

# Coagulopathy in the Emergency Department

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John R. Hess, MD, MPH, FACP, FAAAS



Professor of Laboratory Medicine and Hematology  
Medical Director, Transfusion Service, Harborview MC  
U of Washington School of Medicine, Seattle



Good Morning

# Disclosure Statement

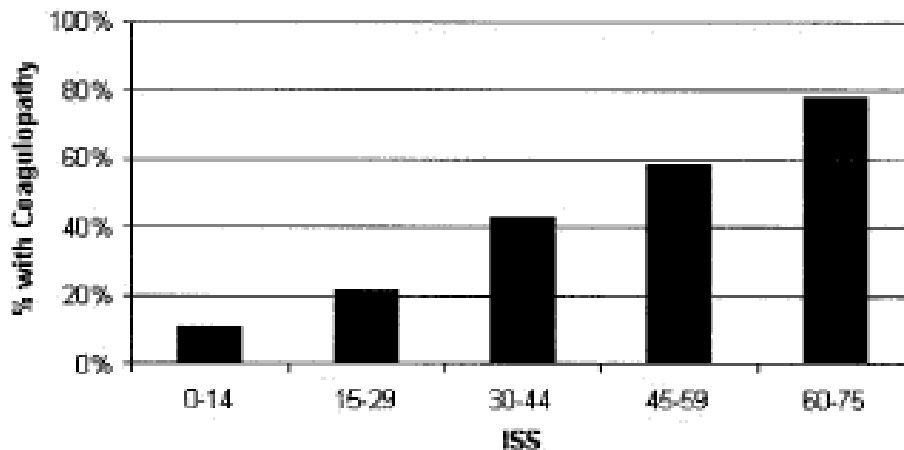
- I receive writer's fees from UpToDate<sup>®</sup> for the section on "Massive Transfusion".

## Acute Traumatic Coagulopathy

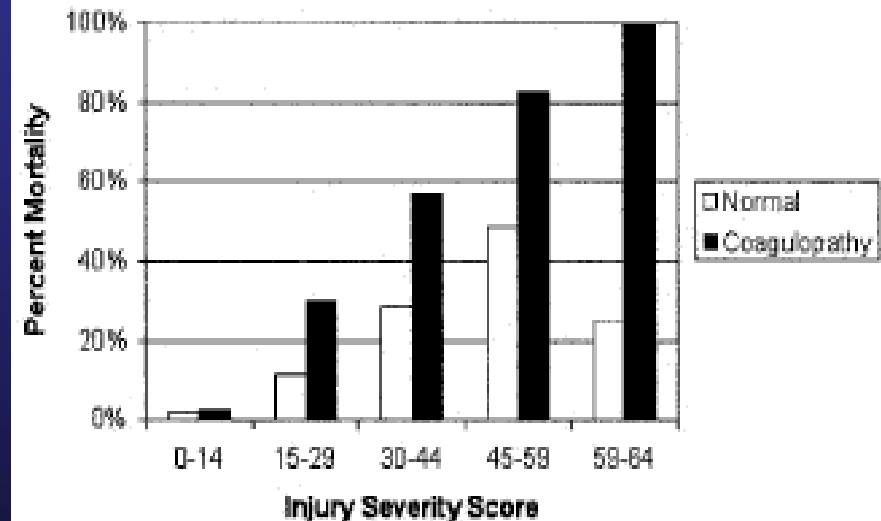
J Trauma, 2003.

Karim Brohi, BSc, FRCS, FRCA, Jasmin Singh, MB, BS, BSc, Mischa Heron, MRCP, FFAEM,  
and Timothy Coats, MD, FRCS, FFAEM

Incidence of Coagulopathy



Mortality



- Derangements in coagulation occur rapidly after trauma even after adjusting for ISS
- By the time of arrival at the ED, 1/4 of trauma patients had a coagulopathy associated with a poor outcome

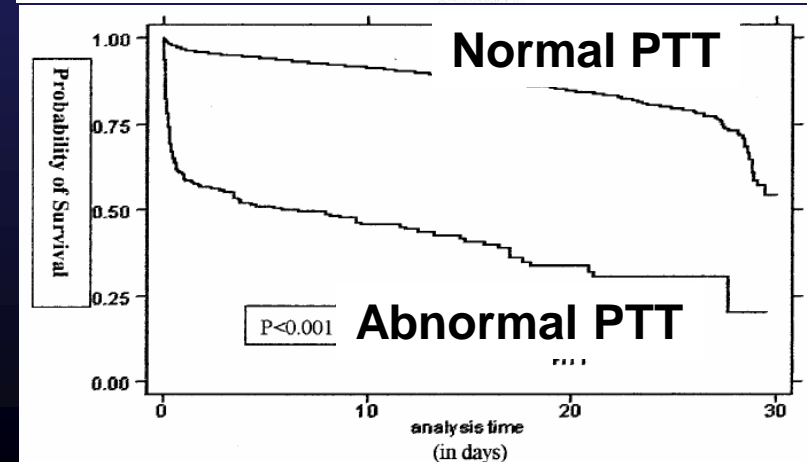
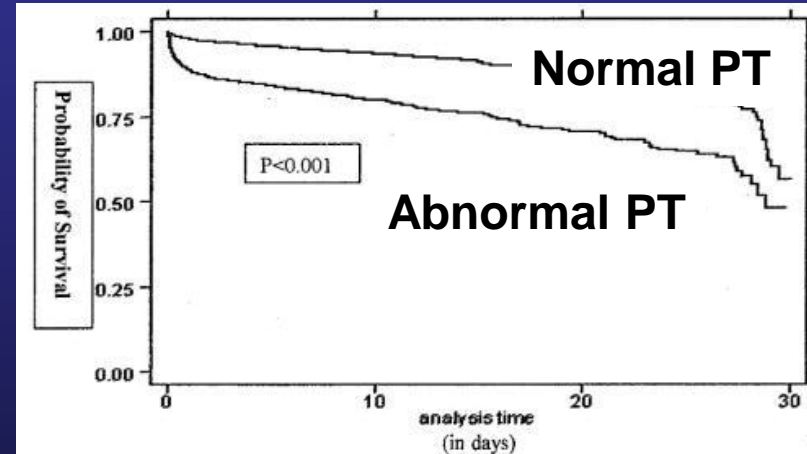
J Trauma, 2003.

## Early Coagulopathy Predicts Mortality in Trauma

Jana B. A. MacLeod, MD, MSc, Mauricio Lynn, MD, Mark G. McKenney, MD, Stephen M. Cohn, MD, and Mary Murtha, RN

In 20,000 direct admissions to the U. Miami trauma center:

- An abnormal PT was common (28%) and predicted a 35% excess mortality
- An abnormal PTT was uncommon (8%) but predicted a 426% excess mortality



# Treating Coagulopathy in Trauma Patients

Ray Armand and John R. Hess

Transfus Med Rev  
2003 Jul; 17:223-231

Coagulopathy in patients with severe trauma is related to platelet and coagulation factor loss, consumption, and dysfunction. It is exacerbated by dilution, acidosis, and hypothermia. Hemorrhage control, warming, and

appropriate blood product support are lifesaving. Further improvements in hemorrhage control will save additional lives and resources.

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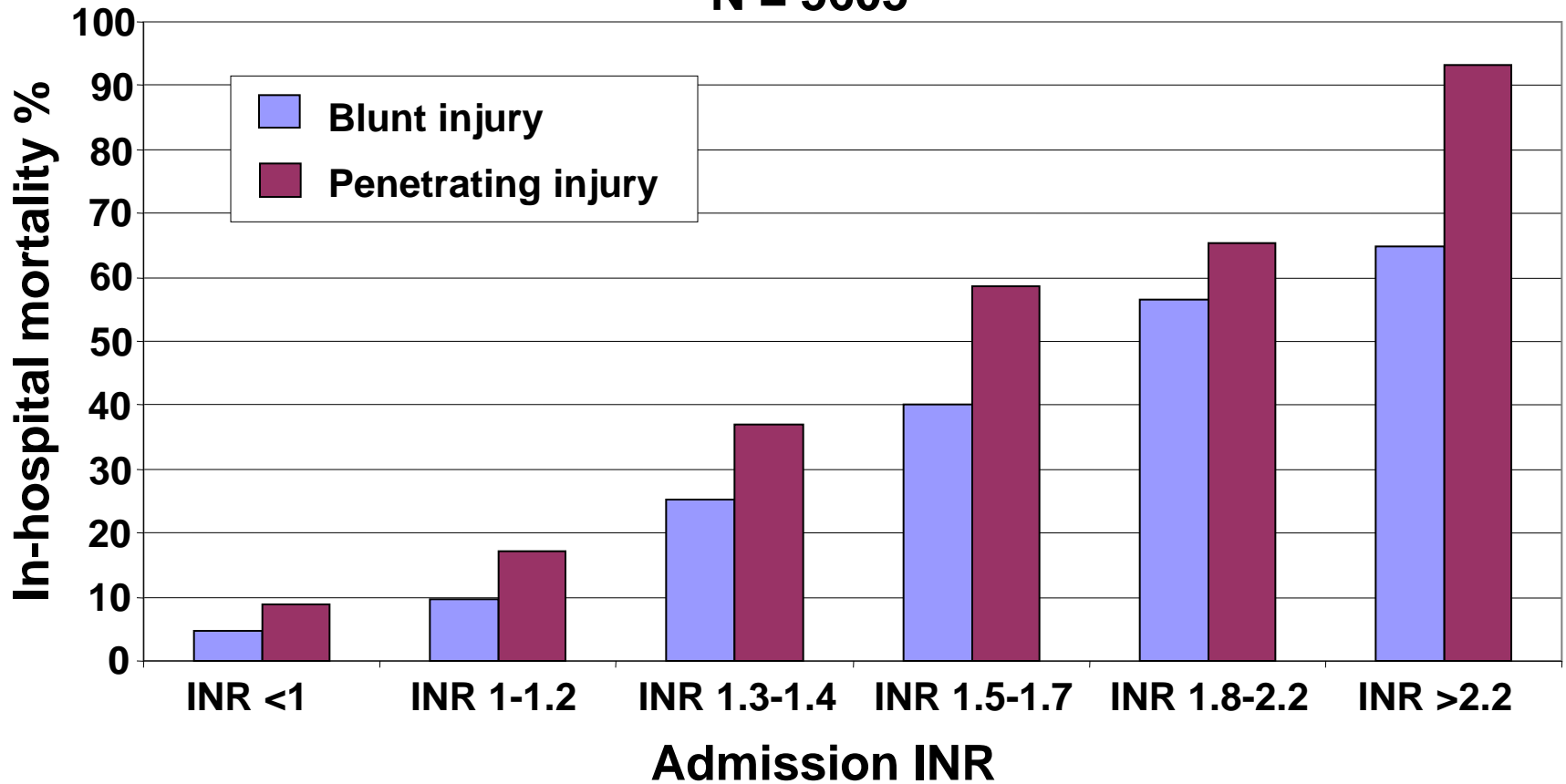
- Loss
- Dilution
- Hypothermia
- Acidosis
- Consumption
- Fibrinolysis

## Coagulopathy of Trauma

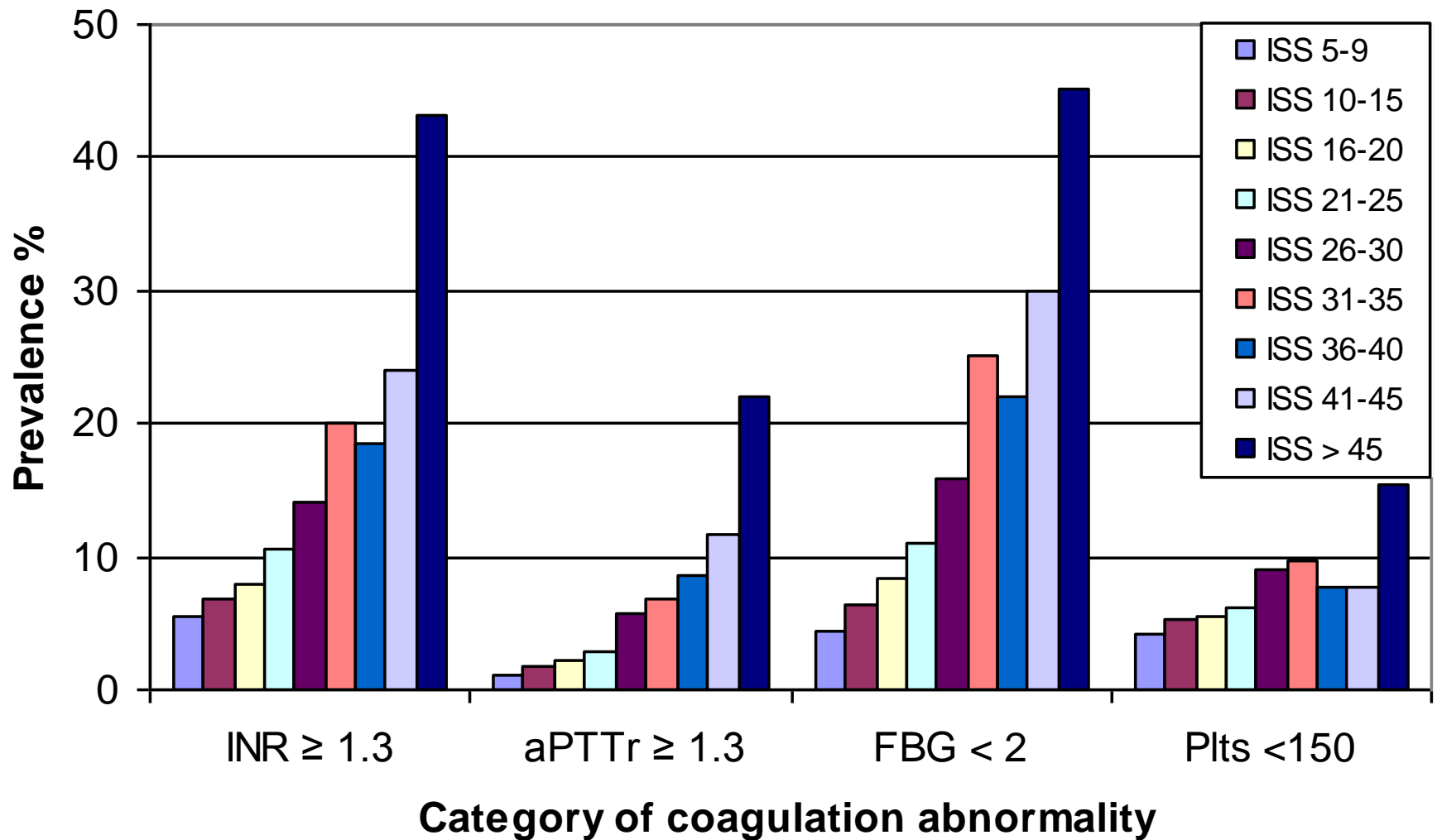
**DIC**



**Admission INR and mechanism of injury in trauma patients  
admitted directly from the scene of injury with ISS > 15  
as predictors of in-hospital mortality at  
U Maryland Cowley Shock-Trauma Center 2000-2006  
N = 5605**

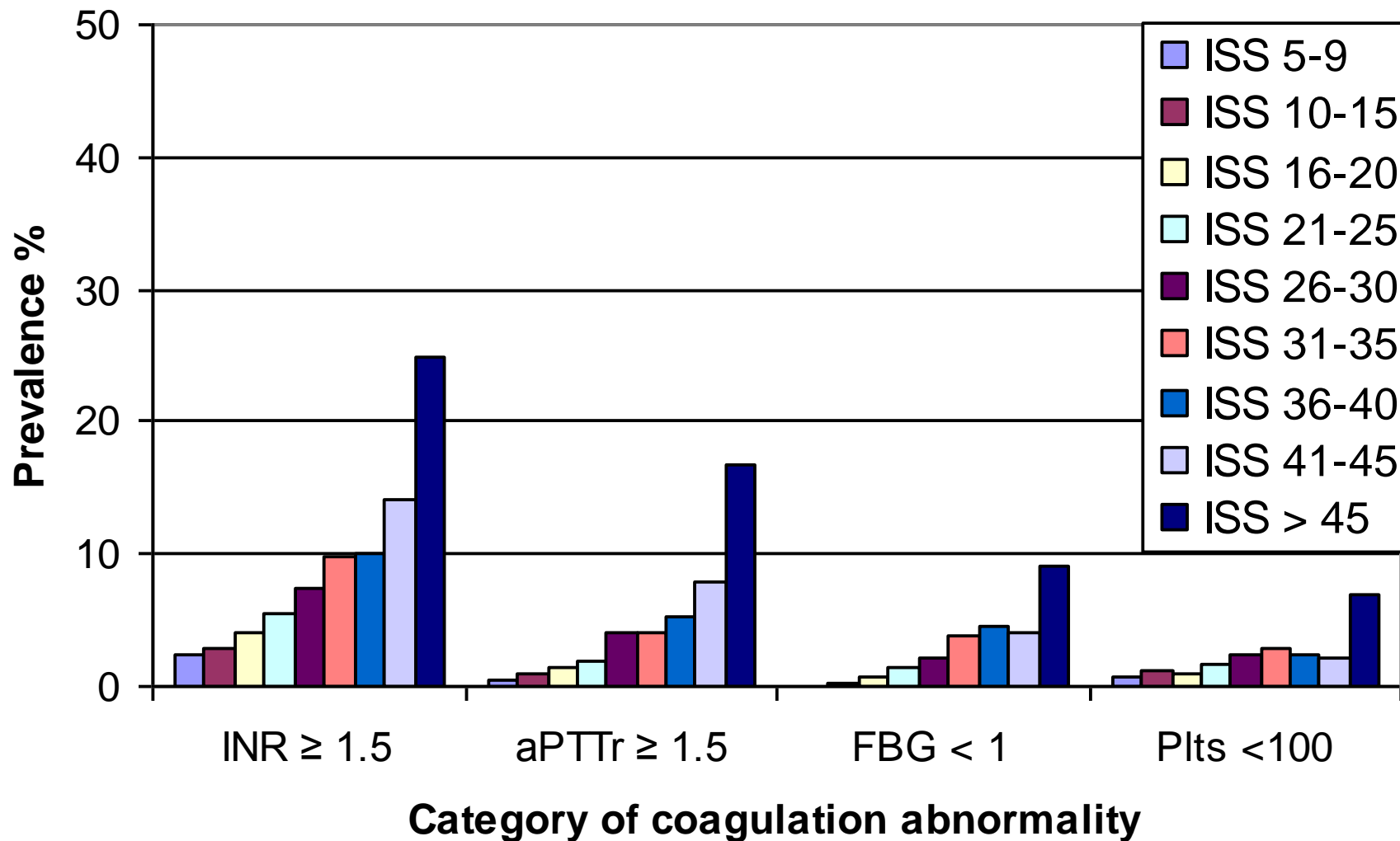


# Prevalence of abnormal admission coagulation tests in a trauma center population, n = 15,782

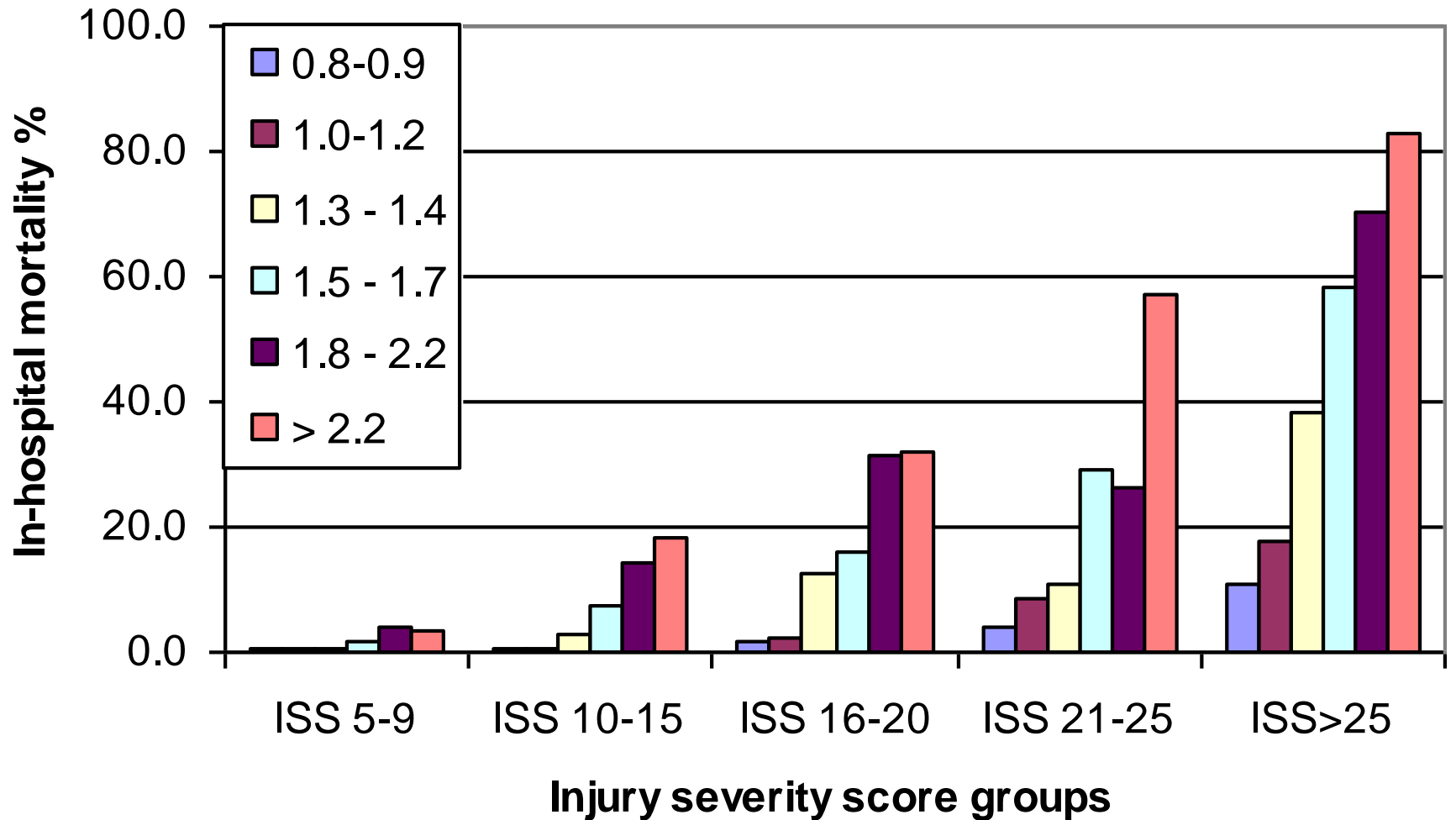




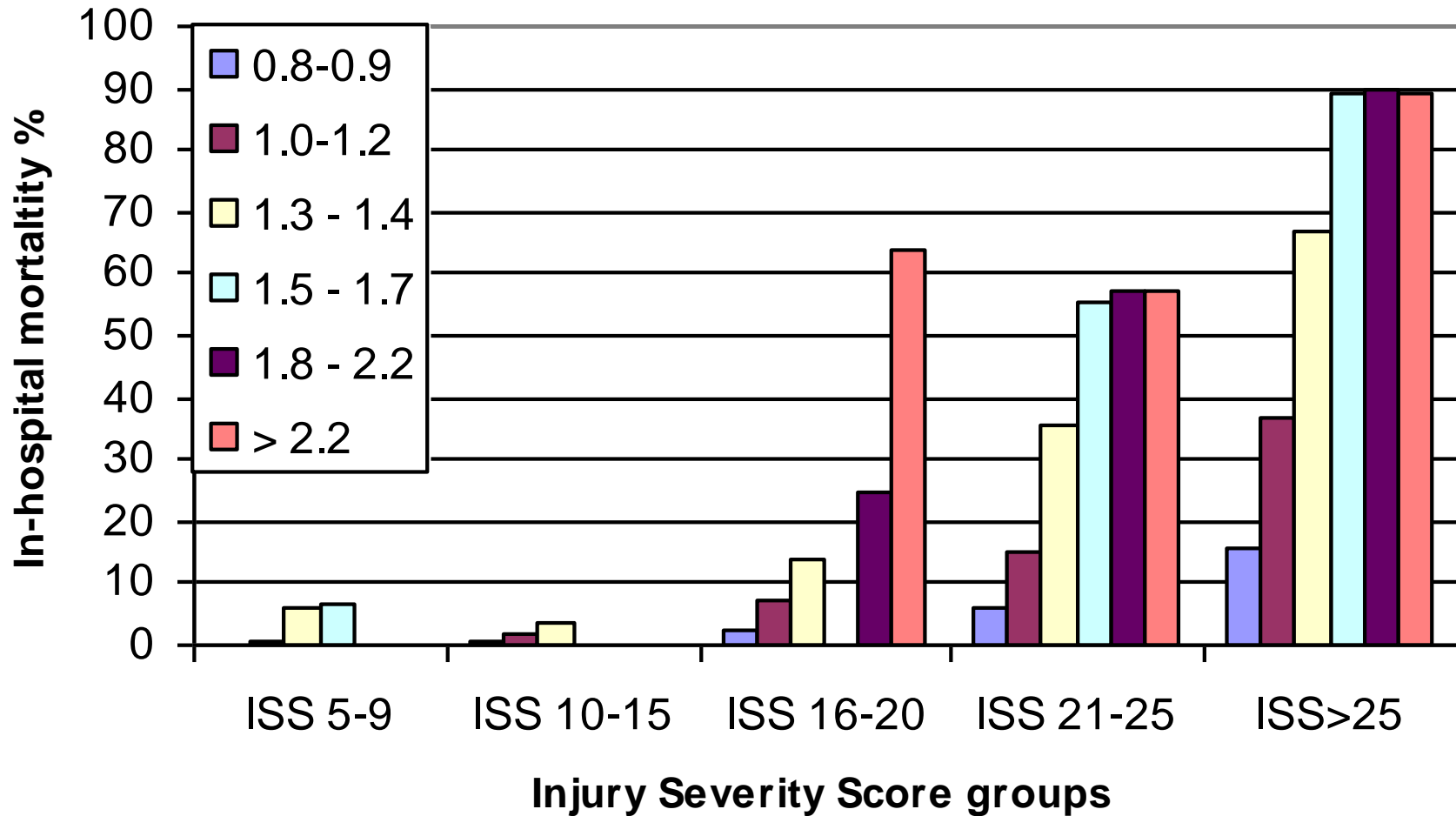
## Prevalence of coagulopathy based on admission laboratory tests of coagulation



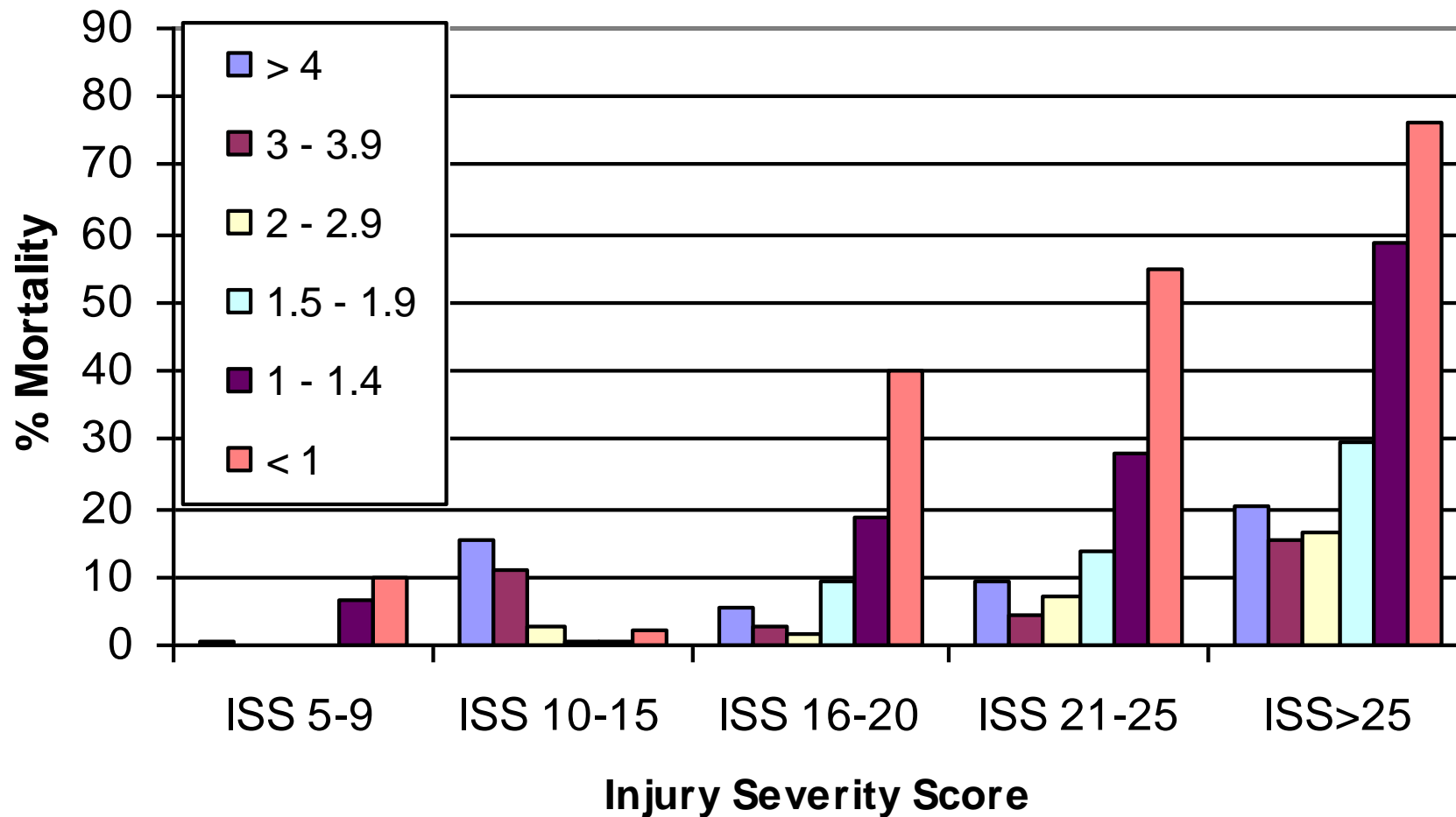
# Interaction of injury severity and admission INR on in-hospital mortality



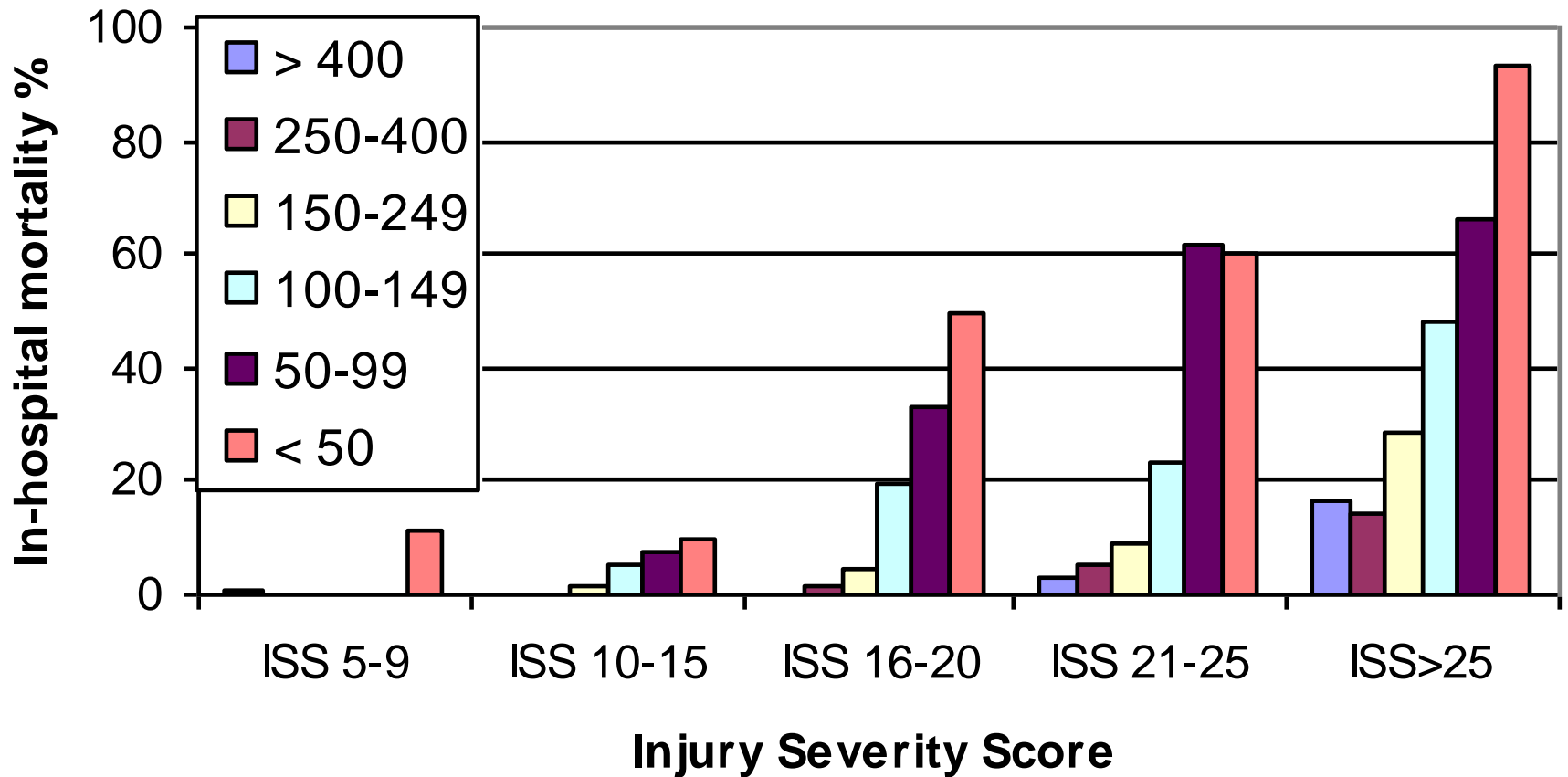
# Interaction of ISS and admission aPTTr on in-hospital mortality in a trauma population



## Interaction of injury severity and admission fibrinogen on in-hospital mortality



## Interaction of ISS with admission platelet count on in-hospital mortality

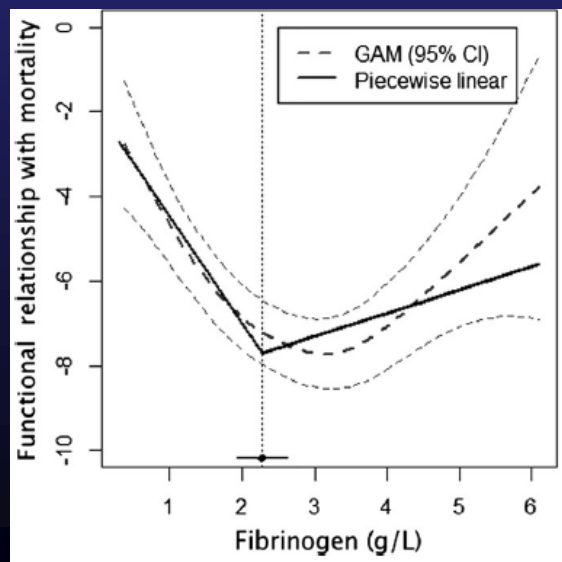


RESEARCH

Open Access

# Prevalence, predictors and outcome of hypofibrinogenaemia in trauma: a multicentre observational study

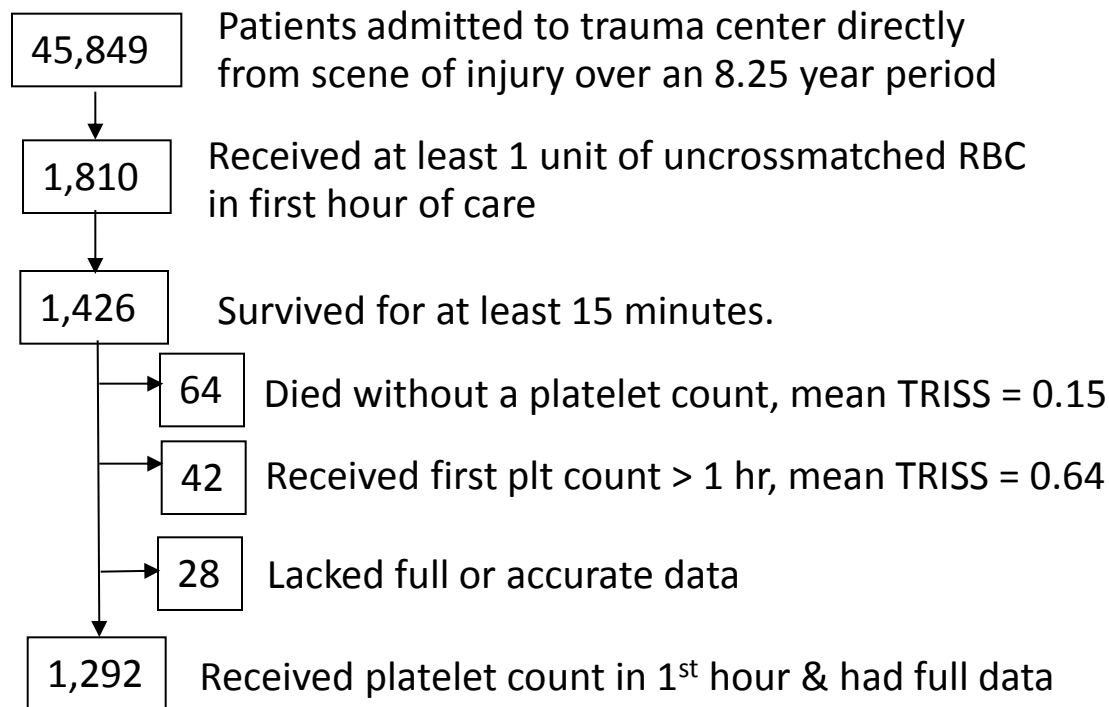
Jostein S Hagemo<sup>1,2\*</sup>, Simon Stanworth<sup>3</sup>, Nicole P Juffermans<sup>4,5</sup>, Karim Brohi<sup>6</sup>, Mitchell Jay Cohen<sup>7</sup>, Pär I Johansson<sup>8,9</sup>, Jo Røislien<sup>1,10</sup>, Torsten Eken<sup>11</sup>, Paal A Næss<sup>12</sup> and Christine Gaarder<sup>12</sup>



Mortality rapidly increased when admission fibrinogen was less 2.29 g/L

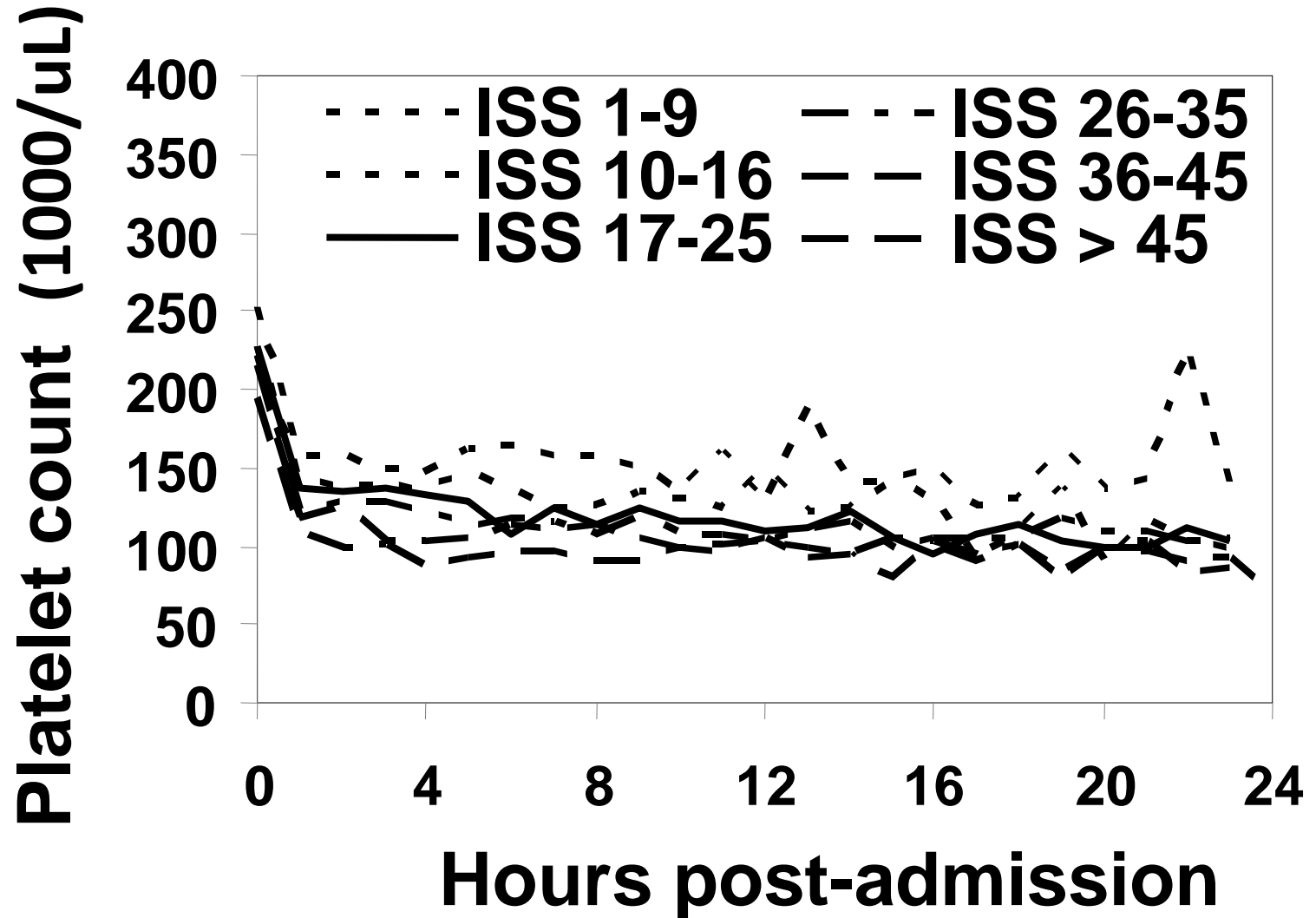
# A large study of patient's platelet counts in a trauma center

Stansbury et al. Transfusion 2013 Apr; 53(4):783-9

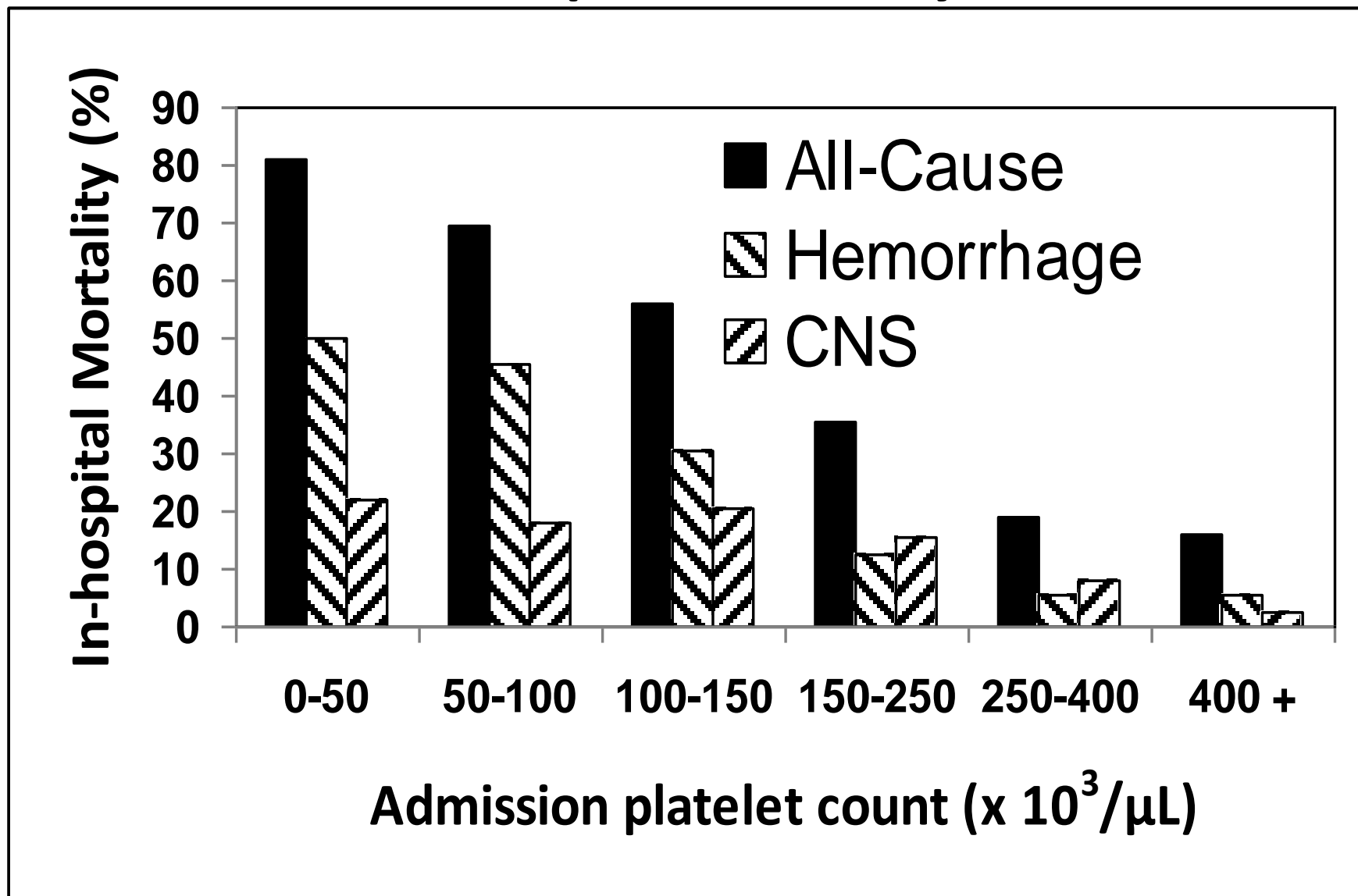




# Relationship between ISS and platelet counts in the first 24 hours of care



# Relationship between admission platelet count and in-hospital mortality



# Admission platelet count & odds of dying

Admission Platelet count group	Odds of mortality, unadjusted	Odds of mortality, TRISS adjusted
>400	0.8	1.0
250 – 400	1.0	1.0
150 - 250	2.4	1.9
100 - 150	5.5	2.7
50 - 100	9.9	4.2
0 - 50	18.7	8.2

# There is an acute coagulopathy of trauma

- It is increasingly frequent and severe with injury severity.
- It involves platelets and plasma coagulation factors all the way into the normal range.
- It is associated with significant mortality.
- It is associated with more than just hemorrhagic complications.

**Thank you**  
**hessj3@uw.edu**

