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PULMONARY- CRITICAL CARE

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What Is an ICU?

- An intensive care unit (ICU) is an area of a hospital that provides **aggressive therapy**, **invasive and noninvasive monitoring** for critically ill and high-risk patients.
- In these units the patient's physiological variables are reported to the practitioner on a continuous basis, so that titrated care can be provided.

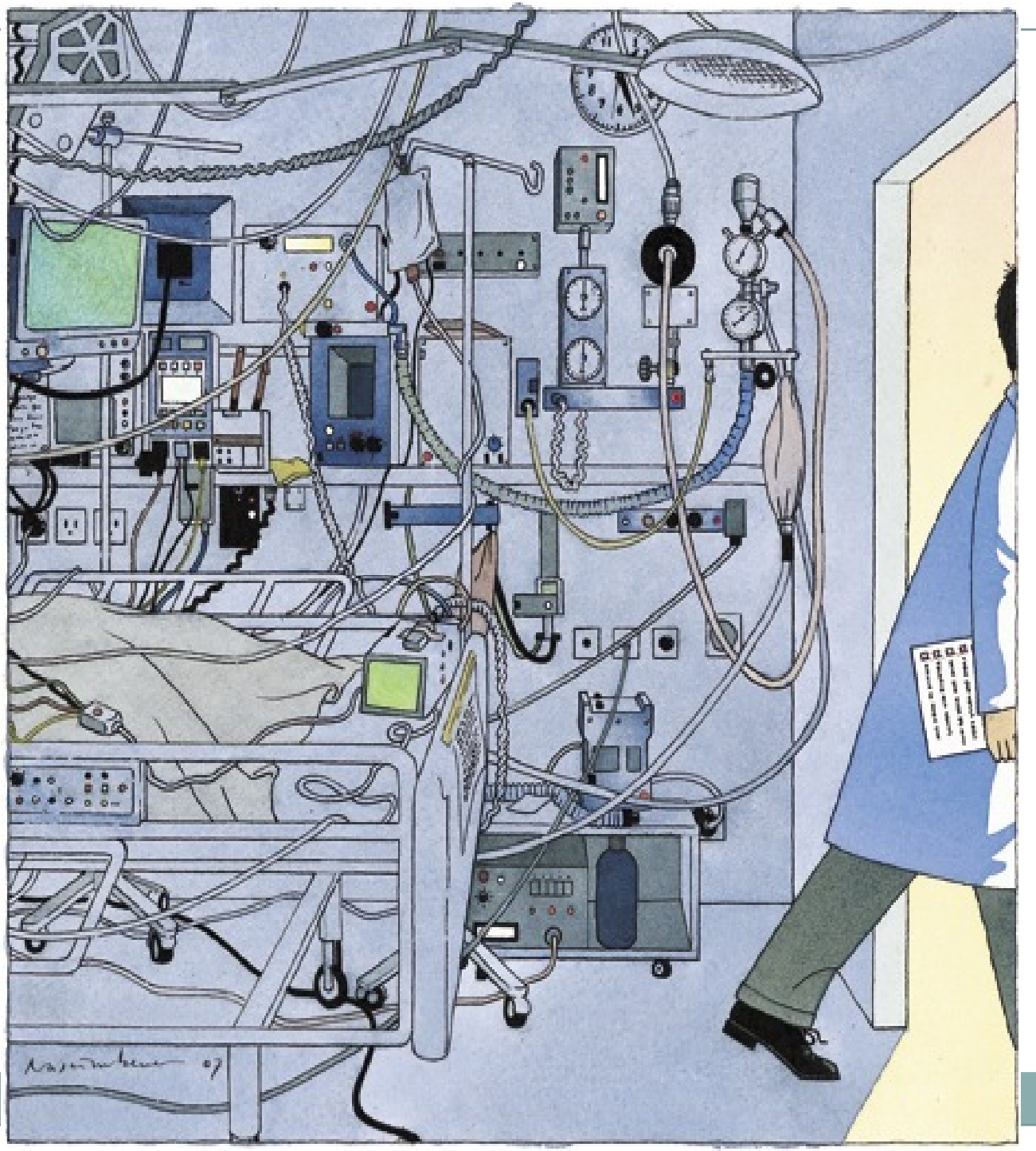
Historical Development of the ICU

- The origin of the ICU remains controversial.
- In 1863,,“In small country hospitals there are areas that have a small room leading from the operating theater in which the patients remain until they have recovered
- ” This is probably the earliest description of what would become the ICU.

- Recovery rooms were developed at the Johns Hopkins Hospital in the 1920s.
- In Germany in the 1930s, the first well organized postoperative ICU was developed.
- In the United States, more specialized postoperative recovery rooms were implemented in the 1940s at the Mayo Clinic.
- By the late 1950s, the first shock unit was established in Los Angeles.

HOW AN ICU DIFFERS FROM OTHER AREAS OF THE HOSPITAL

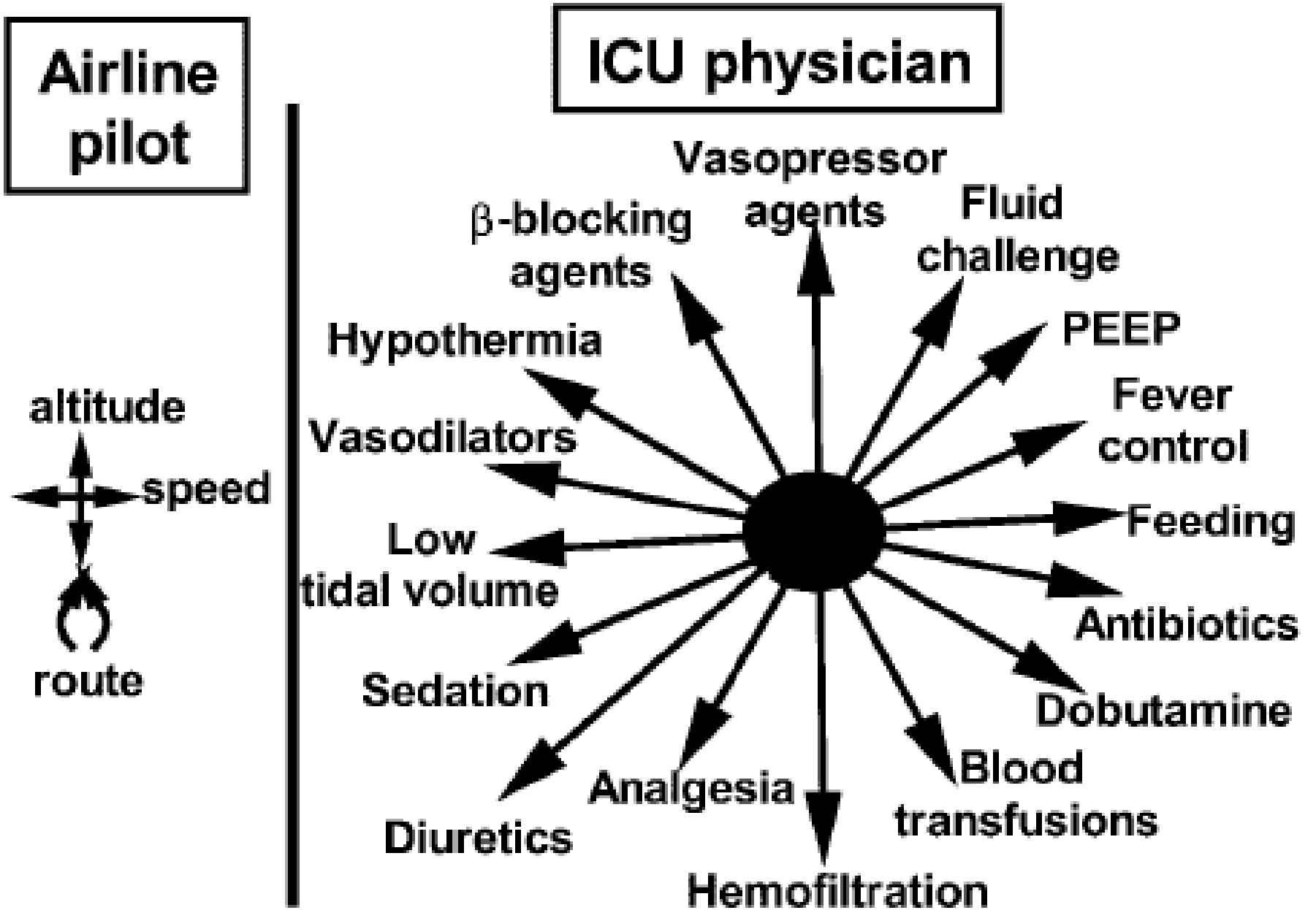
- An ICU is a place where patients undergo intensive and continuous physiological monitoring, where the critical care team applies physiologically based interventions and monitors the response to these interventions which then serves as the basis for further interventions.
- It is therefore clear that critical care medicine can be practiced only at the bedside;
- office-based "intensivists" have no place in the ICU.



"They came up with an ingeniously simple approach: they created a pilot's checklist, with step-by-step checks for takeoff, flight, landing and taxiing…With checklist in hand, the pilots went on to fly the Model 299 a total of 1.8 million miles without one accident."

Landing procedure checklist for a Boeing 737-800 aircraft

Landing gear	❑ Check down
Autopilot	❑ Off
Landing speed	❑ 140 KIAS
After touchdown	❑ Apply reverse thrust
	❑ 60 KIAS: cancel reverse thrust
Spoilers	❑ Verify extended
Brakes	❑ As required


Airline pilot
ICU physician
altitude
speed
route
Vasopressor agents
β-blocking agents
Fluid challenge
PEEP
Hypothermia
Fever control
Vasodilators
Feeding
Low tidal volume
Antibiotics
Sedation
Dobutamine
Analgesia
Blood transfusions
Diuretics
Hemofiltration

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Implementation of a mandatory checklist of protocols and objectives improves compliance with a wide range of evidence-based intensive care unit practices

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Critical Care Medicine. 37(10):2775-2781, October 2009

Verbal consideration of intensive care unit protocols and objectives before and after the checklist was mandated

	Pre Intervention, %	Post Intervention, %	p
Insulin protocol	96	100	.12
Suspected infection protocol	96	100	.12
Sedation protocol	100	100	1
Electrolyte protocol	89	100	.007
Oral care protocol	85	98	.008
Need for telemetry on transfer	96	100	.13
Stress ulcer prophylaxis	89	100	.007
DVT prophylaxis	92	100	.03
Need for physical therapy	81	98	.02
Daily restraint orders	77	100	<.0001
Evaluation of end-of-life issues	98	100	.28

Critical Care Medicine. 37(10):2775-2781, October 2009

Conclusions: A mandatory verbal review of a checklist covering a wide range of objectives and goals at each patient's bedside is an effective method to improve both consideration and implementation of intensive care unit best practices. A bedside checklist is a simple, cost-effective method to prevent errors of omission in basic domains of intensive care unit management that might otherwise be forgotten in the setting of more urgent care requirements. (Crit Care Med 2009; 37:2775–2781)

Critical Care Medicine. 37(10):2775-2781, October 2009

give your patient a **FAST HUG**

Feeding

- **Malnutrition** increases complications and worsens outcomes for critically ill patients .
- Many patients are already malnourished at admission to the ICU and need adequate and appropriate nutritional support, with daily review of feeding.

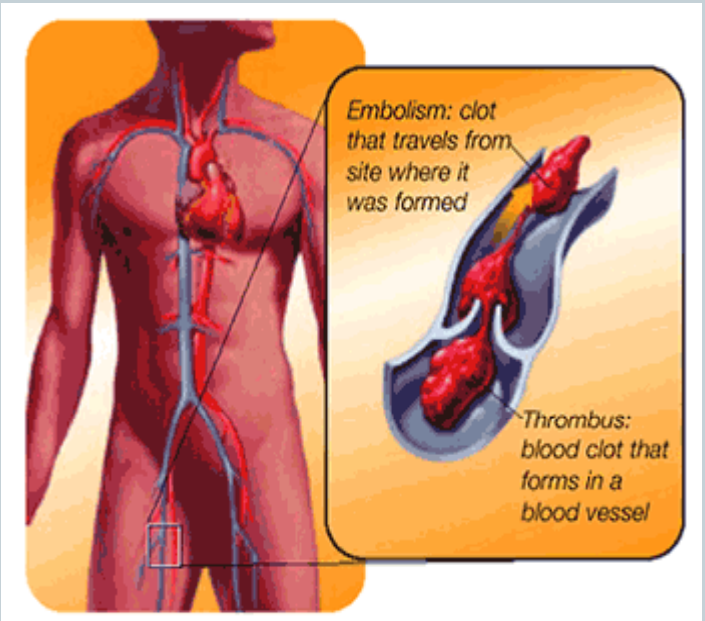
- **In general, 5.6 kJ/kg** per day is an acceptable and achievable target intake, but patients with sepsis or trauma may require almost twice as much energy during the acute phase of their illness .
- If oral feeding is not possible, **enteral nutrition is preferred to parenteral nutrition**
- should be started early, preferably within 24–48 hrs of ICU admission.

Analgesia

Sedation


50 mL Single patient infusion vial
PROPOFOL
Injectable Emulsion
500 mg/50 mL
(10 mg/mL)
1%
CONTAINS BENZYL ALCOHOL
FOR I.V. ADMINISTRATION
SHAKE WELL BEFORE USING

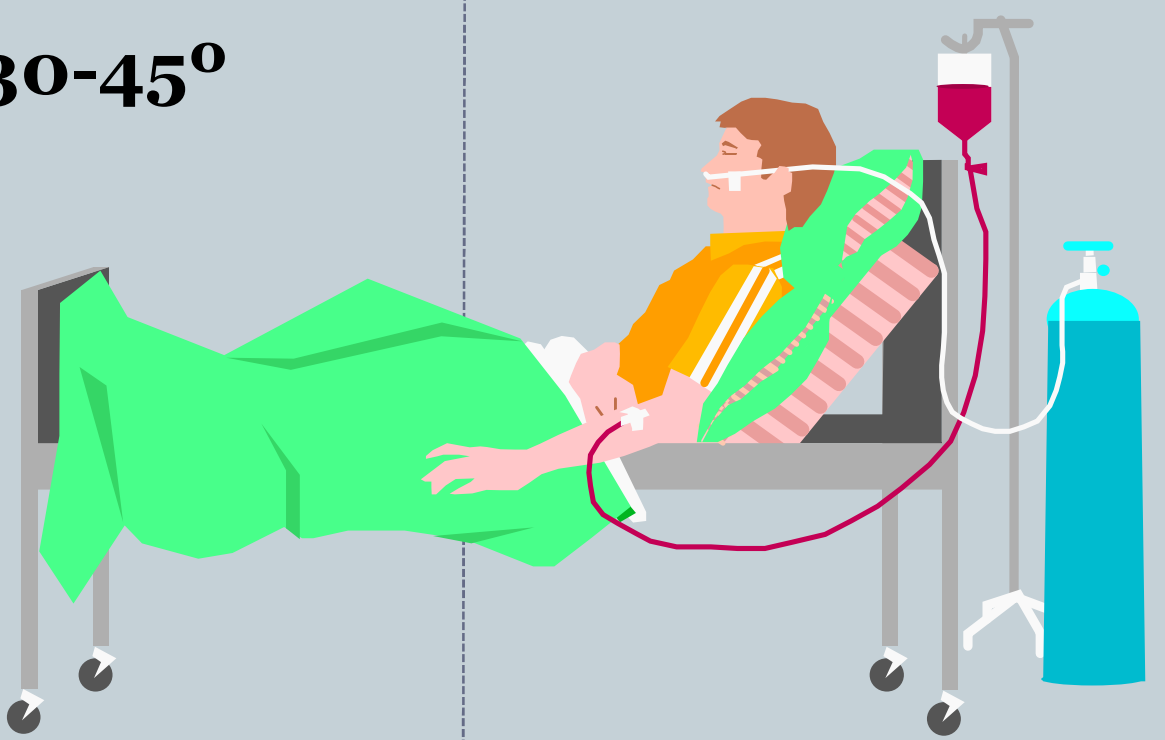
Thromboembolic prevention



- Among patients who do not receive prophylaxis, objectively confirmed rates of deep-vein thrombosis range between 13% and 31%
- For trauma patients this figure may be considerably higher .

HOB Elevation

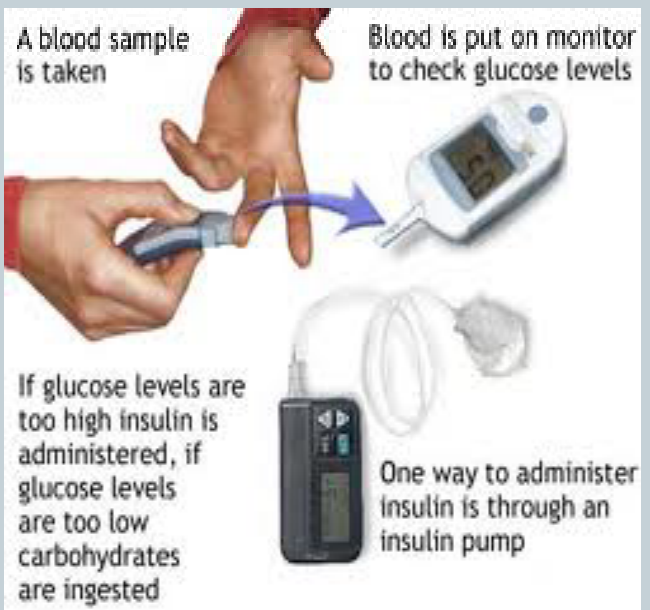
HOB at 30-45°



CDC Guideline for Prevention of Healthcare Associated Pneumonias 2004 ATS / IDSA Guidelines for VAP 2005

Ulcer prophylaxis

Glycemic control



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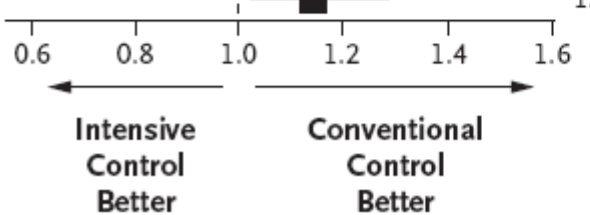
Intensive versus Conventional Glucose Control in Critically Ill Patients

Multicenter, randomized, controlled trial	
Intensive glucose control Target range of 81 to 108	Conventional glucose control Target of 180 mg or less
(N = 3054)	**(N = 3050)**
Death after 90 days	

B

Subgroup	Intensive Control (N=3010)	Conventional Control (N=3012)	Odds Ratio for Death (95% CI)	P Value for Heterogeneity
	no. of deaths/no. with data available			
Operative admission				0.10
Yes	272/1111	222/1121	1.31 (1.07–1.61)	
No	557/1898	529/1891	1.07 (0.93–1.23)	
Diabetes				0.60
Yes	195/615	165/596	1.21 (0.95–1.55)	
No	634/2394	586/2416	1.12 (0.99–1.28)	
Severe sepsis				0.93
Yes	202/673	172/626	1.13 (0.89–1.44)	
No	627/2335	579/2386	1.15 (1.01–1.31)	
Trauma				0.07
All deaths at day 90	829/3010	751/3012	1.14 (1.02–1.28)	0.02



CONCLUSIONS

In this large, international, randomized trial, we found that intensive glucose control increased mortality among adults in the ICU: a blood glucose target of 180 mg or less per deciliter resulted in lower mortality than did a target of 81 to 108 mg per deciliter. (ClinicalTrials.gov number, NCT00220987.)

FAST HUG

		Component	Consideration for Intensive Care Unit (ICU) Team
√	F	**F**eeding	Can the patient be fed orally, if not enterally? If not, should we start parenteral feeding?
√	A	**A**nalgesia	The patient should not suffer pain, but excessive analgesia should be avoided
√	S	**S**edation	The patient should not experience discomfort, but excessive sedation should be avoided; “calm, comfortable, collaborative” is typically the best level
√	T	**T**hromboembolic prevention	Should we give low-molecular-weight heparin or use mechanical adjuncts
√	H	**H**ead of the bed elevated	Optimally, 30° to 45°, unless contraindications (e.g., threatened cerebral perfusion pressure)
√	U	Stress **U**lcer prophylaxis	Usually H2 antagonists; sometimes proton pump inhibitors
√	G	**G**lucose control	Within limits defined in each ICU

Ventilation:

- Ventilation is a dynamic process that moves air in and out of the lungs.
- **Minute ventilation**: Minute ventilation is the volume of air that enters lungs each minute.
- This is the **product of tidal volume and respiratory rate**.
- If tidal volume is 500 ml, and respiratory rate is 12 per
- minute, the minute ventilation is 6 liters.
- **Minute ventilation = tidal volume × respiratory rate**
- = 500 (ml) × 12 (per/min)
- = 6000 ml/min
- Normally, minute ventilation in adult is **5 L to 10 L per/**

Indication for MV

Hypoxemia	Severe hypoxemia ($SpO_2 < 90\%$) unresponsive to conservative measures (supplemental O_2, CPAP)
Hypercarbia	Arterial pH < 7.3 though could consider initiating mechanical ventilation at higher or lower pH depending on patient fatigue or other associated morbidities
Respiratory fatigue	Signs: tachypnea, dyspnea, use of accessory muscles, diaphoresis, tachycardia
Airway protection	Decreased mental status, increased aspiration risk

Thank you