



**НОВЫЕ МЕТОДЫ
ИНТЕНСИВНОЙ ТЕРАПИИ
ТЯЖЕЛОЙ СОЧЕТАННОЙ
ТРАВМЫ-ВНЕДРЕНИЕ
ОПЫТА ВЕЛИКОБРИТАНИИ**

И.П.ШЛАПАК

И.Р.МАЛЫШ

Л.В.ЗГРЖЕБЛОВСКАЯ



Trauma System Development

↓ Deaths

↓ Morbidity

Provide optimal
cost-effective
care



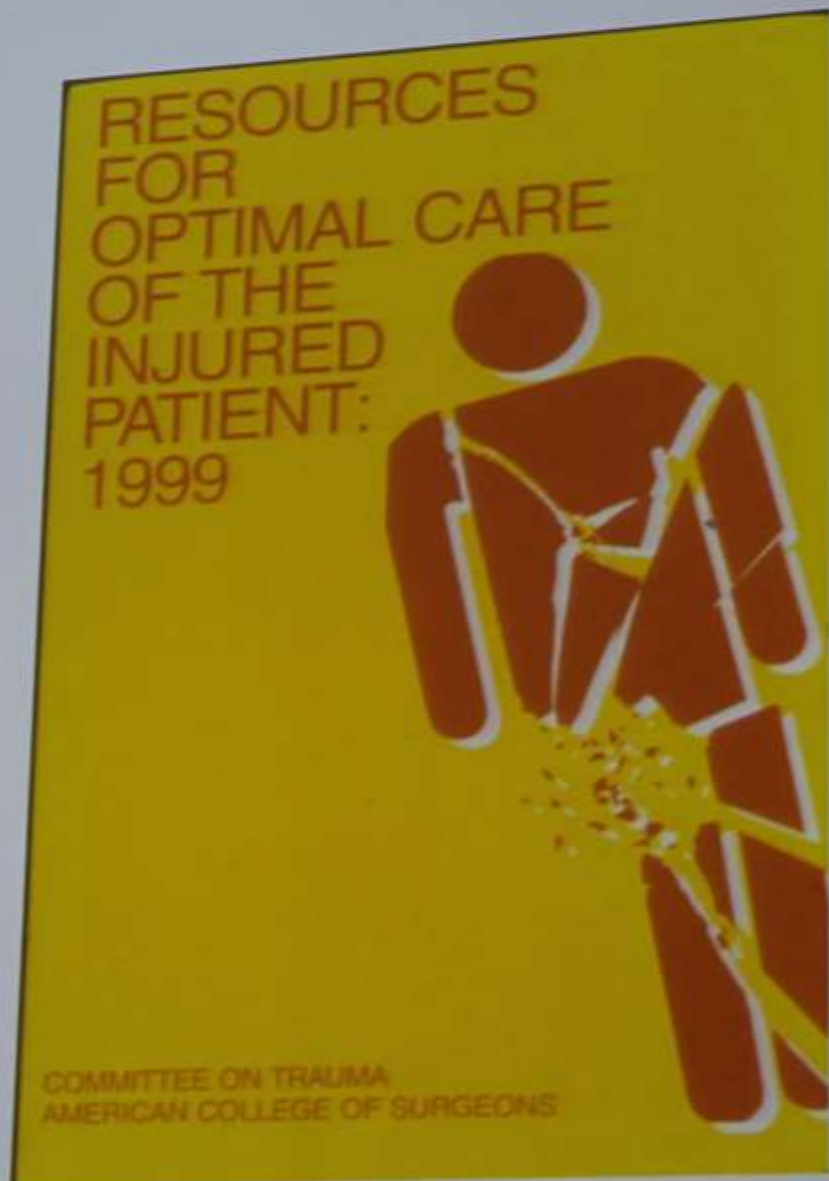
Trauma Center Standards

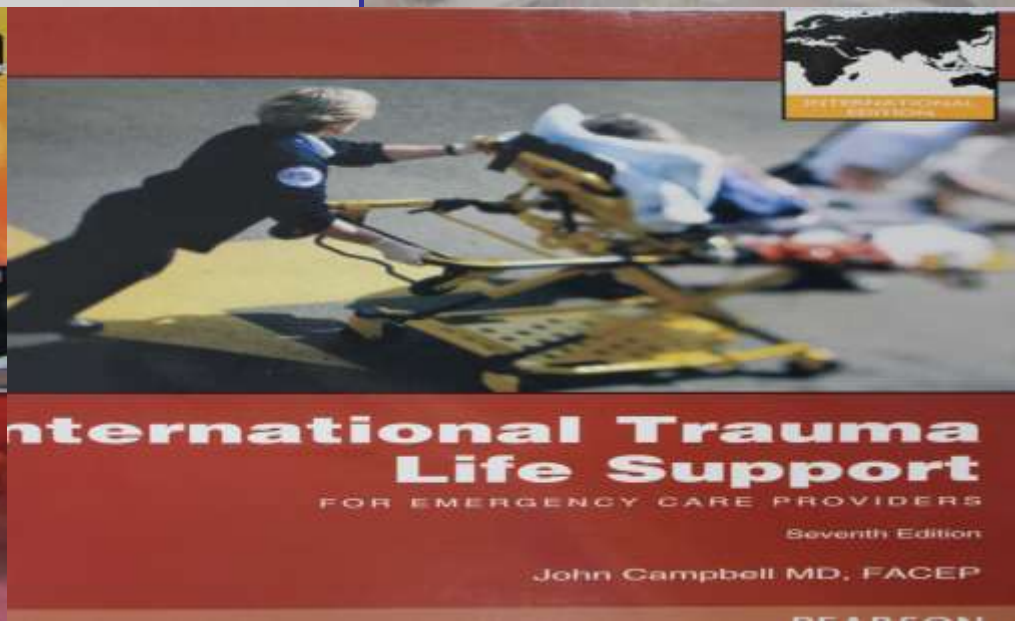
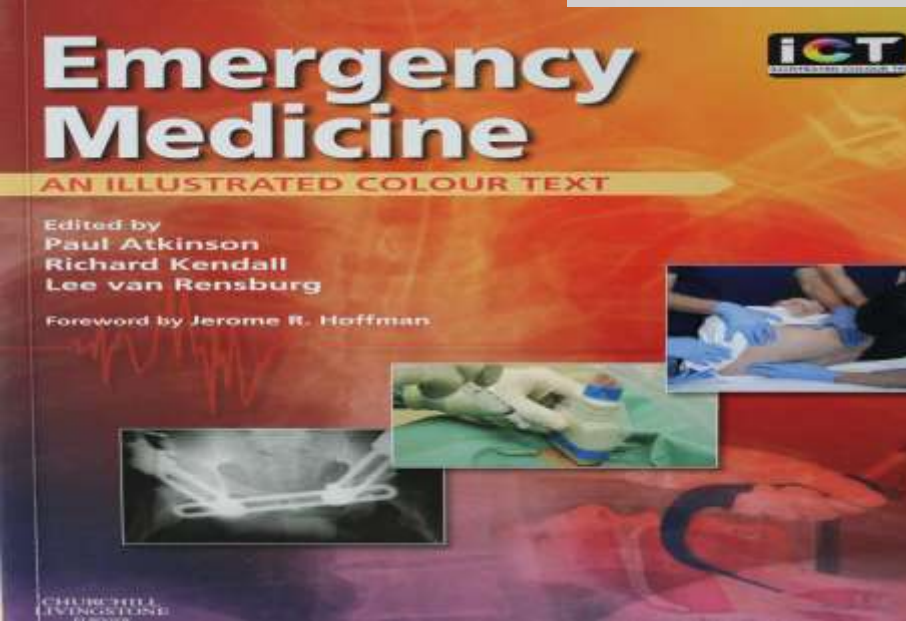
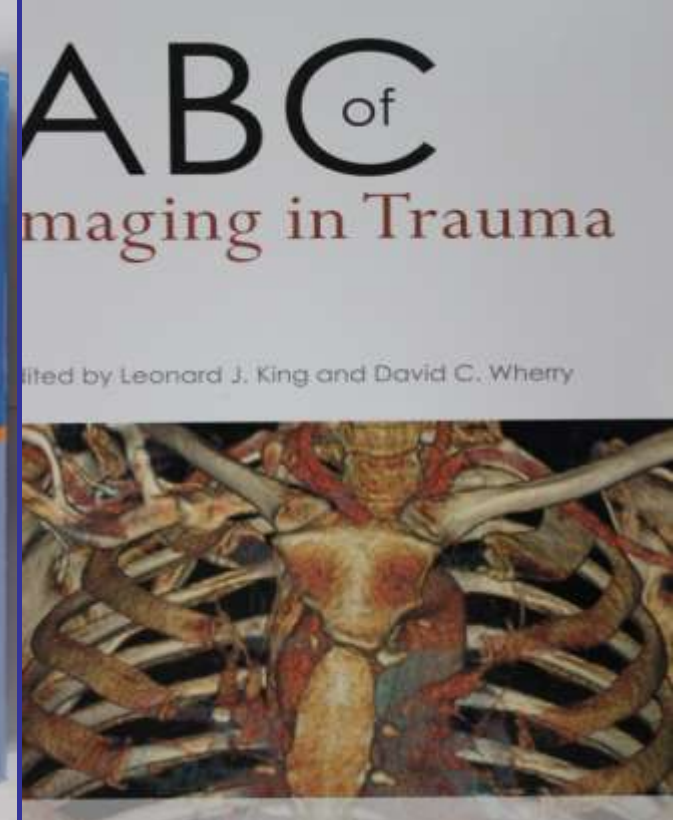
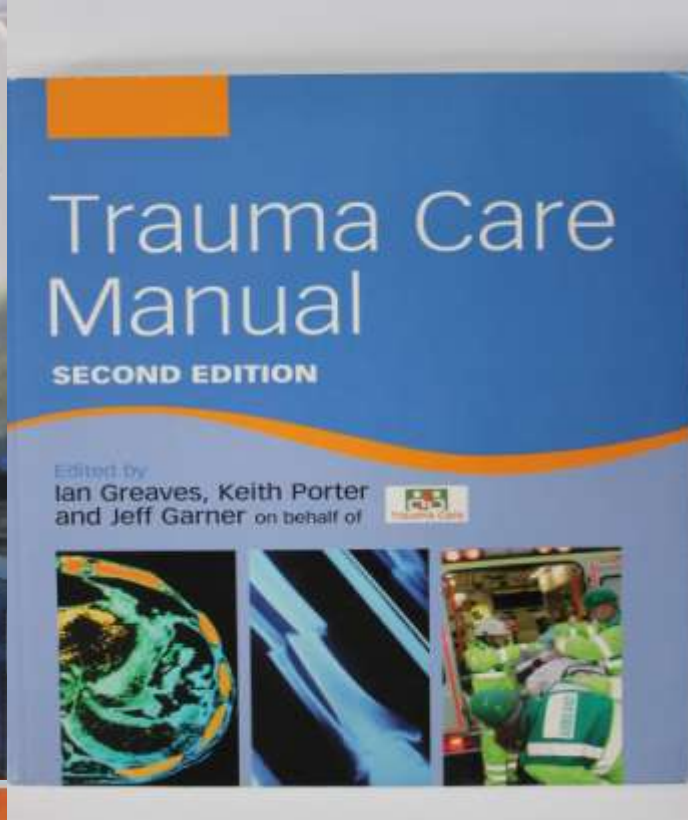
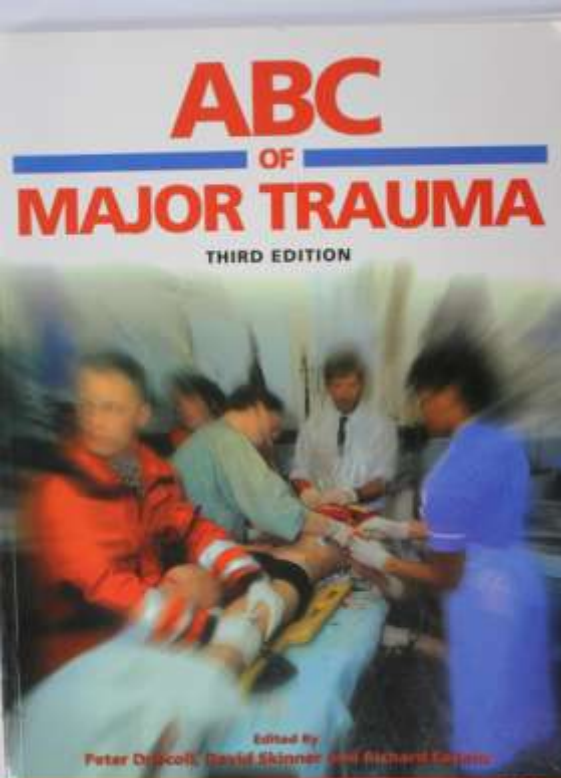
Trauma Center

Designation standards

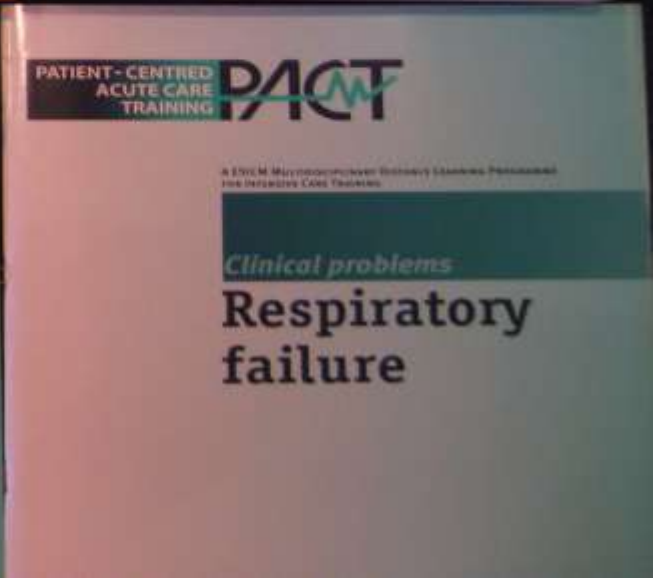
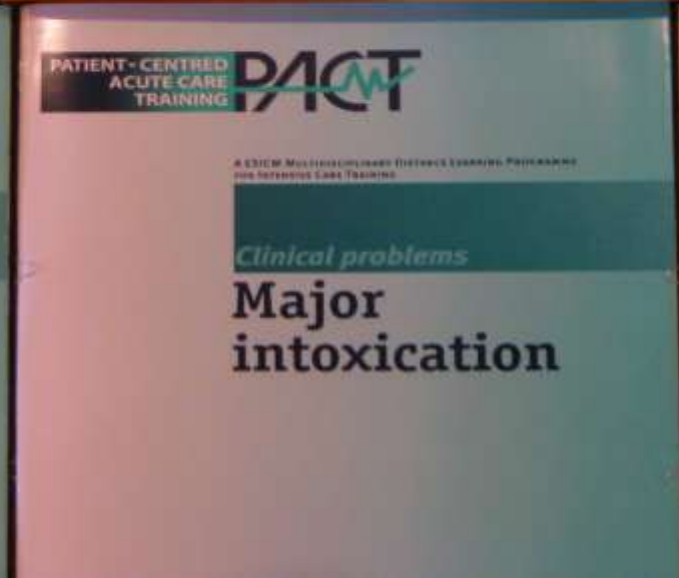
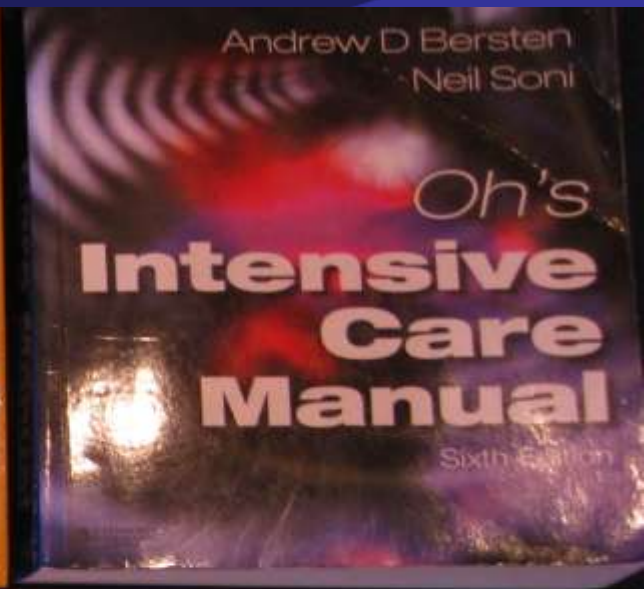
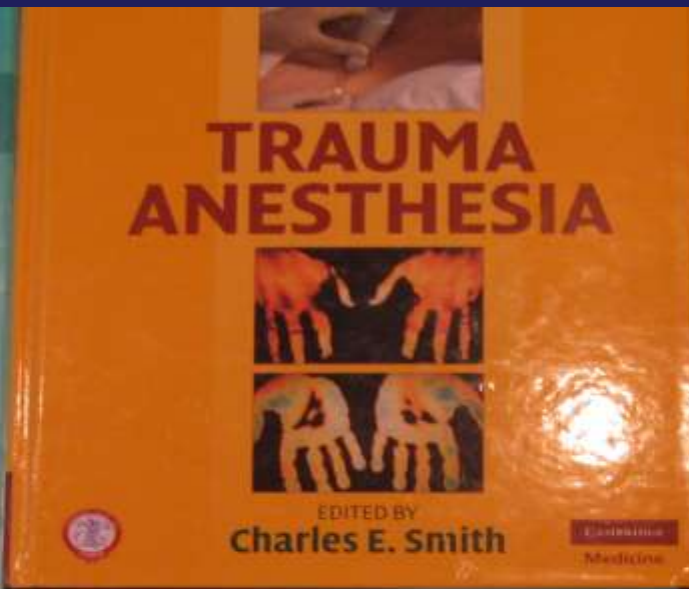
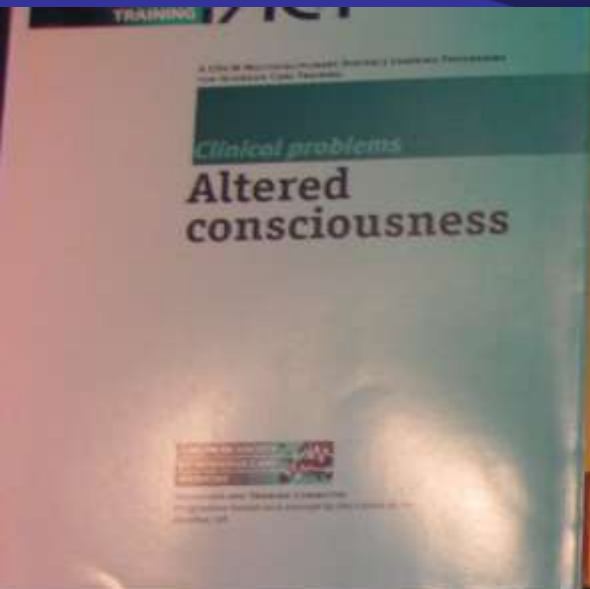
Data collection

Quality improvement
protocols

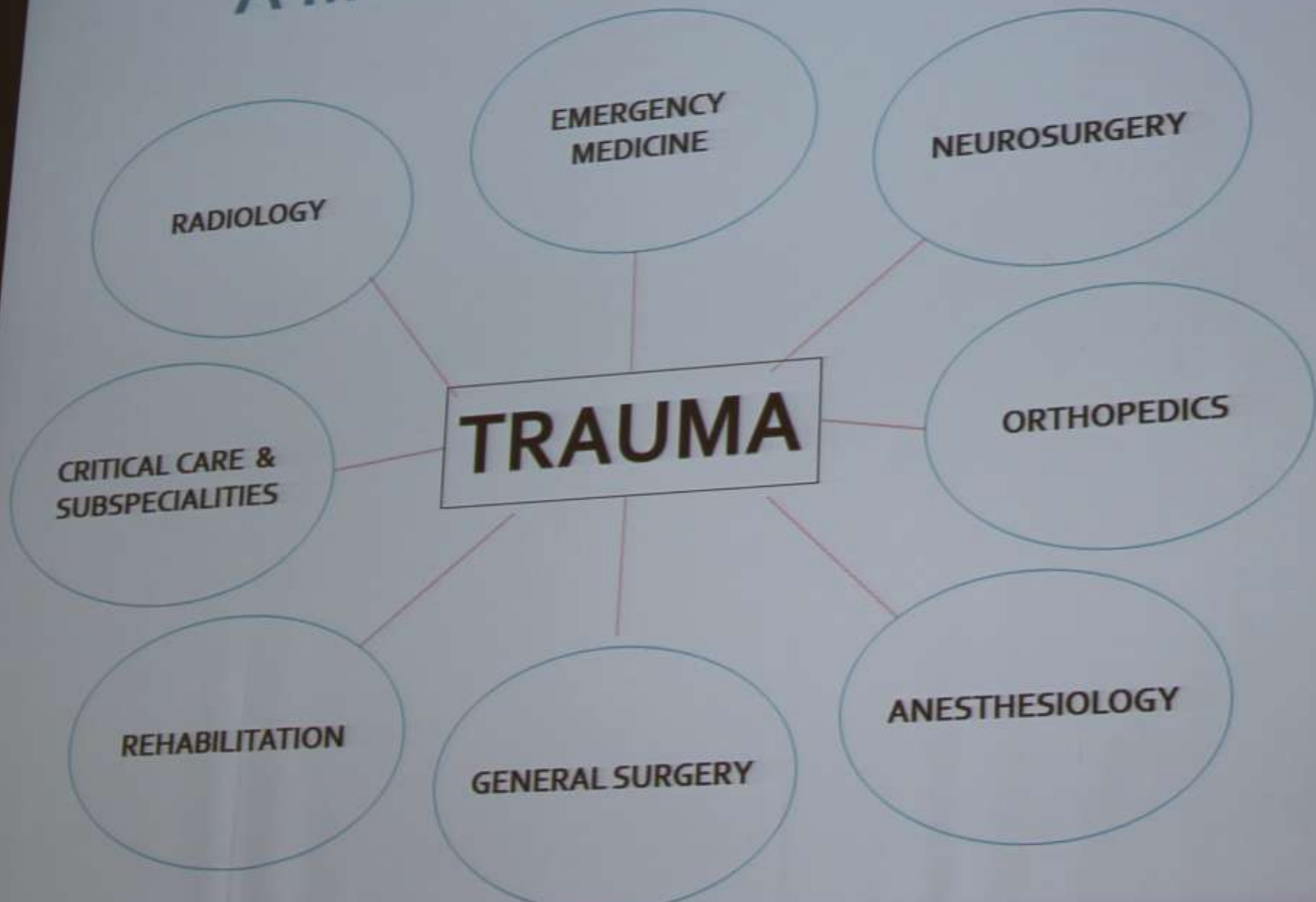




Trauma Guidelines

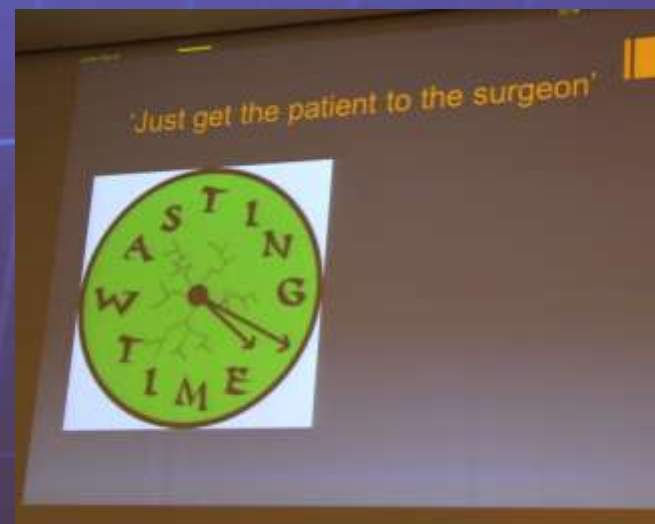
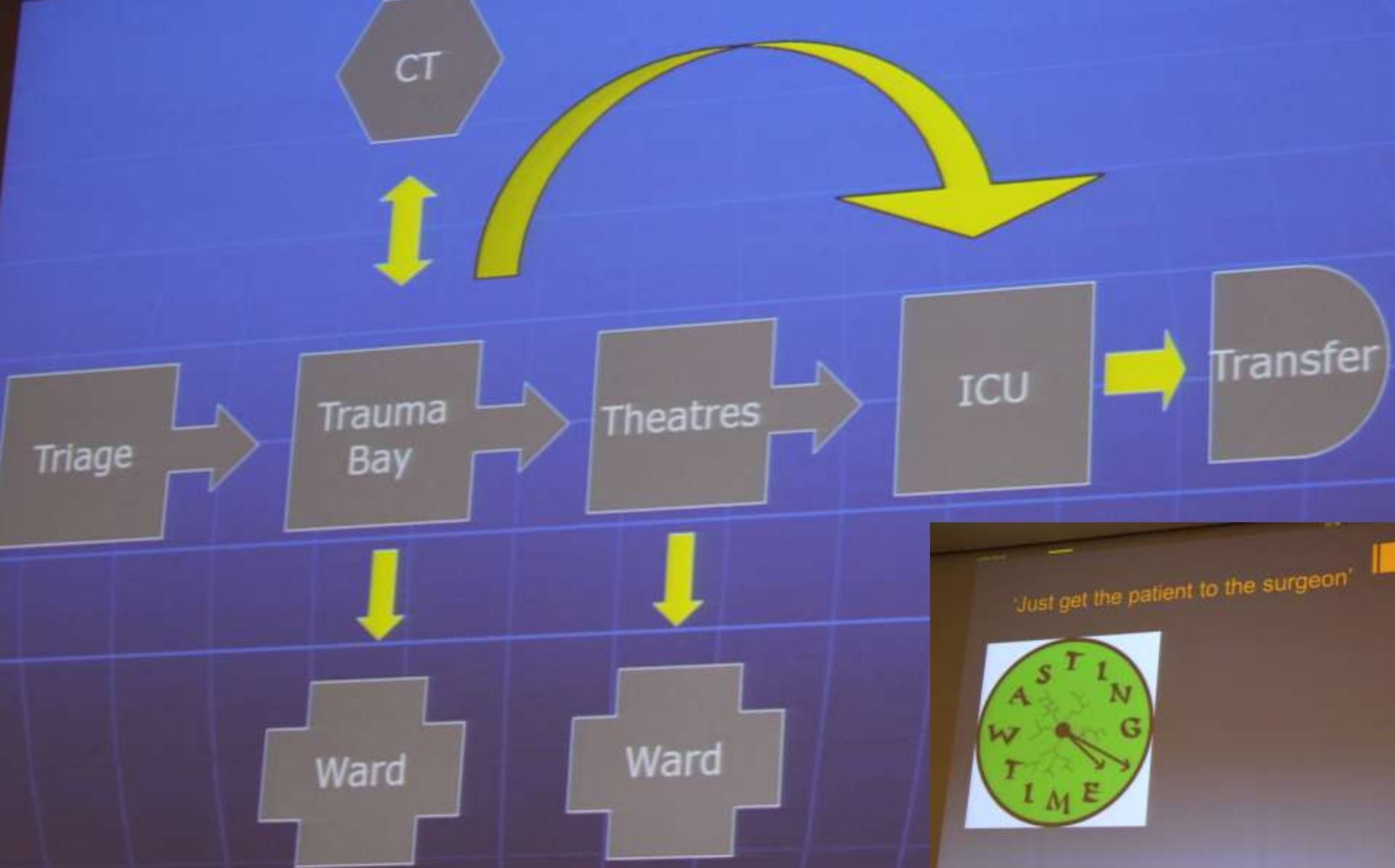


A Multidisciplinary Team



Emergency ward





Trajectory

UK: Paramedic intubation without drugs

"...paramedic intubation can no longer be recommended as a mandatory component of paramedic practice ... for the majority of paramedics emphasis should be placed on airway management using an appropriate supraglottic device". 2008



Diagnosis: Detection of pneumothorax with on-scene Chest Ultrasound



- Quick / simple. Reduction in chest decompression rates

FAST/extended FAST



More recent approaches to pre-hospital bleeding

- Code Red hospital pre-alert
- Tranexamic acid
- Reversal of warfarin on scene
- Blood on scene

'Code Red'

SENIOR MEMBER OF TRAUMA TEAM MUST
DECLARE **CODE RED** if:

- Trauma
- Systolic BP < 90
- Poor response to initial fluid resuscitation
- Suspected active haemorrhage



Activation based on

**"PHYSIOLOGY
NOT
LABORATORY"**



Example 'Code Red' trauma resuscitation policy

- Triggered by PHC doctor / trauma team leader
- Syst BP < 90 / Suspected active haemorrhage
- Pack 1: RBC 6 units / 4 FFP units
- Pack 2: RBC 6 units / 4 FFP units / 1 unit Platelets + 2 pools Cryo Ppt
- Measure clotting but administer without results

C-circulation



Trauma - Hemorrhagic shock - Vasopressors

Vasopressors ?

May be required transiently to sustain life and maintain tissue perfusion in face of a life-threatening hypotension.

Early aggressive fluid resuscitation may increase bleeding.
Vasopressor may reduced the fluid resuscitation and dilution for a given arterial pressure target.

But

- ✓ Vasopressors may induced deleterious vasoconstriction
- ✓ **Vasopressors may increased bleeding by increasing arterial pressure**

Adrenergetic support- is not a rescue therapy

Active approach:
early on-early off



Adremomymetic support: don't wait too
late

Crystalloid Resuscitation Improves Survival in Trauma Patients Receiving Low Ratios of Fresh Frozen Plasma to Packed Red Blood Cells

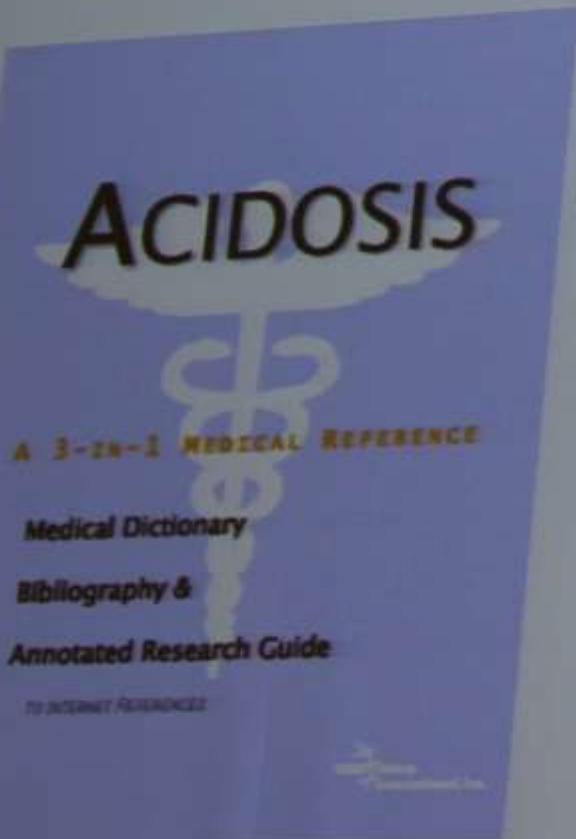
Nicholas Spoerke, MD, Joel Michalek, PhD, Martin Schreiber, MD, FACS, and the Trauma Outcomes Group

Hemostatic Effects of Fresh Frozen Plasma May be Maximal at Red Cell Ratios of 1:2

Ross Davenport, BSc, MD, MRCS, Nicola Curry, MD, MRCP, Joanna Manson, MD, MRCS, Henry De'Ath, MD, MRCS, Amy Coates, BSc, Claire Rourke, BSc, Rupert Pearse, MD, FRCA, Simon Stanworth, MD, MRCP, and Karim Brohi, MD, FRCA, FRCS



Avoiding Harm

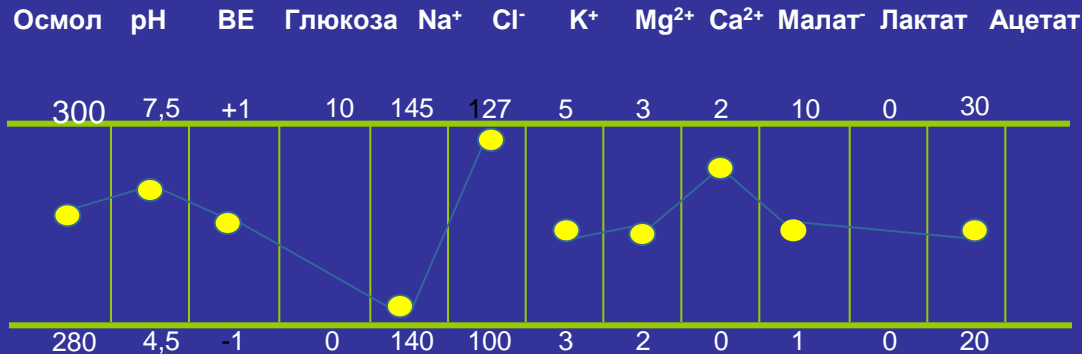


Balanced crystalloid resuscitation

Параметр	Плазма	Стерофундин® изотонический	Натрия Хлорид 0.9%	Раствор Рингера-Локка	Реосорбилакт®
Na ⁺ (ммоль/л)	136-143	140	154	130	278,16
K ⁺ (ммоль/л)	3,5-5,5	4	-	5	4,02
Ca ²⁺ (ммоль/л)	2,38-2,63	2,5	-	1	0,9
Mg ²⁺ (ммоль/л)	0,75-1,1	1	-	1	2,1
Cl ⁻ (ммоль/л)	96-105	127	154	112	112
HCO ₃ ⁻ (ммоль/л)	24	-	-	-	-
Лактат (ммоль/л)	1-1,1	-	-	27	175,52
Ацетат (ммоль/л)	-	24	-	-	-
Малат (ммоль/л)	-	5	-	-	-
Теорет. осмолярность (ммоль/л)	291	309	308	277	900
Потенциальный избыток оснований BE pot (ммоль/л)	-3-+2,5	0	-	+3	?*
Расход O ₂ (1л O ₂ /1л р-ра)	-	1,4	-	1,8	?*
Многоатомный спирт (г/л)	-	-	-	-	60 (сорбитол)

Sterofundin ISO-safe decision

Sterofundin



Safe corridor

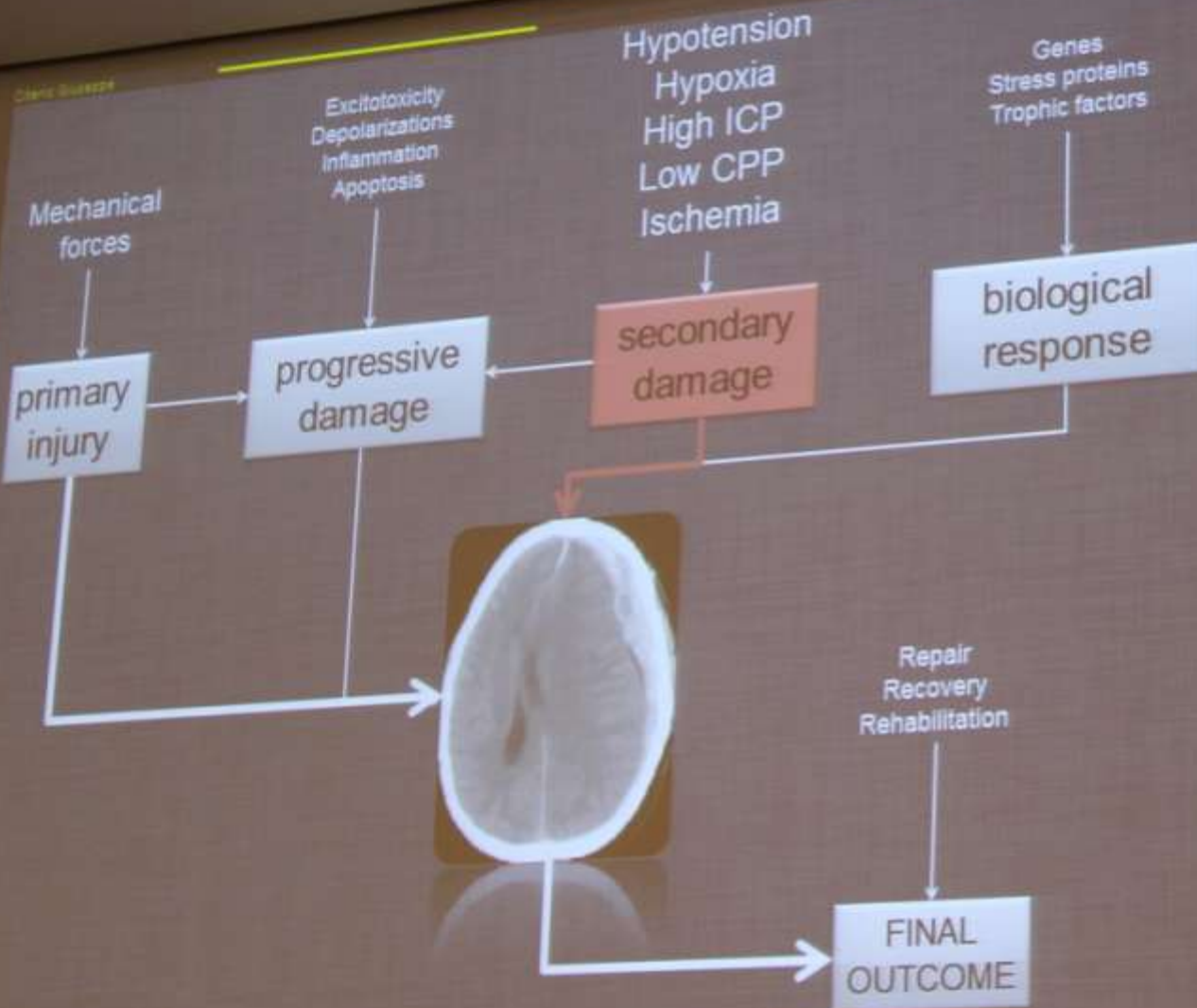
Safe decision means that:

- the fluid is optimal for 95% of patients
- the fluid is safe for other 5%

Sterofundin

- no lactate
- BE_{pot} = 0 mmol/l
- Balanced electrolytes

1.4 l O₂-consumption per l solution
286 mosmol/kg H₂O
BE_{pot} = 0 mmol/l
Na⁺ 140 mmol/l
K⁺ 4 mmol/l



ICP-monitoring; CPP monitoring



Emergency Ultrasound

More
Than Just
F.A.S.T.

ultrasonographic evi-
dence of cardiac activity
in emergency department patients
has 100% positive predictive value for

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Critical Care at a Critical Time

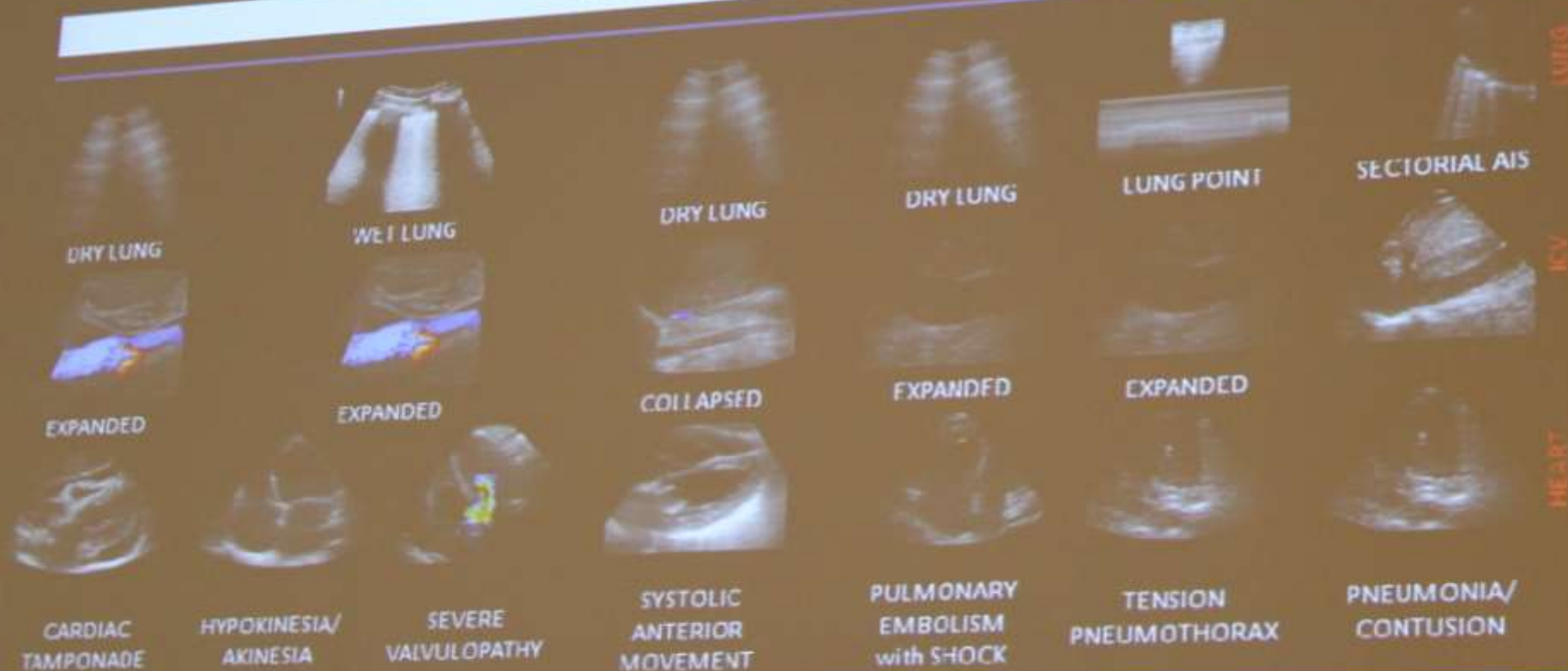
Lung Ultrasound: advantages

- Immediate bedside availability
- Repeatability
- Safe (no radiation)
- Easy to perform, portable
- Cost saving
- Improves outcome ?

LUNG ULTRASOUND PROTOCOL

Pelosi P, Corradi F
Anesthesiology 2012 (Ahead of Print)

ACUTE DYSPNEA WITH DESATURATION

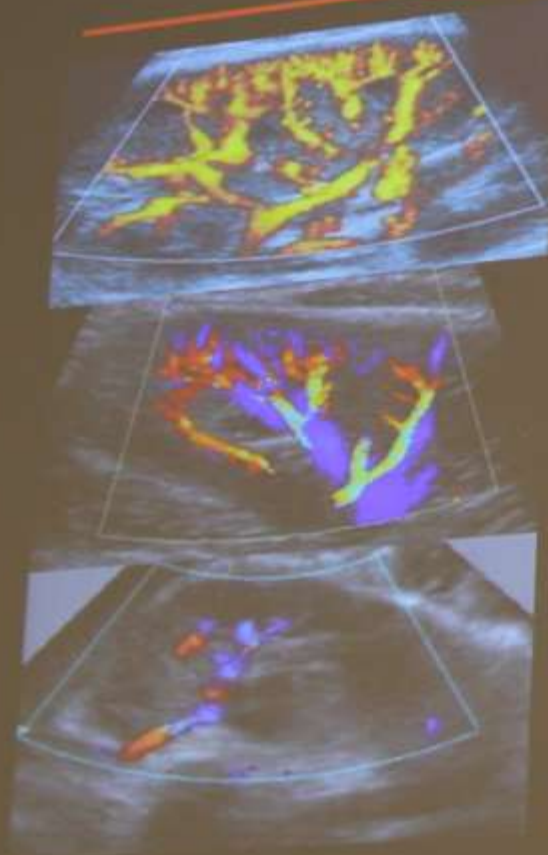




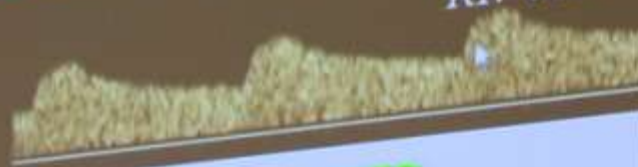


Different patterns of splanchnic perfusion

Pelosi P, Brusasco C, Corradi F ISICEM Yearbook, 2012



RI: 0.60



PERFUSED

RI: 0.80



MILD HYPOPERFUSION

RI: 1

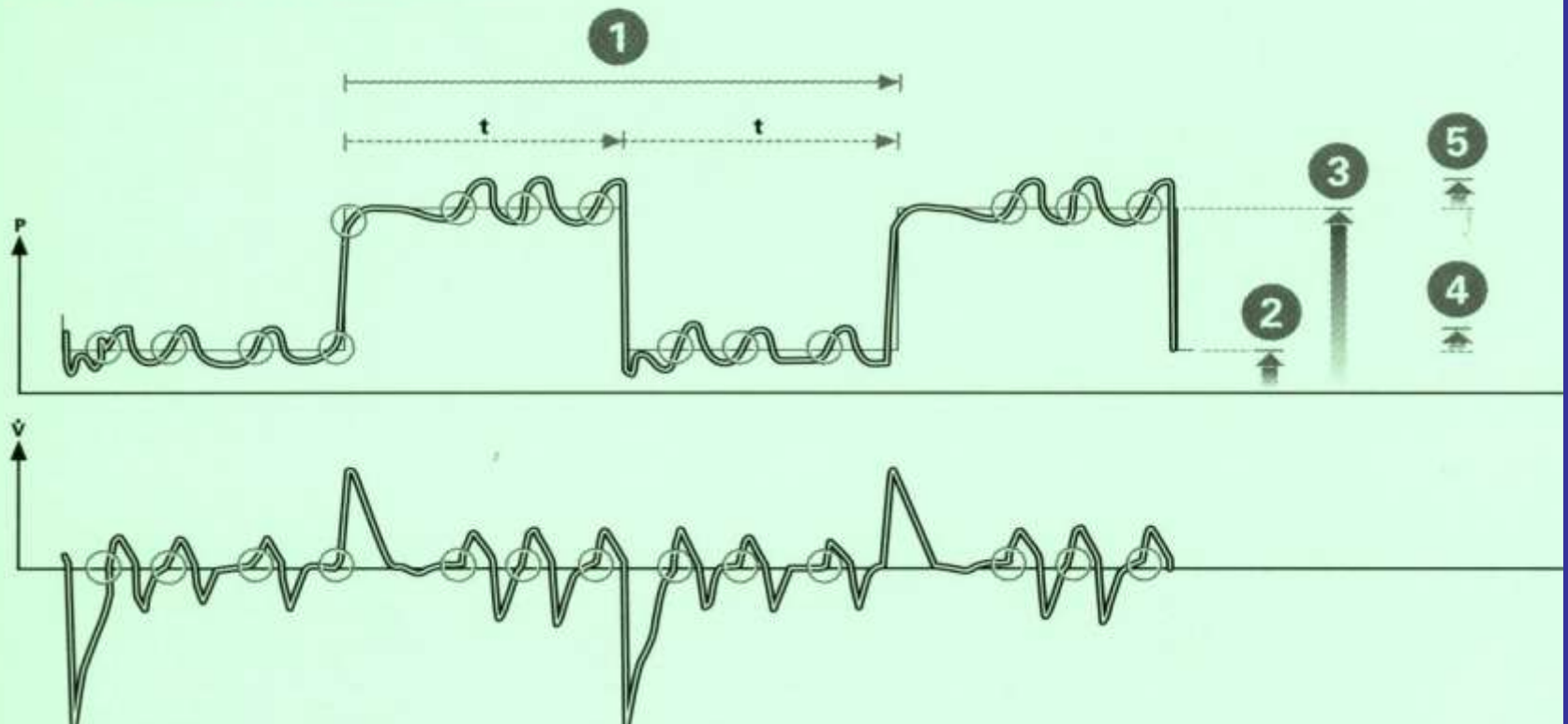


SEVERE HYPOPERFUSION



Pressure Support with APRV

Bi-Vent in detail



Alternative modes of ventilation – BIPHASIC, APRV

these modes of ventilation permit to solve the antagonism between MV and spontaneous breathing and the result is:

↑ activation of spontaneous breathing

↑ venous return

↑ cardiac output

↑ ventilation of basal parts of lungs

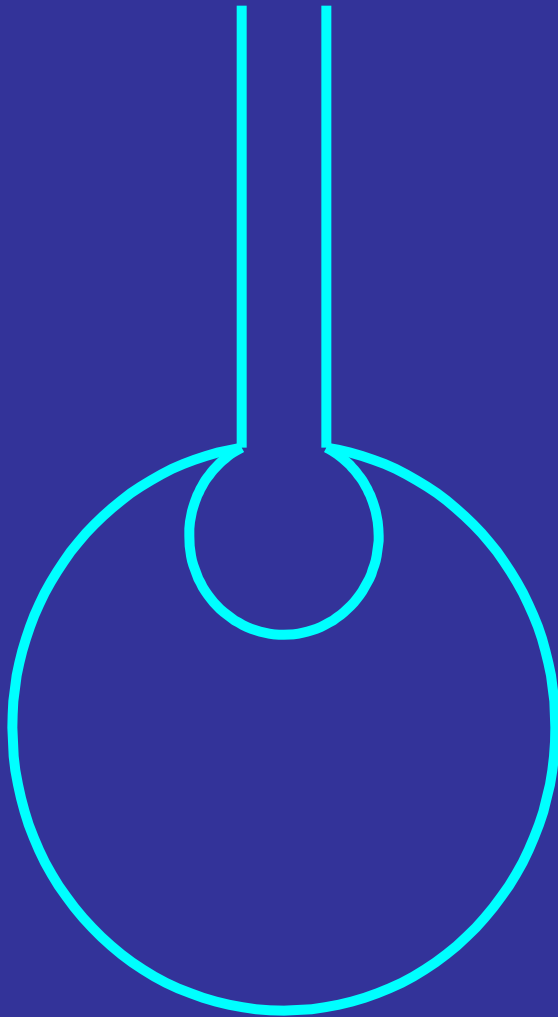
↓ needs in sedation



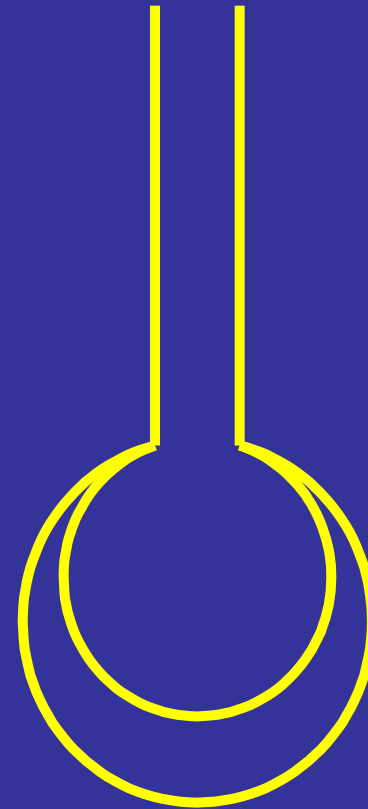
HFOV



Conventional ventilation

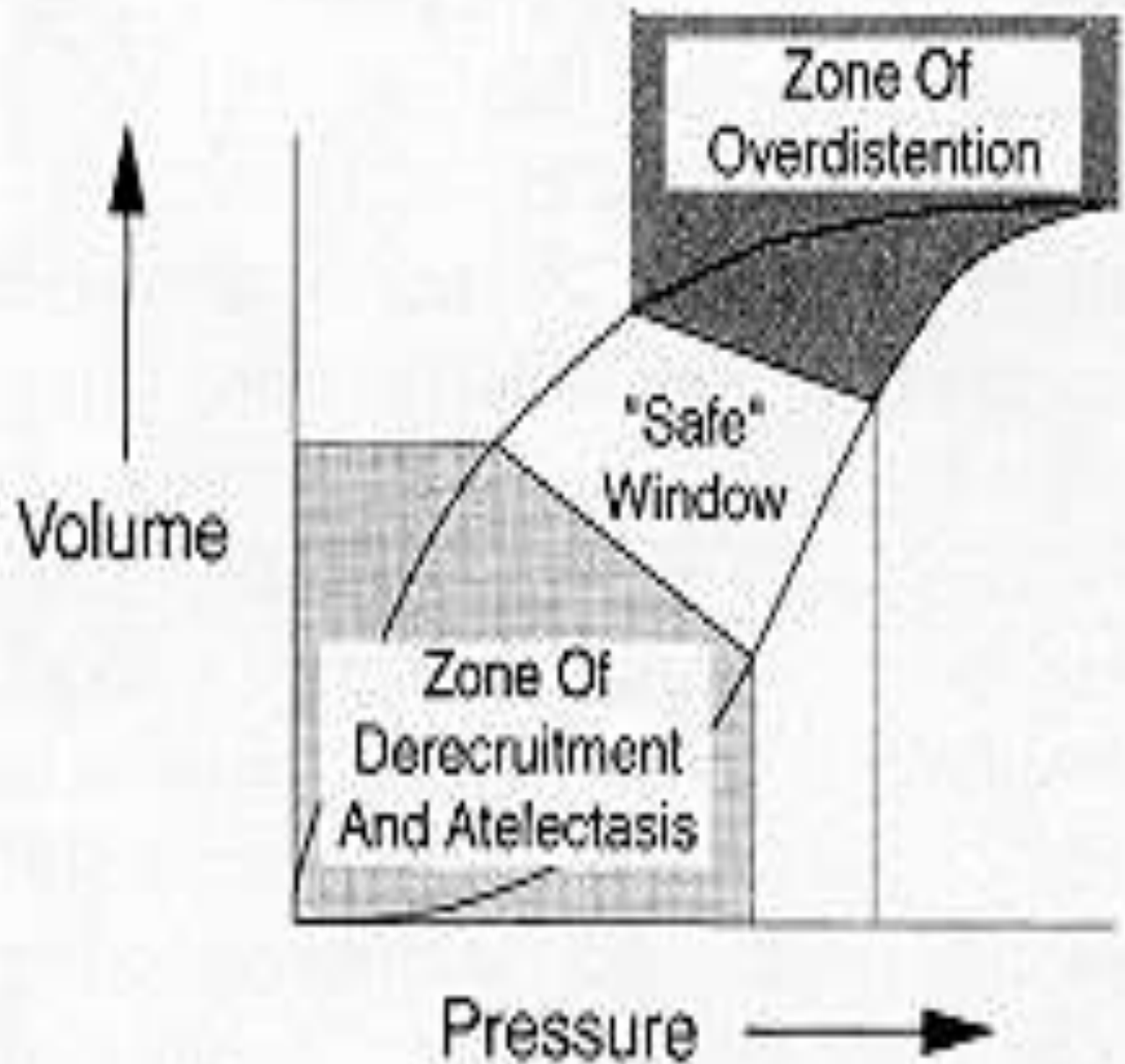


HFOV

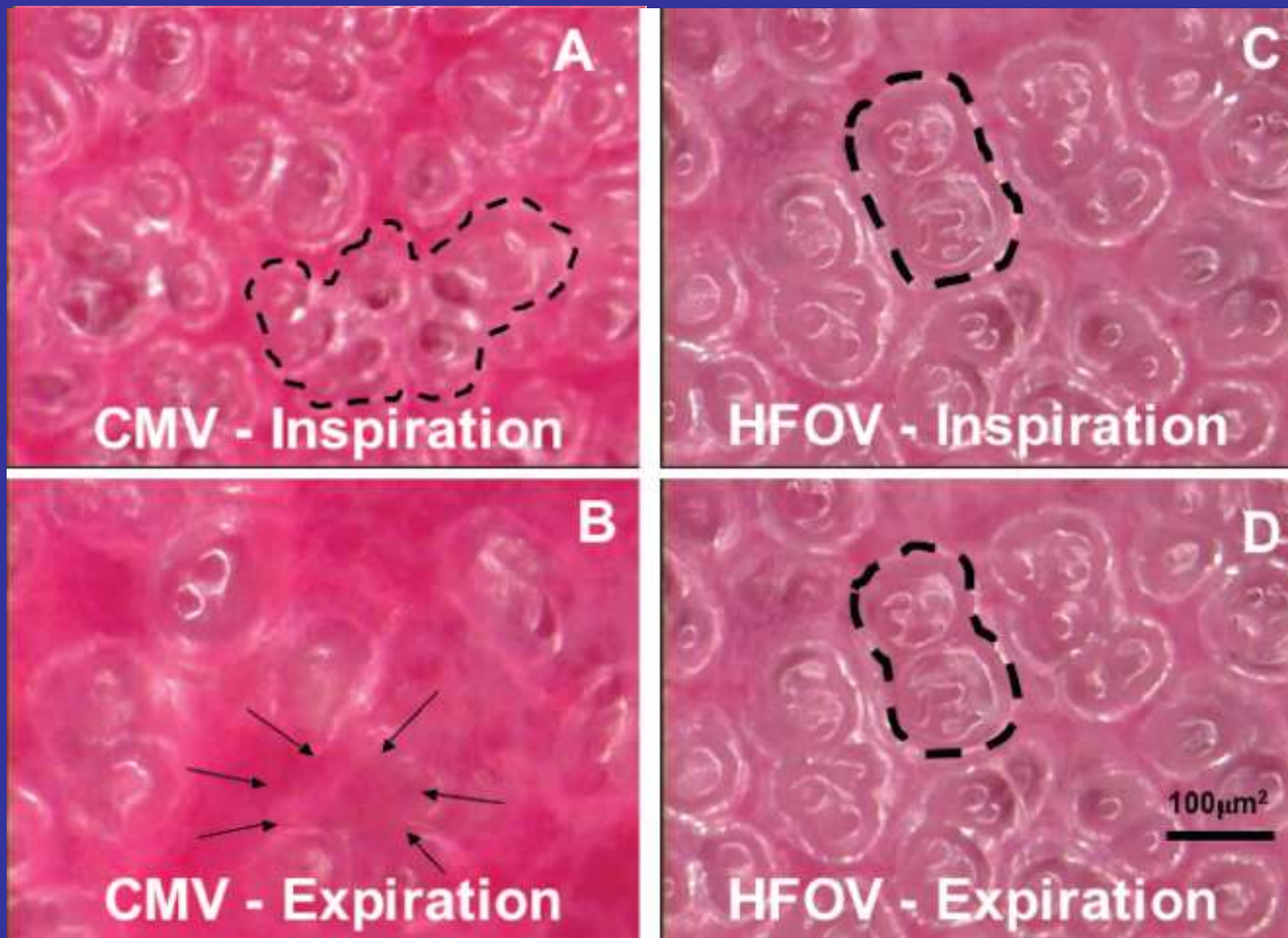


HFOV

Safety window



Unstable alveoles during CMV and HFOV



HFOV



