

Health Information Systems – from Present to Future?

The German Medical Informatics Initiative

Reinhold Haux^{1*}

¹Peter L. Reichertz Institute for Medical Informatics, TU Braunschweig and Hannover Medical School, Braunschweig, Germany

Keywords

Health information systems, medical informatics, biomedical and health informatics, patient care, research

Summary

This article is part of the Focus Theme of Methods of Information in Medicine on the German Medical Informatics Initiative. Funded by the German Federal Ministry of Education and Research with about 150 million Euro in its currently starting development and networking phase this initiative has already a significant impact on the development of health information systems in Germany. In this Focus Theme two editorials introduce this initiative, one from the viewpoint of its funding institution and one from

the initiative's accompanying institutions. Then the initiative's four consortia DIFUTURE (Data Integration for Future Medicine), HiGHmed (Heidelberg-Göttingen-Hannover Medical Informatics), MIRACUM (Medical Informatics in Research and Care in University Medicine), and SMITH (Smart Medical Information Technology for Healthcare) present their concepts and plans. For better readability their manuscripts all contain three major sections on governance and policies, on architectural framework and methodology, and on use cases. As the German Medical Informatics Initiative is a large national experiment, we are convinced that communicating on this initiative already at this early stage to an international audience is of importance.

ogies for health are “recognised as one of the most rapidly growing areas in health today” [8].

Health information systems in this context play an important role. They have developed significantly during the last decades. As examples, for the 1980ies [9], the seminal paper of Peter Reichertz on this topic is mentioned here, also [10] and [11] for the first decade of the 21st century ([11] directly referring to [9]), as well as [12] and [13] for current reflections. As outlined in [14], the trend from institution-centered (e.g. hospital-centered) information processing for health care to information processing, supporting patient-centered care beyond one health care institution has already been mentioned in [11], section 3.2 (see also figure 6 on p. 277, line 2). It was there as well mentioned that health information systems should support both patient care and biomedical research ([11], section 3.4, see also figure 6 on p. 277, line 4). In spite of this progress during the last decades, there is still a significant need for improving health information systems' architectures and functionalities, in particular for the benefit of patients as well as for the progress of biomedical/health sciences and of computer/information sciences.

Correspondence to:

Prof. Dr. Reinhold Haux
Peter L. Reichertz Institute for Medical Informatics
of TU Braunschweig and Hannover Medical School
Muehlenpfordtstr. 23
38106 Braunschweig, Germany
phone: +49(0)531/391-9500
fax: +49(0)531/391-9502
E-mail: Reinhold.Haux@plri.de

Methods Inf Med 2018; 57(Open 1): e43–e45

<https://doi.org/10.3414/ME18-03-0004>

received: May 29, 2018

accepted: June 2, 2018

* Guest Editor of the Focus Theme on the German Medical Informatics Initiative.

1. On Digitization and Health Information Systems

Digitization has meanwhile become a priority for governments and societies (e.g. [1, 2] for Germany). In the context of the United Nation's Sustainable Development Goals it is mentioned that the “spread of information and communications technol-

ogy and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies, as does scientific and technological innovation across areas as diverse as medicine and energy” [3]. Health care and biomedical research in this new information age is affected in many ways (e.g. [4, 5, 6, 7]). According to the World Health Organization, information and communication technol-

2. On the Contents of this Focus Theme on the German Medical Informatics Initiative

In this focus theme of Methods of Information in Medicine, reports are presented on a national experiment: The German Medical Informatics Initiative.

Funded by the German Federal Ministry of Education and Research with about 150 million Euro in its currently starting “development and networking phase” (details in [15, 16]), it has already now, in a still rather initial state, a significant impact on the development of health information systems in Germany. It can be expected that the outcomes of this large national research project will significantly influence biomedical and health informatics research worldwide.

Two editorials provide introductions to the German Medical informatics Initiative.

- In [15] Stefanie Gehring and René Eulenfeld introduce the German Medical informatics Initiative on behalf of its funding institution, the German Federal Ministry of Education and Research.
- In [16] Sebastian Semler, Frank Wissing, and Ralf Heyder take the viewpoint of accompanying institutions of the German Medical informatics Initiative.

These editorials are to some extent redundant in content, while, however, reflecting the initiative from different viewpoints.

Then the four consortia, having been positively evaluated after the initiative’s “conceptual phase” (details in [15, 16]) will introduce their concepts. The consortia are (in alphabetic order):

- DIFUTURE – Data Integration for Future Medicine [17],
- HiGHmed – Heidelberg-Göttingen-Hannover Medical Informatics [18],
- MIRACUM – Medical Informatics in Research and Care in University Medicine [19], and
- SMITH – Smart Medical Information Technology for Healthcare [20].

For better readability all consortia followed an identical structure with three major sections on governance and policies, on architectural framework and methodology, and on use cases.

3. From Present to Future?

When planning this Focus Theme with consortia’s leading medical informatics colleagues and with the journal’s Editor-in-Chief, we were aware of the fact that reporting about the German Medical Informatics Initiative at this early stage can-

not contain results and has to focus on presenting concepts and plans. As it is a large national experiment on an important topic, we are convinced that communicating on these concepts and plans to an international audience is of importance. Choosing for publication Methods Open, the Gold Open Access part of Methods of Information in Medicine, makes the manuscript of this Focus Theme immediately broadly available in a fair way through the journal’s tandem model ([21], p. 484).

Will the German Medical Informatics Initiative push health information systems from the current present state to a new future state? Will this progress be for the benefit of patients as well as for the progress of biomedical/health sciences and of computer/information sciences? Will progress be mainly limited to Germany or will it have an international impact? Answers to all these questions will hopefully be given in the future, after the German Medical Informatics Initiative’s development and networking phase or even later.

References

1. The Federal Government of Germany. Digital Agenda 2014 – 2017. August 2014 [cited 2018 May 27]. Available from: <https://www.digitale-agenda.de>.
2. Scheer AW, Wahlster W. Saarbrücken Declaration for a digitization push in Germany (Saarbrücker Manifest für einen Digitalisierungsruck in Deutschland). November 2016 [cited 2018 May 27]. Available from: https://www.scheer-group.com/Scheer/uploads/2016/11/Scheer_Saarbrücker-Manifest.pdf. German.
3. Transforming our world: the 2030 Agenda for Sustainable Development. Resolution 70/1 adopted by the United Nation’s General Assembly on 25 September 2015 [cited 2018 May 27]. Available from: http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E.
4. Martin-Sanchez FJ, Lopez-Campos GH. The New Role of Biomedical Informatics in the Age of Digital Medicine. *Methods Inf Med* 2016; 55: 392–402.
5. Shortliffe EH. Digital Medicine and Biomedical Informatics: What’s in a Name? *Methods Inf Med* 2016; 55: 389–391.
6. Al-Shorbaji N, Bellazzi R, Gonzalez Bernaldo de Quiros F, Koch S, Kulikowski CA, Lovell NH, Maojo V, Park HA, Sanz F, Sarkar IN, Tanaka H. Discussion of “The New Role of Biomedical Informatics in the Age of Digital Medicine”. *Methods Inf Med* 2016; 55: 403–421.
7. Knaup P, Ammenwerth E, Dujat C, Grant A, Hasman A, Hein A, Hochlehnert A, Kulikowski C, Mantas J, Maojo V, Marschollek M, Moura L, Plischke M, Röhrig R, Stausberg J, Takabayashi K,

Uckert F, Winter A, Wolf KH, Haux R. Assessing the prognoses on Health care in the information society 2013 – thirteen years after. *J Med Syst* 2014; 38: 73.

8. World Health Organization. Global Observatory for eHealth [cited 2018 May 27]. Available from: <http://www.who.int/goe/en/>.
9. Reichertz PL. Hospital information systems – past, present, future. Key-note address during ‘Medical Informatics Europe 84’, 5th Congress of the European Federation for Medical Informatics, Brussels, September 10–13, 1984. First published in: *Int J Med Inform* 2006; 75: 282–299.
10. Kuhn KA, Giuse DA. From hospital information systems to health information systems. Problems, challenges, perspectives. *Methods Inf Med* 2001; 40: 275–287.
11. Haux R. Health information systems – past, present, future. *Int J Med Inform* 2006; 75: 268–281.
12. Friedman CP, Rubin JC, Sullivan KJ. Toward an information infrastructure for global health improvement. *Yearb Med Inform* 2017: 16–17.
13. Gonzalez Bernaldo de Quiros F, Dawidowski AR, Figar S. Representation of people’s decisions in health information systems. A complementary approach for understanding health care systems and population health. *Methods Inf Med* 2017; 56(Open): e13–e19.
14. Haux R, Ammenwerth E, Koch S, Lehmann CU, Park HA, Saranto K, Wong CP. A Brief Survey on Six Basic and Reduced eHealth Indicators in Seven Countries in 2017. Submitted.
15. Gehring S, Eulenfeld R. German Medical Informatics Initiative: Unlocking data for research and health care. *Methods Inf Med* 2018; 57(Open): e46–e49.
16. Semler SC, Wissing F, Heyder R. German Medical Informatics Initiative: A national approach to integrating health data from patient care and medical research. *Methods Inf Med* 2018; 57(Open): e50–e56.
17. Prasser F, Kohlbacher O, Mansmann U, Bauer B, Kuhn KA; DIFUTURE Consortium. Data Integration for Future Medicine (DIFUTURE) – an architectural and methodological overview. *Methods Inf Med* 2018; 57(Open): e57–e65.
18. Haarbrandt B, Schreiwies B, Rey S, Sax U, Scheithauer S, Rienhoff O, Knaup P, Bavendiek U, Dieterich C, Brors B, Kraus I, Thoms C, Jäger D, Ellenrieder V, Bergh B, Yahyapour R, Eils R, HiGHmed Consortium; Marschollek M. HiGHmed – an open platform approach to enhance care and research across institutional boundaries. *Methods Inf Med* 2018; 57(Open): e66–e81.
19. Prokosch HU, Acker T, Bernarding J, Binder H, Boeker M, Daumke P, Ganslandt T, Hesser J, Höning G, Neumaier M, Marquardt K, Renz H, Rothkötter HJ, Schade-Brittinger C, Schmücker P, Schüttler J, Sedlmayr M, Serve H, Sohrabi K, Storf H. MIRACUM: Medical Informatics in Research and Care in University Medicine. A large data sharing network to enhance translational research and medical care. *Methods Inf Med* 2018; 57(Open): e82–e91.
20. Winter A, Stäubert S, Ammon S, Aiche S, Beyan O, Bischoff V, Daumke P, Decker S, Funkat G, Gewehr JE, de Greiff A, Haferkamp S, Hahn U, Henkel A, Kirsten T, Klöss T, Lippert J, Löbe M,

Lowitsch V, Maassen O, Maschmann J, Meister S, Mikolajczyk R, Nüchter M, Pletz MW, Rahm E, Riedel M, Saleh K, Schuppert A, Smers S, Stollenwerk A, Uhlig S, Wendt T, Zenker S, Fleig W, Marx G, Scherag A, Löffler M. Smart Medical Information Technology for Healthcare (SMITH) –

data Integration based on interoperability standards. *Methods Inf Med* 2018; 57(Open): e92–e105.

21. Haux R, Kuballa S, Schulze M, Böhm C, Gefeller O, Haaf J, Henning P, Mielke C, Niggemann F, Schürg A, Bergemann D. Exploring possibilities

for transforming established subscription-based scientific journals into open access journals. Present situation, transformation criteria, and exemplary implementation within Trans-O-MIM. *Methods Inf Med* 2016; 55: 481–487.