

Critical Care The Situation In US Compared To Europe, Turkey And The World

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and Trauma***

US Health Care 2013

- * America's Health-Care System.....
Is Neither Healthy, Nor Caring Nor A
System. **Walter Cronkite 1991**
- * Majority Of American 69% Rate The System
Fair To Poor.
- * Access and Outcomes are Worse than in
Many other Developed Nations Despite the
Highest Health-Care Expenditure in the
World. **Harvard School of PH 2009**

ICU in OBAMA-CARE

Impact of 2009 US Affordable Care ACT

- * Law Prohibits Research Comparing The Effectiveness Of Different Treatments From Being Used To Ration Care
- * Includes More Patient Protections Than Current Laws
- * A CLEAR Disconnect Between Formal Policies Regarding Rationing....
- * And The Reality That Society Inevitably Must Allocate (Ration) Funding For Best Patient Outcomes For The Majority.

Critical Care Rationing

Chest 2011 Evans et al.

- * **Rationing of Beds is NOT ALLOWED.**
But happens every day.
- * Policy Decisions at State and Local Level
(Certificate of Need) Limits ICU Beds Based on
Scarcity of Funding.
- * This Drives Bedside Decisions to Deny ICU Admits
and Push Early Discharge.
- * Patients are not Sufficiently Sick to Derive Benefit.
- * ***Rationing Occurs, Just Under a Different Name.***

Why an increase in ICU admits?

- * Lower threshold to admit to ICU?
 - * No change in ICU LOS
 - * Increased proportion getting meds, IVF, procedures
- * Higher volume of ill patients
 - * Increased proportion of > 85 y/o
 - * Largest increase by insurer - Medicaid

There is Need to Limit ICU Care Because Resources Are Scarce

- * In The ICU, Explicit Bedside Rationing Is Rarely, If Ever, Observed.
- * However Each Hospital Has Made Staffing Decisions That Are, Effectively, Rationing.
- * At The Bedside, Informal Rationing Is A Daily Occurrence.

Intensive Care Delivery Outside the

ICU



Critical Care



*Critical Care Is A Concept
Not A Location

*It Is A Way Of Treating Patients
That Begins In The Pre-hospital
Setting, Continues In The ED,
And Is Completed In The ICU

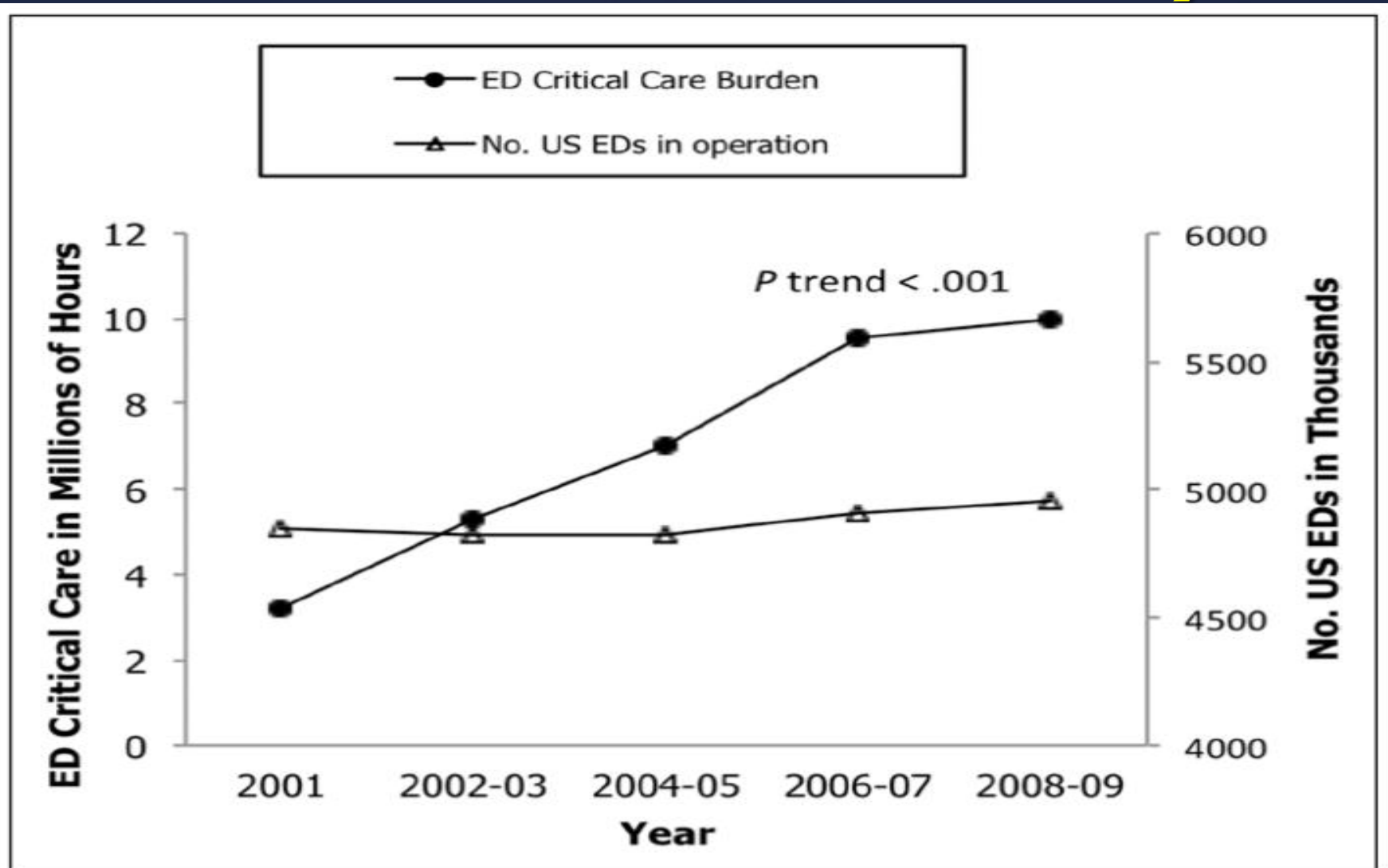
Safar P. Critical care medicine---quo vadis?
CCM. 1974;2:1-5.

Increasing Critical Care Admissions From U.S. Emergency Departments, 2001-2009.

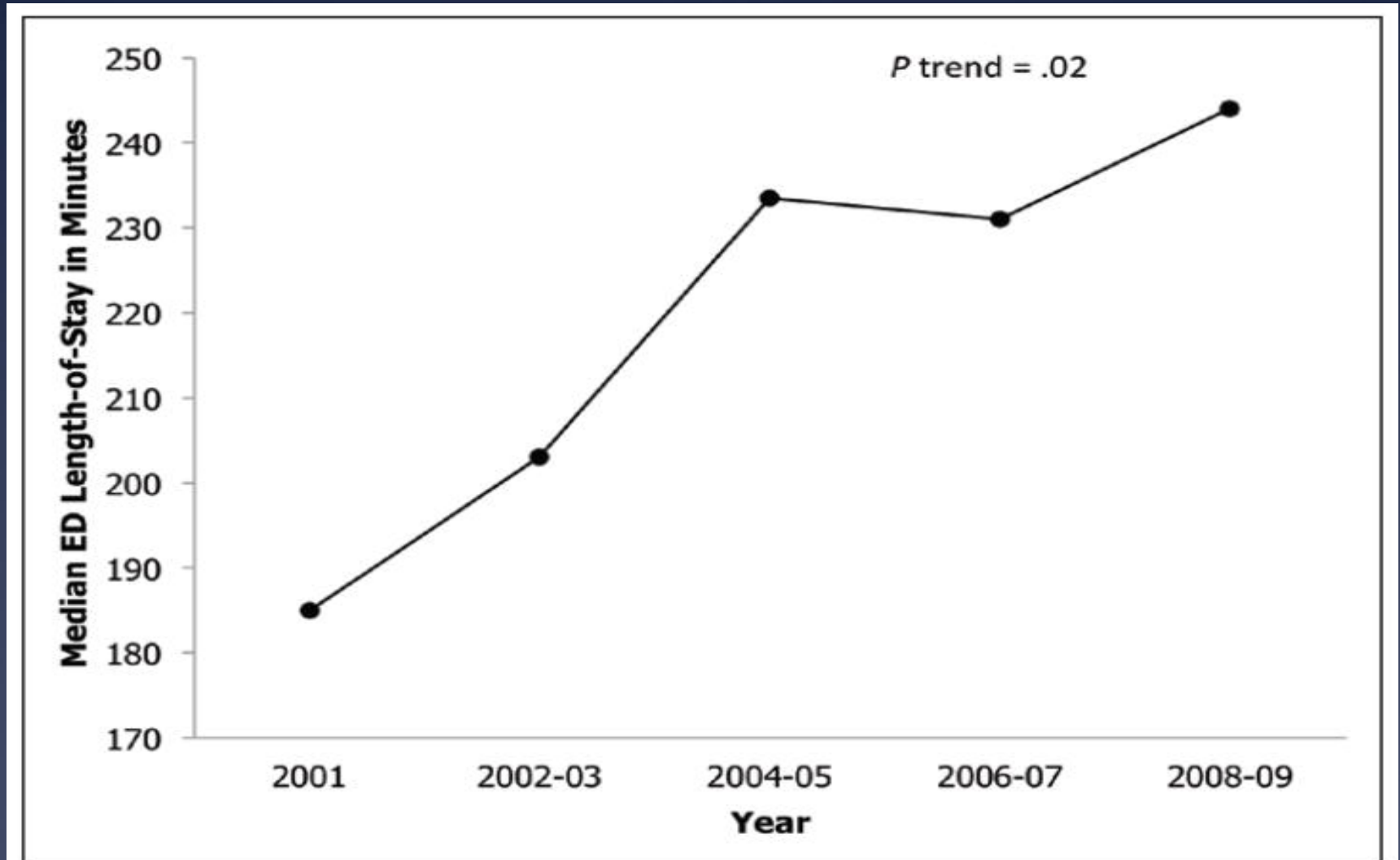
- * Herring et al. CritCare Med. 2013;41(5):1197-204.
- * Annual Critical Care Unit Admissions From U.S. Eds Increased By 79% From 1.2 To 2.2 Million.
- * The Proportion Of All Ed Visits Resulting In Critical Care Unit Admission Increased From 0.9% To 1.6% (p Trend < 0.001).

Total Annual Hours Of Critical Care At U.S. EDs Increased By 217%:

3.2 To 10.1 Million (P Trend < 0.001).

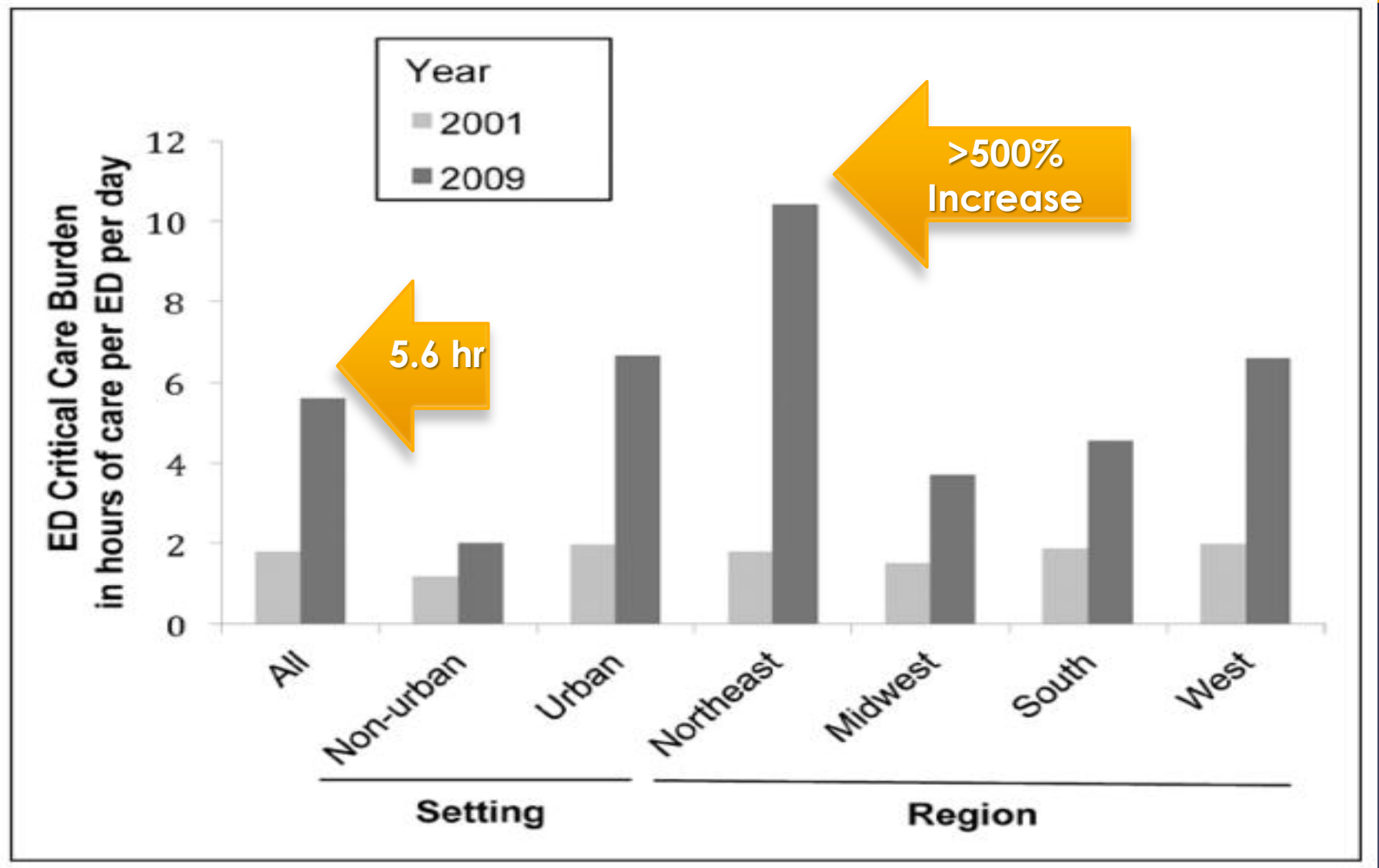


Between 2001 and 2009, the median ED length of stay for critically ill patients increased from 185 to 245 minutes



The Average Daily Amount Of Critical Care Provided In U.S. EDs has *TRIPLED* From 1.8 To 5.6 hrs

Hours per ED per day



Variation In Critical Care Services Across North America & Europe

- * Wunsch, Angus Harrison et al. CCM 2008;36:2787.
- * Comparing Distribution of CC services in 8 countries. US, FR UK Can, Bel, Deust, Neth, Sp
- * No Standard Definitions Exist for ICU beds
- * 3 Fold Difference in Hospital Bed per Country
- * US: 221/100,00 to FR: 593/100,00 Hospital beds / Population
- * 7 fold diff in ICU beds: 3.3/100k UK to 24/100k in Germ
- * **Conclusion: CC services vary dramatically bw/ contries**

Existing Challenges to Estimate and Treat ICU Pts.

- * The Syndrome-based Definitions Of Critical Illness
- * Incorrect Equating Of 'Critical Illness' With 'Admission To An Intensive Care Unit'
- * Lack Of Reliable Case Ascertainment In Administrative Data,
- * Short Prodrome And High Mortality Of Critical Illness, Limiting The Number Of Prevalent Cases.

Worldwide demand for critical care. -

Adhikari NK - *CurrOpinCrit Care* -DEC-2011; 17(6): 620

- * Interest In The Global Burden Of Critical Illness Is Growing,**
- * Data To Describe This Burden And The Resources Available To Provide Care For Critically Ill Patients Are Lacking.**

Demand For Critical Care Is Likely To Increase

- * Related To Urbanization
- * An Aging Demographic
- * Ongoing Wars, Disasters, And Pandemics, Whereas Economic Crises
- * *Will Likely Decrease The Ability To Pay For It*

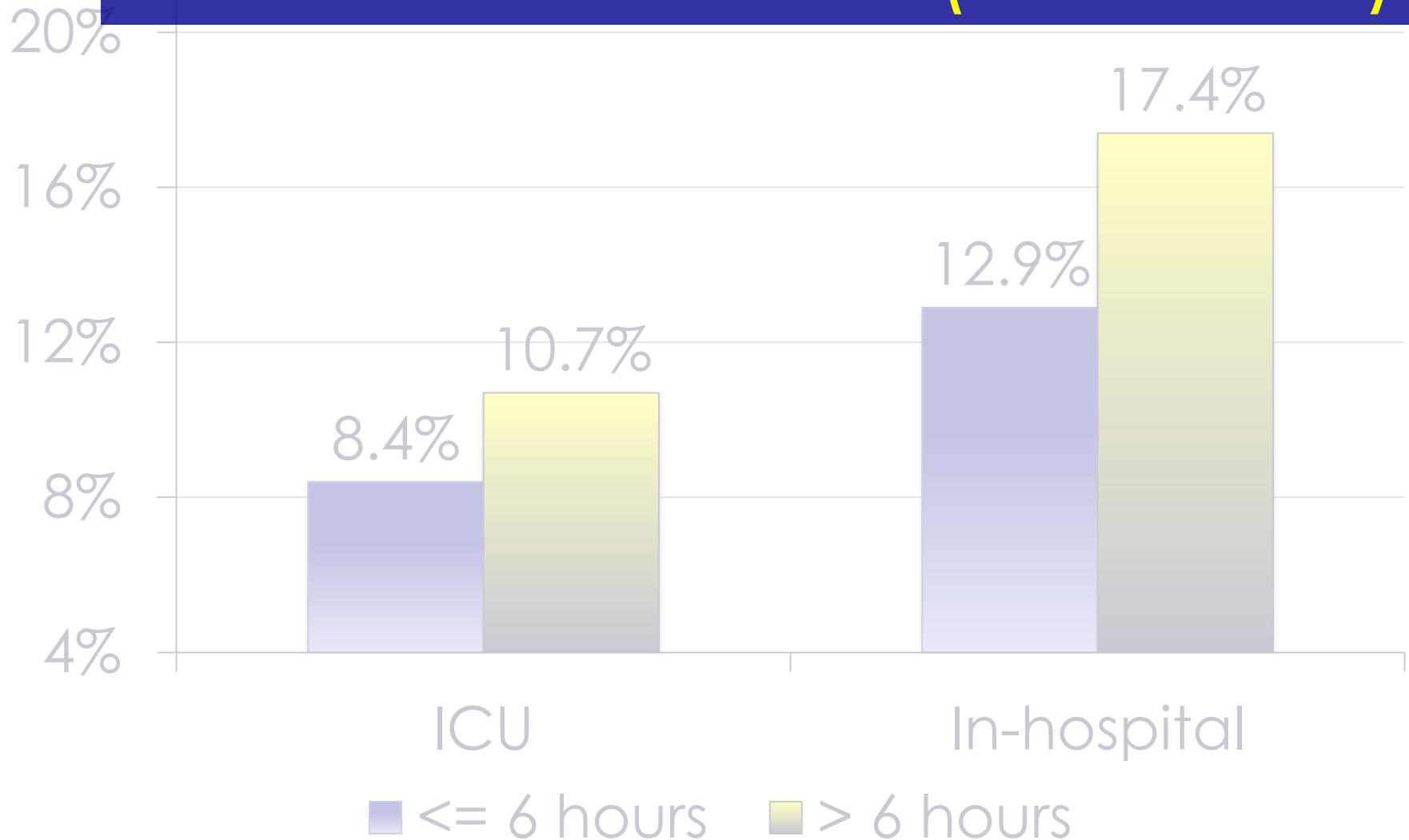
Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit*

Donald B. Chalfin, MD, MS, FCCM; Stephen Trzeciak, MD, MPH; Antonios Likourezos, MA, MPH; Brigitte M. Baumann, MD, MSCE; R. Phillip Dellinger, MD, FCCM; for the DELAY-ED study group

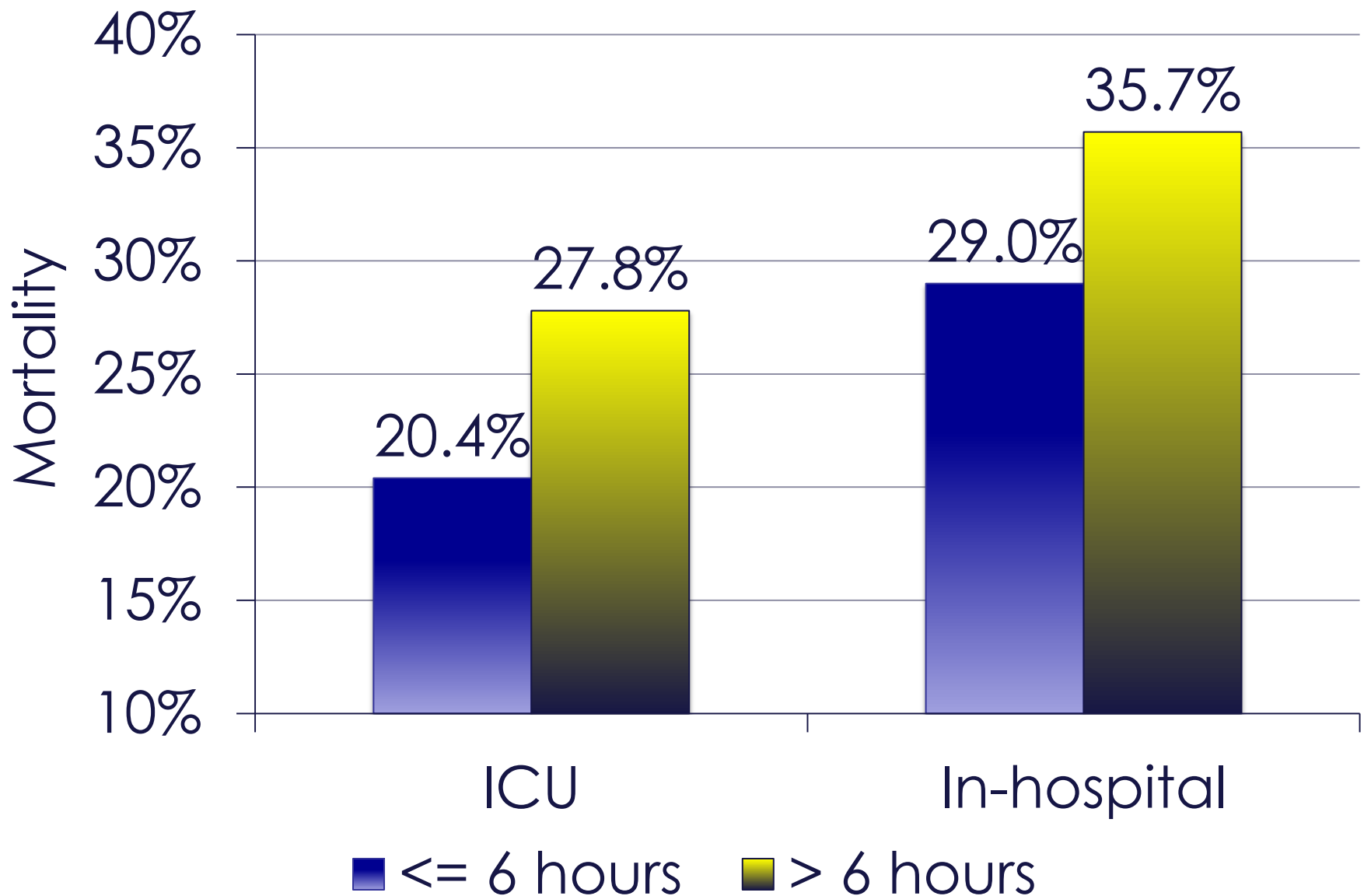
- Divided into two categories
 - Transferred to ICU in < 6 hours
 - Transferred to ICU in ≥ 6 hours
- Measured outcomes
 - ICU and In-hospital mortality
 - ICU and hospital LOS

Mortality

Survival OR = 0.71 (0.57-0.90)



Sepsis Subgroup





ORIGINAL RESEARCH CONTRIBUTION

National Growth in Intensive Care Unit Admissions From Emergency Departments in the United States from 2002 to 2009

Peter M. Mullins, MA, Munish Goyal, MD, and Jesse M. Pines, MD, MBA, MSCE

Abstract

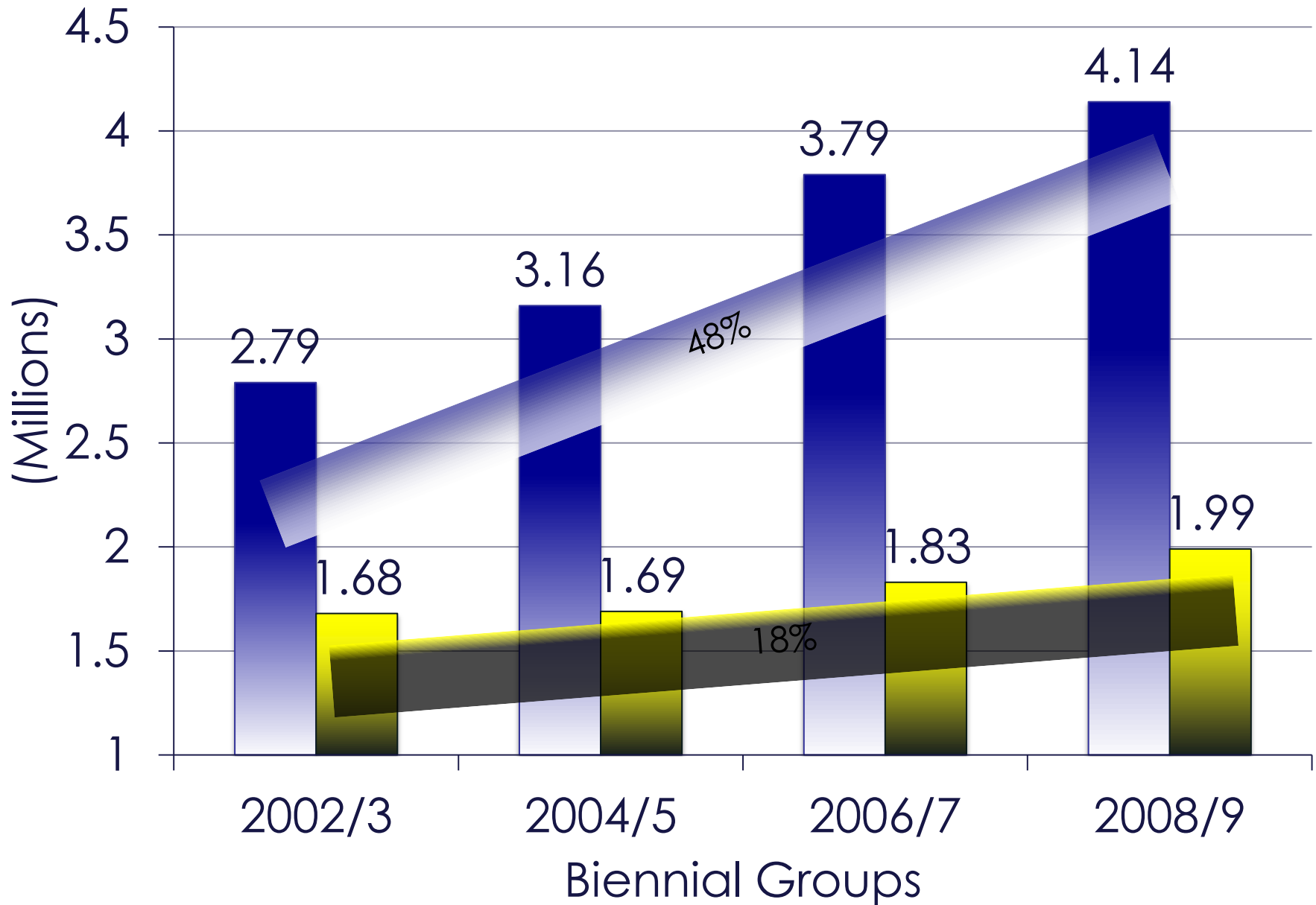
Objectives: The authors describe national trends in use, reasons for visit, most common diagnoses, and resource utilization in patients admitted to intensive care units (ICUs) from hospital-based emergency departments (EDs) in the United States.

Methods: This was an observational study using data from the National Hospital Ambulatory Care Survey, a nationally representative, weighted sample of U.S. hospital-based EDs from 2002 through 2009. The sample comprised a total of 4,267 patients aged 18 years or older admitted to the ICU from the ED, which represent over 14.5 million ED encounters from 2002 through 2009.

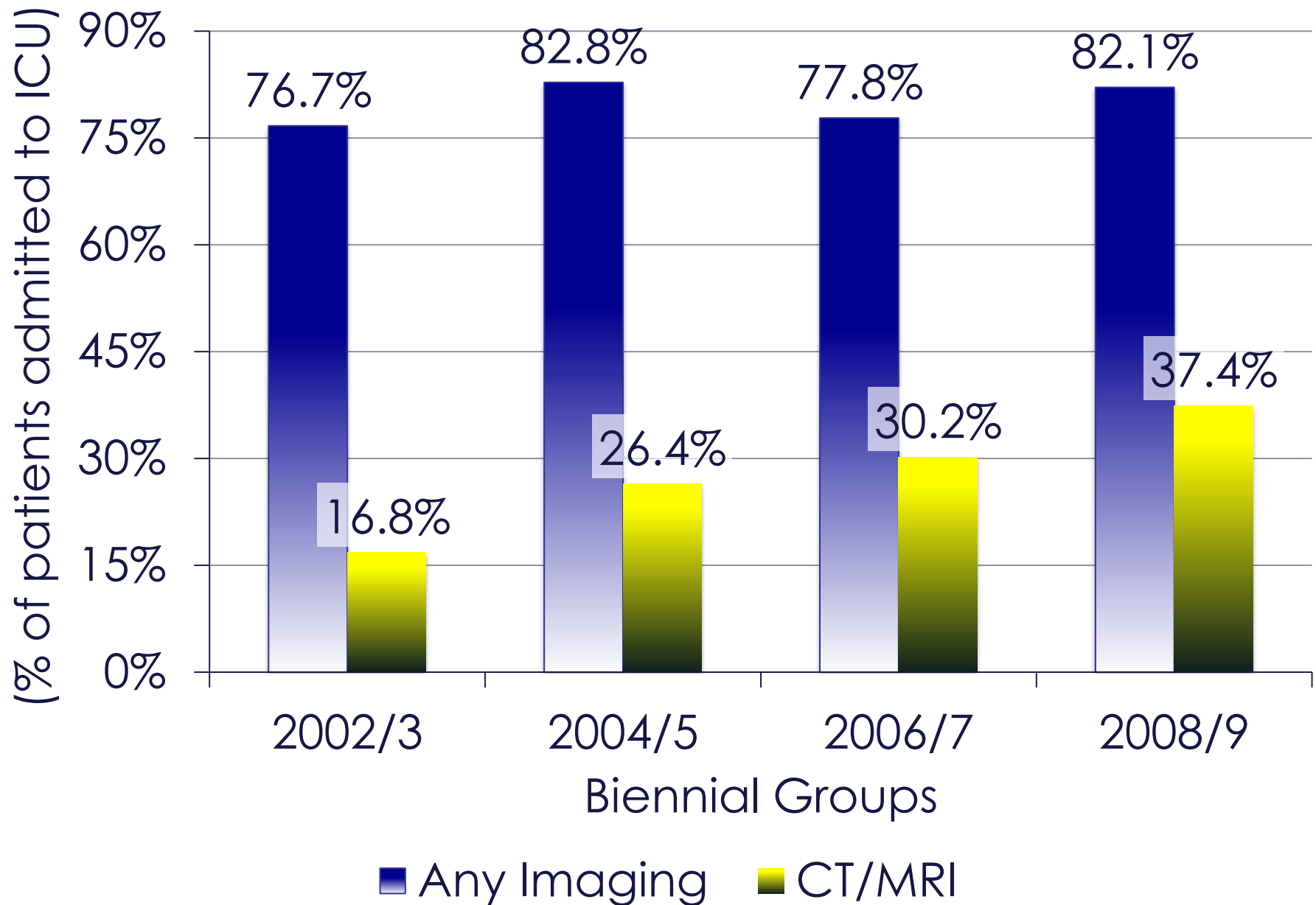
Results: Over the study period, ICU admissions from EDs increased from 2.79 million in 2002/2003, to 4.14 million in 2008/2009, an absolute increase of 48.8% and a mean biennial increase of 14.2%. By comparison, overall ED visits increased a mean of 5.8% per biennial period. The three most common diagnoses for ICU admissions were unspecified chest pain, congestive heart failure, and pneumonia. Utilization rates of most tests and services delivered to patients admitted to the ICU from the ED increased, with the largest increase occurring in computed tomography (CT) and magnetic resonance imaging (MRI), which increased from 16.8% in 2002/2003 to 37.4% in 2008/2009, a 6.9% mean biennial increase. Across all years, mean ED length of stay (LOS) for ICU admissions was 304 minutes (95% confidence interval [CI] = 286 to 323 minutes), and mean hospital LOS was 6.6 days (95% CI = 6.2 to 7.0 days). There was no significant change in either mean ED or hospital LOS over the study period.

Conclusions: Intensive care unit admissions from EDs are increasing at a greater rate than both population growth and overall ED visits. ED resource use, specifically advanced diagnostic imaging, has increased markedly among ICU admissions. While mean ED and hospital LOS have not changed significantly, the mean ICU admission spends over 5 hours in the ED prior to transfer to an ICU bed. A greater emphasis on the ED-ICU interface and critical care delivered in the ED may be warranted.

ICU Admits from the ED



Resource use - Imaging



WORLD FEDERATION OF SOCIETIES OF INTENSIVE AND CRITICAL CARE MEDICINE:2010

- * Development Of A Common International Competency-based Training Program In ICM,**
- * In Conjunction With ESICM, SCCM, Turkish SCC And Other Local National Societies Interested,**
- * Includes An Acceptable Minimum Standard Of Knowledge, Skills, And Attitudes Expected Of A Specialist In ICM.**
- * Development Of A Certification Of Competency In Critical Care Medicine**
- * WFSICCM Should Focus On Training, Continuing Education, Curriculum, And Professional Competence**

A Global View of Education and Training in Critical Care Medicine

Besso et al. Critical Care Clinics -2009

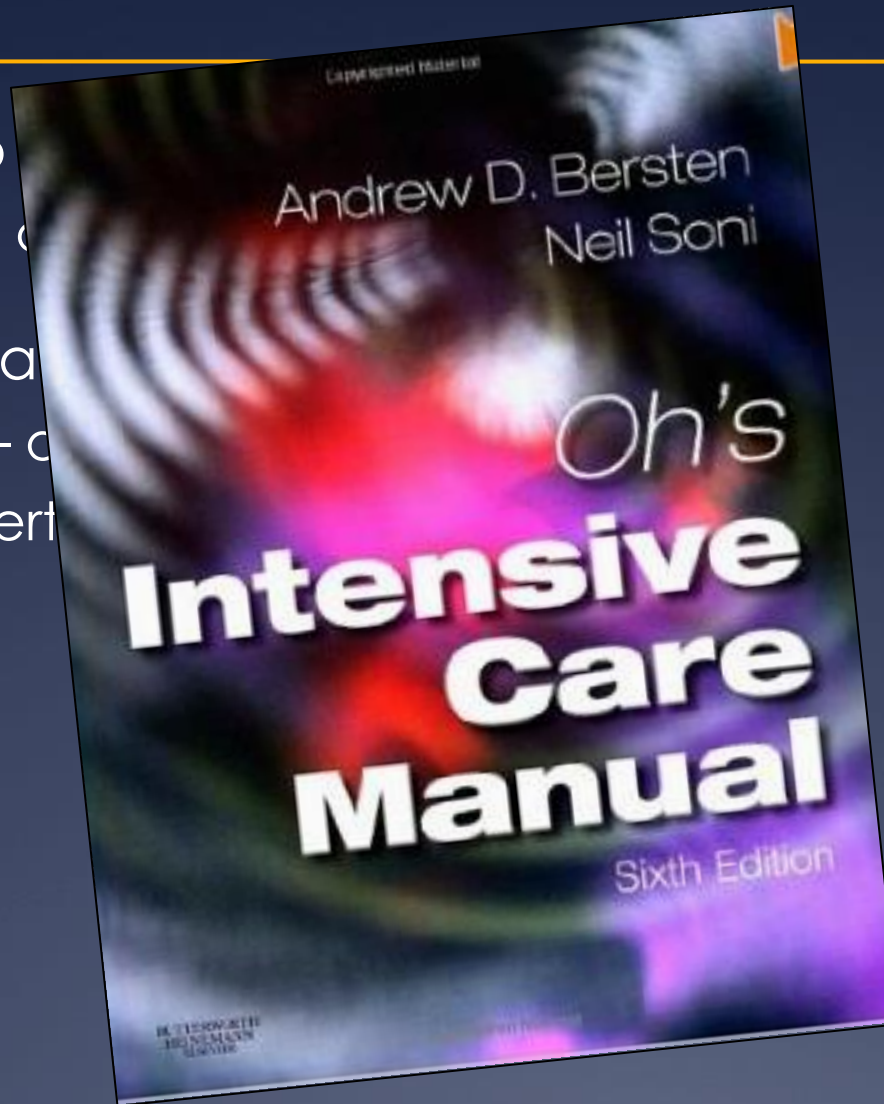
- * Huge World Wide Variation In Critical Care Training**
- * Most Countries Have Single Specialty**
- * Few Have Multi Specialty**
- * The Duration, And Content Of National Training Programs, And In Methods Of Assessment And Accreditation.**
- * A Common Training Program Must Accommodate The Needs Of Trainees With Different Background Skills**
- * Provide Training Environments Suitable For The Acquisition Of Specific Competencies.**

Critical Care Medicine Training and Certification for Emergency Physicians

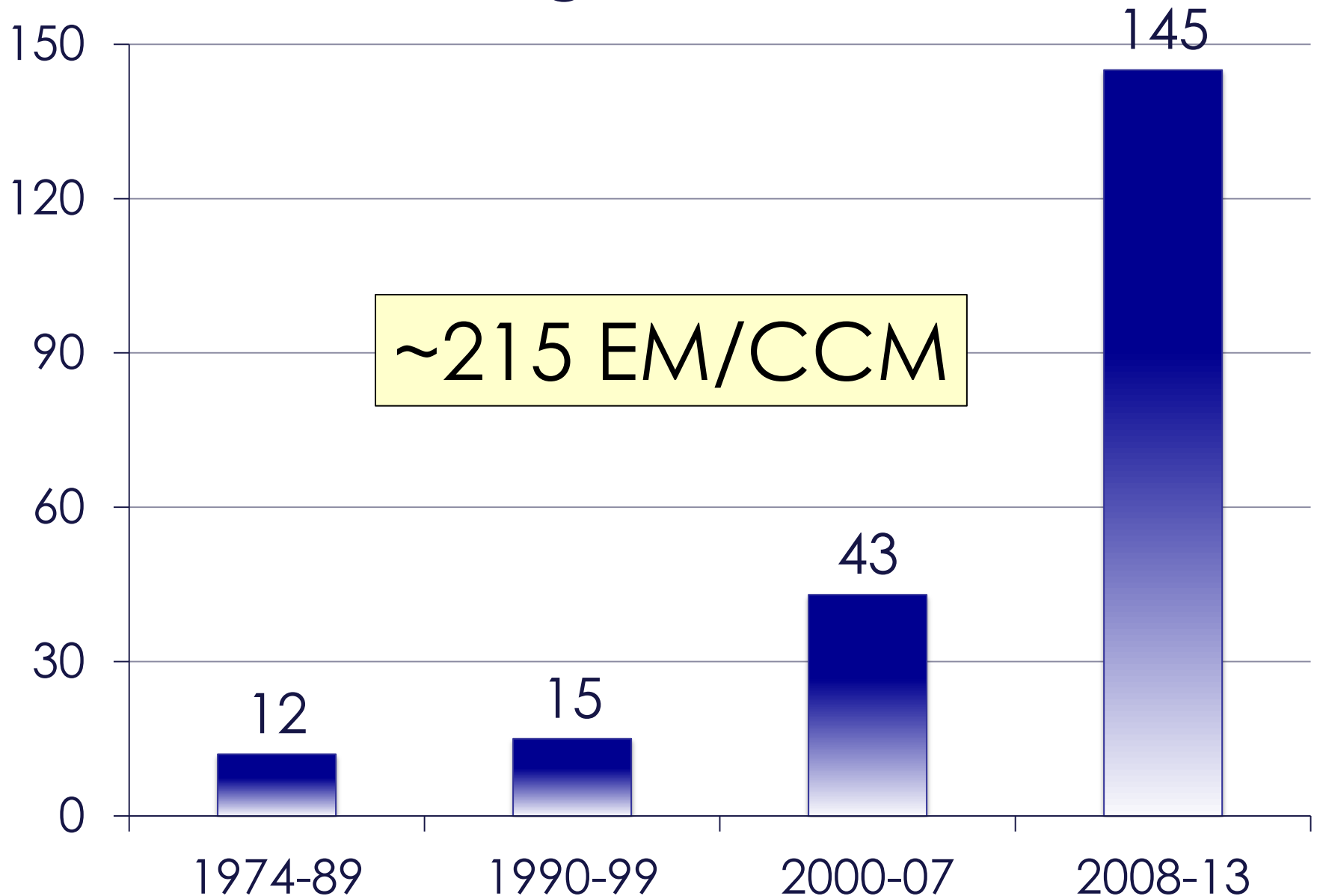
- * Huang et al; Annals Emergency Medicine 2005
- * Milzman et al AEM 1999
- * There was no pathway for Emergency Physicians in US for Critical Care Certification till 2007
- * Internal Medicine 2 yr Critical Care BUT Limits Docs to 40 a year
- * 2012 Surgery: Critical Care/Trauma 2 Year
- * 2013 Anesthesia: 1 year Critical Care

EPs training in Critical Care

- * Fellowship
 - * Informal
- * Multiple boards
 - * In 2005 – c
 - * No US cert
 - * EDIC



EPs training in Critical Care



U Of Michigan Model

- * Michigan Center For Integrative Research In Critical Care (M-CIRCC)
- * Multidisciplinary System Begins In ED
- * 5 ED Resuscitation Bays
- * 5-10 ICU Beds Behind Resus Bays
- * Intend To Keep Ill Pts In ED 12 – 24 Hrs
 - * Shift Emphasis From Transferring Pt To Aggressive Resuscitation

How do we adapt?

- * Change how we train EM physicians
- * Change how we build EDs
- * Regionalize ICU care
- * Change ICU staffing
 - * 24/7 In-house intensivists?

Conclusions

- * Critical Care Is Not A Location
- * Delay To ICU Admission Associated W/ Higher Mortality And Longer LOS
- * ICU Admits From ED Have Increased
- * Adapt To Increasing Volume
 - * Remove Barriers EPs Training In Critical Care
 - * Increasing ICU Capacity (EDs/ICU)
 - * Regionalize Critical Care Delivery?
- * Nighttime Intensivists Not The Answer

Henry Ford ED Resuscitation

Surgical



Medical



U of Pennsylvania Resuscitation

Trauma



Medical



Washington Hospital Center

Trauma



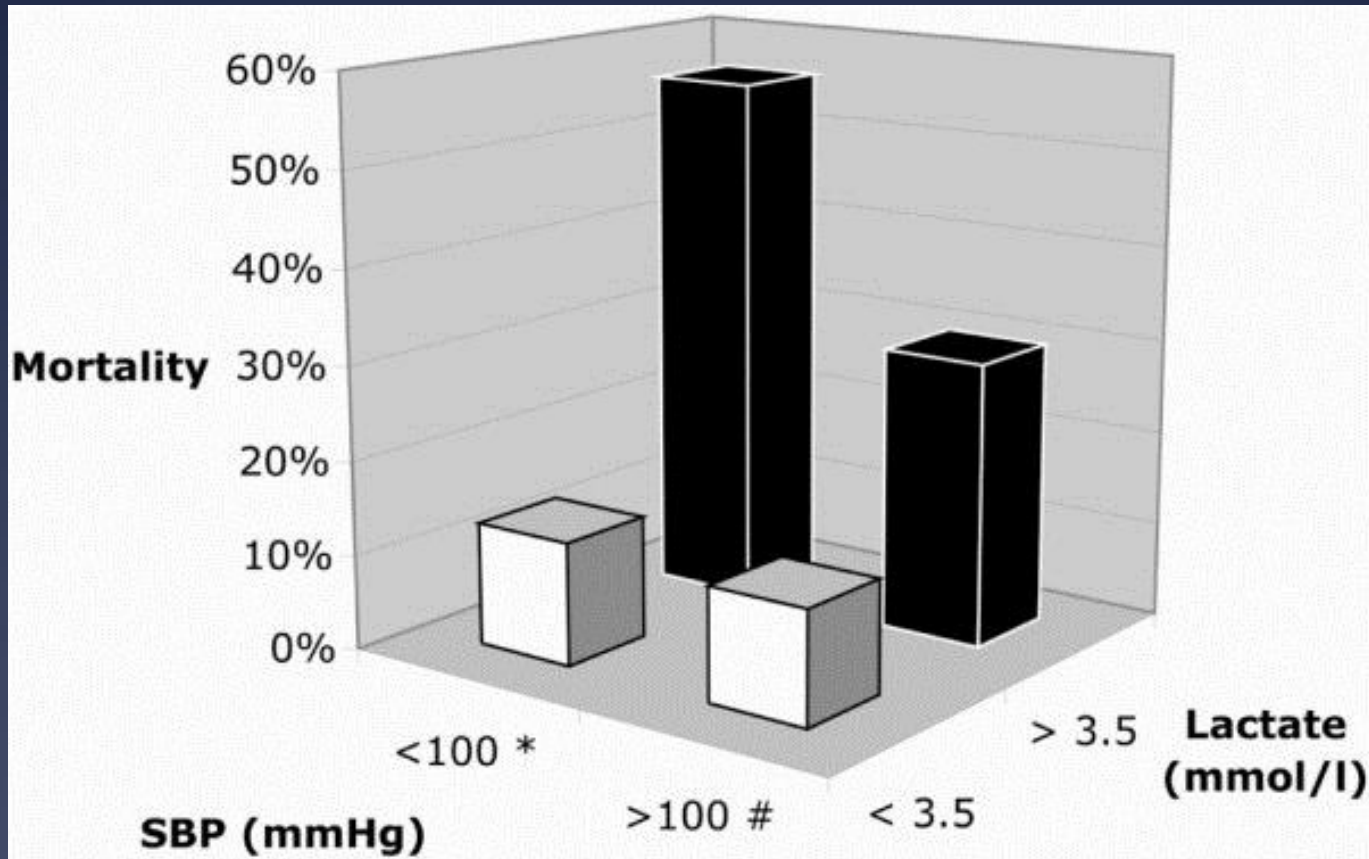
Medical



Non-Inferiority in our New Device: \$\$\$ Drives Developement



PreHospital Predictors of Outcome: Lactate Better then SBP



Blood Lactate in the Prognosis of Various Forms of Shock

VLADIMIR VITEK, SC.D., PH.D., R. A. COWLEY, M.D.

*From the Center for the Study of Trauma, University of Maryland School of Medicine,
Baltimore, Maryland 21201*

Annals of Surgery 1971

TABLE 3. *SL₅₀ of Lactate in Various Groups of Shock*

Group of Shock	SL ₅₀ of Lactate (mEq./l.)
I. Hemorrhagic-traumatic with combinations	7.3
II. Pure septic	5.0
III. Septic with combinations	3.5
IV. Cardiogenic and its combinations	2.3
All Groups Pooled	4.9

The New England Journal of Medicine

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IMMEDIATE VERSUS DELAYED FLUID RESUSCITATION FOR HYPOTENSIVE PATIENTS WITH PENETRATING TORSO INJURIES

WILLIAM H. BICKELL, M.D., MATTHEW J. WALL, JR., M.D., PAUL E. PEPE, M.D.,
R. RUSSELL MARTIN, M.D., VICTORIA F. GINGER, M.S.N., MARY K. ALLEN, B.A.,
AND KENNETH L. MATTOX, M.D.

Abstract. Background: Fluid resuscitation may be delayed in patients with penetrating torso injuries. Results: Among the 333 patients who were treated...

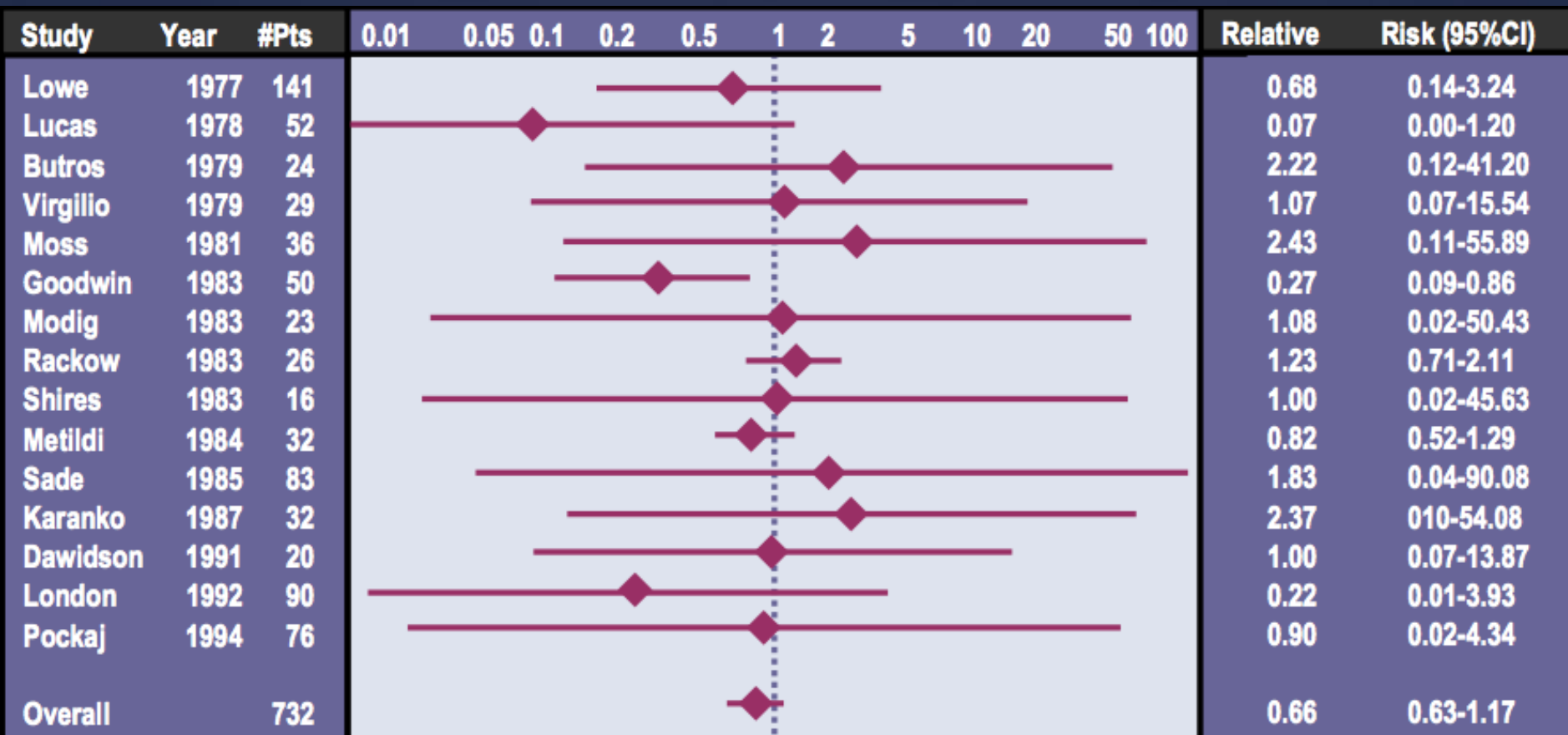
Table 5. Outcome of Patients with Penetrating Torso Injuries,
According to Treatment Group.

VARIABLE	IMMEDIATE RESUSCITATION	DELAYED RESUSCITATION	P VALUE
Survival to discharge — no. of patients/total patients (%)	193/309 (62)*	203/289 (70)†	0.04
Estimated intraoperative blood loss — ml‡	3127±4937	2555±3546	0.11
Length of hospital stay — days§	14±24	11±19	0.006
Length of ICU stay — days§	8±16	7±11	0.30

- Immed VS Delayed Resus had lower Survival 62% VS 70% P <0.04
- No Difference In Blood
- But Increased ICU and Total LOS
- OverResus with Fluid leads to ALL AKI...

Final Answer? Crystalloid or Colloids

Favors Crystalloids Favors Colloids

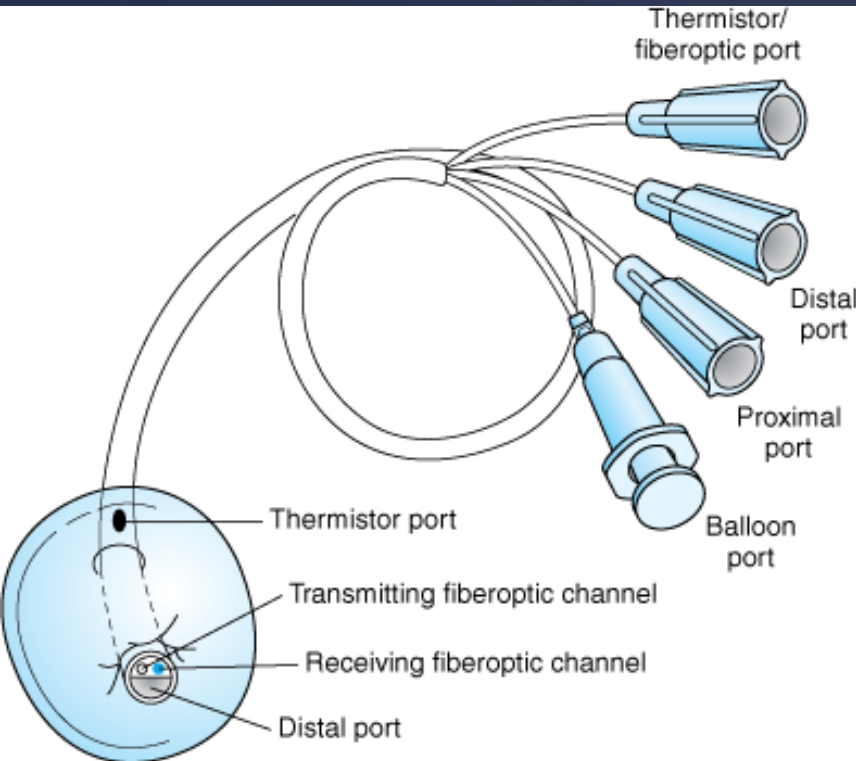


Shock Index (SI)

- * **Heart Rate/Systolic Blood Pressure;**
Normal Range, 0.5 To 0.7) Abnormal > 0.9
- * **Shock Index: A Re-evaluation In Acute**
Circulatory Failure Resuscitation Rady
1992
- * **A Non-invasive Means To Monitor**
Deterioration Or Recovery Of LVSW During
Acute Hypovolemic And Normovolemic
Circulatory Failure And Its Therapy

Scaled Way Ahead in 1986

* Central venous oxygen saturation: An early accurate measurement of volume during hemorrhage. J Trauma 1988;28:725. Scaled TM,



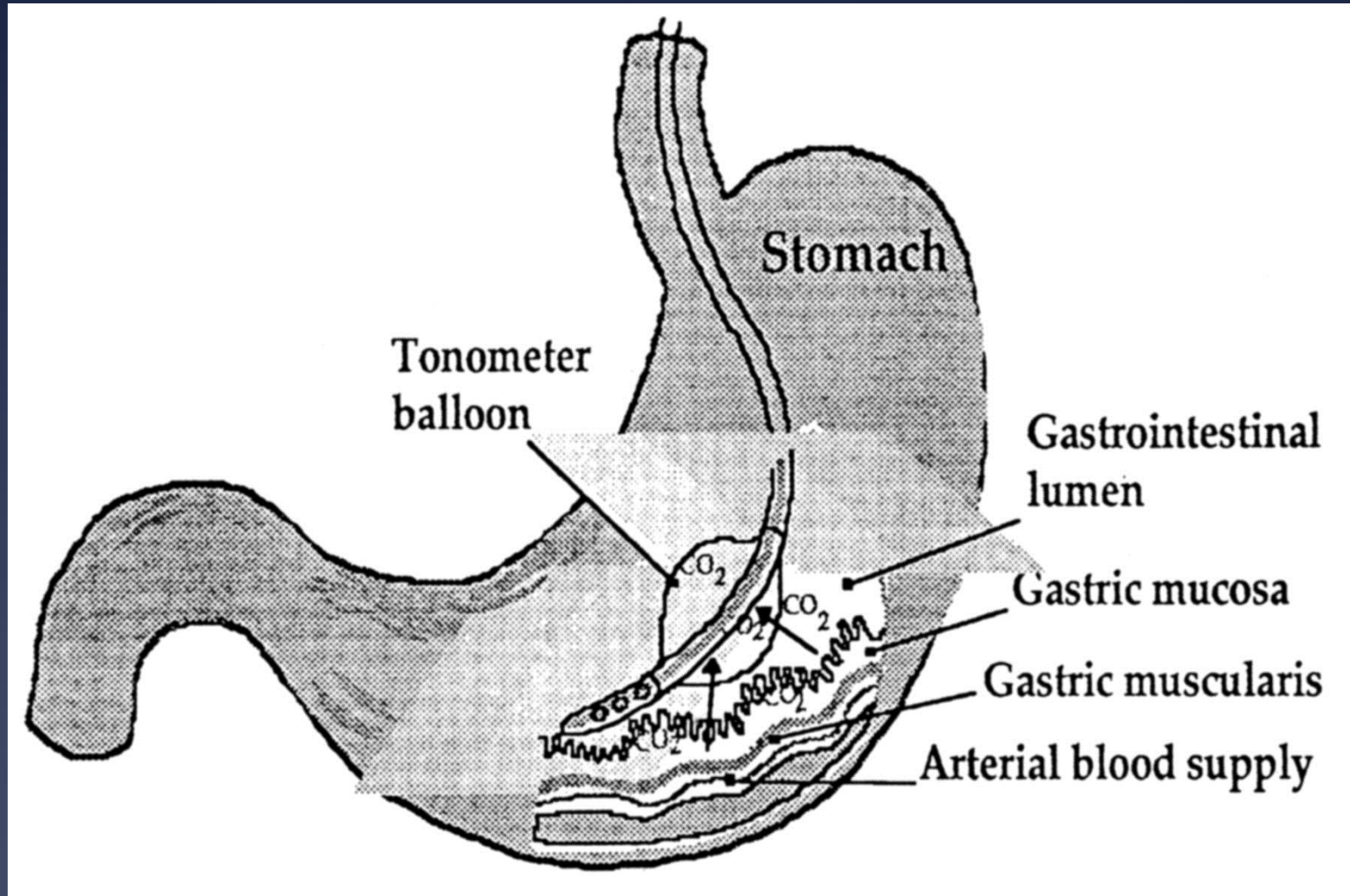
Dogs Monitored With Cath Et Al. Arterial And Mixed Venous Blood Gases Were Measured After Each 3% Blood Loss.

Mixed Venous Oxygen Saturation Showed Linearity As Function Of Measure Blood Loss.
 $R = 0.85-0.99$ With A Mean Of 0.95

Increased Tissue Oxygen Extraction After 3-6% Blood Loss.

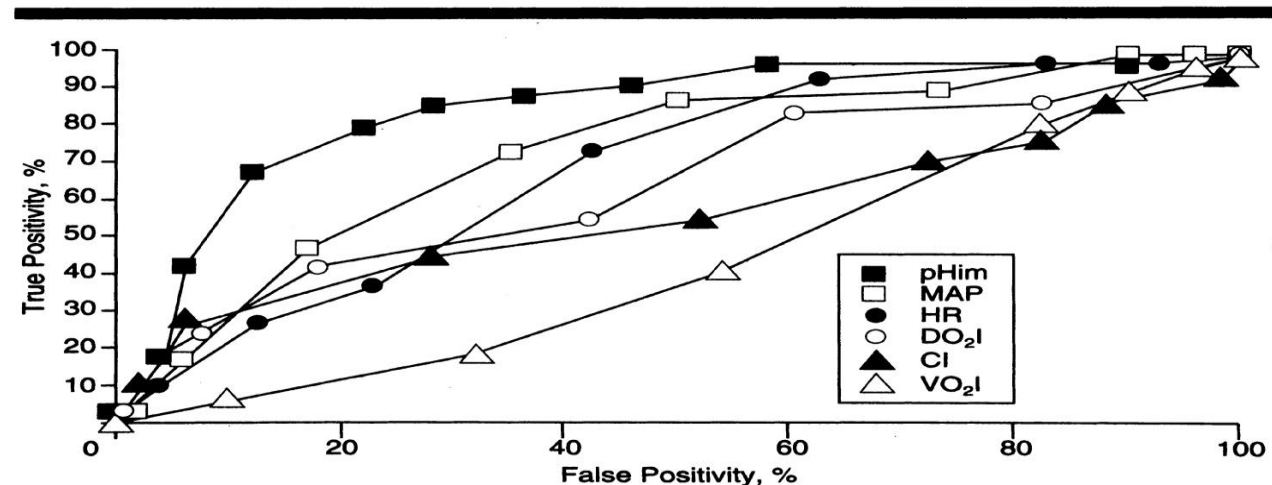
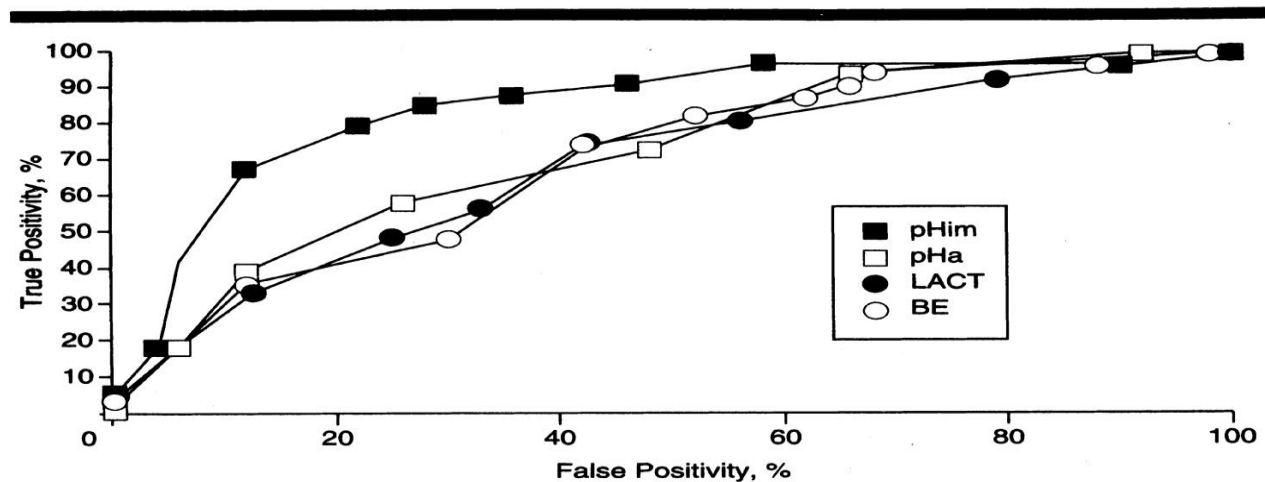
Gastric Tonometry

Easy to Place But Hard to Use

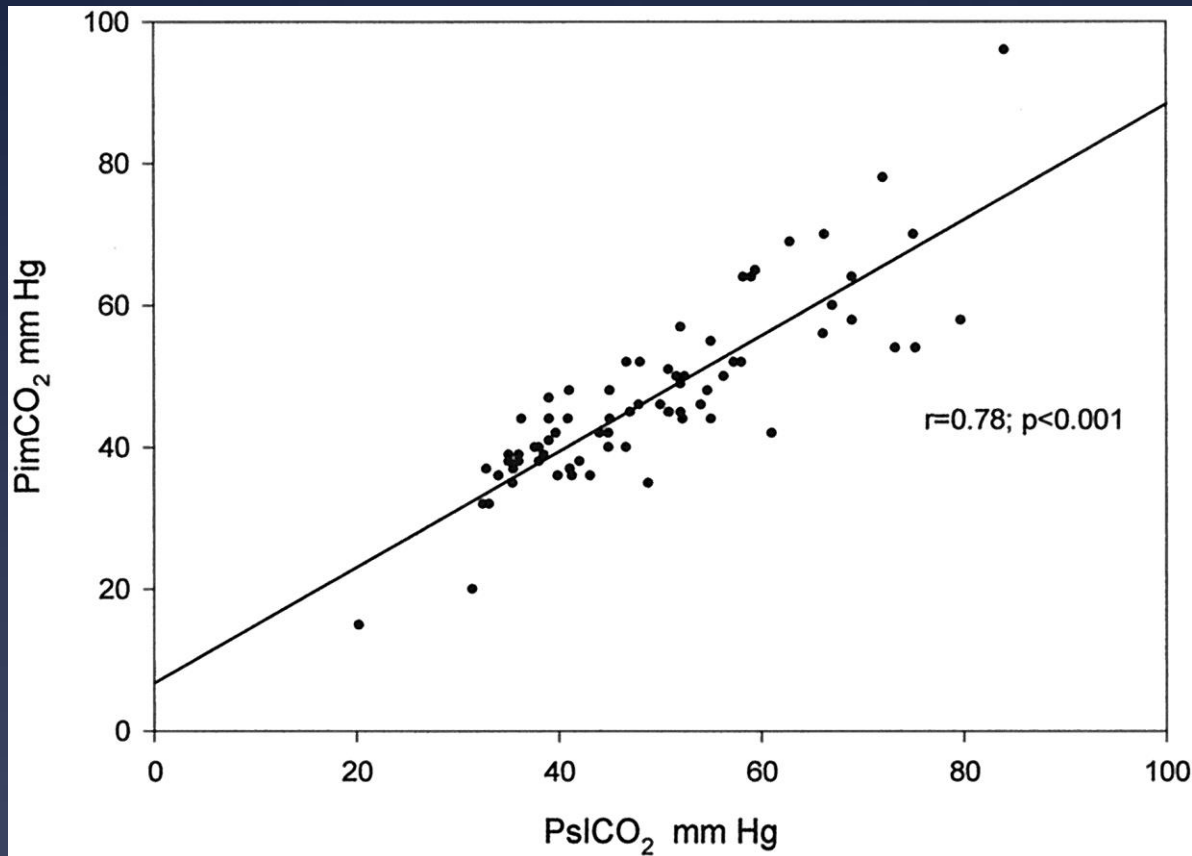


pHi Vs Parameters in Survival

* Gastric Tonometry*The Hemodynamic Monitor of Choice
Chest 2003



Sublingual Capnography



Marik chest 2001

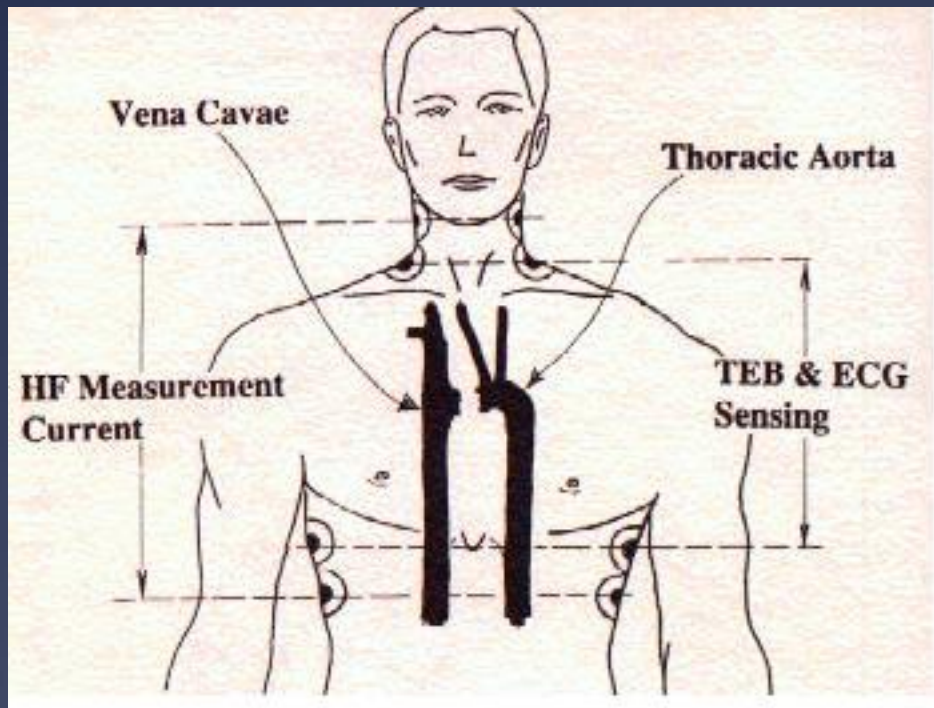
CHEST[®]

Official publication of the American College of Chest Physicians

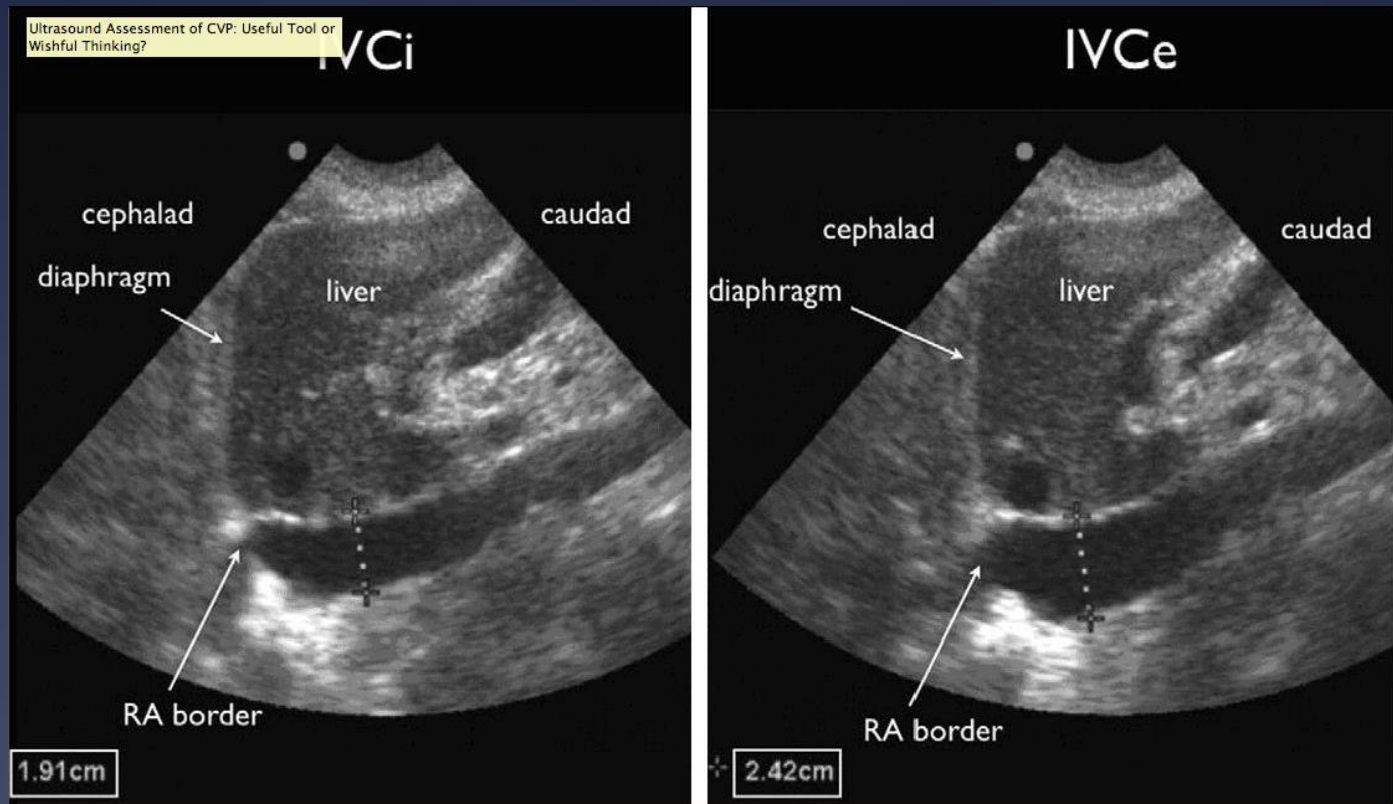
Monitor Wizards Can Be Dangerous

Eugene D. Robin and Robert F. McCauley

Chest 1998;114;1511-1513



Nagdev AD, et al. Emergency department bedside ultrasonographic measurement of the caval index for noninvasive determination of low central venous pressure. Ann Emerg Med 2010



- * Fig 1- IVC diameter at end inspire Fig 2- IVC diameter at end expire. The Caval Index calculation is $(\text{expire IVC diameter} - \text{inspire IVC diameter}) / \text{expire IVC diameter}$ and the Caval Index Percentage = caval index x 100

Costs VS Outcomes

*Is it worth it? Is 1 life for another 3-6 months worth \$150,000.

WHAT GETS REIMBURSED?

WHAT CAN I TELL MY CHAIR?

What Do I Really Want?

***To Be Left Alone Let ME
Care for my Patients!!!!**

