

# Information overload – A case study of using an integrated electronic health record system in the emergency room

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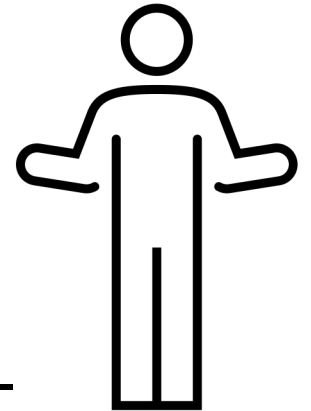
# Motivation 1/2



- **Electronic Health Record (EHR) integration -> benefits**
  - improve quality of care,
  - efficiently manage the healthcare system
- Healthcare professionals must **use** the integrated EHR system in their **practice** -> achieve the benefits

# Motivation 2/2

- Literature reports **mixed outcomes** of using integrated EHR systems
  - **Positive** outcomes: rich picture of patient's health, collaboration, reduced unnecessary visits, tests and treatments
  - **Negative** outcomes: increased workload, low-quality information, lack of trust, usability issues
- There is **still insufficient empirical evidence** on integrated EHR use -> positive or negative outcomes



# Research question

How do Emergency Room (ER) physicians use an integrated EHR system in their practices?



# Case description 1/2

- **ER services**
  - after 15:30 on weekdays and
  - around the clock on weekends and public holidays
- **ER physicians**
  - permanent ER positions
  - general practitioners (GPs)
- Two **kinds** of ER physicians: in-house and ambulating



# Case description 2/2

- Ambulating physician's **car** (one physician, one paramedic driving)
- **Tasks** from Emergency Medical Communication Centre (EMCC)
  - someone calling 116117
  - safety patrol, homecare services, nursing homes, the prison
- Mounted **screen** in the car, a **laptop**
- After 2022 ER has **access** to integrated EHR through the Helseplattformen (HP) system from (almost) **all providers** in the region



# Research methods

- An **interpretative case study** of the Helseplattformen (HP) system in the ER in Trondheim, Norway
- **Data collection**
  - observing 10 ambulatory visits (11 hours)
  - 3 semi-structured Interviews
  - project and legal documents
- **Data analysis:**
  - open coding
  - thematic analysis following Braun & Clarke





# F1. Excessive and irrelevant information

Filtering **irrelevant information** takes time:

*“The challenge is that it can take some time to go through, right, and also, getting it sorted, there is an enormous amount of information in here, so that can occasionally be the problem [...] **it takes some time to filter away.**”*

**Manual filtering** because everything was prioritized equally:

*“We see a lot of information from other professional groups, for example, homecare, which we feel is given the same priority if homecare were there and **served dinner** or if there has been a **visit from the ambulating car.**”*

# F1. Perception of information overload

- **Lack of trust** in the lists: allergies, surgical history, medicines, **problem list** (diagnosis)
- Difficulties in **finding information** – many **documents**
- Physicians had to work **without the needed information**  
*“If you are **unable to locate it** within a **reasonable time**, whether it is rooted in user competence, whether it is rooted in where it is located, or whether it is actually not there, then **you do not spend more time** because you have to **move on**.”*
- **Stress and frustration**  
*“The biggest concern is perhaps that one gets such an **information overload**, it is impossible to find what we need.”*

## F2. Information use by ER physicians

- **Complex cases needing immediate help**

*“After all, most of it is immediate help in some form, then we have to **touch**, find a **solution**, and **quality-assure** that we are not doing anything wrong, and then we have to **move on**.”*

- Patient’s **identity** may not be known
- Not enough **time** to make **decisions**

*“We need to know: **Does the patient have heart disease or not?** So maybe we have to ask the Emergency Medical Call Center (EMCC) to call someone while we figure something else out. We have to use those resources to get **quick answers**, and sometimes we don’t have answers, and then we have to **assume the worst**.”*

## F2. Preparation before the patient visit

- Consult a **specialist** and ask **qualified questions**

*“In those cases where I need to **consult** with a specialist or someone who is more experienced in the field [..] it may be that I could have asked more **qualified questions** or have been **better prepared** if I had access to information [in HP].”*

- Background information may improve **treatment quality**

*“For example, in the event of a cardiac arrest, you were able to look up the medical record. Then you would have seen that this is someone who has a **short life expectancy**, perhaps a month left due to severe cancer. So, you would make **completely different judgments** than you would do for other people.”*

# Conclusion

- An interpretative case study of the Helseplattformen (HP) system in the ER in Trondheim, Norway
  - ER physicians recognized value in patient info; additional challenges: complex cases, time pressure
  - The interface did not seem to be adapted to ER physicians
- Unpack how information overload unfolds
  - Excessive and irrelevant patient info -> perceived information overload -> stress and frustration
  - Information use by ER physicians may have contributed to it

# Information overload – A case study of using an integrated electronic health record system in the

Questions, comments and discussion

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# Contributions and implications

## Contributions

- EHR integration – communication by other media
- Consequences of irrelevant patient info
- Concise medical history – quick decisions

## Implications and future work

- Standardization, regular auditing and cleanup
- Data and value creation in EHR integration
- Unpack the mechanisms behind negative/positive outcomes of EHR integration

## F3. Information presentation

- **Usability** issues
  - inefficient manual filtering – scattered information
  - lacking fine-tuned search
  - missing options to increase text size, document preview
- Possibility of **overlooking** important information

“You’re a little curious about the fact that you might be met with [the statement] that, ‘yes, but this was available to you. Why haven’t you looked at or used it in the assessment?’ But you don’t always have the chance to do that.”



<b>Data source</b>	<b>Description of participants</b>	<b>Duration</b>	<b>Date</b>
1 Meeting	Meeting with a coordinator at ER	1 hour	12 April 2023
3 Observations	Observation of the ER to familiarize the first author with the setting	2 hours	02 May 2023
	Observation of an ER Physician (Phy1) on 3 ambulatory visits	6 hours	03 May 2023
	Observation of an ER Physician (Phy2) on 7 ambulatory visits	5 hours	03 May 2023
3 Semi-structured interviews	ER Physicians (Phy3, Phy4 and Phy5)	30-40 minutes each	May 2023
Documents	Documents related to HP (requirements, implementation phase), legal documents on emergency care, newspaper articles		

<b>First order codes</b>	<b>Second order themes</b>	<b>Third order categories</b>
Filtering irrelevant information takes time	Excessive and irrelevant information	Information overload
Complicated access and time pressure		
Lack of trust in the lists	Perception of information overload	
Difficulties in finding information		
The physicians had to work without the needed information		
Stress and frustration		
Documents containing duplicate information	Inability to gain an overview	
Manual filtering because everything was prioritized equally		

<b>First order codes</b>	<b>Second order themes</b>	<b>Third order categories</b>
Complex cases needing immediate help	Challenges for ambulating ER physicians under high time pressure	Information use by ER physicians
Patient's identity may not be known		
Not enough time to make decisions		
Consult a specialist and ask qualified questions	Preparation before the patient visit	
Background information may improve treatment quality		
Possibility of overlooking important information		
Manual filtering was less effective	Finding relevant information	Usability issues
Search option was difficult to use		
Lack of an option to increase the text size, scrolling issue	Information presentation	
Lack of an option to preview documents		