โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

Trauma Medical Director (TMD) role in TQI program: TQIP

WHO Collaborating Centre for Injury Prevention and Safety Promotion

Tawatchai Impool, MD.
Chief of Trauma Center, Khon Kaen Hospital

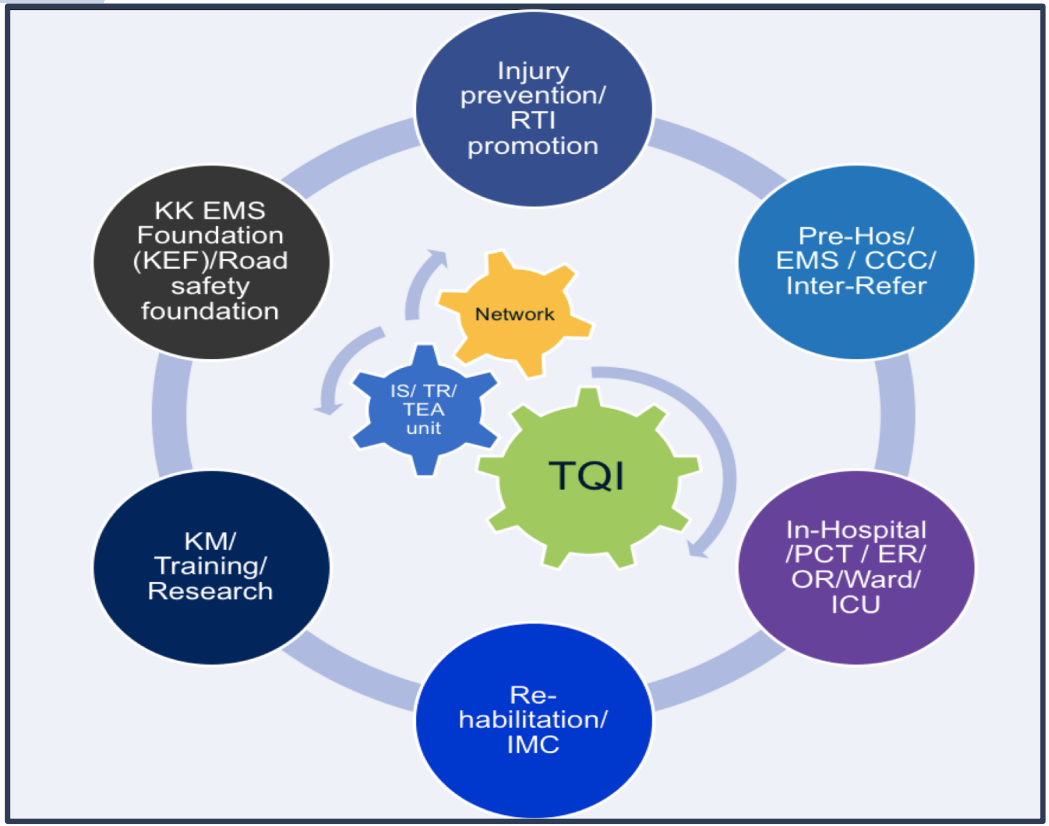
Outline

1. Definitions of Quality Improvement
2. Trauma Quality Improvement Program (TQIP)
   - Technique of TQIP
   - TQIP in Khon Kaen Hospital
3. Trauma Medical Director (TMD) role in TQIP

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

Khon Kaen Inclusive Trauma Care System

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL



Leadership, System Development, Legislation, Finance

Definition

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

Quality Improvement (QI) Program:

- A method of evaluating and improving processes of patient care
  - by monitoring the elements of diagnosis, treatment and outcome
- Emphasizes a multidisciplinary approach to problem-solving
- Aimed to advancement towards => improved the outcomes
- Evaluates the performance of
  - Individual providers & Hospital care systems

Institute of Medicine, 2001b; Maier and Rhodes, 2001; American College of Surgeons, 2006

The evolution of terminology for quality improvement

Timeline	Term
1900s	Medical Audit (MA)
1920s	Quality Assurance (QA)
1980s	Total Quality Management (TQM)
	Continuous Quality Improvement (CQI)
1990s	Performance Improvement (PI)
2000s	Quality Improvement (QI)

Blame / Shame
Focus on Provider

No blame /
No shame
Focus on system

Elements of Quality

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

Structure
infrastructure, tools, technology, resources of the organizations (staffing, training, skills, payment schemes, incentives, funding).

Process
the interaction between care-givers and patients during which structural inputs from the health care system are transformed into health outcomes. The process is the actual provision of medical care to the patient.

Outcome
measured in terms of health status, deaths, or disability-adjusted life years. Outcomes also include patient satisfaction or patient response to the health care system

Donabedian, 1996

Trauma Quality Improvement (TQI) committee

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- **Leader** => **"Trauma Director"**
- **Administrative support**
  - Trauma program manager
  - Trauma program administrative assistant (logistics, data processing, resource allocation, communication with doctors, nurses and supportive services)
- **Participants** => trauma and critical care teams (e.g. anesthesia, orthopedics, emergency medicine, neurosurgery, the blood bank and radiology).
- **Other contributors** => prehospital nurse, ED nurse, ICU nurse and OR (scrub) nurse.

Infrastructure of TQI

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- Support staff : trauma program manager and trauma registrars
- Minutes of meeting : reflect the review, discussion and analysis of the case include the proposed corrective action
- Information from discussions is best recorded by means of a standardized form.

Performance Improvement Subcommittee of the American College of Surgeons Committee on Trauma, 2002; American College of Surgeons, 2006

Techniques of TQIP

Retrospective review:

- Morbidity & Mortality conferences
- Panel reviews of preventable deaths

Prospective review:

- Tracking of audit filters
- Risk-adjusted mortality rates

Morbidity & Mortality conferences

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- **"Deaths and Complications conferences"**
  - all deaths, complications, adverse events and errors
- Discussion of deaths and complications in order to look for preventable factors.

- **The conclusion**: clinicians should move forward and take further corrective action to solve the problems.

Morbidity & Mortality conferences

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- Held at regularly scheduled times (depend on hospital's volume of trauma)
  - High trauma volume – hold weekly
  - Low trauma volume – hold monthly
- Duration 40-60 min/ time

- **"The Golden Hour"** of the surgical working week (Hutter et al., 2006)

High volume of trauma = 1,000-2,000 trauma visits/ year

TRAUMA MORBIDITY AND MORTALITY RECORD FORM
DEPARTMENT OF SURGERY , KHON KAEN HOSPITAL

Presentation Date ..... HN ..... Ward .....

Name/ID ..... O Morbid O Dead AN ..... Division/Unit .....

O Refer form Sex O Male O Female Age years

Admission ..... Discharge ..... Attending Staff ..... Chief Resident .....

Mechanism O Blunt O Stab O GS O Blast O.....

Diagnosis

1.....
2.....
3.....
4.....
5.....

Grading	AIS
OIS.....	AIS.....
OIS.....	AIS.....
OIS.....	AIS.....
OIS.....	AIS.....
OIS.....	AIS.....

Co-Morbidity

O None O CRF O DM
O Cirrhotic liver O COPD/ Asthma
O HT O CVA/Stroke O ACS / MI
O Other.....

GCS	SBP	HR	RR	RTS	ISS	NISS	TRISS	TRISS(N)	APACHE II

Operation

1.....Date.....Surgeon.....
2.....Date.....Surgeon.....

Surgical Complication

O None
O Wound evisceration/Dehiscence
O Abdominal compartmental syndrome
O Enterocutaneous Fistula
O Surgical wound/site infection
O Intraabdominal collection / abscess
O Limb compartmental syndrome
O Iatrogenic injury.....
O Traumatic wound infection
O Anastomosis leakage
O Unplanned reoperation
O .....

Other Complication

O None O VAP/HAP O UTI O ARDS O ACS/MI O Major arrhythmias O ARF
O CHF/Pulmonary edema O DVT O PE O Clot hemothorax O Bed sore O UGIH
O Empyema thoracis O Barotrauma / Pneumothorax O Traumatic polyuria O Revise ICD
O Re-admission in 28 days O Re-admission to ICU in 72 hrs O Re-intubation in 48 hrs O ET tube leakage/ Change ET tube
O Negative EL O Non-therapeutic EL O Other.....

Cause of Complication (more than 1 can be involved)

O Complication due to Disease /Nature of disease (**ND**).....
O Complication due to Problem in Diagnosis (**DP**).....
O Complication due to Problem in Judgment /Decision making (**JD**).....
O Complication due to Problem in Management (**MP**).....
O Complication due to Problem in Surgical technique (**SXP**).....
O Complication due to Equipment Problem (**EP**).....
O Complication due to System problem (**SP**).....
O .....

Plan of prevention or Correction

.....
.....
.....

Pathology/Autopsy O Yes O No

.....
.....

Discharge status

O Improve O Against advice O Refer to.....
O Disability O Dead O .....

Record by .....
Present case by.....
Date.....

ระดับความรุนแรงของภาวะแทรกซ้อน (Harm level of Complication)

O Grade I	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions. Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgetics, diuretics, electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside.
O Grade II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.
O Grade III	Requiring surgical, endoscopic or radiological intervention. O Grade IIIa Intervention not under general anesthesia. O Grade IIIb Intervention under general anesthesia.
O Grade IV	Life-threatening complication (including CNS complications) requiring IC/ICU management. O Grade IVa Single organ dysfunction (including dialysis). O Grade IVb Multi-organ dysfunction.
O Grade V	Death of a patient.

Classification of types and sites of deficiencies

Possible deficiencies to consider include	Yes	No	Note
Airway management			
Haemorrhage control			
Chest management			
Fluid resuscitation			
Delays in treatment		–	
Intensive care and Monitoring			
Other			

Locations of deficiencies to consider include	Yes	No	Note
Prehospital			
Emergency department (ED)			
Operating room (OR)			
Intensive care unit (ICU)			
Ward			
Interfacility transfer			
System inadequacy			

Conclusion of Dead Case

( ) Preventable Death

( ) Non-Preventable Death

( ) Inconclusive

Note

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

6th Revise 27 Aug 2021

Preventable death panel review

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- Extended process / Beyond from the MM conference
- Trauma death with may preventability --- Look for preventable deaths
- **The preventable death panel decides whether**
  - **given optimal care throughout the patient's course, there was any potential to prevent the death?**
  - **Even in the best-case scenario would the outcome still be fatal?**
  - **the death was inevitable in view of the severity of the injuries?**

Preventable death panel review

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- The judgement is made by a **multidisciplinary panel of experts** who assess the care given both by the providers and the system.

- Examples of preventable deaths:
  - **Airway obstruction**
  - **Isolated splenic injuries** (i.e. injuries that could be treated successfully in almost any location in the world).

TABLE 11 **Definitions of preventability for death panel review**

1. **Preventable**
   - injuries and sequelae considered survivable;
   - death could have been prevented if appropriate steps had been taken;
   - frank deviations from standard of care that, directly or indirectly, caused patient's death;
   - statistically, probability of survival greater than 50%, or Injury Severity Score (ISS) below 20.[1]
2. **Potentially preventable**
   - injuries and sequelae severe but survivable;
   - death potentially could have been prevented if appropriate steps had been taken;
   - evaluation and management generally appropriate;
   - some deviations from standard of care that may, directly or indirectly, have been implicated in patient's death;
   - statistically, probability of survival 25–50% or ISS between 20 and 50.[1]
3. **Non-preventable**
   - injuries and sequelae non-survivable even with optimal management;
   - evaluation and management appropriate according to accepted standards;
   - if patient had co-morbid factors, these were major contributors to death;
   - statistically, probability of survival less than 25% or ISS above 50.[1]
4. **Non-preventable, but with care that could have been improved**
   - as with non-preventable above, but care is questionable or clear errors in care are detected, even though these did not lead to the death.

[1] Probabilities of survival and ISS are meant to be a general guide to classification of preventability of death, not rigid cut-offs. Furthermore, neither probability of survival nor ISS is required for determination of preventability. Many panel reviews are conducted without this information. Additional information on calculation of probability of survival and ISS are found in section 4.4.

References: Sanddal, Esposito and Hansen, 1995; Jat et al., 2004; American College of Surgeons, 2006

Constituting the panel

- **Chairperson:** leading and organizing the case review meeting
  - Understand all phases of care for the trauma patient
  - Broad perspective
  - Remain **unbiased**
  - Have the organizational skills to lead the panel
- **Participants**
  - Share the discussion and the common goal of improving in the future care.
  - Maintain an environment of respect/ honesty regarding the suboptimal outcome of death.

Preventable death panel participants

- Prehospital provider
- Emergency department nurse
- Emergency physicians or general doctors
- Trauma surgeons, General surgeons, Orthopedic surgeons and others.
- Anesthesiologist
- Neurosurgeon, if available
- Pathologist or forensic medicine expert/coroner
- Radiologist
- Nursing staff (Scrub nurse/ ICU nurse)

Preparation of data for the review

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- **The Chair / Assistants**
  - Gather the data and written the summary abstracts (report) of each case.
  - Provide the abstract to each panel member (in advance).
  - Assign an uninvolved panel member to discuss (unbiased of the events) and records.
- **Panel member** reviews the summary abstract and all the relevant data sources in advance.

- **Note**: *maintain confidentiality the patient's information.*

Sources of data

- Hospital record (Medical record)
- Prehospital information
- Highway patrol/traffic safety/police records
- Autopsy report / Death certificate
- Direct statements or interviews with care providers involved with the case
- Trauma registry data/ injury severity data (if available)

Abstract components for summary

- Demographics
- Mechanism of injury
- Transfer status
- Mode of arrival
- Prehospital/ field vital signs (specify exact times)
- Vital signs on arrival to emergency department (specify exact time)
- GCS score on admission
- Procedures performed (including advanced airway management such as ET intubation, and operations)
- **Key time variables**
  - estimated time of injury
  - time until arrival at scene of prehospital care providers
  - time of arrival to hospital
  - time until transfusion
  - time of general surgical evaluation
  - time until disposition to operating room, intensive care unit, or ward, and time to death
- Injury Severity Score (if available)
- Probability of survival (Ps) (if available)

Reference: MacKenzie et al., 1992

Sample **TRAUMA PREVENTABLE DEATH PANEL REVIEW**
Page 1. Data Abstraction Form

Code number:

Age: Gender: M F

Mechanism of injury:

Time elapsed from injury to presentation to hospital (if known):

Time elapsed from presentation to hospital to death:

Site of death (circle one):

Prehospital Casualty ward ICU Operating theatre Ward Other

Injuries sustained:

Injury Severity Score:

Abbreviated Injury Scale (AIS) by category:

Initial Systolic Blood Pressure:

Initial Glasgow Coma Scale score:

Description of course of treatment (if any):

Sample **TRAUMA PREVENTABLE DEATH PANEL REVIEW**
Page 2. Case Review Form Summarizing Decisions of Panel Review

Summary of panel discussion on preventability of the death:

Decision as to whether the death was:
- Definitely preventable
- Possibly preventable
- Not preventable
- Not preventable but treatment was suboptimal

Deficiencies in care (circle all that pertain):
- None
- Airway
- Haemorrhage
- Chest
- Fluid resuscitation
- Delays in treatment
- Other treatment problems
- Deficiencies in documentation

Location of deficiencies (if any, circle all that apply):
- Prehospital
- Casualty ward (emergency department)
- Operating theatre
- Intensive care unit
- Ward
- Interfacility transfer
- System inadequacy

Suggested corrective action:

Preventable death panel review

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- Documentation of discussion and analysis
- Adequate records of the patient data and the abstract provided to the panelists must be kept.
- Minutes documenting the panel discussion should also be recorded
- Any recommendations to improve care, as well as communications with an outside agency, should be documented.
- A formal letter that suggests this policy could be written by the chairman and would serve as documentation of efforts to improve deficiency location.

TABLE 12 **Classification of types and sites of deficiencies**

Possible deficiencies to consider include:

- airway
- haemorrhage control
- chest
- fluid resuscitation
- delays in treatment
- other
- documentation.

Locations of deficiencies to consider include:

- prehospital
- emergency department (ED)
- operating room (OR)
- intensive care unit (ICU)
- ward
- interfacility transfer
- system inadequacy.

References: O'Leary, 1995; Sanddal, Esposito and Hansen, 1995

Tracking of audit filters

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- **Audit filters:** variables/ indicators for tracked to identify whether accepted standards of care are being met.
- May including **"near miss"** cases
- To identify patients with a significantly increased risk of mortality or prolonged LOS (hospital/ICU)
- To identify problems in the process of care
- **A adjunct to Preventable death panel review process.**

TABLE 13 **Potential audit filters**

Prehospital care

- field scene time >20 minutes;
- missing emergency medical services (EMS) report or absence of prehospital essential data items on EMS report;
- appropriateness of triage and transfer processes.

Emergency department

- timely response of required personnel and resources in attending to patient needs (e.g. response time of surgeons, availability of operating room);
- absence of sequential neurological documentation in the emergency department of trauma patients with a diagnosis of skull fracture, intracranial injury or spinal cord injury;
- absence of at least hourly determination and recording of blood pressure, pulse, respirations, temperature, Glasgow Coma Scale (GCS) score and intake and output (I & O) measurements for a major or severe trauma patient, beginning with arrival in the resuscitation area and including time spent in radiology up to admission to the operating room or ICU, death, or transfer to another hospital;
- lack of documentation of a history and physical examination note by doctor;
- Glasgow Coma Scale score <13 and no head computerized tomography (CT) scan within 2 hours of arrival at hospital (if CT available in hospital);
- Glasgow Coma Scale score <8 and no endotracheal tube or surgical airway performed before leaving resuscitation area.

Time to operating room

- patient with abdominal injuries and hypotension (systolic BP <90) who does not undergo laparotomy within 1 hour of arrival at the hospital;
- delay in performing laparotomy (from greater than 4 hours to greater than 24 hours after admission depending on hospital practice);
- craniotomy after 4 hours, for drainage of epidural or subdural haematoma;
- abdominal, thoracic, vascular or cranial surgery after 24 hours;
- unplanned return to operating theatre within 48 hours of initial procedure.

Other

- patient requiring re-intubation of the airway within 48 hours of extubation;
- non-operative treatment of gunshot wound to the abdomen;
- non-fixation of femoral fracture in adult;
- all delays in identification of injuries;
- all trauma deaths (particularly can focus on unexpected deaths such as those occurring with low Injury Severity Scores);
- required equipment, shared with other departments (e.g. fluid warmer, ventilator), not immediately available when requested;
- sentinel events (see details in next section)
- non-compliance with institutional protocols;
- any case referred by provider (doctor, nurse, or other) for care concerns;
- all major complications (e.g. deep venous thrombosis, pulmonary embolus, decubitus ulcers. See list of potential complications in Table 14).

It is to be emphasized that this is a list of ***potential filters***. Specific ones may or may not be useful in a given location, depending on local circumstances.

Reference: Maier and Rhodes, 2001

Audit filters of Khon Kaen Hospital

Emergency Department

	Delayed **response time** (response time of surgeons, availability of OR)
	Absence of sequential **neurological documentation** in the ED (skull fracture, intracranial injury or spinal cord injury)
	Absence of at least **hourly determination and recording of vital sign, GCS and I & O** measurements for a major/severe trauma patient , time spent in radiology up to admission to the OR or ICU, death, or transfer to another hospital
	Lack of documentation of a **history and physical examination** note by doctor
	GCS <13 and no **head CT scan within 2 hours** of arrival at hospital (if CT available in hospital)
	GCS <8 and no endotracheal tube or surgical airway performed before leaving resuscitation area
	Type specific **blood transfusion** within 30 minutes

Time to operating room

	Patient with **abdominal injuries and hypotension** (systolic BP <90) who **does not undergo laparotomy** within ½ hour of arrival at the hospital
	Delay in performing laparotomy (> 4-24 hrs after admission depending on hospital practice)
	Craniotomy after 4 hours, for drainage of epidural or subdural haematoma
	Abdominal, thoracic, vascular or cranial surgery after 24 hours
	Unplanned return to operating theatre within 48 hours of initial procedure
	Delayed surgery for **compound fracture** more than 8 hours
	Delayed surgery for **vascular injury** with hard sign more than 2 hours

The American College of Surgeons (2006): recommending that QI program should track some filters, depending on local priorities

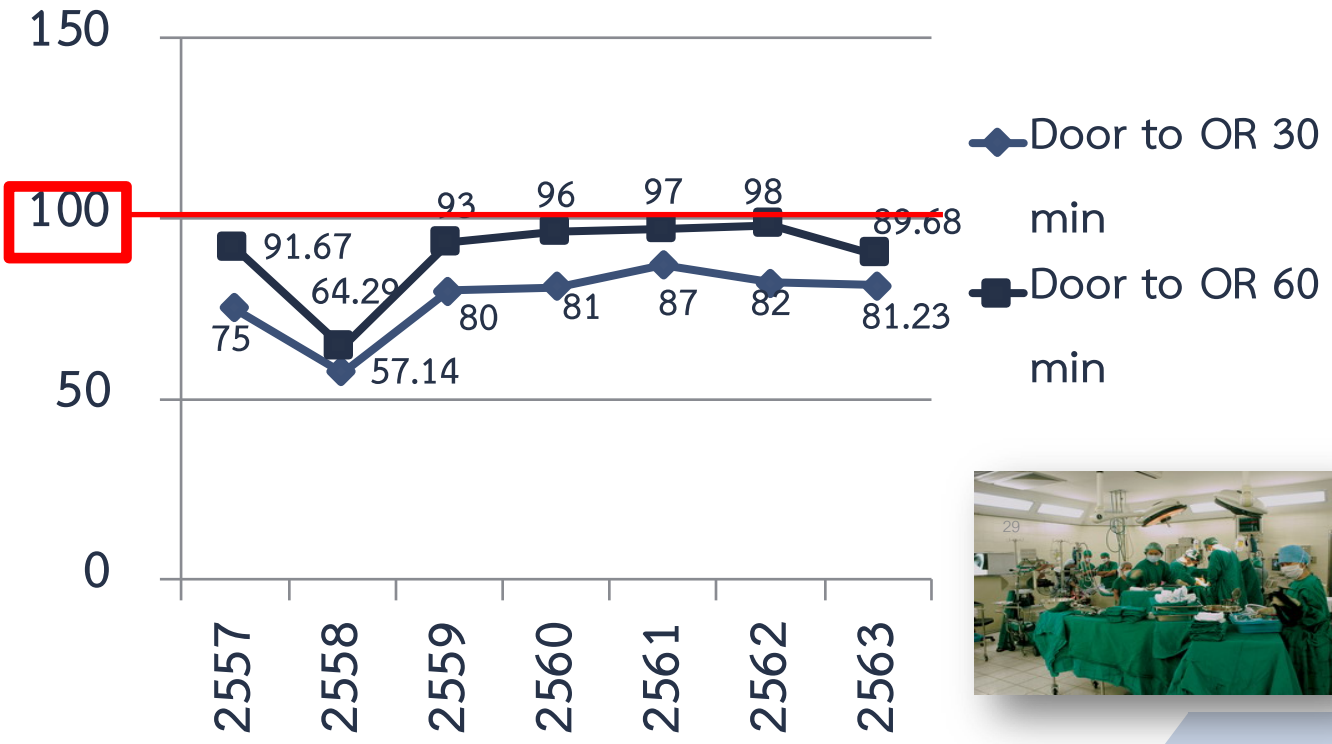
TABLE 14 **Potential complications to be tracked**

- Acute Respiratory Distress Syndrome (ARDS)
- Aspiration pneumonia
- Bacteraemia
- Cardiac arrest
- Coagulopathy
- Compartment syndromes
- Dehiscence/evisceration
- Empyema
- Esophageal intubation
- Hypothermia
- Mortality
- Myocardial infarction
- Pneumonia
- Pneumothorax
- Skin breakdown
- Surgical site infection (deep)
- Renal failure
- Urinary track infection
- Unplanned reoperation
- Wound infection
- Deep venous thrombosis/pulmonary embolus

The process of tracking complications looks for rates of complications that are higher than would normally be expected.

References: Maier and Rhodes, 2001; American College of Surgeons, 2006

Percentage of Trauma Fast Track case undergone Operation within 30 and 60 minutes



Head Injury Fast Track

Consult Trauma

- District Hospital
- HI Fast Track

ER KKH :
Prepare for CT scan brain/ OR

Pt. Arrive to KKH

- Initial Assessment
- Send to Lab/CT /OR Emergency

Door to CT Within 1 hr
Door to OR within 4 hrs

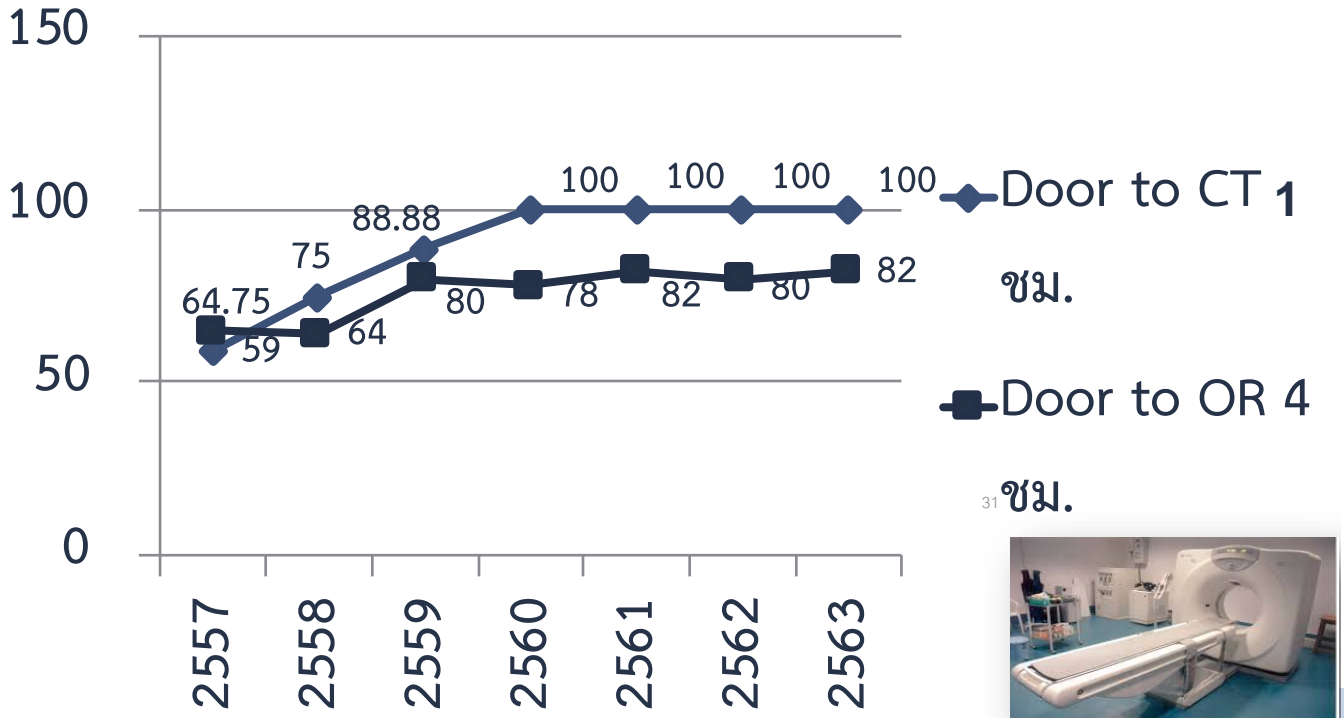
No HI Fast track

- Resuscitation

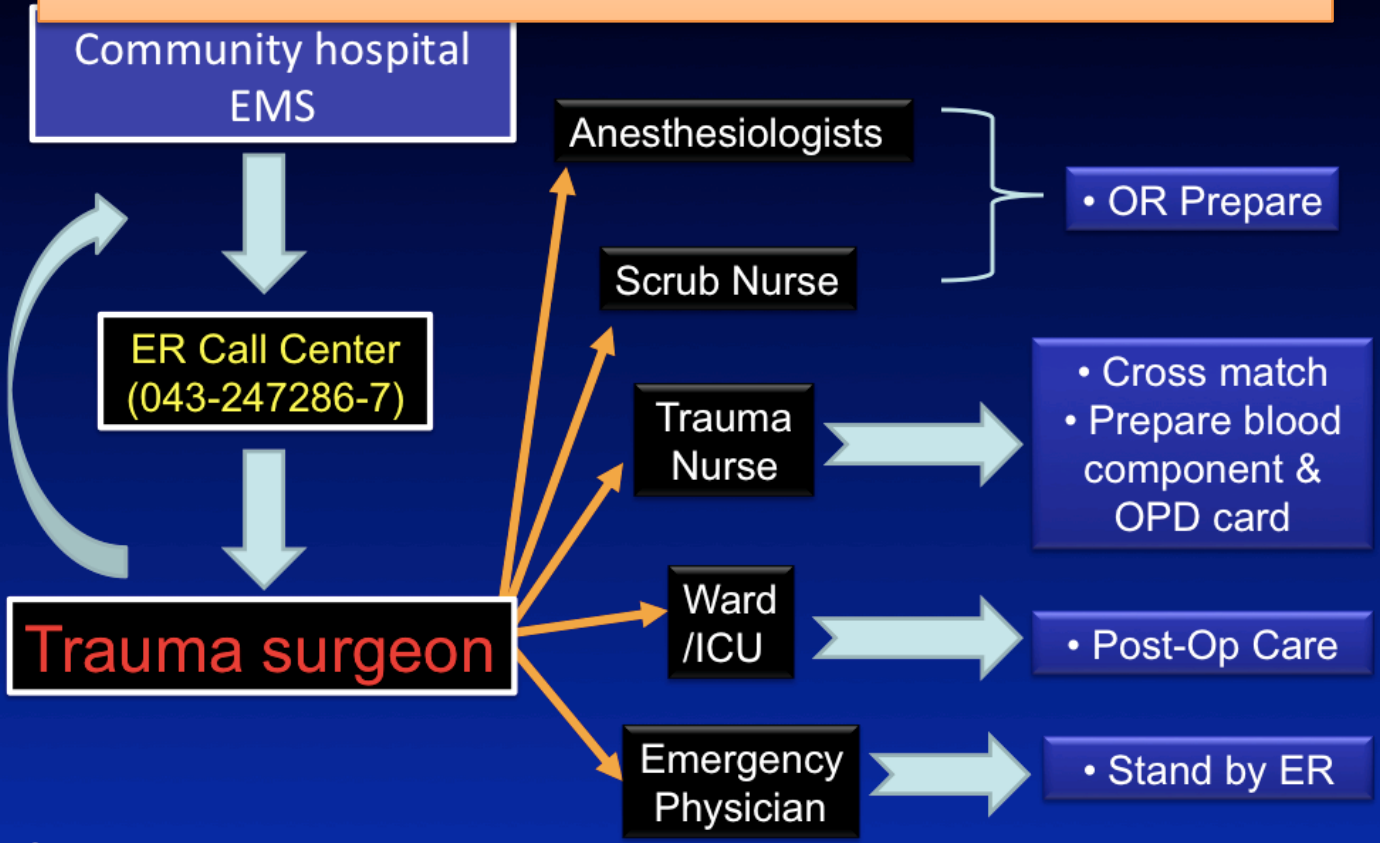
ER Resuscitation to OR / ICU/ Ward

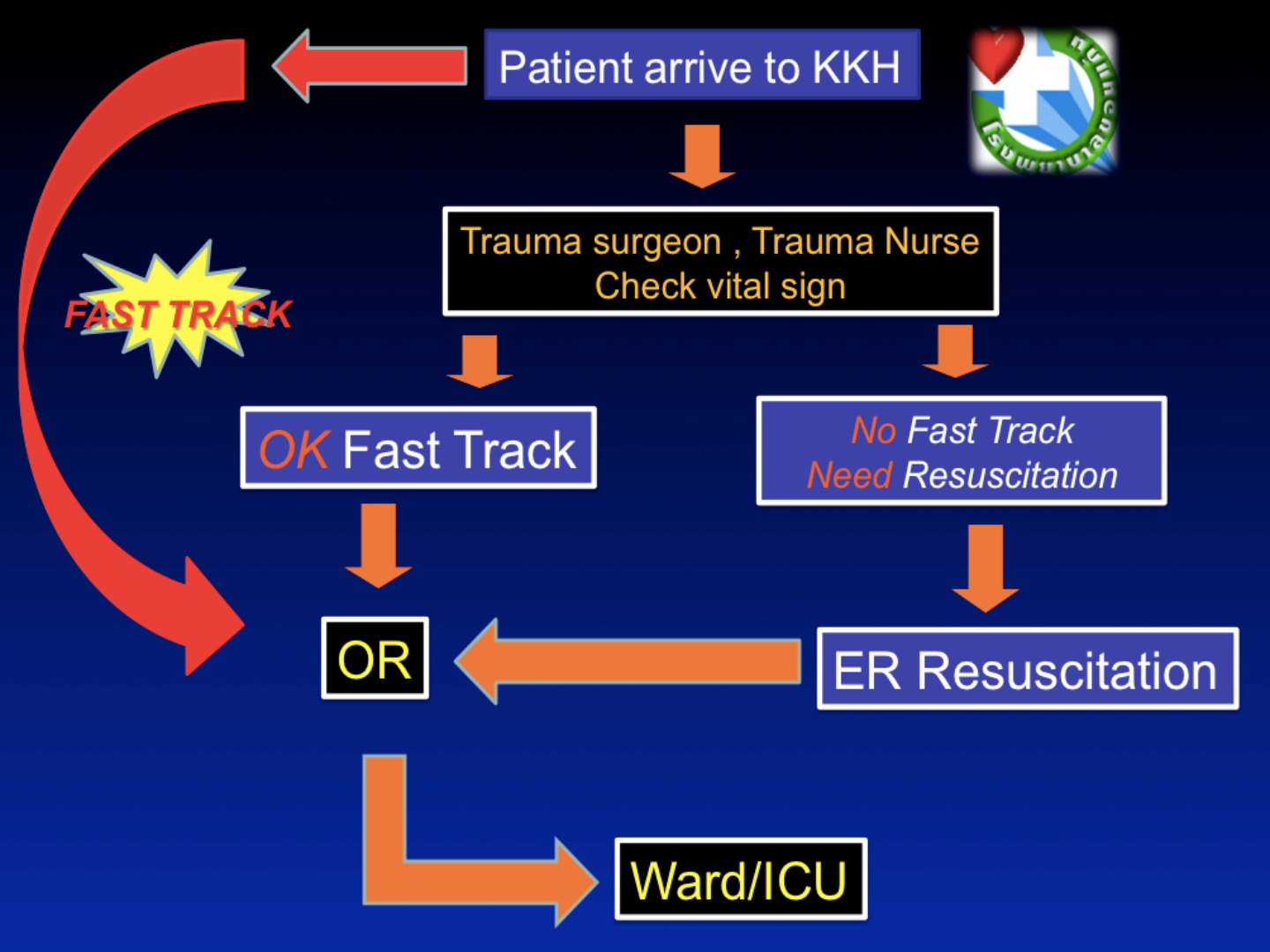
Head Injury Fast Track : KPI

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL



FLOW OF TRAUMA FAST TRACK




Patient arrive to KKH
Trauma surgeon , Trauma Nurse
Check vital sign
FAST TRACK
OK Fast Track
No Fast Track
Need Resuscitation
OR
ER Resuscitation
Ward/ICU

Mortality Cases

MM Conference

PS < 50%

PS 50-74%

PS ≥75%

No obvious adverse events, No Iatrogenic injury that contribute to dead

Unclear / Doubtful in cause of death, +ve Audit filter

Non-preventable death

Dead case peer review

Note : PS = Probability of survival

Dead case peer review (PS≥75%)

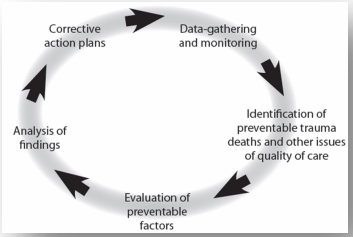
Audit filter, KPI

Look for the pitfalls or adverse events

No

Yes

Closing the loop



Non-preventable death

Action plan, policy, CPG, KM

Note : KPI = Key Performance Indicators

Risk-adjusted mortality

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- The most widely used trauma scoring systems:
  - the Abbreviated Injury Scale (AIS)
  - the Injury Severity Score (ISS)
  - the Glasgow Coma Scale (GCS)
  - the Revised Trauma Score (RTS)
  - the Trauma and Injury and Severity Score (TRISS)
  - A Severity Characterization of Trauma (ASCOT)

Baker, 1974; Champion, 1989; O'Keefe and Jurkovich, 2001; Association for the Advancement of Automotive Medicine, 2005.

Risk-adjusted mortality of Hospital

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

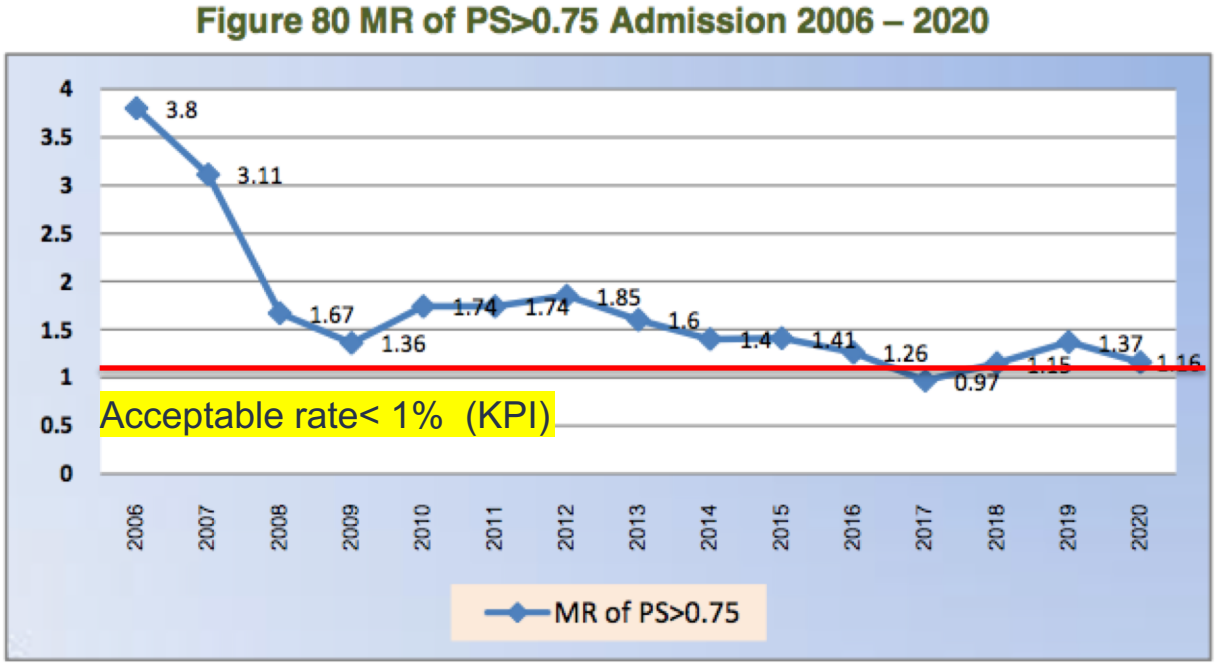
Low Injury Severity Scores (ISS)
or High Probability of Survival (PS)

Mortality rate **over** an acceptable rate
or Key Performance Indicator (KPI)

High risk-adjusted mortality

Need to Evaluation hospital system , Need TQIP

Risk-adjusted Mortality of KKH



Reference: 24 Years Anniversary Trauma Registry 1997-2020, Khon Kaen Hospital

National Level Benchmark

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

Trauma Mortality Rate of Hospital A level, Thailand

Ranking from less mortality to more mortality

ลำดับ	โรงพยาบาล (A)	dead (trauma)	total (trauma)	Mortality(%)_trauma
1	รพ.ยะลา	25	1625	1.5%
2	รพ.บุรีรัมย์	26	1662	1.6%
3	รพ.นครพิงค์	76	4819	1.6%
4	รพ.สกลนคร	92	5575	1.7%
5	รพ.ลำปาง	96	5692	1.7%
6	รพ.ศรีสะเกษ	95	4538	2.1%
7	รพ.อุดรธานี	158	7495	2.1%
8	รพ.ขอนแก่น	124	5232	2.4%
9	รพ.สมุทรปราการ	31	1249	2.5%
10	รพ.สุราษฎร์ธานี	114	4490	2.5%

Reference: MOPH data Thailand, 2021

National Level Benchmark

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

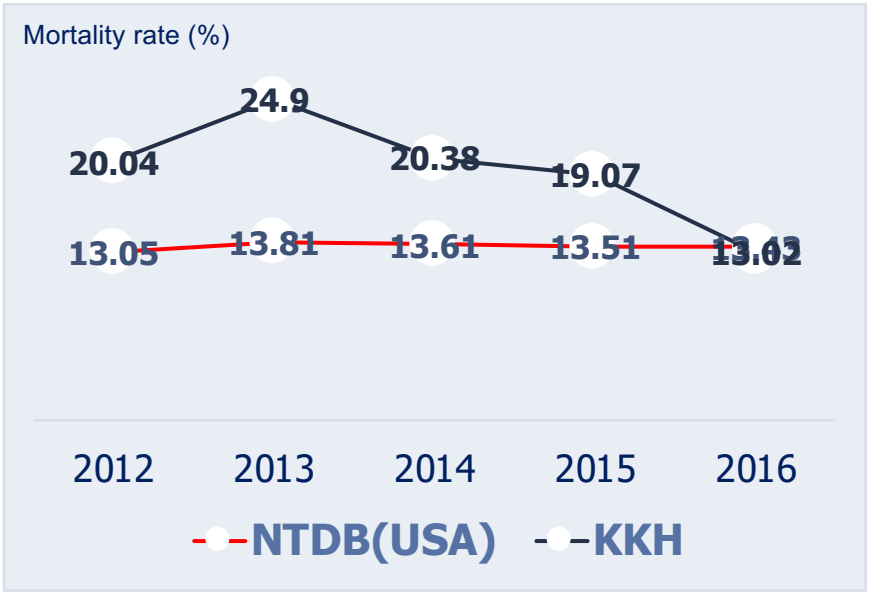
Survival Rate of Patients with Abdominal Trauma in Thailand (Advance Level Hospital)

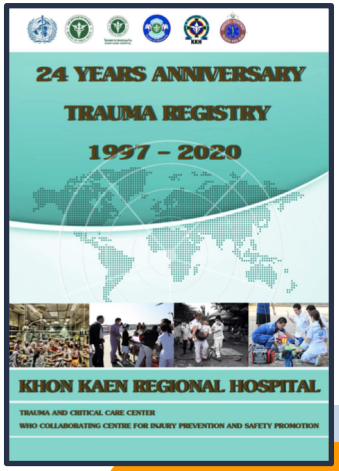
Rank	Hospital (A)	No. of Pts	Survive	Survival rate (%)
1	นครพิงค์	447	423	94.63
2	สุราษฎร์ธานี	465	439	94.41
3	**ขอนแก่น (KKH)**	604	558	92.38
4	ชลบุรี	678	626	92.33
5	ร้อยเอ็ด	361	333	92.24
6	ระยอง	360	330	91.67
7	นครปฐม	320	293	91.56
8	อุดรธานี	495	450	90.91
9	เชียงรายประชานุเคราะห์	561	509	90.73
10	ลำปาง	266	241	90.60

ที่มา: ข้อมูลจากกระทรวงสาธารณสุข ปีงบประมาณ 2560-2563

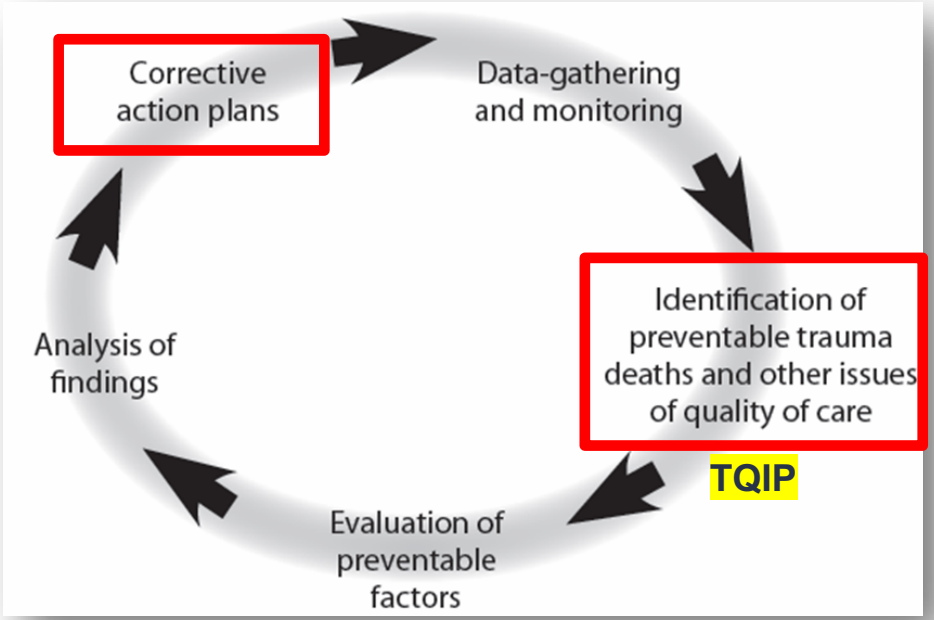
Trauma Mortality Rate with ISS > 15

International Level Benchmark





Corrective strategies and closing the loop



loop closure would require ongoing monitoring

The main corrective strategies

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- **Guidelines, pathways, and protocols:** designed to assist in clinical decision-making and that usually focus on diagnosis and treatment

- **Targeted education:** daily ward rounds, departmental grand rounds, regularly scheduled conferences, and case presentations.
  - Other: journal clubs, alternative educational options (newsletters, posters and videos from professional societies and health ministries).

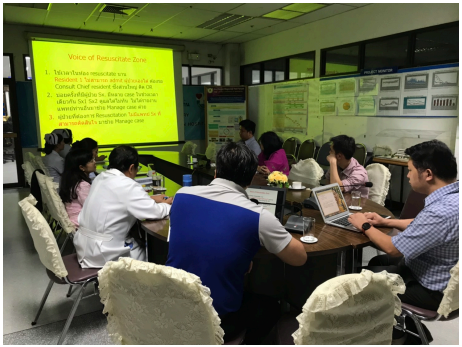
TQI Activities

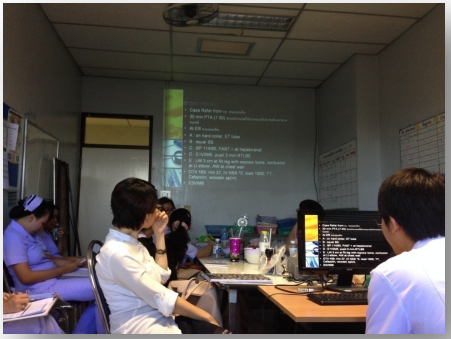
โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

Journal Club / Grand round / Topic / Noon report

Multidisciplinary Conference (Preventable death review)

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL





Preventable death panel review

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

Delay diagnosis of bowel Injury

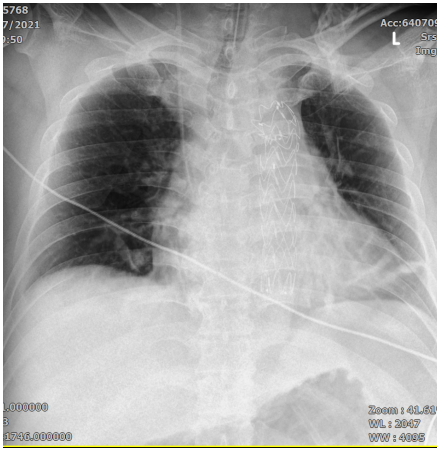
Tracking Audit filter

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- Miss diagnosis : bowel injury , thoracic aortic injury
- Management : ARDS, Rhabdomyolysis
- ICU Care : Malposition of ET tube
- Complication : Fungi infection in ICU , VAP

Common Miss and Delay Diagnosis in Trauma

- Bowel injury
- Thoracic aortic injury
- Diaphragm injury
- Blunt Cerebrovascular Injury
- Minor fracture (at OPD)



Thoracic aortic injury

Year	Number of patients	Miss diagnosis No.
2021	12	4
2022 (7 months)	7	0

Trauma ICU Monitoring

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

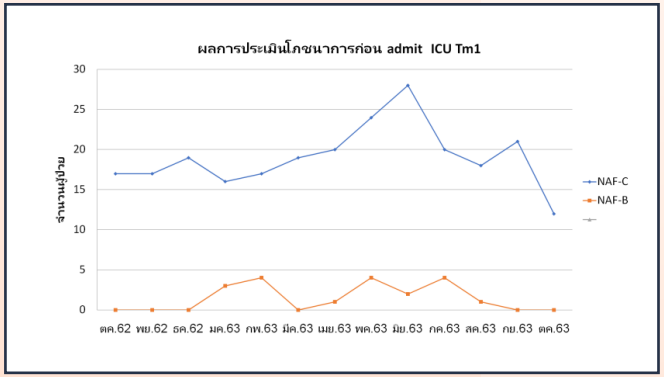
ตารางที่ 1 แสดงข้อมูลเปรียบเทียบจำนวนผู้ป่วยบาดเจ็บหลายระบบ ผู้ป่วยที่มีภาวะ shock ผู้ป่วยที่มีภาวะไตบาดเจ็บเฉียบพลัน ในปี 2563 กับปี 2564

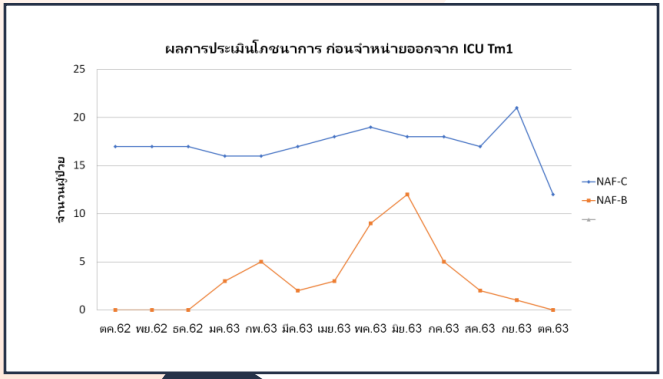
ปี	2563	2564
ผู้ป่วยบาดเจ็บหลายระบบ (ราย)	280 (100%)	194 (100%)
ผู้ป่วยที่มีภาวะ Shock (ราย)	55 (19.6%)	49 (25.3%)
ผู้ป่วยที่มีภาวะไตบาดเจ็บเฉียบพลัน (ราย)	31 (11.1%)	12 (6.17%)

Shock Index

Innovation Award from HA
National Forum 2022

NAF assessment tool Critical ill Patients





ผลการดำเนินงาน

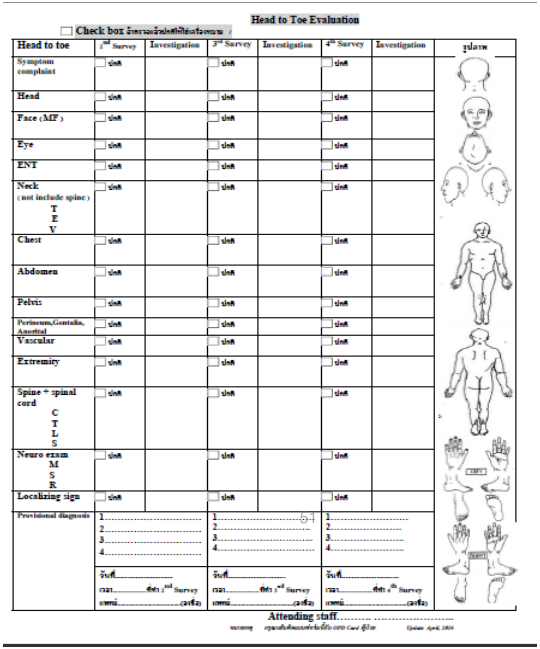
จำนวนผู้ป่วยที่ได้รับการคัดกรองภาวะโภชนาการแรกรับและประเมินภาวะโภชนาการ เดือน ตุลาคม 2562 – กันยายน 2563 มีจำนวน 87 ราย ดังนี้

NAF	ประเมินแรกรับ	ประเมินขณะอยู่รักษา	ประเมินวันจำหน่าย
ระดับ A : Mild malnutrition (0-5 คะแนน)	59 ราย	เปลี่ยนระดับ Aเป็นระดับ B 1ราย	ระดับ A เหมือนเดิม 59 ราย
ระดับB:Moderate malnutrition (6-10 คะแนน)	17 ราย	เปลี่ยนระดับ B เป็นระดับ A 3 ราย	เปลี่ยนระดับ B เป็นระดับ A 17 ราย
ระดับ C : Severe malnutrition (≥11คะแนน)	11 ราย	เปลี่ยนระดับ C เป็นระดับ B 5 ราย	เปลี่ยนระดับ C เป็นระดับ A 11ราย

Nutritional Assessment

3rd and 4th Survey in ICU/Trauma ward

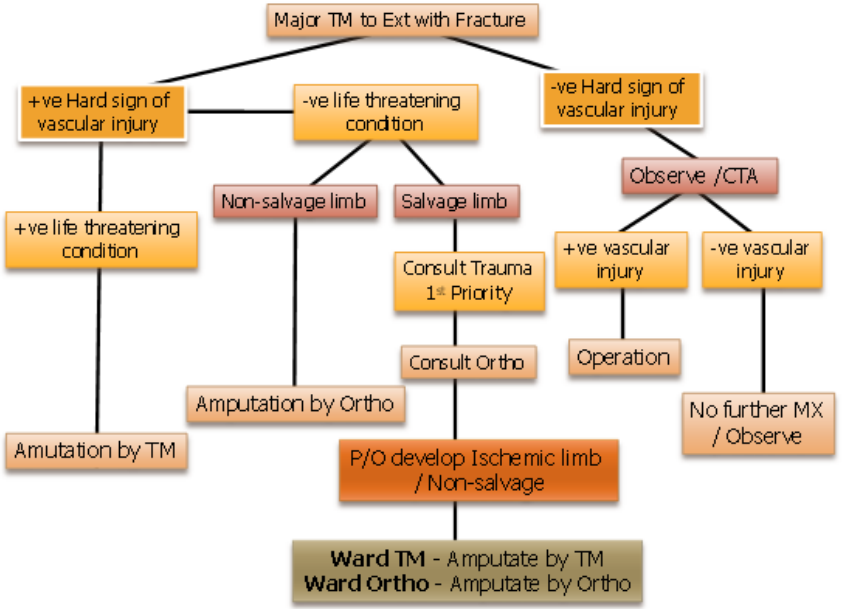
Code	Describe
A	Airway treatment ,C-spine care or protection , maintain airway , tracheostomy ?, End tidal CO_2 monitoring
B	Breathing , ventilator setting , ABG, Oxygen saturation , ICD care (ถ้ามี)
C	Circulation and Monitoring
	C1 = Clinical (organ perfusion), Vital sign , MAP , Urine output , pulse , Capillary refill
	C2 = Lab , Electrolyte (Gap), ABG , VBG , Lactate level (the best prognostic indicator)
	C3 = A-line , Cut down (CVP monitor) , CO monitoring (Vigileo)
	C4 = PAWP , PA catheter
D	Drug , 3A (anti-tetanus,anti-biotic and analgesic : pain score) Other drug : Anticonvulsant , Sedative drugs
E	Enteral diet/feeding, Nutrition and Fluid Electrolyte (early enteral diet if no contra-indication) , Diet formular or IV. fluids
F	Fever , Sepsis , SIRS (ระวัง miss injury , blood transfusion , procedure and intervention ที่ไม่จำเป็น) , hypothermia
G	General ; GI prophylaxis , DVT prophylaxis, Physiotherapy , Clinical Monitoring : neuro sign , Hct , Dtx , laxative , mucolytic agent , Catheter care (NG , Foley cath, Central line)
H	Home health care , Family and patient advice , treatment planning , Information of injury & treatment
I	Injury site specific treatment , definite treatment and complication monitoring



To Prevention of Miss injuries in Trauma

Guideline Management of Vascular injury

Khon Kaen Hospital 2014-2015

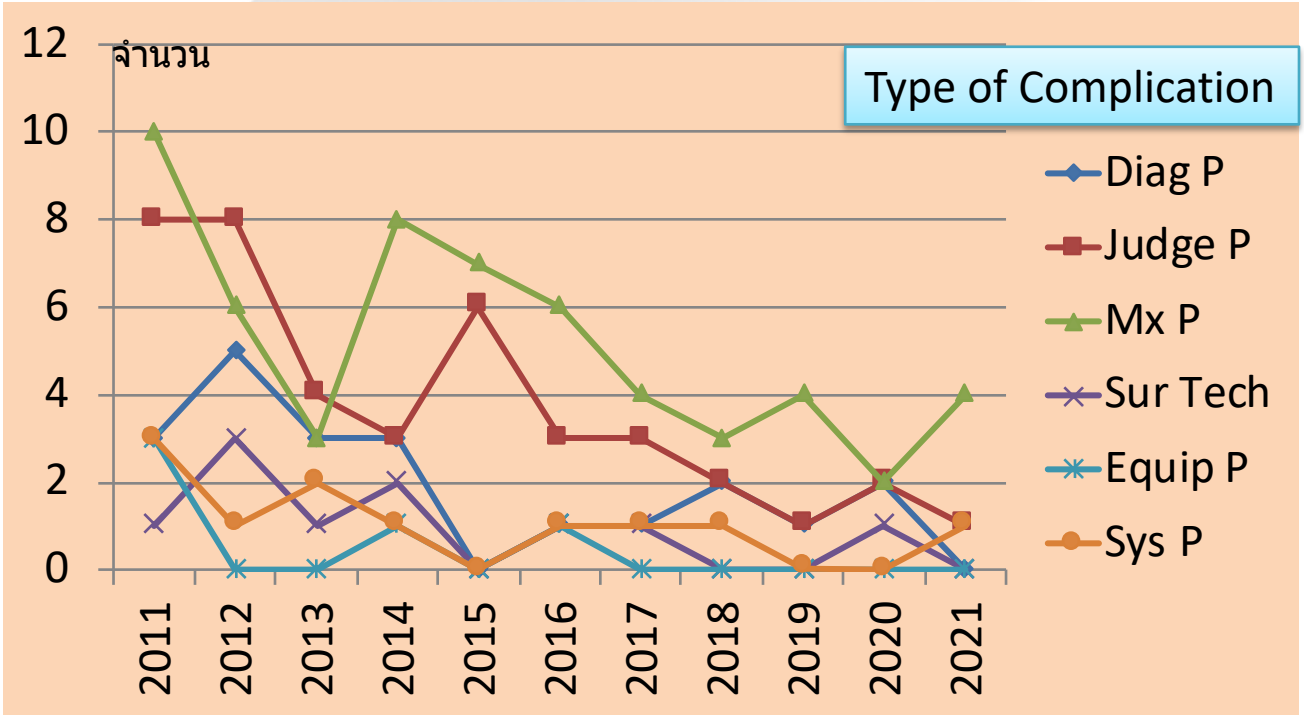


Pediatric Trauma care guideline
(Referral system)

แนวทางการรับและส่งต่อผู้ป่วยอุบัติเหตุในเด็ก
(Pediatric Trauma)

1. ผู้ป่วยเด็กอายุต่ำกว่า 1 ปี หรือ น้ำหนักตัวน้อยกว่า 10 กิโลกรัม และใส่ท่อช่วยหายใจ
    1.1 ให้แพทย์ที่จะส่งต่อผู้ป่วยประสานงานมาที่ ER Call Center (ECC) รพ.ขอนแก่น และให้ ER Call Center รพ.ขอนแก่น ประสานงานไปที่ กุมารแพทย์ และ ศัลยแพทย์ และ/หรือ ให้แพทย์ที่จะส่งต่อผู้ป่วยโทรแจ้งไปที่ศัลยแพทย์โดยตรง เพื่อเตรียมรับคนไข้
    1.2 เมื่อผู้ป่วยมาถึง รพ.ขอนแก่น ให้ศัลยแพทย์ประเมินผู้ป่วย วางแผนการรักษา และแจ้งกุมารแพทย์ให้รับทราบ
    1.3 ให้ผู้ป่วย admit ที่หอผู้ป่วยเด็กเสมอ ยกเว้นกรณีเตียงเต็ม ให้ admit ที่หอผู้ป่วย ICU Trauma ก่อน หรือ ในบางกรณี อาจพิจารณาส่งต่อไปยัง รพ.ศรีนครินทร์ได้ เช่น ICU trauma เต็ม ไม่สามารถจัดการเตียงได้
    1.4 ศัลยแพทย์จะตามไปดูแลผู้ป่วยร่วมกับกุมารแพทย์ที่หอผู้ป่วยเด็ก
2. ผู้ป่วยเด็กทุกกลุ่มอายุ (อายุต่ำกว่า 15 ปี) ที่ไม่ได้ใส่ท่อช่วยหายใจ
    2.1 การประสานส่งต่อผู้ป่วยให้ปฏิบัติตามขั้นตอนเหมือนผู้ป่วยทั่วไป ยกเว้น ในกรณีที่ผู้ป่วยมีสัญญาณชีพไม่คงที่ เช่น blunt abdominal trauma with shock ควรแจ้งให้ศัลยแพทย์รับทราบก่อนเสมอ
    2.2 .ให้ผู้ป่วย admit ที่หอผู้ป่วยศัลยกรรมอุบัติเหตุเสมอ และหากต้องการปรึกษากุมารแพทย์ให้ศัลยแพทย์พิจารณาเป็นกรณีไป

Type of Complication



Actions for improvement targeted at specific providers

- The three potential corrective strategies focusing on individual providers include:

1. Counselling
2. Further training
3. Change in privileges or credentials

Human Error

Counselling

- By the chief of the hospital, head of a department (doctors), nurse manager for nursing staff.
- In a timely fashion , private, or in small groups
- Should be documented and followed up.
- Bearing in mind standard behavioural theory, any positive responses
- Reactions as a result of counselling should be acknowledged and rewarded in order to optimize the effectiveness of the process and to reinforce positive behavior patterns.

Further training

- Providers can be referred to highly specific and intensive courses that emphasize clinical management.

- Further training may be behavior improvement, such as **training in conflict resolution training for staff** who exhibit negative interactions under stressful conditions (non-technical skill training).

Changes in privileges or dismissal from practice

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- Reserved for if other corrective action plans have failed (counselling and further training).

- **Extremely unusual corrective strategies** and require implementation at high levels within the hospital.

- The potential for dismissal also emphasizes the importance of documenting any prior corrective strategies and efforts implemented to improve performance in order to avoid controversy.

Enhanced resources, facilities, or communication

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- May be achieved by improved organization and planning without the need for high-cost solutions.
- Resources that are necessary in emergency situations are readily accessible e.g. airway set, chest tube insertion set.
- Make as a simple solutions of communication such as:
  - All staff wear their name badges correctly
  - The text/ print in document is large enough to be easily readable.
  - To make a blood bank aware of an acute situation requiring immediate availability of blood products, one can create a “massive transfusion protocol” code
  - Set the communicating system: mobile phone, radio-network, Alert system (message/Line).

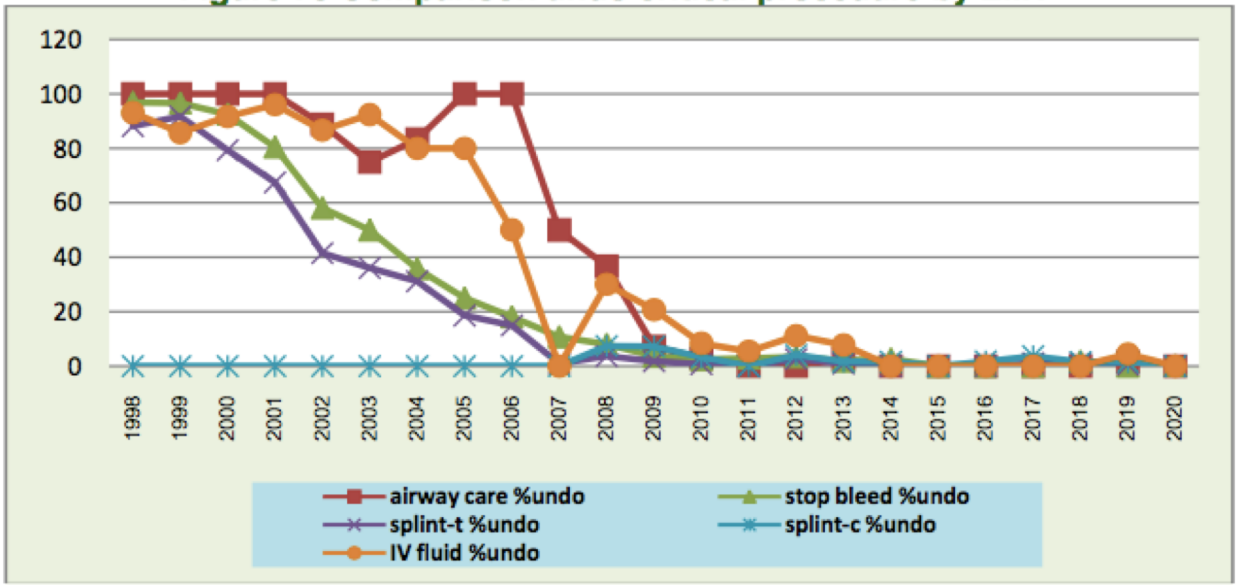
System-wide and prehospital quality improvement

Pre-hospital care (EMS) audit meeting, Khon Kaen Hospital

EMS Meeting Khon Kaen Province

Quality Monitoring

Figure 75 Comparison undo critical procedure by EMT



Phol hospital

Community Hospital Node visit and Trauma care Strengthening

Chumpae hospital

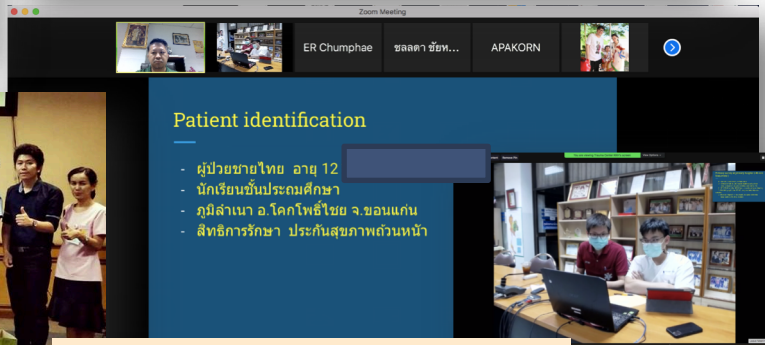
Numpong Hospital

Community Hospital Node visit and Trauma care Strengthening

Sirinthorn Hospital

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

Khon Kaen Interhospital Conference



On site and On line conference

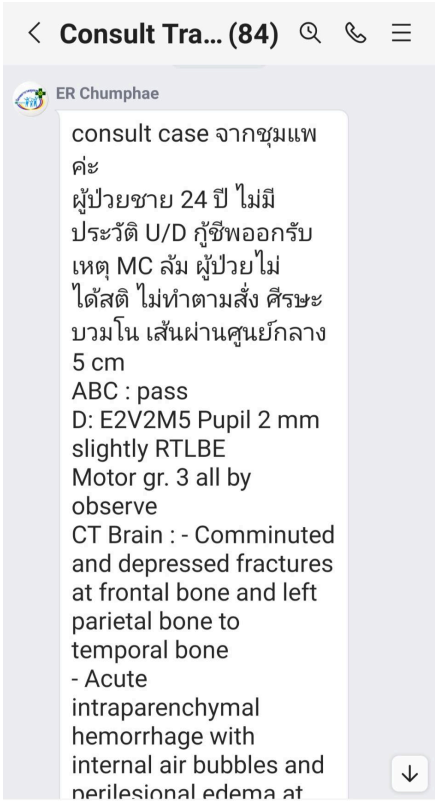
Basic trauma care course for Doctor (Community Hospital)

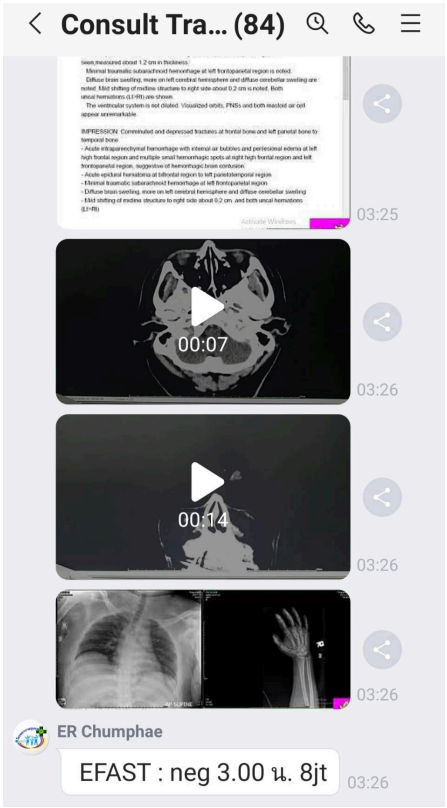
โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

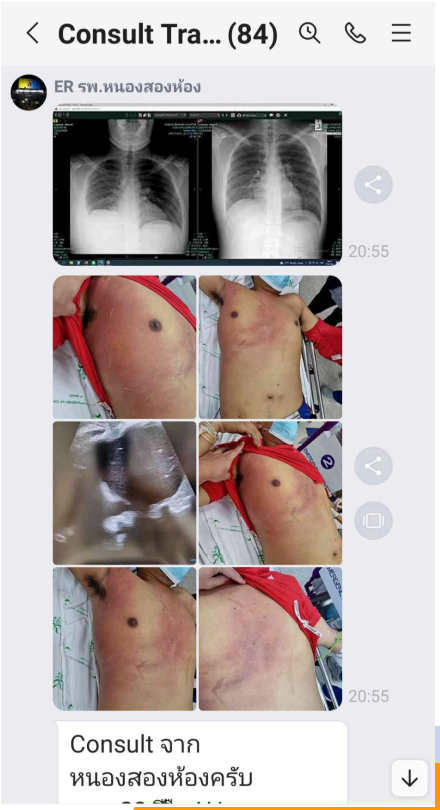
Basic Trauma Care for Nurse

Group Line Consult Trauma

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL



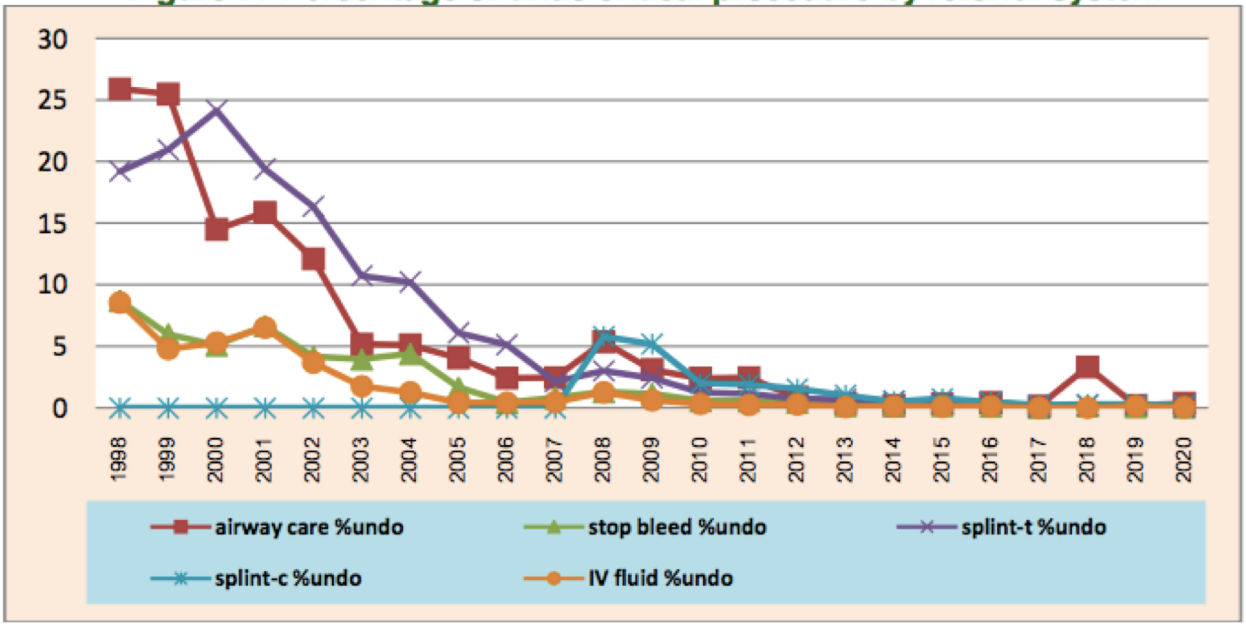




Trauma & Emergency Committee (TEC) Meeting Khon Kaen Province

Quality Monitoring

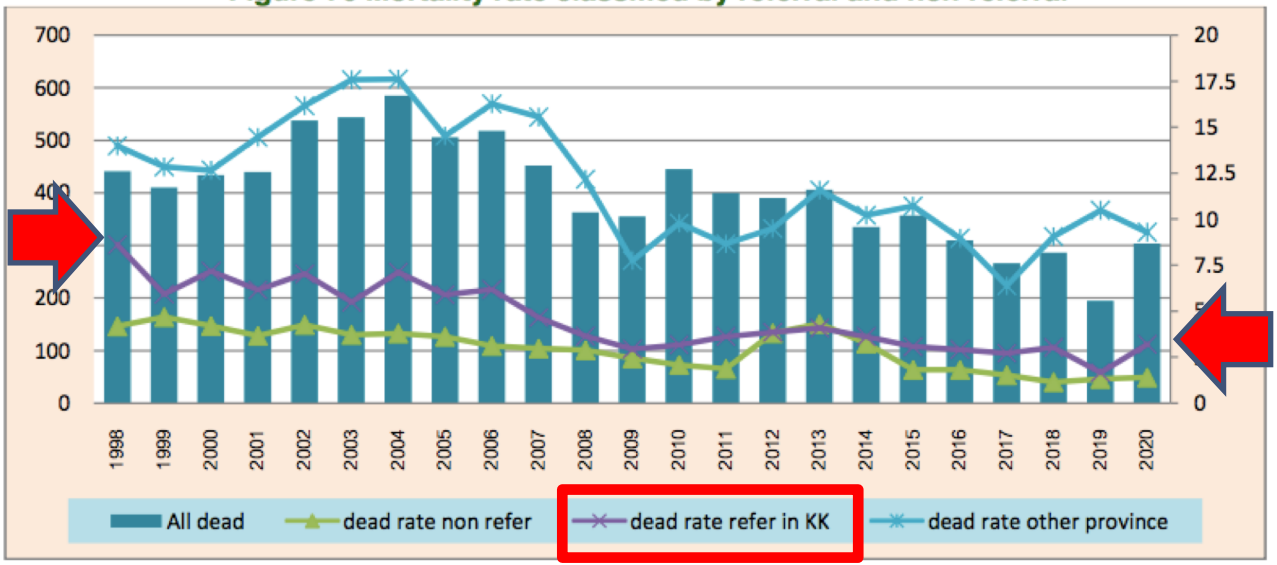
Figure 77 Percentage of undo critical procedure by referral system



Reference: 24 Years Anniversary Trauma Registry 1997-2020, Khon Kaen Hospital

Mortality rate of referral trauma cases

Figure 70 Mortality rate classified by referral and non referral



Reference: 24 Years Anniversary Trauma Registry 1997-2020, Khon Kaen Hospital

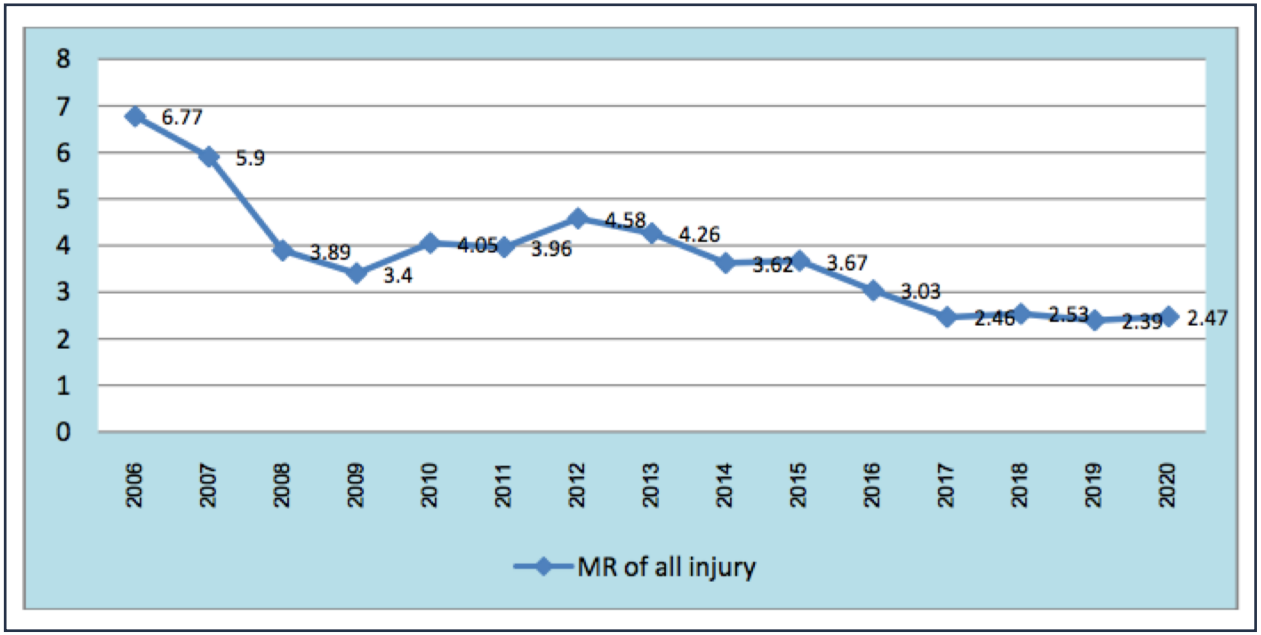
Role of medical records and trauma registry

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

- To support data of TQI program
- Need adequacy of documentation of trauma care in the medical records (especially in the early phases of care).
- **Complete documentation => help QI monitoring and management of care.**
- Use for tracking audit filter and adjusted mortality by scoring system.

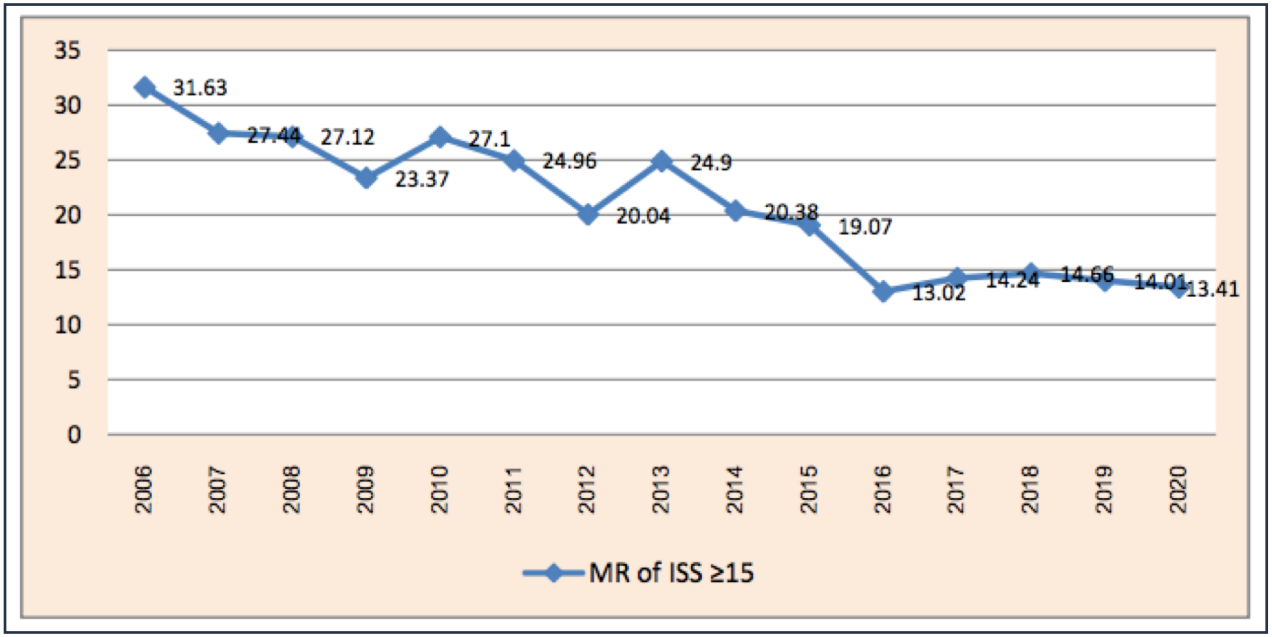
Annual Report Trauma Registry

Mortality rate of Trauma in Khon Kaen Hospital



ที่มา: 24 Years Anniversary Trauma Registry 1997-2020, Khon Kaen Hospital

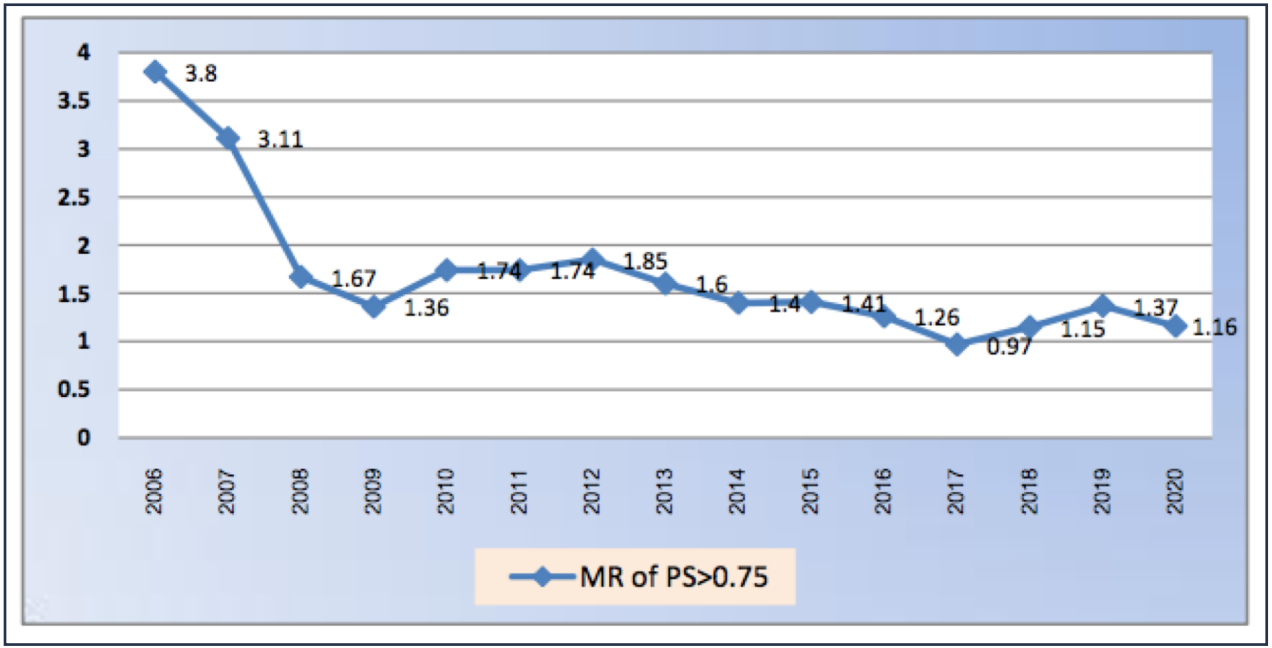
Mortality Rate of Trauma patients with ISS >15



Note: ISS = Injury Severity Score

Reference: 24 Years Anniversary Trauma Registry 1997-2020, Khon Kaen Hospital

Mortality rate of Trauma patients with PS ≥ 0.75



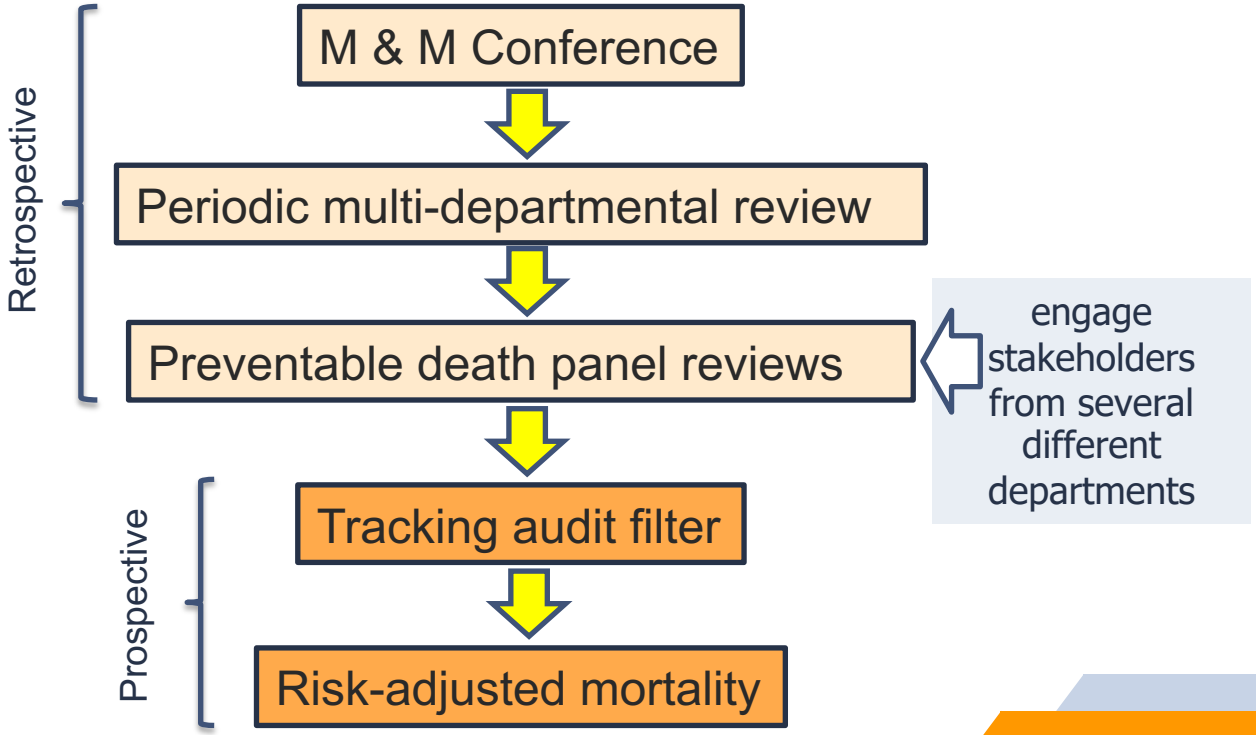
Note: PS = Probability of Survival

Reference: 24 Years Anniversary Trauma Registry 1997-2020, Khon Kaen Hospital

Appropriateness of different techniques at different levels of the health care system

- The most optimal TQI program depend on
  - the level of the health care system
  - the trauma volume of the facility
  - the current status of TQI activities
  - the culture and tradition of organization

Step to Set The TQI Program




ศูนย์ความร่วมมือระหว่าง

TRAUMA CENTER TEAM

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL


The Successful is belonging to all of us!!


WE ARE SMART TRAUMA CENTER!!
Thank you for your Attention

WHO Collaborating Centre
for Injury Prevention
and Safety Promotion

โรงพยาบาลขอนแก่น
KHON KAEN HOSPITAL

THANK YOU