4123 (6.5)	4
Respiratory symptoms	1447/11,920 (12.1)	81/1447 (5.6)	311/1371 (22.7)	141/1336 (10.6)	1
Nausea or vomiting	1137/11,920 (9.5)	56/1137 (4.9)	243/1025 (23.7)	61/994 (6.1)	0
Cardiac symptoms	920/11,920 (7.7)	169/920 (18.4)	370/813 (45.5)	162/770 (21.0)	0
Seizures	689/11,920 (5.8)	83/689 (12.0)	224/626 (35.8)	75/602 (12.5)	0
Abdominal pain	488/11,920 (4.1)	50/488 (10.2)	164/412 (39.8)	41/391 (10.5)	0
Infectious disease	330/11,920 (2.8)	6/330 (1.8)	45/239 (18.8)	8/232 (3.4)	0
Agitation or psychiatric symptoms	287/11,920 (2.4)	16/287 (5.6)	38/249 (15.3)	17/244 (7.0)	0
Allergic reaction	265/11,920 (2.2)	12/265 (4.5)	40/233 (17.2)	8/229 (3.5)	0
Possible stroke	238/11,920 (2.0)	39/238 (16.4)	92/214 (43.0)	46/196 (23.5)	0
Trauma, not otherwise specified	216/11,920 (1.8)	14/216 (6.5)	34/185 (18.4)	5/180 (2.8)	0
Diabetic complication	193/11,920 (1.6)	15/193 (7.8)	45/181 (24.9)	13/172 (7.6)	0
Headache	123/11,920 (1.0)	10/123 (8.1)	23/108 (21.3)	4/107 (3.7)	0
Arm or leg pain or injury	114/11,920 (1.0)	6/114 (5.3)	27/100 (27.0)	4/98 (4.1)	0
Obstetrical or gynecologic symptoms	61/11,920 (0.5)	11/61 (18.0)	29/53 (54.7)	11/47 (23.4)	0
Ear pain	49/11,920 (0.4)	1/49 (2.0)	2/43 (4.7)	1/43 (2.3)	0
Cardiac arrest	38/11,920 (0.3)	22/38 (57.9)	14/34 (41.2)	1/6 (16.7)	31
Laceration	33/11,920 (0.3)	1/33 (3.0)	3/26 (11.5)	0/25	0
Other	821/11,920 (6.9)	62/821 (7.6)	162/705 (23.0)	36/679 (5.3)	0
Unknown	8/11,920 (0.1)	0/8	0/8	0/8	0

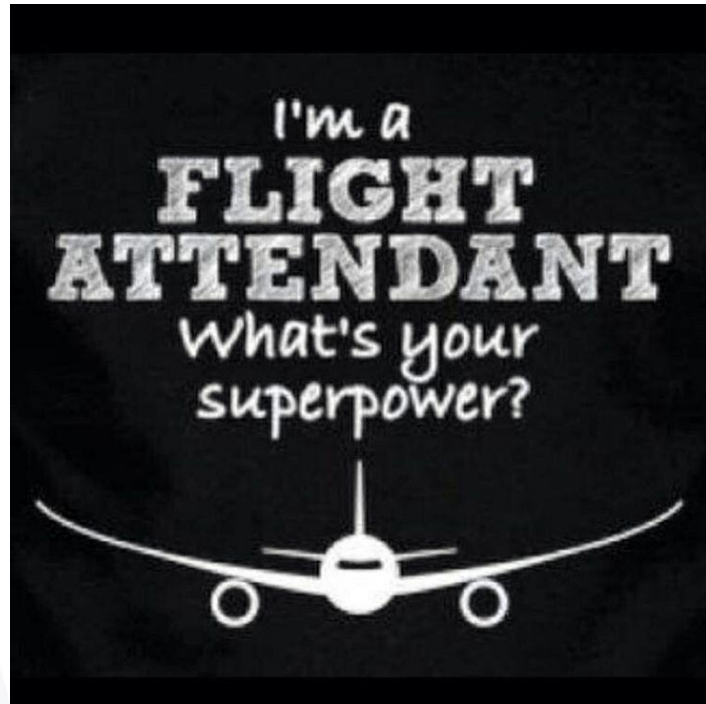
Definition of survivability

What does it mean to you?

What does it mean in the academic literature?



So what does this have to do with NTS?



* Other than the fact that in flight cardiac arrests on commercial flights have double to quadruple success rate to other OOHCA? WELL DONE.

Applying NTS Elements to Resus

Pick out the good, bad and ugly NTS in this resus (Not Too Graphic!)

Decision Making?

Situational Awareness?

Leadership and Teamwork?

Communication?

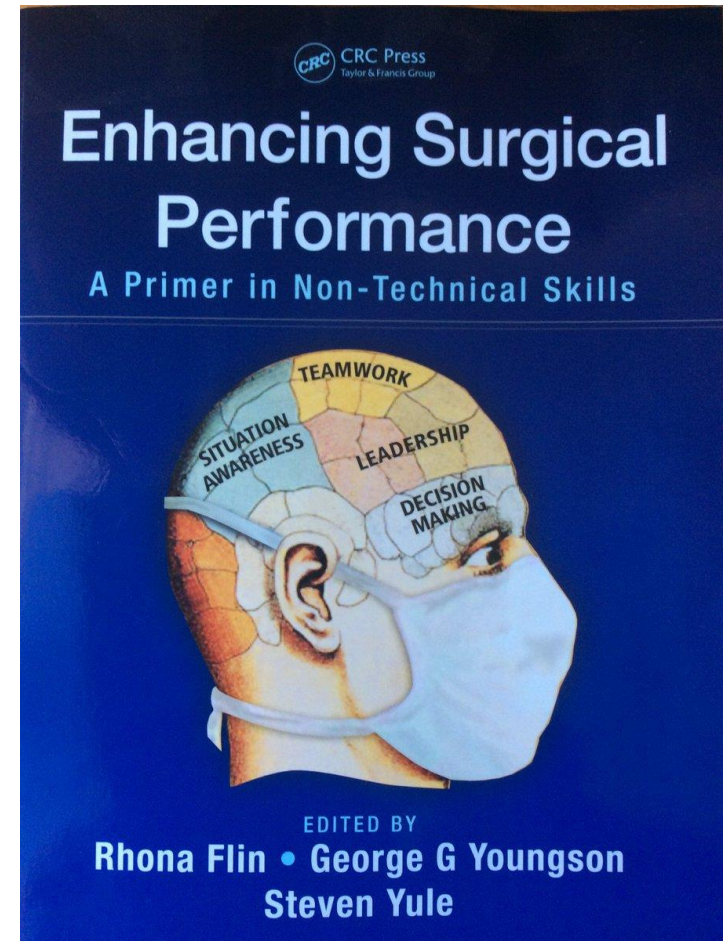
Conflict Resolution?

Fatigue Management ?

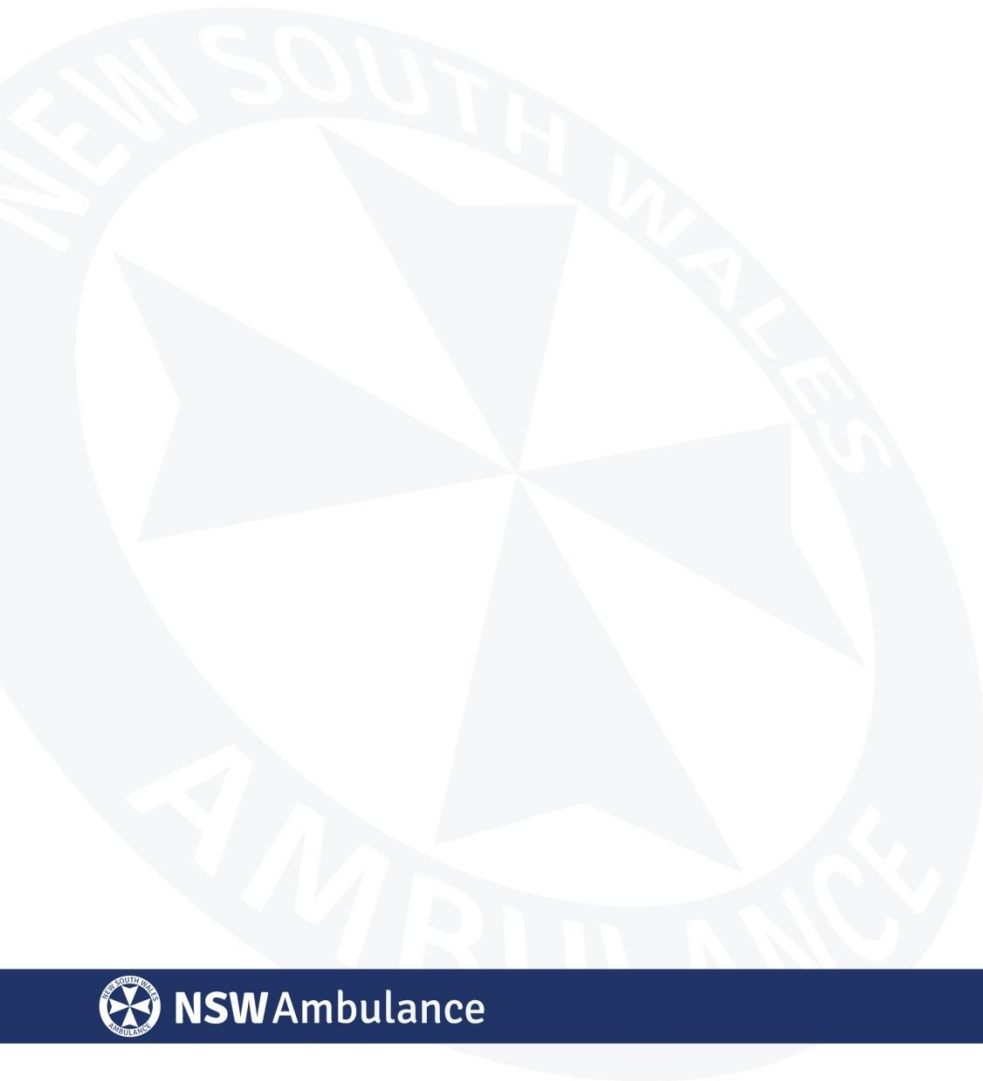
Stress and Workload Management?

Culture ?

Threat and Error Management ?



CPR by Experts – What could possibly go wrong?



Which Elements Applied to ER

Decision Making?

Situational Awareness?

Leadership and Teamwork?

Communication?

Conflict Resolution?

Fatigue Management ?

Stress and Workload Management?

Culture ?

Threat and Error Management ?



Things Could Be Done Better



NSW Ambulance



The Solution: High Performance CPR



RESUSCITATION ACADEMY

A foundation committed to improving cardiac arrest survival rates

1. One team member 'owns' CPR (TW/L, SA, TEM COM)
2. Minimize interruptions in CPR *at all times* (DM)
3. Ensure proper depth of compression (at least 2 inches)
4. Ensure full recoil/decompression
5. Ensure proper chest compression rate (100-120 per minute)
6. Rotate compressors every two minutes (FAT, TW/L, COM, WL)
7. Hover hands over chest during shock and be ready to compress (SA DM)
8. Intubation or advanced airway with ongoing CPR (DM WL)
9. Place IV/IO with ongoing CPR (DM WL)
10. Coordination and teamwork between roles (DM SA, TW/L, COM, CON, FAT, WL, CUL, TEM)
11. Develop a skilled public, cardiac arrest register and coordinated system (CUL)

This is why Seattle has a 50% or greater Success Rate



NSW Ambulance



OOHCA – In My Cabin – HPCPR

Cardiac Arrest on an aeromedical aircraft is an 'In Hospital Cardiac Arrest'

Solo clinicians

2014 several 'unexpected' cardiac arrests

Changed policy based on research to focus on two things:

- **Early defibrillation**
- **Effective continuous compressions**
Combined with
- **Logistical Sequence focused on NTS**
- Communication, workload management, teamwork and evidence based technical practice
- Change supported by facilitated learning and extensive simulation - staff had to 'unlearn' years of experience



HPCPR Applications to Cabin Crew?

This will vary from operator to operator based on crew mix ie Q200 v A380

- Who leads the cardiac arrest in the cabin? CSM/FA?
- Do you have allocated team roles – i.e. one for compressions and one for defib?
- Do you change compressors every two minutes?
- Who do you communicate and coordinate with?
- Who makes the decisions?
- Maintaining SA
- Let Us Do



**I HEAR AND I FORGET.
I SEE AND I REMEMBER.
I DO AND I UNDERSTAND.**

— CONFUCIUS

Simulation Scenario And the future



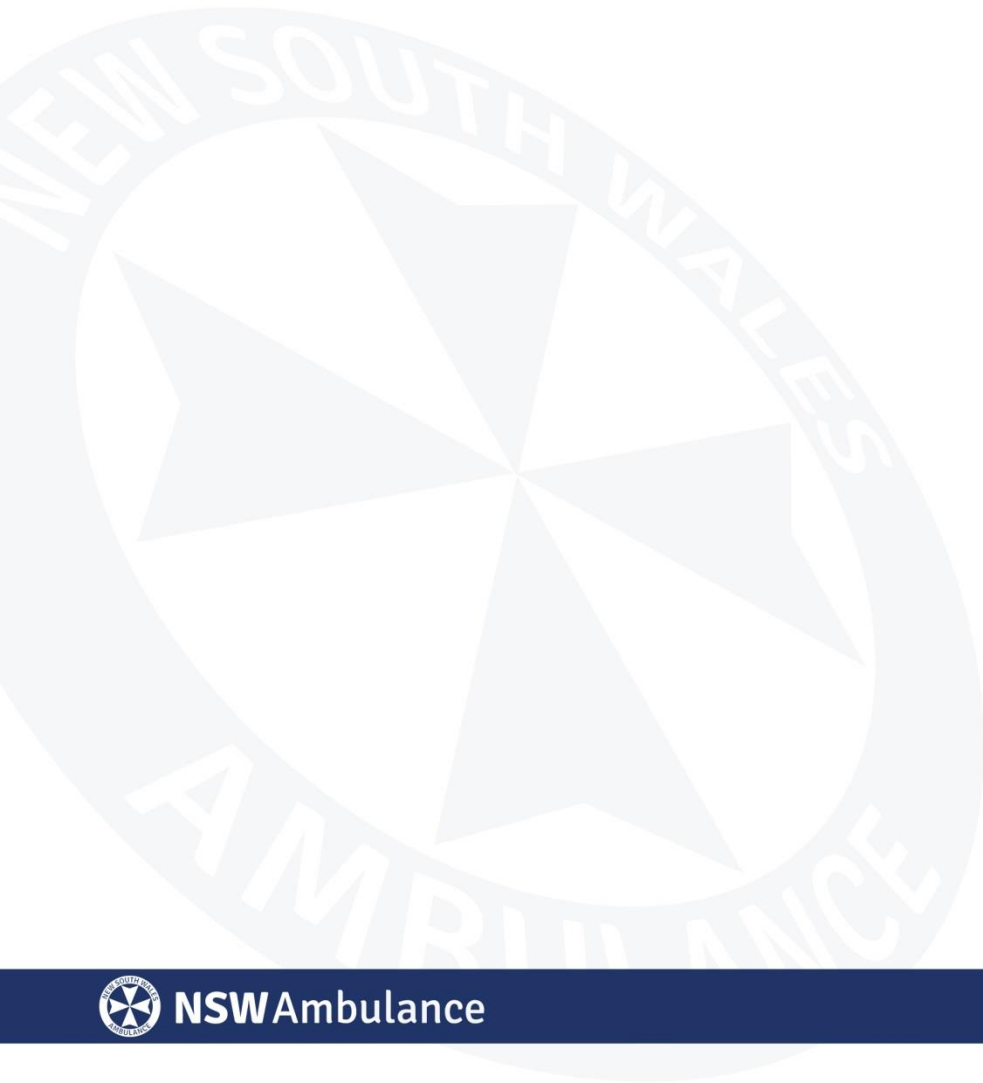
Automation in Cardiac Compressions?



Disclaimer: I have no affiliation with either product



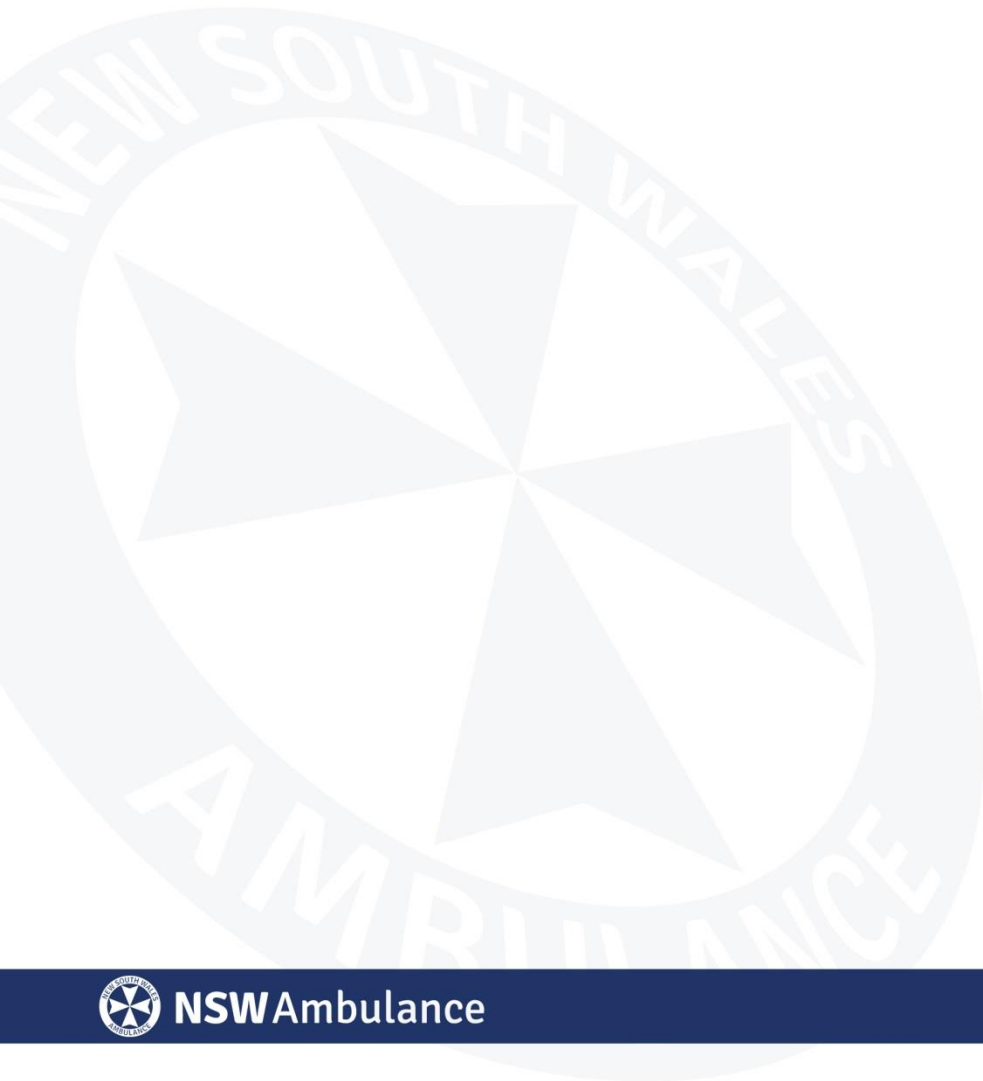
LUCAS IN ACTION – NSW AMBULANCE



NSW Ambulance



The Future = Automation + HPCPR?



Questions?

Technical Crew/Cabin Crew Communication 101



References

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