Dealing with sensitive data in healthcare

Human-Factor-based Risk Management to improve Patient Safety

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„We must avoid the uncontrollable and control the unavoidable."

Hans Joachim Schellnhuber (1950, Bayern/Germany), climate scientist

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OUTLINE

- ☐ Background and Motivation
- ☐ Human-Factor-based Risk Management – the proposed Model
- ☐ Evaluation Setting and Results
- ☐ Restrictions – Limitation – Implications
- ☐ Conclusion

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Background and Motivation

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> ***„You must learn from the mistakes of others. You can‘t possibly live long enough to make them all yourself.“***
>
> *Sam Levenson (1911-1980), American Author*

Background and Motivation

PROBLEM	in the calculation of risks and their extent of damage the impact of human factors is not taken into account
TARGET	Improving Patient Safety
HOW	through Human Factor based Risk Management (RiDeM-H) based on an enhanced FMEA that takes the impact and consequent dependence of human factors into account (HFdFMEA)
WHY	to control and manage risks actively and subsequently to improve patient safety
Customer Usability	higher/improved safety (= patient safety) through proactive (risk) management

Background and Motivation

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Human-Factor-based Risk Management

- What are the challenges?
  - calculation of risks
  - impact of human factors
  - practice of RiDeM
  - controlling & monitoring
  - supervision of the system

- What is the target and how can it be achieved?
  - increasing patient safety
  - active Risk Management
  - classification of human factors (RiDeM-H)
  - controlling & monitoring results
  - supervising the system

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Human-Factor-based Risk Management

Purpose

Improving Patient Safety
- Risk Management
- Failure Mode and Effect Analysis (FMEA)

Problem Statement

- calculation of risks and their extent of damage
- impact of human factors

Expected Result

- Human-Factor-based Risk Management in Healthcare (RiDeM-H)
- HFdFMEA as new risk assessment method

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Human-Factor-based Risk Management

How is it possible
- to increase patient safety through active Risk Management
- by classifying Human Factors and
- by taking into consideration those Human Factors for risk assessments using FMEA?

How to
- control
- monitor and
- supervise

RiDeM method as such?

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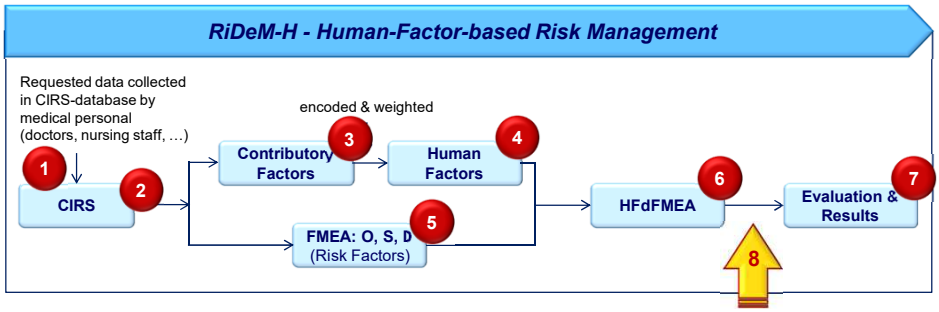
Human-Factor-based Risk Management



Human-Factor-based Risk Management

FMEA → HFdFMEA

$$RPN_{E_i} = \sum_{i=1}^{n} (O_i * S_i * D_i)$$

$$HF_{E_i} = HF_{E_i1} + \ldots + HF_{E_ik} = \sum_{i=1}^{n} \sum_{j=1}^{k} HF_{E_i,j}$$

Evaluation Setting and Results

- **Data Source**
  - Critical-Incident-Reporting-Systems (**CIRS**)
  - The **GOAL** … data about incidents/events
  - The **USE** … voluntary national CIRS (e.g. DE, CH, GB, NL, …) vs compulsory use (e.g. USA, SE)
  - The **PROBLEMS** … access to sensitive data
    … accuracy and trustworthiness
    … human factors

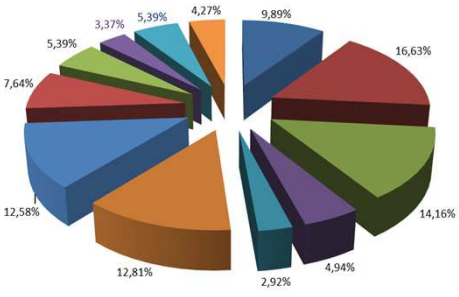
- **Defined data in CIRS**

  Each listed event is assigned to …
  - an expertise area
  - a professional category
  - a place
  - contributory factors
  - others

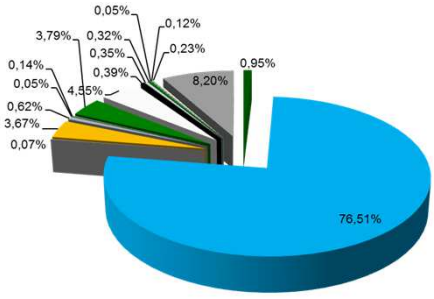
Evaluation Setting and Results

Events according to affected area of expertise

cirs-health-care.de

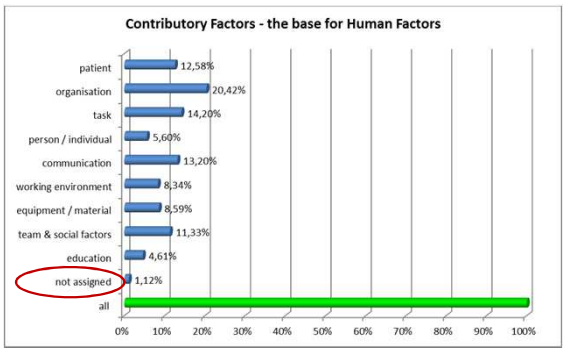


CIRSmedical.de



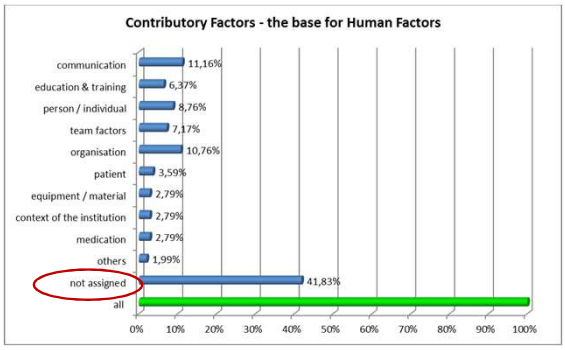
cirs-health-care.de

cirs-health-care.de		
contributory factors	assigned to events	[%]
patient	101	12,58%
organisation	164	20,42%
task	114	14,20%
person / individual	45	5,60%
communication	106	13,20%
working environment	67	8,34%
equipment / material	69	8,59%
team & social factors	91	11,33%
education	37	4,61%
not assigned	9	1,12%
all	**803**	**100,00%**



CIRSmedical.de

CIRSmedical.de		
contributory factors	assigned to events	[%]
communication	28	11,16%
education & training	16	6,37%
person / individual	22	8,76%
team factors	18	7,17%
organisation	27	10,76%
patient	9	3,59%
equipment / material	7	2,79%
context of the instituti	7	2,79%
medication	7	2,79%
others	5	1,99%
not assigned	105	41,83%
all	**251**	**100,00%**



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Restrictions - Limitation - Implications

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Restrictions - Limitation - Implications

- ☐ To which restrictions and limitation lead the CIRS databases?
- ☐ How generalised are the results?
- ☐ Who are the stakeholders of the proposed HFdFMEA technique and RiDeM-H model?
- ☐ What are implications for the health system, practitioners and patients?
- ☐ What are implications for the HFdFMEA and RiDeM-H?
- ☐ Validation of human factors – why I used multiple linear regression analysis and is there another model that could be recommended for validation of the model?

What has all this to do with data protection & data security?

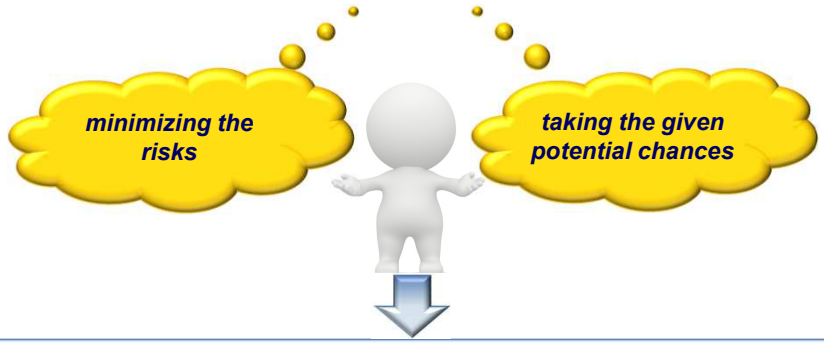
Conclusion

The proposed method …

- ☐ **Human-factor-based Risk Dependent Management** (RiDeM-H) method
  - to control and manage risks actively and subsequently
  - will facilitate to improve patient safety
  - by using HFdFMEA
- ☐ **mandatory required …**
  - access to sensitive data, so that HFdFMEA could work

Conclusion

There is still room for improving patient safety



We just need to take the opportunities to act!

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Thank you for your attention!

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