

**Ambulance
Victoria**



MONASH University

Importance of Pre-Hospital Blood Pressure post ROSC on survival to hospital discharge

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On behalf of the VACAR Steering Committee.**

Ambulance Victoria and Monash University

Background

- Survival to hospital discharge from Out-of-Hospital Cardiac Arrest (OHCA) = 11%
- Most OHCA research is on improving chances of achieving ROSC
- Treatment recommendations post ROSC are based on “goal-directed therapy for haemodynamic optimisation”
- A few studies have examined the role of vital signs (particularly blood pressure) post ROSC and outcome in cardiac arrest but these studies are difficult to compare and generalise to the prehospital setting

Background

Continuing Medical Education Article

Significance of arterial hypotension after resuscitation from cardiac arrest*

Stephen Trzeciak, MD, MPH; Alan E. Jones, MD; J. Hope Kilgannon, MD; Barry Milcarek, PhD; Krystal Hunter, MBA; Nathan I. Shapiro, MD, MPH; Steven M. Hollenberg, MD; R. Phillip Dellinger, MD; Joseph E. Parrillo, MD

LEARNING OBJECTIVES

After participating in this educational activity, the participant should be better able to:

1. Define post-resuscitation hypotension.
2. Explain impact of post-return of spontaneous circulation hypotension on prognosis.
3. Use this information in a clinical setting.

Dr. Trzeciak has disclosed that he was the recipient of research funds/grants from Novo Nordisk. Dr. Kilgannon has disclosed that she is the recipient of a research fund/grant from the American College of Emergency Physicians Career Development. Dr. Shapiro has disclosed that he was the recipient of research funds/grants from Eli Lilly, Hutchinson Technologies, Istat, and Biosite; is the recipient of research funds/grants from Eli Lilly and Hutchinson Technologies; and was on the speaker's bureau for Biosite and Hutchinson. Dr. Parrillo has disclosed that he was the recipient of research funds/grants from the Robert Wood Johnson Foundation and Salem Health Wellness Foundation; is a consultant/advisor for Artisan; and is a stock shareholder for DeepBreeze. The remaining authors have disclosed that they have no financial relationships with or interests in any commercial companies pertaining to this educational activity.

All faculty and staff in a position to control the content of this CME activity have disclosed that they have no financial relationship with, or financial interests in, any commercial companies pertaining to this educational activity.

Lippincott CME Institute, Inc., has identified and resolved all faculty conflicts of interest regarding this educational activity.

Visit the *Critical Care Medicine* Web site (www.ccmjournal.org) for information on obtaining continuing medical education credit.

Objective: Expert guidelines advocate hemodynamic optimization after return of spontaneous circulation (ROSC) from cardiac arrest despite a lack of empirical data on prevalence of post-ROSC hemodynamic abnormalities and their relationship with outcome. Our objective was to determine whether post-ROSC arterial hypotension predicts outcome among postcardiac arrest patients who survive to intensive care unit admission.

Design: Cohort study utilizing the Project IMPACT database (intensive care unit admissions from 120 U.S. hospitals) from 2001–2005.

Setting: One hundred twenty intensive care units.

Patients: Inclusion criteria were: 1) age ≥ 18 yrs; 2) nontrauma; and 3) received cardiopulmonary resuscitation before intensive care unit arrival.

Interventions: None.

Measurements and Main Results: Subjects were divided into two groups: 1) Hypotension Present—one or more documented systolic blood pressure < 90 mm Hg within 1 hr of intensive care unit arrival; or 2) Hypotension Absent—all systolic blood pressure

≥ 90 mm Hg. The primary outcome was in-hospital mortality. The secondary outcome was functional status at hospital discharge among survivors. A total of 8736 subjects met the inclusion criteria. Overall mortality was 50%. Post-ROSC hypotension was present in 47% and was associated with significantly higher rates of mortality (65% vs. 37%) and diminished discharge functional status among survivors (49% vs. 38%), $p < .001$ for both. On multivariable analysis, post-ROSC hypotension had an odds ratio for death of 2.7 (95% confidence interval, 2.5–3.0).

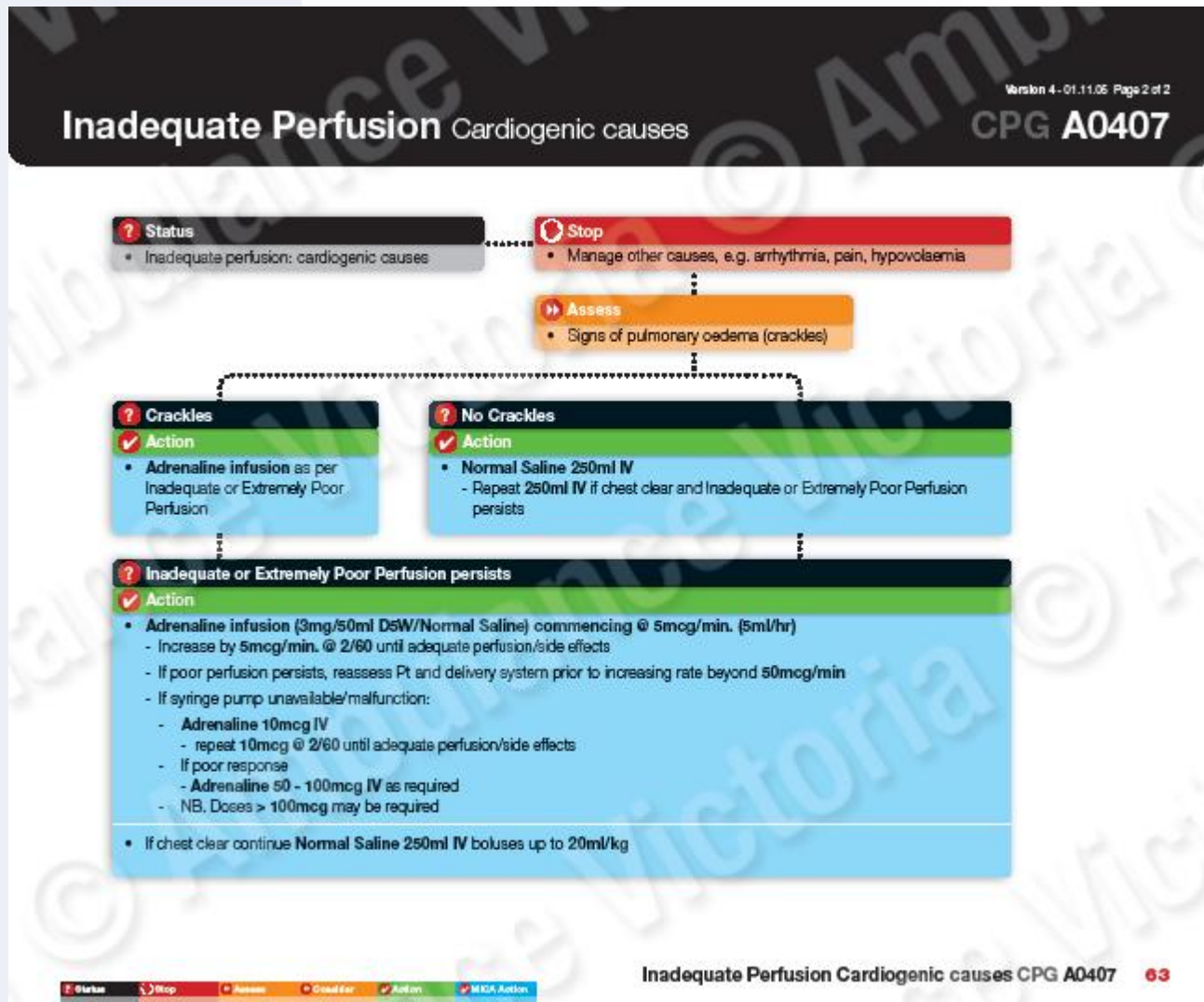
Conclusions: Half of postcardiac arrest patients who survive to intensive care unit admission die in the hospital. Post-ROSC hypotension is common, is a predictor of in-hospital death, and is associated with diminished functional status among survivors. These associations indicate that arterial hypotension after ROSC may represent a potentially treatable target to improve outcomes from cardiac arrest. (*Crit Care Med* 2009; 37:2895–2903)

Key Words: heart arrest; cardiopulmonary resuscitation; resuscitation; shock; hemodynamics

ROSC management in Ambulance Victoria

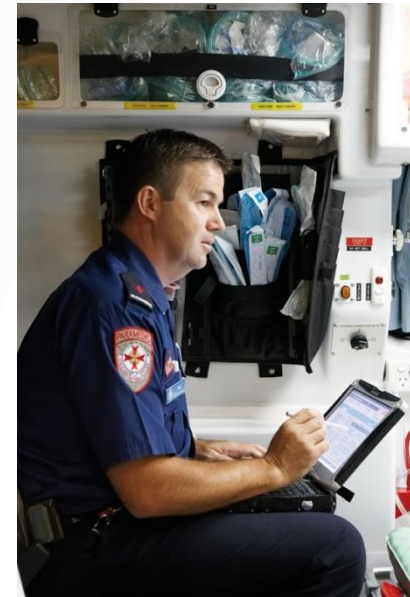


ROSC management in Ambulance Victoria



Setting

- Melbourne (Australia)
 - Population 4 million
- Emergency Medical System (EMS)
 - ESTA: Emergency calls AMPDS (updated to Version 11.3 17/8/07)
 - Ambulance Victoria (AV): two-tiered ambulance service (ALS & intensive care) use VACIS (electronic patient record)
- The Victorian Ambulance Cardiac Arrest Registry (VACAR)
 - AV commenced in 1999
 - Utstein elements



Methods

- VACAR searched:
 - 1) EMS resuscitated OHCA 2007 to 2009;
 - 2) ≥ 16 years;
 - 3) presumed cardiac aetiology;
 - 4) Achieved a prehospital ROSC of >30 secs;
 - 5) ePCR and
 - 6) unwitnessed by Emergency Medical Services (EMS).
- Outcomes
 - Primary outcome was survival to hospital discharge

Results: Baseline Characteristics

Out-of-hospital Cardiac Arrest who achieved >30 seconds of ROSC 2007 - 2009

N=1111

Bystander Witnessed = 75%

Median Age= 69yrs (17 – 98)

Female = 30%

Average EMS response time = 8.4 mins

VF/VT = 58%

Asystole = 21%

PEA = 21%

Results: Baseline Characteristics

Out-of-hospital Cardiac Arrest who achieved >30 seconds of ROSC 2007 - 2009

Survival to discharge information N=1046

Survived to Discharge

Age = 60 yrs

Female = 24%

Witnessed = 83%

EMS response= 7.9 mins

VF/VT = 83%

Mean syst BP= 128mmHg

Died prior to Discharge

Age = 70 yrs

Female = 34%

Witnessed = 70%

EMS response= 8.8 mins

VF/VT = 44%

Mean syst BP= 118mmHg

Results

- Logistic Regression using known prehospital predictors of cardiac arrest survival.

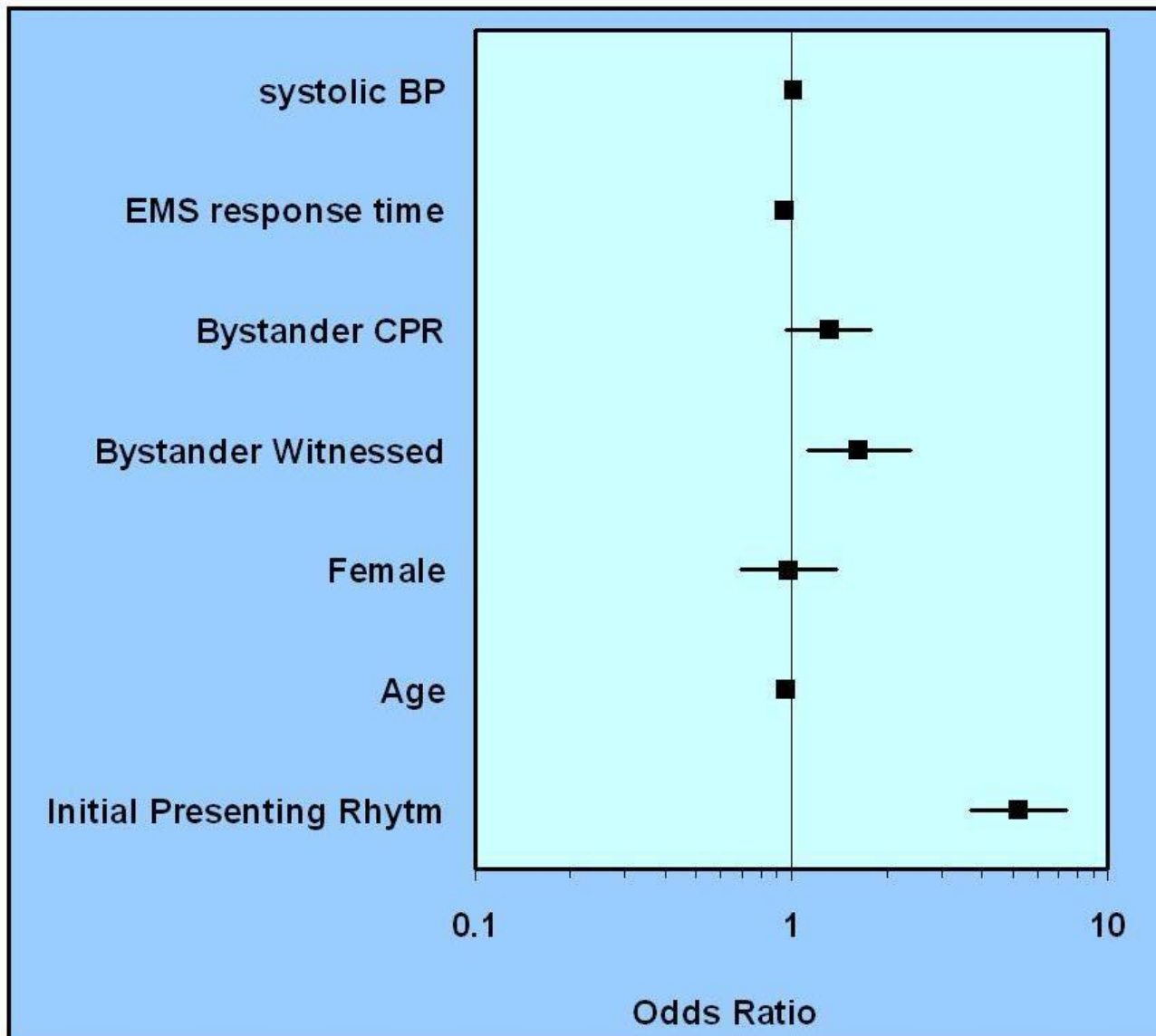
Significant predictors of survival to discharge shown to be

initial presenting rhythm	OR 5.22 (95%CI 3.68-7.39)
age	OR 0.96 (95%CI 0.95-0.97)
bystander witness	OR 1.62 (95%CI 2.37-1-12)
time to EMS response	OR 0.93 (95%CI 0.91-0.99)
systolic BP on arrival at hospital	OR 1.01 (95%CI 1.004-1.01)

p<0.05

This analysis showed that systolic BP was associated with survival to discharge in patients found in VF/VT.

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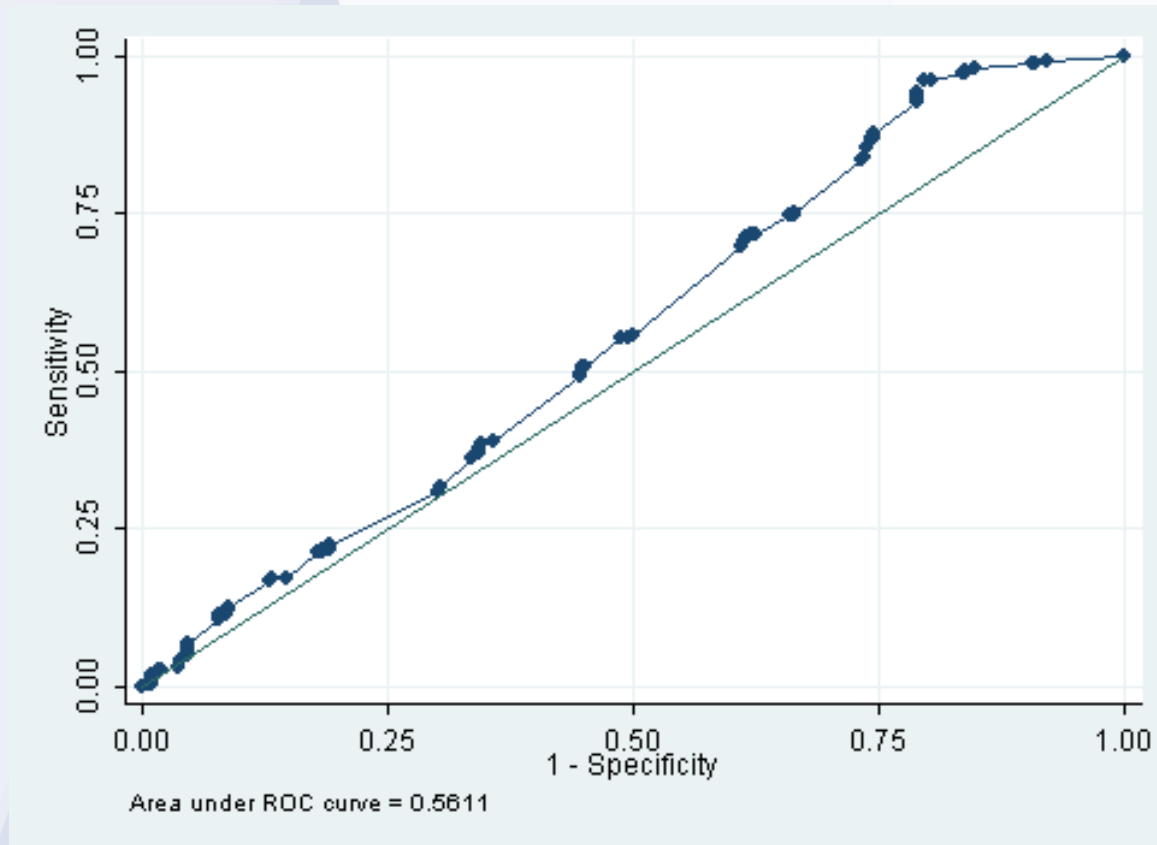
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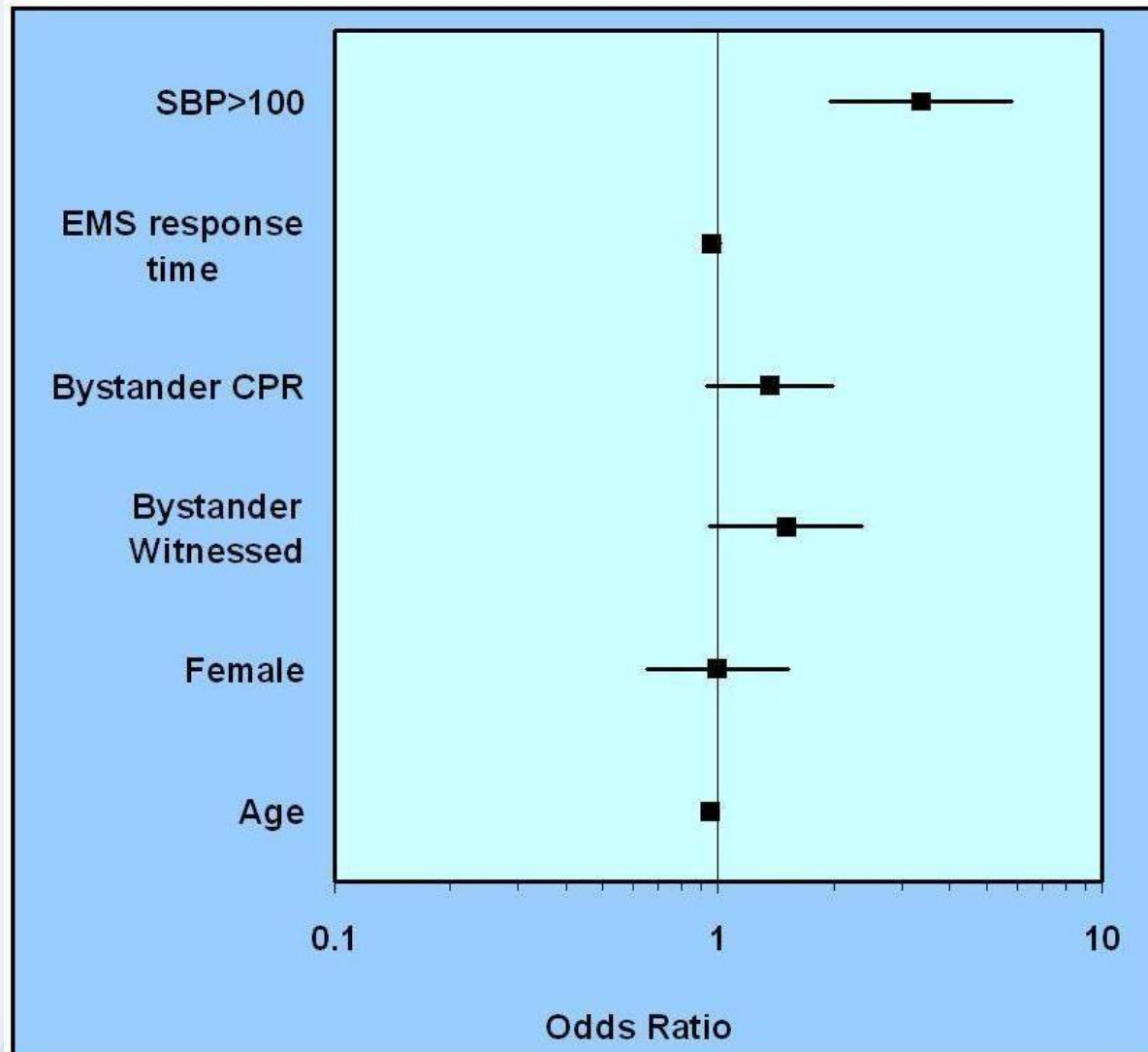
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Results

- BUT what is the minimum optimal blood pressure



Results- patients found in VF/VT



Conclusions

- Further research:
 - Increase the sample size so grab your electronic patient care record and get typing.
 - Subgroup analysis comparing assisted (fluid and adrenaline) versus non-assisted blood pressure on survival to discharge
 - Trzeciak (2009)
 - BP > 90 did very well
 - Bp < 90 but increased with adrenaline did quite well
 - BP < 90 didn't do well at all

Conclusions

- VACIS data is very useful and worth the trouble
- Systolic blood pressure is associated with an increased chance of survival to discharge.
- The minimum blood pressure seems to be 100mmHg
- Patients on arrival at hospital with a systolic blood pressure over 100mmHg are 3.25 times more likely to survive to discharge.

Thankyou

- Any questions?