
XIII congresso nazionale
simeu
GENOVA 30 MAG - 1 GIU 2024
I.MEU
I.MEU
SOCIETÀ ITALIANA MEDICINA D'EMERGENZA-URGENZA
SIMEU

Il trauma nel paziente anziano

Cosa cambia?

XIII congresso nazionale

SIMEU

GENOVA 30 MAG - 1 GIU 2024

SOCIETÀ ITALIANA MEDICINA D'EMERGENZA-URGENZA · SIMEU ·

Dott. Paolo FRANZESE
S.C. MeCAU – ASL TO4 - Chivasso

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SOCIETÀ ITALIANA MEDICINA D'EMERGENZA-URGENZA · SIMEU ·

Agenda

- Undertriage
- Trauma scores
- Pathophysiology of shock in elderly
- Anticoagulant Reversal Therapy
- Pain control
- Post-acute

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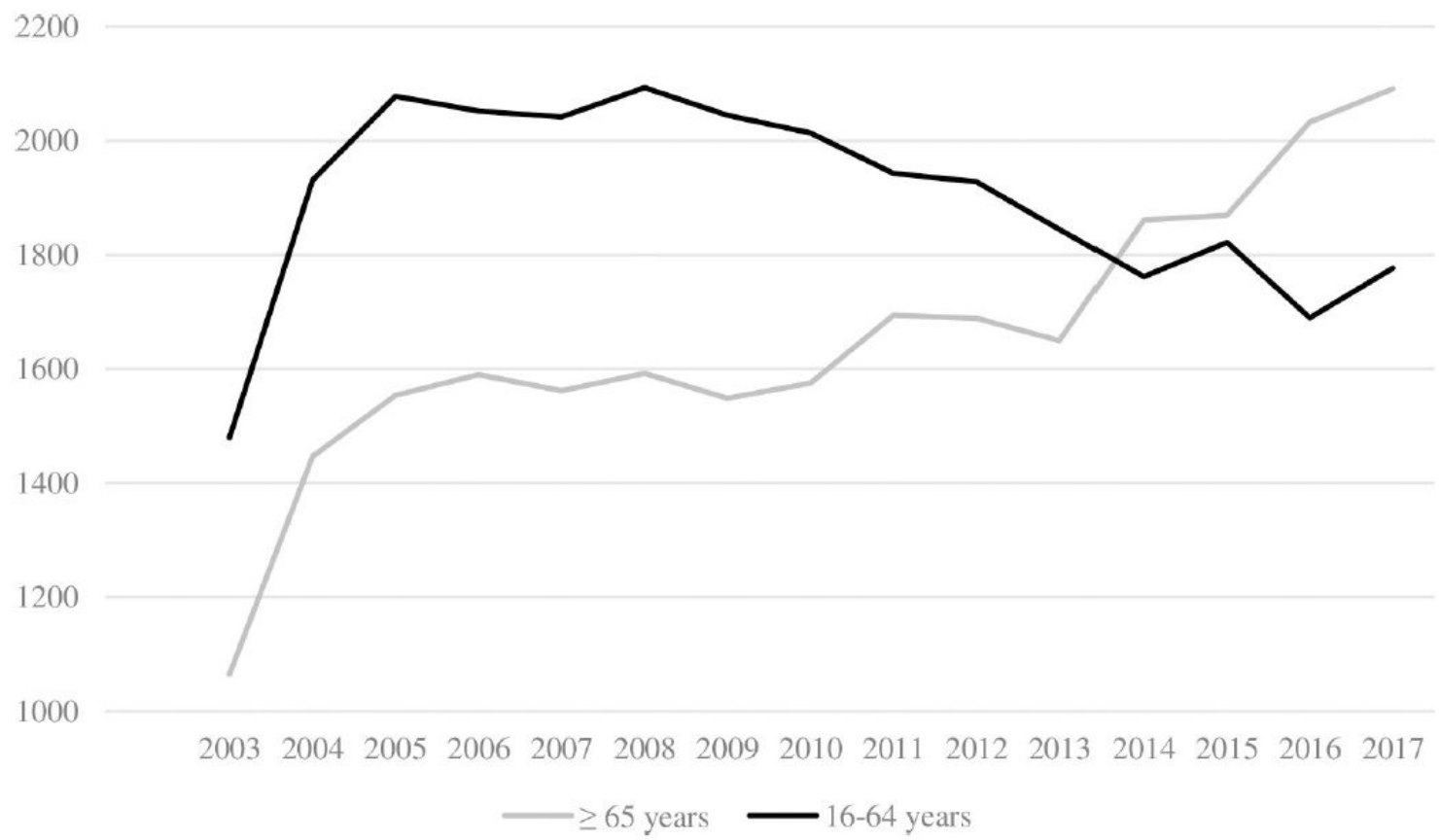
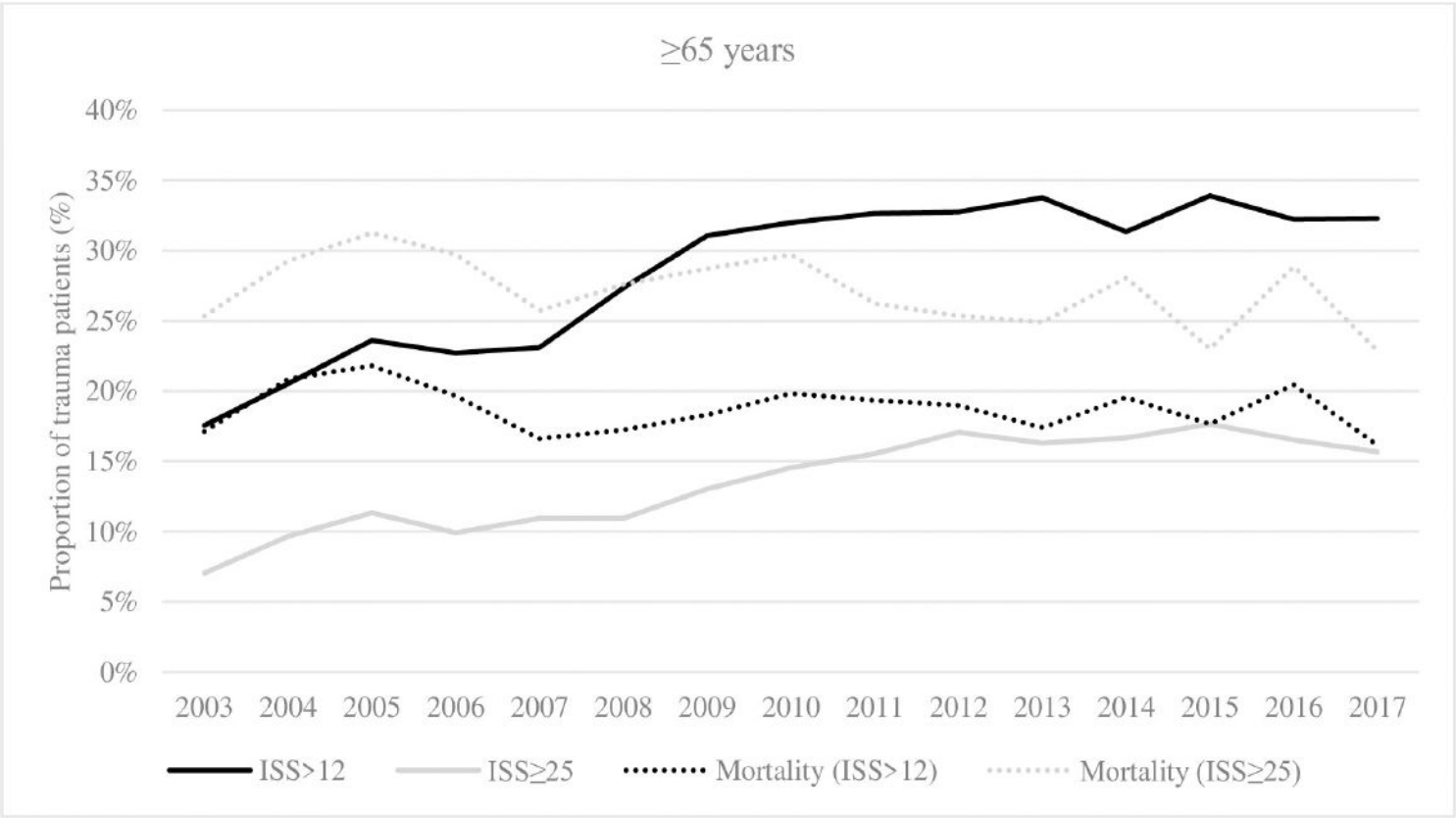


Fig 1. Annual trauma admissions over the years.

Benhamed et al. (2023) Epidemiology, injury pattern and outcome of older trauma patients: A 15-year study of level-I trauma centers. PLoS ONE 18(1): e0280345.



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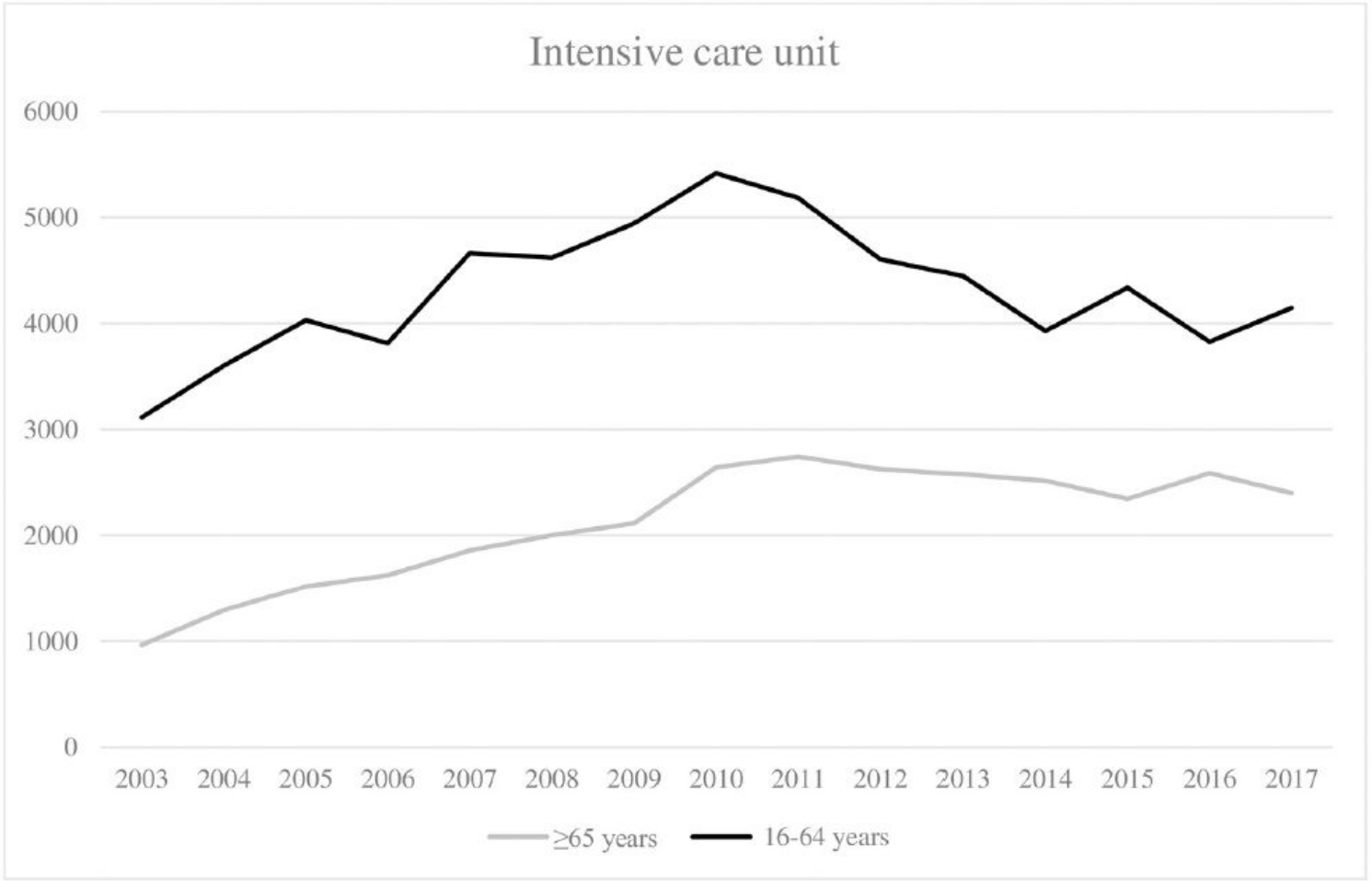

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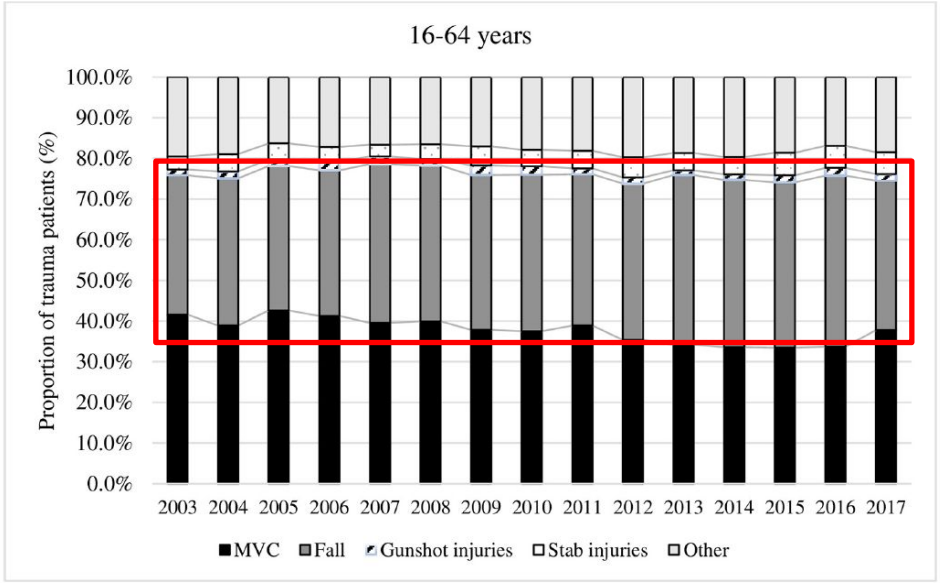

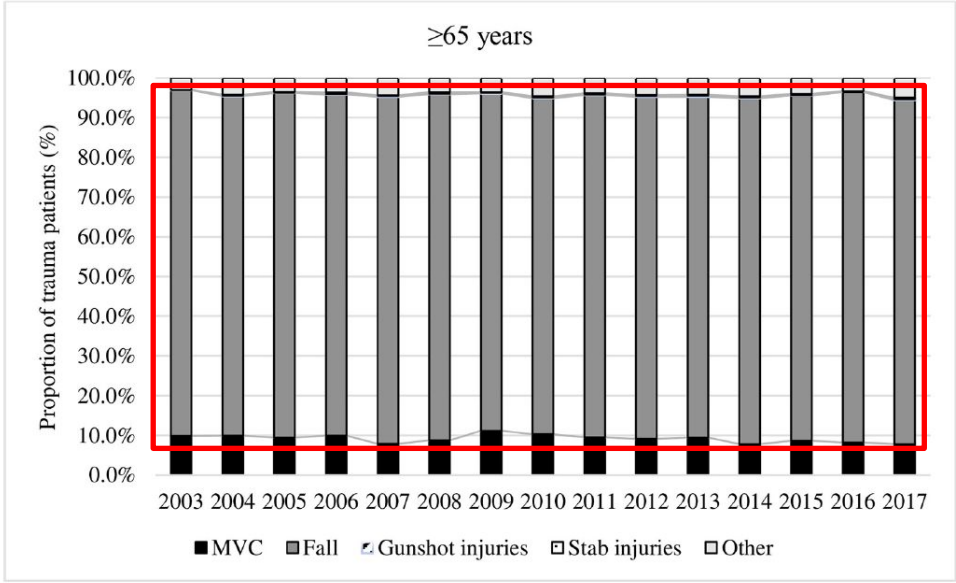

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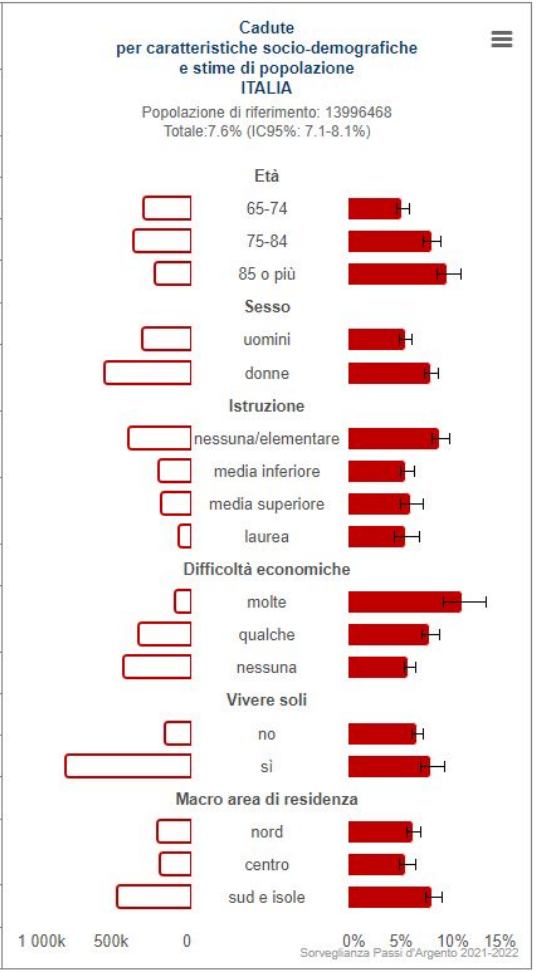
Benhamed et al. (2023) Epidemiology, injury pattern and outcome of older trauma patients: A 15-year study of level-I trauma centers. PLoS ONE 18(1): e0280345.

Italia 2021 - 2022

- Donna
- Ultra 85enne
- Fragilità socio-economica
  - Bassa scolarità
  - Basso reddito
  - Vive solo

Cadute *

		ITALIA n = 25093		
		%	IC95% inf	IC95% sup
Età	65-74	5.8	5.2	6.5
	75-84	8.9	8.0	9.8
	85 o più	10.6	9.4	12.0
Sesso	uomini	6.1	5.4	6.7
	donne	8.8	8.1	9.6
Istruzione	nessuna / elementare	9.8	8.9	10.8
	media inferiore	6.2	5.5	7.0
	media superiore	6.7	5.6	7.9
	laurea	6.1	4.9	7.6
Difficoltà economiche	molte	12.2	10.1	14.6
	qualche	8.7	7.8	9.7
	nessuna	6.4	5.9	7.1
Vivere soli	no	7.3	6.8	7.9
	sì	8.8	7.7	10.2
Macro area di residenza	nord	6.9	6.2	7.7
	centro	6.2	5.4	7.2
	sud e isole	9.0	8.2	10.0



** = Cadute avvenute nei 30 giorni precedenti l'intervista*

Istituto Superiore di Sanità
EpiCentro - L'epidemiologia per la sanità pubblica
La sorveglianza Passi d'Argento

Agenda

- Undertriage
- Trauma scores
- Pathophysiology of shock in elderly
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Table 1 Patient cohort characteristics

	n	Mean age (years) (95% CI)	Sex (M:F)	Median ISS (IQR)	Blunt injuries (%)	Mean number of injured body areas (95% CI)
Total	153	–	108:50	–	–	–
Younger (aged 18–64)	107	40 (37.2 to 42.1)	83:24	25 (16–25)	96.3	2.0 (1.8 to 2.3)
Older (aged 65+)	46	82 (79.4 to 84.6)	25:26	20 (16–25)	100	1.4 (1.2 to 1.6)

ISS, Injury Severity Score.

	young	older	p
undertriage	32,8	62,2	
mortality	10,3	19,6	0,9

Hoyle AC, *et al*. *Emerg Med J* 2020;**37**:508–514. doi:10.1136/emermed-2019-208541

Table 2 Results: patient outcomes and subgroup analyses

All severely injured patients						Subgroup analysis: falls <2 m		Subgroup analysis: by number of injured body areas		
	n	Mortality (%) (95% CI)	No consultant first attender (%) (95% CI)	No trauma team activation (%) (95% CI)	Undertriage (%) (either indicator)	Consultant first attender present	Trauma team activated	Patients with a single body area injured (%)	Consultant first attender present for single body area injury	Maximum number of concurrent injured body areas
Younger (aged 18–64)	107	10.3 (4.5 to 16.1)	25.2 (17.0 to 33.4)	37.4 (28.2 to 46.6)	43.9 (34.5%–53.3%)	61.1	27.8	41.4	72.7	5
Older (aged 65+)	46	19.6 (98.1 to 31.1)	45.7 (31.3 to 60.1)	65.2 (51.4 to 79.0)	65.2 (51.4%–79.0%)	38.2	20.6	73.9	32.5	3

We believe this study serves to highlight that undertriage of the older patient exists as a real phenomenon, and should serve as a springboard for further investigation as to why this is the case. Although numbers are small, the results of this study would suggest that there is a lack of early recognition and appropriate triage of severe trauma in the older patient population, with

	Age 18–30	Age 60–69	Age 70–79	Age 80+
Number of patients	20,820	13,089	15,502	12,720
Ultrasound (%)	87.1	84.2	82.5	76.3
X-ray chest(%)	38.1	38.6	38.7	40.9
X-ray pelvis (%)	28.1	25.9	26.6	28.9
WBCT (%)	86.5	81.4	76.3	64.6
cCT with ISS ≥ 16 (%)	89.2	91.4	91.8	90.5
WBCR with ISS ≥ 16 (%)	88.8	83.8	78.7	69.2
Intubation in ER (%)	11.7	11.5	10.2	11.4
Blood transfusion (%)	12.9%	10.5%	9.8%	9.3%
Thoracic drain (%)	14.1%	13.5%	11.2%	8.8%
ER time (mean) (min)	59.6	62.1	63.2	65.5
ICU transferred (%)	48.1	62.4	66.6	70.8
OR transferred (%)	44.9	30.4	25.2	18.9
Mortality in ER (%)	2.4	2.0	2.4	2.8

European Journal of Trauma and Emergency Surgery (2020) 46:487–497

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Table 3 Summary Statistics of Survivors and non-Survivors for Age, ISS, GTOS and Ps17 Scores

	Survivors ($n = 193$)	Non-survivors ($n = 62$)	Total ($n = 255$)	P-value (Mann-Whitney)
Age, years				
Mean ± SD	74.3 ± 6.7	77.3 ± 8.1	75.0 ± 7.14	0.014
Median, (IQR)	73 (69–79)	77 (71–84)	74 (69–80)	
ISS				
Mean ± SD	24.8 ± 11.96	31.7 ± 12.5	26.4 ± 12.4	0.000
Median, (IQR)	25 (17–30)	29.5 (24–38)	25 (17–34)	
GTOS				
Mean ± SD	141.7 ± 33.5	164.6 ± 35.6	147.2 ± 35.3	0.000
Median, (IQR)	139 (120–161)	158.5 (140–183)	143 (125–167)	
Ps17	($n = 185$)	($n = 62$)	($n = 247$)	
Mean ± SD	76.4 ± 23.6	44.3 ± 31.3	68.3 ± 29.2	0.000
Median, (IQR)	85.67 (66–93)	40.04 (14–73)	81.29 (49–92)	

ISS Injury severity score; *GTOS* Geriatric trauma outcome score; *IQR* interquartile range; *Ps17* Probability of survival; *SD* standard deviation. *P* value reflects comparison between survivors and non-survivors

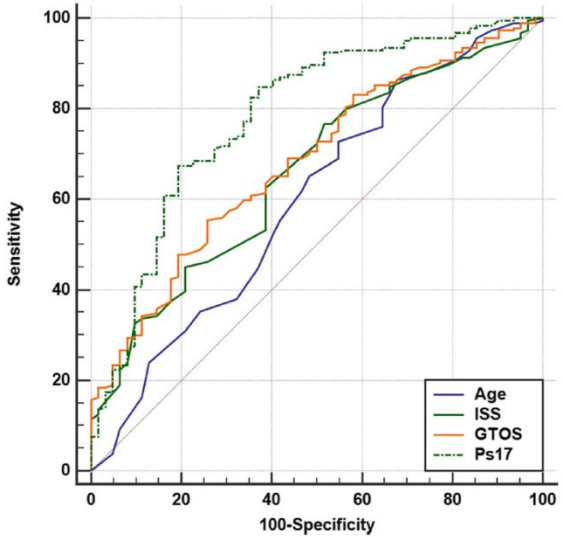


Fig. 2 ROC curves of age, ISS, GTOS and Ps17 in mortality prediction of elderly trauma patients. ISS: Injury Severity Score; GTOS: Geriatric Trauma Outcome Score; Ps17: Probability of Survival; ROC receiver operator characteristic

Table 4 Comparison of AUROC and cut-off values for ISS, GTOS and Ps17

Score	AUROC	95% CI	Specificity (%)	Sensitivity (%)	Cut-off
ISS	0.66	0.59–0.74	62.5	61.3	≥ 28
GTOS	0.68	0.61–0.76	54.9	74.2	≥ 142.25
Ps17	0.79	0.72–0.85	67.4	80.6	≤76.73

AUROC area under receiver operator curve; *CI* confidence interval; *ISS* injury severity score; *GTOS* elderly trauma outcome score; *Ps17* probability of survival

ORIGINAL ARTICLE

Predictors of elderly mortality after trauma: A novel outcome score

Rachel S. Morris, MD, David Milia, MD, James Glover, MS, Lena M. Napolitano, MD, Benjamin Chen, Elizabeth Lindemann, BS, Mark R. Hemmila, MD, Deborah Stein, MD, MPH, Erich Kummerfeld, PhD, Jeffrey Chipman, MD, *and* **Christopher J. Tignanelli, MD**, *Minneapolis, Minnesota*

J Trauma Acute Care Surg
Volume 88, Number 3

TABLE 3. Development of the fEMAT and qEMAT Using Regression Coefficients of the Variables Significant for Mortality

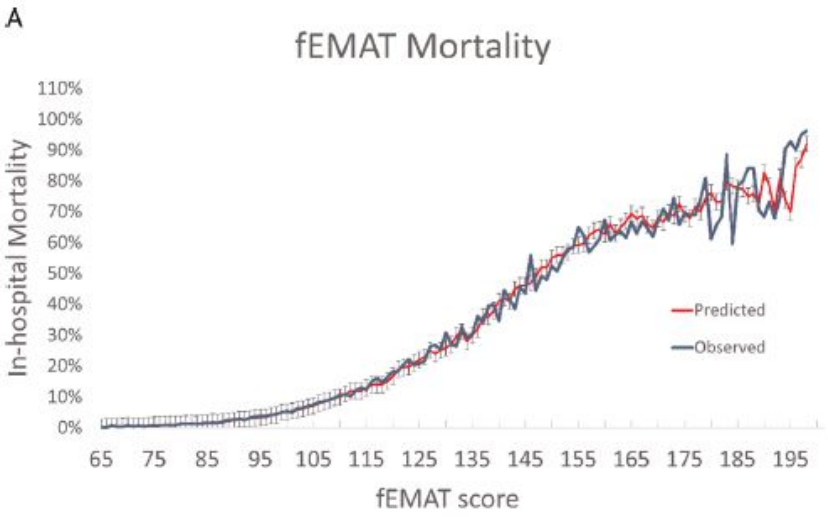
A. fEMAT

Variable	Points*
Injuries	
Bowel pancreas	20
Traumatic brain injury	15.5
Great vessel injury	11.5
Cervical spine injury	11
Penetrating injury	10.5
Solid organ injury	9.5
7 or more rib fractures	6
Hemo/pneumothorax	6
Femur fracture	5
Pelvic injury	4
Thoracic/lumbar spine injury	1.5
1–6 rib fractures	1
Comorbidities	
Advance directive with DNR in place	23.5
Cirrhosis	17
Chronic renal failure	13
Congestive heart failure	10
Chronic obstructive pulmonary disease	6
Stroke with residual defects	4.5
History of myocardial infarction (within 6 mo)	4
Steroid use	1.5
Physiologic parameters	
SBP <90 mm Hg	13.5
SBP <110 mm Hg	10
Pulse >120 bpm	10.5
Pulse <50 bpm	7.5
(15-GCS)	5
Respiratory rate <9 or >29	2.5

B. qEMAT

Variable	Points*
SBP <90 mm Hg	17
Pulse >120 bpm	11.5
(15-GCS)	5.5
Penetrating injury	6
Pulse <50 bpm	7
Congestive heart failure	11.5
Chronic renal failure	15
Cirrhosis	19

*The β coefficient for each variable was rounded to the nearest half integer to arrive at the number of points.
bpm, beats per minute.



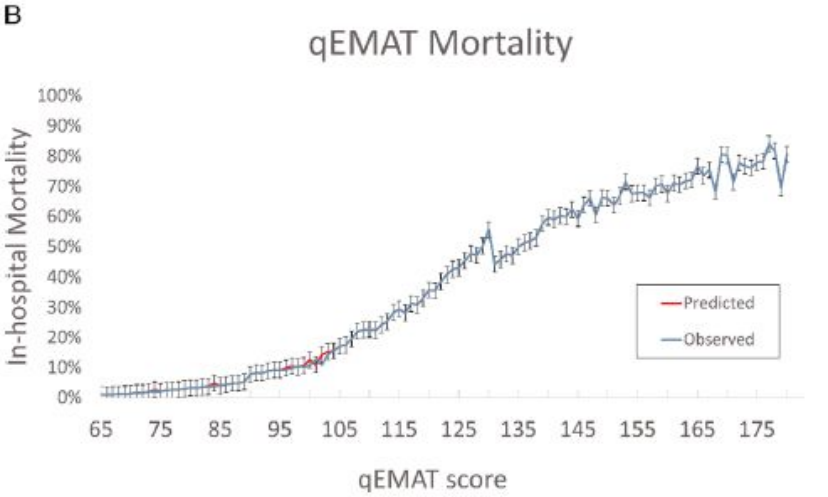
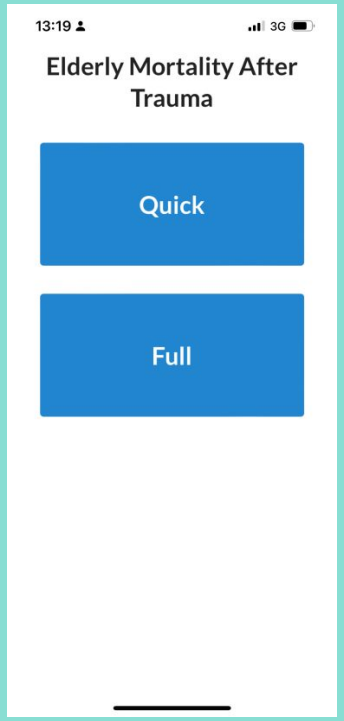


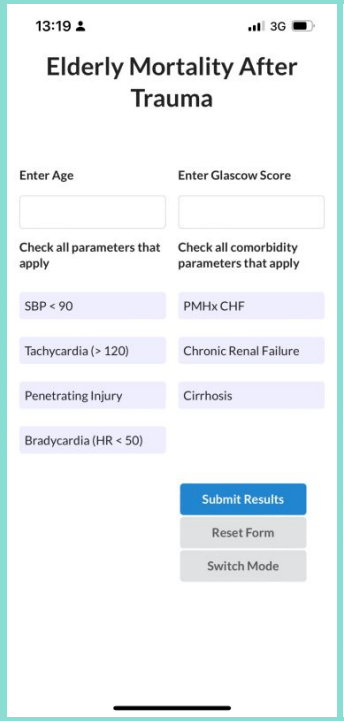
TABLE 4. AuROC Analysis Comparing in qEMAT, fEMAT, TRISS, and Age Plus ISS in MTQIP, NTDB Derivation and Validation Cohorts

	NTDB (80%)		NTDB (20%)		MTQIP	
	AuROC	95% CI	AuROC	95% CI	AuROC	95% CI
TRISS-B	0.62	0.63–0.63	0.62	0.62–0.62		
TRISS-P	0.77	0.75–0.78	0.75	0.72–0.77		
Age + ISS	0.78	0.77–0.78	0.77	0.76–0.77	0.85	0.85–0.86
fEMAT	0.85	0.84–0.85	0.85	0.84–0.85		
qEMAT	0.80	0.80–0.83	0.80	0.80–0.83	0.87	0.86–0.87
GTOS					0.83	0.82–0.84

CI, confidence interval.

Injuries		
	Bowel/Pancreas	20
	TBI	15,5
	Great vessels	11,5
	Penetrating injury	10,5
Comorbidities		
	DNR	23,5
	Cirrhosis	17
	CRF	13
	CHF	10
Physiologic parameters		
	SBP < 90	13,5
	SBP < 110	10
	HR > 120	10,5
	HR < 50	7,5





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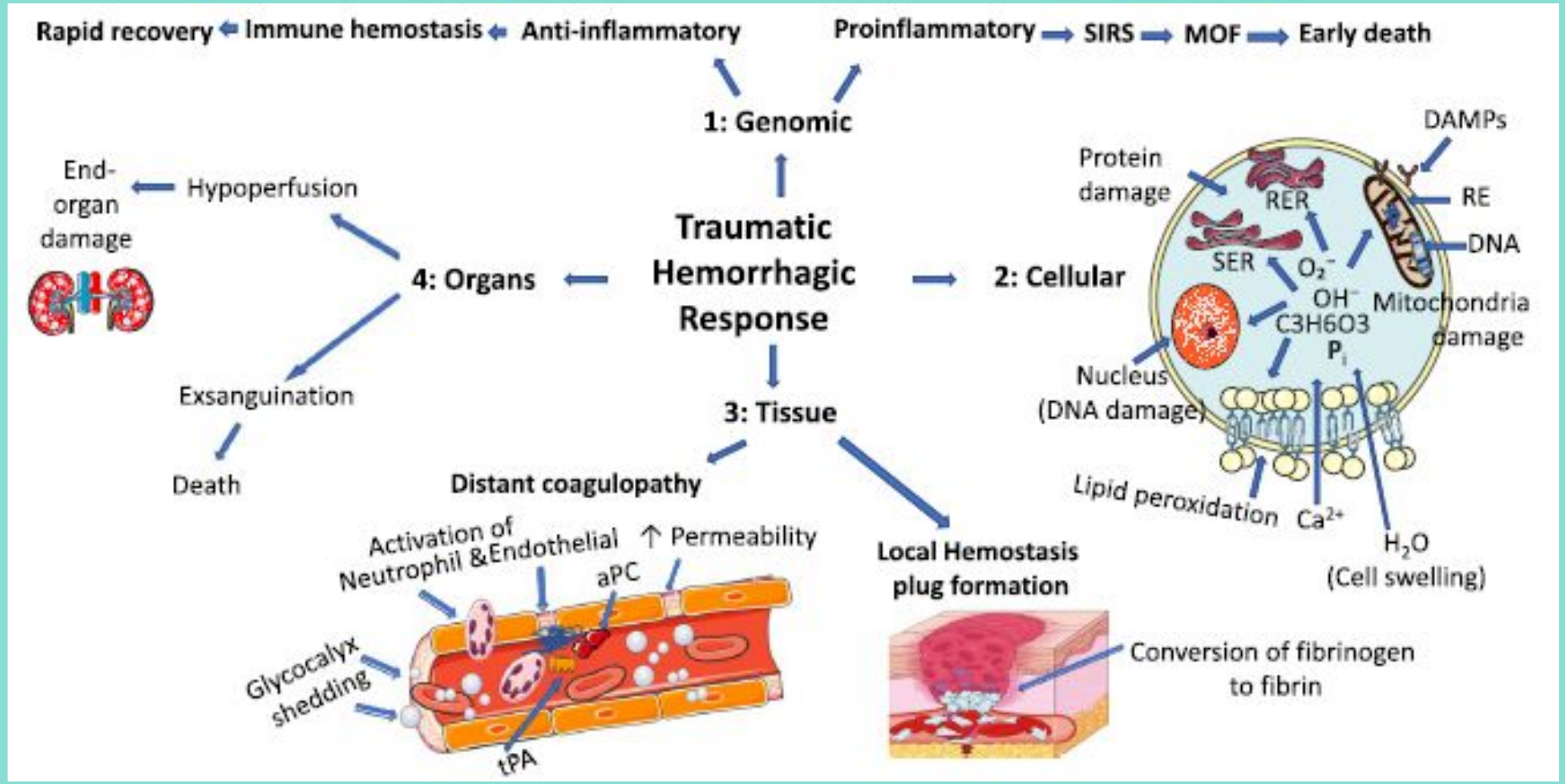
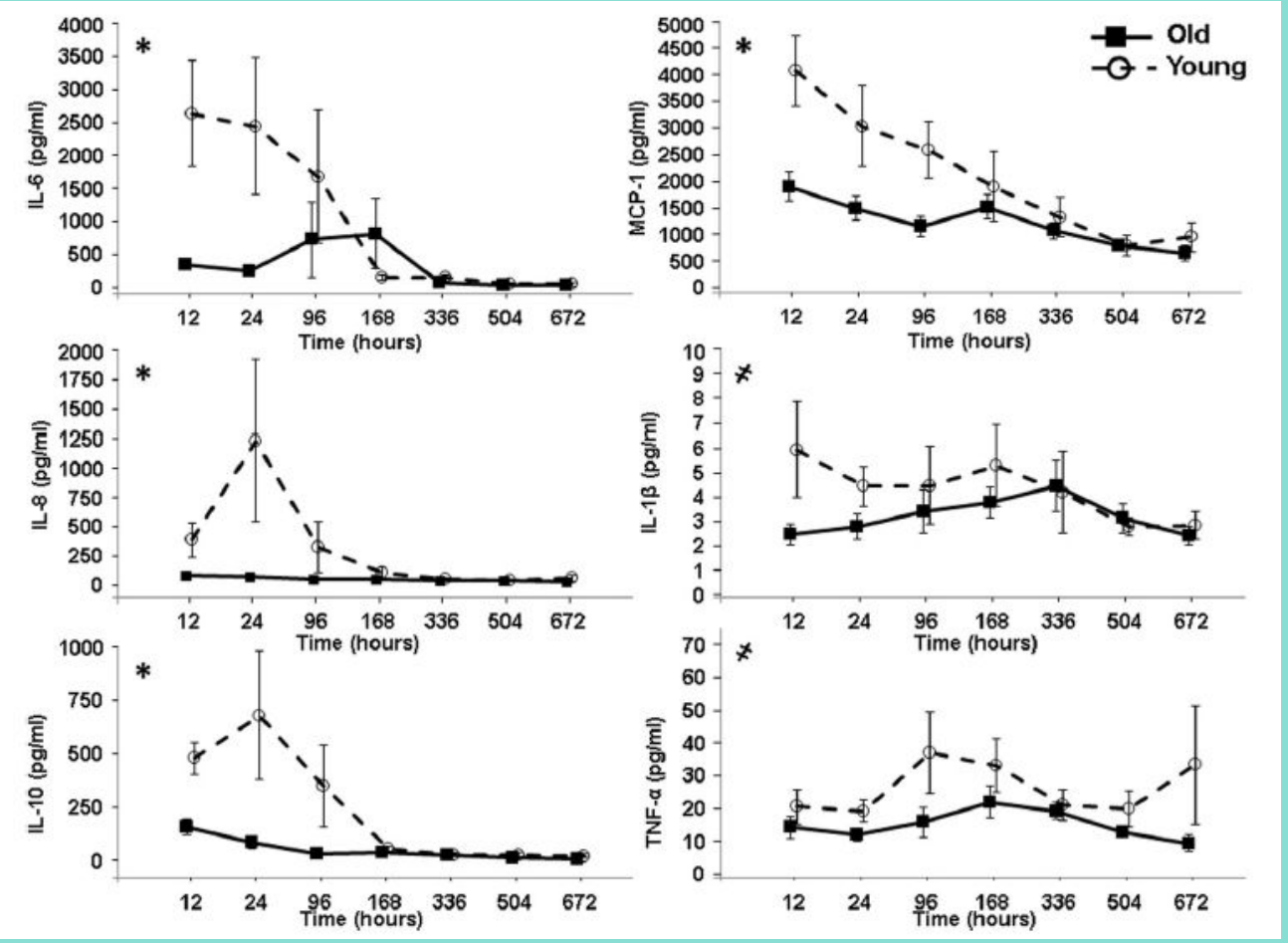

Rapid recovery
Immune hemostasis
Anti-inflammatory
Proinflammatory
SIRS
MOF
Early death
1: Genomic
Traumatic Hemorrhagic Response
End-organ damage
Hypoperfusion
4: Organs
Exsanguination
Death
2: Cellular
DAMPs
Protein damage
RER
RE
SER
DNA
O_2^-
OH^-
C3H6O3
P_i
Mitochondria damage
Nucleus (DNA damage)
Lipid peroxidation
Ca^{2+}
H_2O
(Cell swelling)
3: Tissue
Distant coagulopathy
Activation of Neutrophil &Endothelial
↑ Permeability
aPC
Glycocalyx shedding
tPA
Local Hemostasis plug formation
Conversion of fibrinogen to fibrin



Vanzant *et al. Critical Care* (2015) 19:77
DOI 10.1186/s13054-015-0788-x

CRITICAL CARE

Ridotta incidenza di febbre

48% vs. 77% *p=0.027*

VO2

- 8% *p=0.0032*

Iperglicemia

+ 38% *p=0.0001*

Iperazotemia

62% vs. 22% *p=0.004*

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The Journal of Trauma: Injury, Infection, and Critical Care 48(1):p 49, January 2000.

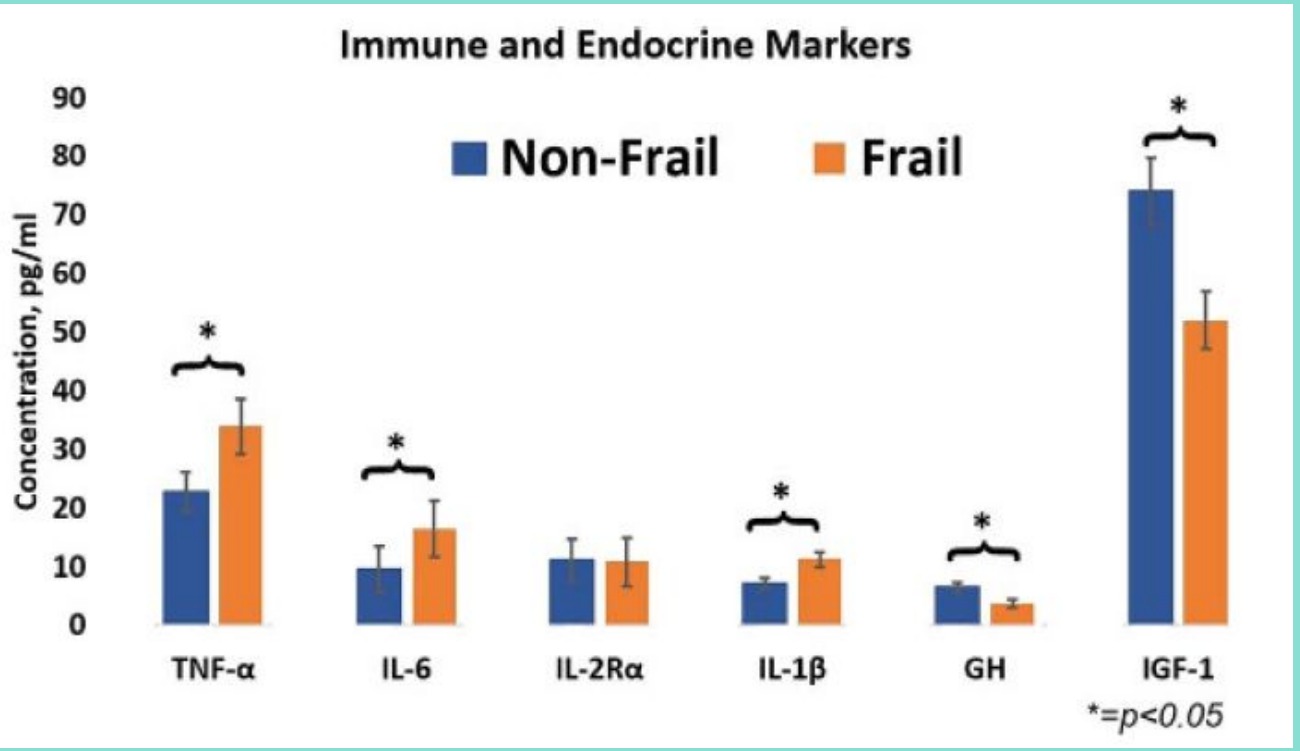
TABLE 2. Hospital Outcomes

Variables	Nonfrail (n = 61)	Frail (n = 39)	*p*
Complications, %	18%	39%	0.01
Hospital LOS, d, median [IQR]	4 [2–6]	6 [3–7]	0.03
ICU LOS, d, median [IQR]	1 [0–2]	2 [0–4]	0.12
Adverse Discharge disposition, %	23%	56%	0.01
Mortality, %	7%	18%	0.03

The acute inflammatory response after trauma is heightened by frailty: A prospective evaluation of inflammatory and endocrine system alterations in frailty

James Palmer, MS, Viraj Pandit, MD, Muhammad Zeeshan, MD, Narong Kulvatunyou, MD, Mohammad Hamidi, MD, Kamil Hanna, MD, Mindy Fain, MD, Janko Nikolich-Zugich, PhD, El-Rasheid Zakaria, PhD, *and* Bellal Joseph, MD, *Tucson, Arizona*

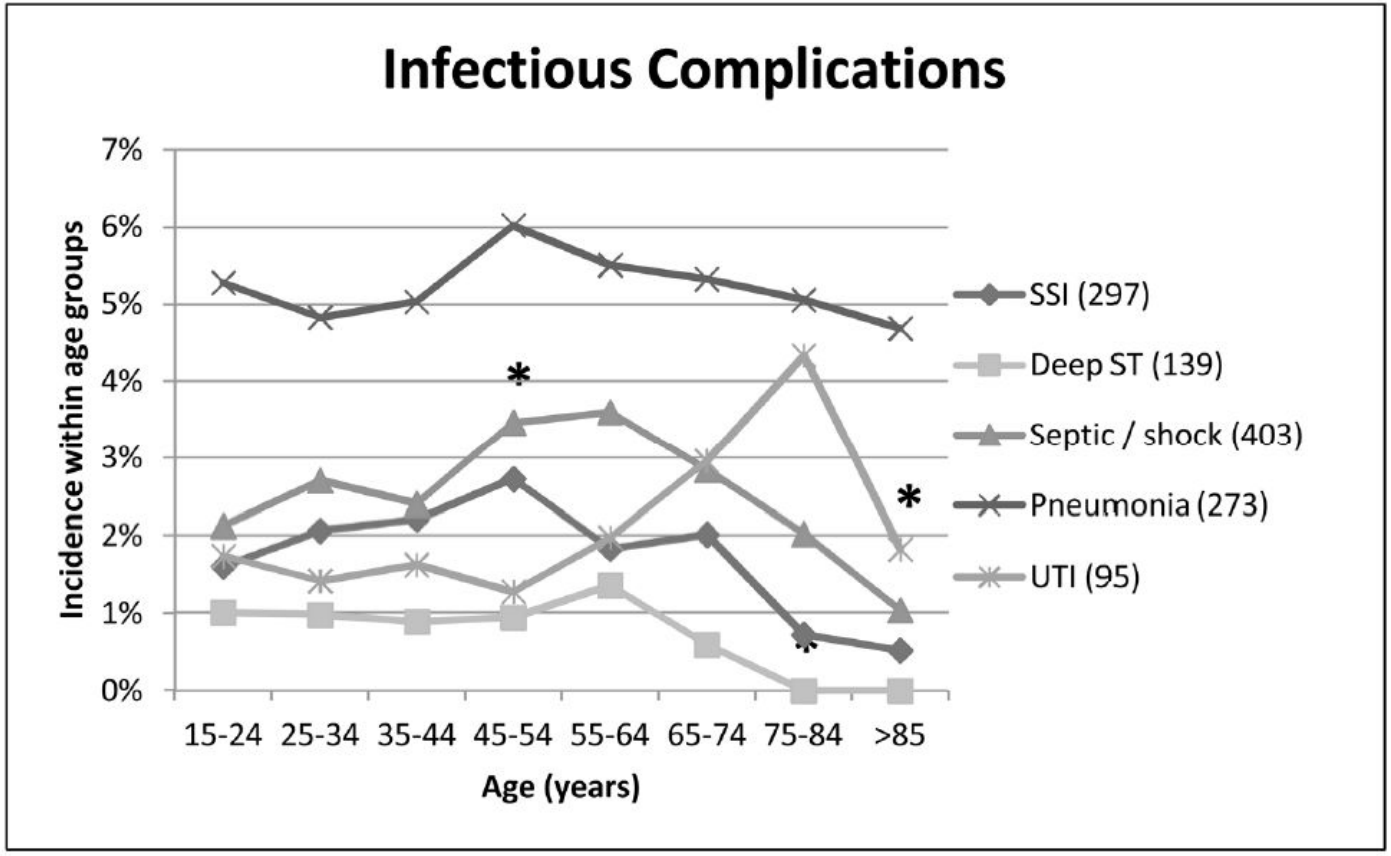
J Trauma Acute Care Surg
Volume 87, Number 1



THE UNIQUE PATTERN OF COMPLICATIONS IN ELDERLY TRAUMA PATIENTS AT A LEVEL I TRAUMA CENTER

Sasha D Adams, MD[1], Bryan A Cotton, MD[1], Mary F McGuire, MS[3], Edmundo Dipasupil, CSTR[4], Jeanette M Podbielski, RN[1], Adrian Zaharia, MD[2], Drue N Ware, MD[1], Brijesh S Gill, MD[1], Rondel Albarado, MD[1], Rosemary A Kozar, MD[1], James R Duke, MD[1], Philip R Adams, MD[1], Carmel B Dyer, MD[2], and **John B Holcomb, MD[1]**

J Trauma Acute Care Surg. 2012 January ; 72(1):



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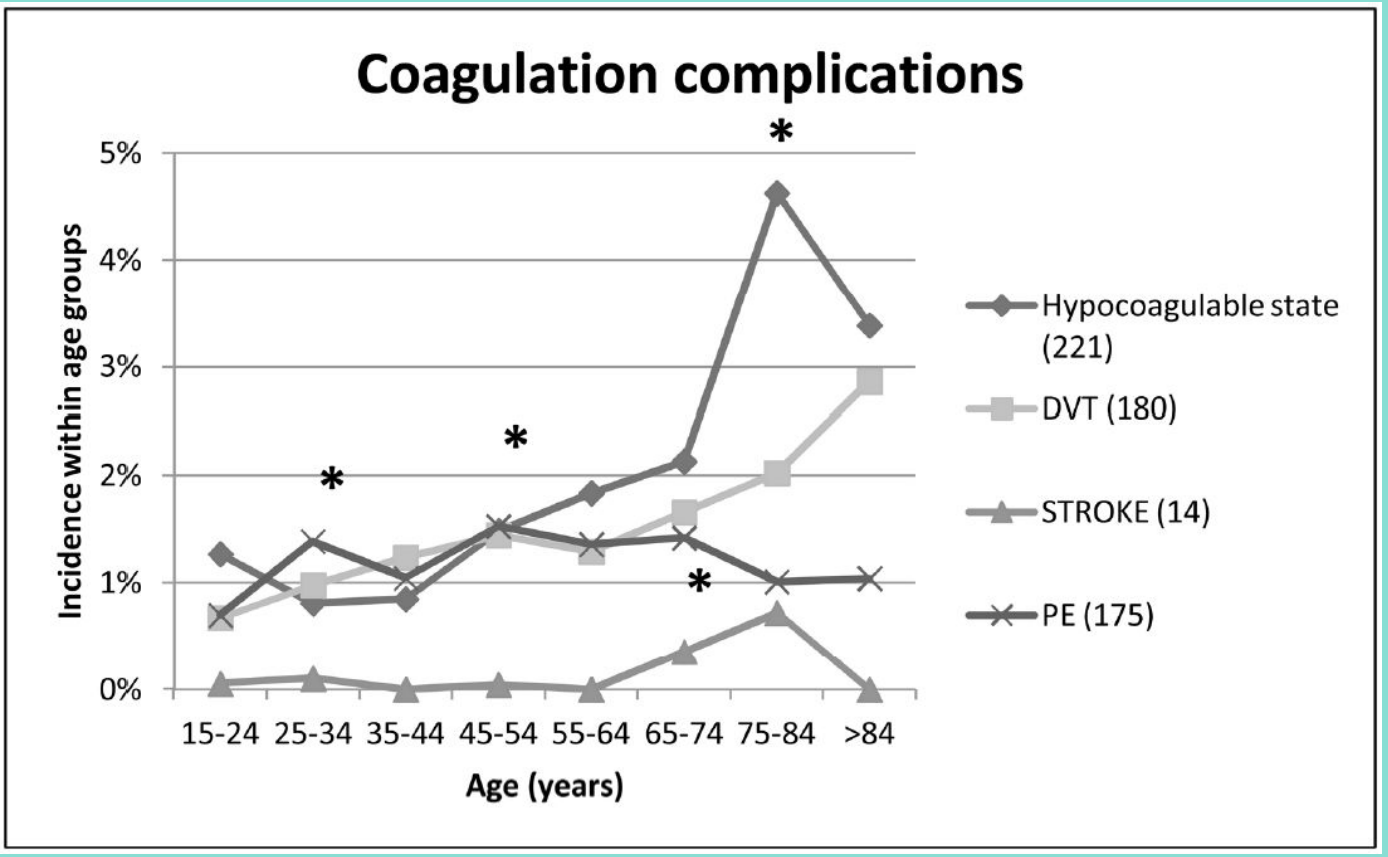

It is time for a change in the management of elderly severely injured patients! An analysis of 126,015 patients from the TraumaRegister DGU®

Christopher Spering[1] · Rolf Lefering[2] · Bertil Bouillon[3] · Wolfgang Lehmann[1] · Kajetan von Eckardstein[4] · Klaus Dresing[1] · Stephan Sehmisch[1]

European Journal of Trauma and Emergency Surgery (2020) 46:487–497

We need to create awareness for the special challenges we face in the management of severely injured elderly patients and we need an agenda to achieve our goal:

1. Reduce undertriage in elderly trauma patients
2. Specific guidelines for the management of severely injured elderly patients
3. Criteria for decision making when surgery is appropriate
4. Criteria for decision making in palliative settings or specific wish towards life-sustaining procedures

Agenda

- Undertriage
- Trauma scores
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- Post-acute

Post-acute

Impariamo a ragionare da subito sulla programmazione della dimissione ospedaliera

1. Identificazione precoce della struttura di destinazione, basata sulla capacità della stessa di disporre degli strumenti di gestione idonei per la diagnosi del paziente.
2. Impiego di strumenti di identificazione precoce per pazienti potenzialmente evolutivi, così da ridurre il rischio di un nuovo accesso in DEA e/o nuova ospedalizzazione.
3. Collaborazione tra ospedale e strutture di post-acuzie per la preparazione di pianificazione centrata sul paziente, al fine di evitare una potenziale re-ospedalizzazione.

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Take home messages

Chi definiamo anziano?
65?... 55??... 45???

L'Homo sapiens apparve tra i 130.000 e i 200.000 anni fa.

Circa 75.000 anni fa si spostò dall'Africa per colonizzare l'intero pianeta.

Circa 30.000 anni fa si impose sulle altre specie di Homo.

12.000 anni fa terminò l'ultima era glaciale: l'evoluzione non fu più fisica ma culturale.

Take home messages

- Chi definiamo anziano?
- Come stratifichiamo il rischio?
- Come interpretiamo la caratteristica risposta immunomediata dell'anziano al trauma?
- Come interpretiamo i peculiari cambiamenti fisiopatologici dell'anziano?
  - incapacità di contrarre la diuresi
  - antiaggregazione-anticoagulazione jatrogena
- Sappiamo modulare il nostro approccio?
- Dobbiamo invece imparare a ragionare da subito sulla programmazione della dimissione ospedaliera

“LE STRADE DRITTE NON HANNO MAI PRODOTTO PILOTI ESPERTI”