PreHospen Conference 2016

Where all care begins

7th PreHospen Conference in Prehospital Emergency Care

10-11 March 2016

PreHospen – Centre for Prehospital Research
University of Borås
Borås, Sweden
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Greetings and Conference Goals

PreHospen Conference 2016 – Where all care begins

Welcome to the 7th PreHospen Conference in Prehospital Emergency Care at the University of Borås, 10-11 March, and to the Pre-Congress Workshop 9 March!

We are happy to welcome you to Western Sweden and the University of Borås for PreHospen 2016. Our goal is to stimulate knowledge development within dispatch, medical information provision, ambulance emergency care, emergency rooms, and primary and regional healthcare. Moreover, we offer opportunities to make new contacts, or maintain established ones, for professionals and researchers.

All who work in some way with, or are affected by, prehospital emergency care are welcome. There will be something of interest for all conference participants regardless of previous experience or which profession you represent.

About PreHospen – Centre for Prehospital Research

PreHospen is a strong national and international knowledge resource at the University of Borås. PreHospen is a leading prehospital research centre for issues and knowledge needs within prehospital emergency healthcare.

Research is conducted in national and international collaboration at PreHospen. The integration of both research and clinical practice makes PreHospen a unique asset for researchers and doctoral students as well as professionals. Interdisciplinary research is conducted that integrates caring sciences, medicine, medical technology, and technology related to dispatch centres, ambulance emergency care, emergency rooms, and primary and regional healthcare. The goal is to increase knowledge development within the prehospital area so that the early care of ill, injured, and suffering people can be improved.

PreHospen's research and development projects are divided into eight areas:

- Patient safety
- Ambulance and other registries
- Patients’ and relatives’ experiences
- Prehospital assessment for accurate care
- Prehospital emergency care and treatment
- Ambulance staff’s work environment
- Care in war settings
- Leadership and education
About the University of Borås

The University of Borås has approximately 13,000 students and 700 employees. In collaboration with the public and private sectors, we conduct education and research of high international quality with great societal relevance. We are a modern university with a campus in the centre of the city.

The national and internationally known Swedish School of Textiles and Swedish School of Library and Information Science are a part of the University of Borås; both host educational programmes and researchers.

Attractive educational programmes

Several of our educational programmes are only available at our institution and therefore attract students from all over Sweden.

The university offers courses and study programmes within the areas of:

- Library and Information Science
- Business and IT
- Pedagogy
- Technology and Engineering
- Textile and Fashion
- Caring Science

Research that changes society

- Library and Information Science
- Business and IT
- The Human Perspective in Care
- Teacher Education Programmes and Pedagogic Environments
- Resource Recovery
- Textile and Fashion

We are entitled to award doctoral degrees within Library and Information Science, Resource Recovery, and Textiles and Fashion (design and general).
About the City of Borås

Borås is a city in southwestern Sweden located approximately 60 kilometres east of Gothenburg, Sweden’s second largest city.

Borås has a population of around 100,000 inhabitants. Western Sweden’s main international airport is within easy access of Borås and there are many train and bus connections linking Borås with destinations all over Sweden and Europe.

Borås is sometimes referred to as the textile capital of Sweden. The city became the centre for Sweden’s textile industry several hundred years ago. These days, however, most manufacturing has moved abroad, but Borås remains the centre for textile design in Sweden. Many of Sweden’s leading fashion and textile companies are based in and around Borås and the Swedish School of Textiles leads the way in textile research and education.

In recent years, Borås has also earned a reputation as the sculpture capital of Sweden. There are sculptures by renowned Swedish and international artists placed all over the city. The largest attraction, literally, is the nine-metre-tall sculpture of Pinocchio by American artist Jim Dine.

The city centre is vibrant with plenty of shops, cafés, and restaurants. Everything you need is within walking distance. Borås is a multicultural city with a large immigrant community. This is particularly evident in the number of restaurants serving food from other parts of the world.

Those who are interested in sports can find a lot in Borås. The area around ‘Knalleland’ has numerous athletic facilities including the Borås Arena, built in 2005. The arena is home to the football club Elfsborg, champions of the top Swedish league in 2012, and is also a venue for concerts and other events.

If you prefer the countryside, you’re in luck. A short bus or cycle ride from the city centre you will find forests, lakes, and large areas of farmland. In short, it can be said that Borås offers the best of both city and country life and its proximity to one of the largest cities in Scandinavia makes it an ideal place to live and study.


**Transportation and Taxis**

Borås Central Station has frequent bus and train connections and is located a lovely 8-9 minute walk from campus at Stationsgatan 16. Taxis are available via MyCab at +46 (0) 771-555 666.

**Registration**

The registration desk will be open the mornings of both conference days, 10-11 March. Name badges will be provided at the Registration Desk and all participants are kindly requested to wear the badge throughout the conference.

**Conference Venue, Maps, and Directions**

The campus of the University of Borås is comprised of four buildings that are gathered at a central meeting point at the intersection of Allégatan and Järnvägsgatan in Borås, Sweden. Each room has a name composed of a letter and number combination. The letter indicates which building or building wing the room is in and the first of the three numbers indicates which floor the room is on. The floor that is at street-level is always the second floor. The map indicates the locations of the rooms and events planned for the conference. Gathering places in case of fire are also indicated as well as the location of the Registration Desk and the luggage room, where guests can store their belongings.

**Directions to Gala Dinner, Thursday, 10 March**

The Gala Dinner will be held at 19:30 at Quality Hotel Grand, Hallbergplatsen 2, Borås, a lovely 800-metre walk through the centre of Borås City.

1. Head south on Allégatan towards the city.
2. Continue across the square down Österlänggatan until you reach Lilla Brugatan. Turn right and enjoy one of the city’s main shopping avenues.
3. Continue across the square down Österlänggatan until you reach Lilla Brugatan. Turn right and enjoy one of the city’s main shopping avenues.
4. You can continue down this street until you reach the Quality Hotel Grand on your left, or instead turn left onto Lilla Kyrkogatan until you come to the River Viskan, across which you can see the City Park. Turn right and follow the river until you reach the hotel on your right.

**Emergency**

In case of emergency, please dial 112.

**For other urgent matters:**

Please see the Registration Desk. You can also contact Eva Medin at +46 (0) 762 164 228, eva.medin@hb.se

**Internet access/WiFi**

Information about Internet access can be received at the Registration Desk.

**Meals**

Lunch and refreshments are included in the registration fee. Lunches will be held in the Green Dining Room in the Balder Building across the street from Akademiplatsen.

**Information for Presenters**

Presenters are kindly asked to upload their PowerPoint presentations or other media at least 15 minutes before the afternoon parallel sessions commence. The ‘Presenters’ Room’ for preparation can be found across from H302.

Conference abstracts will be published at http://hb.diva-portal.org/ under ‘Prehospen2016’.

**Luggage and Belongings**

You may store any belongings in the luggage room but the conference and the University of Borås take no responsibility for items lost.

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**Textbook in Prehospital Emergency Care**

The full conference package includes the newly released revised second edition of the Swedish-language textbook Prehospital Emergency Care. The book illuminates prehospital emergency care from a medical and caring science perspective. This new edition has been substantively revised; in addition, new areas have been added. The book addresses, among other things, the issue of the prehospital care environment, the continuum of care, the care process, documentation, prehospital medical technology, the optimal level of care and care continuum, and care programmes for various pre-hospital events. Care programmes are based, as a rule, on a patient case as followed by the patient’s or caregiver’s retelling. This is then the basis for a medical and caring science analysis of prehospital care. A number of researchers and other experts in the field are co-authors of the book. Prehospital Emergency Care is primarily intended for specialist education in prehospital emergency care, but should be of great value to all personnel involved in prehospital care.

Book orders can be made during the conference.

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Akademiplatsen 1, Borås. Latecomers to Sparbankssalen are kindly asked to enter one floor up via the door marked M202.
### Activities

You do not need to register for these activities – just show up! There is limited space for the tours and yoga, so first come, first served!

These activities are free of charge to participants who are wearing their conference badges.

**Thursday, 10 March**

Join us for a **Guided Tour of Textile Fashion Center** from 16:45-17:30. The meeting place for the tour is the Registration Desk.

Socialise with colleagues and friends and make new contacts at the **Meet and Greet event** outside Sparbankssalen at 17:30.

All delegates who have registered for the two-day conference package or who have pre-arranged to attend are welcome to the **Gala Dinner with Live Music at Quality Hotel Grand at 19:30**.

The entertainment will be provided by the Ambulance Band (Ambulansbandet). This band has been together for 12 years and is composed of firefighters and ambulance staff from Borås.

**Friday, 11 March**

**Morning Yoga at 7:00-7:50 at Scandic Plaza Hotel.**

Ashtanga is a dynamic form of yoga with focus on Breathing, Movement, and Energy.

The class will begin with sun salutations and then move on to standing exercises that focus on breathing. We will end with sitting exercises, reflection, relaxation, and rest. No previous experience is required. Our advice: shower before the session and wear comfortable clothes (there is no need for special attire). Enjoy your breakfast after the yoga class. Fredrik Salevik från usyoga in Borås will lead the class. Welcome!

**A Guided Sculpture and Mural Tour of Borås** including a street art outdoor gallery from the show No Limit will be held from 11:15-12:00. The meeting place for the tour is the Registration Desk.

In recent years, the city of Borås has acquired the nickname of ‘the Sculpture city’. It is easy to understand why as you walk around the city centre; it is adorned with an unusually large number of sculptures by renowned artists.
## Conference Themes

### The dispatch centre’s impossible task

**Moderators:** Björn-Ove Suserud and Leif Sandsjö

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### Value-based healthcare – value for whom?

**Moderators:** Henrik Andersson and Kristina Lundberg

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<th>Henrik Andersson</th>
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### Early assessments, decisions, and treatments

**Moderators:** Angela Bång and Christer Axelsson

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<td><a href="mailto:christer.axelsson@hb.se">christer.axelsson@hb.se</a></td>
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### Prehospital care – different professional roles

**Moderators:** Anders Bremer and Agnes Olander

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### Prehospital eHealth

**Moderators:** Hanna Maurin Söderholm and Leif Sandsjö

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### Healthcare in crisis and war/catastrophe healthcare

**Moderator:** Lars Lundberg

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### Sustainable change and ambulance healthcare’s work environment

**Moderator:** Anders Jonsson

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### Posters

**Moderators:** Henrik Andersson and Mats Holmberg

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The Conference Programme for Thursday, 10 March:

08.00 - 09.30: Registration/Exhibitions Open

09.30: Welcome & Opening - Lotta Dalheim Englund, Dean of Faculty and Björn Brorström, Vice-Chancellor, University of Borås

10.30: Refeshment Pause

11.00: Using Electronic Routine Linked Health Records in HTA of Interventions in Emergency Care - Inger Ekman

12.00: Lunch in the Green Dining Room, Posters, and Exhibitions

13.15: Group Photographs

13.30: The dispatch centre’s impossible task - branches: Björn-Ove Suserud & Lef Sandsjö Room: M402

13.45: Telephone Assessments of Care Needs - Anna Carin Wahlberg

13.50: Challenges in Doing the Acute Flow at the Emergency Operations Centre: Managing Medical Emergency Calls - Karl Hedman

14.10: Communication and protocol compliance and their relation to the quality of cardiopulmonary resuscitation (CPR): A mixed-methods study of simulated telephone-assisted CPR. - Helena Nord-Ljungquist

14.20: Send Me an Ambulance or I Will Report You – Interviews with Ambulance Managers of their Ambulance Clinicians - Boose Ek

14.30: The Ambulance to the Emergency Medical Communication Centre (EMCC) - Katarina Bohm

14.40: Feedback of Estimated States and Seriousness from Nurses at an Emergency Medical Dispatch Centre - Anna Abelsson

14.50: The Role of Vmer São José in Portuguese EMS: “Green-Way” After Accidental Profound Hypothermia (13.8°C) and Drowning - Tiago Amaral

15.15: Refreshments, Exhibitions, and Posters

15.45: Johan Herlitz Symposium - Room: Sparbankssalen

16.30: Meet and Greet and Exhibitions

17.30: Gala Dinner with Live Music, Quality Hotel Grand

The programme will also be available online at www.hb.se/en/Research/Research-at-the-University/PreHospen-Conference-2016/Programme/
## Conference Programme  Friday, 11 March

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<th>Time</th>
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<tr>
<td>08.00</td>
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| 09.00 | **MODERATORS:** Angela Bång & Johan Herlitz  
Lars Lundberg: Summary of the Pre-Congress Workshop | SPARBANKSSALEN                   |
| 09.15 | Brian Maguire: Occupational Injuries and Fatalities Among Ambulance Personnel | KEYNOTE SPEAKER                |
| 10.00 | REFRESHMENTS, POSTERS, AND POSTER PRESENTATIONS FROM THE SWEDISH ASSOCIATION OF AMBULANCE NURSES (RAS) |                                 |
| 10.15 | RAS Prizes for the Year’s Master’s Thesis 2015 and the Year’s Ambulance Nurse 2016 Location: Stage |                                 |
| 10.45 | **MODERATORS:** Lars Lundberg  
Lars Ljungström: Early Identification of Severe Sepsis – “the Big Killer”: A Challenge for EMS | KEYNOTE SPEAKER                |
| 11.15 | **MODERATORS:** Jörgen Lundälv  
National and Potential Preventive Strategies for Ambulance Safety in Sweden – The Importance of Adverse Events | INVITED SPEAKER                |
| 12.00 | LUNCH IN THE GREEN DINING ROOM AND EXHIBITIONS |                                 |
| 13.15 | **Prehospital eHealth**  
**MODERATORS:** Hanna Maurin Söderholm, Leif Sandsjö  
Room: H301  
PrehospIT- Stroke: ICT Harmonisation in Prehospital eHealth Improves Acute Stroke Care |                                 |
|       | Bengt Arne Sjöqvist  
PrehospIT- Stroke: ICT Harmonisation in Prehospital eHealth Improves Acute Stroke Care |                                 |
|       | Beatrice Ahlénjung  
Collaboration between Researchers and Prehospital Care Professionals for Design and Development of Simulation-based Training. |                                 |
|       | Leila Edie  
Software Support for Novice Transcranial Ultrasound Scanning |                                 |
|       | Stefan Candefjord  
On Scene Injury Severity Prediction (OSISP): Using Mathematical Algorithms to Improve Field Triage of Trauma Patients |                                 |
|       | Maria Jiménez-Herrera  
Optimisation Tools and Mobile Resources in Prehospital Care Research |                                 |
|       | Summary |                                 |
| 15.00 | Angela Bång: CONCLUSION AND PRIZE FOR BEST POSTER |                                 |
| 15.15 | TAKEAWAY REFRESHMENTS |                                 |
| 15.15 | **Healthcare in crisis and war/catastrophe healthcare**  
**MODERATOR:** Lars Lundberg  
Room: H302 |                                 |
|       | Helene Nilsson  
Strategies for Swedish Disaster Medicine Based on Future Needs |                                 |
|       | Kristina Lundberg  
Ethical Problems When Licensed Medical Personnel Perform Care In A Combat Zone |                                 |
|       | Karin Hugelius  
Disaster Radio: A Tool to Promote Health |                                 |
|       | Karin Hugelius  
“The Turning Point Of Everything”, Medical Professionals Experiences Of Working During A Natural Disaster |                                 |
|       | Summary |                                 |
| 15.15 | **Sustainable change and ambulance healthcare’s work environment**  
**MODERATOR:** Anders Jonsson  
Room: M402 |                                 |
|       | Lotta Délive  
Sustainable organisational development of emergency processes in hospitals |                                 |
|       | Jörgen Andreasson  
How Preconditions and Support Resources Affect Healthcare Managers’ Appraisal and Work with Planned Change |                                 |
|       | Birgitta Winkelint Sundström  
Healthcare at optimal Care Level for Patients who needs Primary Care – Collaboration between care providers from The Emergency Medical Services’ perspective |                                 |
|       | Anna Kristensson-Ekwall  
Burnout and Work Satisfaction Among Ambulance Staff |                                 |
|       | Kåre Karlsson & Patrik Niemelä  
Using Shoulder Straps Decreases Heart Rate Variability And Salivary Cortisol Concentration In Swedish Ambulance Personnel |                                 |
|       | Summary |                                 |
| 15.15 | **Patients’ Participation and Involvement**  
**MODERATORS:** Mats Holmberg, Andreas Ranta & Birgitta Wireklint Sundström  
Room: M401 & M402 |                                 |
|       | Mats Holmberg, Andreas Ranta & Birgitta Wireklint Sundström  
Patient Participation: A Challenge within Contemporary Ambulance Care? |                                 |
|       | Bridie Angela Evans  
Involving older people in a multi-centre randomised trial of a complex intervention in pre-hospital emergency care: implementation of a collaborative model |                                 |
|       | Summary |                                 |
Workshops

Pre-Congress Workshop

Moderators: Leif Sandsjö, Vidar Melby, Björn-Ove Suserud, Lars Lundberg and Anders Jonsson

Wednesday, 9 March, 12:30 - 17:30

All conference participants are encouraged to take part in the pre-congress workshop which will be held the day before the conference.

The aim of this workshop is to gather emergency care professionals, researchers, and industry representatives to discuss current and future challenges in emergency care. The workshop will start with a series of inspirational talks given by invited speakers relating to the workshop's three main themes.

During the second part of the workshop, you can choose which of the three themes you want to follow for more in-depth discussions in smaller groups. Each group will propose initiatives for future collaboration projects related to the theme and possibly also generate ideas for cooperation and financing. During the third and last part of the workshop, each theme group will present a summary of their results to the entire group.

Theme 1
– Emerging new disasters – ensuring a societal response founded on core caring concepts is evidence informed, culturally sensitive and person-centred.

Recent terrorist incidents in Paris, environmental disasters such as floods across Europe, and the challenges presented to European nations through recent mass migration have demonstrated the extent to which our modern society is complex and shown that present health and social structures are inadequately prepared to effectively meet such challenges.

Disasters of various origins can significantly endanger public health, and in addition to natural disasters, we now experience significant threats in the form of indiscriminate terrorism. Mass migration challenges society when it comes to health and social care assessment frameworks as protocols for dealing with mass groups of migrants across EU countries related to the evaluation of medical histories do not yet exist. These societal risks have been difficult to assess and prepare for. The risks of strain to societies in peacetime increase while global developments also show a growing threat of war.

What are key questions in relation to culture? Such frameworks and protocols must adhere to the Core Caring Concepts of dignity, comfort, safety, temperature, and ensuring a person-centred approach. Research is therefore needed to develop and test new models for disaster preparedness to handle both military and civilian disasters in the future.

Theme 2
– The ‘new patient’ and person-centred care

Today healthcare systems are challenged by ‘the new patient’ who is not only better informed but might also have a clear opinion about possible diagnoses when seeking care and have higher demands on what the healthcare system should provide. How can healthcare systems better prepare to meet these ‘new patients’ and use their interest and provided information in the assessment to arrive at appropriate treatments faster than today? How can we employ a more person-centred care to facilitate a more participatory approach for better adherence to the treatment? And to what extent is it possible in emergency care where ambulance staff only meet the patient once and for a short period of time?
Theme 3
– How can we promote eHealth/ICT solutions in prehospital care?

eHealth/ICT (Information and Communication Technology) solutions have the potential to improve healthcare in terms of quality, patient safety, and a more efficient use of resources. The implementation of the new technology in prehospital care has until now been rather slow (as in most parts of the healthcare system). This is not due to the lack of technology; the technical solutions are already here! The difficulty is how we can adopt the technology to best exploit the inherent potential of the new technology. Thus, the implementation process is not only to digitise the current way of working but to re-evaluate current practices and see what the new technology may offer in terms of supporting new ways of performing health care.

Practical issues might be: How can anamnesis/tests follow the patient from the first contact to the emergency ward? How can the information gathered and the treatments performed be more effectively handled in relation to patient records and quality registers? Can information exchange between ambulance staff and hospital specialists facilitate early interventions already in the ambulance?

EMS Work Environment Workshop
Moderators: Brian Maguire and Mats Holmberg
Thursday, 10 March, 15:45-16:45

Patients’ Participation and Involvement Workshop
Moderators: Anders Bremer, Andreas Rantala, and Mats Holmberg
Friday, 11 March, 13:15-14:15

Johan Herlitz Symposium
Johan Herlitz is a Professor of Emergency and Prehospital Care. His research work began in the early 1980s in cardiology studies that examined the early treatment of patients with myocardial infarction (TEAHAT) as well as whether a special ambulance could save more lives in the event of sudden and unexpected cardiac arrest outside hospitals.

Johan’s research is world-leading and has resulted in nearly 800 scientific articles. In recent years, his research has broadened to include early identification of the right level of care, patient safety, and the early treatment/identification of stroke and sepsis. Johan also runs a national registry regarding cardiac arrests in and outside of hospitals. Additionally, Johan has supervised at least 40 doctoral students.

This year, Johan is 67 years old and a Professor Emeritus. PreHospen 2016 will draw attention to Johan’s unique knowledge base and research experience, which he generously shares with colleagues and students at all levels. Johan daily shows his great engagement with research when it comes to supervising the work of Master’s students, planning a research project, or working on a new article for publication.

We have therefore chosen to honour Johan as an outstanding colleague and scientific leader by organising the Johan Herlitz Symposium on Thursday, 10 March, 15:45-17:30. Former doctoral students will describe their research and Johan’s role in each respective thesis. Due to limited programme space, we have randomly selected nine presentations.

Presenters:
Christina Holmgren
Marie-Louise Södersved
Björn Karlsson
Johan Engdahl
Åsa Axelsson
Niklas Nielsen or Anneli Strömsöe
Andreas Claesson
Martin Risenfors
Araz Rawshani
Keynote Speakers

Anneli Eriksson
Registered Nurse at Karolinska Institutet, Stockholm

Anneli Eriksson is a registered nurse specialising in anaesthesia care. She has a Master's in international health and human rights. She presently works as a project coordinator at Karolinska Institutet's Knowledge Centre for Catastrophe Medicine (in Swedish, Kunskapscentrum för Katastrofmedicin, or KcKM) with a research team focusing on healthcare needs related to disasters.

At Karolinska Institutet, Anneli Eriksson coordinates research support and is engaged in developing and teaching courses in catastrophe medicine. She researches severity grading of catastrophes. In 1995, she travelled to Chechnya for her first field assignment with Médecins Sans Frontières (MSF), or Doctors without Borders. Since then, she has held several positions on field missions in various countries and in the Swedish MSF office, most recently in Liberia in 2014 during the Ebola epidemic. She has also initiated an evaluation unit for MSF's operational centre in Brussels. For four years, Anneli Eriksson was the president of MSF Sweden.

At PreHospen 2016, Anneli Eriksson will hold a keynote lecture on the refugee crisis and health needs during different catastrophes and which responses are important for saving lives and relieving suffering.

Helen Snooks
Professor of Health Services Research in the College of Medicine at Swansea University

Helen leads the Patient and Population Health theme within the College and is Interim Director of the Swansea Trials Unit (STU).

She graduated in 1981 from the University of Surrey with a Bsc (Hons) Economics, Sociology, Statistics and completed her PhD in Health Services Research 'Post Traumatic Stress Disorder in seriously injured accident victims' at the University of Sheffield in 2000.

Her main research interests and expertise lie in the fields of Emergency Pre-hospital and Unscheduled Care, Clinical Audit and Effectiveness, and research support. In these areas, the focus of her work is to plan, design and carry out evaluations of health technologies and new models of service delivery which often involve changing roles and working across boundaries between service providers.

Her work is strongly patient-focused and collaborative, and uses mixed methods to achieve study aims.
**Keynote Speakers**

**Inger Ekman**
*Professor and Centre Director of the Centre for Person-Centred Care at the University of Gothenburg (GPCC).*

Inger Ekman is a registered nurse and professor of nursing at Sahlgrenska Academy at the University of Gothenburg. She has been Head of the Department of Health and Care Sciences and Vice Dean at Sahlgrenska Academy and since 2010 she has been Director of the Centre for Person-Centred Care (www.GPCC.gu.se). GPCC is a research centre within health care research and one of the government’s strategic research areas (SFO) with approximately 30 teams. These teams come mainly from the nursing and health sciences but also other disciplines such as medicine, education, and economics. Her research concerns how patients perceive their condition, treatment, and care, and evaluations of person-centred interventions in healthcare. Inger Ekman has also coordinated an EU project with the objective of working with ‘key players’ in Europe from academia, health care, industry, patient organisations and policy to formula a plan of action in research and innovation (R & D roadmap) for future health care in Europe. (www.we-do-care.eu).

**Barbro Edén**
*Doctor of Medicine and Chief of Staff of Gynaecology and Reproductive Medicine as well as Medical Director for Values-based Care at Sahlgrenska University Hospital.*

Since March 2015, she has been connected to the ‘Value Office’, a resource centre and support for the introduction of values-based care at SU. She has worked as a doctor at the hospital since 1982.

Barbro has shown a great commitment to education and leadership. As Director of Studies for specialist educational programmes for doctors, or ST, in Gynaecology and Obstetrics as well as the Assistant General Director of ST at Sahlgrens University Hospital, she has for many years worked both locally and nationally with the design and implementation of new national target definitions for specialists. She has extensive experience as an educator in leadership for specialist physicians and of education for supervisors and study directors.

Based on her commitment to leadership within patient participation and her focus on the creation of value, she has assumed the role of Medical Director and will speak about the experience of working with the introduction of values-based care at Sahlgrenska University Hospital.

**Brian Maguire**
*Professor of Paramedic Science at Central Queensland University, Australia*

Professor Maguire is a leading researcher within ambulance safety and the work environment for ambulance staff members. He holds a doctorate from George Washington University in the U.S. and has worked in New York City as a paramedic and instructor of prehospital emergency medicine.

He has also been a consultant for the U.S. Department of Homeland Security regarding bioterrorism, pandemic, and disaster preparedness. Professor Maguire now works in Australia and will be a keynote speaker at PreHospen 2016 where he will present new research on ambulance safety.
Keynote Speakers

Lars Ljungström  Chief Physician at the Department of Infectious Diseases at Skaraborg Hospital
Skövde and doctoral student at Sahlgrensa Academy, University of Gothenburg

Lars Ljungström has been involved since the very inception with the Swedish Medical Association of Infectious Diseases’s programme group, which has developed national guidelines for the early assessment and treatment of severe sepsis. He works as an infectious disease physician in Sweden and abroad. He also contributes to relief efforts related to HIV/AIDS in Kenya as he completes his dissertation. The latter focuses on the epidemiology and early identification of severe sepsis.

Lars Ljungström lectures on sepsis in a vivid way. Among other things, he discusses images with ‘six faces’ to convey varied symptoms and courses of events, as in a football match where the picture is constantly changing.

At PreHospen 2016, he will present new research in the field of early identification of severe sepsis related to early suspicions that are symptom-driven.

Anna Carin Wahlberg  Senior Lecturer, Ph D, Karolinska Institutet, Stockholm

Anna Carin Wahlberg is a Registered Nurse and has worked as a telephone nurse at SOS Alarm with the telephone-based evaluation of care needs related to both ambulance assessment and healthcare advising. She defended her dissertation in 2004 at Karolinska Institutet with the dissertation Telephone Advice Nursing: Callers’ Perceptions, Nurses’ Experiences of Problems, and Basis for Assessments. Today, she works as a university lecturer and is Head of Programme for several programmes within advanced care. Her current research concerns telephone nursing and nursing in prehospital care. She is also president of the Association of Telephone Nurses within Healthcare (or TRIHS, for its Swedish name, Föreningen för Telefonrådgivning inom Hälso- och sjukvård) under The Swedish Society of Nursing.

Jörgen Lundälv  Associate Professor in Traffic Medicine at the Department of Surgical and Perioperative Sciences at Umeå University

Jörgen Lundälv will be a keynote speaker at PreHospen 2016 where he will present new research on National and potential preventive strategies for ambulance safety in Sweden – the importance of adverse events.

Photo: Photographer Sören Häkanlind.

Invited Speakers

Anna Carin Wahlberg  Senior Lecturer, Ph D, Karolinska Institutet, Stockholm

Anna Carin Wahlberg is a Registered Nurse and has worked as a telephone nurse at SOS Alarm with the telephone-based evaluation of care needs related to both ambulance assessment and healthcare advising. She defended her dissertation in 2004 at Karolinska Institutet with the dissertation Telephone Advice Nursing: Callers’ Perceptions, Nurses’ Experiences of Problems, and Basis for Assessments. Today, she works as a university lecturer and is Head of Programme for several programmes within advanced care. Her current research concerns telephone nursing and nursing in prehospital care. She is also president of the Association of Telephone Nurses within Healthcare (or TRIHS, for its Swedish name, Föreningen för Telefonrådgivning inom Hälso- och sjukvård) under The Swedish Society of Nursing.

Karl Hedman  University Lecturer in International Health and Welfare, Jönköping University

Karl Hedman is an International Coordinator of the Nursing Department at the School of Health and Welfare at Jönköping University and Doctoral Researcher in Sociology at the Department of Sociology at Lund University. His primary research field is institutional interaction with a special interest in medical emergency calls between nurses, physicians, emergency operators and callers, radio communication between ambulance dispatchers and ambulance services, nurse-patient interaction, doctor-patient consultations, emergency, crises and disaster management, cancer care and telephone advice nursing.
Heléne Nilsson is the Head of Education at the Catastrophe Medical Centre (KMC) in Linköping. Her background is intensive care nursing, yet over the last 14 years, she has primarily worked in research and training on disaster medical preparedness, both at the KMC but also for Sweden’s National Board of Health and Welfare. Her area of expertise is management and cooperation with a special interest in simulation and measurable indicators as a tool to increase the quality of pre-hospital response and care.

Heléne received her doctorate in 2013 for the thesis Demand for Rapid and Accurate Regional Medical Response at Major Incidents. She has recently had a major role in the National Board’s national trauma assessment with emphasis on the prehospital and emergency medical aspects in events with many severely injured.
Magnus Andersson Hagiwara's background is within emergency medical care, primarily ambulance medical care, as he has been an ambulance nurse since 1999. Apart from clinical practise, he has been involved in the Specialist educational programme for ambulance nurses at the University of Borås. Magnus defended his thesis 'Quality improvements and leadership in health care' in 2014. In his dissertation, he developed and evaluated a computerised support tool for decisions in ambulance health care.

Magnus's primary research interest is patient safety in ambulance health care. Because of this, he has been involved in projects that track risks to prehospital patient safety. He is also involved in a project that intends to improve stroke processes through the use of IT solutions and eHealth. Simulations are another research area of interest. In collaboration with Serious Games at the University of Skövde, Magnus participates in a research project that aims to develop prehospital simulations.

At the University of Borås, Magnus participates in many of the courses within the Specialist educational programme for ambulance nurses as well as the Master's programme in emergency health care.

Kristina Lundberg, doctoral student at the University of Borås and Jönköping University, has a master's degree in theology and has also studied leadership and classical languages at the University of Uppsala. Kristina is an ordained priest in the Church of Sweden and has held positions both in Sweden and abroad; she also has a background as a military chaplain in Kosovo and Afghanistan.

Kristina Lundberg's dissertation deals with the ethical issues that physicians and nurses face in the context of international military operations. When Sweden partakes in international military operations, medical personnel are almost always part of the unit. Physicians and nurses often have extensive expertise in their own professions. Their competence is important as the conditions in combat zone are usually critical. It is thus problematic that physicians and nurses are not always prepared for the ethical issues required. Research results show that medical personnel tend to very easily adapt to the military organisation, sometimes at the expense of their own ethical medical and nursing principles. As non-combatants in the units, medical personnel are protected by the Geneva Convention, which clearly describes the tasks soldiers are permitted to perform. Kristina's research shows that physicians and nurses often go beyond these limits.

Kristina Lundberg will present these unique results at PreHospen 2016.
The titles of the presentations are presented as received from the presenters. However, some minor editorial changes have been made.

N/A means 'not applicable'.

### Thursday, 10 March

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The Refugee Crisis and Health Needs in Catastrophes
Anneli Eriksson

Health needs during different disasters:
What response is needed to save lives and relieve suffering?
A disaster is an event that overwhelms local capacity, necessitating national or international assistance. In the news, we can follow how people in the world suffer from different types of disasters on a daily basis. They can be sudden and overwhelming, such as earthquakes and floods, but can also evolve gradually, little by little as prolonged droughts and food insecurity or situations where conflict and instability put people in a chronic and worsening state of emergency.

An estimated half a billion people are annually affected by disasters. Vulnerability is higher in the poorest countries, with fewer resources to prevent disasters and to respond to needs in a disaster situation.

Disaster relief in the form of humanitarian assistance aims to save lives, alleviate suffering, and preserve human dignity. Needs alone should be the driving force. In order to respond according to needs, we must understand how disaster situations cause human suffering and needs, but also how the pre-disaster context, as well as the general health situation in a country, affects the types of needs present. We need to be able to compare the severity between disaster situations and we need to understand the most common health threats that emerge with different disasters.

Our world is changing. Countries that previously have been the recipients of emergency assistance are now international actors and donors. The burden of disease is shifting in all parts of the world. Infectious diseases are still major health threats in resource poor countries, especially in disaster situations, but the proportion of non-communicable diseases is increasing. We need to adjust our response to the situations.

The relatively large number of refugees arriving in Sweden during the past half a year has put a strain on society and its national and local authorities. Newly arrived refugees have been and will continue to be a challenge; in order to meet the existing expectations we need to be prepared and realistic in our responses.

However, the basic elements of a public health response in a disaster situation remain the same: water, food, sanitation, shelter and appropriate health care.

Using Electronic Routine Linked Health Records In HTA Of Interventions In Emergency Care
Helen Snooks

Background
The SAFER programme conducts research into treating falls in older people; SAFER1 was a pragmatic cluster randomised controlled trial that examined a Computerised Clinical Decision Support system for paramedics, using a hierarchy of outcomes comprising death, unscheduled hospital admission, unscheduled ED attendance, and 999 calls. SAFER2 used a similar study framework to assess new protocols that allow emergency ambulance paramedics to assess and refer patients to appropriate community based care.

Objectives
In SAFER2, all participants consent to follow up through routine medical records, and some by postal questionnaire. We consider (a) the characteristics of those providing data through two routes, (b) the consistency between data on hierarchy outcomes available through the two routes, and (c) the resulting effect on reported study outcomes.

Methods
Routine medical records are available anonymously through the SAIL Databank in Wales and HSCIC in England; following successful linkage with study participants, data on each component in the hierarchy of outcomes is assessed at one month (for safety) and six months (for effectiveness). Data on QoL is also available at both timepoints.
Values-based Care at Sahlgrenska University Hospital
Barbro Edén

What have we learnt and where are we going?
The VBHC management model consists of new components and organizational structures for healthcare. Focus is to manage the hospital on the united view of what healthcare provides seen as results from health outcomes and costs. It is a method for quality improvement with the patient as a partner across organizational borders.

So far 13 pilot projects containing processes organized around medical symptoms and treatments have been conducted. Each patient/symptoms group establish a cross-functional project group with representatives from healthcare professionals who treated and/or cared for the patients and support functions. Connected to each project groups are a reference- and a steering group with heads of departments and experts.


For each patient group the implementation is done with a structured model with three phases. The pilot has included development of the structured model based on feedback from colleagues who have started with VBHC and the patients involved.

A new process oriented organization for improvement work is created around medical symptoms. A change of focus in regular follows ups within the hospital’s hierarchal structure to central measurements for each group. The patient is a partner in the continued work. During the project and process phases patient representatives from the clinics and/or patient associations are interviewed regarding what matters to them e.g. their perspective of the patient process, important measurements, and improvement works.

It is a change of culture to go from only process measurement to health outcome, cost, and process measurement connected to each other. It is also a challenge to extract, analyze, and visualize correct data and present results.

Learn by doing in the pilots has led to a knowledge of the importance to communicate why this change is needed, positive aspects and challenges for patients and employees. The need to involve different professionals from the pilots in developing the implementation became clear.

Now we stand before a large scale implementation with another six processes this spring and after that more symptoms oriented larger processes involving the overall hospital.

This together with other quality improvement processes will hopefully increase the value for the patients and the value created from our shared resource.

The relationship between patient and health professional-possibilities and barriers for person-centred care
Inger Ekman

Health care professionals need to widen their remit whereby the patient’s experience of illness and health are central instead of focusing entirely on disease. Person-centred care means that the patient (often with relatives) and health care professionals enter into a partnership, where decisions regarding care and treatment are taken collaboratively; in particular, each patient’s human resources are identified by the skilled professional. We have evaluated person-centred care in controlled studies in different contexts and among the effects are increased patients’ satisfaction with care and cost savings. Barriers and possibilities for implementation will be discussed.
### Telephone Assessments of Care Needs (Telefonbedömning av vårdbehov.
Sjukvårdsrådgivning och ambulansprioritering)

Anna Carin Wahlberg

All registered nurses in Sweden make telephone assessments of care need as part of their work assignment. Telephone nurses, who do telephone assessments as their main task, are mainly working at health care direct centers 1177 and emergency medical dispatch centers 112. All telephone assessments focus on assessing the care-seekers urgent care needs in the first stage. Thereafter they may also coordinate health care resources; provide care-seekers with advice, support, education and information.

Telephone assessments can be understood from the perspectives of the care-seeker, the telephone nurse and the organization. From the care-seeker perspective calls to the health care are often made due to insecurity on their own or relatives health problems and they mainly trust the telephone nurses and experience that they have are nicely treated when calling. Telephone nurses use between 13-18 bases for their assessments in non-urgent calls and among them non-verbal communication is one basis. They wish for continues training in telephone assessments. From an organizational perspective telephone assessments is used as a way to help care-seekers to the adequate level of health care, it is cost effective and is a part of a sustainable health care. One implication for the future is that the individual care-seeker’s care need should decide the telephone nurse conduct, whether the telephone numbers 112 or 1177 have been used should not matter. Therefore, telephone nurses need specialist training on an advanced level in nursing, communication, medicine, technology, organization, society, ethics.

### Challenges in Doing the Acute Flow at the Emergency Operations Centre: Managing Medical Emergency Calls (Utmaningar i att åstadkomma det akuta flödet vid SOS-centralen: Att hantera medicinska nödsamtal)

Karl Hedman

**Background**

This presentation is a sociological conversation analysis of recurrent practices of interaction in medical emergency calls. The exploration broadens the scope to not only examine medical emergency call interaction between emergency operators and callers but also between nurses, physicians and callers. Fundamental procedures examined in the presentation are: (1) emotion management, (2) risk management and (3) instructing. The investigation is based on ethnographic fieldwork in a Swedish emergency operations centre.

**Methods**

The data used for the study consists mainly of audio recordings of medical emergency calls.

**Results**

The analysis reveals four main types of emotion management procedures: (1) emergency call-takers maintaining a calm state and avoiding going up into emotions of callers; (2) delivering positive decisions about ambulance assistance; (3) problem solving presentations including emergency response measures to concerns of callers, and (4) emphasising the positive to create hope for callers. Risk management in medical emergency calls consists of seven essential interactive practices: (1) risk listening through active listening after actual and possible risks; (2) risk questioning; (3) risk identification; (4) risk monitoring; (5) risk assessment; (6) risk decision-making and (7) risk reduction. Four main types of instructing are described: (1) institutional instructing; (2) measure oriented instructions; (3) organisational response instructions and (4) summarising instructing.

**Conclusions**

Callers follow risk identifications and instructions delivered by physicians and nurses about examining statuses and life signs of patients such as breathing, movement and pulse, and perform treatment and emergency situation related measures while waiting for ambulance services. This study expands the analytical focus in past research on emergency operator practices to healthcare procedures carried out by nurses and physicians.
Communication and protocol compliance and their relation to the quality of cardiopulmonary resuscitation (CPR): A mixed-methods study of simulated telephone-assisted CPR. (Kommunikation och protokoll överensstämmelse och dess relation till kvaliteten på hjärt-lungräddning (HLR). En mixad metod studie av simulerad telefon-assisterad hjärt-lungräddning)
Helena Nord-Ljungquist, Margareta Brännström and Katarina Bohm

Background
In the event of a cardiac arrest, emergency medical dispatchers (EMDs) play a critical role by providing telephone-assisted cardiopulmonary resuscitation (T-CPR) to laypersons. In this study, we attempted to gain a better understanding of this crucial service. The aim of our investigation was to describe T-CPR protocol compliance by the laymen following instructions, and the EMD following the protocol correctly and to analyze the communication between them.

Method
We conducted a retrospective observational study by analyzing 20 recorded video and audio files. In a simulation EMD’s provided laymen with instructions following T-CPR protocols. These were then analyzed using mixed method with convergent parallel design.

Results
There were no difference on performed action and quality of CPR by laymen if there was a lack of communication or good communication with the EMD. Quantitative results showed that if the EMD’s complied with T-CPR protocol, laymen performed correct action in 71 % of the actions. The single most difficult instructions to follow in the T-CPR protocol both for EMD’s and laymen to perform, was respiratory control. Mean values for compression depth and frequency did not reach established guideline goals for CPR.

Conclusion
Proper compliance with T-CPR protocols by EMDs resulted in better performance by laymen in CPR. The most problematic area to perform for EMDs as well laymen was airway management. The study results did not establish that the quality of communication between EMD’s and laymen performing CPR in cardiac arrest led to statistically different outcomes, as measured by the quality and effectiveness of CPR delivered.

Send Me an Ambulance or I Will Report You – Interviews with Nurses at an Emergency Medical Dispatch Centre (Skicka en ambulans, annars ska jag anmäla dig – intervjuer med sjuksköterskor på SOS Alarm)
Bosse Ek

Background
It is important that ambulances are urgently directed to patients who are in need of immediate help and of quick transportation to a hospital. Because resources are limited, Emergency Medical Dispatch (EMDs) centres cannot send ambulances with high priority to all callers. The efficiency of the system is therefore dependent on triage. Nurses worldwide are involved in patient triage, both before the patient’s arrival to the hospital and in the subsequent emergency care. Ambulance dispatching is traditionally a duty for operators at EMDs. In Sweden this duty has become increasingly performed by registered nurses (RNs).

Methods
With the aim to describe their experiences were fifteen RNs with at an EMD interviewed. They were asked to describe the content of their work and their experiences. They also described the most challenging and difficult situations according to the critical incidence technique. Content analysis was used.

Results
Two themes emerged during the analysis: “Having a profession with opportunities and obstacles” and “Meeting serious and difficult situations”. The results showed that the decisions to dispatch ambulances were both challenging and difficult. Difficulties included conveying medical advice without seeing the patient, teaching cardio-pulmonary resuscitation via telephone and dealing with intoxicated and aggressive callers. Conflicts with colleagues and ambulance-crews as well as fear of making wrong decisions were also mentioned.

Conclusions
Work at the EMD is a demanding but stimulating duty for RNs. Great benefits can be achieved using experienced triage nurses for this work, including increased patient safety and better use of medical resources. Improved internal support systems at the EMDs and striving for a blame-free culture are important factors to attract and retain employees.
In order to strengthen the first part of the continuum of care and to develop the quality of the emergency medical communication centre (EMCC), a technical feedback system where the ambulance send structured and regular feedback to the EMCC was developed in ÅSA project (ÅSA - Feedback SOS Ambulance) [1]. The third ÅSA study ÅSA III, was carried out in Skåne-, Örebro-, Halland- and Jönköping Counties for six months 2014-15. Approximately 32,000 feedbacks have been analyzed and the results show the sensitivity and specificity as well as over- and under triage for the five most common alerted health conditions; chest pain, altered breathing, abdominal pain, minor injuries, stroke, and for unclear information.

Reference

Abstracts Thursday, 10 March

9 ÅSA III – Feedback of Estimated States and Seriousness from the Ambulance to the Emergency Medical Communication Centre (EMCC) (ÅSA III- återkoppling på ambulansutalarmering)
Katarina Bohm, Glenn Larsson and Veronica Lindström

10 Emergency Medical Dispatch Priority in Chest-Pain Patients due to Life-Threatening Conditions (Larmoperatörens prioritering av patienter med bröstsmärta: betydelsen av tidpunkt och utbildningsnivå)
Araz Rawshani

Background
We investigated how time of the day and dispatchers’ education relates to accuracy in assessments of emergency dispatchers. This was examined among 2205 persons who called the dispatch center due to chest pain, and were diagnosed with a life-threatening condition or died within 30 days.

Methods
Logistic regression was used to study how the time of the call and the dispatcher’s education (nurse, assistant nurse and other training), associates with the probability of missing to give priority 1.

Results
A 7-fold increase in odds of missing to give priority 1 was noted at 12:59 pm, as compared with midnight. Compared with assistant nurses, odds ratio for dispatchers with other training was 0.34 (95% CI 0.14 to 0.77). The predictive value of a priority 1 was lower when given by an operator with other training. Additional delay from call for Emergency Medical Service until arrival in hospital for persons who were not assigned to priority 1 was 6 minutes.

Conclusion
The probability of not obtaining highest dispatch priority was increased up to 7-fold during lunchtime as compared with midnight. Dispatch operators without formal medical education had lower risk of missing to give priority 1, at the expense of lower positive predictive value.
Presence of Family in Resuscitation in Prehospital: The Nurses’ Opinion
Tiago Amaral, Marco Job Batista, Pedro Vasconcelos, Michael Isidro and Pedro Caldeira

Background
The effect of family presence during resuscitation on the pre-hospital medical team remains controversial. In the pre-hospital setting, the patient’s home is the most frequent place where resuscitation care is supplied by these teams. In Portugal we have a lack of studies about this topic. We wanted to know nurses’ opinion.

Methods
We have applied an online questionnaire to 66 nurses who work in a pre-hospital setting. The questionnaire consisted of three parts: demographic, pre-hospital and hospital activity.

Results
Of the 66 nurses surveyed, 15% work in SIV ambulances, 68% in VMER and 14% in both. All provided nursing care in the pre-hospital with the presence of family members, particularly in resuscitation situations (83%). When asked whether they agreed with the presence of relatives in resuscitation situations in the pre-hospital, 42% agree and 9% completely agree. The main advantages mentioned were in obtaining the health history, recognition of the team effort and the help in the grieving process. Also the disadvantages mentioned were the possible interference from family members in the procedures, the stress experienced by the team for being watched and anxiety felt by the family. Regarding the presence of family in hospital resuscitation situations, only 33% of nurses agree and 9% completely agree.

Conclusions
In general, nurses find that the presence of family members is beneficial as long as they are able to realize the significance of interventions in resuscitation situations and that they do not interfere with the team’s performance.

Reference

Family Interventions and Family Presence during Resuscitation Events in the Emergency Department: Is there Evidence of a Person-centred Approach?
Vidar Melby, Emma Magowan and Kieran McLaughlin

Background
This presentation reports on two studies of the views and experiences of emergency department clinicians regarding family member presence at resuscitation events and end of life care. Holistic family-centred care aims to meet the physical, cultural, emotional and spiritual needs of patients and their families. A resuscitation event represents a highly emotionally charged time for relatives, but family presence initiatives during such critical events speak to the very essence of person and family centred care. This presentation aims to analyse whether such care is person-centred.

Methods
Two surveys were undertaken in different health trusts in the United Kingdom, incorporating 160 and 163 emergency department clinicians respectively. Data from the studies were mapped against the constructs of the McCormack and McCance (2010) Person-centred Practice Framework, aiming to evidence whether care provided during resuscitation events is person-centred.

Results
Many aspects of person-centred practice were central to the findings of the two studies. Components of the framework were supported by a majority of respondents in both studies. There was evidence of strong prerequisites of person-centred practice with majority views suggesting that clinicians were professionally competent to care for relatives during resuscitation events. Care processes were also aligned with person-centred approaches, with respondents strongly indicating that holistic care, facilitation of shared decision making, and a sympathetic presence being provided. However, the care environment was not generally viewed as supportive of person-centred practice.

Conclusions
There is evidence to suggest that elements of person-centred practice are present in the care of patients and their relatives during resuscitation events, and there is evidence of attempts to create a therapeutic culture and support for the principles of involving relatives in care during this traumatic part of the patient journey.

Reference
Exploring Person-Centredness in the Emergency Department
Donna McConnell

Background
Person-centred approaches to care delivery have been increasingly promoted in international policy and strategy over the last decade as a means of enhancing standards of care (Laird et al 2015). Despite such efforts to enhance emergency care, emergency departments highlight overcrowding, inadequate patient care resulting from prolonged delays in the treatment of pain and suffering, lengthy waiting times and patient and staff dissatisfaction (Canadian Association of Emergency Physicians 2015). No studies have explored person-centredness within the ED care environment.

Methods
This study adopted a two stage sequential mixed methods approach. Stage 1 was a survey designed to test relationships between the attributes of staff and the care processes they engage in within the emergency care environment. Stage 2 consisted of individual interviews with staff and service users to identify their experiences of caring or being cared for in emergency departments.

Results
Results from stage 1 reveals that staff felt they had the attributes and engaged in the necessary care processes to deliver person-centred care, but they did not feel that the emergency care environment facilitated person-centred care. Data from stage two of the study will report findings from the interviews with staff and service users.

Conclusions
Preliminary conclusive arguments and recommendations will be presented on the present state of person-centredness in emergency care environments and how such an approach may be facilitated to enhance care to patients.

Balancing Caring and Medical Care – The Knowledge Desired by Ambulance Managers of their Ambulance Clinicians
Mats Holmberg, Kerstin Forslund, Ingegerd Fagerberg and Anna Carin Wahlberg

Background
Research on knowledge within ambulance care is earlier related to the use of medical evidence in praxis. In addition knowledge in caring also embrace ‘tacit’ aspects as how to respond to a unique person and situation. From an organisational perspective ambulance care managers are responsible for organisational tasking and in this are dependent on the knowledge held by their ambulance clinicians. Managing knowledge-sharing cultures has been found to enhance the outcomes of caring. The aim of the study was therefore to identify and estimate the desired knowledge among Swedish ambulance clinicians from the perspective of ambulance care managers.

Methods
A modified Delphi method in three rounds was used. In total thirty-six ambulance care managers participated, and twenty-four finished all three rounds. Five categories and twenty-six sub-categories emerged in the first round. The managers were encouraged to rate each sub-category, and the ten with the highest mean were interdependently ranked in the final round.

Results
The sub-category ‘Knowledge to assess the patient’s situation from a holistic perspective’ was the highest ranked, followed by ‘Medical knowledge to assess and care for different diseases’ and ‘Knowledge to be able to care for critically ill patients’.

Conclusions
Taken together the knowledge areas address essentially medical care, contextual aspects and caring. The boundaries between these can sometimes be seen as elusive, calling for the ambulance clinicians to find a balance in these areas of knowledge.

The ambulance clinicians need support to develop knowledge, both through formal education, but also by continuously developing caring knowledge through practical experience. This may be understood as a responsibility for both universities and the ambulance organisation.
Patient safety in prehospital care is not well researched. There are some surveying of patient safety problems, particularly in hospital environments, but the problems in prehospital care are probably both unique and understated. The little research that exists showing that improper patient assessment leading to wrong decisions is a major patient safety risk in the prehospital care. In order to improve the system so that the risk of mistakes is reduced or the impact minimised, knowledge is required of why these mistakes happen.

One hundred years of cognitive research has led to "the dual process theory". The theory says that humans have two different systems to process information and make decisions. System 1 is described as an automatic and unconscious system that relies on earlier experiences of similar situations. It is in System 1 that experts make the most mistakes. System 2 is described as the analytical system. Here, thinking is conscious and depends on individual differences, such as intelligence and working memory. System 2 is used in situations that are new and undefined. Thinking in system 2 is also much slower than system 1 processes, and it is here that the inexperienced carer makes most mistakes.

By making use of dual process theory, it is possible to develop systems to prevent cognitive mistakes, so-called forcing strategies. Examples of systems are decision support, checklists, and simulation. The purpose of the speech is to discuss how we can use cognitive theories to improve the assessment and decision-making in prehospital care.
Prehospital Fast Track Pathway for Patients with Hip Fracture and Impact on Time to Surgery, Hospital Stay, Postoperative Complications and Mortality

Glenn Larsson, Ulf Strömberg, Cecilia Rogmark and Anna Nilsdotter

Background
Ambulance organizations in Sweden have introduced a prehospital fast track care (PFTC) for patients with suspected hip fracture. It means that the ambulance nurse starts the preoperative procedure otherwise done at the Accident & Emergency ward (A&E) and transport the patient direct to the radiology department instead of A&E. If the diagnosis is confirmed the patient is transported directly to the orthopedic ward. No previous randomized controlled studies which describes advantages has analyzed the PFTC. The aim of this study was to examine if PFTC has impact on outcomes as time to surgery, length of stay, postoperative complications and mortality.

Methods
The design of this study was a prehospital randomized controlled study, powered to include 400 patients. The patients were randomized into PFTC or the traditional way (A&E group).

Results
By the design, time from arrival to start for x-ray was faster for PFTC (mean, 26 vs. 145 min; p<0.001), but the groups did not differ with regard to time from start of x-ray to start of surgery (mean 18.4 h in both groups). No significant differences between the groups were observed: time from arrival to start of surgery (p=0.066), proportion operated within 24 h (79% PFTC, 75% A&E; p=0.34), length of stay (p=0.34), postoperative complications (p=0.8) and the 4-month mortality (18% PFTC, 15% A&E p=0.6).

Conclusion
PFTC improved time to x-ray and admission to a ward, as expected, but did not significantly affect time to start of surgery, length of stay, postoperative complications or mortality. These outcomes were probably affected by other factors at the hospital.

Pre-hospital Assessment and Patient Experience from Being Assessed by a Single Responder

Carl Magnusson, Christofer Källenius, Susanne Knutsson, Johan Herlitz and Christer Axelsson

When a person with vague symptoms calls 112, the dispatchers often have difficulty prioritising the severity of the call. Their only alternative has been to send an ambulance. In Gothenburg, Sweden, a nurse-manned single responder (SR) was initiated to assess this patient group. It aims to describe patient characteristics and assessment level made by the SR nurse among patients assessed by the dispatcher as low priority and/or vague symptoms. A consecutive journal review was conducted and a follow up telephone survey. During six months, 529 patients were assessed; 329 (62%) attended the emergency department (ED) or inpatient care (IC). Of these, 85 patients (26%) were assessed as high priority. Only 108 were assessed as being in need of ambulance transport. ED/IC patients were significantly older. Two hundred (38%) stayed at the scene (SS) (n = 142) or were referred to primary care (PC) (n = 58). Of the 200 SS/PC patients, 38 (19%) attended the ED within 72 hrs with residual symptoms, 20 of whom were admitted to a ward. Nine patients (4% of 200 SS/PC patients) required inpatient treatment and 11 patients stayed overnight for observation. One-hundred (50%) of the patients responded to the survey. A majority of the patients experienced a better health status in comparison with the initial contact. Furthermore, a majority of the patients were satisfied with the assessment by the single responder and with the care received in primary care. These results suggest a relatively high level of patient safety and the usefulness of an SR among patients assessed by the dispatcher as low priority.
**Objective**
To report outcome and intensive care strategy in a 7-year-old girl with accidental profound hypothermia and drowning.

**Data Sources and Extraction**
Patient records and interviews with search-and-rescue personnel.

**Study Selection**
Case report.

**Data Synthesis**
The girl was rescued after an estimated submersion time of at least 83 minutes in icy sea water. She presented with cardiac arrest, ice in her upper airways, a first-documented nasopharyngeal temperature of 13.8°C, and a serum potassium of 11.3 mmol/L. The patient was slowly rewarmed with extracorporeal membrane oxygenation and made an exceptional recovery after intensive care and a long rehabilitation time.

**Conclusion**
Excellent outcome is possible in children with body temperature and serum potassium reaching the far limits of previously reported human survival and prolonged submersion time.

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**Background**
STEMI patients need rapid identification by experienced providers and interventions aimed at rapid reperfusion performed in a comprehensive system of care. In Portugal, VMER is the pre-hospital intervention vehicle with a nurse and a physician that goes to the location of the patient providing a "green-way" to save myocardium.

**Methods**
We used coronary "green-way" data from January 2014 to October 2015 with the variables: sex, age, initial triage, initial ECG, diagnostic of acute myocardial infarction, cardiac arrest episode in pre-hospital setting, percutaneous coronary intervention (PCI), therapeutic hypothermia protocol implementation and survival at 7 and 30 days.

**Results**
We found registries of 44 patients referenced for coronary "green-way". 9 had incomplete information and were excluded. From the 35 patients studied, 30 were male and 5 female. Average age was 61.9 ± 12.76 years. Initial triage was thoracic pain in 22 patients, cardiac arrest in 4, altered consciousness in 3, dyspnea in 1, and other in 5 patients.

Initial ECG was altered in 30 patients, and 23 of them had STEMI. Acute myocardial infarction was diagnosed in 25 patients. Cardiac arrest was verified during the pre-hospital phase in 8 patients, 7 of which had FV. PCI was the first treatment in 26 patients. 6 patients entered therapeutic hypothermia protocol after PCI. Concerning survival, 32 (91.4%) patients survived after 7 days, and 28 (80%) survived after 30 days. This is the first time we evaluate our coronary "green-way" protocol results.

**Conclusions**
The delay to the start revascularisation is reduced with the protocol established between cath lab and VMER. A study defends that the direct access to primary angioplasty was associated with low mortality in patients admitted with STEMI. Our 30-day mortality is 20% vs 3%. We have to identify opportunities to improve.

Comparison of Swedish and Irish OHCA Incidence and Outcome – What are the Key Differences?
Siobhan Masterson, Annell Strömströ, Akke Vellinga and Johan Herlitz

Rationale & Background Information
Variations in incidence and outcome from out-of-hospital cardiac arrest (OHCA) may be a result of national differences in the risk profile of patients and standards of care. Differences in data collection and reporting methodologies may also account for variation.

Swedish registry data has been used to monitor national changes in OHCA for almost 25 years. Ireland’s registry has collected national data since 2012. This provides the opportunity to compare data collection, reporting methodologies and OHCA incidence and outcomes from two national registries. The processes for defining and comparing Swedish and Irish data may be transferable to other national registries.

Study Goals
Using data collected nationally over a three year period, the primary aim of this retrospective cohort study is to determine differences in the incidence and outcome of Emergency Medical Staff (EMS)-attended OHCA where resuscitation is attempted between Ireland and Sweden.

Methodology
• Comparison of Data Collection Methodologies: Irish and Swedish investigators will document how data is collected and processed for both Registries.
• Definition of Variables: The interpretation of risk factors in both registries will be guided by means of case studies. A number of case studies based on real life situations, will be translated from both registries and presented to personnel responsible for extracting data.
• Standardisation of Data Extraction Methodologies: Irish and Swedish investigators will devise a data collection sheet with agreed headings and questions to standardise data extraction from both registries.
• Registry Analysis: A descriptive analysis will be performed on both the Swedish and Irish data and will include an overall and age-adjusted incidence of treated OHCA and survival (incidence/100,000/year).

Expected Study Outcomes
• This study will highlight differences in Irish and Swedish OHCA incidence, outcomes and risk factors. This will help to guide service planning in both countries.

The Role of Paramedic Practitioner in the UK Ambulance Service
Claire Hall

The role of Paramedic in the UK has changed over the last 10 years from a predominantly time-critical emergency response to a non-time critical urgent response. Whereas Paramedics used to stabilise the patient and take them to hospital, now many Paramedics diagnose and treat patients at home, or refer them to other community based professionals.

This change has occurred in response to an altered demographic of healthcare in the UK - an aging and growing population, and increased pressure on NHS resources, particularly on community doctors.

The UK ambulance service has had to adapt to this change. Most of the 13 UK ambulance services now have an urgent care Paramedic role which is complementary to community doctors. South East Coast Ambulance Service (where I am employed) has 2 specialist Paramedic roles - Critical Care Paramedic (out of hospital trauma, and time critical conditions) and Paramedic Practitioner (urgent medical problems, less time critical illness and trauma, and complex social issues).

I am a United Kingdom Paramedic with 11 years emergency care experience, currently working as a Clinical Team Leader with responsibility for 7 Paramedics and Emergency Care Workers. I am also half way through the 2 year Paramedic Practitioner programme at St George’s University, a teaching hospital in London.

I would like to present to you the pre-requisites for the course, the selection process, and the contents of the course, academic and practical, with my personal reflections on the future of this role in the UK.

Reference
Several previous studies have explored nursing students’ perceptions of clinical learning at hospitals and in other health care facilities, but there are few studies exploring nursing students’ perceptions of the clinical learning in the ambulance service. Therefore, the aim of this study was to explore nursing students’ perceptions of learning nursing skills in the ambulance service. An inductive qualitative study design with two focus group interviews and content analysis was used. Two themes were identified. The first theme, professional skills, included: Assessment, Prioritizing and initiating care, and Medical treatment and evaluation of interventions. The second theme, a holistic approach to the care included: Cultural, social, and ethical aspects of caring, Decision-making in collaboration with patients, and Care provided in the patient’s home. Conclusion: The ambulance service provides a learning environment where the students face a multifaceted picture of health and illness. This learning environment helps nursing students to learn independently how to use professional nursing skills and how to care by employing a holistic approach.

However, further research is needed to explore if and how this knowledge about nursing and caring in the ambulance service is useful when working as an RN in other health care settings.

Highlights
• Ambulance is not just a car with blue light and siren driving fast to emergencies
• The ambulance service provides a multifaceted picture learning environment
• Nursing students learn professional skills in the ambulance service

Background
When a human being, young or old, comes in contact with prehospital emergency care, the person has been exposed to a sudden trauma or illness. The unexpected situation can be experienced as suffering. In some prehospital emergency situations, the patient experiences feelings of vulnerability and loss of dignity. The aim of this study was to describe what specialist ambulance nurse students experienced as preserved or humiliated dignity in prehospital emergency care.

Methods
Data were collected through critical incident technique, a self-reporting technique that focuses on critical incidents that have affected the participants positively or negatively. The analysis were performed with a text-driven, interpretive content analysis.

Results
Specialist ambulance nurse students experienced preserved dignity when the specialist ambulance nurse was there for the patient, when the patient was respected and protected and when professional decisions were made. Humiliated dignity were experienced when the patient were abandon which involved ignoring or not respecting the patients will. It could also include to treat the patient nonchalanly or brutally.

Conclusions
The specialist ambulance nurse students see how other professionals fail the patient, disrespect or ignore the patient. This ethical dilemma affect the ambulance nurse students badly due to the fact that the ambulance nurses’ morals and attitudes are reflected in their actions towards the patient.
Abstracts Thursday, 10 March

25 Occupational Injuries and Fatalities Among Ambulance Personnel
Brian Maguire

The prehospital emergency medical profession is undergoing dramatic transformation as it gains international recognition. These personnel are more respected, more highly educated, more capable and, are taking on responsibilities unheard of in the past. In addition to daily critical medical emergencies, they are depended on to respond to disasters and to be involved in community health. Instead of waiting for emergencies to happen, more and more paramedics are out in their communities preventing emergencies. Yet a growing body of research shows that paramedics themselves face tremendous risks to their own safety and well being. Recent research in Australia found that the risk of serious injury among Australian paramedics was found to be more than seven times higher than the Australian national average. The fatality rate for paramedics was about six times higher than the national average. On average, every 2 years during the study period, one paramedic died and 30 were seriously injured in vehicle crashes. Ten Australian paramedics were seriously injured each year as a result of an assault. The injury rate for paramedics was more than two times higher than the rate for police officers. In the United States, emergency medical services (EMS) personnel have a fatality rate comparable to police and firefighters and a risk of non-fatal injury far above the rates for police and firefighters. Ambulance crashes, lifting injuries and violence contribute to the risks faced by providers on a day to day basis. These risks for paramedics hamper the development of the profession and also present risks to our communities including fewer available paramedics and higher costs of care. Prof. Brian Maguire, a pioneering paramedic-safety researcher, will discuss the transformative processes needed to ensure the safety of paramedics around the world.

During the session we will: examine the rates and types of fatal occupational injuries; summarize the types of non-fatal injuries among EMS personnel; compare EMS risks across countries; calculate injury rates for an individual agency; and, compare and contrast national and international rates. Finally we will focus on ways to reduce the risks and improve the safety for all providers.

Abstracts Friday, 11 March

26 To Optimise Prehospital CPR Performed by Firefighters (Att optimera prehospital HLR, genomförd av brandmän)
Anna Abelsson, Tony Falk and Christer Axellson

Background
In Sweden, firefighters are included in the emergency medical service. They are dispatched on cardiac arrests when there are no ambulances available. The fire fighters are trained to provide immediate CPR and the fire trucks are equipped with defibrillators. Fire fighters encounter a variety of cardiac arrest scenarios, both on the scene of the accident as well as in people’s homes. CPR comprise of good quality chest compressions containing adherence to rate, depth and full recoil. It also include ventilation of the patient. The aim of the study was to improve CPR quality performed by fire fighters by objective feedback.

Methods
Participants performed CPR for two minutes as a pre-test. Participants practiced thereafter low-dose, high-frequency CPR for one month. The training consisted of two minutes training with feedback during every shift. The month of training were ended with a 2 minute post-test. The data were analyzed with SPSS.

Results
The pre-test presents the participants initial CPR skills. The result show detailed information regarding compression depth, rate, recoil and fraction. It also show volumes of ventilation. The post-test presents the participants enhanced results after one month low-dose, high-frequency training consisting of two minutes CPR training per shift. These results identify a skill enhancement amongst the participants and therefore a comprised CPR quality.

Conclusions
Educational interventions are through feedback able to be evaluated to ensure the CPR quality. Feedback enable the fire fighters to act correctly in actual cardiac arrests which will improve patient outcome.
Early identification of severe sepsis – “the big killer”: a challenge for the EMS.
Lars Ljungström

Background
Severe sepsis is as common as acute myocardial infarction in Emergency Medicine, but 4-5 times as deadly. EMS nurses identify only a small proportion of these patients. Why?
Severe sepsis and septic shock mostly develop within the first 24 hours after admission to hospital. Early adequate antibiotic treatment reduces mortality and morbidity. How can we suspect or even diagnose severe sepsis already in the prehospital setting?
People with acute illnesses contact the EMS because of symptoms. Are there symptoms of sepsis? If so, which are they? What about vital signs? Which are the most common in patients with severe sepsis? And what about biomarkers? Can they be used already in the ambulance? If so, which ones?

Methods
In 2011-2012, we performed a 9-month population-based study on the incidence of community onset severe sepsis and septic shock in adults in part of our region. We discovered that patients with sepsis seek medical care with the same symptoms regardless of the focus of the infection or the causing bacteria. This hypothesis was later tested in another study. We also looked at vital signs, biomarkers, and molecular rapid tests for pathogen identification.

Results
Symptoms: Fever, dyspnea, confusion, severe pain, vomiting or diarrhea, and muscle weakness are symptoms caused by the inflammatory response to an infection. If three or more of these symptoms occur in a patient, they may have or be about to develop severe sepsis. Especially dyspnea or confusion alone correlate to severe sepsis.
Vital signs: Respiratory rate of >24/min, systolic blood pressure <90 mmHg or saturation <90 % are the most frequently found in patients with severe sepsis.
Biomarkers: The neutrophil to lymphocyte count ratio is faster than most other biomarkers and as good as procalcitonin.

Conclusion
Knowledge of the symptoms, the most common vital signs, and some biomarkers of severe sepsis can greatly enhance our ability to rapidly suspect or identify those patients in the prehospital setting.

National and Potential Preventive Strategies for Ambulance Safety in Sweden – The Importance of Adverse Events (Nationella och potentiella förebyggande strategier för säker ambulanstransport i Sverige - avvikelserapporteringens betydelse)
Jörgen Lundälv

In recent years, the importance of risk awareness, the significance of speed, and fatigue impact on emergency drivers have been increasingly discussed. In 2014, the Association of Health in Sweden performed a survey of 996 ambulance nurses regarding fatigue and rest periods. One-third were found to have fallen asleep at the wheel at some point. In 2015, a small study was conducted at Umeå University with ambulance nurses’ and ambulance personnel’s experiences of fatigue and rest in relation to ambulance driving. The material consisted of staff’s own reports of irregularities via the system Med Kontro Pro in Western Götaland, Sweden. In this system, during the period October 1, 2012 until November 1, 2015, 1700 irregularities were reported in ambulance and prehospital emergency care in Western Götaland. Of these, only 12 irregularities involved fatigue and rest periods that were reported during the period from 1 January 2013- November 2015. The informants describe their experiences in the form of lack of concentration, fatigue, risk exposure, hunger, nausea, and dizziness associated with long shifts. None of the informants focus on the driver’s role as emergency drivers. There are no notes about increased vulnerability in terms of increased safety risks, such as driving ability or suitability for being an emergency drivers. Half of the irregularities did not result in any action (N = 6). In five cases, the event was reported supervisor in the organisation, while in one case was related to a review of a routine. Despite Med Control Pro system's accessibility and user-friendliness, which only takes a few minutes to use, it can be stated that the ambulance nurses and paramedics rarely indicate safety concerns as emergency drivers. Although a majority of the irregularities describe illness during working hours, personnel do not declare there to be risks or issues with suitability as drivers to their employer.

During the speech, the importance of a national irregularity systems and feedback systems for emergency drivers of ambulances and other emergency drivers such the police will be discussed. Also to be discussed the importance of training for emergency drivers, regulatory requirements for emergency drivers, and the importance of developing skills and knowledge of injury prevention for emergency drivers. An emergency driver must always be a positive role model on the roads. Increased risk-taking, fatigue, and disinterest in irregularities within ambulance care thereby obstruct both preventative work and sends the wrong signal to future emergency drivers.
Abstracts Friday, 11 March

29 PrehospIT – Stroke: ICT Harmonisation in Prehospital eHealth Improves Acute Stroke Care
Bengt Arne Sjöqvist

Background
eHealth has the potential to radically improve prehospital care, but has not yet been deployed to its full strength. One major reason is the lack of agreed standards and methods for semantic and technical interoperability. This hinders systems to cooperate, and mitigates technical and clinical development and innovation. PrehospIT-stroke address this and aims at a national recommendation for harmonization of semantic and technical interoperability.

Methods
The focus for PrehospIT-Stroke is to pave the way for national harmonization of semantic and technical interoperability, with the stroke as the first application. This shall lead to better ICT/eHealth solutions in the acute phase as well as in follow-up, care development and quality assurance. PrehospIT-Stroke is implemented in 3 phases, including process mapping, standard inventory, recommendation, testing in lab environment, and field tests. In addition to ICT harmonization, video solutions for prehospital consultation shall be tested. PrehospIT-Stroke is run by Prehospital ICT Arena and funded by Vinnova and contributions from the 19 participants representing health care, business, and academia.

Results
In phase 1 a recommendation for harmonization has been suggested. It propose that NEMSIS, Snomed CT and HL7 shall be used as basis for interoperability. In phase 2 practical tests in a lab environment with modified and adapted existing products are carried out to verify the recommendation. These tests are done in co-operation by participating companies in an IHE influenced spirit with Connectathon as model. Predefined use cases covering the complete care chain of modern acute stroke care, including thrombolitics and thrombectomy, are used. The results will form the basis for practical field tests.

Conclusions
PrehospIT-Stroke has proposed a common ground for semantic and technical interoperability, which is now tested. So far the results are pointing in a direction of a well underpinned national recommendation for harmonization of semantic and technical interoperability.

30 Collaboration between Researchers and Prehospital Care Professionals for Design and Development of Simulation-based Training
Beatrice Alenljung and Hanna Maurin Söderholm

Background
Technology development for prehospital emergency care, e.g., simulation-based training, is characterized by high degrees of complexity. In order for new technology to become successful, developers need thorough knowledge of prehospital work practices and settings. It is therefore important to involve end-users as well as other stakeholders to collaborate during the whole design process.

Aim
The aim of this study is to investigate collaboration between prehospital practitioners and researchers in informatics and prehospital emergency care.

Methods
The case consists of a two-year development project for a new simulation-based training concept. Two rounds of interviews were conducted with project group members, half-way through the project and then after the project had ended. The interviews focused on how project participants experience collaboration, work process, and being involved in this type of development project. In all 23 interviews were conducted.

Results
Strikingly, the results show that while there are problems and tensions that potentially could overturn the project, e.g., conflicting goals, different priorities and ways of working, all participants express strong satisfaction with their participation. First, the interpersonal relationships between the individuals are reported to be very rewarding. They perceive each other as highly committed and easy to cooperate with. Second, the project vision is considered to be of high societal importance and all participants strongly believe in the new training concept. This implies that the accumulated positive experiences are so strong that they overshadow tensions and problems that under other circumstances could have caused a project breakdown.

Conclusions
Collaboration is not only a necessity to develop useful and effective technology for prehospital care; it can also be personally meaningful and enjoyable for the participants. The group composition and the importance and relevance of the project end results are two of the most important factors, along with a project leadership that acknowledges differences in work practices and priorities.
Software Support for Novice Transcranial Ultrasound Scanning
Leila Eadie, Luke Regan, Ashish MacAden and Philip Wilson

Background
Closed traumatic brain injury is a significant problem, with difficulties in early diagnosis in the field. Computed tomography is the gold standard for detecting brain haemorrhage, but scanners are bulky, expensive and currently not ‘ruggedized’. A cheap, portable scanner for brain bleeding could allow early triage and intervention: transcranial ultrasound (TCUS) has potential and, if paired with a communications system to transmit images to remote experts for diagnosis, could be used by minimally trained prehospital staff to assess the injured.

Methods
We aim to make head scanning simpler for non-medically trained users, providing a virtual 3-dimensional head model showing which areas of the brain have been imaged already, the probe’s current position, and where still must be covered to generate a full scan. We use movement sensors to measure the position and rotation of the TCUS transducer and determine where it is pointing: linking this to a 3D model of the head lets us display which areas have been imaged. The TCUS images recorded can be composited into a 3D scan, using image processing techniques to locate the skull and reshape the model to the individual’s head. This creates a personalised 3D scan with maximal coverage, which can be transmitted for diagnostic review with less chance of data loss than streaming an ongoing scan. Initial testing of the MATLAB software was performed by 12 healthy volunteers.

Results
92% volunteers reported the software was easy to use; all said it seemed accurate and achieved its aims. Feedback was used to improve program features.

Conclusions
This software supports novice TCUS users in taking diagnostically useful images; no ultrasound expertise is required. Only brief training on the machine and new program is needed. These initial tests in healthy volunteers will be followed by further testing in patients with brain haemorrhage.

On Scene Injury Severity Prediction (OSISP): Using Mathematical Algorithms to Improve Field Triage of Trauma Patients
Stefan Candefjord, Ruben Buendia, and Bengt-Arne Sjöqvist

Background
Many traffic accident victims do not receive optimal care because the severity of their injuries is not realized at an early phase. Those patients often require transfer to specialized care facilities. The delay causes detrimental medical outcome. Characteristics of crash severity like magnitude and principal direction of force (PDOF), i.e. retardation and crash angle, have proven valuable in improving field triage. This way mathematical algorithms can predict the risk that any passenger sustained severe injury based on these characteristics. As a complement, we are developing OSISP algorithms that perform injury severity prediction based on variables that can be assessed on scene. They do not need information from vehicle sensors.

Methods
The Swedish Traffic Accident Data Acquisition (STRADA) database and multivariate logistic regression were used [1, 2]. 29 128 patients were analyzed for cars, 2 775 for light trucks, and 922 for heavy trucks. ISS > 15 was used as threshold for partition between severe and non-severe injury. A protocol for evaluating the accuracy of the OSISP algorithm in prehospital use is under development.

Results & Discussion
The area under the receiver operator characteristic curve was 0.83 (cars), 0.81 (light trucks) and 0.74 (heavy trucks). Belt use was the most valuable predictor in every model.

Conclusions
OSISP shows promise to enhance field triage for traffic injury. Prehospital field tests are now needed for verification.

References
To perform a clinical trial in the prehospital field is often challenging. The environment is shifting all the time and the frequency of alerts often make it difficult to have the chance to fill in the clinical report form CRF. In many organizations you need to wait until you have the access to a computer at the hospital or in the ambulance station. The journals are often filled in after the shift or in the beginning of the next shift. In this system there are built in deficit and missing variables. The aim of this abstract is to show systems that make it easier to fill in the forms, during the alert or direct after when you still remember what you did and what happened.

**Method**
Most of the people today have a smartphone with applications to make the life simpler. We choose to use this system to perform a CRF on clinical Passive Leg Raise (PLR) study during cardiac arrest (CA). The study use variables according to ulstein which include both clinical data and ambulance delay. Before we started the study in a new area we educate the ambulance staff to use the website and how they put in the PLR application on ios and android. When they have this on their smartphones we tell them how to fill it in.

**Result**
Mobile application for research in prehospital care and new strategy will minimize missing and make the study easier to perform. It will definitely make it easier to collect data and decrease the work with finding paper journals and CRF. We will also have the possibility to computerize the data without delay.

Will the future disaster medicine still be based upon myths or are we turning towards a more evidence based approach? Despite 10 years of implementation of a new doctrine for a common medical response at major incidents, still old nomenclatures and medical disaster management tactics are present in hospital plans and in the minds of both health care and liaison agencies. The national indicators for medical response are only used in some of the health care authorities. The often-governing perception in the Swedish crisis and emergency preparedness system is that the health care medical disaster preparedness and response should be carried out in the so-called "basic capability" systems really needs revaluation. Is it possible to evaluate a medical system's ability and what are the outcome measures? What we believe is related to a prediction (risk) of mortality and morbidity has yet to be identified and scientifically evaluated also within the disaster medicine sciences. Globally, nations' disaster response systems are working towards an "all agencies, all hazard" approach where it is fundamental that the all emergency and disaster response are intertwined with each other. The future demands will be huge and the attacks in Paris have stressed the need for a broader and direct operative national coordination for all health care. Can Sweden cope with a major incident with many severe casualties? That depends on the total efforts of collaboration and management at all levels, with a goal-oriented coordination of time sensitive processes. Effective disaster management of today is to maintain the level of care as long as possible in prehospital and hospital setting by the use of a direct response and effective resource management to reinforce and maintain operative capability to avoid any preventable deaths.
**Ethical Problems When Licensed Medical Personnel Perform Care In A Combat Zone**

**Kristina Lundberg**

**Background**

The aim is to analyze the ethical problems when physicians and registered nurses, i.e. licensed medical personnel (LMP) in the Swedish Armed Forces perform care in the combat zone. Ethical problems lifted are that LMP are gathering intelligence and also perform guard duties. Question raised are if it is possible to follow international humanitarian laws when working in the combat zone? Dual loyalties – Swedish Armed Forces and medical ethics - are another issue in the combat zone. This presentation focuses when licensed medical personnel are gathering intelligence.

**Methods**

The method used was a normative analysis based on the idea of reflective equilibrium.

**Results**

The analysis showed that LMP gathered information. Relevant factors involved in the ethical problems when LMP work in the combat zone if LMP voluntarily or by order, transparently or covertly; if there are any physical risks for the civilians from host nation; if LMP violate the integrity and privacy of their patients, if there are long-term risks for the role of LMP and under which phases LMP gather information; before, concurrently with or after giving medical care.

**Conclusions**

Intelligence gathering can be ethically justified when it is voluntary and transparent, and it is least problematic after care provision. In the short run it does not seem to imply medical or other risks. From a systemic perspective and ethical point of view it may be problematic if LMP gather intelligence, because they put their non-combatant status, and their special protection according to the Geneva Convention and laws of war, at risk which might involve not being able to fulfill their medical role.

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**Disaster Radio: A Tool to Promote Health**

**Karin Hugelius, Mervyn Gifford, Per Örtenwall and Annsofie Adolfsson**

**Background**

Disasters can cause physical and psychosocial health problems in both a short and long time perspective. After the supertyphoon Haiyan that hit parts of the Philippines in November 2013, disaster radio was used as part of the response strategy to broadcast information and music to the population in one of the most affected areas. This study describes survivors’ experiences of the immediate aftermath of a natural disaster and the impact disaster radio made on recovery from the perspectives of the individuals affected.

**Method**

Twenty eight persons were interviewed in focus groups and individual interviews, five months after the disaster. The interviews were analyzed with phenomenological hermeneutical method.

**Results**

"Being in survival mode", the overall experience, included both physical and psychosocial dimensions. Several urgent needs experienced by the survivors were identified. Disaster radio contributed to the recovery by providing facts and information that helped the survivors to understand, create a sense of control and to adapt to the new situation. The music that was played contributed to emotional endurance and hope among the survivors. To re-establish social contacts, other interventions are needed.

**Conclusion**

Disaster radio can positively and in many aspects contribute to recovery among disaster survivors also in situations with a severely affected infrastructure and a large number of potentially affected people. Further studies on the use and impact of disaster radio in a health perspective are needed.
Background

The outcome of a disaster is depended on many factors including the medical response from local and external resources, including international response(1). Medical professionals working in a disaster area can be affected by psychosocial problems including moral conflicts (2) and post-traumatic stress (PTSD) (2,3). In order to optimize disaster response and recovery, further knowledge of medical staffs’ specific needs and experiences from being and working in a natural disaster is needed.

This study aimed to describe medical professionals’ experiences from being in, and in the immediate aftermath, of the super typhoon Haiyan that hit the Philippines in November 2013.

Method

Four medical doctors, three nurses and one paramedic who had been on duty during and immediately after the typhoon were interviewed, five month after the event. The interviews were analyzed with phenomenological-hermeneutical method(4).

Results

At the time for submitting abstract, the study is under analysis.

Conclusion

At the time for submitting abstract, the study is under analysis

References:


(2) Geisz-Everson MA, Dodd-McCue D, Bennett M. Shared Experiences of CRNAs Who Were on Duty in New Orleans During Hurricane Katrina. AANA journal 2012; 80(3):205.212.


Introduction

Public hospitals in Sweden struggle with how to decrease the costs and at the same time develop processes of care of good qualities combined with sustainable working conditions. In particular, the emergency processes of care have been a challenge in these aspects within the hospitals. Hospitals management has often applied methods inspired by Lean production in the organizational improvements of emergency processes of care. Studies have shown that main challenge for success, in practice, is to engage health care clinicians and operative managers in the implementation. Few studies have investigated the long-term impacts.

Aim

to assess the long-term importance of implementing LP in hospitals for improved quality of care, efficiency and sustainable working conditions and work engagement.

Methods

Five hospitals working with improvements of care processes were tracked during 2012-2014, two of them had strategically implemented lean production as the model for change. Interviews at strategic and operative levels (n=198) were analysed qualitatively. Questionnaire was sent to physicians, nurses and assistant nurses working at selected units at five hospitals in 2012, 2013 and 2014 (n=913). Descriptive, comparative, multivariate and repeated analysis over time was conducted.

Results

The implementation strategies varied between the strategic and operative levels. Increased work and organizational resources had strong importance for the high clinical engagement in improving care processes. Lean-inspired work adapted at operative-level was, especially at the one-year follow-up, associated with increased work conditions (improved leadership, recognition, role-clarity and predictability as well as decreased pace and quantitative demands) and increased engagement in clinical improvement of quality of care and patient safety. The long-term follow-up showed that stress-related symptoms and work demands increased in units and hospitals not working with improvements of care processes. There were different patterns of results with regard to top-managerial approaches, e.g. governance by contracts of trust or control and degree of intervening approaches.

Conclusions

The study contributes to the knowledge about implementation of management concepts in professional organizations and, when professionals are mobilized for engaging in development of emergency care processes. The results demonstrate the intertwined importance of work context resources in relation to initiatives, approaches and drives of change.
How Preconditions and Support Resources Affect Healthcare Managers’ Appraisal and Work with Planned Change (Hur förutsättningar och stödresurser påverkar hälsos- och sjukvårdens chefsers arbete och attityd till att arbeta med verksamhetsutveckling)

Jörgen Andreasson, Linda Ählström, Andrea Eriksson and Lotta Dellve

Background
Healthcare managers are expected to lead and manage planned organizational change that aim to improve healthcare process quality. Despite recent year’s studies on manager’s preconditions and support resources, there is still lack of knowledge in how this kind of conditions affect the outcome of work with planned change. We also propose that the availability to preconditions and support resources are associated with the manager’s appraisal to change, and the outcome from the work with planned change.

Methods
Prospective cohort study including managers at three Swedish hospitals, at the time implementing Lean and two Swedish hospitals implementing their own improvement model. Questionnaire data were used with a three year follow up, 2012, 2013 and 2014. For analyses we used t-test, and a linear mixed model design.

Results
Managers that estimated high support from, employees, management and organizational structure rated higher levels of healthcare process quality. No associations between preconditions and healthcare process quality were found. In general and over the whole study period managers estimated to some degree negative appraisal to change. Managers that felt high supported in all studied variables, and the managers with longest managerial experience estimated least negative appraisal to change. The only difference found between Lean vs no Lean hospitals, were if organizational support was given, the no Lean hospitals estimated lower levels of negative appraisal to change.

Conclusions
Managerial experience and perceived high support from people in the managers proximity is favorable for less negative appraisal to change. High support predicts higher levels of healthcare process quality.

Healthcare at optimal Care Level for Patients who needs Primary Care — Collaboration between care providers From The Emergency Medical Services’ perspective (Vård på optimal vårdnivå för patienter som är i behov av primärvård — Samarbet mellan vårdnivåer från ambulanssjukvårdens perspektiv)

Birgitta Wireklint Sundström, Gabriella Norberg Boysen, Lennart Christensson, Maria Nyström, Göran Jutengren and Johan Herlitz

Background
If patients receive the optimal level of healthcare directly it will prevent suffering for both patients and their relatives and moreover save a lot of resources. It is a well-known problem in western countries that patients end up at the emergency department (ED) using the emergency medical services (EMS) although they could be treated at another level of care.

Aim
The overall aim of this research project is to investigate if it is possible for the prehospital emergency nurse (PEN) to triage non-urgent patients to the optimal care level in the primary healthcare (PHC). This project is expected to provide answers as to whether this prehospital triage is possible to manage with medical safety and that the patients experience trust in healthcare. And further it will answer the question as to whether the care providers around the patient manage to collaborate. The research has a health care science approach, which has the patient in focus, with the general aim to describe care that strengthens and supports health.

Methods

Results

Conclusion
No conclusion is formulated yet.

Acknowledgements
Many thanks to Länsförsäkringar (a Swedish insurance company) for generous financial support.
Burnout and Work Satisfaction Among Ambulance Staff (Utbrändhet och samvetsstress hos ambulanspersonal)
Anna Kristensson-Ekwall

The ambulance service is part of the acute care chain and also part of the public safety organization, with many similarities to the emergency services and the police, some of the same situations that are stressful, such as accidents, fires, assaults and death. As the ambulance crew also is engaged in health care, there is also stress and burden experienced in the caring part of the work, which has features in common with other health services. Staff turnover in this group has recently increased, which may be due to stress and burnout. Knowledge of how the situation is perceived by the staff is lacking. The staff in the acute care chain is influenced by both social as interpersonal aspects, and have a low degree of influence on their work situation. Knowledge of how this affects them, and in turn the patient care, needs to be developed.

The method was a cross sectional survey among Swedish ambulance staff, using a questionnaire including Maslach Burnout inventory, work satisfaction, Sense of Coherence and demographic data. Persons working in the ambulance care in the southern part of Sweden were invited to participate.

The colleagues seemed to be of great importance, but one fifth of the sample had thought about changing career. The work of the ambulance can be stressful and unpredictable. All persons handle stress differently. Knowledge correlation between degree of exhaustion and the sense of connection of the paramedics would give the business the opportunity to identify those who may feel bad in his situation, but also strengthen those who seem to manage it in a good way. This is to get staff who are well and who want to remain in the ambulance service.

Using Shoulder Straps Decreases Heart Rate Variability And Salivary Cortisol Concentration In Swedish Ambulance Personnel (Stressmätning - lyftjälmkedel minskar den uppmätta fysiska ansträngningen)
Kåre Karlsson and Patrik Niemelä

Background
Previous research has shown that paramedics are exposed to risks in form of injuries to the musculoskeletal system. In addition there are studies that show that they are over-represented in terms of cardiovascular disease, cancer and psychiatric diseases, partly explained by exposure to stress. The aim of this study was to see if use of shoulder straps decreases the physical effort in form of decreased heart rate and cortisol concentration.

Method
A stretcher with a dummy was carried by 20 participants 400 meters on two occasions, one time with and once without shoulder straps. Heart rate was continuous monitored and cortisol samples were taken at 0, 15, 30, 45 and 60 minutes. Each participant was his own control.

Results
A significant decrease in heart rate and cortisol concentration were seen when shoulder straps were used. Median for men at 0 minutes 78/21.1 (heart rate/cortisol concentration), 15 minutes 85/16.9 and 60 minutes 76/15.7 and without shoulder straps at 0 minutes 78/21.9, 15 minutes 93/21.9 and 60 minutes 73/20.5. For women, 85/23.3, 92/20.8, 70/18.4 and 84/32.4, 100/32.5, 75/25.2 respectively.

Conclusion
Use of shoulder straps decrease measurable physical stress and should therefore be used when heavy equipment or stretcher needs to be carried. To ensure this they should be personal alternatively be sewn into alarm jackets.
Abstracts Friday, 11 March

**43 Patient Participation: A Challenge within Contemporary Ambulance Care?**

*Mats Holmberg, Andreas Rantala and Anders Bremer*

**Background**
Patient participation should be understood in relation to vulnerability, power and responsibility. Patients in ambulance care have urgent care needs and are vulnerable in an asymmetrical relationship with the clinicians. This places great responsibility on the clinicians to use their power for the benefit of the patient. An invitation to participate requires an informed consent and depends on the patient’s willingness and ability to participate. Hence, assessment of the patient’s decision-making ability is central together with a caring approach to enhance trust and confidence. Undoubtedly, patient participation is a challenge within contemporary ambulance care – where failure is likely to cause suffering.

**Methods**
Patient participation in ambulance care is discussed from philosophical, patient and person-centred perspectives in relation to empirical research of Bremer et al. (2012), Holmberg et al. (2014; 2015) and Rantala et al. (2015).

**Results**
Patients are comfortable in their surrender to ambulance clinicians, obeying commands and being important while involved in the care. However, patients are powerless when they experience ambulance clinicians’ care as excessive, having a strong desire of being acknowledged in their suffering. This can be achieved by seeing the patient as capable and involve the patient and significant others in the decision-making. In addition ambulance clinicians have an ambition to be pliable to the patient’s wishes, inviting the patient in a shared decision-making.

**Conclusions**
Patient participation in ambulance care can be understood as important for the patient’s wellbeing. However, unequal distribution of power within the ambulance clinician-patient relationship may challenge patient autonomy and interests. Is it possible to achieve genuine patient participation in the context of ambulance care?

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**44 Developing a model to enhance patient involvement in designing and conducting research: views of patients, academics and health service staff**

*Bridie Angela Evans*

**Background**
Patients with chronic conditions are at high risk of using unscheduled and emergency services because health status fluctuates and deteriorates. We work with them to design and conduct collaborative research, but need an effective interaction process with academic and organisational experts. Involving patients and members of the public in planning and conducting research is encouraged to improve quality, relevance and accountability of research.

**Objectives**
To describe development and implementation of a model to enhance patient involvement in research about prehospital and community health and social care

**Methods**
Twenty patients with chronic conditions were supported by a researcher to develop ways to enable their involvement in health services research. We explored experience of being involved in research through the model by conducting interviews with participating patients, academics and senior managers responsible for health policy and services. Data were audio-recorded with consent and analysed using Interpretative Phenomenological Analysis.

**Results**
Patients established a pool structure, sharing support, information and skills development. Members were recruited to more than 30 collaborative research opportunities over three years. Interview respondents agreed the model increased the number and proficiency of patients involved in research about prehospital and community based care. Academics and health service managers perceived this was a credible and legitimate patient group. However recruitment and communication processes were seen as confusing and interaction in research meetings was not consistently effective. Patients found the language and culture of research environments was off-putting and said they did not always know what they should and could contribute.

**Conclusions**
We developed a model which enhanced patients’ contributory expertise and strengthened some interaction processes when they were involved in research through collaboration. Further research training for patients, improved communication and better ways to match patients’ skills to research opportunities are needed to strengthen the model. Research teams should also clarify aims and roles of all collaborators when involving patients in research, to enable all expertise to be effectively integrated within research processes.
Involving older people in a multi-centre randomised trial of a complex intervention in pre-hospital emergency care: implementation of a collaborative model

Bridie Angela Evans

**Background**

Health services research is expected to involve service users as active partners in the research process, but few examples report how this has been achieved in practice in trials or prehospital emergency care. We implemented a model to involve service users in a multi-centre randomised controlled trial in pre-hospital emergency care. We used the generic Standard Operating Procedure (SOP) from our Clinical Trials Unit (CTU) as the basis for creating a model to fit the context and population of the SAFER 2 trial.

**Methods**

In our model, we planned to involve service users at all stages in the trial through decision-making forums at 3 levels: 1) strategic; 2) site (e.g. Wales; London; East Midlands); 3) local. We linked with charities and community groups to recruit people with experience of our study population. We collected notes of meetings alongside other documentary evidence such as attendance records and study documentation to track how we implemented our model.

**Results**

We involved service users at strategic, site and local level. We also added additional strategic level forums (Task and Finish Groups and Writing Days) where we included service users. Service user involvement varied in frequency and type across meetings, research stages and locations but stabilised and increased as the trial progressed.

**Conclusion**

Involving service users in the SAFER 2 trial showed how it is feasible and achievable for patients, carers and potential patients sharing the demographic characteristics of our study population to collaborate in a multi-centre trial at the level which suited their health, location, skills and expertise. A standard model of involvement can be tailored by adopting a flexible approach to take account of the context and complexities of a multi-site trial.

Can a Regular Smartphone be used as an Automatic Crash Notification System for Vulnerable Road Users?

Leif Sandsjö, Bengt Arne Sjöqvist and Stefan Candefjord

**Background**

To reduce the effects of a traffic accident it is essential to transport the casualties to the right care facility with minimal delay. For (single) accidents involving Vulnerable Road Users (VRUs) it is often a problem to know about and report the accident and its location swiftly, and thereby the rescue gets delayed. EU’s eCall regulation requires future cars to be equipped with Automatic Crash Notification (ACN), which notifies 112 with the vehicle’s exact location (GPS) in case of a crash.

Today's smartphones are equipped with high quality movement sensors (accelerometers, gyroscopes, magnetometers), GPS and SMS functionality, i.e. key components of an ACN. Thus, the aim of this study was to explore the feasibility to develop ACN for VRUs based on regular smartphones.

**Methods**

We have focused on recording normal activity from bicyclists, horse-back riders, and ATV (All Terrain Vehicle) users, i.e. three different VRU categories who could benefit from an ACN system. Based on these recordings and simplified crash tests/simulations we have developed algorithms for incident detection, i.e. activities which are recognized as non-normal and should be reported as a potential accident.

**Result**

A fully functional ACN app for bicyclists (available from Google Play) and a beta prototype for horse-back riders have been developed. ATV use may be the most challenging of the three VRU groups, as ATVs are often used at low velocities and may rollover without causing high impact to the driver. A first prototype of an ACN algorithm for ATV users resulted in 13 false alarms during 49 hours, i.e. about one every fourth hour. The current development is focused on improving the accuracy of incident detection for ATVs, firstly by decreasing the number of false alarms.

**Conclusions**

This work demonstrates the feasibility of smartphone based ACN systems for VRUs.
Ambulance personnel participating in co-design of a new concept for detection of traumatic injuries in emergency care
Leif Sandsjö, Siw Eriksson, Pontus Wallgren and Marianne Karlsson

Background
Studies in product development argue the importance of user involvement when designing products. Benefits include targeting relevant problems, finding usable and innovative solutions, and eliciting user needs and expectations that may prove critical when introducing the new product.

However, some difficulties have been identified. These are mainly related to differences between the users and developers in terms of skills, experiences, terminology, goals and perspectives and that the users tend to neglect the value of their input. Typically users are also included too late in the process to have any real opportunities to alter the final product.

The aim of this study was to explore how early inclusion of user competence might influence the development of a novel concept for detection of traumatic injuries in emergency care.

Methods
Ambulance nurses representing car and helicopter ambulance were invited to three consecutive workshops to co-design key products of the new concept together with development personnel from the company behind the new concept and design researchers/engineers. The workshops were held in the ideation, concept generation, and development stages of the project. Each workshop was prepared by the researchers to enable and stimulate interaction within the group by applying design practices and provide mock-ups/illustrations.

Result
Preliminary results from interviews tell that the company representatives report more detailed knowledge about the ambulance personnel’s needs earlier in the process compared to previous projects, and that this knowledge contributed to products with higher usability.

The ambulance personnel were positive and pleased to contribute their knowledge. One response was “it is very interesting to contribute to the development of a future product”.

Conclusions
The tested co-design process facilitated the ambulance nurses to contribute their knowledge so that needs and requirements was understood and integrated by the engineers in the design of the new concept for emergency care.

Nursing Prehospital Care In A Rural Region Of Portugal
Cláudia Isabel Neves Pacheco Da Silva

Background
Odemira is the largest county in Portugal and Europe. It is predominantly rural with particular geodemographic characteristics that influence the population’s health, such as high number of senior people, large distances to hospitals, difficult communication and poor condition of road networks that increases this distance even more. This influences prehospital emergency care, which is performed by teams (a nurse and a technician) in the Immediate Life Support (ILS) ambulances, particularly in acute cardiac events and their prognoses.

Methods
Using a descriptive approach, the occurrences of ILS activations in Odemira during 2014 were analyzed to characterize the main reasons for activation, time for arrival, time on site and total duration of the event. Questionnaires were also applied to all nurses of the ILS team to understand their perception about the specificity of nursing prehospital care to critical ill patient with chest pain.

Result
In 2014, the leading cause for activation of ILS ambulance in Odemira was chest pain. The average time of arrival was 23 minutes, time on site was 32 minutes and total time of occurrence was 2:30 hours. This doesn’t include the time of performing PCI. Nurses of ILS ambulances agree that geodemographic characteristics of the county influence the emergency nursing care to critical ill patient with chest pain.

Conclusions
The large extension of Odemira and long distances to PCI center difficult to accomplish the 2015 myocardial reperfusion guidelines, requiring implementation of new strategies to improve accessibility. Although, spending more time with critically ill patients promotes the development of highly skills in monitoring and clinical decision making of prehospital emergency nurses. This is also an opportunity to enhance the safety of these patients.
Ambulance Nurses’ Thoughts and Experiences of Text Message Lifesaving and Suspected Cardiac Arrest: A Qualitative Interview Study
Marlene Soldemo and David Norén

**Background**
Studies and writings about SMS (text message)-lifesaving clearly indicate that it improves survival rate; however, no studies describe how the ambulance nurse experience the meeting with the SMS (text message)-lifesaver.

**Aim**
To describe the ambulance nurse’s thoughts and experiences about the SMS (text message)-lifesaver being the first to arrive on suspected cardiac arrest.

**Method**
A qualitative interview study with 6 participants.

**Result**
Both positive and negative thoughts and experiences have been expressed in the meeting with SMS (text message)-lifesavers. They were seen as an asset because they shortened the time between cardiac arrest and cardiopulmonary resuscitation (CPR). There was a feeling of uncertainty about the competence of the SMS (text message)-lifesaver. Their action affected the ambulance nurses experiences. The safety aspects and the ethics concerning SMS (text message)-lifesaving where emphasized.

**Conclusion**
The meeting with the SMS (text message)-lifesaver was described both positively and negatively. Due to the result of this study the SMS (text message)-lifesaving was developed in a time when it was very much needed since the ambulance service in the county of Stockholm is under increasing pressure.

**Keywords:** Cardiac arrest, SMS (text message)-lifesaver, Cardiopulmonary resuscitation (CPR), Specialist nurse, ambulance nurse.

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Rapid Analgesia for Prehospital Hip Disruption (RAPID): a feasibility study
Jenna Bulger

**Background**
Transporting a patient with hip fracture is very painful and can cause high levels of distress. Patients attended by 999 emergency paramedics may not receive adequate pain relief, and the usual analgesia given may affect patients’ health and recovery. Fascia Iliaca Compartment Block (FICB), a procedure involving injection of local anaesthetic into tissues surrounding the hip, is routinely administered by doctors and nurses in Emergency Departments for patients with hip fracture, but its use has not been tested by paramedics at the scene of the patient’s injury.

**Aim of the research**
This study aims to assess whether FICB administered by paramedics at the scene is feasible, safe and acceptable. The outcome will determined the need for a full randomised controlled trial to decide whether the procedure is effective for patients and worthwhile for the NHS.

**Methods**
We will recruit ten paramedics in the Swansea locality who will be trained to administer FICB. Eligible patients will be randomly allocated to FICB or usual care using scratch cards. We will assess compliance of paramedics; pain scores; side effects; length of hospital stay; quality of life; and acceptability to patients and paramedics by conducting interviews and focus groups.

**Outputs**
We will recommend whether a full randomised controlled trial of FICB by paramedics for hip fracture is warranted and, if so, a proposal for research funding will be submitted.

This project is funded by Health and Care Research Wales, through their Research for Patient and Public Benefit funding call (1003). The views and opinions expressed are those of the authors and do not necessarily reflect those of Health and Care Research Wales or the National Health Service.

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**49** Rapid Analgesia for Prehospital Hip Disruption (RAPID): a feasibility study
Jenna Bulger

**50** Ambulance Nurses’ Thoughts and Experiences of Text Message Lifesaving and Suspected Cardiac Arrest: A Qualitative Interview Study
Marlene Soldemo and David Norén
**Immobilization after trauma: a retrospective study of the incidence of spinal injuries**  
*Emma Johansson and Johan Mälberg*

**Background**  
Spinal immobilization is an established practice in today's prehospital trauma care. This even though there is a lack of randomized controlled studies regarding this practice. Many studies points to the risks regarding spinal immobilization why it is of importance to further examine the practice.

**Aim**  
The aim of this study was to investigate the incidence of radiologically confirmed spinal injuries in patients immobilized after prehospital trauma and on what indications this immobilization was done.

**Method**  
A quantitative retrospective study of 288 medical records acquired from the ambulance medical record system Mobimed 3.0 and the hospital's medical record Cosmic were examined. The results were analyzed in SPSS descriptive and graphic, with chi2-test and independent t-test.

**Result**  
The results show that of the 246 patients who underwent a radiological examination, 46 had a spinal injury, approximately 17%. All of the included patients had been exposed to blunt trauma and the most common indication for immobilization was pain/tenderness over the spine. The mean age of the patients with spinal injuries was significantly higher than the mean age of those without spinal injuries. A significant difference was also found between patients with pain/tenderness over the spine and spinal injury and those without spinal injury.

**Conclusion**  
A greater number of patients had a spinal injury in this study compared with previous studies, although the majority of the patients had no spinal injury. This means that the majority of the patients were exposed to a potentially unnecessary procedure that lacks scientifically evidence. More studies about immobilization are required to reduce the patients' potential suffering in connection with prehospital immobilization.

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**The ambulance personnel’s experiences of recovery between missions**  
*Jonas Andersson and Torkel Liljekvist*

**Background**  
Ambulance personnel face daily stress and high workload. This leads to increased risk of health problems among ambulance personnel and risk to affect care.

**Purpose**  
The purpose of this study was to elucidate the ambulance personnel experiences of recovery between missions.

**Participants**  
In the study contributed ten employees in prehospital care at two mid-sized cities in Sweden and surrounding rural areas.

**Method**  
The study was based on ten semi-structured interviews conducted in December 2014. The interviews were recorded and analyzed using qualitative content analysis.

**Results**  
Four categories emerged: Prerequisites for recovery, Circumstances that provides recovery, Circumstances that impairs recovery and Consequences of lack of recovery. To the four categories 14 subcategories were created. The factors that were considered most important for good recovery is daytime, meals and social interaction. During nighttime sleep was described as the most elementary. It was pointed out that it is difficult to plan for rest and recovery, partly because the workload, partly because of uncertainty about the workshifts progression.

**Conclusion**  
The result of the study shows that ambulance personnel feel that the most important recovery occurs through sleep, meals and socializing. Prerequisites for rest and recovery has a fundamental role. What may limit the recovery is perceived to be; lack of adequate crisis management, short time for recovery and poor peer support. Which can lead to impaired care and risk of adverse health effects.
Swedish ambulance care has undergone major changes in recent decades, which has meant that demands on nurses’ competence to ensure quality care and patient safety have increased significantly. Generally lacking in Swedish ambulance healthcare is an effective system for monitoring patients who have been treated prior to the hospital. As a result, this important opportunity for professional and organizational development is not utilized. In the surveyed ambulance organization, a new system was introduced in early 2015 for monitoring patients who have been treated prior to the hospital which created new opportunities for the nurse to follow up their assessments and treatments.

The aim was to survey the patient follow-up system of patients who have been treated prior to the hospital within a specific ambulance organization based on the following questions: To what extent the opportunity to follow up used, what influenced the nurse to follow-up, and the perceived impact of follow-up. The method used was a single case study method, which meant that both quantitative and qualitative data were used. Unique to the case study method is that data collected in different phases is analyzed before the next phase of data collection starts. In the first phase, a search was conducted for documents within the ambulance service that related to monitoring. In phase two, a survey was conducted which also formed the basis of the interviews conducted in phase three.

The results showed that follow-up of patients who have been treated prior to the hospital increased after the introduction of the new system and that current procedures were unclear. Common reasons for the ambulance nurse to follow up their patients were the uncertainty of the assessments, own skill development, and a willingness to contribute to increased patient safety. The follow-up had a positive impact on nurses’ confidence and competence. However, there was a need to clarify the procedures on how the system could be used to ensure the feedback around the knowledge obtained through follow-up to the organization. This was a wish from both the employers and the nurses in the ambulance. More systematic follow-up can lead to follow-up that is not limited to individual patient cases that individual nurses considered to be relevant. This can promote patient safety and ultimately reduce unnecessary suffering for the patient.

Patients with mental illness- ambulance nurse’s experience of the caring meeting.

Jenny Karlsson Pajaujis

Background
To meet patients with mental illness is included in the profession of the ambulance nurse. As a professional, with her self as a tool, the ambulance nurse shall accomplish good care by meeting these patients based on individual and sometimes complex needs.

Purpose
The purpose of this study was to describe the ambulance nurse’s experiences of meeting patients with mental illness.

Methods
The study was performed using a qualitative method. Semistructured individual interviews were used as method for collecting the data. Content analysis was performed according to Elo and Satu (2008) description of the process of analyzing.

Findings
One generic category was found in the result: “Suffering various needs of unique care creates increased vulnerability and challenge for the ambulance nurse in the caring meeting with patients with mental illness”. The following three categories builds up the generic category: “The shades of suffering”, “Relatives suffering from life and increased responsibility” and “The ambulance nurse’s increased vulnerability and challenges in the caring meeting”.

Conclusion
With her self as a tool in the meeting with patients with mental illness the ambulance nurse shall create a caring meeting. The meeting shall be created with a unique individual, often suffering, sometimes in an unpredictable situation. This entails an increased challenge and vulnerability both from the perspective of the profession and her self in a demanding health care environment. Keywords: mental illness, ambulance nurse, suffering, caring, vulnerability, content analysis
Aims and objectives
The aim of this study was to examine the preparedness of ambulance personnel to major incidents in the underground mining industry.

Background
Every year, a high number of incidents, workplace accidents and fires are reported from the Swedish mining industry. Taking care of patients located in an underground mine represents a challenge to the ambulance personnel. Today, knowledge about the ambulance personnel’s preparedness to major incidents in the mining industry is limited. Design: The study design was a cross-sectional survey.

Methods
The postal questionnaire was sent to ambulance personnel working in an ambulance station geographically situated near an underground mine. A total of thirteen ambulance stations were included and 137 personnel answered. Demographic data was analyzed by descriptive statistics. Differences between groups were analyzed by Chi2-test, Continuity correction and t-test.

Results
About half of the participants reported they do not feel prepared to work in a major incident in an underground mine. The majority wished to receive education to enhance their preparedness. The most commonly requested type of education was practical drills on scene, in an underground mine. The reported preparedness was significantly higher among the participants who had withheld some kind of education, or had authentic experience of a mission in an underground mine than those who did not.

Conclusion
This study reveals shortcomings in the preparedness work of the ambulance services. The perceived low preparedness of the ambulance personnel may affect their work achievement in a major incident in the mining industry. Relevance to clinical practice: The study results may be used in planning the future education including practical drills of the ambulance personnel.

Obstructive Sleep Apnea in Coronary Artery Disease; Impact of CPAP treatment
Helena Glantz

Background
Obstructive sleep apnea (OSA) is common in coronary artery disease (CAD) and a possible cause of increased mortality and morbidity. Many of these patients do not report daytime sleepiness and are not considered for investigation for OSA or treatment with continuous positive airway (CPAP).

Methods
Between December 2005 and November 2010, 511 consecutive patients with CAD and OSA (apnea-hypopnea index [AHI] ≥15/h), or without OSA (AHI <5/h) were enrolled in Skaraborg. Patients with CAD and nonsleepy OSA (Epworth Sleepiness Scale [ESS] score <10) were randomized to CPAP or no intervention (n=244). As additional controls, 155 patients with sleepy OSA (ESS >10) receiving CPAP, and 112 patients without OSA were followed. The primary outcome was the composite of repeat revascularization, myocardial infarction, stroke and cardiovascular mortality.

Results
The incidence of the primary endpoint was similar in the randomized arms (hazard ration [HR] 0.80; 95% confidence interval [CI] 0.46-1.41; P=.45) for CPAP vs no-CPAP in nonsleepy OSA in the intention-to-treat analysis. In the per-protocol population, unadjusted and adjusted HRs were 0.52 (95% CI 0.23-1.15; P=0.11) and 0.41 (95% CI 0.18-0.94 P=.04), respectively. The association was stronger when CPAP usage was ≥4h/night (HR 0.29 95% CI 0.10-0.86; P=.03).

Conclusions
Routine treatment with CPAP did not significantly reduce long-term adverse outcomes in patients with nonsleepy OSA. However, risk was significantly reduced after adjustment of baseline comorbidities and CPAP adherence.
Emergency medical dispatch – the first medical response for life threatening conditions
Angela Bång

Aims
To describe the Emergency Medical Dispatcher’s (EMD) possibility of assessment and intervention of patients reported having chest pain and/or cardiac arrest, with regard to identification of the problem, priority-decision, provision of instructions in dispatcher-assisted bystander cardiopulmonary resuscitation (CPR), and the subsequent outcome in terms of final diagnosis and survival.

Methods
Prospective and retrospective observational studies based on registrations made by EMDs in case record forms (during two months, 1993), and in the dispatch protocol (27 months, 1994-1996) and subsequent follow-up in ambulance and hospital files. Evaluations of tape recordings of emergency calls to the EMS dispatch centre, concerning patients treated for out-of-hospital cardiac arrest (99 calls/1986, 100 calls/2000-2001). A qualitative study was used to describe the EMDs perceptions of identifying cardiac arrest, offer and provide instructions in CPR to callers. Ten EMDs were approached for face-to-face interviews in 1997.

Results
Among 503 patients reporting chest pain, 68% were judged as having severe chest pain, of which 26% developed acute myocardial infarction (AMI) as compared with 13% among patients judged as having only vague chest pain (p = 0.0004). The EMDs had a strong suspicion of AMI in 36%, a moderate suspicion of AMI in 34%, and a vague or no suspicion in 30%. Among patients with a strong suspicion of AMI, 29% subsequently developed AMI compared with 18% among patients with a moderate suspicion, and 15% among patients with only a vague or no suspicion of AMI (p = 0.001). The study sample size was too small to evaluate the predictive value of various associated symptoms accompanying chest pain. The priority level was similar in patients with and without a life-threatening condition (81% vs. 73% receiving the highest priority). In patients with cardiac arrest outside hospital, more attention should be paid to the detection of these patients by the EMDs, however, when the EMDs had a suspicion, their accuracy was high. Half of witnesses accepted an offer of instructions in CPR, and one-third completed dispatcher-assisted bystander CPR. The comparison between no performance and performance of dispatcher-assisted bystander CPR, suggests an increase in survival from 6% to 9%. Among suspected cardiac arrest cases, EMDs offer CPR instruction to only a small fraction of callers, with an accomplishment in all of ~8%. However, 30-50% of suspected cardiac arrest cases seemed eligible to be approached with such an offer. A major obstacle was the presentation of suspected agonal breathing, which was estimated to occur in about 30%, and was described as: difficulties breathing, poorly, gasping, wheezing, impaired and occasional breathing. The EMDs have a belief that they are being an empathic authority that relieves the caller of the burden of responsibility, and by meeting the witness mentally, this may enable the caller to act at the scene. The EMDs are dependent on the callers knowledge and trustworthiness, and convincing answers from the caller prompt a more secure feeling in the EMDs, just as caller’s lack of knowledge having a negative effect on the EMDs efforts.

Conclusion
There was a strong relationship between the EMDs suspicion of AMI and subsequent development of AMI. One-third, however, developed AMI among those where the EMD had made a moderate, vague or no suspicion of AMI. Patients judged to have severe chest pain, developed AMI twice as often as patients judged to have vague pain. Caller’s reporting patients with a combination of unconsciousness and agonal breathing or respiratory arrest should be offered dispatcher-assisted CPR instruction. This may improve survival in out-of-hospital cardiac arrest.

Lifesaving after cardiac arrest due to drowning – Characteristics and outcome
Andreas Claesson

Aims
The aim of this thesis was to describe out-of-hospital cardiac arrest (OHCA) due to drowning from the following angles. In Paper I: To describe the characteristics of OHCA due to drowning and evaluate factors of importance for survival. In Paper II: To describe lifesaving skills and CPR competence among surf lifeguards. In Paper III: To describe the characteristics of interventions performed by the Swedish fire and rescue services (SEARS) and evaluate survival with or without rescue diving units. In Paper IV: To describe the prevalence of possible confounders for death due to drowning. In Paper V: To describe changes in characteristics and survival over time and again to evaluate factors of importance for survival.

Methods
Papers I and III-V are based on retrospective register data from the Swedish OHCA Register reported by Emergency Medical Service (EMS) clinicians between 1990-2011. In addition, in Paper III, the data have been analysed and compared with the SFARS database for rescue characteristics. In Paper IV, the data have been compared with those of the National Board of Forensic Medicine (NBFM). Paper II is a descriptive study of 40 surf lifeguards evaluating delay and CPR quality as performed on a manikin.

Results
Among 2,166 autopsied cases of drowning, more than half were judged as accidents and about one third as intentional suicide cases. Among accidents, 14% were found to have a cardiac aetiology, while the corresponding figure among suicides was 0%. In a 20-year follow-up of OHCA due to drowning in Sweden, both bystander CPR and early survival to hospital admission are increasing. The proportion of cases alive after one month has not changed significantly during the period.

Conclusions
Survival from OHCA due to drowning is low. A reduction in the EMS response time appears to have high priority, i.e. early ALS is important. The quality of CPR among surf lifeguards appear to be high and not affected by prior physical strain. In all treated OHCA cases, the majority were found at the surface and survival when rescue diving took place did not appear to be poorer than in non-rescue diving cases. In a minor proportion of cases, cardiac disease could be a confounder for death due to drowning. Bystander CPR in OHCA due to drowning has increased over a 20-year period and the proportion of early survivors to hospital admission is increasing. We speculate that our studies were underpowered with regard to the opportunity adequately to assess the effects of bystander CPR on survival to hospital discharge. A uniform Swedish definition of drowning based on the recommended international terms should be implemented throughout Swedish authorities and health care, in order to enhance the quality of data and improve the potential for future research.
How can we optimize basic life support in cardiac arrest?

Ann-Britt Thorén

The aim of this thesis was to describe various aspects of cardiopulmonary resuscitation (CPR) and CPR training in order to find approaches for enhancing bystander interventions. Cardiac care patients (n=401) were interviewed with regard to their attitude toward CPR and CPR training (II). Among those who were co-habiting (n=268), possibilities for and obstacles in relation to training were investigated (III). An instrument for measuring quality of CPR performance was tested in a pilot study using a suitable selection of cardiac care nurses (I, n=10). Quality of performance was studied among laypersons after CPR training and three months later (IV, n=32). A qualitative method was used to describe spouses’ experiences during the cardiac arrest (CA) at home. Fifteen spouses were interviewed (V). Most of the cardiac care patients had a positive attitude towards CPR and many had trained or wished to undergo training in CPR (II). Two-thirds of patients who were co-habiting were unsure or doubted that their co-habitant had CPR training. More than half of these wanted their co-habitant to attend a course. Younger patients were more willing to participate in CPR training than those who were older. Major obstacles for CPR training were their own medical condition, and doubts concerning co-habitants physical ability or interest in participation (III). Measurements of the quality of CPR performance revealed several points of concern regarding CPR training and skill-retention; the difficulties in making the pauses for ventilations short enough, leading to low number of chest compressions per minute and poor performance regarding ventilations (I, IV). Immediately after training the laypersons performed relatively high proportions of chest compressions correctly, which after three months decreased significantly. ‘Too shallow’ chest compressions were common whilst the cardiac care nurses often made chest compressions ‘too deep’. Spouses’ experience of CA included two time domains and seven themes. Prior to the CA the themes deal with spouses’ perceptions and interpretations of early warning signs. When a CA developed spouses quickly perceived the seriousness of the situation. Some lacked the ability to intervene whilst others did everything in their power to influence the outcome. The Emergency call services played an important supportive role and guided spouses in performing CPR (V). Conclusion: CPR training for cardiac care patients and co-habitants is important and feasible. The outcome of training has to be enhanced. Simplification of the message and concerning CPR training and skill-retention; the difficulties in making the pauses for ventilations short enough, leading to low number of chest compressions per minute and poor performance regarding ventilations (I, IV). Immediately after training the laypersons performed relatively high proportions of chest compressions correctly, which after three months decreased significantly. ‘Too shallow’ chest compressions were common whilst the cardiac care nurses often made chest compressions ‘too deep’. Spouses’ experience of CA included two time domains and seven themes. Prior to the CA the themes deal with spouses’ perceptions and interpretations of early warning signs. When a CA developed spouses quickly perceived the seriousness of the situation. Some lacked the ability to intervene whilst others did everything in their power to influence the outcome. The Emergency call services played an important supportive role and guided spouses in performing CPR (V). Conclusion: CPR training for cardiac care patients and co-habitants is important and feasible. The outcome of training has to be enhanced. Simplification of the message and reduction in number of skills taught seems urgent. Symptoms and signs regarding myocardial infarction have to be communicated more clearly.

Optimizing the early treatment of a threatening myocardial infarction

Annica Ravn-Fischer

Acute myocardial infarction is the single most common cause of death for both women and men in Sweden. Great efforts have, over the years, been made to improve immediate treatment and care of acute coronary syndromes. Through fast and efficient chest pain care we know that we can minimize myocardial damage and improve outcome and prognosis. In this thesis we have focused on the early chain of care in patients with a threatening myocardial infarction. In five papers we describe chest pain care in our community with regard to the gender-, the foreign-, the age and the comorbidity perspective. We have also investigated predictors of direct admittance to a coronary care unit and predictors of mortality. Regarding the gender perspective, women with chest pain were older as compared to men. Women were not admitted to a coronary care unit as often as men and there were longer delays to the right level of care and to performance of coronary angiography among women. However, a final acute coronary syndrome diagnosis was more common in the male group. Among women, who actually had an acute coronary syndrome and were admitted to a coronary care unit, gender differences were minor or even non-existent. In non-Swedish speaking chest pain patients we found a higher prevalence of diabetes and previous stroke, placing them at increased risk also for coronary heart disease. Poorer language proficiency was associated with longer delay time from arrival in hospital to admission to a coronary care unit or catheterization laboratory. Maybe this prolonged delay is due to communication difficulties and there could be room for improvements by increased use of interpreters. The strongest predictor for admittance to a coronary care unit was a prehospital ECG suggesting acute occlusion of a coronary vessel. Interestingly, these patients had lower 1-year mortality. The future challenge is to improve early cardiac care for the large infarction-group with poor prognosis but without such alarming ECG signs. In the municipality of Gothenburg there are three hospitals offering emergency care for chest pain patients. In our studies we found differences between these hospitals especially with regard to delays to coronary angiography in presumed acute coronary syndrome patients. Our data highlight logistical problems that our health care system has to deal with in order to improve chest pain care and to follow current guidelines. Hopefully our findings will improve the early treatment of a threatening myocardial infarction and hopefully other communities can learn from our experience. Our goal is an efficient and equitable chest pain care despite age, gender, ethnicity and geographical belongings.
The effect of bystander cardio pulmonary resuscitation (CPR) was maintained ventricular fibrillation and a marked increase in survival rate in patients with witnessed cardiac arrest (CA) before arrival of emergency medical service (EMS) was seen. However, the proportion of OHCA in which bystander CPR was initiated increased only moderately over time.

Trained rescuers were willing to perform CPR on a known person, while there was some hesitation about performing CPR on a stranger. Respondents from rural areas were more frequently positive about starting CPR than those from metropolitan areas and professionals were generally more positive than lay people about starting CPR.

Personal values such as humanity seemed to constitute the foundation of the bystander’s acting. The acting bystander felt an obligation to intervene and had courage to do so. Competence provided the possibility to give appropriate help and strengthened the bystanders in their attempt to help.

In order to intervene the bystanders had to overcome some unwanted feelings of exposure, such as feelings of being deserted, powerlessness, ambivalence, uncertainty and repugnance. Lack of debriefing and fatal victim outcome influenced the bystanders’ reactions negatively.

Rescuers ask for, and need, regular retraining to be well prepared in the actual emergency!

Patients with chest pain or other symptoms suggestive of acute myocardial infarction are common in every emergency room, and there is a variety of different diagnoses to consider. All such patients who came to the emergency room of Sahlgrenska Hospital, Gothenburg, Sweden, between February 15, 198, and November 9, 1987, were registered in the Follow-up of chest Pain (FCP) study. A total of 7,157 visits were registered, making up 19% of all emergency room visits. Chest pain was reported by 93% of the patients and 55% were men. Based on history, examination and electrocardiogram all patients were classified into one of four categories: 1) obvious infarction (4% of all patients); 2) strong suspicion of infarction (20%); 3) vague suspicion (35%); and 4) no suspicion (4.1%). In category 4 the most common types of symptoms were musculoskeletal (26%), obscure (21%), and psychogenic (16%). Of the 4,690 patients admitted to hospital 921 developed myocardial infarction during the first 3 days. Of admitted category 1 patients 88% developed myocardial infarction, in category 2 34%, in category 3 8%, and in category 4 1%.

Among the 1,715 patients considered to have an obvious, or a strongly suspected myocardial infarction in the emergency room the percentage of patients eligible for thrombolysis, the per centage of patients with infarctions who would receive thrombolysis, and the percentage of treated patients who would develop an infarction were calculated according to electrocardiographic and delay time criteria.
### Johan Herlitz Symposium

**On the causes of ventricular arrhythmia, its treatment and outcome**

*Christina Holmgren*

Ventricular arrhythmias are the most common causes of sudden cardiac death. Death can sometimes be prevented by the implantation of a defibrillator (ICD). When out-of-hospital cardiac arrest (OHCA) occurs different circumstances characterize those who survive. Drugs aimed to treat several conditions are not always harmless.

The Swedish Cardiac Arrest Register was used to characterize the survivors of OHCA and was together with the Swedish Prescribed Drug Register used to find recently added drugs before the OHCA. The echocardiographic criterion of ejection fraction ≤ 30% is used to select patients who are supposed to benefit from ICD implantation after myocardial infarction. We investigated if this criterion could find those patients who died of arrhythmia within two years after their myocardial infarction.

We found that only three of the patients that died of presumed arrhythmia had a better ejection fraction. Among survivors of OHCA 20% had a non-shockable rhythm on their first ECG and the majority was not reached by the ambulance within five minutes.

Recently added drugs before OHCA were most often prescribed for infections, respiratory and neuro-psychological disorders. Of the OHCA victims 16.2% had claimed drugs that appear on the "qtdrugs.org" list.

Better criteria or combinations are needed to identify the patients that will benefit from an ICD implantation on a primary prevention indication. The OHCA victims found in a non-shockable rhythm need more attention. New drugs frequently claimed before OHCA should be further investigated.

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### Johan Herlitz Symposium

**Studies of out-of hospital cardiac arrest in Göteborg**

*Johan Engdahl*

**Aim**

To describe the epidemiological development and long-term trends for cardiac arrest outside the hospital in Gothenburg.

**Method**


**Results**

The median age of patients with cardiac arrest outside the hospital increased from 68 to 73 years between 1981 and 1997. During the same period, the percentage of ventricular fibrillation (VF) as the first arrhythmia from 39% to 32%.

The survival rate among patients with asystole and PEA was very low (2%). Time to arrival of the OLA ambulance was of great importance for survival among patients with asystole.

Patients admitted alive to Sahlgrenska hospital after cardiac arrest had higher unadjusted survival to discharge than patients admitted to Eastern Hospital (44% vs 33%). There were socioeconomic differences between the hospitals’ catchment areas but also larger assessment activity at Sahlgrenska.

There was no difference in long-term survival after cardiac arrest during the two periods 1981-1991 and from 1991 to 1998.

**Conclusion**

The epidemiology of cardiac arrest outside hospitals changed during the study with fewer patients experiencing VF. Difference in survival between hospitals after cardiac arrest was detected.
Johan Herlitz Symposium

In-Hospital Cardiac Arrest
Marie-Louise Södersved Källestedt

This thesis investigated whether outcome after in-hospital cardiac arrest patients could be improved by a cardiopulmonary resuscitation (CPR) educational intervention focusing on all hospital healthcare professionals. Annually in Sweden, approximately 3000 in-hospital patients suffer a cardiac arrest in which CPR is attempted, and which 900 will survive.

The thesis is based on five papers:

Paper I was a methodological study concluding in a reliable multiple choice questionnaire (MCQ) aimed at measuring CPR knowledge.

Paper II was an intervention study. The intervention consisted of educating 3144 healthcare professionals in CPR. The MCQ from Paper I was answered by the healthcare professionals both before (82% response rate) and after (98% response rate) education. Theoretical knowledge improved in all the different groups of healthcare professionals after the intervention.

Paper III was an observational laboratory study investigating the practical CPR skills of 74 healthcare professionals. Willingness to use an automated external defibrillator (AED) improved generally after education, and there were no major differences in CPR skills between the different healthcare professions.

Paper IV investigated, by use of a questionnaire, the attitudes to CPR of 2152 healthcare professionals (82% response rate). A majority of healthcare professionals reported a positive attitude to resuscitation.

Paper V was a register study of patients suffering from cardiac arrest. The intervention tended not to reduce the delay to start of treatment or to increase overall survival. However, our results suggested indirect signs of an improved cerebral function among survivors.

In conclusion, CPR education and the introduction of AEDs in-hospital – improved healthcare professionals knowledge, skills, and attitudes – did not improve patients’ survival to hospital discharge, but the functional status among survivors improved.

Cardiac arrest outside and inside hospital from a 30 year perspective in the Municipality of Gothenburg
Martin Fredriksson

Aims
To describe: 1. The epidemiology of both out-of-hospital cardiac arrest (OHCA) and in-hospital cardiac arrest (IHCA) in Gothenburg. 2. The differences and similarities in cardiac arrest inside and outside hospital. 3. The change in outcome following the implementation of mechanical chest compression in the EMS.

Method
All OHCA cases in Gothenburg between 1980 and 2009 were followed up according to the Utstein guidelines. All IHCA cases at Sahlgrenska university hospital between 1994 and 2006 were followed up according to the Utstein guidelines.

Results
Of the OHCA 8.8% survived to discharge, in bystander-witnessed OHCA with VF were 20% discharged alive. Survival to discharge was 63% for IHCA with VF and defibrillation <3 minutes, overall survival were 37%. The survival after IHCA was three times higher compared with OHCA for shockable rhythms and seven times higher for non-shockable rhythms. During the last decade, there was an increase in survival which was associated in terms of time with an increase in the use of mechanical chest compression.

Conclusion
If patients with VF are defibrillated within three minutes, the majority will survive. Survival after IHCA is much higher than after OHCA, this is not solely explained by a short time to the delivery of treatment.
**Induced hypothermia after cardiac arrest**
Niklas Nielsens

My thesis from 2010 was based on studies of the clinical use of induced hypothermia as an intervention to reduce mortality and neurological impairment after cardiac arrest.

After the publication of two trials indicating benefit of induced hypothermia, we developed a registry to assess outcome, possible adverse events and conduct of induced hypothermia when this intervention was implemented in a clinical population of cardiac arrest patients.

Approximately half of the patients admitted to intensive care after out-of-hospital cardiac arrest survived and few patients had severe residual neurological impairment.

The timing of hypothermia (early versus late induction of hypothermia and achievement of target temperature) and depth of cooling were not associated to outcome.

Adverse events were common, but only sustained hyperglycaemia and anticonvulsants administered for seizures were associated with increased mortality.

In a systematic review with meta-analyses and trial sequential analyses we conclude that the accumulated evidence for induced hypothermia was associated with substantial risks of systematic errors and the quality of the evidence was low. Trial sequential analyses indicate that the required information size to establish firm conclusions was not yet reached. Thus, we did not know if induced hypothermia was beneficial, neutral or harmful for cardiac arrest patients.

Accordingly, clinical equipoise existed 2010 with respect to induced hypothermia and we therefore proposed a new randomised trial—the TTM-trial.

**Early Thrombolysis in suspected acute myocardial infarction; Results from the TEAHAT Study**
Martin Risenfors

The aim of the study was to evaluate the effect on infarct size, chest pain parameters and long term prognosis of very early thrombolysis in patients with suspected acute myocardial infarction, and to evaluate the feasibility of prehospitally initiated thrombolytic therapy.

Results were obtained from the TEAHAT Study, a double blind placebo controlled trial of 352 patients aged below 75 and with symptoms indicative of acute myocardial infarction randomized within 2 hours and 45 minutes from onset to treatment with IV rt-PA or placebo. Of those 101 patients were randomized prehospitally, at that time the largest published material of prehospital thrombolysis.

Our findings strongly suggested that findings on an early ECG in patients with suspected myocardial infarction identified patients suitable for thrombolytic therapy. Prehospital administration of rt-PA showed to be feasible and safe method of thrombolytic treatment which significantly reduced delay time to treatment and also limited enzymatically and electrocardiographically estimated infarct size and also significantly reduced chest pain.

**Aspects of Abnormal Glucose Regulation in Various Manifestations of Coronary Artery Disease**
Petur Petursson

**Background**
Diabetes is common among patients with coronary artery disease (CAD) and is associated with an approximate doubling of the mortality risk in this patient population. Prediabetes, an intermediate glycometabolite state between normal and diabetic glucose homeostasis, is also prevalent in patients with CAD but its prognostic impact has not been studied in detail. The optimal glucose-lowering treatment in CAD patients has been the subject of debate.

**Aims**
1. To evaluate the association between admission glycaemia and future disturbance in glucose regulation, and mortality in patients with acute coronary syndrome (ACS).
2. To describe the association between diabetes and outcome after in-hospital cardiac arrest.
3. To evaluate the prevalence and the prognostic impact of abnormal glucose regulation after coronary artery bypass grafting (CABG).
4. To investigate whether increased mortality rates in insulin treated patients with type 2 diabetes and CAD can be explained by comorbidities.

Continued on next page
Study population
This thesis is based on observational studies of four different study populations. To evaluate the association between admission glycaemia and future disturbance in glucose regulation (Study I) and mortality (Study II) we used data from the PRAC-SIS study comprising patients with ACS admitted to the coronary care unit at Sahlgrenska University Hospital, Gothenburg, between 1995 and 2001. Data on 1,810 patients, treated for in-hospital cardiac arrest between 1994 and 2006 at Sahlgrenska University Hospital and nine other hospitals in Sweden were used to analyse the association between diabetes and outcome (Study III). The prevalence and impact of abnormal glucose regulation were assessed in 276 patients undergoing CABG at Sahlgrenska University Hospital between 2003 and 2006 (Study IV). Data on 12,515 patients with type 2 diabetes undergoing coronary angiography between 2001 and 2009 were obtained from the NDR and the SCAAR registries and the association between glucose-lowering treatment and long-term mortality was analysed (Study V). Admission hyperglycaemia in patients with ACS In 762 ACS patients without known diabetes, the prevalence of diabetes at the 2.5 year follow-up increased with rising admission glucose, from 5% in those with plasma glucose of <6.1 mmol/l to 24% in those with plasma glucose of ≥7.0 mmol/l. Among 1,957 patients with ACS, admission hyperglycaemia defined as plasma glucose >9.4 mmol/l, was found to be an independent predictor of both 30-day mortality (HR 4.13, 95% CI: 2.54-6.70, p<0.0001) and late mortality (HR 1.57, 95% CI: 1.02-2.41, p=0.04) in patients without known diabetes. In patients with diabetes admission hyperglycaemia was an independent predictor of late mortality (HR 2.14, 95% CI: 1.21 to 3.78, p=0.009). Diabetes and survival after in-hospital cardiac arrest The in-hospital mortality rate was higher among patients with diabetes than among those without (70.7% vs 62.4%, p=0.001). The adjusted odds ratio of being discharged alive for patients with diabetes was 0.57 (95% CI: 0.40-0.79). Abnormal glucose regulation and prognosis after CABG Two-thirds (65%) of the patients undergoing CABG had either prediabetes or diabetes. During a mean follow-up period of 5.3 years there was a successive increase in the primary endpoint rate (a composite of all-cause mortality and hospitalisation for a cardiovascular event) from normoglycaemia through prediabetes to diabetes (adjusted HR 1.40; 95% CI, 1.01 to 1.96; p=0.045). Glucose-lowering treatment and prognosis Compared with diet treatment alone, insulin in combination with oral glucose-lowering treatment (adjusted HR 1.22; CI 1.06 to 1.40; p<0.005) and treatment with insulin alone (adjusted HR 1.17; CI 1.02 to 1.35; p<0.01) were independent predictors of long-term mortality in patients with type 2 diabetes undergoing coronary angiography.

Conclusions
These observational studies show that abnormal glucose regulation is prevalent and predicts a poor prognosis in patients with various manifestations of coronary artery disease. Not only patients with diabetes but also patients with acute phase hyperglycaemia and hyperglycaemia in the non-diabetic range appear to run an increased risk of unfavourable outcome. Treatment with insulin in type 2 diabetic patients undergoing coronary angiography predicts long-term mortality risk even after adjustment for comorbidities. Whether or not this association is causal remains to be clarified.

In Sweden, the reported incidence and outcome of out-of-hospital cardiac arrest (OHCA) vary between counties. In the mid-1980s, a national programme in cardiopulmonary resuscitation (CPR) was developed and rescuers have been educated in CPR. Since 1990, Swedish OHCA data are to be reported to the Swedish Cardiac Arrest Register (SCAR). The aim of this thesis was to describe and analyse the incidence and outcome of OHCA and the amount of national training in CPR from data reported to the SCAR and to the CPR training register. The data on OHCA were related to a variety of epidemiological and quality indicators. Methods: this thesis is based on register data from both the SCAR and the CPR training register. The inclusion criteria were treated OHCA (I-IV), witnessed treated OHCA (V) and rescuers educated in CPR (I). The number of participants were: I: CPR training register, 1983-2007, n=2 million rescuers, and SCAR, 1990-2007, n=45,775, II: SCAR, 2008-2009, n=6,457 registered manually or on the web and n=3,522 registered on the web, III: SCAR, 2008-2010, n=2,398 prospectively registered and n=800 retrospectively registered, IV: SCAR, 1992-2011, n=59,926, V: SCAR, 2008-2010, n=11,005. Results: since 1983, 5,000 instructor-trainers have trained more than 50,000 instructors who have trained almost two million of Sweden’s nine million inhabitants to perform adult CPR. The number of bystander CPR attempts for OHCA in Sweden increased from 31% (1992) to 55% (2007) (I). In 2008-2009, the number of reported OHCA’s varied between 13 and 52 per 100,000 inhabitants and year. Bystander CPR, cardiac aetiology and longer emergency medical service (EMS) response times were more frequent in less populated areas, but survival was not associated with population density (II). A validation process showed that, there was a 25% missing rate between 2008 and 2010 of OHCA’s reported to the SCAR. In the non-reported OHCA’s, patients were older and had less frequently received bystander CPR, but, despite this, they also had a higher survival rate (III). From 1992 to 2011, the OHCA’s reported to the SCAR increased from 27 to 52 per 100,000 inhabitants and year. Survival to one month increased from 4.8% (1992) to 10.7% (2011), particularly among patients found in a shockable rhythm. This increase in survival was associated with signs of improvement in all four links of the chain of survival (IV). Furthermore, estimates indicate that, if the delay from collapse to 1) calling for an ambulance, 2) the start of CPR, and 3) the time to defibrillation is reduced to <2 min, <2min and <8 min respectively, approximately 300-400 additional lives could be saved (V). Conclusions: there has been an impressive development in the preparedness for and treatment of patients suffering from OHCA’s in Sweden during the last 30 years. Improvements in various links in the chain of survival have resulted in a marked increase in survival after OHCA. It suggests that this figure will increase further if the delay to the start of treatment can be reduced still further.
Cardiopulmonary resuscitation (CPR) skills vary among health care professionals. A previous study revealed that chest compressions were only performed half the time in out-of-hospital cardiac arrest (OHCA). Field conditions and fatigue could be possible explanations. The aim of this thesis was to study the impact of the introduction of mechanical chest compression in OHCA according to survival and its usability and b) passive leg raising (PLR), to augment the artificial circulation, during CPR.

Methods
This thesis is based on a pilot study conducted in the Gothenburg/Mölndal and Södertälje Emergency Medical Service systems in 2003-2005. Witnessed OHCA (adult >18 years) received either mechanical (n=159) or manual (n=169) chest compressions. The pressure of end-tidal carbon dioxide (PETCO2) has been shown to correlate with cardiac output (CO) during CPR. To compare the effect of the different strategies, the PETCO2 was measured, during CPR, with standardised ventilation.

Result
PLR during CPR increased the PETCO2 value within 30 seconds. Mechanical active compression-decompression (ACD) CPR, compared with manual compressions, produced the highest mean of initial, minimum and average values of PETCO2. However, mechanical chest compressions did not appear to result in improved survival. Clinical circumstances such as unidentified cardiac arrests (CAs) resulted in a large drop-out in the intervention group or a late start to the intervention in relation to CA. The late start meant that the intervention targeted a high-risk population with a low chance of survival.

The majority of identified CAs were coded by the Rescue Co-ordination Centre (RCC) according to symptoms (usually unconsciousness), while the minority were coded according to the diagnosis of CA. Patients coded according to the diagnosis of CA had an earlier start of CPR, a higher rate of bystander CPR and a tendency toward higher survival rates.

Conclusion
Since PLR during CPR appears to improve circulation after OHCA, larger studies are needed to evaluate its potential effects on survival. Compared with manual compressions, mechanical ACD CPR produces probably the most effective CPR. However, different clinical circumstances make the device difficult to study outside hospital. Coding a CA according to diagnosis rather than symptoms appears to improve the out-of-hospital care.
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We would also like to thank
Filip Asphäll, Helen Rosenberg, Eva-Lotta Andersson, Jennifer Tydén, Josefine Bjuvefors, and Suss Wilén, University of Borås
Anna Lilja, Borås Convention Bureau
Helena Flodin, Resia
Lotta Weinahall and Krister Andersson, Umeå Congress
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RAS, or the Swedish Association of Ambulance Nurses, is a professional association for ambulance nurses in Sweden. Visit us at our booth and talk ambulance!
This year, the association is giving prizes for the Year's Master's Thesis at PreHospen 2016 in collaboration with FernoNorden AB and the magazine Samverkan 112. See our nominated poster presentations and visit our website: www.ambssk.se

Samverkan 112
For 14 years the publisher On Road Communications AB has published Samverkan 112 (for the term 'collaboration' in Swedish and Sweden's emergency phone number). This is a national magazine that primarily caters to public safety personnel and public safety organisations around Sweden and Scandinavia. The magazine contains readable, current, and interesting features that spread knowledge relevant to several professional groups.
Since its inception in 2002, every issue has included one or more research articles from PreHospen at the University of Borås. Samverkan 112 mixes everyday articles about public safety organisations with research results for those who work in emergency medical services. ‘Our articles are intended to be understandable for all who are interested in public safety operations’, says Sven Åsheden, editor and publisher.
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Resia

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PreHospen – Centre for Prehospital Research and the University of Borås would like to thank the Forum for Prehospital Research and Development in Västra Götalandsregionen for making PreHospen Conference 2016 possible.