Copenhagen EMS
Use of AI in medical dispatch

EMDC-Copenhagen case
Disclosure

I have no actual or potential conflict of interest in relation to this research project.

• Received an unrestricted research grant from TrygFoundation
• Received centresupport from Laerdal
Why is artificial intelligence relevant for Out-of-Hospital Cardiac Arrest?

Recognising out-of-hospital cardiac arrest is the challenge

- We have trained dispatchers in recognising OHCA
- We use decision support tools
- Still, we recognize just about 75% of all EMS-treated cardiac arrests
Can AI help?
How EMDC-Copenhagen uses AI.

• We set out to investigate if AI can be used as a decision support tool in medical dispatch

• It is a tool for support, not a final bottom line
Clinical paper

Machine learning as a supportive tool to recognize cardiac arrest in emergency calls

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Can AI recognize cardiac arrest from audio. Retrospective study all calls in 2014

- 108,607 incidents with call to emergency number (1-1-2)
- 918 calls regarding cardiac arrest
- 84.1% recognised by AI (95% CI: 81.6-86.4)
- 72.4% (95% CI: 69.4-75.3). Recognised by Dispatch
- 107 previously unrecognised OHCA recognised

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<tr>
<th>Status</th>
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<th>Machine learning framework</th>
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<tbody>
<tr>
<td>Recognized cardiac arrests</td>
<td>665</td>
<td>772</td>
</tr>
<tr>
<td>Unrecognized cardiac arrests</td>
<td>253</td>
<td>146</td>
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<td>Cardiac arrest in population</td>
<td>918</td>
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The other side of the coin
False positive

- 108,607 incidents with call to emergency number (1-1-2)
- 918 calls regarding cardiac arrest
- 1,300 false positives by dispatcher
- 2,900 false positive by AI
- 1,600 extra cardiac arrest alerts

- Problem ?
- Consequence ?
Can AI work on live audio in clinical practice

- Prospective randomised trial
- Started September 2018
- 12 months, at least 400 arrests in each group
- Dispatchers in intervention group will receive alert in case of AI recognised cardiac arrest

- Alert: Dispatch High-Priority light and sirens; repeat No-No-Go; Dispatch Citizen responders
1. Maskinen mistænker hjertestop.

2. Der bliver trukket lod om advarsel skal vises på skærmen.
Happening right now
Challenges using AI

• Data ethics
• Overfitting model
• Public opinion on data usage
• Data validation and “time changes”
• Black box vs known impact of single factors
My supervisors

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Summary

AI can be trained to recognize Cardiac Arrest
AI can improve recognition of Cardiac Arrest
AI is a decision support tool
A randomized clinical trial is being performed, preliminary results expected autumn 2019

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