Medical Emergency at Sea, a Challenge?
Digital Ship 2015 Hamburg

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GHC Global Health Care GmbH
Accident and Sickness at High-Sea can simply happen!
### Relevance

- **Number of consultations**: 21,000/year
- **MRCC interventions**: 340/year
- **Costs/evac**: 25,000 €/helicopter
- **Average deviation duration**: 1.5 day/ship/year
- **Average deviation costs**: 163,750 €/day
### Prevention/Safety

<table>
<thead>
<tr>
<th>Service</th>
<th>Number/Year</th>
<th>Average Cost</th>
<th>Total Cost (million euros)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>People trained 60,000/year</td>
<td>Per trainee 1,744 €</td>
<td>104</td>
</tr>
<tr>
<td>Medical check-up</td>
<td>Medical check-ups 420,000/year</td>
<td>Per medical check-up 200 €</td>
<td>84</td>
</tr>
</tbody>
</table>

### Reaction/Response

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
<th>Number/Year</th>
<th>Average Cost</th>
<th>Total Cost (million euros)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical consultation by TMAS</td>
<td>Medical consultations per year 21,000/year</td>
<td>Per medical consultation 250 €</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>MRCC interventions</td>
<td>Interventions (1.62% of medical consultations) 340/year</td>
<td>Per intervention (by helicopter or speedboat) 25,000 €</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Evacuations board to shore</td>
<td>Rerouting days per vessel 1.5 days/vessel/year</td>
<td>Per rerouting day 163,750 €/day</td>
<td>1,144</td>
<td></td>
</tr>
<tr>
<td>Evacuations shore to international</td>
<td>Evacuations 1,548/year</td>
<td>Per evacuation 10,000 €</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

**Total average maritime health cost for sample = Euro 1,360**

**Total average maritime health cost per vessel per year = Euro 58,000**
Accident and Sickness at High-Sea can lead to Complex Medical Emergency Situation!
Complex Medical Emergency Situation

- helpers are medically not adequately qualified
- no physician on board
- no right diagnosis
- no right therapeutic measures
- no time to make right decision
- all participants under stress
Current Situation

- telephone consultation provides no real help
- e.g. myocardial infarction cannot be diagnosed by telephone
- recording of vital parameters and offline making diagnosis is not adequate
- no guaranteed response time on incoming calls
- available devices not suitable for laymen and novices
Complex Medical Emergency Situation

- is a challenging situation for all helpers
- unsure about the cause (no knowledge in making diagnosis)
- no routine in medical procedures
- fear of doing wrong procedures
How to solve the problems?
We need a physician on board!
and in fact virtually!
Telemedicine Assistance Service has to provide:

- instant response to the incoming emergency call
- high-level medical expertise (consultant level)
- telemedicine doctor virtually on board
- real-time diagnostics and treatment instruction
- bridging of the therapy free time until rescue
- coordination with rescue team (MRCC, helicopter)
The Patient System has to enable and ensure

a maximal disburden of helpers, e.g. by using

- easy to use UI and intuitive handling of the system,
- real-time communication including vital parameters
- remote control of the patient system
- instruction per audio, video, text and graphics
Required Vital Parameters

- 12 lead ECG
- Pulsoximeter (SPO2)
- Blood pressure (NIBP)
- Temperature
- CO2
- Glucose
The Tele-Physician

has to treat the patient as if the patient were in his practice office, with other words:

- he has to see the patient
- he has to hear the patient
- he has to speak with the patient
- he has to investigate the patient
- and last but not least he has to instruct the helper to treat the patient
The Tele-Physician

has to know:

- the medical equipment on board
- the medical skills and competence of the crew
- the maritime vocabulary
- the communication via satellite
Proposal of GHC

- Establishment of a Maritime Medical Emergency Coordination Team
- Based on existing infrastructure (TMAS, MRCC)
- Enhancement by adding new technological and telemedicine solutions
Maritime Medical Emergency Coordination

Consists of:

- Telemedicine assistance services on different levels
- MRCC for merchant shipping
- If required HQ of shipping company

Using

- Modern real-time telemedicine equipment
- Broadband data transmission
Maritime Medical Emergency Coordination

Consists of:

- Charité Berlin and the Trauma Clinic Berlin (ukb)
- MRCC Bremen for merchant shipping
- HQs of shipping companies

Using

- AescuLink and VER
- Broadband data transmission (see next slide)
Data Transmission Network

- Inmarsat (e.g. FBB 500 Streaming)
- VSAT
- 3G/4G, WiMax (offshore)
- WiFi
- LAN
Consciousness
Is the patient conscious?

- Yes
- No
- Unsure

Breathing
Is the patient breathing?

- Yes
- No
- Unsure

Pulse
Does the patient have a pulse?

- Yes
- No
- Unsure

System ready. To connect, please press the "Emergency call" button.
Use Cases

Freighter, container, tanker

Passenger liner, ferry

Oil rig

Special ship

Sailing boats
Status

Pilot utilisation with

- Shipping companies
- AWI
- DGzRS
- Charité and ukb

Start routine operation

- May 2015
GHC at a Glance

- system house, specialized on emergency telemedicine
- found in 2001 as technology-spin-off of the Charité gegründet
- business goal: 24/7 telemedicine emergency services
- partners: BMW, Charité, DGzRS, DTAG, ESA, HAPAG, Inmarsat, Lufthansa, Johanniter, …
- competences: emergency telemedicine, medical engineering, tele-communication
Charité at a Glance

- largest european university hospital
- 80 clinics and 25 institutes
- 14.000 employees
- special services (poison hotline, stroke-unit, …)
- telemedicine services
- 3 emergency rooms (24/7)
Thank you for your attention!

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