THE COPENHAGEN EMS MODEL FOR EMERGENCY PATIENT CARE
The Capital Region of Denmark
Emergency Medical Services Copenhagen

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This presentation

- Danish?
- We share the same challenges in Emergency Medical Services
- We are reorganising emergency patient care in Copenhagen to an integrated and cohesive solution for emergency patient care
- Some of our results so far
- Short presentation of The Global Resuscitation Alliance (GRA)
DANISH?

Danish pastry
DANISH?

Fairytales of Hans Christian Andersen
DANISH?

Carolina Wozniacki
DANISH?

Victor Axelsen
DANISH?

"The Danish Case": Tripling survival

The European EMS Congress in Copenhagen: EMS2016, EMS2017 and EMS2018

Our fully integrated EMS solution
Wonderful Copenhagen
Copenhagen and Denmark from our view
Emergency Medical Services Copenhagen
The changing community and population

• Growing population
• More elderly patients
• Patients with more co-morbidity
• Higher expectations for emergency care 24/7
• More advanced diagnostic tools and treatment available
• Demand for patient empowerment
• New opportunities that requires new solutions
It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change.

Charles Darwin
EMERGENCY HEALTH CARE IN COPENHAGEN

FROM SILOS TO INTEGRATED AND PATIENT CENTRED CARE
Change in emergency health care in Copenhagen

Before 2008:

• Emergency care free of charge
• Emergency (112) call taking and triage by police
• Four separate ambulance services and two separate dispatch centres
• Different Standard Operation Procedures and medical supervision
• Out-of-Hours services a separate entity
• Stand-alone emergency departments and walk-in patients
• 3 different hospitals trusts and 12 independent hospitals
Health care in Copenhagen now

- 1 hospital trust - 5 university hospitals in 9 locations and 1 EMS
- Health Care related Emergency Calls (112) part of EMS - triage using health care personnel for medical dispatch
- All ambulance service part of EMS – same SOP and medical supervision 24/7
- Out-of-Hours services part of EMS
- Referral of patients to emergency departments triaged by the EMS Dispatch Center through a separate telephone number
- Still free of charge
Our journey: from…. to.....

• From paper documentation to full electronic documentation in dispatch center and electronic patient charge fra call taking to hospital care
• From limited data and limited quality control to all the data we need
• From limited research to leading in research
• From no innovation to numerous ongoing projects
Main tasks for EMS Copenhagen (1.8 mio)

- One Emergency Medical Command and Control Centre
- Health related emergency calls (1-1-2) (130,000 / year)
- Medical help-line 1813 for health care advice and admission to ED (1 mio/year)
- Dispatch Centre for all prehospital resources
  - Ambulances
  - Emergency physician critical care units
  - HEMS
  - Specialised Neonatal Transport
  - Special respons car for chief emergency physician to major incidents
  - Major incident mobile control centre
  - Mobile Psychiatric Care Unit
  - “Social-ambulance”
Activity

130,000 Emergency medical calls (1-1-2)
950,000 Medical Helpline 1813
120,000 Emergency ambulance missions
   17,000 Mobile Critical Care Unit (Physician-staffed) missions
   10,000 Interhospital transfers (3000 Physician-escorts)
   30,000 Scheduled ambulance tasks
   60,000 Patient transfers – non-emergency
      1,000 Mobile prehospital psychiatric care unit tasks
      1,000 Helicopter Emergency Medical Services missions

Approximately 700 missions per day

60% of all ambulance tasks are emergency
Emergency care
Before 2014
Today: Emergency Care 24/7 in Copenhagen
Today: Emergency Care 24/7 in Copenhagen
Emergency Medical Dispatch Center in Copenhagen
Data summery

• 945,000 calls per year for population of 1.8 mil
• Time to call answered: 5 seconds for the emergency number and 3 minutes (median) other calls
• Shortest waiting time in emergency departments ever
• Emergency departments visits reduced with 10%
• Fewer home visits by physicians
• Hospitalization rates slightly decreased
• Increase in ambulance mission (less than expected)
• Patient satisfaction high
• Few complaints (15-20 per months for 80,000 calls)
• Few patient safety issues
• Total lower costs in the system
Summary

- We managed to establish an integrated EMS system
- For the first time ONE easy access for citizens 24/7 (besides 112)
- For the first time: ED fulfilling goals
- Reductions in ED visits by 10 %
- For the first time: Available data
- It took three years, but it can be done!
CARDIAC ARREST
IS A KEY PERFORMANCE INDICATOR
FOR EMERGENCY MEDICAL SERVICES
Temporal trends in ROSC on arrival at the hospital and 30-day survival

![Graph showing temporal trends in ROSC and 30-day survival over calendar years 2000 to 2010.](image)

** p<0.001
Temporal trends in Bystander CPR, Witnessed status and Shockable heart rhythm

![Graph showing temporal trends in Bystander CPR, Witnessed status and Shockable heart rhythm.]

- **Bystander CPR (EMS witnessed arrest excluded)**
- **Shockable heart rhythm**
- **EMS witnessed arrest**

- * P< 0.05
- ** P< 0.001

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Calendar year

- 2000
- 2002
- 2004
- 2006
- 2008
- 2010

(%)

- 0
- 10
- 20
- 30
- 40
- 50

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October 2013

Association of National Initiatives to Improve Cardiac Arrest Management With Rates of Bystander Intervention and Patient Survival After Out-of-Hospital Cardiac Arrest

Wissenberg et al

The important role of medical dispatch and the first resuscitation team
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Chain of survival

Early recognition and call for help
- to prevent cardiac arrest
- to buy time
Early CPR
- to restart the heart
Early Defibrillation
- to restart the heart
Post resuscitation care
- to restore quality of life

Resources

Impact on survival
Follow-up study: Do Cardiac arrest survivors return to work? Circulation 2015

Return to Work in Out-of-Hospital Cardiac Arrest Survivors
A Nationwide Register-Based Follow-Up Study

Kristian Kragholm, MD; Mads Wissenberg, MD; Rikke Normark Mortensen, MSc;
Kirsten Fonager, MD, PhD; Svend Eggert Jensen, MD, PhD; Shahnaz Shahzehi, MD;
Freddy Knudsen Lippert, MD; Erika Frischknecht Christensen, MD; Poul Anders Hansen, MD;
Torsten Lang-Jensen, MD; Ole Mazur Hendriksen, MD; Lars Kober, MD, DSc;
Gunnar Gislason, MD, PhD; Christian Torp-Pedersen, MD, DSc; Bodil Steen Rasmussen, MD, PhD
Link to NEJM 2017 Kragholm et al

NEJM 2017 Results

• Rate of bystander CPR increased from 66.7% to 80.6%
• Rate of bystander defibrillation increased from 2.1% to 16.8%
• Rate of brain damage or nursing home admission decreased from 10.0% to 7.6%
Innovation in EMS
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If an OHCA is suspected, the dispatcher activates the mobile-phone positioning system and standard EMS at the same time. The location of all laypersons who are trained in CPR is then determined and matched with the location of the incoming emergency call.

The geographic location of the source of all incoming emergency calls in Sweden can be determined automatically.

EMS dispatch

MPS

EMS

Lay volunteer

SMS: OHCA at 24 Main St.
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Connected SMS lifesaver
Running pace: 8 km/h

Mobile SMS lifesaver, pace: 30 km/h

"Open" AED
"Closed" AED

OHCA
CARTOON ABOUT THE CASE DENMARK

EVERYONE CAN SAVE A LIFE
LINK: www.youtube.com/watch?v=EDp4krk2--M
INTERNATIONAL COOPERATION
Background

- We have science and consensus
- We have the chain of survival
- We have education
- We have seen very little progress in survival
- We have huge disparity in outcome
Global Resuscitation Alliance

- All about implementation of evidence best practices and best practices in Emergency medical Services Systems

- To increase survival by 50% locally
Global Resuscitation Alliance

Update paper in 2018

Improving Survival from Out-of-Hospital Cardiac Arrest

Acting on the Call

2018 Update from the Global Resuscitation Alliance

Including 27 Case Reports
Global Resuscitation Alliance

**Programs**
- Cardiac arrest registry
- Telephone CPR
- High performance CPR
- Rapid dispatch
- Measurement of professional resuscitation
- AED program for first responders
- Smart technologies for CPR and AED
- Mandatory training for CPR and AED
- Accountability
- Culture of excellence

**Actions**
- Form a team
- Select programs
- Plan implementation strategy
- Set specific goals
- Achieve buy-in
- Establish standards
- Pilot the program
- Consult experts
- Communicate progress
- Support, advocate, celebrate

**Improved Survival**
Development EMS systems: Where does the world live?

More than half of the people on earth live within this circle
GRA Conclusions

• We have a common challenge to improve survival
• The Global Resuscitation Alliance facilitates and supports local implementation of best practices in EMS systems globally
• Aim: improving survival by 50 % locally
• Tool: Resuscitation Academys 10 programs to improve survival
• Think Global, Act Local
Summary

• We share the same challenges in Emergency Medical Services
• We reorganise emergency patient care in Copenhagen to an integrated and cohesive solution and model for emergency patient care
• We tripled survival from cardiac arrest, we reduced emergency department visits and
• Join the Global Resuscitation Alliance (GRA) in Asia through Asian Association of EMS (AAEMS)
For more information

EMS Copenhagen
www.regionh.dk/akutberedskabet

EMS congress
www.emseurope.org

European EMS Leadership Network
www.emsleadershipnetwork.org

Global Resuscitation Alliance
www.globalresuscitationalliance.org

Resuscitation Academy
www.resuscitationacademy.org