Mass civilian casualties

Lessons from Utøya and Oslo

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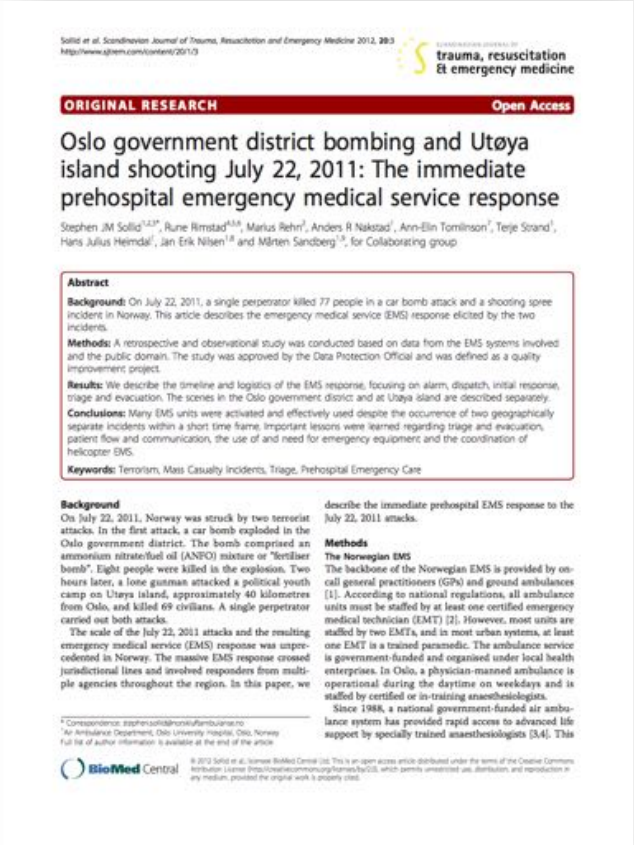

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trauma, resuscitation & emergency medicine

ORIGINAL RESEARCH Open Access

Oslo government district bombing and Utøya island shooting July 22, 2011: The immediate prehospital emergency medical service response

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Abstract

Background: On July 22, 2011, a single perpetrator killed 77 people in a car bomb attack and a shooting spree incident in Norway. This article describes the emergency medical service (EMS) response elicited by the two incidents.

Methods: A retrospective and observational study was conducted based on data from the EMS systems involved and the public domain. The study was approved by the Data Protection Official and was defined as a quality improvement project.

Results: We describe the timeline and logistics of the EMS response, focusing on alarm, dispatch, initial response, triage and evacuation. The scenes in the Oslo government district and at Utøya island are described separately.

Conclusions: Many EMS units were activated and effectively used despite the occurrence of two geographically separate incidents within a short time frame. Important lessons were learned regarding triage and evacuation, patient flow and communication, the use of and need for emergency equipment and the coordination of helicopter EMS.

Keywords: Terrorism, Mass Casualty Incidents, Triage, Prehospital Emergency Care

Background

On July 22, 2011, Norway was struck by two terrorist attacks. In the first attack, a car bomb exploded in the Oslo government district. The bomb comprised an ammonium nitrate/fuel oil (ANFO) mixture or "fertiliser bomb". Eight people were killed in the explosion. Two hours later, a lone gunman attacked a political youth camp on Utøya island, approximately 40 kilometres from Oslo, and killed 69 civilians. A single perpetrator carried out both attacks.

The scale of the July 22, 2011 attacks and the resulting emergency medical service (EMS) response was unprecedented in Norway. The massive EMS response crossed jurisdictional lines and involved responders from multiple agencies throughout the region. In this paper, we describe the immediate prehospital EMS response to the July 22, 2011 attacks.

Methods

The Norwegian EMS

The backbone of the Norwegian EMS is provided by on-call general practitioners (GPs) and ground ambulances [1]. According to national regulations, all ambulance units must be staffed by at least one certified emergency medical technician (EMT) [2]. However, most units are staffed by two EMTs, and in most urban systems, at least one EMT is a trained paramedic. The ambulance service is government-funded and organised under local health enterprises. In Oslo, a physician-manned ambulance is operational during the daytime on weekdays and is staffed by certified or in-training anaesthesiologists.

Since 1988, a national government-funded air ambulance system has provided rapid access to advanced life support by specially trained anaesthesiologists [3,4]. This

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[1]Sollid et al. (2012) Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

Content

- Prehospital Care
  - Oslo scene
  - Utøya scene
- Hospital care
- Changes implemented

THE NORWEGIAN EMS

National/ Regional	Regional	Regional/ Community
Air Ambulance Service	Ground Ambulance Service	Community based Physician on call

July 22. 2011 - Timeline

Oslo bombing

98 casualties
8 dead on scene
10 severely injured
80 lightly injured

Utøya shooting

129 GSW

68 dead on scene

21 severe injuries


77 dead
>200 casualties


18 years
14 years


Oslo
July 22nd 2011 3:25 pm


IN
OUT
IN
OUT
C1
C2
1
2
3
4
5


Nydalen T

Medical incident command and decision making

- Important critical decisions made in the early phase, under significant uncertainty and time pressure

- Decision-making must be dynamic and flexible

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ORIGINAL RESEARCH **Open Access**

A retrospective observational study of medical incident command and decision-making in the 2011 Oslo bombing

Rune Rimstad[1,2,3*] and Stephen JM Sollid[1,4,5]

Abstract

Background: A core task for commanders in charge of an emergency response operation is to make decisions. The purposes of the study were to describe what critical decisions the ambulance commander and the medical commander make in a mass casualty incident response and to explore what the underlying conditions affecting decision-making are. The study was conducted in the context of the 2011 government district terrorist bombing in Norway.

Methods: The study was a retrospective, descriptive observational study collecting data through participating observation, semi-structured interviews, and recordings of emergency medical services' radio communications. Analysis was conducted using systematic text condensation. The ambulance commander was interviewed using the critical decision method.

Results: The medical emergency response lasted 6.5 h, with little clinical activity after 2 h. Most critical decisions were made within the first 30 min, with the ambulance commander making the bulk of decisions. Situation assessment and underlying uncertainties strongly affected decision-making, but there was a mutual interaction between these three factors that developed throughout the different stages of the operation. Knowledge and experience were major determinants of how easily commanders picked up sensory cues and translated them into situation assessments. The number and magnitude of uncertainties were largest in the development stage, after most of the critical decisions had been made.

Conclusions: In the studied mass casualty incident, the commanders made most critical decisions in the early stages of the emergency response when resources did not meet demand. Decisions were made under significant uncertainty and time pressure. Ambulance and medical commanders should be prepared to make situation assessments and decisions early and be ready to adjust as uncertainties are reduced.

Keywords: Decision-making; Emergency medical services; Emergency medicine; Leadership; Mass casualty incidents; Observational study; Risk management

Background

Commanders are the individuals appointed to be in charge of an emergency response operation. A core task for commanders is to make decisions [1-3]. Narratives and analyses of mass casualty incidents will typically not contain detailed descriptions of what decisions the commanders made. Based on a previously published case description of the 2011 Oslo bombing, the aim of this study was to probe deeper into the actions of the commanders to contribute to the empirical knowledge base on incident command and decision-making [4]. The research questions are more focused on the 'what' than the 'how': What critical decisions do the ambulance commander and the medical commander make in a mass casualty incident emergency response? What are the underlying conditions affecting decision-making?

In the Norwegian incident command system, a police incident commander provides overall command. The prehospital health resources are jointly commanded by an ambulance commander (emergency medical technician or paramedic), which appoint sub-commanders and organize the incident scene, and a medical

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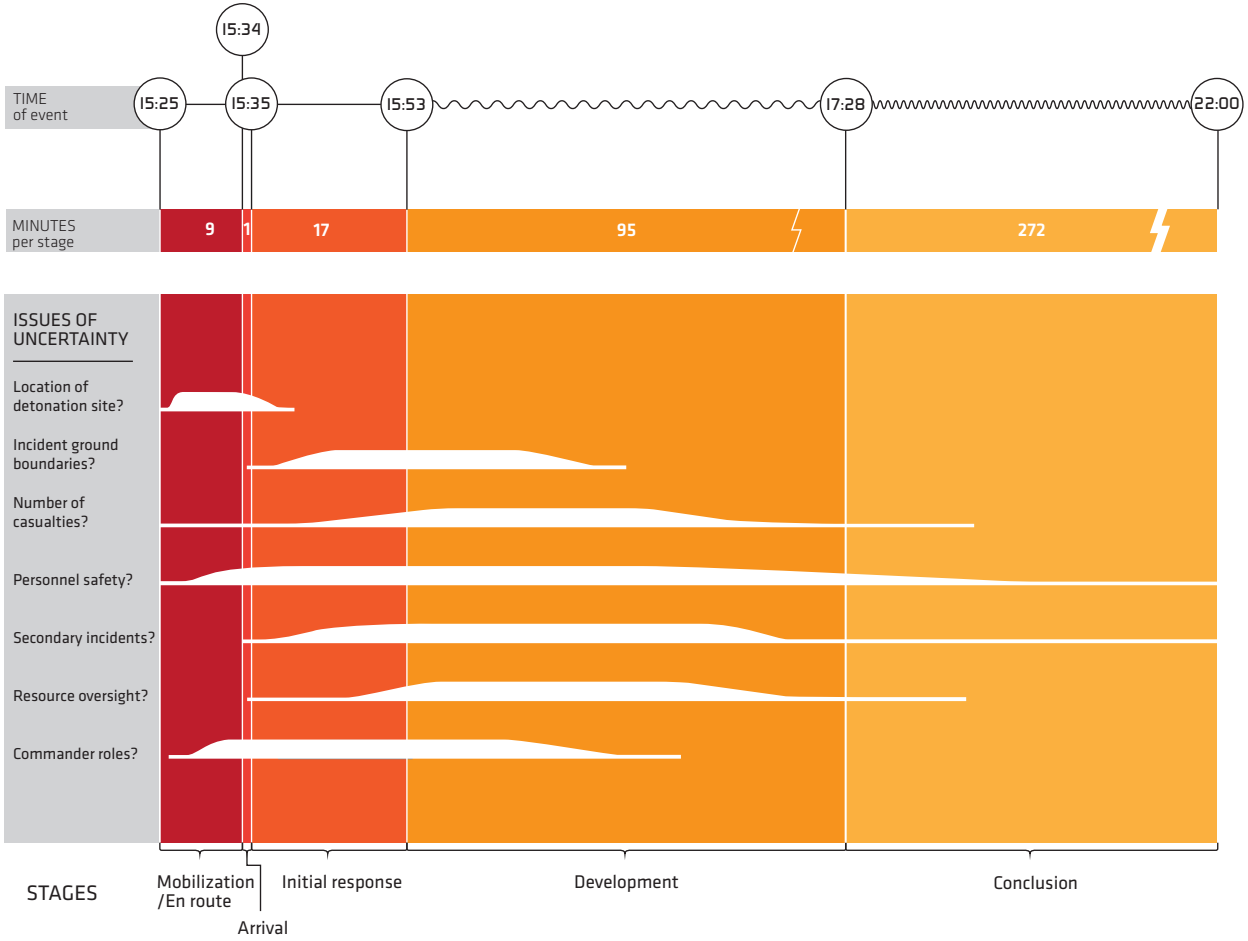

15:34
TIME
of event
15:25
15:35
15:53
17:28
22:00
MINUTES
per stage
9
1
17
95
272
ISSUES OF
UNCERTAINTY
Location of
detonation site?
Incident ground
boundaries?
Number of
casualties?
Personnel safety?
Secondary incidents?
Resource oversight?
Commander roles?
STAGES
Mobilization
/En route
Arrival
Initial response
Development
Conclusion

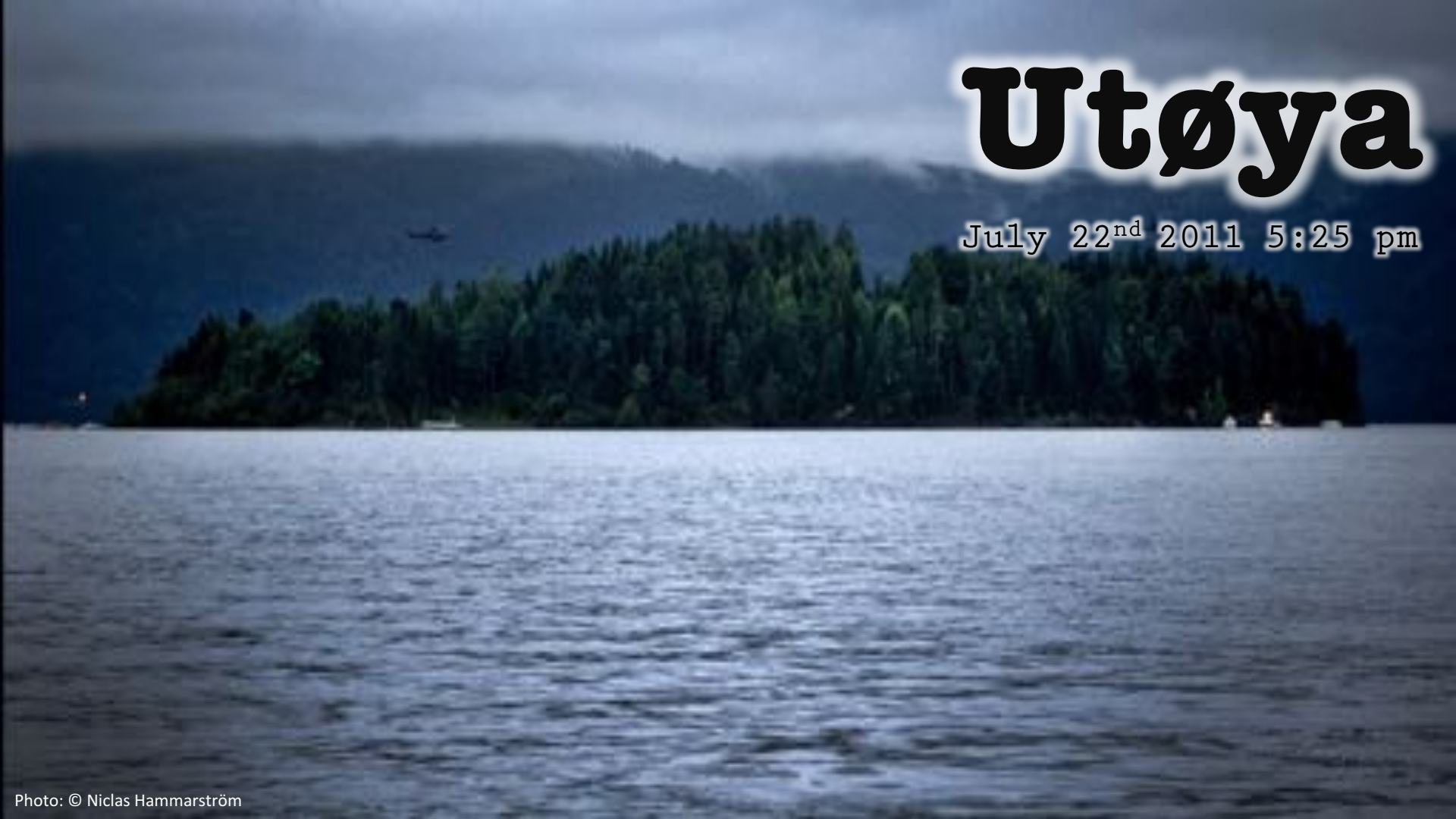


Photo: © Niclas Hammarström


500 m
H1+H2 = Helicopter landing and reloading area
C0 = Improvised casualty clearing station on Utøya Island
C1 = Primary casualty clearing station
C2 = Secondary casualty clearing station
Direction Sundvolden hotel and Ringerike local hospital
H1
H2
C2
Storøya island
Waiting ambulances
Tyrifjorden lake
N
W
E
S
Utøya island
C0
C1
Direction Oslo
Waiting ambulances

Timeline of events

Table 3 Timeline of the EMS response to the Utøya island shooting (estimated points of time in italics)

Event	Time
Reports of shooting at Utøya island reaches Buskerud EMCC	17:24
First ambulance units dispatched by Buskerud EMCC	17:24
First EMS unit arrives near Utøya island	17:33
A major incident declared in VVE.	17:45
VVE hospitals Drammen and Ringerike activate their major incident plan (Asker Bærum already activated their major incident plan following the Oslo bombing)	17:45
Utvika quay briefly declared secure by local police	17:55
First victims arrive on the mainland shores east of Utøya island	18:05
First HEMS unit arrives at deployment site south of Utøya island	18:10
Last HEMS unit arrives at deployment site south of Utøya island	18:25
First organised casualty-clearing station established at Utvika quay	18:50
Second casualty-clearing station established at Storøya	19:05
First EMS personnel arrive at Utøya island	*19:40*
First casualty-clearing station closed	*19:45*
First patient from Utøya island arrives at Oslo University Hospital Ullevål	19:57
Last patient from Utøya island arrives at Oslo University Hospital Ullevål	21:30
Last HEMS unit leaves secondary casualty-clearing station	22:20
Second casualty-clearing station closed	*23:00*

EMCC = Emergency Medical Communication Centre, EMS = Emergency Medical Service, HEMS = Helicopter Emergency Medical Service, VVE = Vestre Viken Health Enterprise

Casualty clearing station 1

Photo: Adrian Øhrn Johansen

Level of care provided

Equipment and tools

Safety challenges

Foto: Adrian Øhrn Johansen

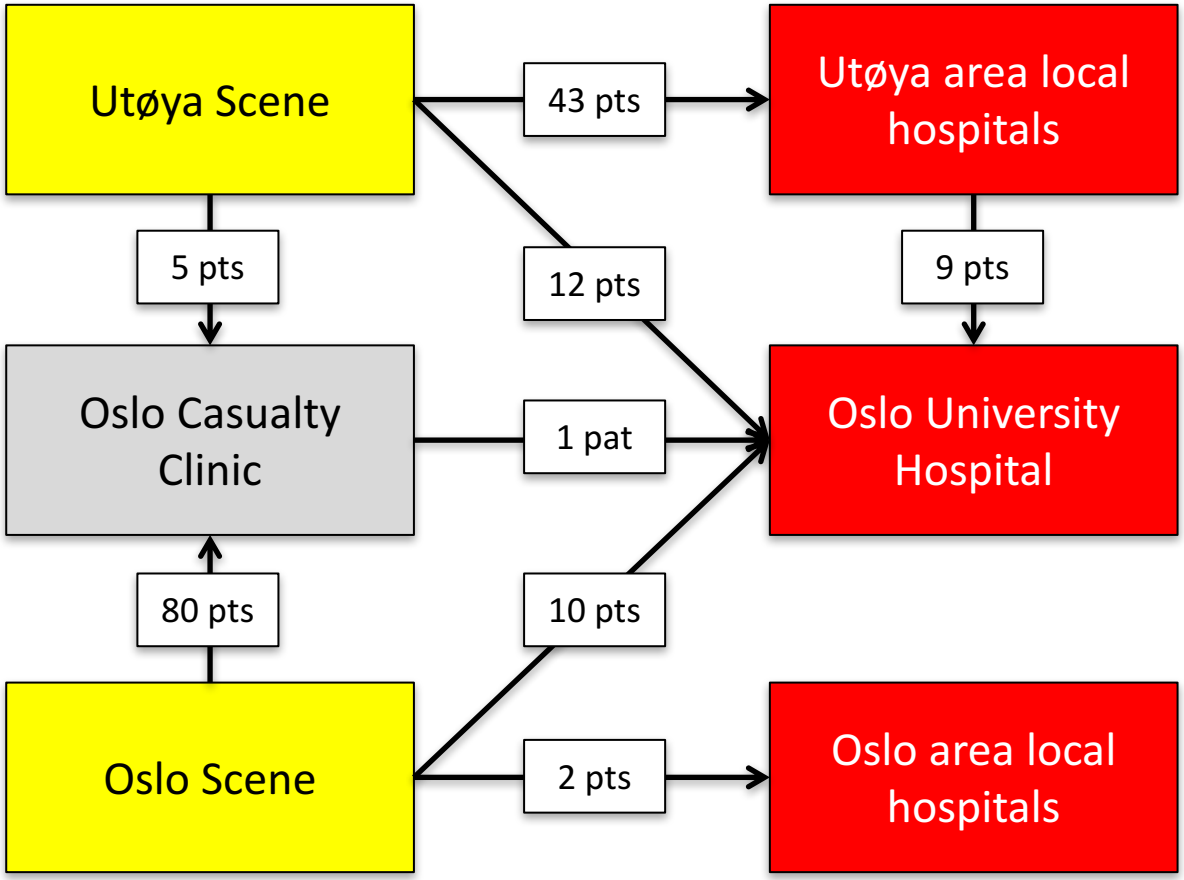
Civilian involvement

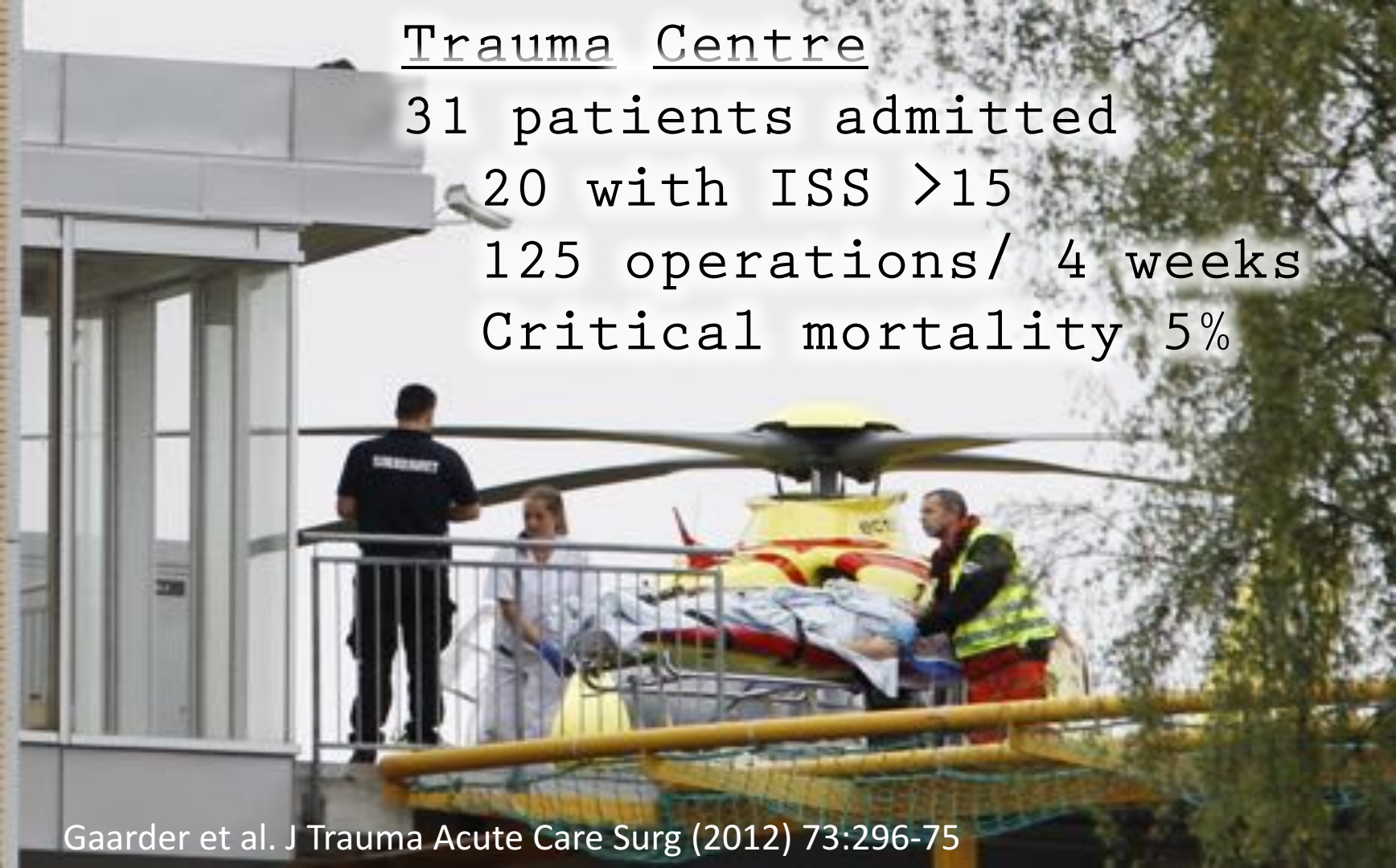
Photo: © Niclas Hammarström

Advanced casualty clearing station

Photo: © Niclas Hammarström

Casualty clearing station 2


Utøya Scene
43 pts
Utøya area local hospitals
5 pts
12 pts
9 pts
Oslo Casualty Clinic
1 pat
Oslo University Hospital
80 pts
10 pts
Oslo Scene
2 pts
Oslo area local hospitals



Trauma Centre

31 patients admitted

- 20 with ISS >15
- 125 operations/ 4 weeks
- Critical mortality 5%

Gaarder et al. J Trauma Acute Care Surg (2012) 73:296-75

Defusing, debrief and psychological follow up

- Different strategies for EMS personnel and volunteers
- Victims followed up in local communities

Main lessons learned

- Unified triage system needed
- Medical incident command is unclear
- EMS personnel response during on-going violence unclear
- (H)EMS coordination at strategic level absent
- HEMS is a valuable resource
- The redundancy of the EMS system is good
- Trauma Centre redundancy is excellent

What has changed

- National triage system developed
- SOP for EMS response during on-going violence developed
- Description of medical incident command revised
- Regional HEMS coordination established (partially and in progress)

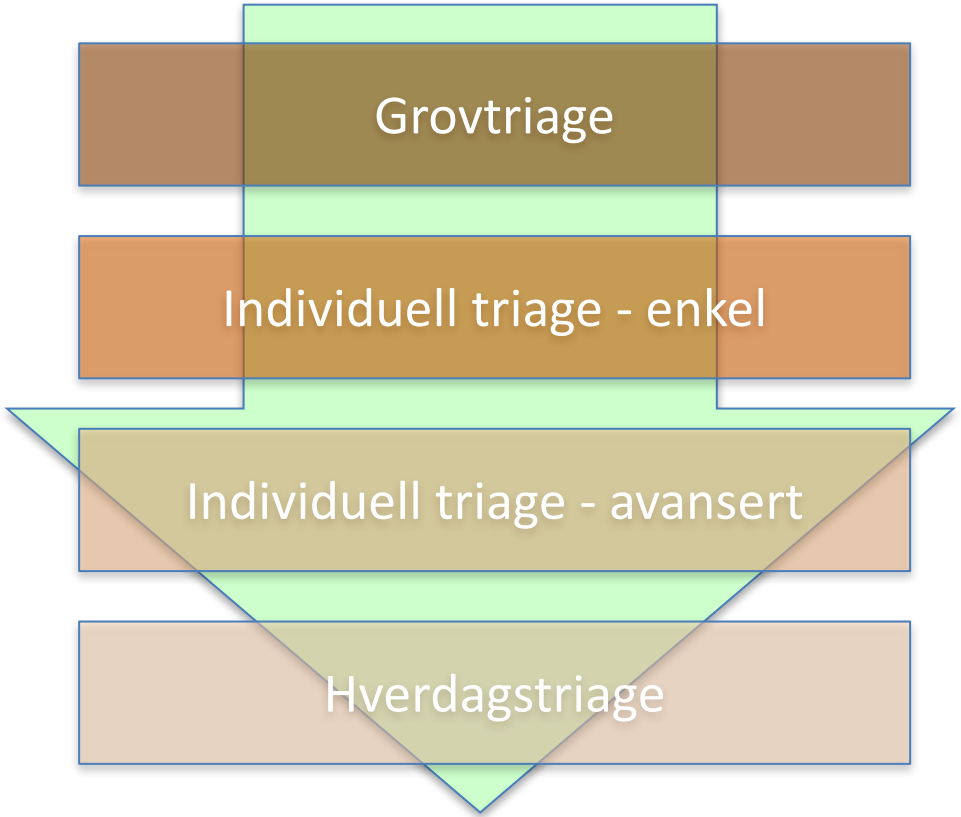
Nasjonal prosedyre for PLIVO

- Vedtatt og etablert
- Kort oppsummert:
  - Helsepersonell kan vurdere egen sikkerhet når politi ikke er tilstede
  - Helsepersonell kan gripe inn ovenfor gjerningsmann I visse tilfeller når politi ikke er tilstede
- Men har helsepersonell kompetanse til dette??
  - Er PLIVO øvelser nok?

Nasjonal veileder for masseskadetriage

- Kun veileder
- Ingen plan for implementering
- Ingen plan for distribuering av nødvendig utstyr for triage

Triage metoder



Figuren illustrerer sammenhengen mellom masseskadetriage og systemer for hverdagstriage som benyttes flere steder i norsk helsevesen.

SKADESTED			TRANSPORT	MOTTAK	TRAUMETEAM
UTILSTREKKELIGE RESSURSER →			TILSTREKKELIGE RESSURSER		
Grovtriage	**Individuell triage i masseskade** - for alle personellgrupper og helsepersonell med lite erfaring	**Individuell triage i masseskade** - for helsepersonell med adekvat akuttmedisinsk erfaring	**Individuell triage i ambulansefartøy**	**Individuell triage i mottak på sykehus / legevakt**	**Presis diagnostikk og behandling**
	Rød Akutt	**Rød** Akutt	**Rød** Akutt	**Rød** Akutt	
	Gul Haster	**Gul** Haster	**Oransje** Truende	**Oransje** Truende	
	Grønn Vanlig	**Grønn** Vanlig	**Gul** Haster	**Gul** Haster	Diagnose (ICD-10) og skårings-systemer (AIS)
	Livløs	**Blå** Avventе	**Grønn** Vanlig	**Grønn** Vanlig	
		Livløs	**Blå** Avventе	**Blå** Avventе	
			Livløs		

Masseskadetriage
Benyttes ved store ulykker og masseskadesituasjoner. Flytskjemaene som anbefales er basert på:

TAS-triage | **SALT-prinsippene**

Hverdagstriage
Kvalitetssystemer som også brukes i ordinær drift i enkelte helseforetak

Felttriage
F.eks RETTS og prehospital MTS

Mottakstriage
F.eks RETTS og MTS

TAS: Tverretatlig Akuttmedisinsk Samarbeid
SALT: Sort, Assess, Lifesaving Interventions, Treatment/Transport
RETTS: Rapid Emergency Triage and Treatment System
MTS: Manchester Triage Scale

Summary

- Patient care at Utøya delayed due to security issues
- Effective triage executed by experienced and trained physicians
- HEMS is an important resource
- Trauma centre has high capacity and should receive all trauma patients


LEGE
AMBULANSE
AMBU