

Toward National Trauma Care Practice Change for PTSD & Comorbidity: Lessons Learned from the TSOS Pragmatic Trial

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Trauma Survivors Outcomes & Support (TSOS)



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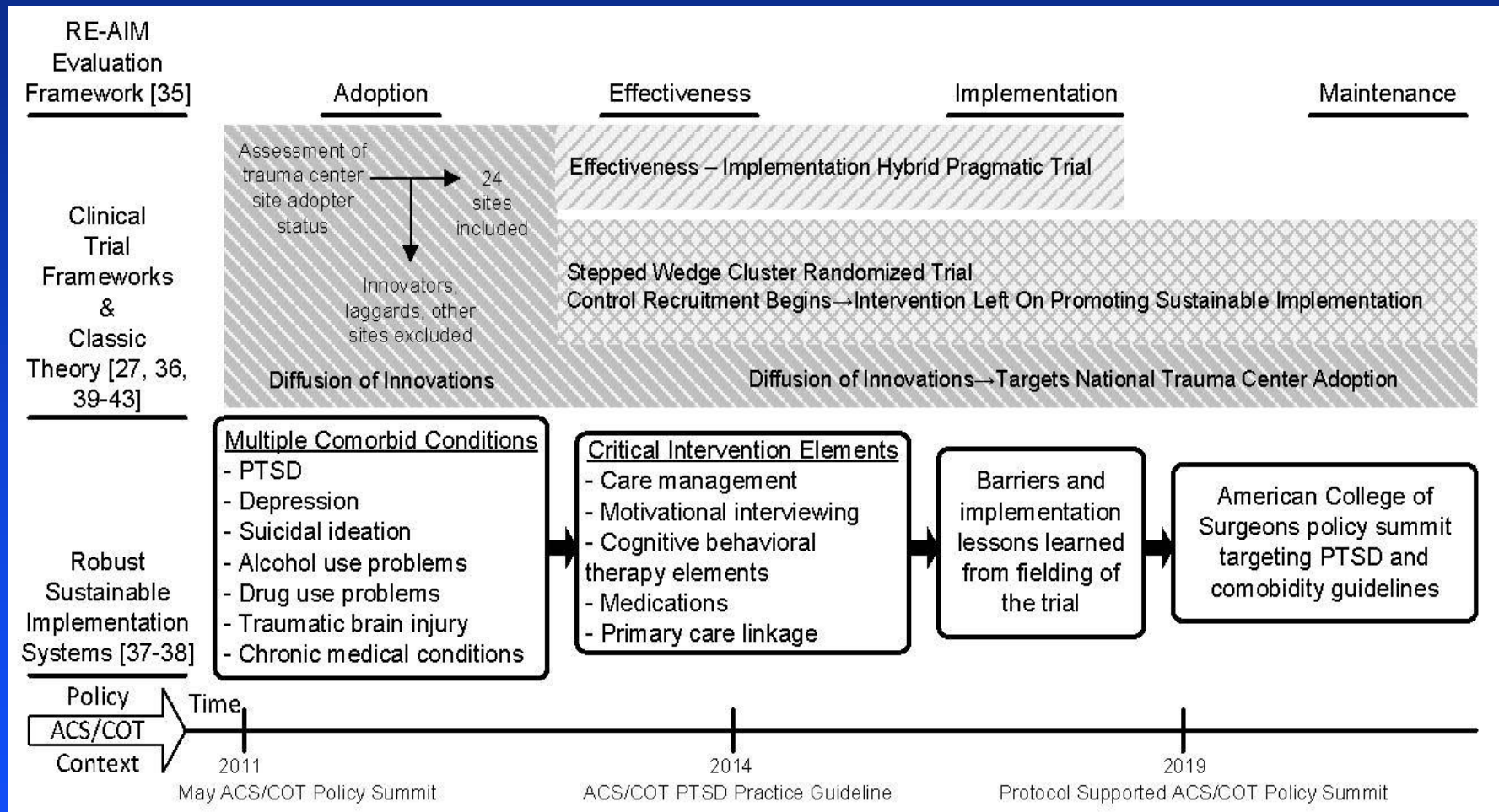
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Overview

- TSOS trial updates
- Pragmatic trials & practice change
- Implementation science & practice change
- A decade of American College of Surgeons policy
- Current TSOS activities facilitating practice change
 - Recent TSOS Multiple Chronic Condition findings & “A National Trauma Care System Zero Preventable Deaths” policy discussion
 - TSOS intervention design elements
 - TSOS collaborative publication in the service of PTSD & comorbidity practice change
- Summary and future directions

TSOS Effectiveness-Implementation Hybrid Pragmatic Trial Framework



TSOS Pragmatic Trial Update

- 25 US level I trauma center sites
- 516 Patients consented/screened
 - 305 patients randomized
 - 59% PTSD EHR screen in rate
- Stepped wedge intervention roll-out
 - 2/4 intervention waves trained
- 70-80% 3 & 6 mo. follow-up to date

TSOS Challenges, Strengths, and Lessons Learned

Challenges

25 site regulatory considerations

25 site information technology issues

Strengths

Intervention roll-out

Policy arm targeting practice change

Pragmatic Trials & Practice Change

Pragmatic Trials & Practice Change

- Ellenberg et al Data Monitoring Committees for Pragmatic Clinical Trials, Clinical Trials Oct 2015
- Discussion of trial futility:

Why would a trial continue if results were unlikely to change practice?

Implementation Science & Practice Change

- Diffusion of Innovations (Rogers 1995)
- Variability in uptake of a new practice
 - Innovators
 - Early Adopters
 - Middle Adopters
 - Late Adopters
 - Laggards

US Trauma Center Adoption



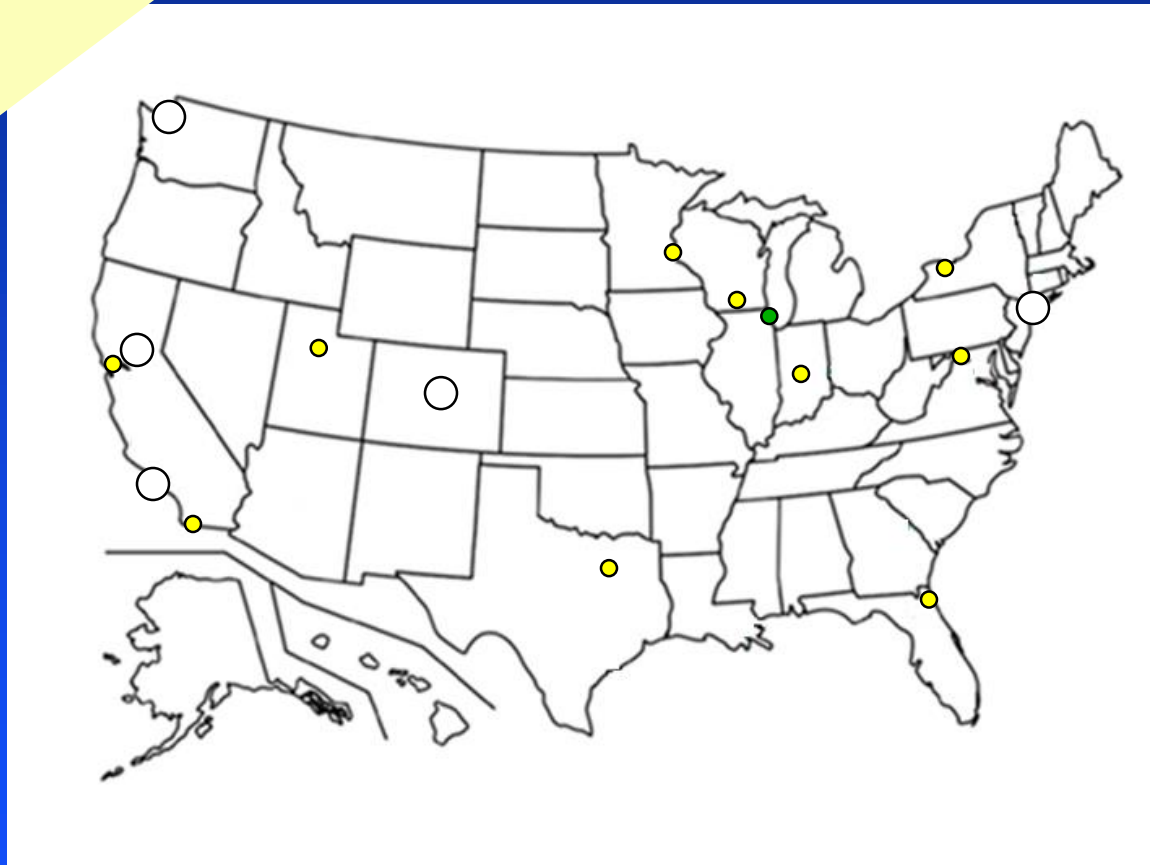
US Trauma Center Adoption

○ Innovator



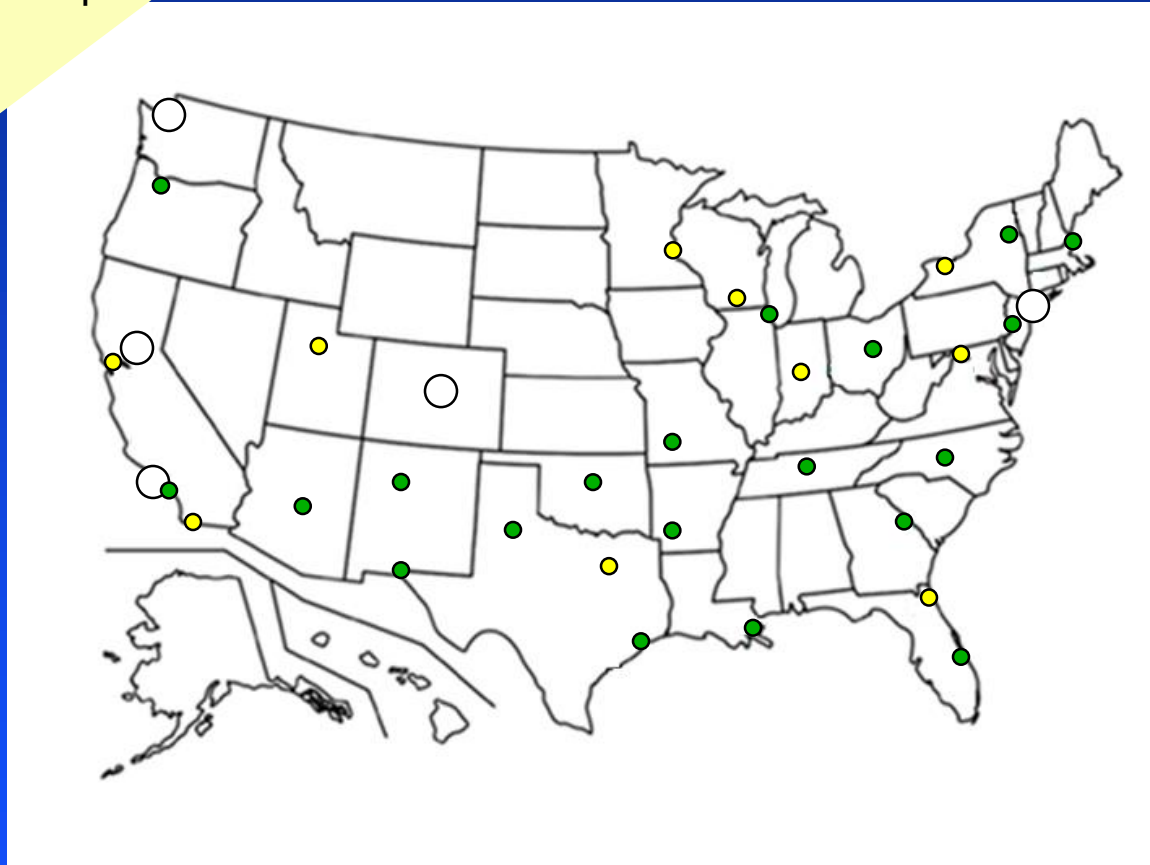
US Trauma Center Adoption

- Innovator
- Early Adopter



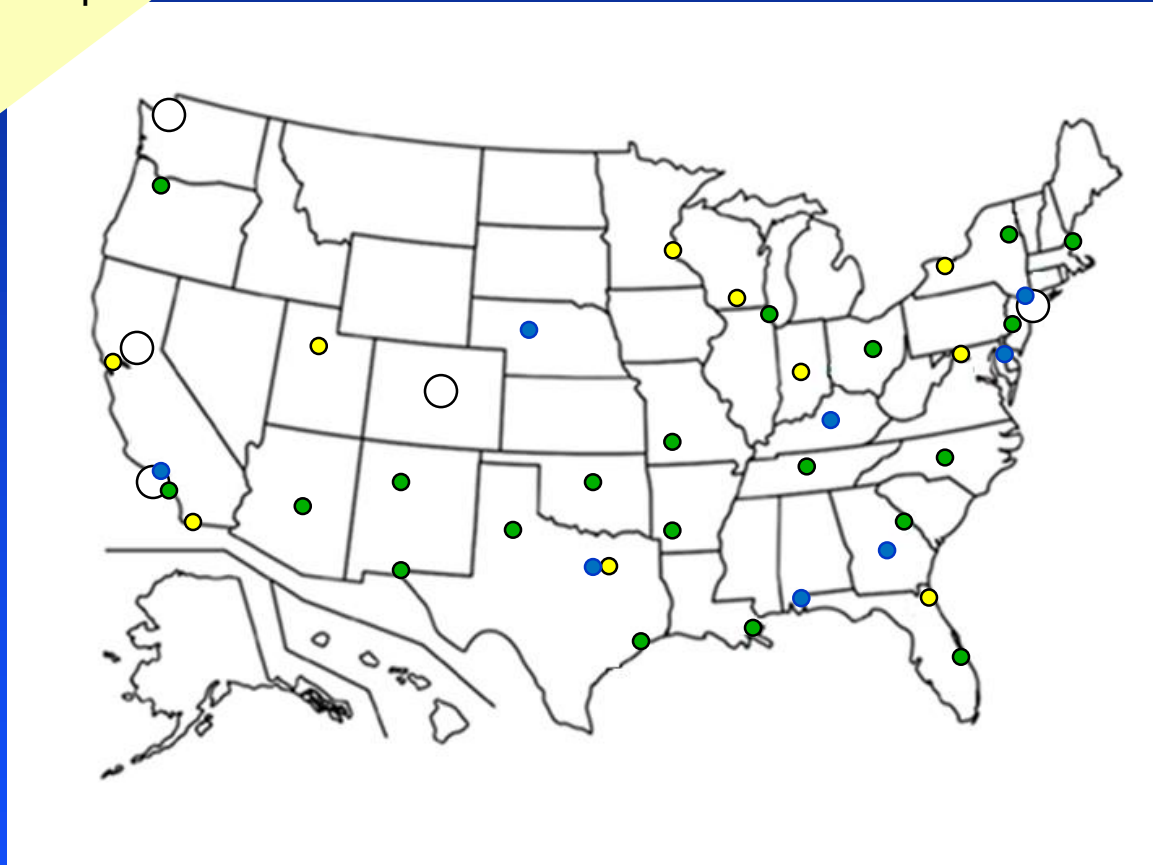
US Trauma Center Adoption

- Innovator
- Early Adopter
- Middle Majority Adopter



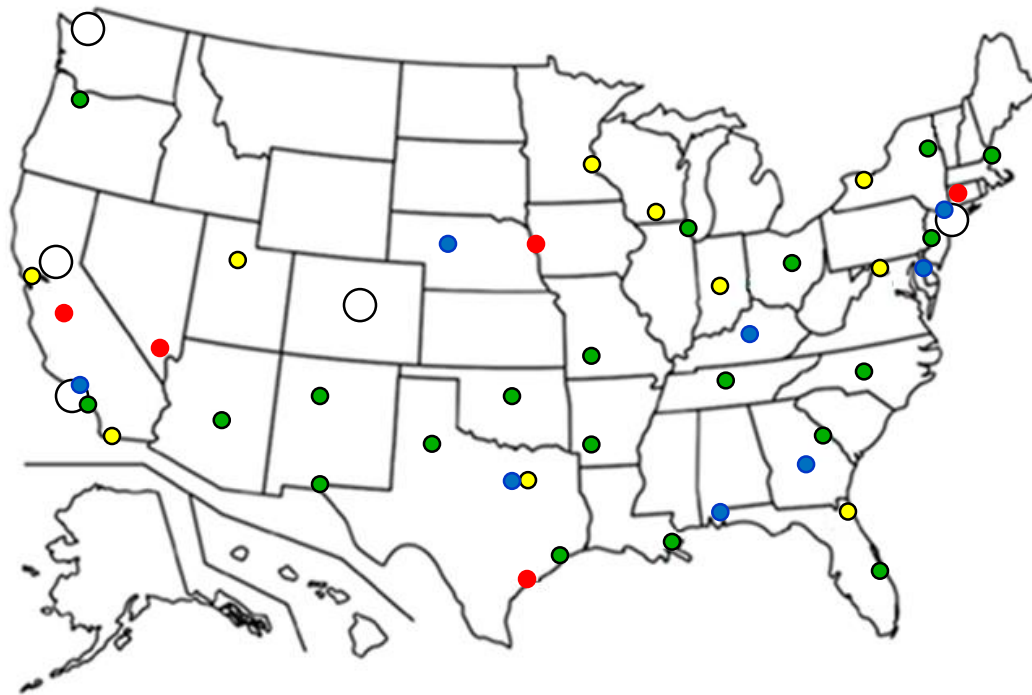
US Trauma Center Adoption

- Innovator
- Early Adopter
- Middle Majority Adopter
- Late Adopter

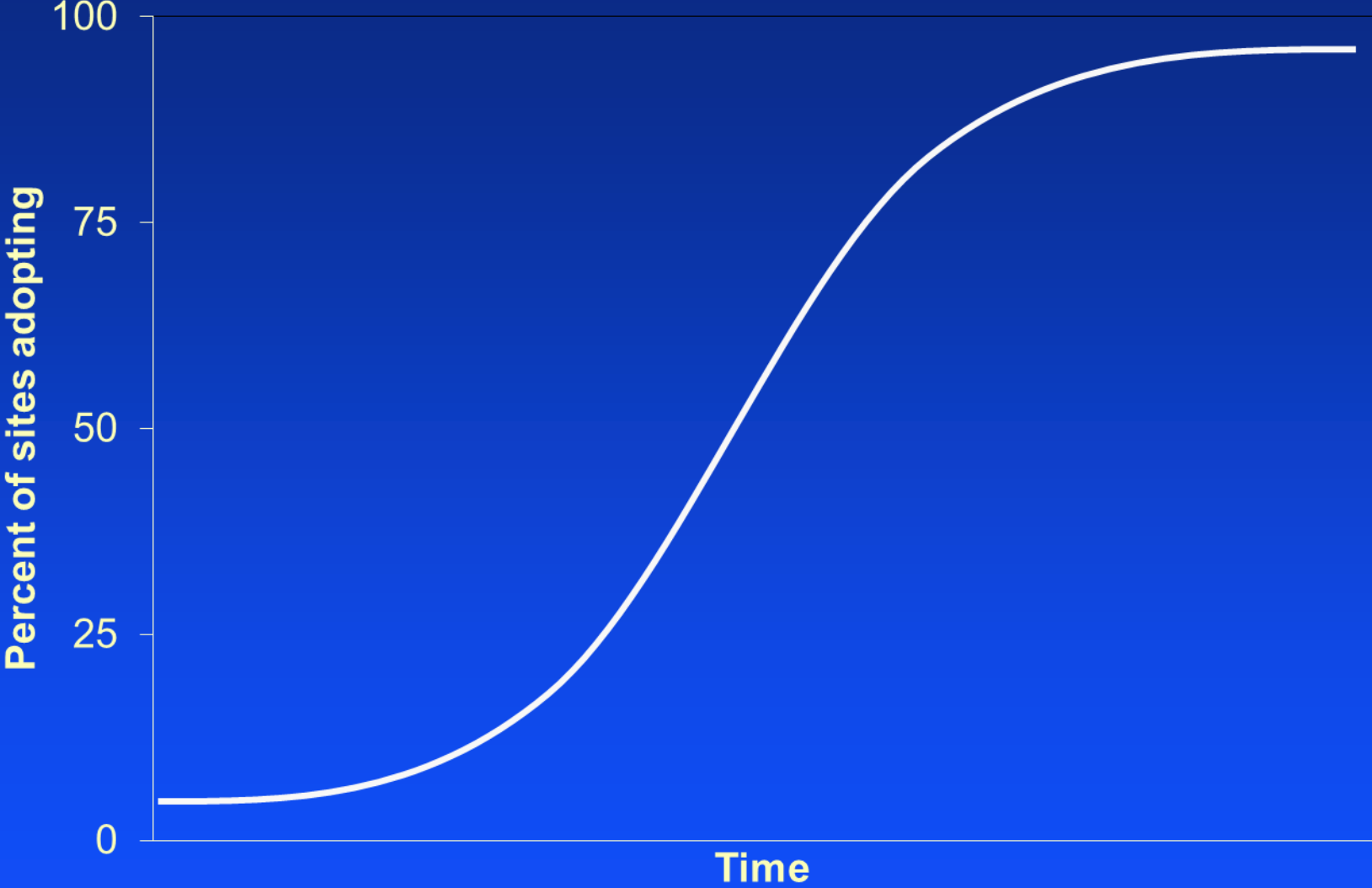


US Trauma Center Adoption

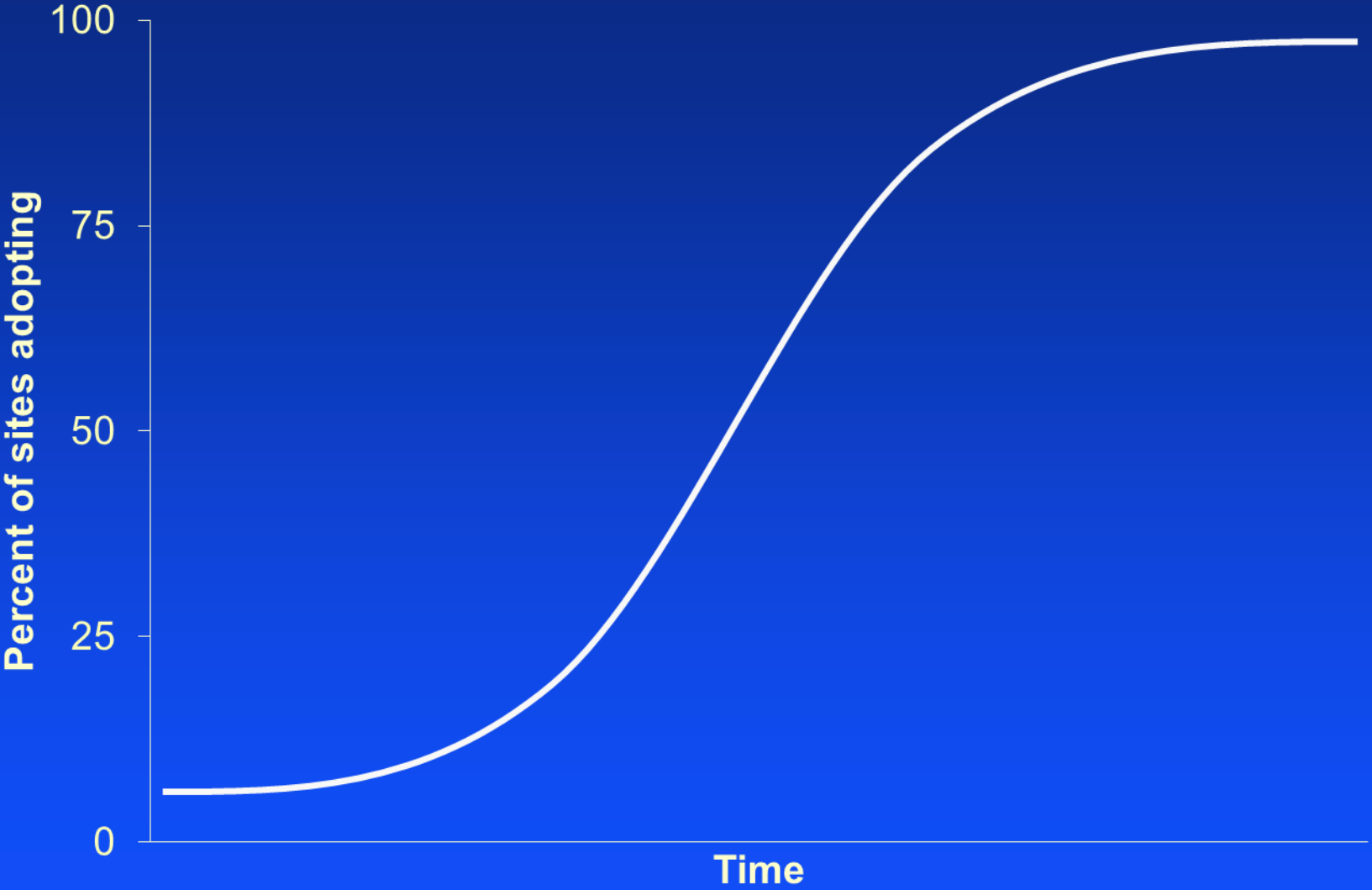
- Innovator
- Early Adopter
- Middle Majority Adopter
- Late Adopter
- Laggard



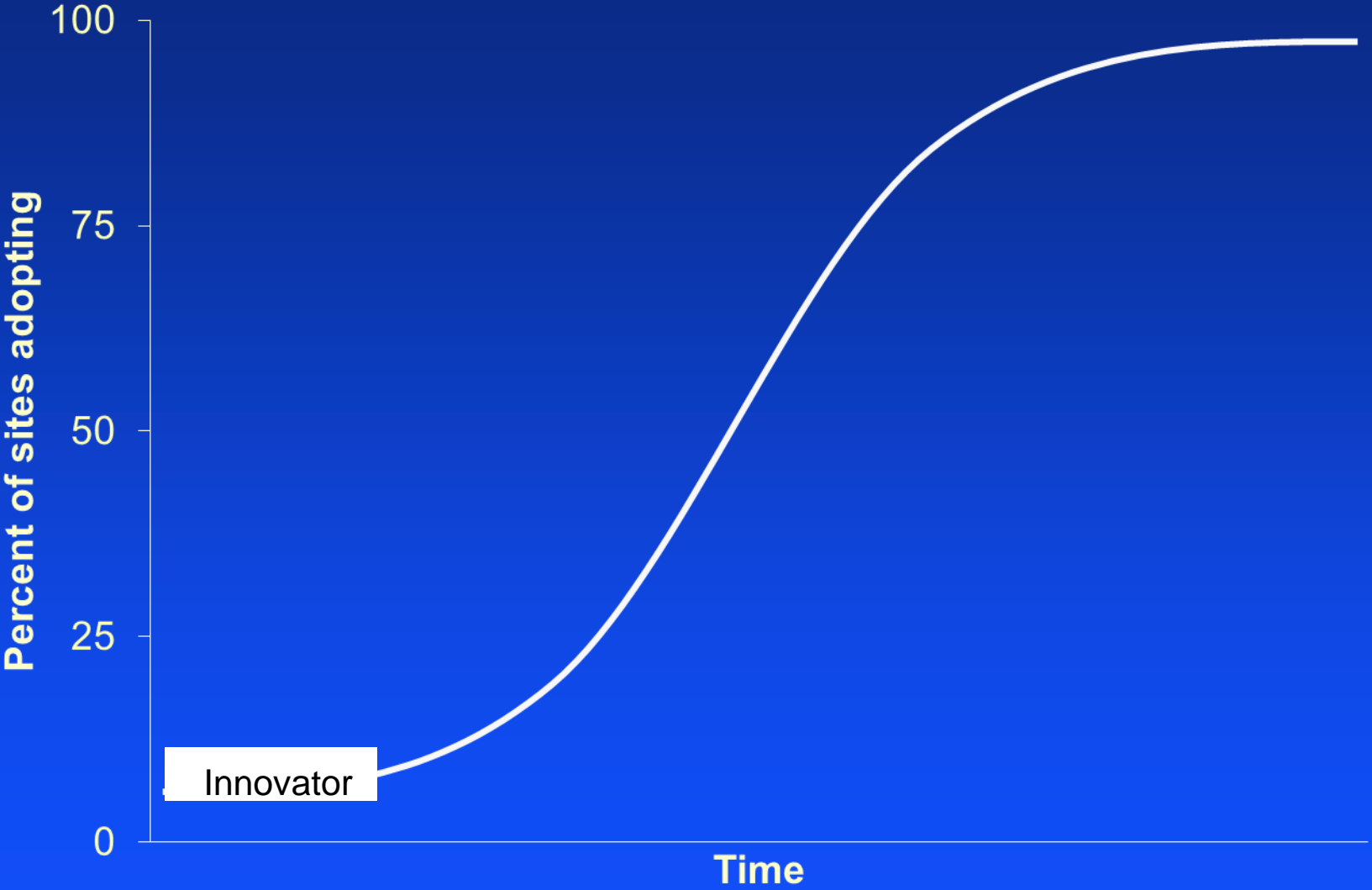
US Trauma Center Adoption Curve



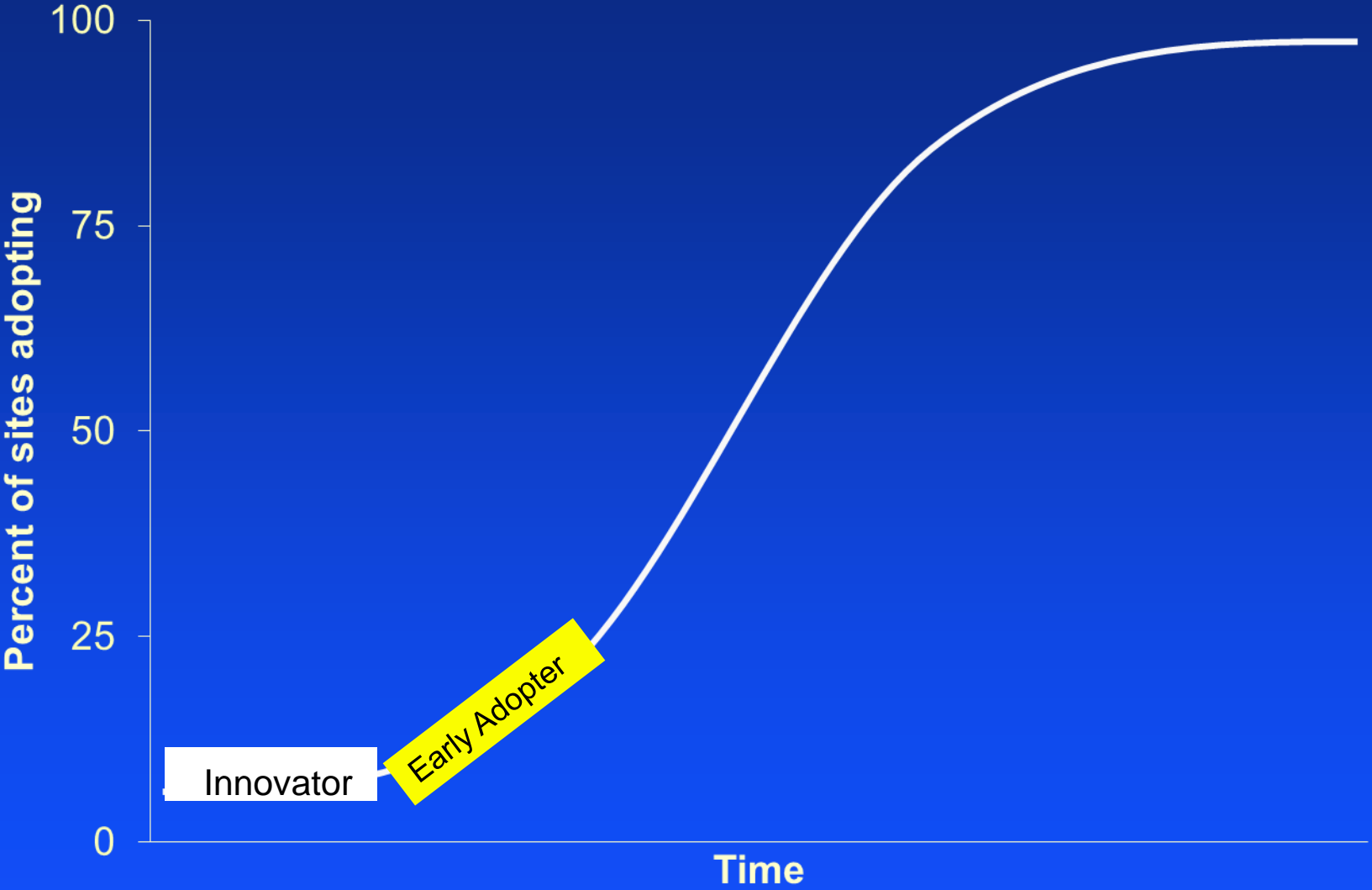
US Trauma Center Adoption Curve



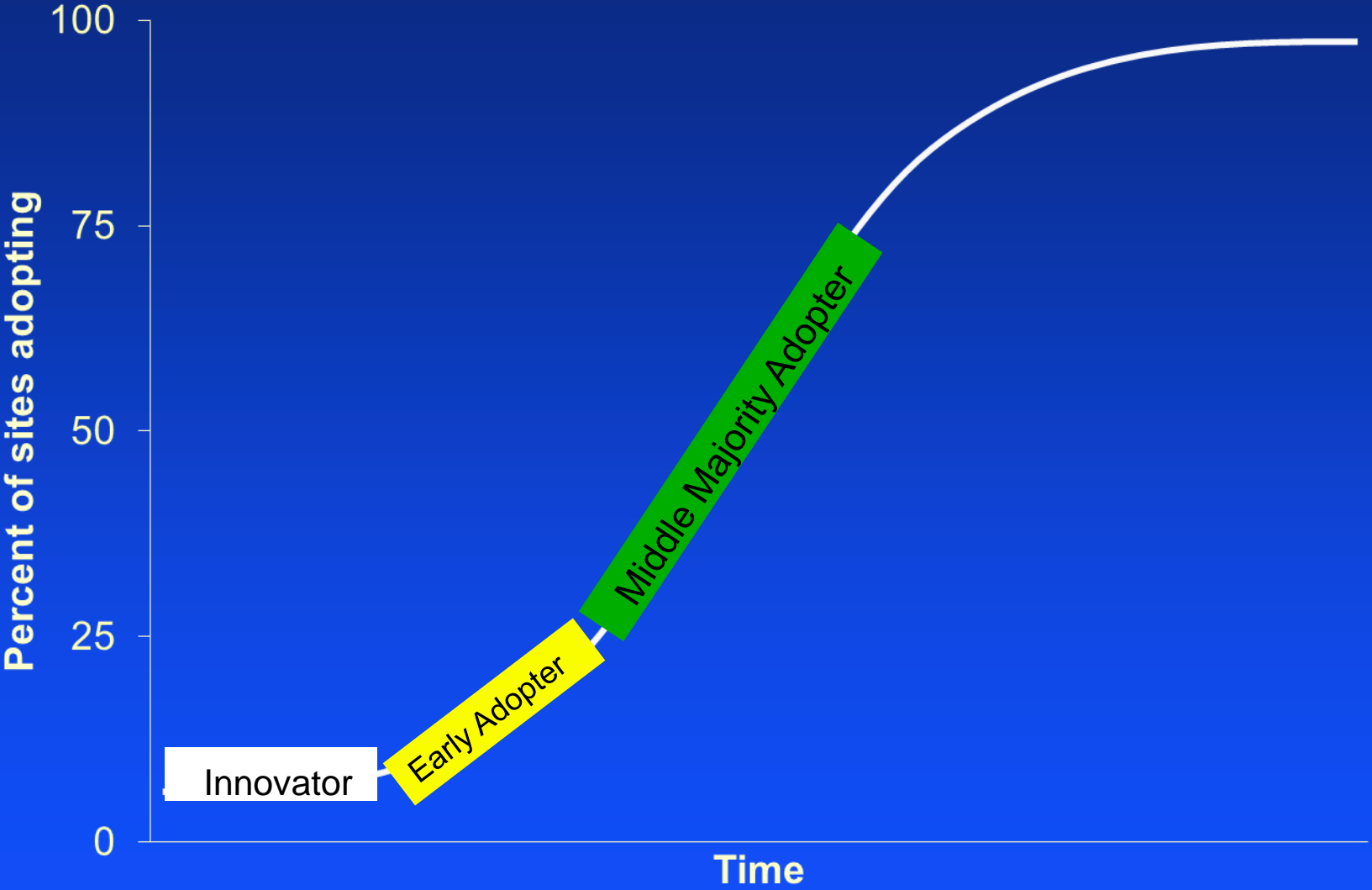
US Trauma Center Adoption Curve



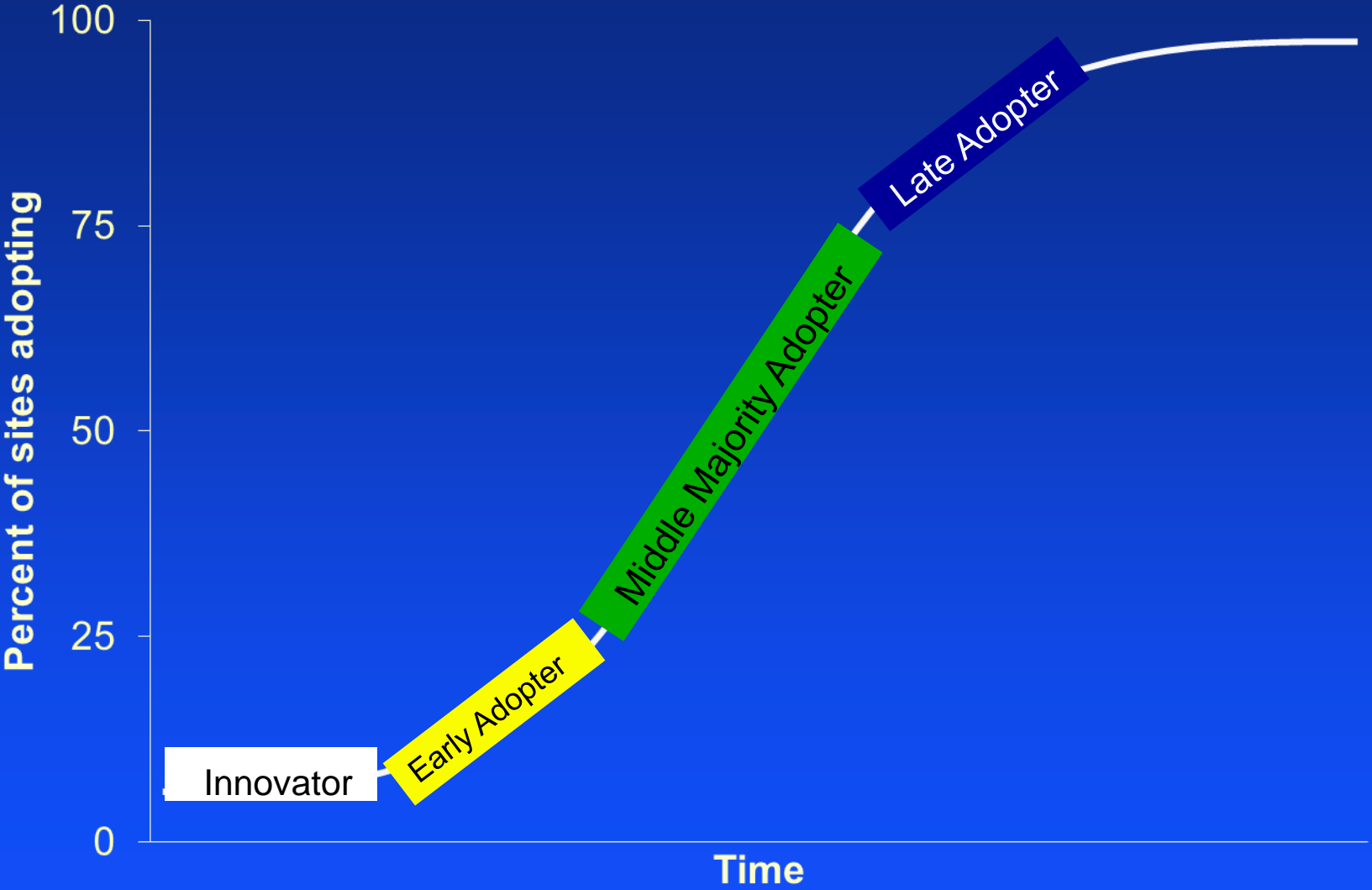
US Trauma Center Adoption Curve



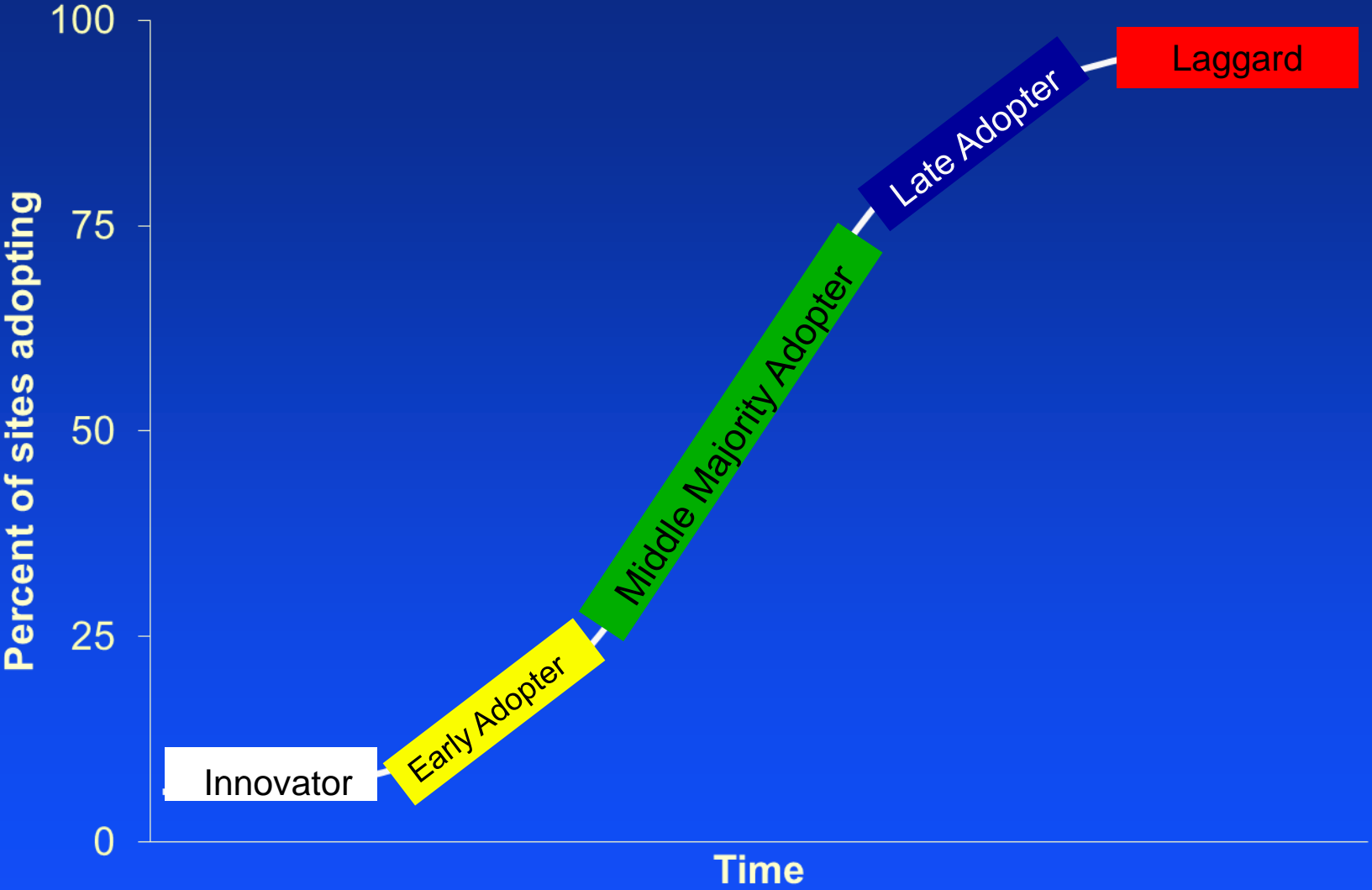
US Trauma Center Adoption Curve



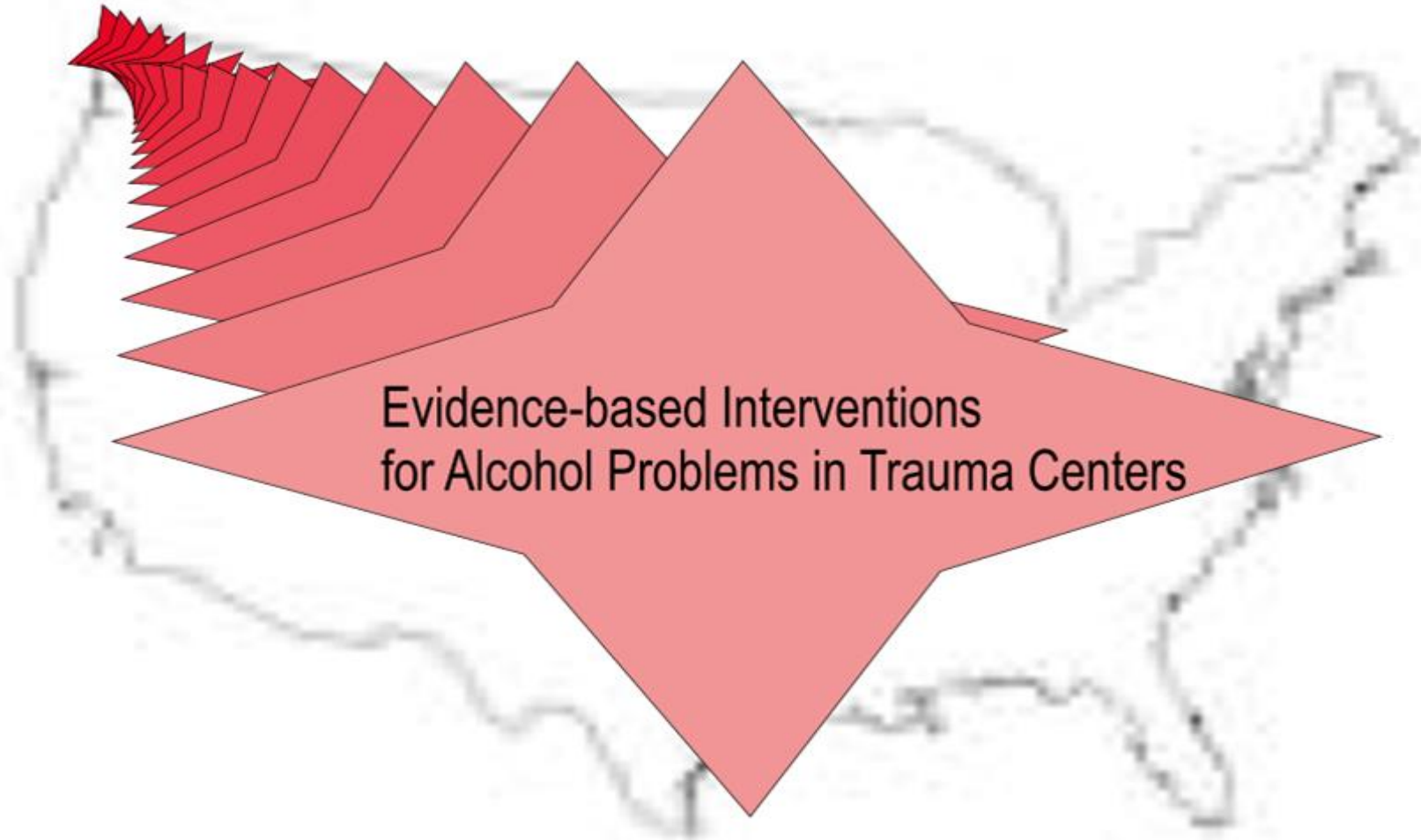
US Trauma Center Adoption Curve



US Trauma Center Adoption Curve



**Disseminating Organizational Screening & Brief Interventions
(DO-SBIS)**



Evidence-based Interventions
for Alcohol Problems in Trauma Centers

DO-SBIS Trauma Center Adopter Categorization

Category	Color	Surgeon Champion	Other Champion (eg RN)	NIH Funded Alcohol Research	FTE Allocation	Prior Training	Blood Alcohol Drawn	Responses to ACS Survey	ACS Survey Response
Innovator	White	Yes	Yes	Yes	Yes	Yes	Yes	Mean of 4 items <7	Yes
Early Majority	Yellow	Yes/No	Yes/No	No	Yes/No	Yes/No	Yes	Mean of 4 items >7	Yes
Middle Majority	Green	Yes/No	Yes/No	No	Yes/No	No	Yes	Mean of 4 items >7	Yes
Late Majority	Dark Blue	Yes/No	Yes/No	No	Yes/No	No	Yes	No mean specified	Yes
Laggard	Red	No	No	No	No	No	No	Mean of 4 items <7	No

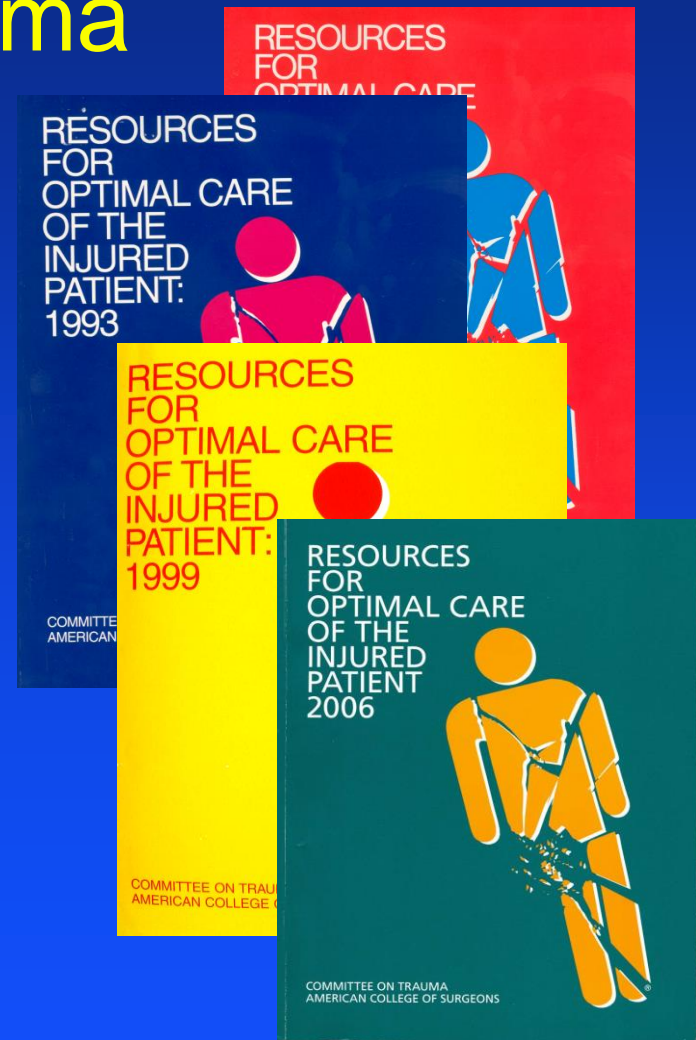
American College of Surgeons'
Committee on Trauma Policy
Targeting Practice Change

American College of Surgeons' Committee on Trauma Policy

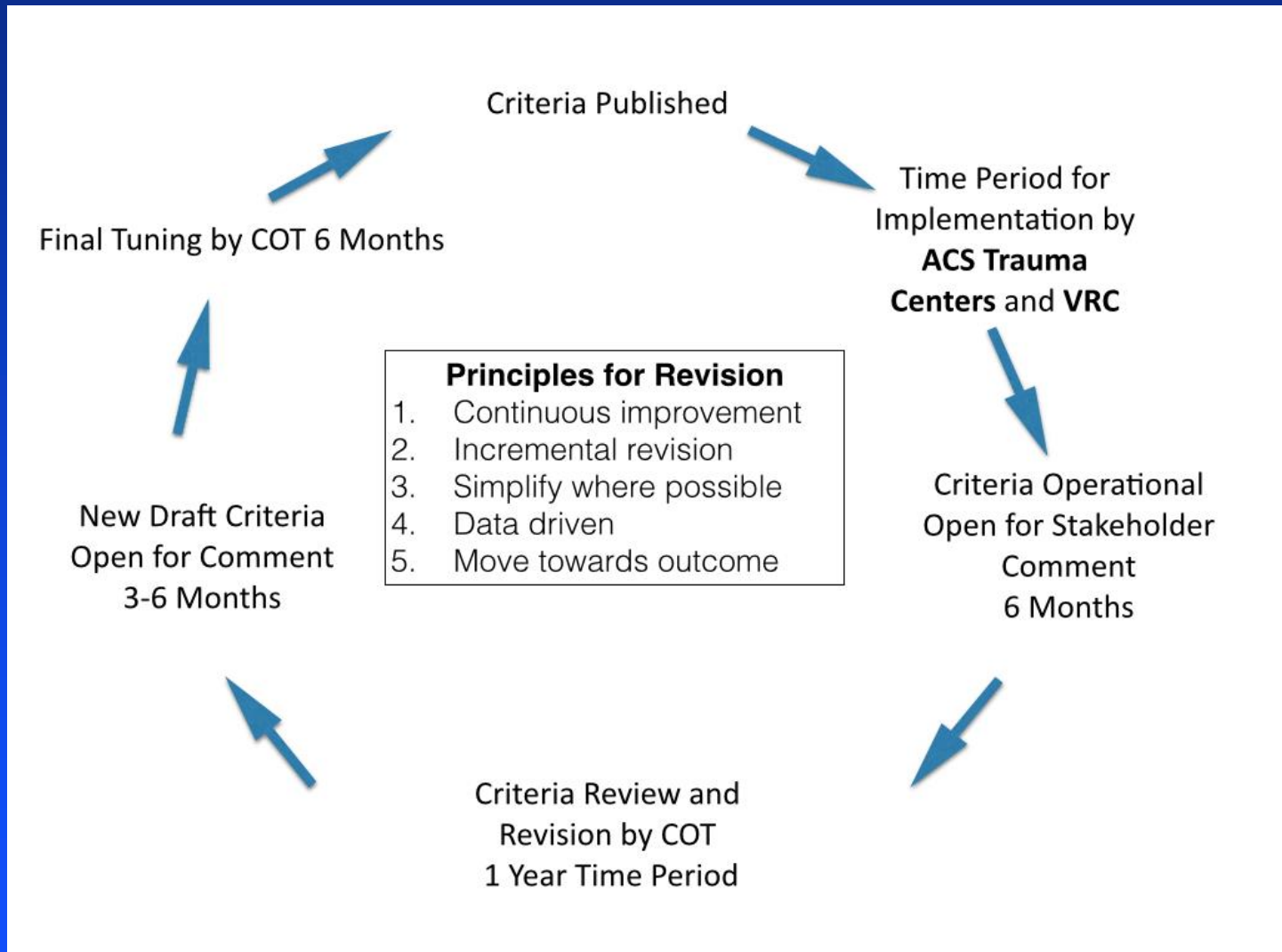


American College of Surgeons' Committee on Trauma

- 1976 1st Book
- 2006 “Green Book”
- 2014 “Orange Book”



American College of Surgeons' Resources Guide Revision Process

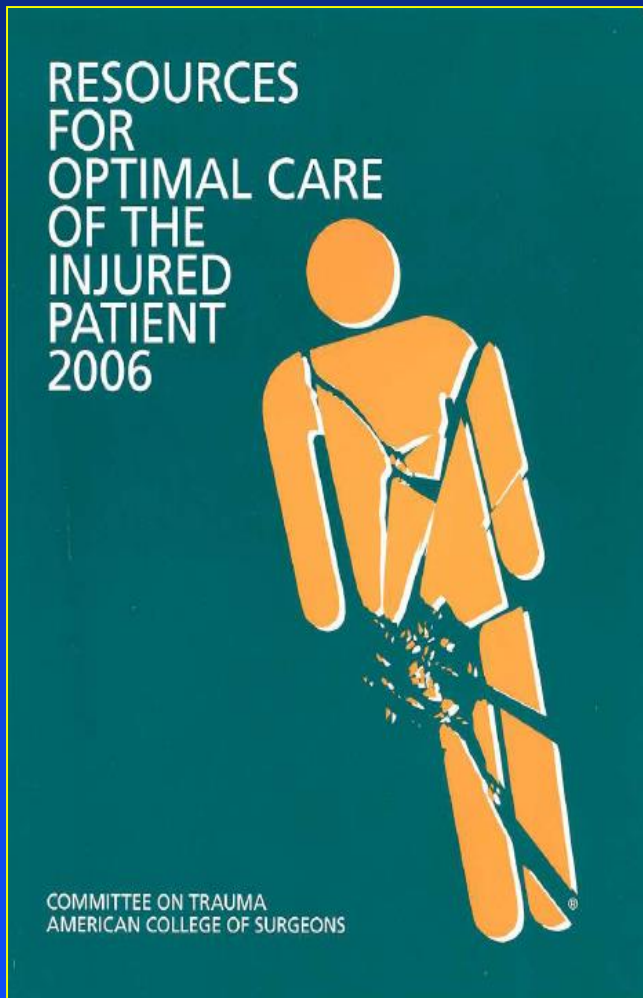


Two Decades of Orchestrated Clinical Trials & American College of Surgeons' Policy



Prevention

Chapter 18

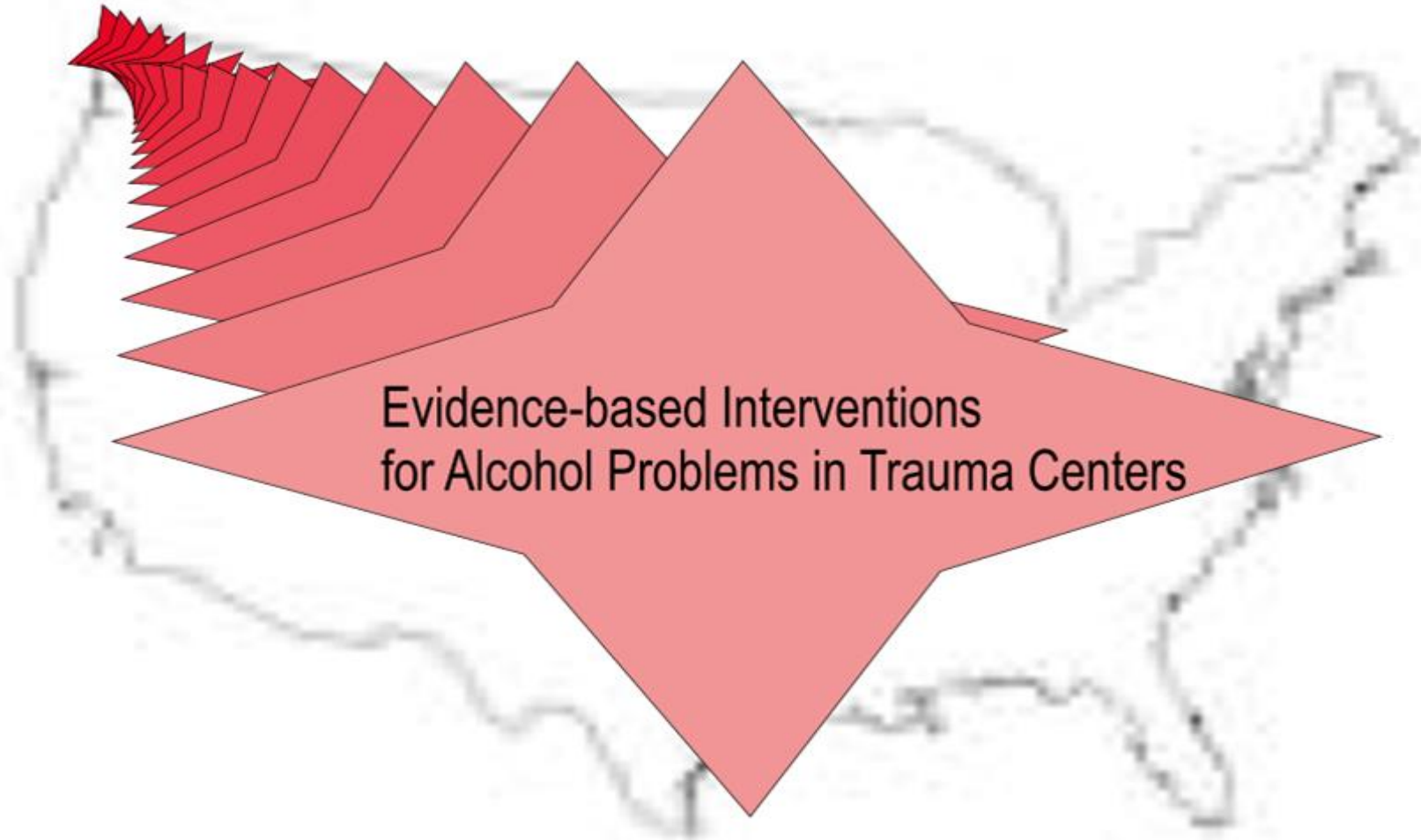


2006

“Alcohol is such a significant associated factor and contributor to injury that it is vital that level I and level II trauma centers have a mechanism to identify patients who are problem drinkers.”

“In addition, level I centers must have the capability to provide an intervention for patients identified as problem drinkers.”

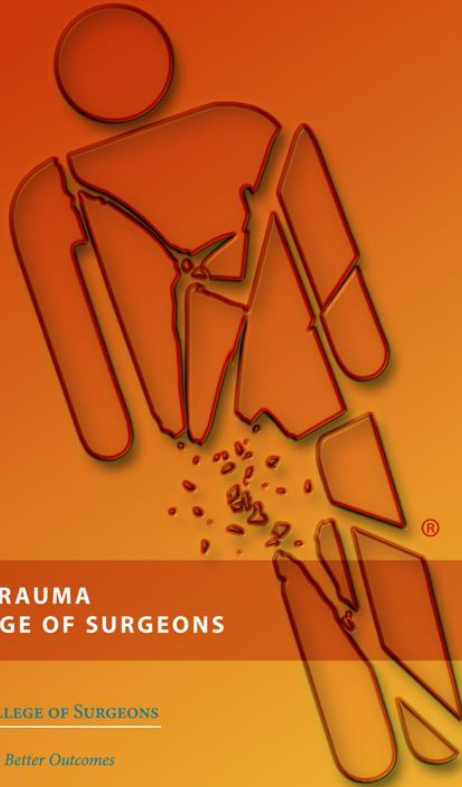
**Disseminating Organizational Screening & Brief Interventions
(DO-SBIS)**



Evidence-based Interventions
for Alcohol Problems in Trauma Centers

RESOURCES
FOR OPTIMAL CARE
OF THE INJURED PATIENT

2014



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Highest Standards, Better Outcomes*

100+ years

Alcohol

Universal Screening
& Intervention at
Level I & II trauma
centers

2014

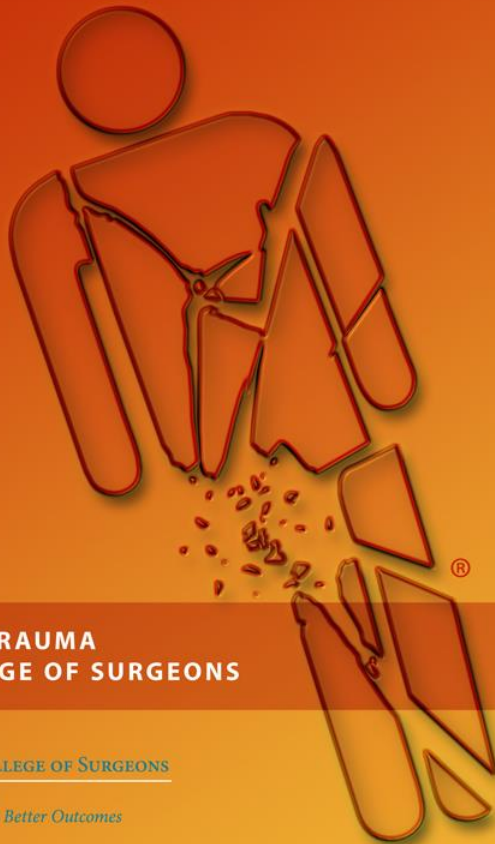
Two Decades of Orchestrated Clinical Trials & American College of Surgeons' Policy



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PTSD

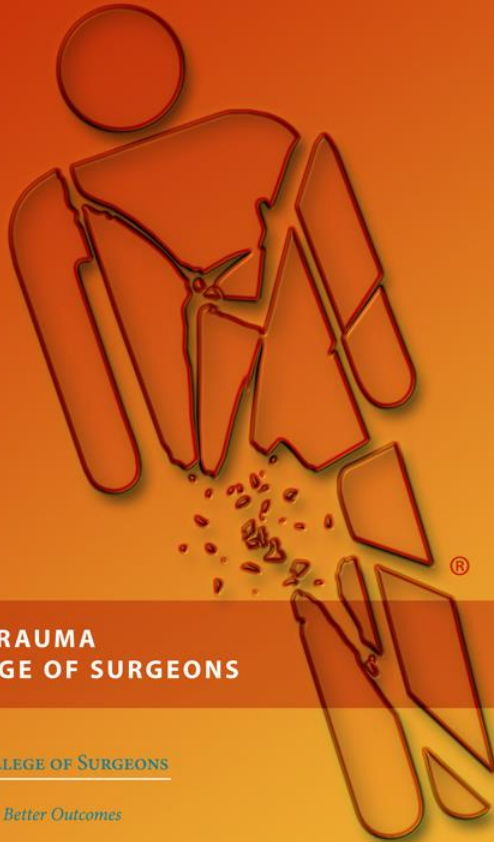
PTSD screening &
intervention best
practice guideline
recommendation

2014

RESOURCES

FOR OPTIMAL CARE
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2014



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PTSD

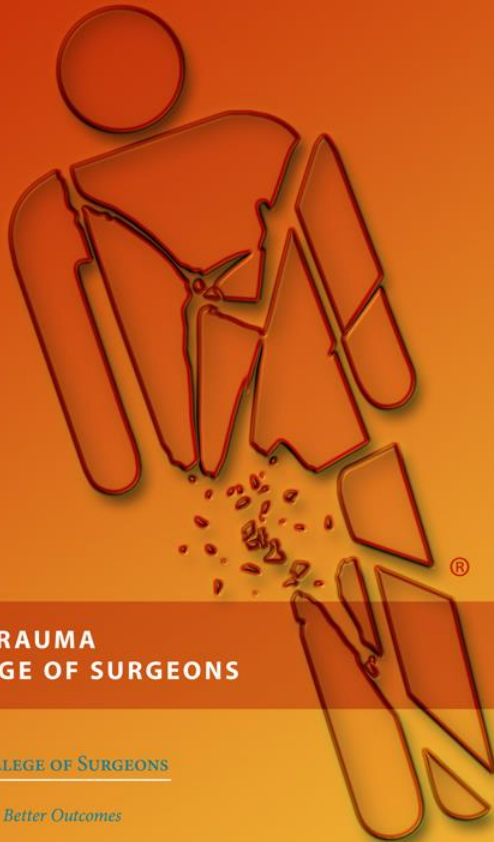
“The incorporation of routine trauma center–based screening and intervention for PTSD and depression is an area that could benefit from the ongoing integration of emerging data and evolving expert opinion”.

2014

RESOURCES

FOR OPTIMAL CARE
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2014



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Patient-Centered Care

Three studies reviewed at
ACS/COT Policy summit
9-23-16

Resource guide
informational guideline
recommendations under
review by COT

2016

Current TSOS Activities Targeting Practice Change

Current TSOS Activities Targeting Practice Change

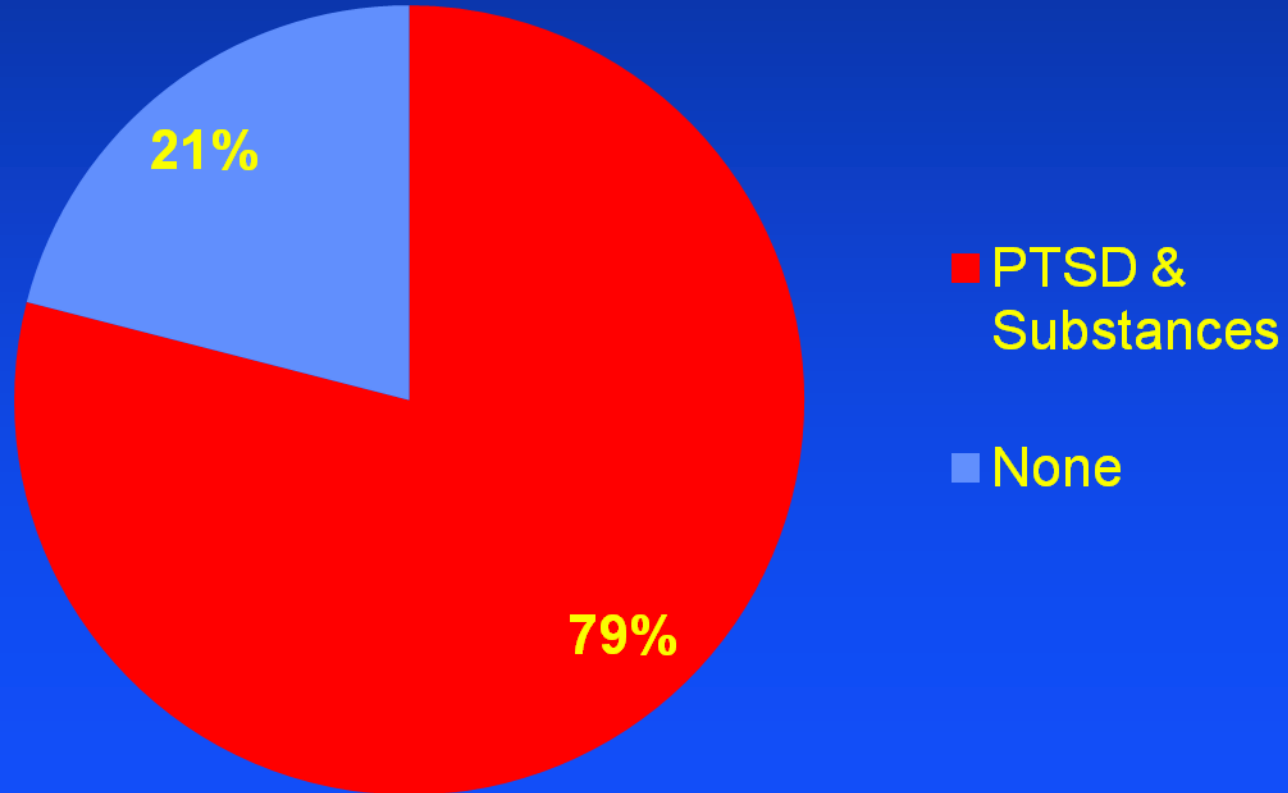
- Recent TSOS multiple chronic condition research findings and “A National Trauma Care System Zero Preventable Deaths” policy discussion
- TSOS intervention design elements
- TSOS collaborative publication in the service of PTSD & comorbidity practice change

Achieving Zero Preventable Deaths: Building a National Trauma Care System and Research Action Plan

NIH Campus April 18-19 2017

- Primary focus on “resuscitation” deaths
- TSOS study team advocating for greater focus on preventable deaths from mental health/ substance use etiologies including suicide and unintentional overdose

Co-morbidity: PTSD, Depression/Suicidal Ideation, & Alcohol and Drug Use Problems Among Randomly Selected Trauma Surgery Inpatients (N=878)



Mental Health, Alcohol, Drug, Violence, Suicide & Chronic Medical Conditions in Trauma Patients: More is Worse

The Cumulative Burden of Mental, Substance Use, and General Medical Disorders and Rehospitalization and Mortality After an Injury

Douglas F. Zatzick, M.D., Ali Rowhani-Rahbar, M.D., Ph.D., Jin Wang, Ph.D., Joan Russo, Ph.D., Doyanne Darnell, Ph.D., Leah Ingraham, B.S., Lauren K. Whiteside, M.D., M.S., Roxanne Guiney, B.A., Margot Kelly Hedrick, Frederick P. Rivara, M.D., M.P.H.

Objective: Each year in the United States, 1.5–2.5 million individuals require hospitalization for an injury. Multiple mental, substance use, and chronic general medical disorders are endemic among injury survivors with and without traumatic brain injury (TBI), yet few studies have assessed the association between the cumulative burden of these conditions and health care outcomes. This study of patients hospitalized for an injury assessed associations between comorbid mental, substance use, and general medical disorders, TBI, and violent events or suicide attempts and the postinjury outcomes of recurrent hospitalization and death.

Methods: Recurrent hospitalization and all-cause mortality were examined in this population-based retrospective cohort study. A total of 76,942 patients hospitalized for an injury in Washington State during 2006–2007 were followed for five years. *ICD-9-CM* codes identified conditions prior to or at the index injury admission. Index admissions related to injuries from firearms, assaultive violence,

suicide attempts, and overdoses were identified through E-codes.

Results: Adjusted regression analyses demonstrated a significant, dose-response relationship between an increasing cumulative burden of disorders and an increasing risk of recurrent hospitalization (four or more conditions, relative risk=3.89, 95% confidence interval [CI]=3.66–4.14). Adjusted Cox proportional hazard regression demonstrated a similar relationship between increasing cumulative burden of disorders and all-cause mortality (four or more conditions, hazard ratio=5.33, CI=4.71–6.04).

Conclusions: Increasing cumulative burden of disorders was associated with greater postinjury risk of recurrent hospitalization and death. Orchestrated investigative and policy efforts could introduce screening and intervention procedures that target this spectrum of comorbidity.

Psychiatric Services in Advance (doi: 10.1176/appi.ps.201600311)

Washington State Trauma Care System (N = 76,942)

- Retrospective cohort study
- 76,942 injury admits 2006-2007
- ICD comorbidity & E-Codes assessed
 - Mental Health Diagnosis
 - Alcohol Diagnosis
 - Drug Diagnosis
 - Chronic medical Diagnosis
 - Suicide admission
 - Gun violence admission
- 5 year outcomes
 - Recurrent hospital admissions
 - All cause mortality

Washington State Trauma Care System (N = 76,942)

- 29% Mental health DX
- 25% Alcohol DX
- 21% Drug DX
- 62% Chronic medical DX
- 14% Suicide/overdose admission
- 4% Gunshot/assault admission

Comorbidity Cumulative Burden: All Cause Mortality Dose-Response

- ↑ Mortality with ↑ Disorders

<u>Group</u>	<u>HR</u>	<u>95% CI</u>
≥4 Disorders	5.3	4.7, 6.0
3 Disorders	3.8	3.4, 4.3
2 Disorders	3.5	3.1, 3.9
1 Disorder	2.5	2.2, 2.8
0 Disorders	---	-----

TSOS Intervention Design Nudges Trauma Center Practice Change

- Stepped wedge design begins each site as control
- When intervention “turned on” control patient cases reviewed

Why Trauma Survivors Outcomes & Support (TSOS)?

The problem

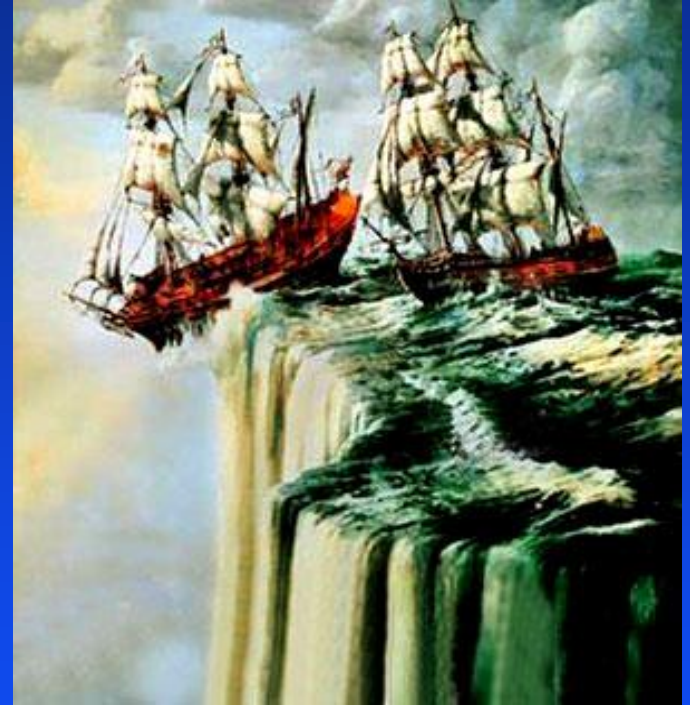
Traumatic injury

PTSD, depression, suicidal ideation

High risk behaviors (e.g., alcohol)

Traumatic brain injury

Chronic medical conditions common



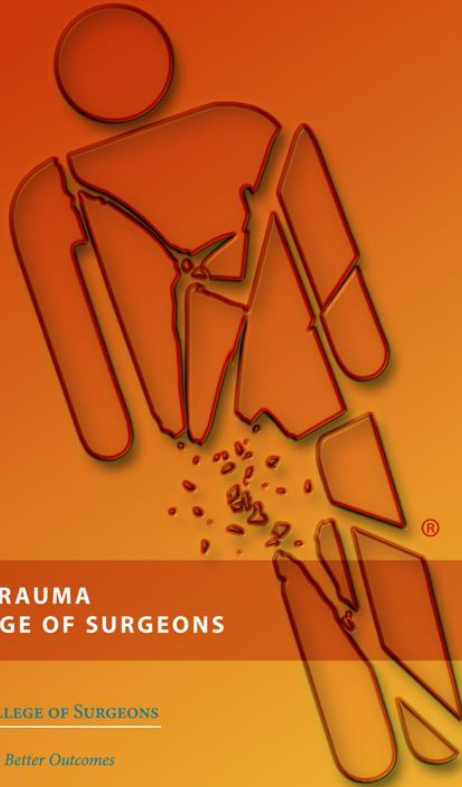
Patients “sail off of a flat earth”

TSOS Publications & Data Sharing Also Aim to “Nudge” Practice Change

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PTSD Chapter References

Supplemental Readings

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TSOS Publications & Data Sharing Also Aim to “Nudge” Practice Change

- Collaborative publication is an essential goal of the TSOS trial
- TSOS data sharing in the service of PTSD & comorbidity practice change

Summary

- Key element of pragmatic trials is the targeting of practice change
- Implementation science frameworks useful
- TSOS has incorporated up-front multiple design features targeting practice change
 - Longstanding policy dialogue
 - Stepped wedge intervention roll-out
 - Collaborative publication & data sharing