Disaster Preparedness

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Disaster Preparedness

- INTRODUCTION
- DISASTER DEFINITION
- Hospital Disaster
- Factors That May Hinder ED Response to Disasters
- TYPES OF DISASTERS
- DISASTER PREPAREDNESS AND PLANNING
- Hospital Disaster Planning Group
- HOSPITAL EMERGENCY OPERATIONS PLAN

- Decontamination

- FIELD TRIAGE AND MEDICAL CARE
- ED TRIAGE

- ED DISASTER PATIENT CARE

INTRODUCTION

- Disasters have claimed **millions of lives** and **cost**

INTRODUCTION

INTRODUCTION

DISASTER DEFINITION

- A sudden ecologic phenomenon
- Sufficient magnitude
- Require external assistance

Hospital Disaster

- Overwhelms the resources
- Any size ….

For example…

A single patient who ingested an **organic phosphorous pesticide** may overwhelm the resources of a hospital if that hospital is not prepared to decontaminate external to the ED.

- Depends on the time of day, nature of the injuries, type of event, and the amount of preparation time before the arrival of patients

Factors That May Hinder ED Response to Disasters

- Poor communication between ED and disaster scene
- Poor communication within the hospital
- Inability to control volunteer healthcare personnel
- Inability to engage and control convergence of media to the ED
- Inability to engage, control, and direct visitors
- Difficulty maintaining high staffing needs for extended periods

TYPES OF DISASTERS

- Natural disaster
- Man-made disaster
- Terrorist-related disaster

- Internal disaster
- External disaster

- Acute disaster
- Nonacute disaster

DISASTER PREPAREDNESS AND PLANNING

- A **hospital disaster planning group** is **responsible** for generating the hospital's emergency operations plan.
- The group should meet on a regular basis to
  - ✓Assess hazards
  - ✓Develop and update short- and long-term disaster plans
  - ✓Plan exercises and training
  - ✓Redesign the disaster plan based on evaluations of exercises and real events.
  - ✓Develop specific plans (for radiation, explosions, mass casualties, decontamination)

Hospital Disaster Planning Group

- Public safety
- Facilities/engineering
- Logistics/equipment supply
- Pharmacy
- Transportation
- Clinical fields
- Media/public relations
- Communications officer
- Nonclinical patient care
- Safety officer
- Radiation safety officer
- Infection control officer

Public safety

- Crowd control
- Hospital lockdown
- Hospital access control

Facilities/engineering

- Evaluate Structural Damage
- Advise on Stability of Facilities

Logistics/equipment supply

- Provide supplies
- Equipment
- Arrange for rapid ordering of additional supplies

Pharmacy

- Provide pharmaceuticals Antidotes, and Antibiotics
- Arrange for rapid ordering of additional pharmaceuticals

Transportation

- Assist with patient transport

Clinical fields

- Representatives from the ED
- Internal medicine
- Family medicine
- Pediatrics specialties
- Surgical specialties

Media/public relations

- Single point of contact for media
- liaise between media and clinical areas
- Emergency operations center

Communications officer

- Coordinate communication to employees

  - ✓ E-mail
  - ✓Web site
  - ✓Paging groups
  - ✓Phone
  - ✓ Social Media

Nonclinical patient care

- Housekeeping and Food services

Safety officer

- Determine and ensure safe practices for employees

For Example….

✓appropriate personal protective equipment for decontamination

Radiation safety officer

- Prepare plan for and respond to radiologic emergencies

Infection control officer

- Prepare for and respond to infectious disease emergencies

HAZARD VULNERABILITY ANALYSIS

- Address those disasters that are most likely to occur..

HAZARD VULNERABILITY ANALYSIS

- **Different disasters ……..different morbidity and mortality patterns** and different challenges to the ED and hospital.

- **Industries** are required to **report** spills of potentially **harmful chemicals**, and the **approximate location** of these sites may be found

http://toxmap.nlm. nih.gov

IRAN

- Material Safety Data Sheet(MSDS).....برگه اطلاعات ایمنی مواد شیمیایی

HAZARD VULNERABILITY ANALYSIS

- Earthquakes
  - ✓Severe traumatic injuries
  - ✓Crush Injury
  - ✓Renal failure

HAZARD VULNERABILITY ANALYSIS

- Natural disasters
  - ✓large numbers of homeless or displaced persons whose everyday medical needs are exacerbated by limited access to usual health care
- Chemical releases
  - ✓may require **mass decontamination** as well as large numbers of ventilators, oxygen, and specific antidotes that are not typically available in large quantities.

HOSPITAL–COMMUNITY COORDINATION

HOSPITAL–COMMUNITY COORDINATION

- **Disaster notification** and communications
- **Transportation** of casualties
- **Dispatch** of hospital medical teams to a **disaster site**.

TRAINING AND DISASTER DRILLS

- Regular training and drills

Identify weaknesses or omissions in the plans

TRAINING AND DISASTER DRILLS

- Full-scale,community-wide simulations
- Tabletop triage scenarios
- Mini-drills that test only certain components of the disaster plan

HOSPITAL EMERGENCY OPERATIONS PLAN

- An organized response of the hospital from **the time of notification** of a disaster until the situation normalizes

HOSPITAL EMERGENCY OPERATIONS PLAN

- Activate emergency operations plan
- Set up emergency operations center
- Assess hospital capacity
- Create surge capacity
- Establish communication systems
- Provide supplies and equipment
- Establish support areas
- Establish decontamination, triage, and treatment areas
- Terminate disaster response and provide for remediation

ACTIVATE THE EMERGENCY OPERATIONS PLAN

- Should Provide for the **immediate mobilization** of **supplies**, **equipment, and personnel**.

ESTABLISH EMERGENCY OPERATIONS CENTER

- Nerve center for hospital response and communication with outside agencies

ASSESS HOSPITAL CAPACITY

- Determine safety of hospital itself
- Determine capabilities of hospital in all units

CREATE SURGE CAPACITY

- Surge capacity is the ability to increase hospital bed capacity over normal limits.

ESTABLISH COMMUNICATIONS SYSTEMS

- Establishment of good communications is critical in any disaster or mass casualty situation.
- Develop multiple and redundant systems
  - ✓ cellular phones
  - ✓satellite phones
  - ✓two-way radios
  - ✓runners

Provide supplies and equipment

- Deliver available supplies to proper areas
- Plan for resupplying or obtaining other needed materials

Establish support areas

- Volunteer
- Media
- Family information centers

Decontamination

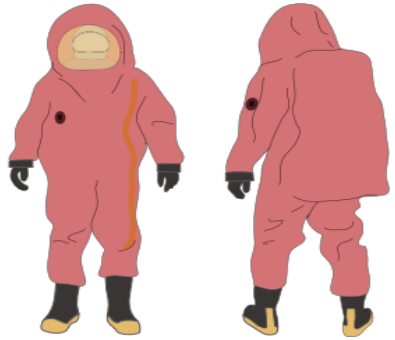
DECONTAMINATION

- **Outside of the clinical care** area of the ED

Decontamination Guidelines

- Decontaminate patients exposed to **solids, liquids, vapors, or mists**
- Only **dispersed gas ……..do not require** decontamination
- Hospital personnel should decontaminate one patient at a time with a **shower** or **hose system** while setting up a larger tent or a multiple-person decontaminate on system

Decontamination Guidelines



Level A

Level B

Level C

- Sufficient equipment for multiple personnel and rotations of personnel in and out of the decontamination zone **every 30 min** is suggested

Decontamination Guidelines

- The first and a very effective method for decontamination is to disrobe, brush off solid dusts or powders, and wash and dry the face.
- Patient clothing and belongings should be individually bagged and labeled.
- Watches, earrings, body piercings, jewelry, and contact lenses should be removed.
- Hearing aids should be wiped with a moistened cloth and may be returned to patients after the decontamination procedure

Decontamination Guidelines

- Warm water is the universal decontamination fluid.
- Hosing a patient from head to toe (or showering) for 5 min
- Patients with adherent materials will need additional scrubbing of hair and affected body parts with soap to remove these
- Medical assistance will be necessary in some circumstances.
- An additional check to ensure the removal of all earrings and body piercings should be done.
- Young children need assistance and reassurance

Decontamination Guidelines

- After the decontamination procedure, provide hospital clothing (cloth or paper gowns) and triage patients to an area to await further assessment. Retriage patients with eye pain after whole-body decontamination for individual irrigation of their eyes with sterile normal saline. Patients with contaminated wounds will likely need additional irrigation of debris in wounds

- Attention to occult areas….. such as the hair, skin folds, axilla, groin, toes, and eyes

Decontamination Guidelines

- Contain runoff water from the decontamination
- Critical medical devices .
- Wash canes and walkers

Decontamination Guidelines

- **At least one radiation** survey meter (e.g., Geiger-Muller counter).
- Patients may need a radiation survey sweep before and after decontamination

Decontamination Guidelines

- Staff involved in the decontamination process and systems need annual training and practice drills.

Decontamination Guidelines in Radiation

- Assess external contamination
- Contact radiation safety officer.
- Assess contamination with radiation survey meter (Geiger counter).
- Evaluate for radioactive shrapnel. Easily accessible pieces should be removed with a forceps and placed in a lead container.
- Document contamination pattern on a body diagram.
- Swab each nostril separately to estimate level of internal contamination of the lungs.
- Decontaminate whole body
- Carefully cut and roll clothing away from the face to contain contamination.
- Double bag clothing and label as hazardous waste.
- Wash wounds first with saline or water.
- If facial contamination is present, rinse as appropriate.
- Gently cleanse intact skin and avoid scrubbing.
- Repeat patient scan with radiation survey meter. Repeat washing until radiation is <2 times background. . Avoid scrubbing.
- Cover wounds with waterproof dressing.

TRIAGE

- Restrict patient entry to only one location—the triage area.
- A disaster triage area
  - ✓Rapid assessment
  - ✓Patient registration and identification,
  - ✓The assignment of priorities for management, and distribution of patients to appropriate treatment areas in the ED and hospital.

TREATMENT

- Staff should perform the clinical roles
- Typical tasks quickly than real time.
- Organize patient care stations…..
  - ✓Resuscitation areas
  - ✓ Minor treatment areas

RESUSCITATION

- Seriously injured patients
  - ✓Trauma and cardiac resuscitation
  - ✓Hypovolemic or septic shock
  - ✓Severe respiratory distress
- Staffed by emergency physicians

MINOR TREATMENT AREA

- The majority of patients **are not** very seriously injured
- These patients can be sent to an “urgent care” area
  - ✓Splinting of fractures
  - ✓Primary closure of lacerations
  - ✓Tetanus prophylaxis
  - ✓Observation for delayed symptoms.

PRESURGICAL HOLDING AREA AND SURGICAL TRIAGE

- Send patients to the presurgical holding area for preoperative preparation and observation.
- The **number of operating rooms …….**the **main limiting factor**
- The **most experienced surgeon** should take the responsibility.

MENTAL HEALTH

- Consider **a separate isolated area** to receive individuals in need of psychological intervention
- Consider providing a critical stress response team, including social workers and psychiatrists

MORGUE FACILITIES

- A large number of fatalities…… Morgue capacities may need to be expanded
  - ✓Other areas of the hospital (medical school anatomy area, auditorium),
  - ✓local freezer trucks

TERMINATING DISASTER RESPONSE (RECOVERY)

- Direct efforts toward returning the hospital to normal operations
- Immediate emotional support to healthcare workers
- Record and review deficiencies in a hospital’s disaster plan

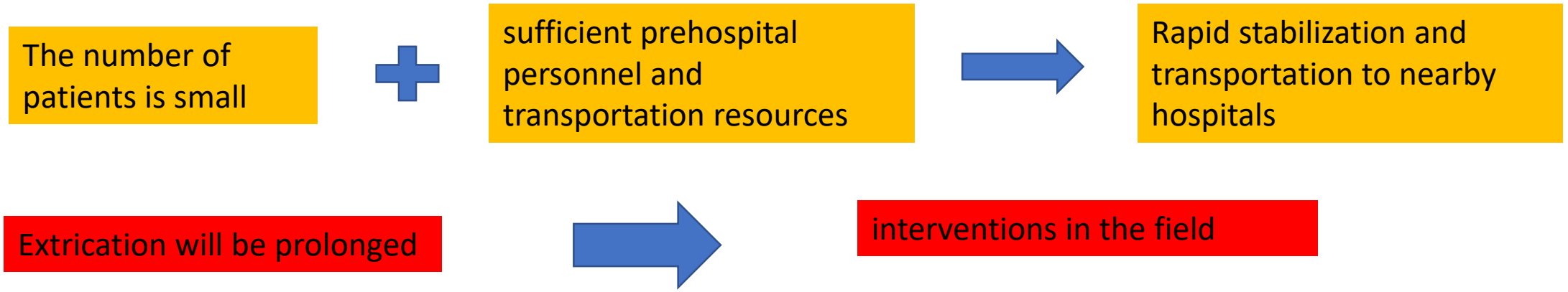
Triage

FIELD TRIAGE AND MEDICAL CARE

- A rapid assessment of **respiratory status**, **perfusion**, **hemorrhage control**, and **mental status**.
- Patients are then triaged to **immediate care**, **delayed care**, or **dead/dying**.

FIELD TRIAGE AND MEDICAL CARE

- **Type of care** to administer at the disaster site depends on several factors:



- Delayed transport from a scene ……..the “Secondary Assessment of Victim Endpoint” triage system

ED TRIAGE

- **Triage will need to be performed** at the ED entrance even if it was done at the scene.
- **Triage category** is identified by use of a **colored** band or trauma/disaster tag .

ED TRIGE **category**

First priority ▪ Most urgent	Second priority ▪ Urgent	Third Priority ▪ Nonurgent	Dead
Life threatening shock Hypoxia	systemic effects not yet in life threatening shock or hypoxia A 45- to 60-min wait	localized without immediate systemic effort unlikely to deteriorate for several hour	Clinical death ≅ biological death any unresponsive no spontaneous ventilation or Circulation Catastrophically injured patients

TRIAGE TEAM

- An emergency physician
- An ED nurse
- Medical records or admitting clerks

TRIAGE TEAM

- Several triage teams may be required

- If identification of the patient is not available, **ethnicity**, **gender**, and **approximate age** should be noted on the tag.
- An **initial diagnostic impression** should also be registered on the tag.
- This information is entered into **a department log** or into the **electronic medical record**, if possible.
- Tracking systems, a scan of the bar code on the disaster tag
- Additional care can be recorded or in a paper disaster chart and kept with the patient at all times

تریاژ بیمارستانی در بلایا و حوادث با مصدومین انبوه
(دستورالعمل کشوری)

اجزاي نظام ترياژ اجزاي يك نظام (سيستم) ترياژ

1. كاركنان متخصص (آموزش ديده)؛
2. فضاي مناسب؛
3. لوازم و تجهيزات مورد نياز؛
4. تجهيزات و بسترهاي ارتباطي لازم؛
5. فرآيند ثبت اطلاعات و رديابي بيماران.

تيمهاي پشتيبان تريـاژ

1. تيم ايمني (جهت پيشگيري از ايراد آسيب ناشي از سهلانگاريها در شرايط حادثه)؛
2. تيم حراست و انتظامات (حفاظت فيزيكي براي پيشگيري از مداخلات بيروني)؛
3. تيم انتقال مصدومين (جهت انواع انتقال اعم از ويلچير و برانكارد)؛
4. تيم مديريت اجساد (شامل پزشكي قانوني، خدمات، متوليان مراسم مذهبي و...)؛
5. تيم سلامت روان.

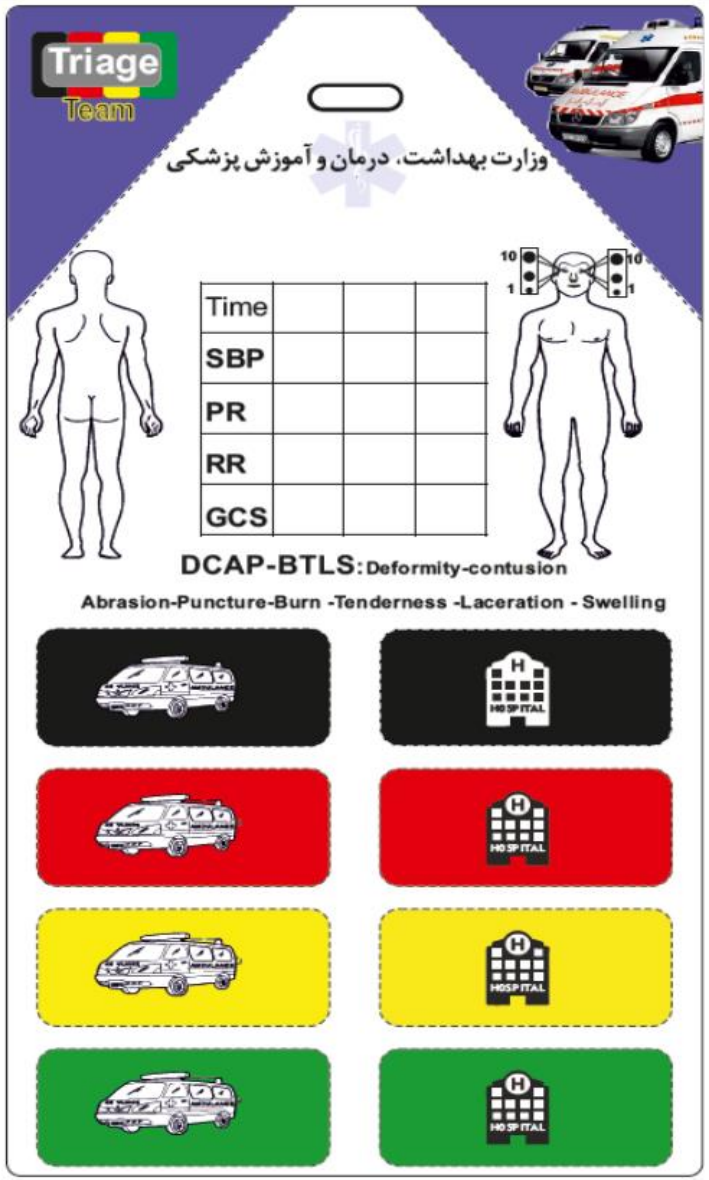
نكات تكميلي و قابل توجه

1. انجام تریاژ درست و بِموقع در صحنة حادثه (تریاژ پیشبیمارستاني)، اثري مستقیم بر سرعت و کیفیت تریاژ و درمان بیمارستاني مصدومین/ بیماران دارد.
2. تریاژ در بلایا و حوادث با مصدومین انبوه، نه صد در صد کامل و بدون اشکال است و نه صد در صد عادلانه؛ ولي امري است اخلاقي و گریزناپذیر.
3. در تریاژ جایي براي احساسات و توجه به ویژگیهاي فردي مصدومین وجود ندارد و تنها نتیجه و کارآیي عملیات از اهمیت برخوردار است.
4. دشوارترین تصمیمگیري در مورد مصدومیني است که علیرغم زنده بودن، امیدي به نجات آنها نیست و با حذف آنها از چرخة درمان یا دست کم تأخیر منطقي در رسیدگي به ایشان، شانس زنده ماندن و نجات تعداد بیشتري از دیگر مصدومین افزایش خواهد یافت.

- تریاژ بیمارستاني مصدومین بزرگسال بلایا و حوادث با مصدومین انبوه (افراد بالاتر از 8 سال)، با الگوي «تریاژ ساده و درمان سریع» یا همان START بر اساس جدیدترین منابع معتبر علمي انجام میگیرد.
- در همة موارد مندرج در این دستورالعمل، تریاژ نوزادان، شیرخواران و کودکان زیر 8 سال با الگوي تریاژ START Jump انجام خواهد پذیرفت.
- مدت زمان مجاز انجام این تریاژ حداکثر 30 ثانیه (براي بیماران/ مصدومین غیرنیازمند به مداخلات درماني) و حداکثر 60 ثانیه (براي بیماران/ مصدومین نیازمند مداخلات درماني) میباشد. هرچند توصیه میشود با تمرین مکرر، این زمان به 5 تا 10 ثانیه کاهش یابد.

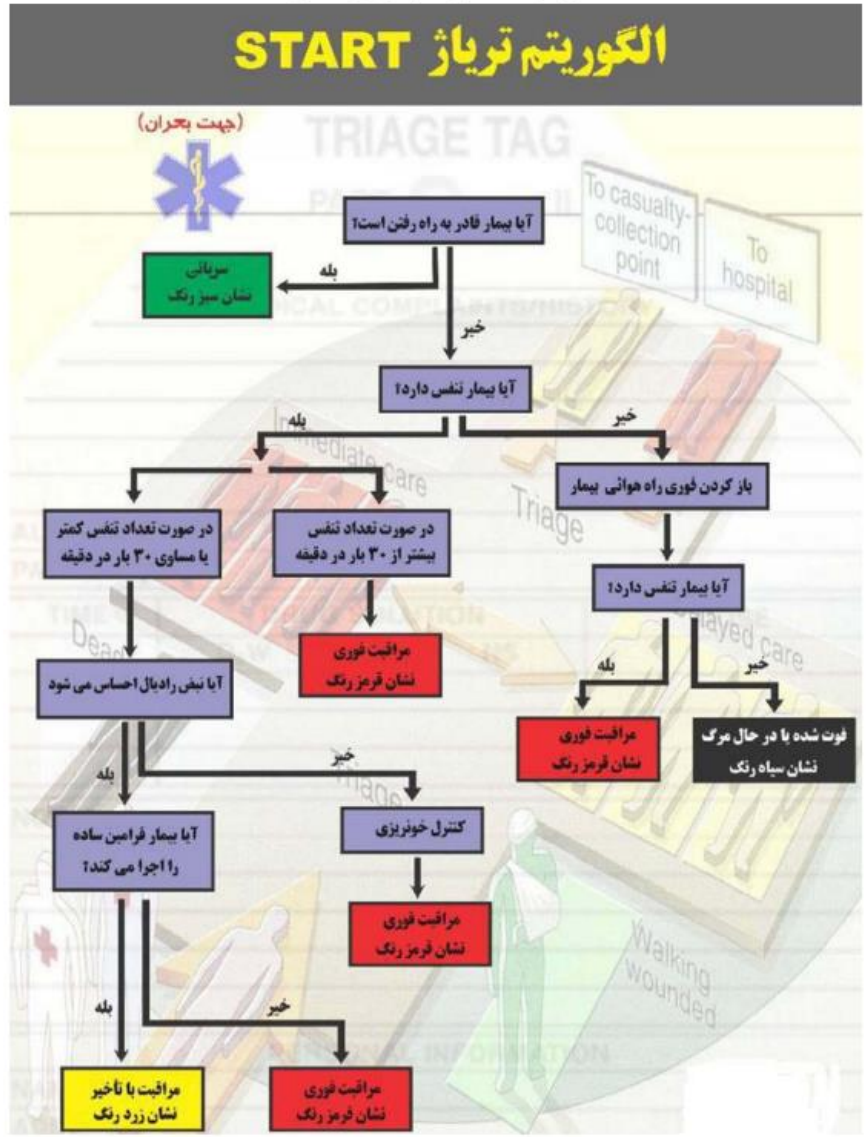
- در آموزش تریاژ START ضرورت دارد آخرین ویرایش موجود در منابع علمي مد نظر قرار گیرد. براي مثال در این شیوه براي تعیین کفایت عملکرد دستگاه گردش خون، منسوخ و معیار لمس نبض رادیال جایگزین آن 5 استفاده از معیار «پرشدگي مویرگي» شده است.
- این دستورالعمل فعلاً شامل حوادث شیمیایي، زیستي، پرتوي و هستهاي (CBRN) نمیباشد و دستورالعمل تریاژ این حوادث متعاقباً با مشارکت مراجع ذیصلاح، تهیه و ابلاغ خواهد شد؛ هرچند در کارت تریاژ پیشبیني لازم براي آلودگیهاي CBRN شده است

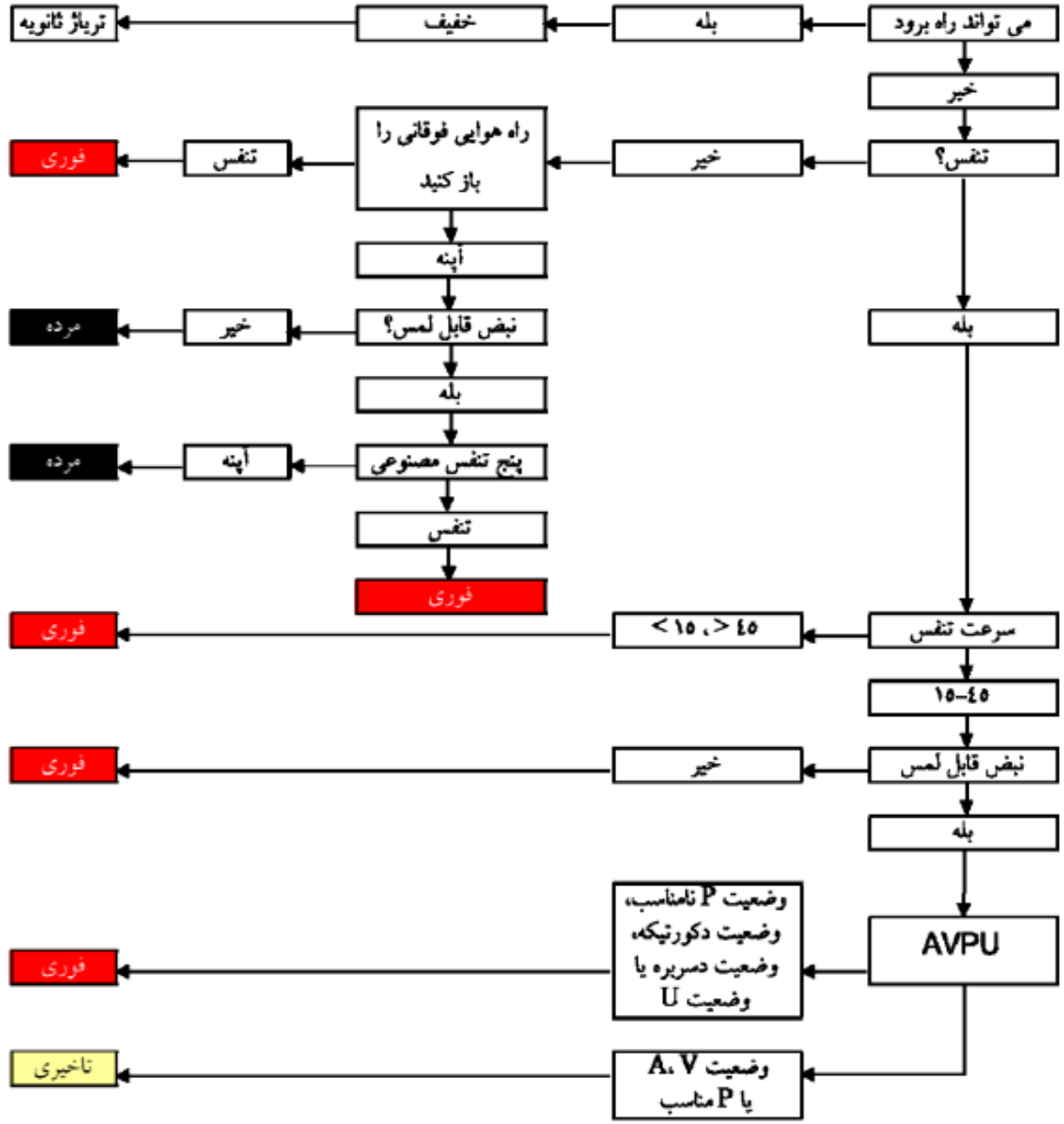
تصویر نمونه کارت تریاژ



تصویر ۲- پشت کارت تریاژ

نمودار ۱- الگوریتم تریاژ استارت

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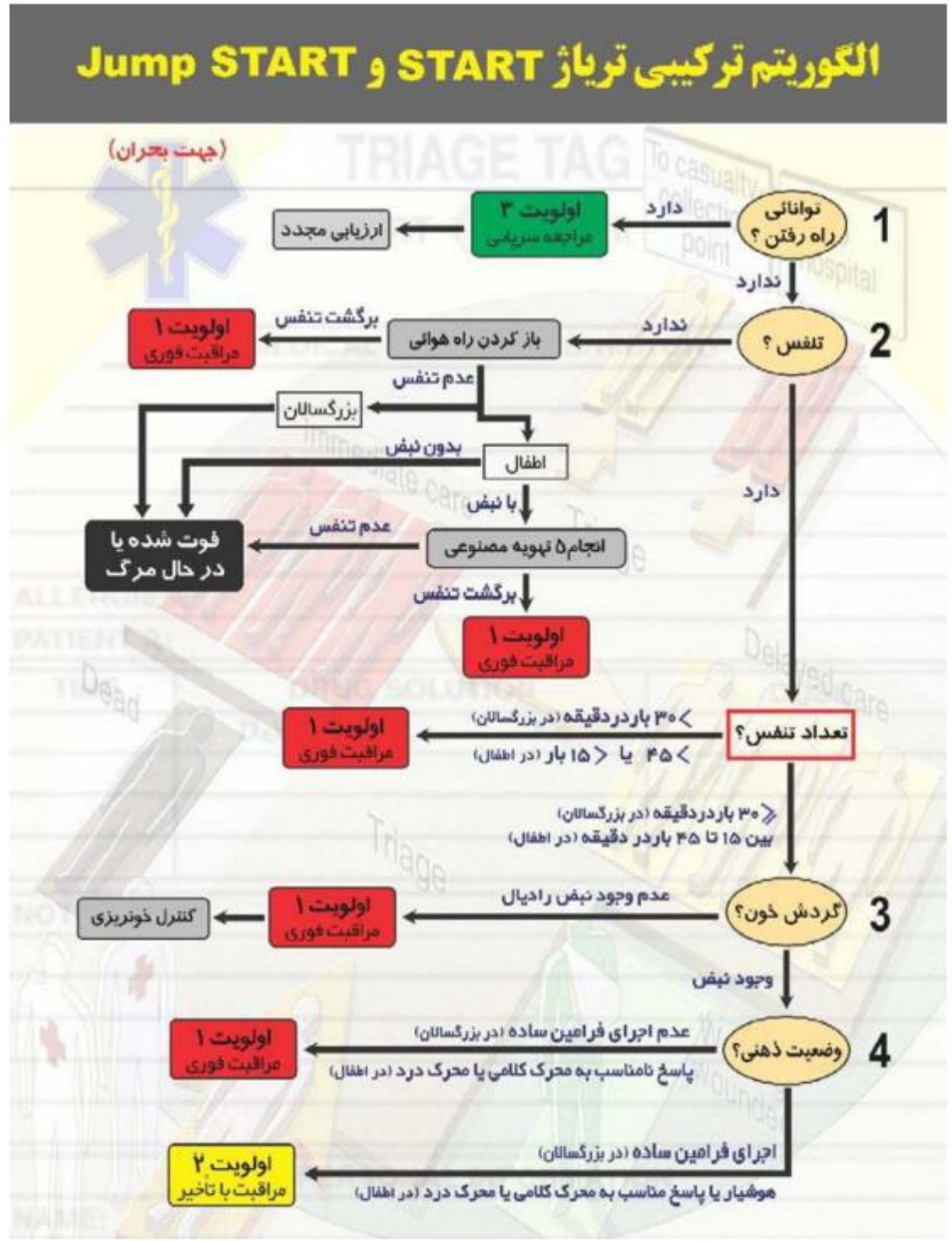

نمودار ۳- الگوریتم ترکیبی تریاژ استارت و جامپ استارت

ED DISASTER PATIENT CARE

ED DISASTER PATIENT CARE

- Care that is not immediately time sensitive can be provided **the next day**
  - ✓For example, **wounds** may benefit from **delayed closure** ……

- In the event of **prolonged extrication** from rubble, assess for **delayed signs** and symptoms, including **cardiac dysrhythmias**, **hyperkalemia** from crush injury, **renal failure**, and **pulmonary blast injury**.

ED DISASTER PATIENT CARE

- Use radiographic and laboratory studies sparingly
  - ✓For example, possible closed, nonangulated fractures can be splinted, and radiographs can be safely delayed for 24 to 48 hours.
  - ✓A **chest radiograph** may be appropriate in those patients complaining of **chest pain**, **dyspnea**, or **abnormal chest wall motion**, or who were potentially exposed to **blast waves secondary to bombs**.
  - ✓CT imaging may be **quicker** than plain radiographs
  - ✓Ultrasonography to detect **free intraperitoneal fluid**, **pericardial fluid**, and pneumothorax

ED DISASTER PATIENT CARE

- Pulse oximetry monitors may need to be used as spot assessments

- In a disaster situation involving many casualties, the blood bank should have up to **50 units of blood** available and should have access to volunteer donors who can be rapidly mobilized.

THANK YOU FOR YOUR ATTENTION