



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

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

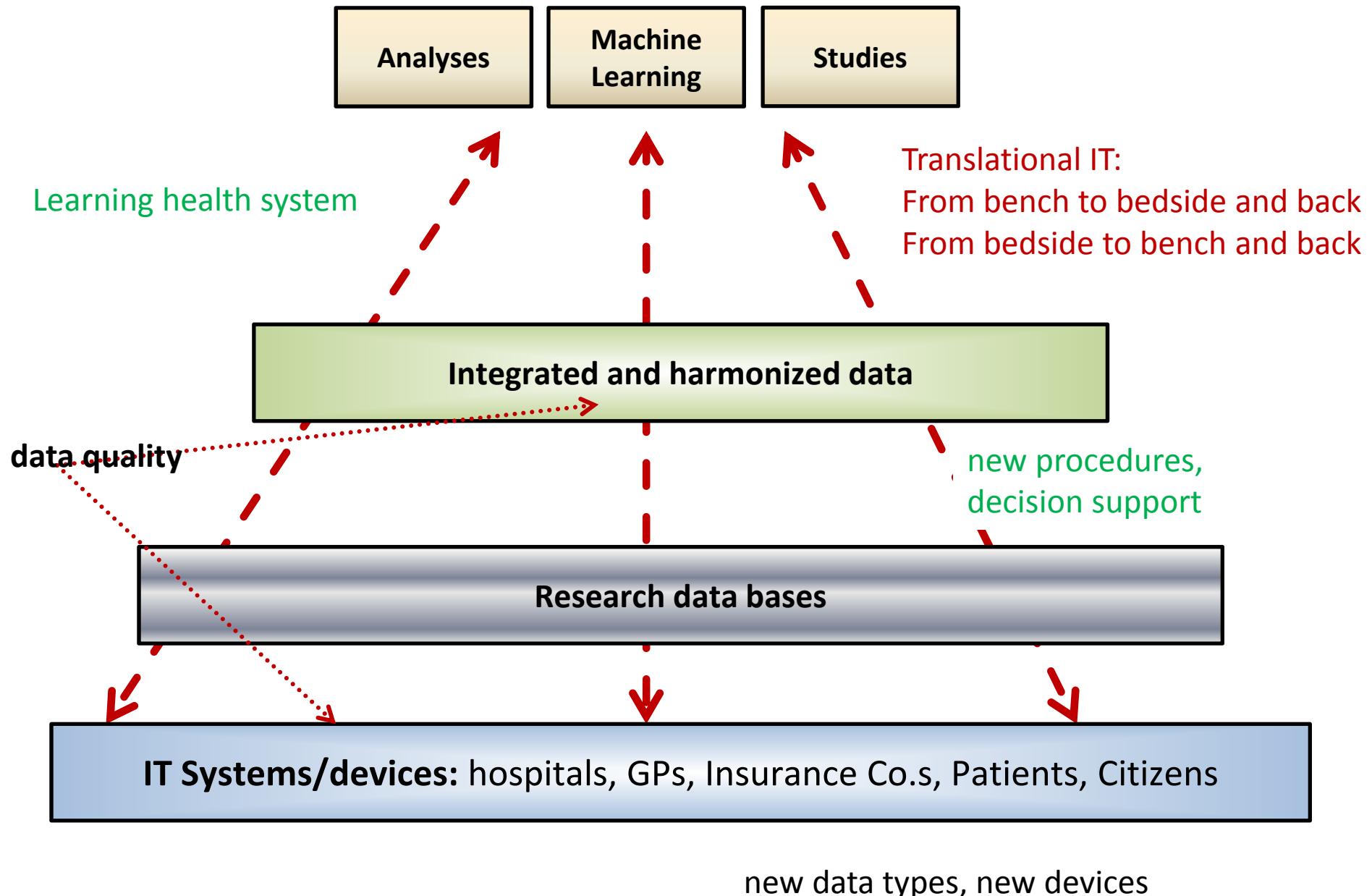
existing as well as new data types: genetics, imaging, ...

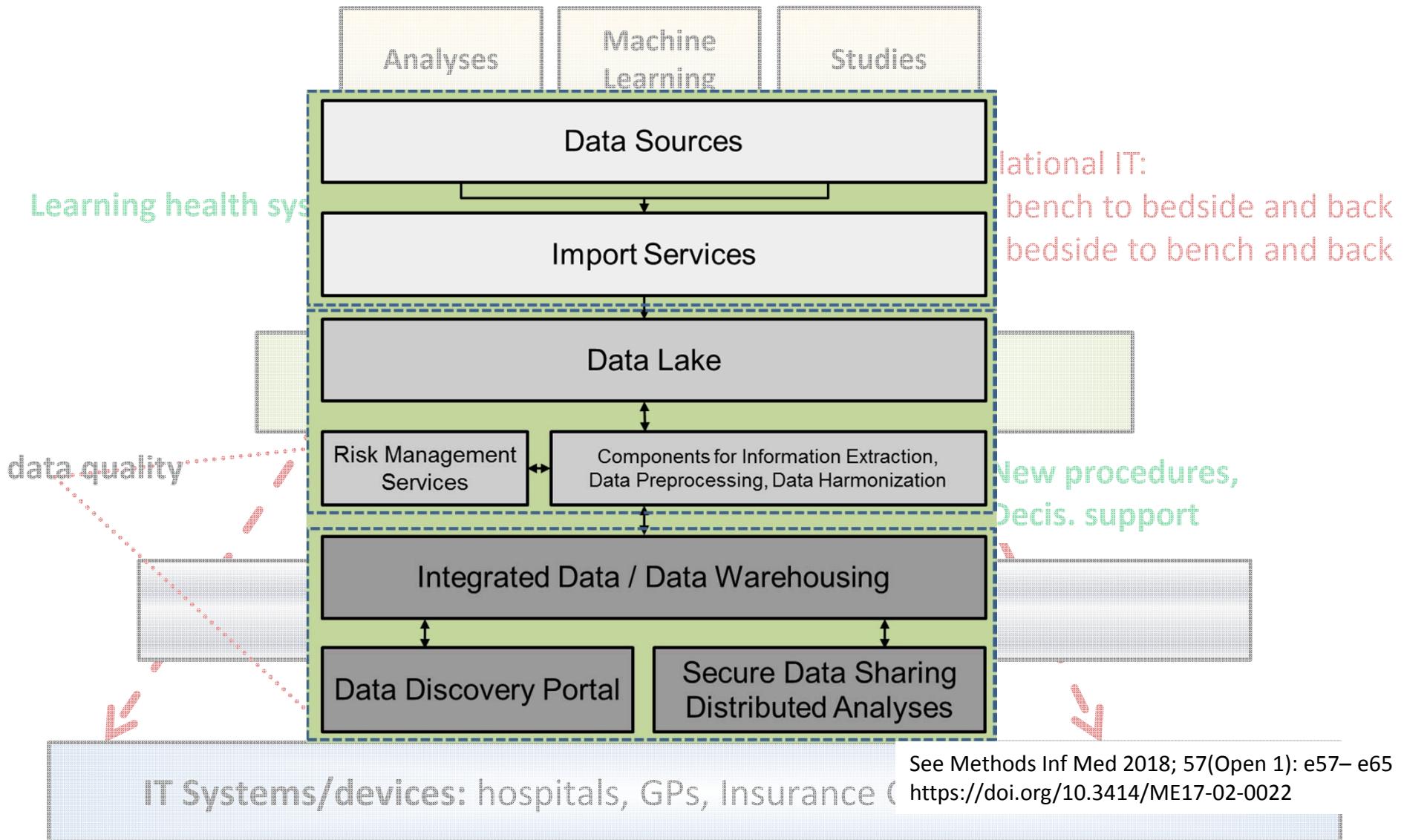
new and traditionally separate sources: smartphones, insurance data

research based on health care data: learning health system

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

Central challenge: data protection





Multiple Sclerosis

DIFUTURE
Data Integration for Future Medicine

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

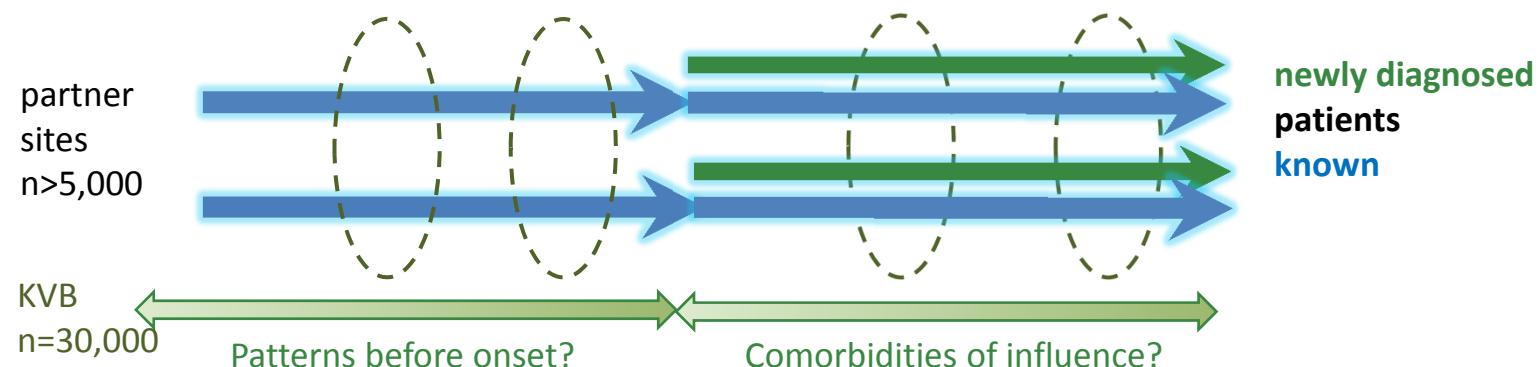
- distributed analyses: **functional hypotheses, algorithmic prognostic rules**

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?





Immunmodulatorische Therapie									
Beginn				Ende					
Tag	Monat	Jahr	Medikament:	Tag	Monat	Jahr	Grund für Ende der Therapie	Compliance	
2	2003	Glatirameracetat 20 mg ixtgl		6	2004	Non-Response	▼ 1 = bestens		
7	2004	Interferon - Beta 1a (Rebif 22pg)		7	2006	Non-Response	▼ 1 = bestens		
8	2006	Interferon - Beta 1a (Rebif 44 pg)	▼ 30	3	2007	schwanger	▼ 1 = bestens		
16	5	2008	Natalizumab	8	2011	schwanger	▼ 1 - bestens		
14	9	2012	Natalizumab	10	4	2014	JCV-Serologie/PCR pos..	▼ 1 = bestens	
4	6	2014	Fingolimod				▼ 1 = bestens		
2	2012	IVIG		4	2012	Sonstige Gründe	▼ 1 = bestens		

Schub																										
Beginn		Tag	Monat	Jahr	Opti... Opti...	Opti... Opti...	Opti... Opti...	Son...	Par...	Gef...	Son...	Glei...	Blas...	Fati...	Dep...	Schi...	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	□	

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



Patient Reported Outcomes

Kein Netz 10:39 75 %

DIS Beenden

A: Familie & Bildung
B: Körpergröße und Gewicht
C: Rauchen und Schnupftabakgewohnheiten
D: Allergien
E: Infektionskrankheiten in der Kindheit...
F: Andere Erkrankungen, Verletzungen un...
G: Sonnen- und Lichtaussetzung
H: Sport und körperliche Betätigung
I: Ernährungsgewohnheiten
J: Beruf und Arbeitsplatz
K: Arbeitsbedingungen und Kontakt zu Ch...
L: Für weibliche Teilnehmer
M: Gedanken zur Ursache der Krankheit
N: Andere Fragen

Allergien

Leiden Sie an oder haben Sie Probleme mit Asthma?

* Ja Nein

Wenn "ja", wann begannen diese Probleme?

Leiden Sie an oder haben Sie Probleme mit allergisch bedingten Bindegewebsveränderungen?

* Ja Nein

Wenn "ja", wann begannen diese Probleme?

Leiden Sie an oder haben Sie Probleme mit Heuschnupfen?

* Ja Nein

Wenn "ja", wann begannen diese Probleme?

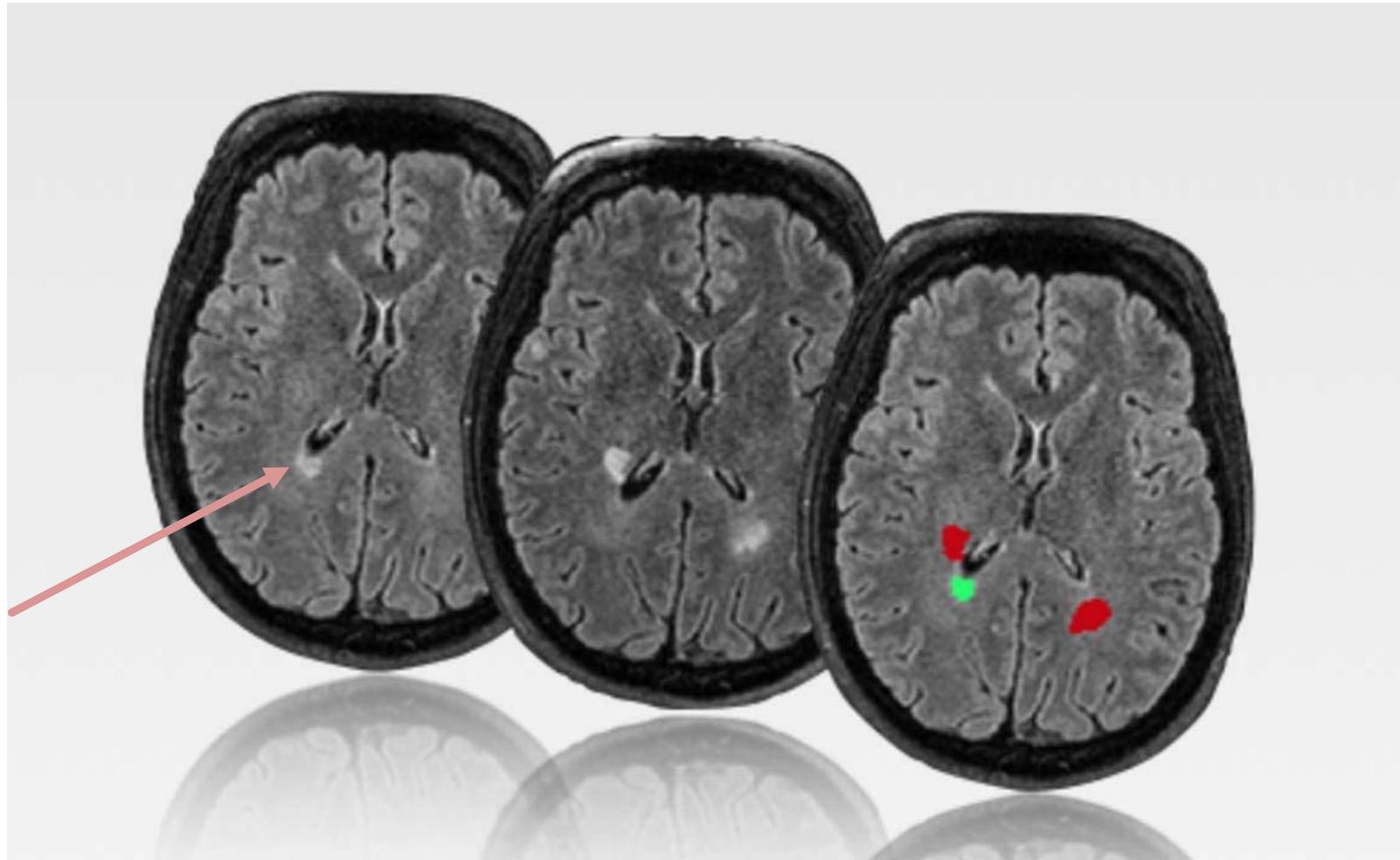
Leiden Sie an oder haben Sie Probleme mit Neurodermitis?

* Ja Nein

Wenn "ja", wann begannen diese Probleme?



Imaging: standardized procedures, image processing



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

Befund

Erfasste Höhen Kopf
 HWS
 BWS/LWS

Sequenzen 3D-Flair 3D-DIR isoT2 SWI DTI/DWI MPRage MPRage + KM Sonstiges

Bildqualität Gut
 Artefaktüberlagert aber verwertbar
 Nicht verwertbar, Wiederholung empfohlen

Structured Reporting MRI

Provided by
Dr. J. Kirschke

Läsionen Kopf <small>?</small>	<small>nativ</small>
Anzahl spez. <small>?</small>	0
<input type="checkbox"/> Subkortikal	
Spinal erfasst bis	C5
Spinale Läsionen nachweisbar	<input type="checkbox"/> nativ
Spinale Läsionen aus VU bekannt	<input type="checkbox"/> Ja <input type="checkbox"/> Nein
Sonstiges	
Nebenbefunde Kopf	
N. opticus rechts <small>?</small>	<input checked="" type="checkbox"/> Unauffällig <input type="checkbox"/> Auffällig
N. opticus links	<input checked="" type="checkbox"/> Unauffällig <input type="checkbox"/> Auffällig
PML-typische Veränderungen vorhanden <small>?</small>	<input type="checkbox"/> Ja <input checked="" type="checkbox"/> Nein
Liquorsystem altersentsprechend unauffällig	<input checked="" type="checkbox"/> Ja <input type="checkbox"/> Nein
Hirnatrophie visuell vorhanden <small>?</small>	<input type="checkbox"/> Ja <input checked="" type="checkbox"/> Nein
Mark-Rinden-Differenzierung erhalten	<input checked="" type="checkbox"/> Ja <input type="checkbox"/> Nein
Sella- und Mastoidregion unauffällig	<input checked="" type="checkbox"/> Ja <input type="checkbox"/> Nein
Orbita symmetrisch	<input checked="" type="checkbox"/> Ja <input type="checkbox"/> Nein
NNH frei	<input checked="" type="checkbox"/> Ja <input type="checkbox"/> Nein
Sonstiges	

Many Thanks to All Members of DIFUTURE!

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