



# Safety in the ambulance Service

- from the patient and the personnel's view

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## What is prehospital emergency care?





## Prehospital Emergency Care



- “Prehospital care consists of the recognition, resuscitation, and stabilisation of the seriously ill and injured, and the deployment of appropriate resources. It extends beyond the preservation of life to the prevention of complications and the relief of suffering” (Brittain, 1996)

## Pre-hospital emergency care

Involved resources




- Road ambulances  
Technicians  
Paramedics  
Ambulance nurses
- the public  
Bystanders
- Medical team  
Physicians  
Nurses
- The fire brigade
- Unified alarm centre
- Police
- Military force
- Helicopter ambulances  
Paramedics  
Ambulance nurses  
Emergency physicians

## Pre-hospital emergency care

Experience at the scene


- Complicated
- Social strain
- Physical strain
- Repulsive
- A mental strain
- Threatening
- New environment
- New situation
- Work alone
- Frustration
- Dramatic



## Pre-hospital emergency care

What kind of knowledge and skills are needed?

- ALS knowledge
- Co-operation
- “all-round” competence
- Pre-hospital and hospital experience
- Leadership at all levels
- Initiate and perform research
- Broad knowledge
- Supervise new colleges
- Psychological support
- Medical technical procedures



(Suserud & Haljamae, 1998, 1999)

### The chain of prehospital care (Spaite et al,1995)

Event	Call received	Alarm	Arrival at Scene	Arrival at Patient	Begin Intervention	First Moving Patient	Begin Moving Patient	Leave Scene	Arrive Hospital	Care Transferred	Back in Service
Notification Interval	Activation Interval	Response Interval	Patient Access Interval	Initial Assessment Interval	Patient Removal Interval	Scene Treatment Interval	Transport Interval	Delivery Interval	Recovery Interval		

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### The Dispatch Centre – some of the tasks

- Phone number 112
- Answer and act on emergency calls from the public
- Alert and direct the ambulance service
- Alert and direct the Fire Brigade

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### The Assessment process - phases

- ▶ Identify – what kind of mission – an emergency ambulance mission?
- ▶ Sort: Level of priority
- ▶ Activate:
  - ▶ chose recourse
  - ▶ activate the ambulance
  - ▶ give advice to the caller while waiting

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### The priority levels for ambulance response

**Priority 1**  
Emergency, life-threatening conditions

**Priority 2**  
Urgent but not life-threatening conditions,  
(where the ambulance is supposed to arrive within 30 minutes)

**Priority 3**  
Non-life-threatening, not urgent conditions,  
(where the time aspect is adjusted to enable the optimal use of the ambulances)

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### Prehospital competence

- **Ambulance nurse**
  - Registered nurse (3-year programme)
  - Specialist Education in Prehospital Emergency Care (Advanced level)

**Note:**  
All emergency ambulances are staffed with at least one ambulance nurse – medical responsible team member

- **Ambulance paramedic**
  - Nurse Assistant
  - 1-year course in Prehospital Emergency care (Basic level)

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### What is professional competence in pre-hospital emergency care?

- Competent practitioners are described as those who demonstrate *good clinical care*, *maintain good medical practise*, are professional in their *relationship with patients and colleagues*, apply themselves properly to *teaching and training*, are honest, are aware of their own *health needs...* (Clements & Mackenzie, 2005)

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**Who are the patients in prehospital emergency care?**



**Table 1.** Distribution of ambulance missions during time of day, patients age and the registration of the caller to the dispatch centre in relation to geographic area

	Urban (%)	Suburban (%)	Rural (%)	Remote rural (%)
<b>Time of day</b>				
6.am-6.pm	59	59	60	62
6.pm-12.pm	28	28	28	24
12.pm-6.am	13	13	12	14
<b>Age distribution</b>				
<16	4	4	7	3
17-44	22	17	16	13
45-65	22	20	22	26
66-80	27	31	30	36
>81	25	28	25	22
<b>Who made the request for ambulance?</b>				
Patients themselves	18	11	10	11
Another person in family	37	33	29	29
Medical personnel	21	21	31	32
Municipal social sector personnel	7	17	14	10
Bystander	17	18	16	13

(Beillon, Suserud, Herlitz & Karlberg, 2007 - 2009)

**Table 4.** Distribution of high priority missions according to cause in geographic areas.

Cause	Urban (n=246)	Suburban (n=100)	Rural (n=245)	Remote rural (n=53)
Chest pain	20%	22%	24%	26%
Trauma	24%	21%	24%	23%
Unconsciousness	11%	17%	14%	11%
Breathing problems	13%	13%	10%	6%

(Beillon, Suserud, Herlitz & Karlberg, 2007 - 2009)

**Table 5.** Patients age and needs for ambulance transport as assessed by the ambulance crew in relation to geographic areas.

Patients age	Fraction of patients with needs within age groups in geographic areas			
	Urban (%)	Suburban (%)	Rural (%)	Remote rural (%)
<16	74	88	83	100
17-44	62	73	80	88
45-65	54	65	74	85
66-80	63	72	75	84
> 81	61	65	79	82

(Beillon, Suserud, Herlitz & Karlberg, 2007 - 2009)

**Table 3.** The assessment of initial priority by the operators at the emergency medical dispatch centre, cross-tabulated with the ambulance staff assessment of appropriate initial priority for ambulance response.

The emergency dispatch operators' assessment of priority level	The ambulance staff assessment of appropriate initial priority level				
	Prio 1 (n=440)	Prio 2 (n=342)	Prio3 (n=694)	Prio 4 (n=210)	Total (n=1886)
Priority level 1 (n=567)	69%	20%	9%	2%	30%
Priority level 2 (n=742)	6%	55%	34%	5%	39%
Priority level 3 (n=577)	1%	4%	68%	27%	31%
<b>Total</b>	<b>23%</b>	<b>29%</b>	<b>37%</b>	<b>11%</b>	

(Beillon, Suserud, Herlitz & Karlberg, 2007 - 2009)

**Giving safe care and treatment in the ambulance**



- The ambulance personnel's task is to give care from the result of the assessment
- What kind of symptom?
- What kind of needs?
- How fast must I transport/drive the patient to the hospital?

### What we wanted to know:

What is it like to provide care in the pre-hospital environment?

What is the nature of the meeting between the patient and the ambulance crew?

An qualitative interview studies with experienced ambulance nurses



### Studies on assessment and hand-over

- Suserud, B-O., Bruce, K., Dahlberg, K. (2003). Initial assessment in ambulance nursing – part one. *Emergency Nurse*, 10(10), 13-17.
- Suserud, B-O., Bruce, K., Dahlberg, K. (2003). Ambulance nursing- The nurse assessment –part two. *Emergency Nurse*, 11(1), 14-18.
- Suserud, B-O., Bruce, K. (2003). Ambulance Nursing. Part three. *Emergency Nurse*, 11(2), 16-21.
- Bruce, K., Suserud, B-O. (2005). The hand-over process and triage of ambulance-borne patients: the experience of emergency nurses. *Nursing in Critical Care*, 10(4), 201-209.
- Suserud, B-O. (2005). A new profession in the pre-hospital care field – the ambulance nurse. *Nursing in Critical Care*, 10(6), 269-271.
- Ahl, C., Hjalte, L., Johansson, C., Wireklint-Sundström, B., Jonsson, A., Suserud, B-O. (2005). Culture and care in the Swedish ambulance services. *Emergency Nurse*, 13(8), 30-36.



### Experience of assessment on the site

### Results

- Respect for a patient's integrity is to **respect the patient's specific culture.**
- The **primary and secondary assessments** follow a set pattern for the patient's vital functions.
- **Keeping a necessary distance.**



### Results

- The ambulance nurse emphasis the importance of doing **an overall assessment** made on the spot, with the aim of forming a **comprehensive picture** of the scene.
- Using the available clues **to the patient's medical condition.**
- A pause for reflection **may prove decisive, before the action can began.**

### Results

- **Less planning for alarm calls that seem routine**
  - secure in her professionalism.
- **Unusually serious and not routine.**
  - a stage of conscious planning. The nurse tries to think herself into the context, the scenario.
- **The importance of an open approach**
- **Capture the situation at a glance**



## Groups of patients

**Complete trust** - is the most dominant in number:

*"I'm in the habit of saying that you can mishandle a patient and still get credit for it when you get to the hospital".*

**Patients who question** - have many questions and want everything explained and then they question.

**Unwanted patients** - is extremely unusual but is described as existing in present-day ambulance health care service.

### • Team relation stronger than the patient relation

- Two roles one drives and one is responsible for the caring. Roles are strictly defined prior to every mission.
- This strong relation could in some situations lead to that they "rather let the patient suffer".

## Non-caring situations

What may be described as non-caring is when the focus on the patient disappears and the caregiver is bereft of empathy in the encounter with the patient. Situations as:

- When caregivers believe that the patient's condition is self-inflicted
- Patients who misuse the services of ambulances
- When caregivers are met disrespectfully and when their professionalism is questioned
- Threats and violence against themselves or for example. wife-assault

## Peplau - a matching theory

- Orientation
- Identification
- Access
- Ending



Phase in a caring relation

(Peplau, 1991; Dahlberg et al., 2003)

## The hand-over to receiving care facility?

- Explicit care needs – straight on to care and treatment
- Non-explicit care needs – the necessity of making a diagnosis
- A wrong diagnosis can be enduring
- Communicating the patient's need for care to the receiving unit



- The symbolic hand-over
- The ideal hand-over
- The experienced assessment: putting pieces of the puzzle together
- The non-ideal hand-over
- Lack of resources complicates reception

## Safety in the ambulance service



## Safety in the ambulance service

- Laws about traffic rules
- The ambulance driver can disregard those laws under certain circumstances
- Studies shows marginal shorter time (43.5 – 106 second, depending on distance (Hunt et al., 1995, Brown et al., 2000, Petzäll, 2009)

## Safety in the ambulance service

- The patients blood pressure, pulse, breathing - increase during high speed transport (Kahn et al, 2001)
- Unbelted personnel – high risk of injure the patient and him/her self (Maguire et al., 2002)
- If involved in an accident treatment and arrival to the hospital - be delayed
- Light and sirens – stresses other road user, the ambulance can cause accident without being directly involved

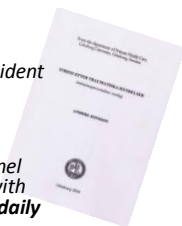
## Physical/mental related problems

- A mental and physical demanding work and workplace
- Health problems can occur
- Risk of:
  - Post-traumatic stress
  - Burnout
  - Depression and anxiety
  - Medical impairment
  - Early retirement

(Sterud, Ekeberg, Hem, 2006; Petzäll, 2009)

### STRESS AFTER TRAUMATIC EVENTS – A part of the daily work for ambulance personnel (2004)

- **Conclusions:** *The mental health and emotional well being of ambulance personnel appears to be at risk in accident and emergency work.*
- *The high prevalence of PTSD (12-15%) symptoms in ambulance personnel indicates a normal inability to cope with posttraumatic stress caused by their daily work.*



## Physical/mental related problems

- Somatic health problems as:
  - Lower back problems
  - Problems with neck, shoulder and knee
  - Headache
  - Stomach problems
  - Sleeping problems
  - High blood pressure
  - Hepatitis
  - A slighter higher mortality rate (reported in some studies)



## Prehospital care and traffic safety

(Petzäll K., Johansson, A., Jonsson, A., Suserud, B-O, 2009)

## Aim

- Investigate the experience of giving care during an ambulance transport
- With focus on:
  - Caring activities
  - Accessibility of equipment
  - Improvements
  - Traffic safety
  - Driving styles

## Method (first steps)

- Focus group interviews
- Analyse and log of priority 1 missions
- How much differ light and sirens from ordinary driving (under equal circumstances) ?

## Some results

- If seated – problems with accessibility of important equipment
- They try to plan and organise what do they need, before starting the transport
- Equipment not always adapted to use in an ambulance – assembled in afterwards
  - Goes for both the patient compartment and the driver's cab
- Movable equipment
- As syringes, cannulas, ampoules and other single use equipment
- Patient often more safe then the ambulance personnel

## Some results

- Difficulties to satisfied the need for all groups of patients during the transport, especially on some priority 1 missions
- Hard surfaces – close to the carer
- Noisy environment – not easy to communicate with the patient
- Noisy environment in driver's cabin when driving with light and sirens
- Different driving styles - affect both the patient and the carer (travel-sick, unsafe)
- Communication driver – carer during transport
- The traffic environment – more complicated and stressed today than for some years ago

## Suggestions for improvement

- A bigger patient compartment in the ambulance
- Equipment placed nearer the carer
- More compact equipment
- A better chair for the carer in the cabin (Comfort, back support and move ability)
- A hazard flashers in the drivers cabin, indicating when the carer are unbelted
- Communication with headset (driver, carer and the patient)
- Wireless (cordless) equipment
- Better sound insulation

## The importance's of safe equipment



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## Ambulance stretchers – adverse events

(Wang, Weaver, Abo, Kaliappan, Faribanks, 2009)

- Investigated 671 reports from year 1996 - 2005

Adverse event	N (%)
Collapsed stretcher	360 (54)
Broken, missing or malfunctioning part	189 (28)
Dropped stretcher or non-specified patient fall	48 (7)
Tipped stretcher	30 (4)
Isolated rescuer injury during stretcher operation	13 (2)
Failure of stretcher fastening system	4 (1)
Unknown	27 (4)
<b>Total</b>	<b>671</b>

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## Ambulance stretchers – adverse events

(Wang, Weaver, Abo, Kaliappan, Faribanks, 2009)

- Injuries from ambulance stretchers

Type of injury	Patients	Ambulance personnel	Other <sup>1</sup>	N (%)
Strain/sprain	3	35	0	38 (29)
Fracture	12	9	0	21 (16)
Laceration/avulsion	12	4	1	17 (13)
Contusion/abrasion	2	2	0	4 (4)
Death	3	0	0	3 (3)
Traumatic brain injury	1	1	1	3 (3)
Other injury	5	4	0	9 (7)
Unknown	12	16	7	35 (27)
<b>Total</b>	<b>50 (38)</b>	<b>71 (54)</b>	<b>9 (7)</b>	<b>130</b>

<sup>1</sup> family members, nurses

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## Ambulance stretchers – adverse events

(Wang, Weaver, Abo, Kaliappan, Faribanks, 2009)

Method of stretcher handling at the time of event	N (%)
Unloaded stretcher from the ambulance	108 (16)
Moving stretcher	28 (4)
Adjusting stretcher height	21 (3)
Transferring patient on/off stretcher	18 (3)
Loading stretcher onto ambulance	17 (3)
Lifting stretcher	7 (1)
Transporting stretcher in ambulance	5 (1)
Unknown	467 (70)
<b>Total</b>	<b>671</b>

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## The patients safety and comfort



- Suserud, B-O., Jonsson, A., Backlund, A., Hagiwara, M., (2009). Patients' comfort in prehospital emergency care, *Prehospital and Disaster Medicine*, 24(2), S 10.

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## Comfort and safety

- The comfort, warmth, feelings of safety and preservation of dignity is important for all patients in the ambulance service.
- The study deals with patients' well-being and the concept of comfort during the transport to the emergency department.
- In the Swedish ambulance service, today's routine requires use of blankets for all patients who are transported on an ambulance stretcher.



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### Comfort and safety

- One task for the ambulance staff is to prevent patients' negative experience as feelings of discomfort, insecurity and risk for hypothermia.
- Does the new equipment, the rescue bag increase patients' comfort?
- Does the patient feel any difference between the new equipment and the traditional blankets?



### Comfort and safety

- The first pilot study investigates the ambulance patients' view of comfort.
- The quantitative study is carried out in a test group (n=46) and a control group (n=48), randomly selected ambulance missions.
- For the intervention in the test group, new developed equipment, rescue bag were used.
- The ordinary ambulance blankets were used in the control group.



### Comfort and safety – the intervention group

Instrument built upon a Likert scale with statements as:

- + My convenience and comfort was good
- + My integrity and dignity were maintain
- + My body temperature was reasonable
- + I felt safe
- + The ambulance personnel could examine me easy
- + I felt convenience when the moved me to the ambulance
- + Other experience?

### Comfort and safety

- Results The study shows that patients are more satisfied with the rescue bag than the ordinary blankets, especially when the pick up point is in the terrain.
- Conclusion The transport of patient in a rescue bag offers more comfort and is a safer way of transporting the patient in the ambulance service.

### Decision support in prehospital emergency care - a better and safer assessment?

### When the patient experience a need of acute care

1. The dispatcher decide – is there a need of an ambulance for the patient? Listen – analyse – judgement
2. The ambulance service makes the assessment on site through an encounter with the patient
3. What kind of support could be available for the ambulance personnel?

## Aim

- to develop and evaluated two computer-based decision support - for the dispatch centre and the ambulance service - which can result increasing the security of the prehospital assessment.
- to achieve improved evidence for prehospital assessment and thereby enhancing patient safety.

## Decision support – Dispatch centre

1. Evaluation / review records of patients with chest pain which is the basis for a statistical model and the development of a new decision support for emergency and,
2. an intervention in the emergency with the project's new decision support. Components in relation to ambulance care includes;
3. meta-analysis of available research and,
4. a content analysis of experience-based assessment after interviews with experienced ambulance nurses,
5. an experimental study in which the ambulance nurses evaluate the new decision support developed in an IT-platform integrated into the ambulance documentation system,
6. clinical trials on regular in the ambulance service.

## What is patient safety?

Actions undertaken by health care personnel and their organisation to protect the patient from being harmed by the effect of the delivered health care service.

(SOU 2008:117)

## How to do it?

- Organised systems
- Structured caring processes
- Competence reviews of each individual
- Clinical practice - professional standards
- Quality improvement



## Factors in general

- Critical factors often mention:
  - Inattention
  - Memory lapse
  - Failure to communicate
  - Poorly designed equipment
  - Exhaustion
  - Ignorance
  - Noisy working conditions
  - A number of other personal and environmental factors

## Critical factors - medication

- Action – and distraction
- Problems with communication failure
- Inadequate or not proper labelling
- Important information not given to carer
- Competency of staff competency
- Lack of training
- Medication problem access and storage
- Supervision

## How to improve the safety?

- Read research studies
- Use recommendations made by external groups
- Documentation of patient incidents
- Share ideas of safety improvement



## Conclusions

- In most cases the patient feel secure in the hands of ambulance personnel
- Problems can arise, depending on personal or environmental circumstances
- What is good for the patient is also good for the ambulance personnel's working environment and their own health