



Trauma Care

Course Objectives

- **Importance of Trauma Care**
- **Principles of primary and secondary assessments.**
- **Establish management priorities.**

The Need

- The leading cause of death in the first four decades of life.
- More than 5 million trauma-related deaths each year worldwide.
- Motor vehicle crashes cause over 1 million deaths per year. (we don't call it accidents b/c it's preventable)
- Injury accounts for 12% of the world's burden of disease.

The Need In Saudi



The Beginning

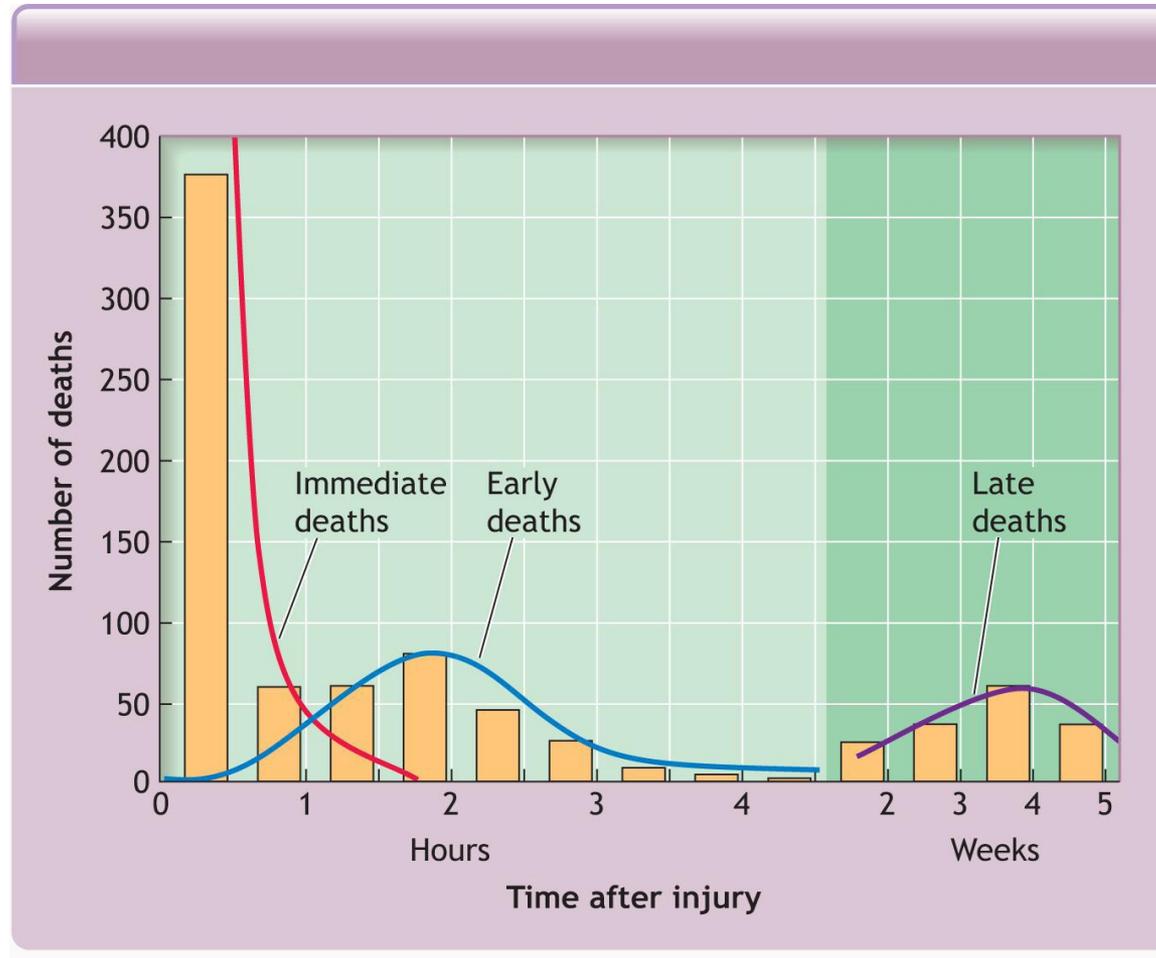


The Beginning

“When I can provide better care in the field with limited resources than what my children and I received at the primary care facility there is something wrong with the system, and the system has to be changed.”

James Styner, MD, FACS
1977

Trimodal Death Distribution



Immediate > u
have to prevent it
(seatbelt) !
Early: Get to
hospital (gold
hour)
Late: complication
e.g. infection,
multiorgan failure

ATLS Concept

ATLS : Advanced Trauma Life Support

- ABCDE approach to evaluation and treatment
- Treat greatest threat to life *first*
- Definitive diagnosis *not* immediately important
- Time is of the essence
- Do no further harm

ATLS Concept

Airway with c-spine protection

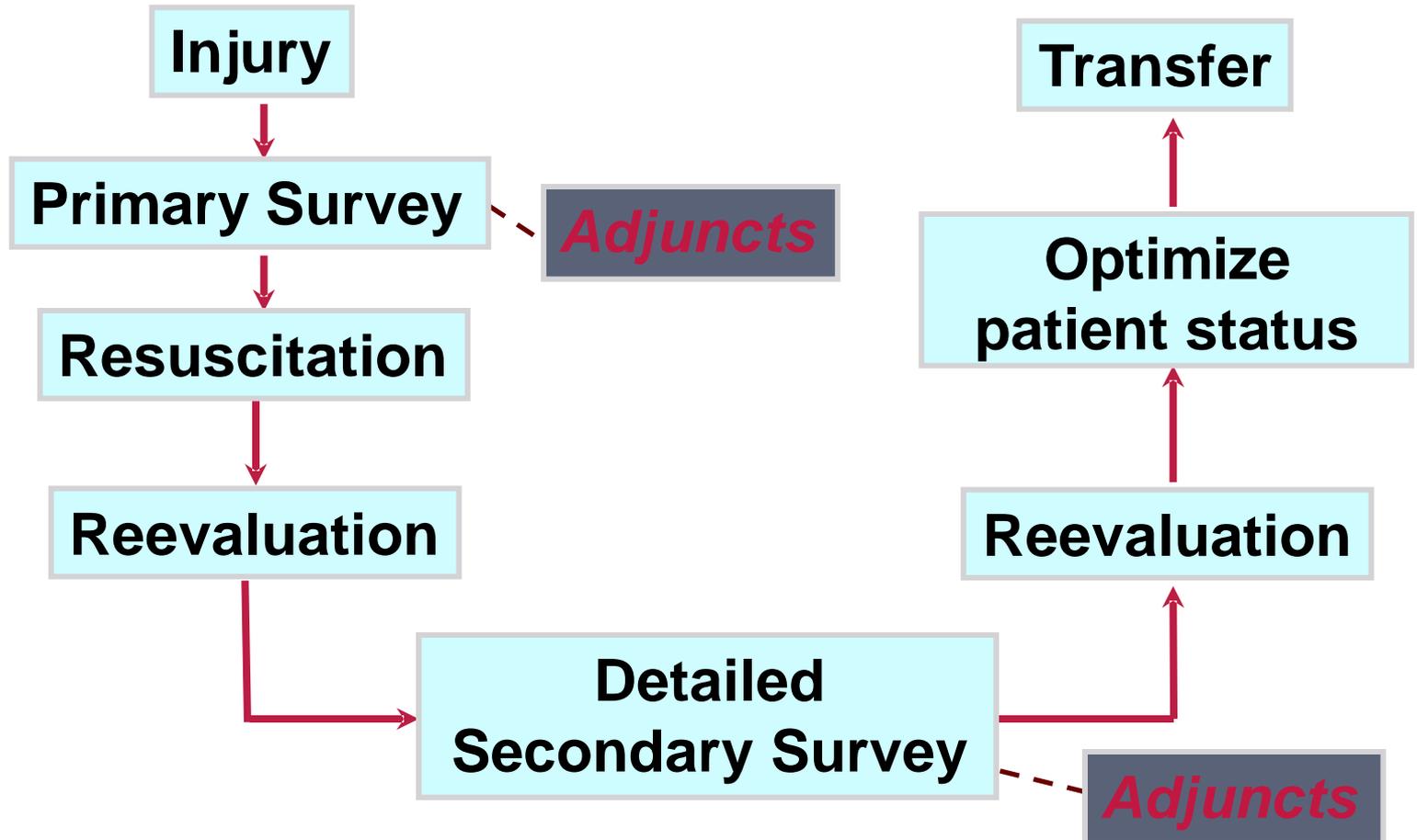
Breathing / ventilation / oxygenation

Circulation: stop the bleeding!

Disability / neurological status

Expose / **E**nvironment / body temperature

Initial Assessment / Management



Case Scenario

- 24-year-old male involved in a motorcycle crash in to a truck
- Not wearing a helmet
- Arrives at hospital with the red crescent
- BP 80/40, P140, RR 33, and central cyanosis
- C-collar, Oxygen at 8L/min, Dressing to forehead & thigh soaked in blood
- Has a wrist splint & is on a spinal board

Case Scenario

Demonstration
1

ATLS Objectives

- **Apply principles of primary and secondary surveys**
- **Identify management priorities**
- **Institute appropriate resuscitation and monitoring procedures**
- **Recognize the value of the patient history and biomechanics of injury**
- **Anticipate and manage pitfalls**

Standard Precautions

- Cap
- Gown
- Gloves
- Mask
- Shoe covers
- Goggles / face shield

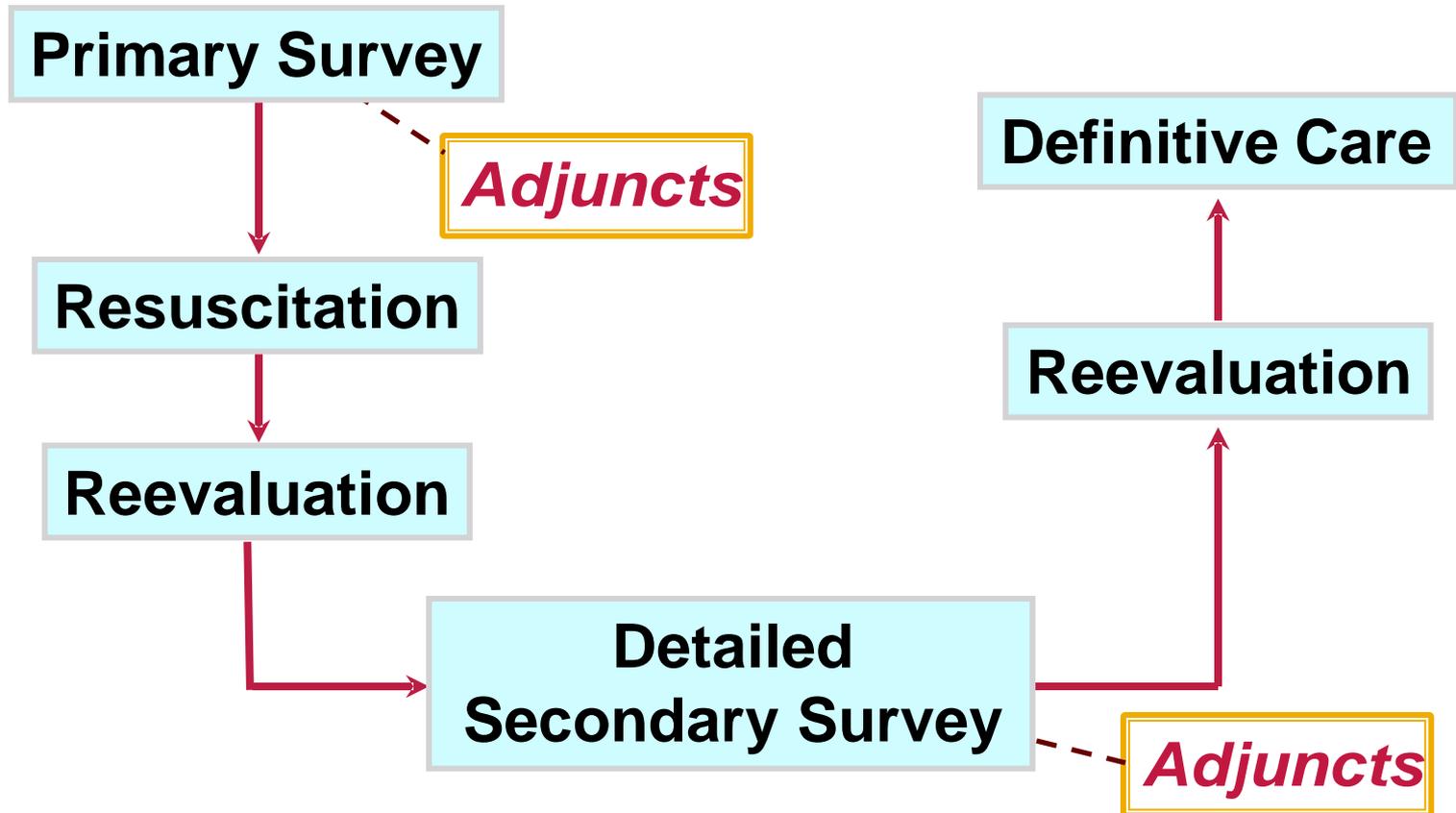


Initial Assessment

Primary survey and resuscitation of vital functions are done simultaneously using a team approach.



Concepts of Initial Assessment



Quick Assessment

What is a quick, simple way to assess a patient in 10 seconds?

Quick Assessment

What is a quick, simple way to assess a patient in 10 seconds?

- **Identify yourself**
- **Ask the patient his or her name**
- **Ask the patient what happened**

Appropriate Response Confirms

- A** Patent airway
- B** Sufficient air reserve to permit speech
- C** Sufficient perfusion to permit cerebation
- D** Clear sensorium

لما يجاوب المريض .. معناته
Airway , breathing , circulation
كويسين ,, لانه كمان فاهم ففيه دم واصل لـ
المخ

Primary Survey

Airway with c-spine protection

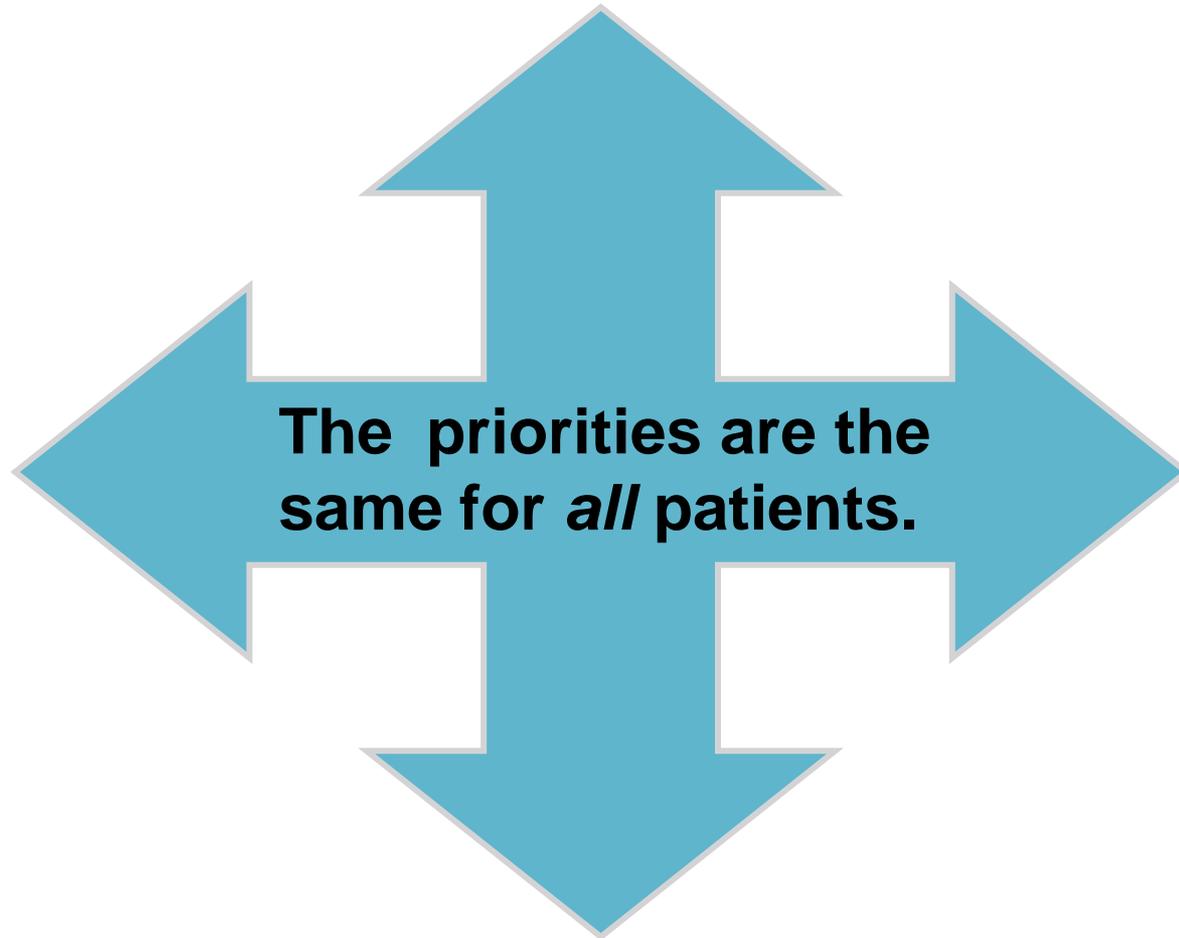
Breathing with adequate oxygenation

Circulation with hemorrhage control

Disability

Exposure / **E**nvironment

Primary Survey



Special Considerations

- **Trauma in the elderly**
- **Pediatric trauma**
- **Trauma in pregnancy**



Primary Survey

Airway

Establish patent airway and protect c-spine



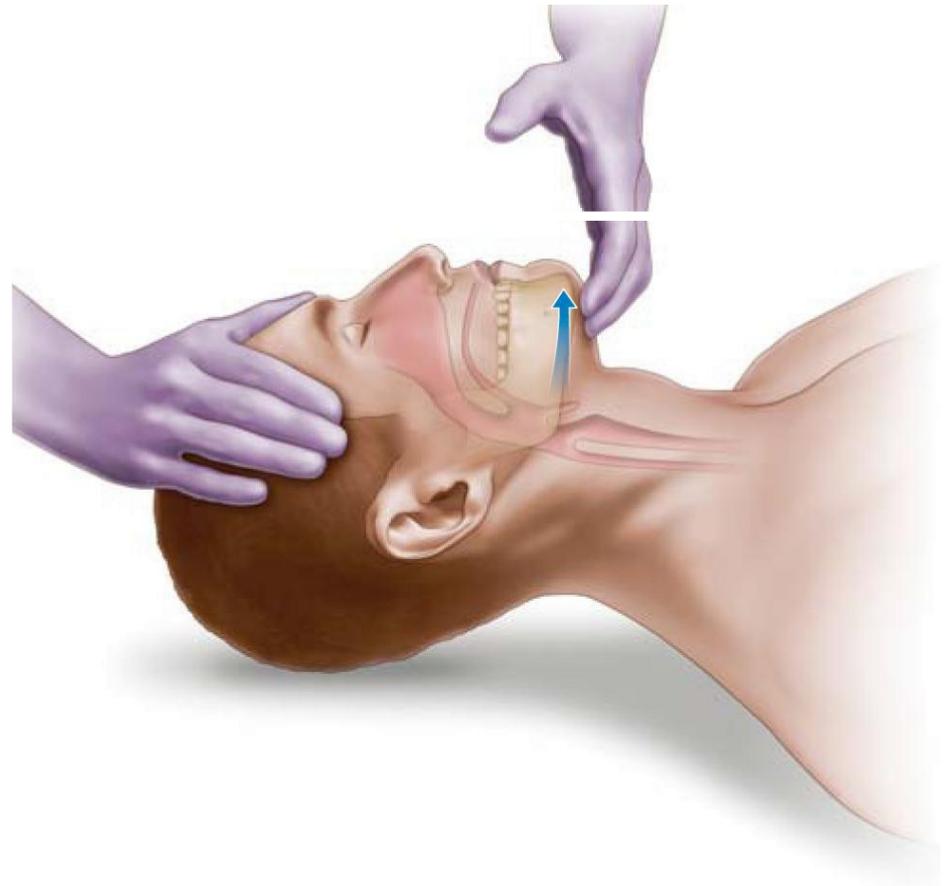
Occult airway injury
Progressive loss of airway
Equipment failure
Inability to intubate

Primary Survey

Basic Airway Techniques **IMP!**

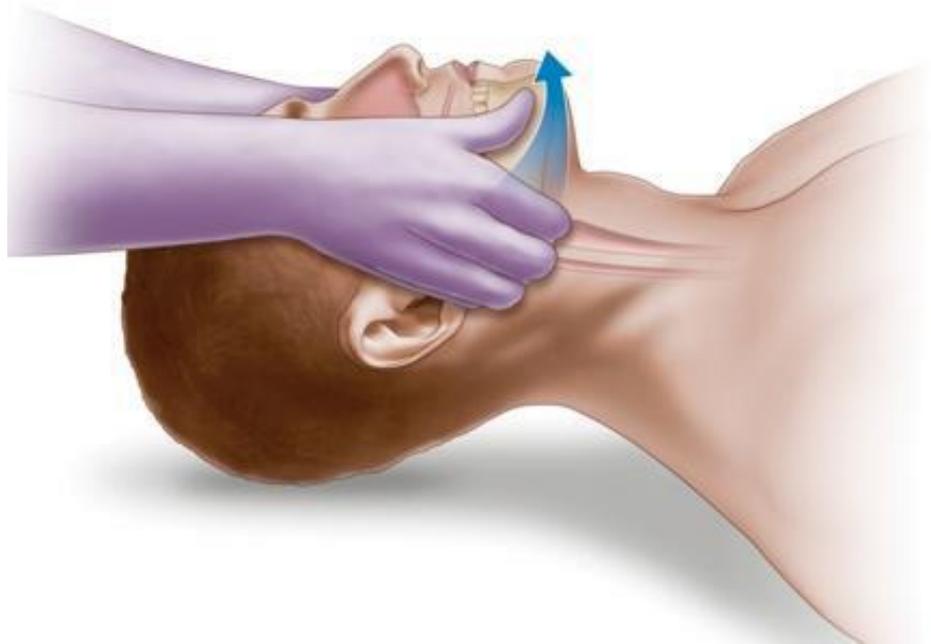
Chin-lift Maneuver

Actually it's called Head-tilt/ chin-lift maneuver
But remember the cervical spine could be injured that's why the doctor remove the head part =>



Basic Airway Techniques

Jaw-thrust Maneuver



Primary Survey

Advanced Airway Techniques *Orotracheal intubation*

Other way:
Tracheostomy



Primary Survey

Breathing

Assess and ensure adequate oxygenation and ventilation

- Respiratory rate
- Chest movement
- Air entry
- Oxygen saturation

Primary Survey

Breathing



Airway versus ventilation problem?

**iatrogenic pneumothorax
or
tension pneumothorax?**

Primary Survey

Breathing

The **Immediate** life threatening injuries **IMP!**

- Laryngeotracheal injury / Airway obstruction
- Tension pneumothorax > **u don't see this on CXR cause u**

want to see chest tube in CXR =)

- Open pneumothorax
- Flail chest and pulmonary contusion
- Massive hemothorax > **1.5 L (MCQ)**
- Cardiac tamponade

- Where to insert chest tube ?
5th intercostal space, anterior to mid axillary line.

-How to manage tension pneumothorax?>
2nd intercostal at mid axillary line (needle thoracostomy) > followed by Chest tube!

- How to manage open pneumothorax?
Placement of dressing secured on 3 sides to create (flutter-valve) b/c securing on 4 sides will cause tension pneumothorax, a chest tube distant from injury must then placed.

- How to manage hemothorax ?
Chest tube if bleeding didn't stop>OR

-Cardiac tamponade in trauma?
Heart injured , needle pericardiocentesis or pericardial window can be immediately life-saving . Thoracotomy is the definitive treatment with repair of injury

Primary Survey

Circulation

- **Level of consciousness**
- **Skin color and temperature**
- **Pulse rate and character**

Primary Survey

Circulatory Management

- Control hemorrhage
- Restore volume
- Reassess patient
- Lethal triad **MCQ!**

1-Hypothermia 2- Coagulopathy (it consumed)

3-Acidosis

What are the causes of Hypotension in Trauma?
1-Bleeding chest> Dx: by Examination & xray
2-bleeding in abdomen> Dx: Fast , DPL,
abdominal distention
3-bleeding in pelvis> pelvis is moving with
hypotension !
4 External bleeding
5-bleeding at site

Pitfalls

Elderly
Children
Athletes
Medications

Primary Survey

Disability

- Baseline neurologic evaluation
 - Glasgow Coma Scale Score **IMP! Memorize!**

Table 4. Pediatric Glasgow Coma Scale For Nonverbal Children.

Eye Opening	
Spontaneous	4
To speech	3
To pain	2
No response	1
Verbal Response	
Coos, babbles	5
Irritable cry	4
Cries to pain	3
Moans to pain	2
No response	1
Motor Response	
Follows commands	6
Localizes pain	5
Withdraws to pain	4
Decorticate flexion	3
Decerebrate extension	2
No response	1

Primary Survey

Brian herniation > compress nucleus of 3rd never > one eye pupil dilated > if not treated > both eyes > may end with brain death

Disability

- **Baseline neurologic evaluation**
 - **Glasgow Coma Scale score**
 - **Pupillary response**

Primary Survey

Disability

- **Baseline neurologic evaluation**
 - **Glasgow Coma Scale score**
 - **Pupillary response**



**Observe for
neurologic
deterioration**

Primary Survey

Exposure / Environment

Completely undress the patient



**Prevent
hypothermia**

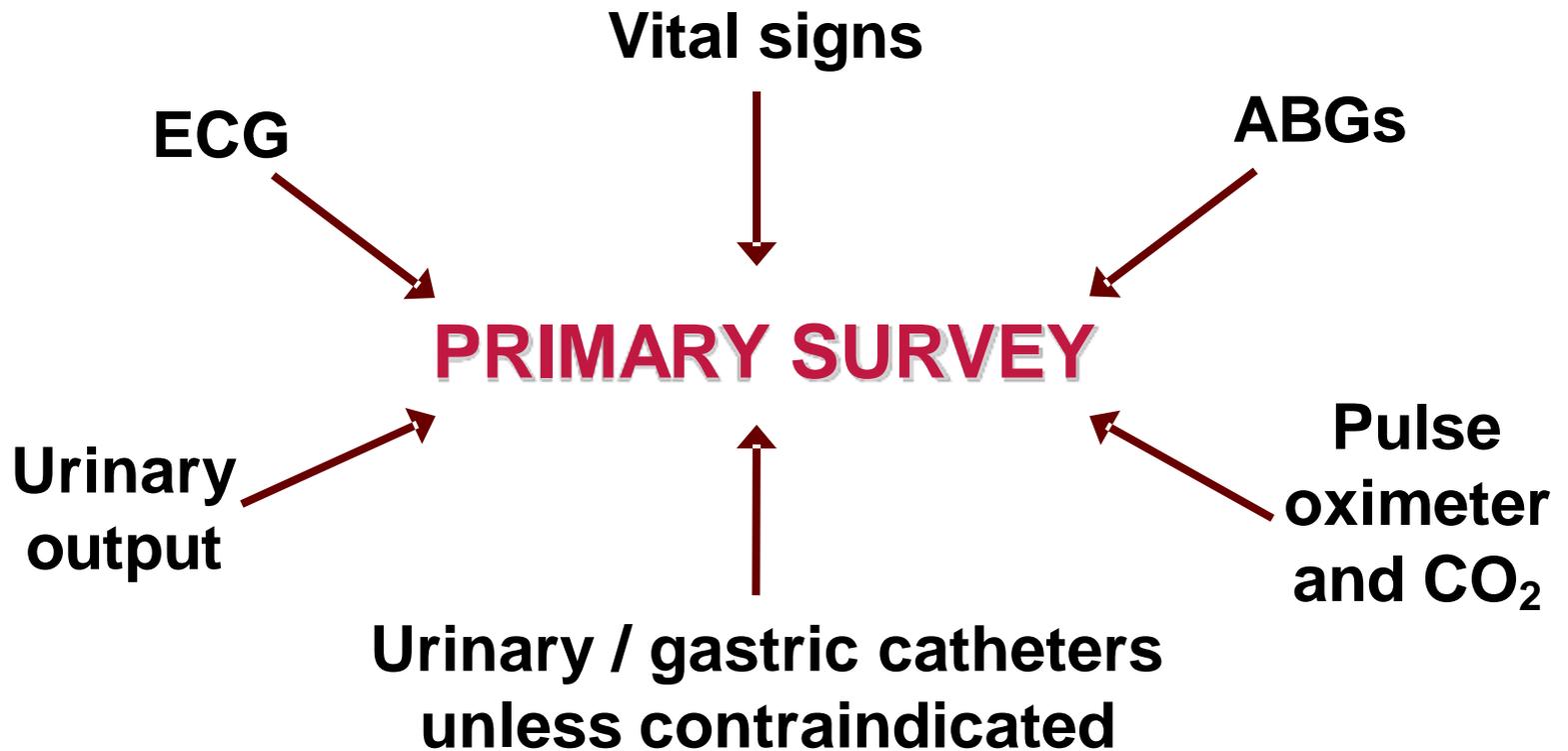


**Missed
injuries**

Resuscitation

- **Protect and secure airway**
- **Ventilate and oxygenate**
- **Stop the bleeding!**
- **Vigorous shock therapy**
- **Protect from hypothermia**

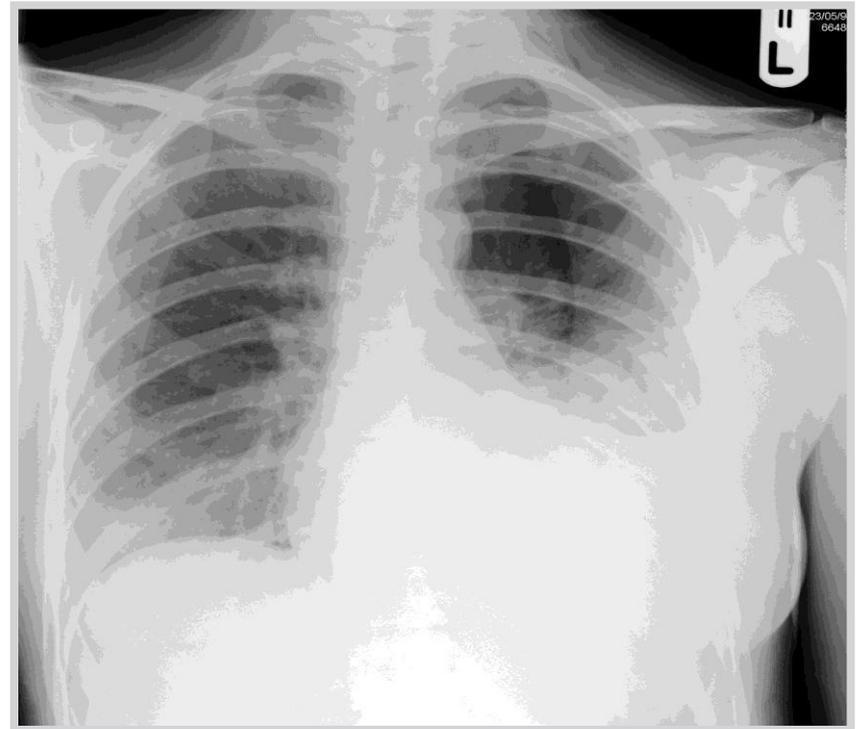
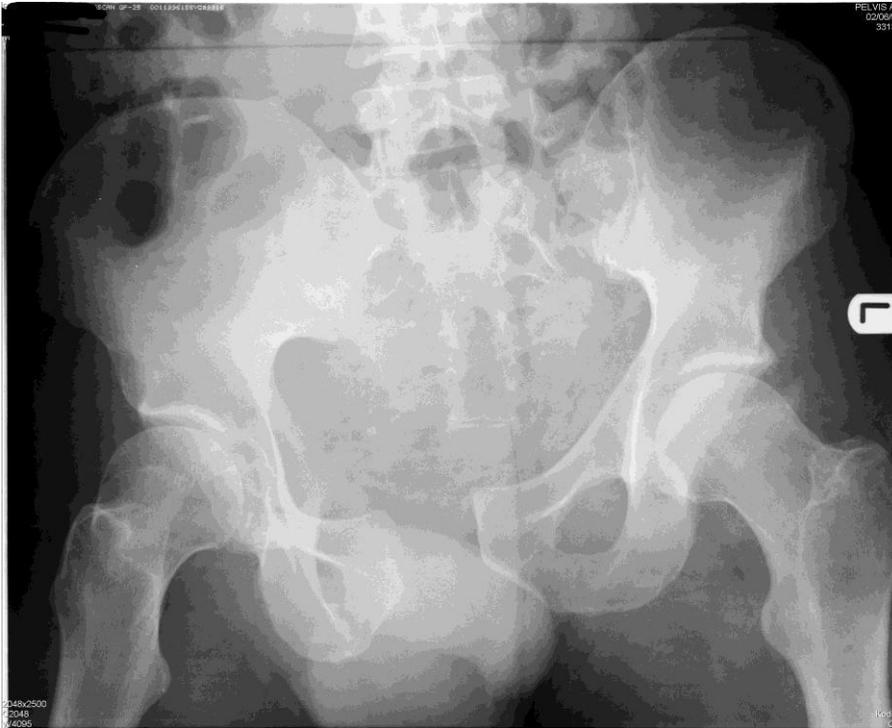
Adjuncts to Primary Survey



Adjuncts to Primary Survey

Xray to any trauma pt?

- 1- C-spine Xray better if CT available
- 2- CXR
- 3- Pelvis xray



Adjuncts to Primary Survey

Diagnostic Tools

- **FAST** (Focused Assessment with Sonography for Trauma)
- **DPL** (diagnostic peritoneal lavage) > if u don't have FAST , If no blood is aspirated, 1 litre of warm 0.9% saline is infused and after a few (usually 5) minutes this is drained .



Adjuncts to Primary Survey

Consider Early Transfer

- Use time before transfer for resuscitation
- Do not delay transfer for diagnostic tests

For primary survey it should take 10-20 min

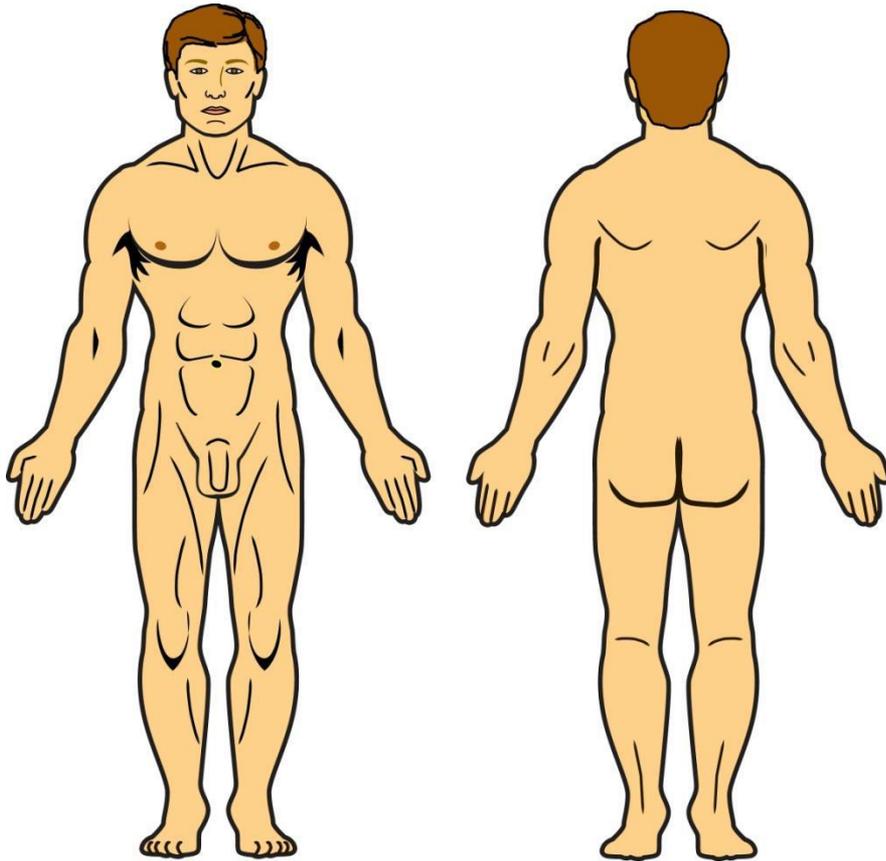


Case Scenario

Demonstration

11

What is the secondary survey?



The ***complete***
history and
physical
examination

Secondary Survey

When do I start the secondary survey?

After

- **Primary survey is completed**
- **ABCDEs are reassessed**
- **Vital functions are returning to normal**

Secondary Survey

What are the components of the secondary survey?

- **History**
- **Physical exam: Head to toe**
- **Complete neurologic exam**
- **Special diagnostic tests**
- **Reevaluation**

Secondary Survey

History

Allergies

Medications

Past illnesses

Last meal

Events / Environment / Mechanism

Secondary Survey

Mechanisms of Injury



Secondary Survey

Head

- External exam
- Scalp palpation
- Comprehensive eye and ear exam
 - Including visual acuity



Unconsciousness
Periorbital edema
Occluded auditory canal

Secondary Survey

Maxillofacial

- Bony crepitus
- Deformity
- Malocclusion



Potential airway obstruction
Cribriform plate fracture
Frequently missed

Secondary Survey

Neck (Soft Tissues)

Mechanism: Blunt vs penetrating

Symptoms: Airway obstruction, hoarseness

Findings: Crepitus, hematoma, stridor, bruit



Delayed symptoms and signs
Progressive airway obstruction
Occult injuries

Secondary Survey

Chest

- **Inspect**
- **Palpate**
- **Percuss**
- **Auscultate**
- **X-rays**



Secondary Survey

Chest

The **Potential** life threatening injuries

- Blunt cardiac injury
- Traumatic aortic disruption
- Blunt esophageal rupture
- Traumatic diaphragmatic injury

Secondary Survey

Abdomen

- Inspect / Auscultate
- Palpate / Percuss
- Reevaluate
- Special studies



Hollow viscous injury
Retroperitoneal injury

Secondary Survey

Indications for Laparotomy – Blunt Trauma

- Hemodynamically abnormal with suspected abdominal injury (DPL / FAST)
- Free air
- Diaphragmatic rupture
- Peritonitis
- Positive CT

Secondary Survey

Indications for Laparotomy – Penetrating Trauma

- Hemodynamically abnormal
- Peritonitis
- Evisceration
- Positive DPL, FAST, or CT

Secondary Survey

Perineum

Contusions, hematomas, lacerations, urethral blood

Rectum

Sphincter tone, high-riding prostate, pelvic fracture, rectal wall integrity, blood

Vagina

Blood, lacerations



Urethral injury

Pregnancy

Secondary Survey

Pelvis

- Pain on palpation
- Leg length unequal
- Instability
- X-rays as needed



Excessive pelvic manipulation
Underestimating pelvic blood loss

Secondary Survey

Extremities

- **Contusion, deformity**
- **Pain**
- **Perfusion**
- **Peripheral neurovascular status**
- **X-rays as needed**



Secondary Survey

Musculoskeletal



Potential blood loss
Missed fractures
Soft tissue or ligamentous injury
Compartment syndrome (especially with altered sensorium / hypotension)

Secondary Survey

Neurologic: Brain

- GCS
- Pupil size and reaction
- Lateralizing signs
- Frequent reevaluation
- Prevent secondary brain injury



**Early
neurosurgical
consult**

Secondary Survey

Neurologic: Spinal Assessment

- Whole spine
- Tenderness and swelling
- Complete motor and sensory exams
- Reflexes
- Imaging studies



Altered sensorium
Inability to cooperate with
clinical exam

Secondary Survey

Neurologic: Spine and Cord

Conduct an in-depth evaluation of the patient's spine and spinal cord

**Early neurosurgical /
orthopedic consult**



Adjuncts to Secondary Survey

Special Diagnostic Tests as Indicated



**Patient
deterioration**

Delay of transfer

**Deterioration
during transfer**

**Poor
communication**

How do I minimize missed injuries?

- **High index of suspicion**
- **Frequent reevaluation and monitoring**



Pain Management

- Relief of pain / anxiety as appropriate
- Administer intravenously
- Careful monitoring is essential



Transfer

Which patients do I transfer to a higher level of care?

Transfer

Which patients do I transfer to a higher level of care?

Those whose injuries exceed institutional capabilities:

- **Multisystem or complex injuries**
- **Patients with comorbidity or age extremes**

Transfer

When should the transfer occur?

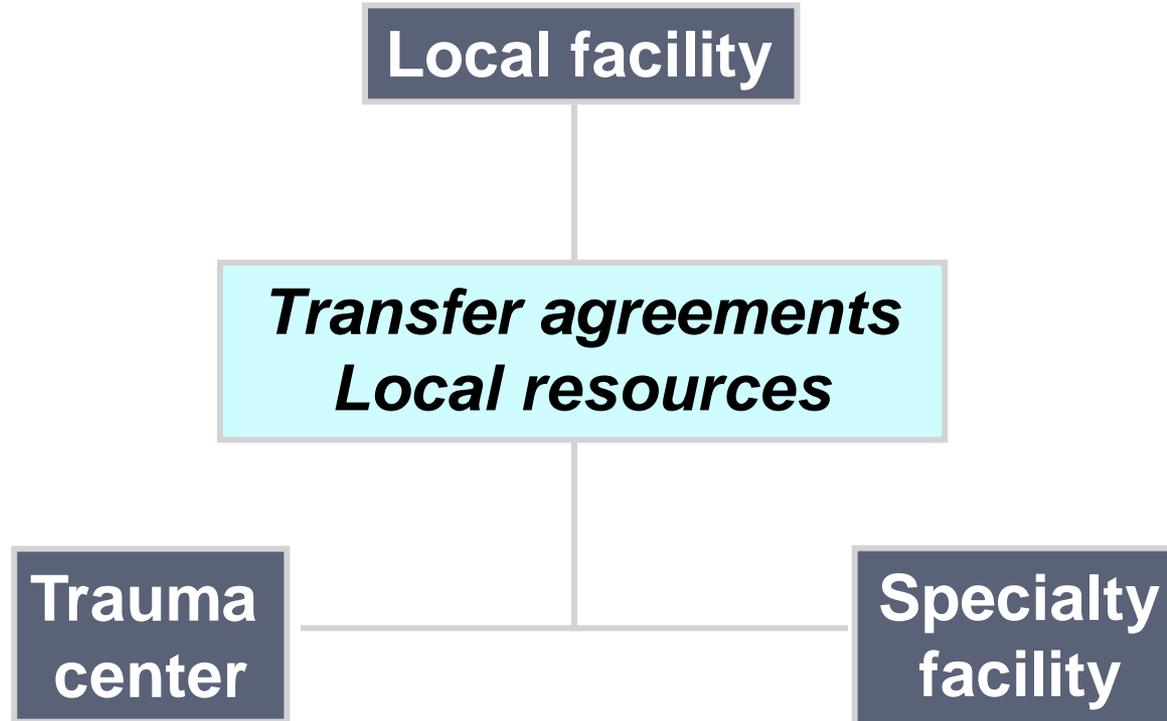
Transfer

Which patients do I transfer to a higher level of care?

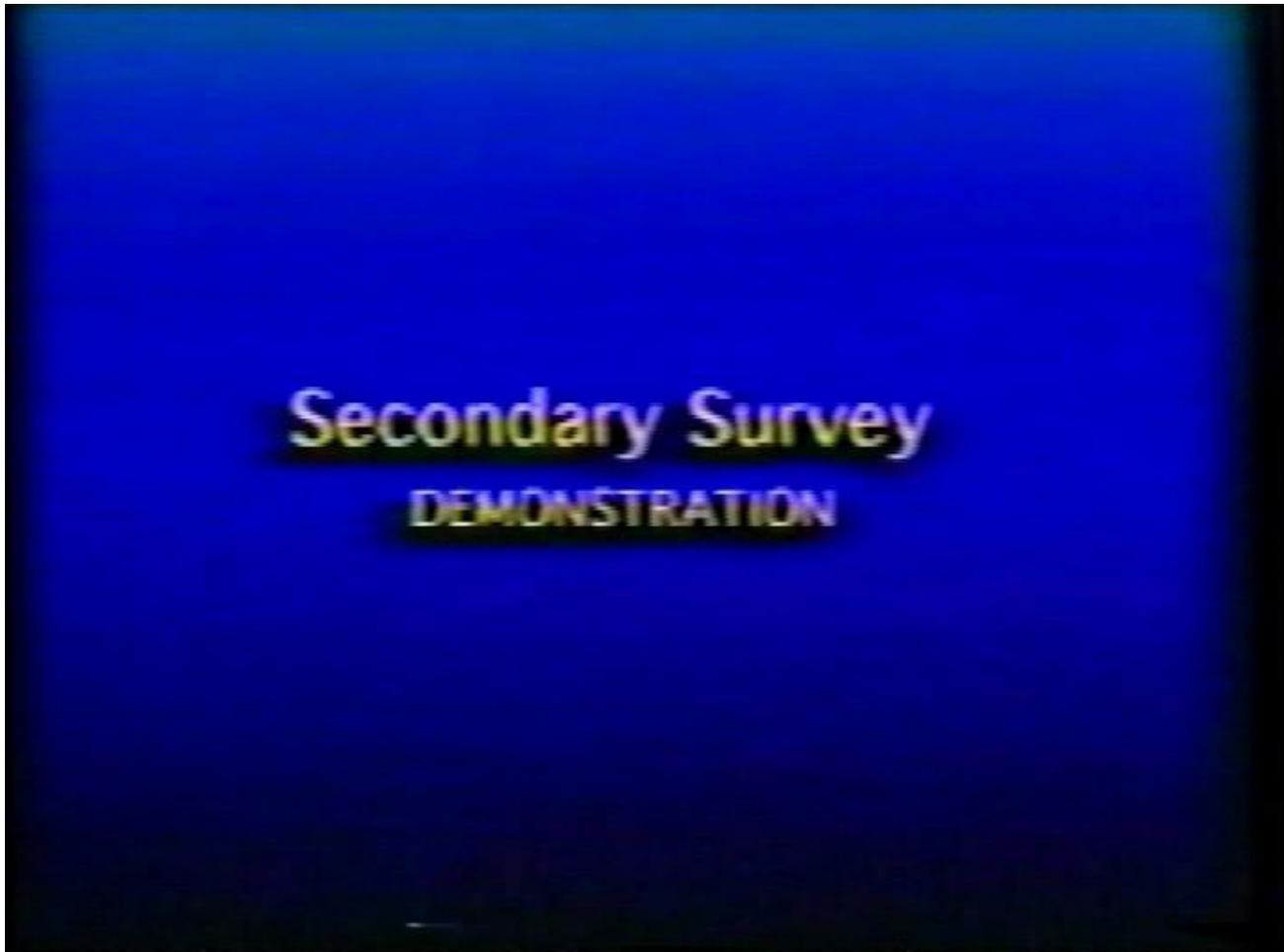
As soon as possible after stabilization:

- **Airway and ventilatory control**
- **Hemorrhage control**

Transfer to Definitive Care



Case Scenario



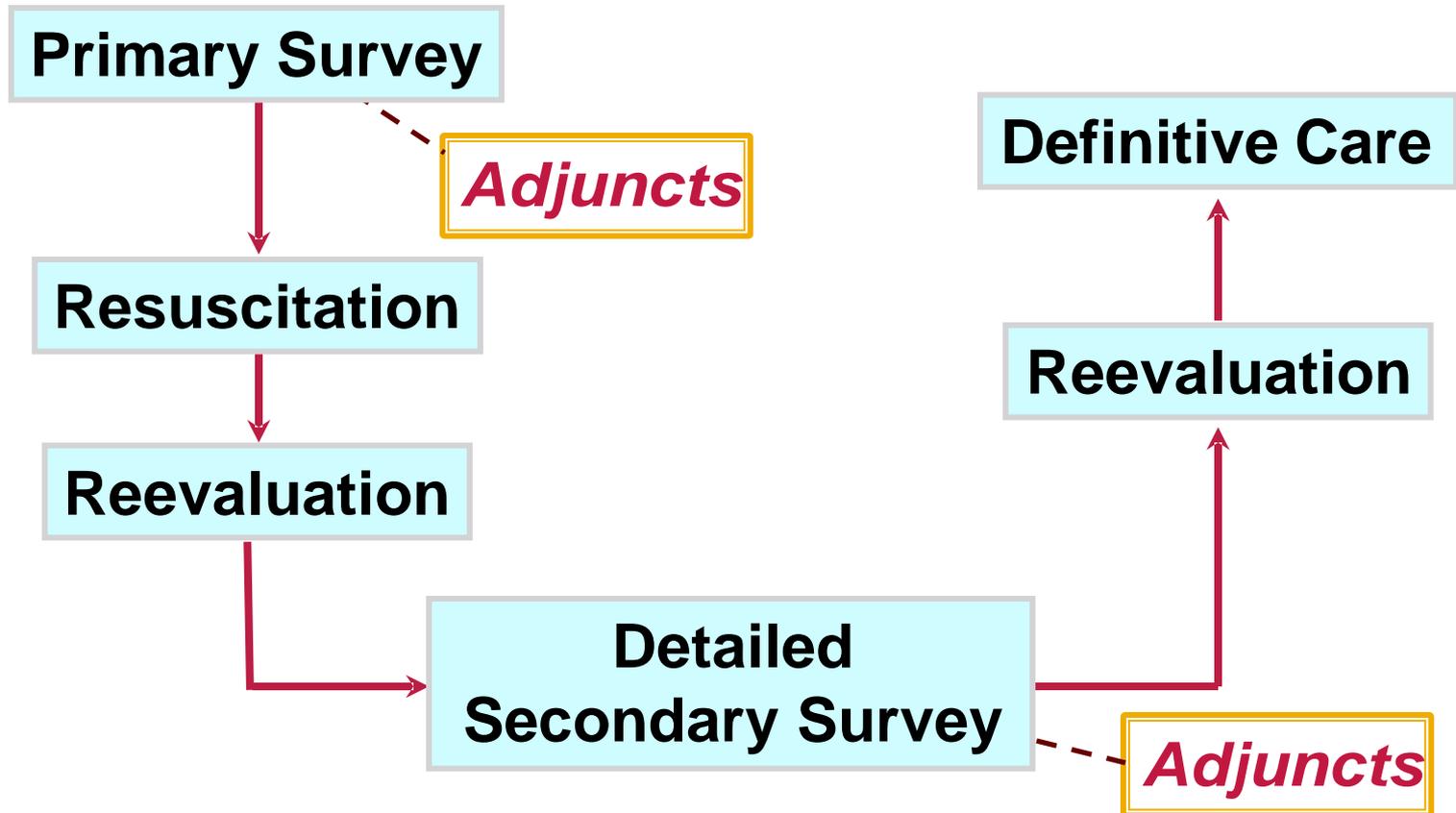
Summary

- **Rapid accurate assessment**
- **Resuscitate and stabilize by priority**
- **Determine needs and capabilities**
- **Arrange for transfer to definitive care**
- **Ensure optimum care**

Summary

- **ABCDE approach to trauma care**
- **Do no further harm**
- **Treat the greatest threat to life first**
- **One safe way**
- **A common language**

Summary



Trauma Care

Questions