DIFUTURE
Data Integration for Future Medicine

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Digital Health Summit Munich

International Day 2

Nov 30, 2018

Introduction, K. A. Kuhn

for the DIFUTURE consortium

Part 1

Short Overview of DIFUTURE

Part 2

Overview of the International Day

see presentations

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DIFUTURE: Overview of the Consortium

Funded by BMBF - **Federal Ministry of Education and Research** BMBF
in the framework of the **National Medical Informatics Initiative**
Funding: **28.5 M Euro for 4 Years**, starting in 1/2018

- **Core Consortium**
  - **TU Munich / U Medical Center „rechts der Isar“**
  - **U Munich / U Medical Center**
  - **U Tübingen / U Medical Center**
    - Establish Data Integration Centers
    - Implement “Use Cases”, starting with Multiple Sclerosis
  - **U Augsburg**, Medical Center Augsburg
    - U Medical Center currently being built up
    - Data Integration Center by 2021, one UC: Multiple Sclerosis

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DIFUTURE: Overview of the Consortium

- **Networking Partners**
  - University Medical Center **Regensburg**
  - **Saarland** University and University Medical Center
    - Will use, adapt, and roll-out solutions of the consortium
    - Participate in conceptual work
    - Strive for establishing data integration centers

- **New Partner**
  - University and University Medical Center **Ulm**
    - Positive evaluation of application has just been received
    - Will establish DIC and participate in MS use case

- **Kairos, Industrial partner**
  - Metadata repository

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DIFUTURE's Use Cases

Use Cases of DIFUTURE

are disease-oriented

aim at demonstrating measurable benefits
no "methodical" use case in DIFUTURE

Objectives of all Use Cases

Integration analyses of Data for targeted prevention, diagnosis, **therapy**, follow-up care

Development and integration of
decision support components

Overall Objectives

precision medicine, personalized medicine

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DIFUTURE's Use Cases

Diseases addressed by the UCs

- Multiple Sclerosis, from 2016/17
- Parkinson's Disease, from 2017
- Oncology, Cardiology, Stroke from 2020, more in 2022
- Concepts and solutions are re-usable, blue prints

Approach

- Integration of health care data and research data
- follow-up documentation structured / harmonized / standardized
- Standardization of imaging
  - technical parameters, structured / harmonized reports
- Patient reported outcomes via mobile devices
- Focus on high data quality; in addition: NLP on free text data

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Data Integration Centers in DIFUTURE

- Harmonize and structure processes and data at each site
- Support secure data sharing

Focus on Integration of Health Care Data comprising

existing as well as new data types: genetics, imaging, …

new and traditionally separate sources: smartphones, insurance data

research based on health care data: learning health system

Focus on Integration of Research Data: combination increases depth and breadth

Central challenge: data protection

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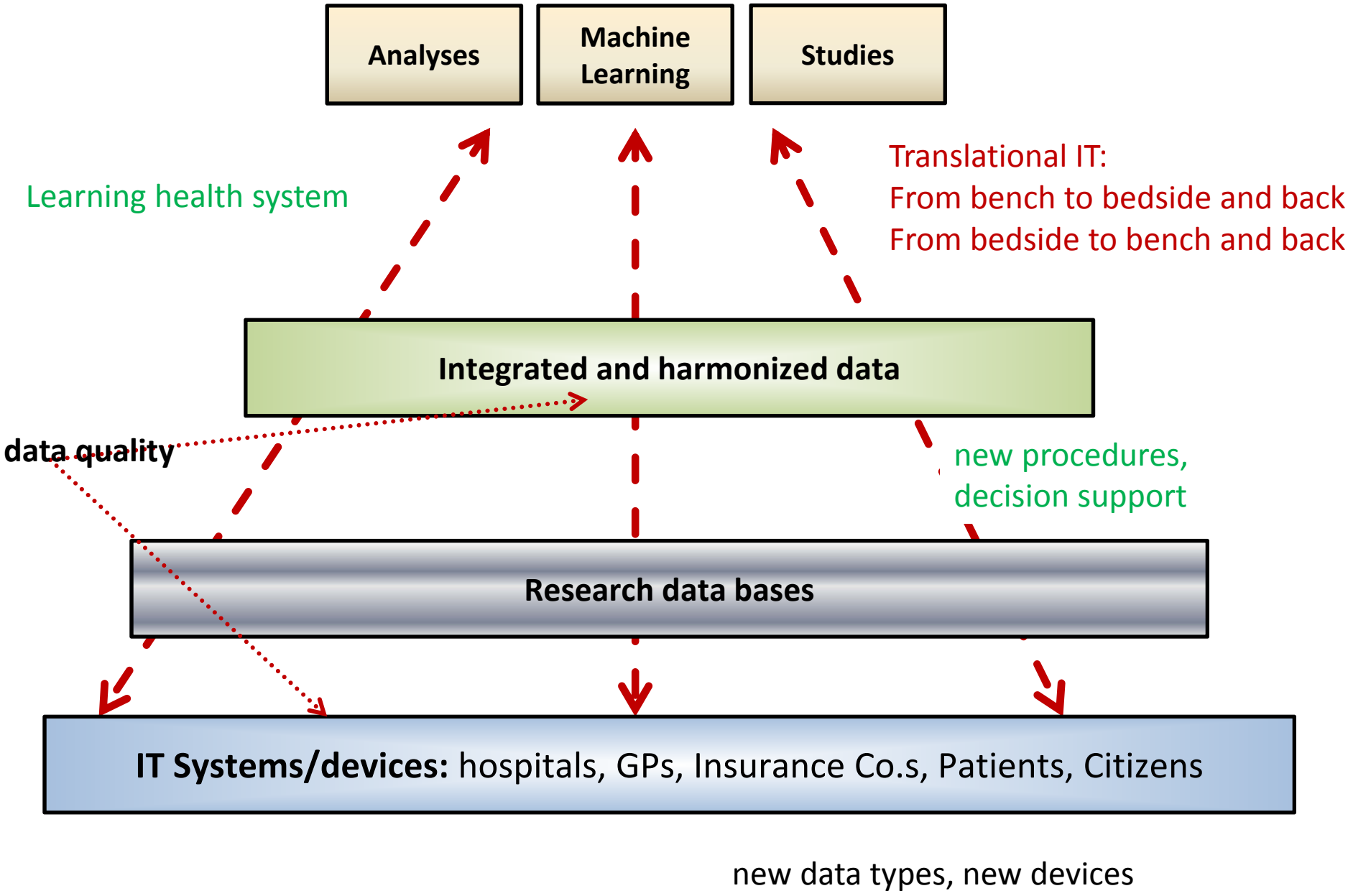

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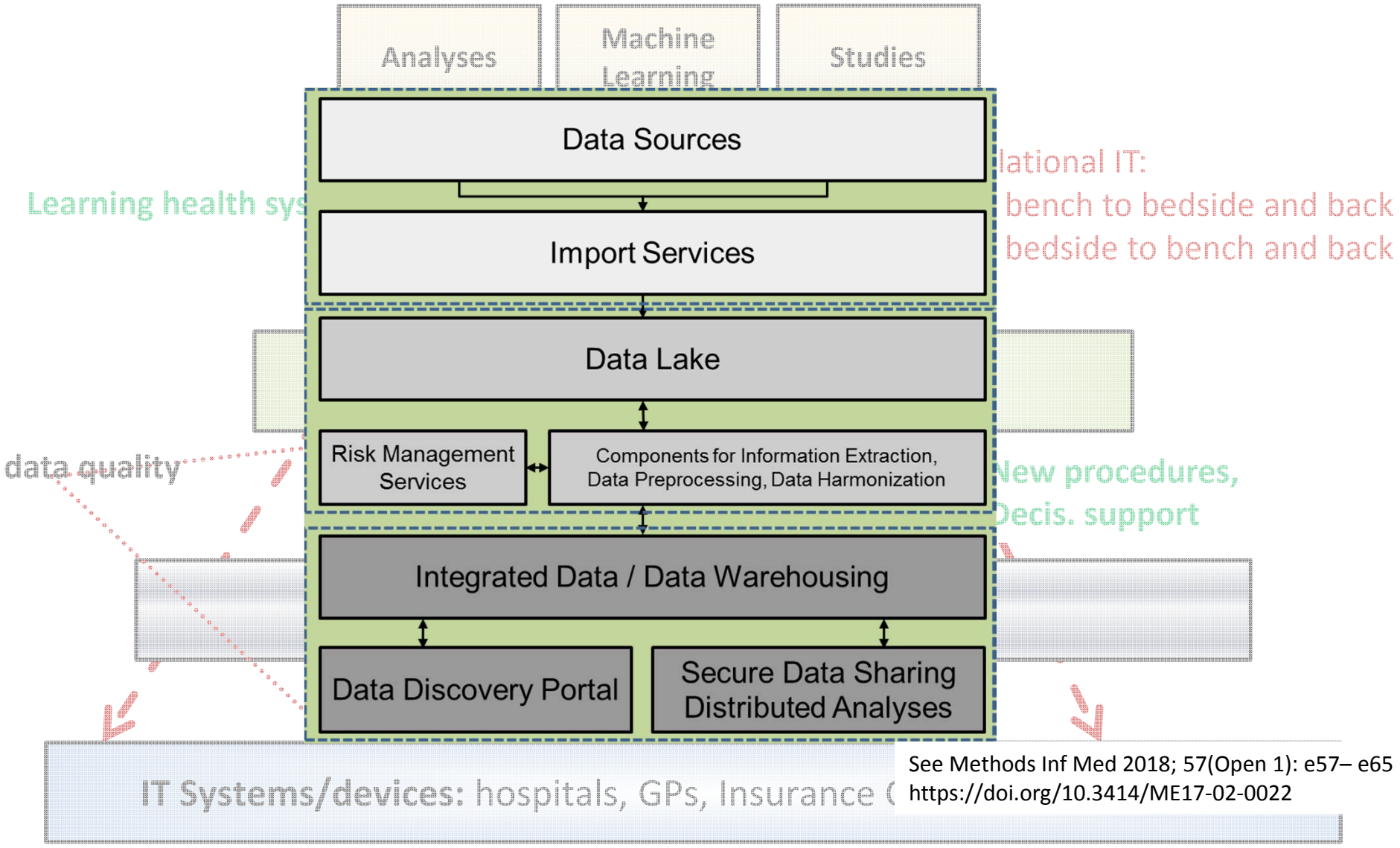

See Methods Inf Med 2018; 57(Open 1): e57– e65
https://doi.org/10.3414/ME17-02-0022

Multiple Sclerosis

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Since 2010: existing follow-up data: texts, structured data, images

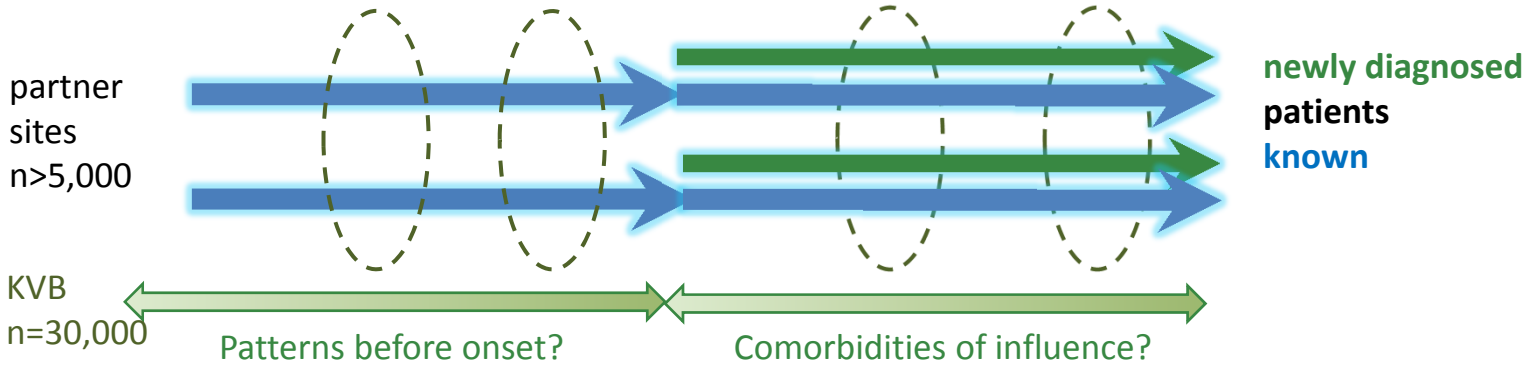
- distributed analyses: **functional hypotheses, algorithmic prognostic rules**

From 01/2018: further follow-up and newly diagnosed (500) patients

- imaging and structured data collection is standardized
- distributed analyses and evaluation of study
- **validation of rules, generation of further hypotheses**

KVB (assoc. statutory insurance physicians) database:

patterns before onset? comorbidities?



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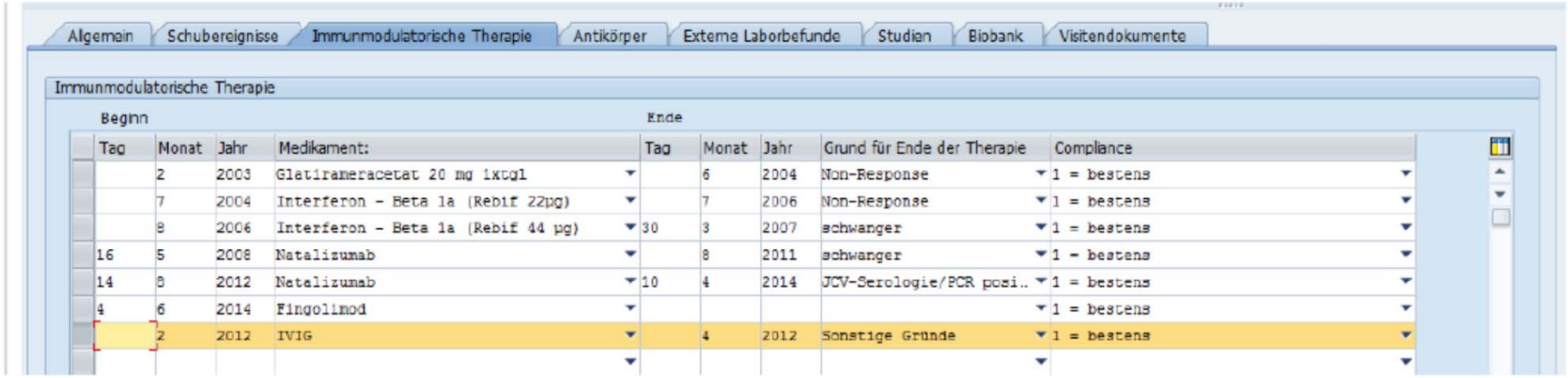
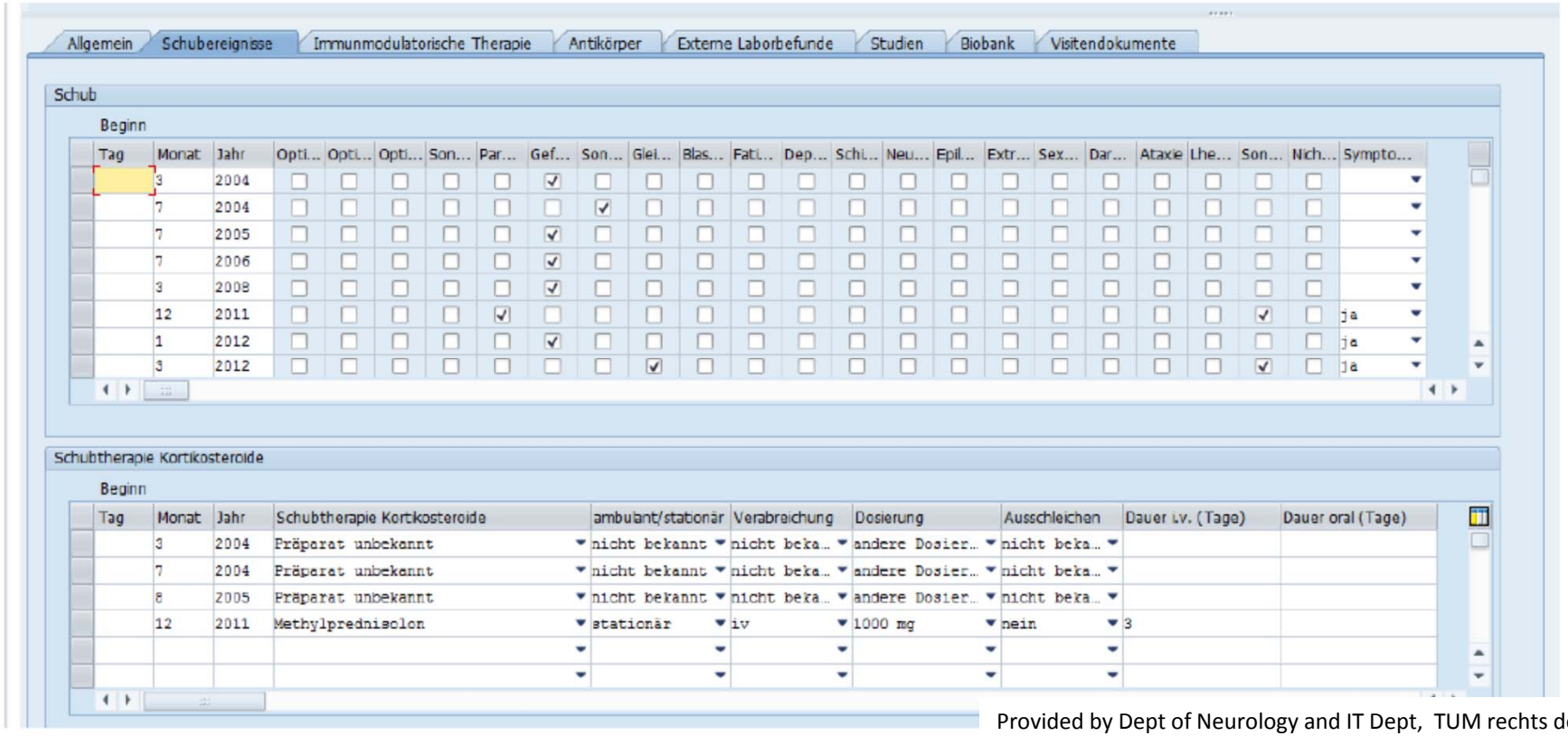


Tag	Monat	Jahr	Medikament:	Tag	Monat	Jahr	Grund für Ende der Therapie	Compliance
	2	2003	Glatirameracetat 20 mg 1xtgl		6	2004	Non-Response	1 = bestens
	7	2004	Interferon - Beta 1a (Rebif 22µg)		7	2006	Non-Response	1 = bestens
	8	2006	Interferon - Beta 1a (Rebif 44 µg)	30	3	2007	schwanger	1 = bestens
16	5	2008	Natalizumab		8	2011	schwanger	1 = bestens
14	8	2012	Natalizumab	10	4	2014	JCV-Serologie/PCR posi..	1 = bestens
4	6	2014	Fingolimod					1 = bestens
	2	2012	IVIG		4	2012	Sonstige Gründe	1 = bestens



Tag	Monat	Jahr	Opti...	Opti...	Opti...	Son...	Par...	Gef...	Son...	Glei...	Blas...	Fati...	Dep...	Schl...	Neu...	Epil...	Extr...	Sex...	Dar...	Ataxie	Lhe...	Son...	Nich...	Sympto...
	3	2004	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
	7	2004	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
	7	2005	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
	7	2006	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
	3	2008	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
	12	2011	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	ja
	1	2012	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ja
	3	2012	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	ja

Tag	Monat	Jahr	Schubtherapie Kortikosteroide	ambulant/stationär	Verabreichung	Dosierung	Ausschleichen	Dauer iv. (Tage)	Dauer oral (Tage)
	3	2004	Präparat unbekannt	nicht bekannt	nicht beka...	andere Dosier...	nicht beka...		
	7	2004	Präparat unbekannt	nicht bekannt	nicht beka...	andere Dosier...	nicht beka...		
	8	2005	Präparat unbekannt	nicht bekannt	nicht beka...	andere Dosier...	nicht beka...		
	12	2011	Methylprednisolon	stationär	iv	1000 mg	nein	3	

Provided by Dept of Neurology and IT Dept, TUM rechts der Isar

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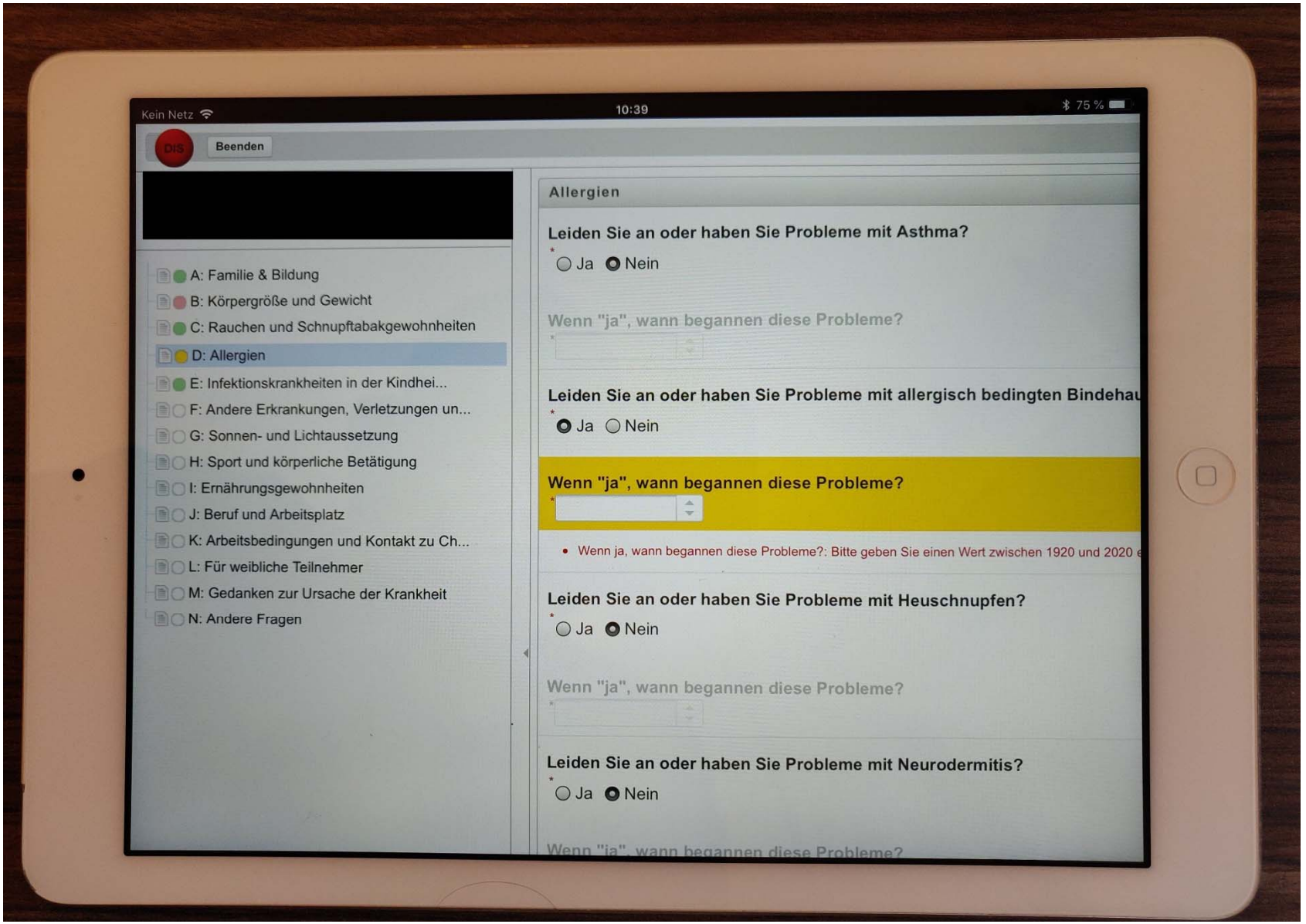
Patient Reported Outcomes



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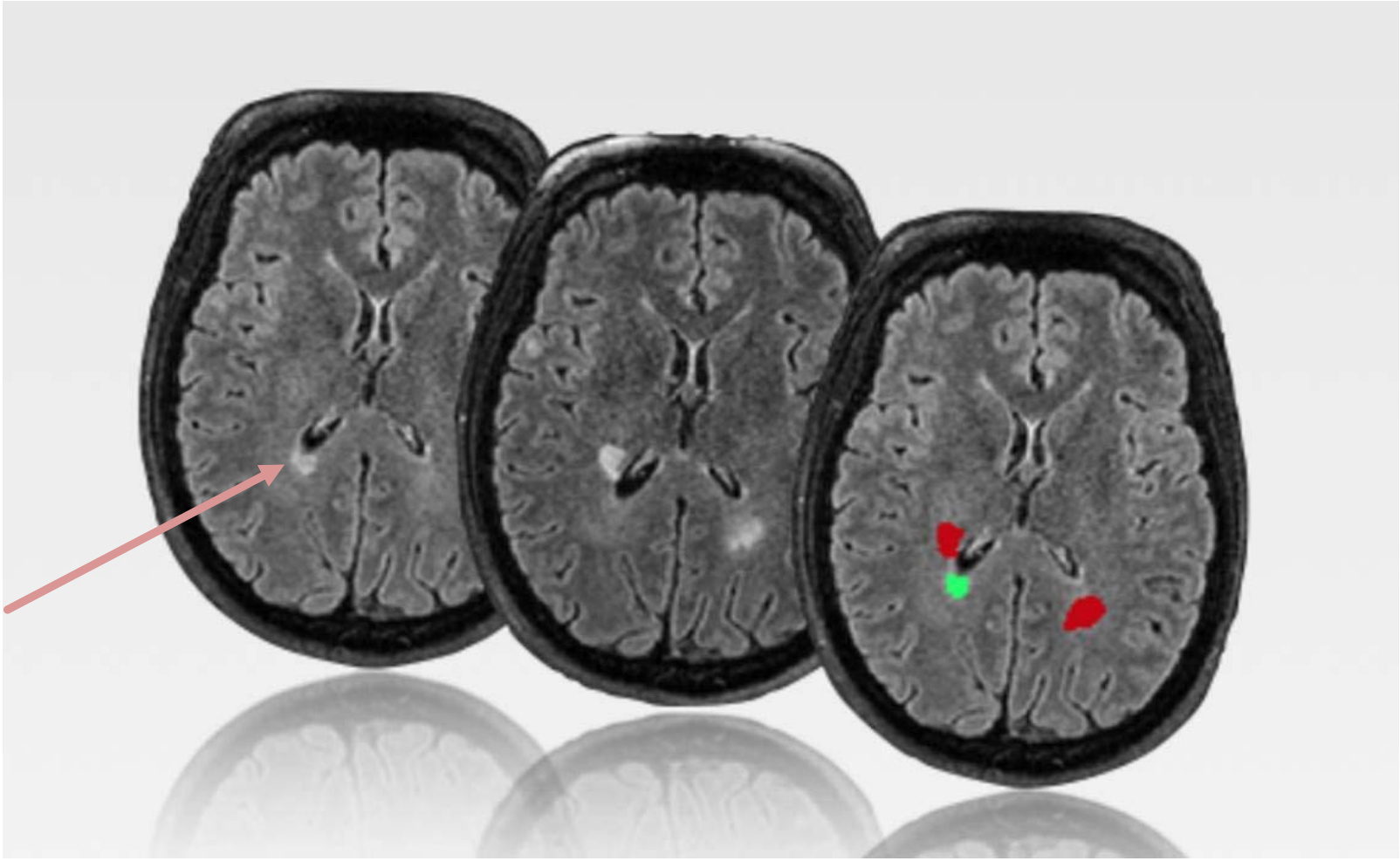
Imaging: standardized procedures, image processing



https://www.applied-statistics.de/lst.html, Zugriff 26.11.18. **LST algorithm: Prof. Mark Mühlau, Dr. Paul Schmidt**

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Structured Reporting MRI

Provided by
Dr. J. Kirschke

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Many Thanks to All Members of DIFUTURE!

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Day 2

see presentations

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