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Robotics and Autonomous Devices in Health Care – a Technology Assessment Study –

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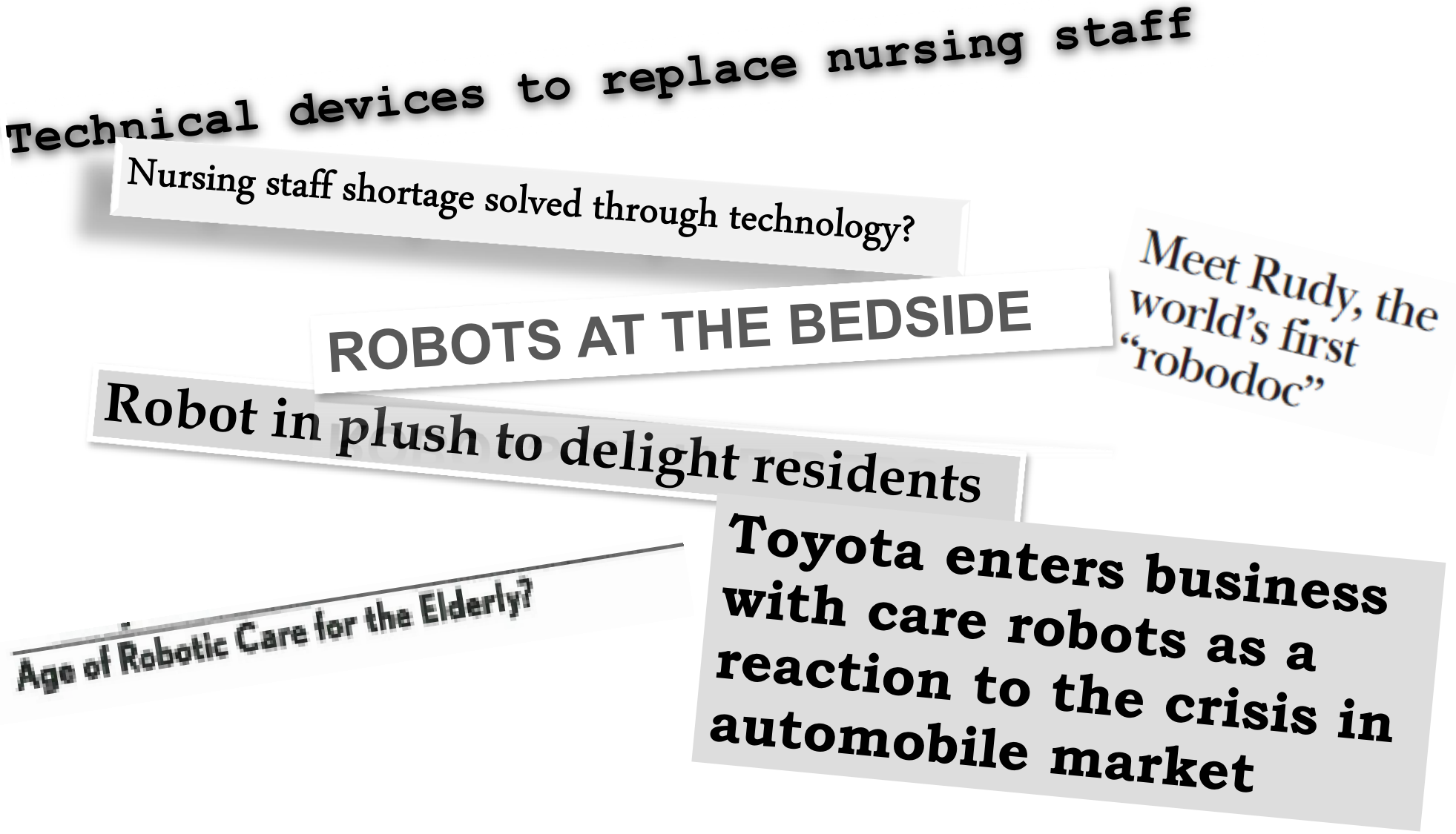
2012 movie *Robot & Frank …*

... to reality

In view of robotics and autonomous devices in health care:

- What is technically feasible?
- What is socially, ethically and legally desirable and justifiable?
- What is economically and politically achievable?

Why TA on Robots in Health Care?



Interdisciplinary project team:

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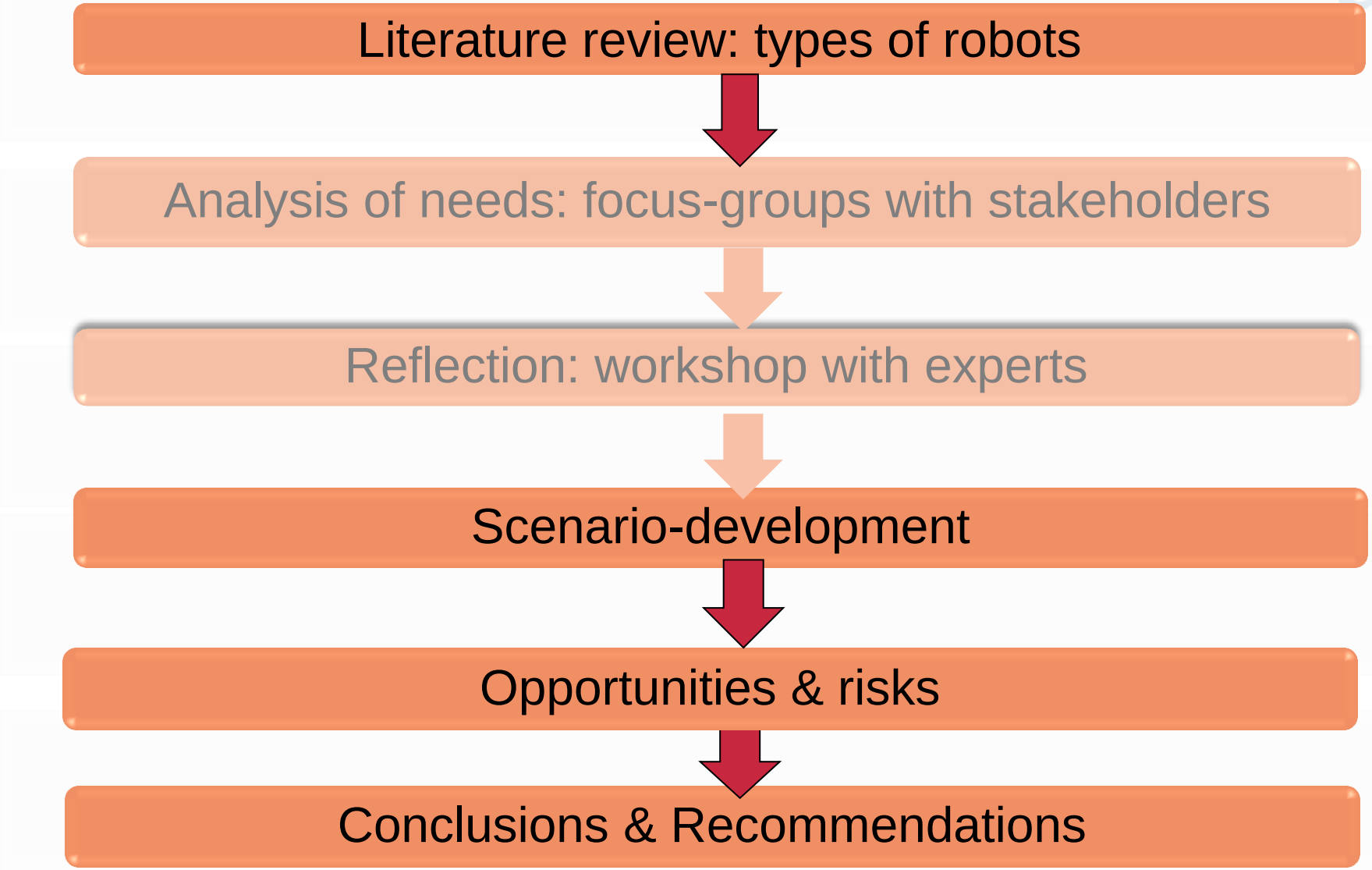
Methods


Literature review: types of robots
Analysis of needs: focus-groups with stakeholders
Reflection: workshop with experts
Scenario-development
Opportunities & risks
Conclusions & Recommendations

First type: training devices and mobility aids

Exoskeletons

Rehabilitation robots

Second type: telepresence robots and assistant robots

transportsystems

servicerobots

telerobots

Third type: Social-interactive robots

Pleo

Paro

Opportunities for …

Users: autonomy, mobility, independence, assistance, communication

Institutions: effectivity and supplement, new treatments

Society: (partly) compensation of shortage staff, new jobs

Risks for …

Users: loss of direct contact and autonomy, increases isolation, use without the consent of vulnerable people

Institutions: risk of cost increases, lack of convergence

Society: health care costs, market-focused technologies

Future scenarios 2025

1. **Reactive politics:** only applications of excisting regulations und regulate measures

2. **Proactive politics:** new regulations in law, registration and ethics, etc.

3. **Proactive control politics:** additional regulating measures like research funding, promotion of a discussion of robotics in health care, promotion of societal support

Future scenario: Proactive control politics
– e.g. Nadine at home, tetraplegia after riding accident –

- Devices: smart wheelchair, Rewalker, sub-arm, telepresence
- Opportunities: autonomy, mobility, participation
- Risks: high priced devices for rare diseases, fair access
- Political measures: research funding for robotic development, debate about robots in society and with health professionals

Conclusions

- The spectrum of possible applications of robots in health care is very broad.
- There is a insufficient regulation in liability law, data protection and ethics.
- A proactive and coordinated policy framework is required.
- Robots on their own could not solve the problem of skill shortages in health care.

Actual publication: Download open access

- **Robotik in Betreuung und Gesundheitsversorgung** (2013)
  Heidrun Becker, Mandy Scheermesser, Michael Früh, Yvonne Treusch, Holger Auerbach, Richard Alexander Hüppi, Flurina Meier, Zürich, vdf, 252 p., CHF 39.-/EUR 34.-
  ISBN 978-3-7281-3520-9 (print edition)/vdf Hochschulverlag AG (in German)

- Abridged version of the TA-SWISS study “RoboCare Healthcare in the robot age” (in English)

- www.ta-swiss.ch

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Future scenarios: Methodology

1. Preparation

- Analysis of current status, facts, trends, 7 key factors
- Influence factors: politics lecture by a political scientist

2. Scenario-Development

- In-house Scenario-workshop
- Cross-Impact analysis to account the interdependence of uncertain future events of future images in 2025
- problem identification by comparing the images

3. Scenario-Writing

- formulate 3 scenarios with different criteria:
  Age, gender, disability/handicap, types of robotics, determining factors, social development, etc.

4. Scenario-illustration

- Problem definition, political impact

Future scenario 2: Reactive politics
- e.g. Mr. Franchi, ambulatory care after stroke -

- Devices: Telerehabilitation, telepresence, vacuum cleaner robot
- Opportunities: enhanced training possibilies → earlier return to work
- Risks: isolation, less personal care, lack of diagnostic

Futures scenario 2: Proactive politics
- e.g. Mrs. Hunziker in old people's home with dementia -

- Devices: lift, carry, navigate, hair washing, communication, logistic, telepresence
- Oppportunies: autonomy, mobility, contact, entertainment
- Risks: excessive demand, confusion, unavailable options, freedom of decision
- Political measures: liability law, data protection, Ethical guidelines

Key Recommendations

- Check and amend issues of liability for robots in healthcare
- Data protection must also be clarified for data that are unrelated to health.
- The Swiss Academy of Medical Sciences SAMS should take into account the effects that the use of robots might have.
- Professional and non-professional users should be included at an early stage.