



Using R in a health insurance company – lessons learned from automating reports

satRday Berlin

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Outline

- Background
- Presenting the project and it's implementation
 - Outline
 - Who are the costumers?
 - Which technology do we use for what?
 - Examples of the R-implementation
- Lessons learned



Background

Who are „we“? What do „we“ do?

- About 26 Mio. people have health insurance with the AOKs
- AOK-Bundesverband represents the 11 regional AOKs on national level
- Data of all AOKs are pooled at the Bundesverband, therefore it can provide analyses on a deep and broad level
- My field of expertise is mainly the outpatient care (ambulant ärztliche Versorgung)



Creating Automated Reports

What was at the beginning?

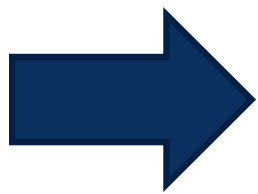
- Stronger focus on analyzing the supply of ambulatory care by hospitals
- Contracts are made with each hospital individually, therefore we have to analyze each hospital individually
- Focus on 5 different types of ambulatory care by hospitals
 - between 100 and 450 hospitals for each type
 - between 1 and 30.000 patients per hospital
- Reports have to be divided by region, every region must only see reports of their own region
- Data is organized in quarters, every quarter is exchanged about 3 times



about 340 reports every quarter

Who is the target group?

- Employees of the AOKs at the regional level, with a wide range of professional backgrounds and data knowledge
- They negotiate and control the contracts with the hospitals
- Questions to be answered:
 - How does my region compare to others?
 - How does one hospital compare to the other hospitals of the region?
 - What kind of diseases do the hospitals treat?
 - Where do the patients come from?



- Presenting data in tables and graphs
- Various approaches to one subject
- Providing not only a PDF-report but also an Excel-output, if users want to use the numbers further

Where do we use what?

Oracle

The data is stored in an oracle database

SQL

Preparing all analyses on the database,
storing older data i.e. for overview tables

RMarkdown

Creating the reports
Creating QS-documents (quality control)

Creating the excel-output

openxlsx

Moving the reports to the assigned folders

moving reports



Lessons Learned

What would I do differently this time?

- To make trouble shooting easier in the long run -> no more than one chapter / analysis per child-script
- If you use conditional scripts to cope with missing data, make sure the data is really missing and it's not a mistake at some other point in data management
- Spend some time thinking about the QS and how to make it “fun” to really go through it every couple of weeks
- If you have to coordinate written text with others, Word is still a lot easier. Thankfully the export to Word is pretty good, so this can be used.
- Probably true for all outputs, but especially for the combination of Rmarkdown and latex -> sometimes it does not have to be as pretty as you think

UEBERSICHT_20190326_20171_20182 - Excel

Datei Start Einfügen Seitenlayout Formeln Daten Überprüfen Ansicht Was möchten Sie tun? Tillmanns, Hanna Freigeben

E6 Name of the Hospital

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	JAHR	QUART	ARZT_K	KH_IK	ALLG_DESC	T_tabe	ANZ_FAL	betrie	dauer	herkur	temp_F	topd	treem	
6	2017	1	3	XXXX	Name of the Hospital	6	102	1	1	1	1	1	1	
7	2017	1	17	XXXX	Name of the Hospital	6	11187	1	1	1	1	1	1	
8	2017	1	17	XXXX	Name of the Hospital	6	6091	1	1	1	1	1	1	
9	2017	1	17	XXXX	Name of the Hospital	6	44	1	1	1	1	1	1	
10	2017	1	17	XXXX	Name of the Hospital	6	27	1	1	1	1	1	1	
11	2017	1	17	XXXX	Name of the Hospital	6	19	1	1	1	1	1	1	
12	2017	1	17	XXXX	Name of the Hospital	6	18	1	1	1	1	1	1	
13	2017	1	17	XXXX	Name of the Hospital	6	37	1	1	1	1	1	1	
14	2017	1	20	XXXX	Name of the Hospital	5	1	1	0	1	1	1	1	
15	2017	1	20	XXXX	Name of the Hospital	6	7527	1	1	1	1	1	1	
16	2017	1	20	XXXX	Name of the Hospital	6	307	1	1	1	1	1	1	
17	2017	1	20	XXXX	Name of the Hospital	6	1411	1	1	1	1	1	1	
18	2017	1	20	XXXX	Name of the Hospital	6	34	1	1	1	1	1	1	
19	2017	1	20	XXXX	Name of the Hospital	6	1027	1	1	1	1	1	1	
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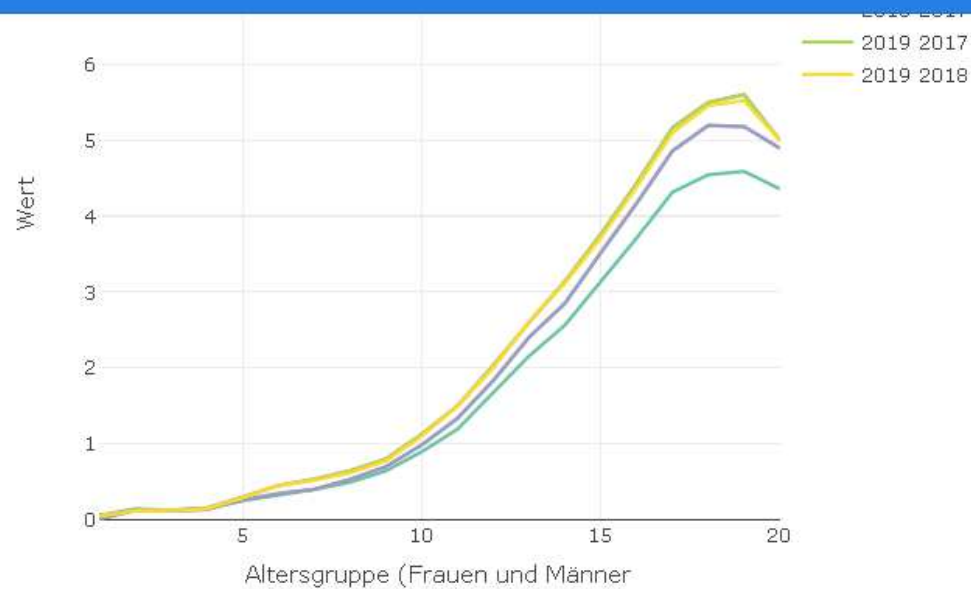
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Bereit Anzahl: 25 100 %

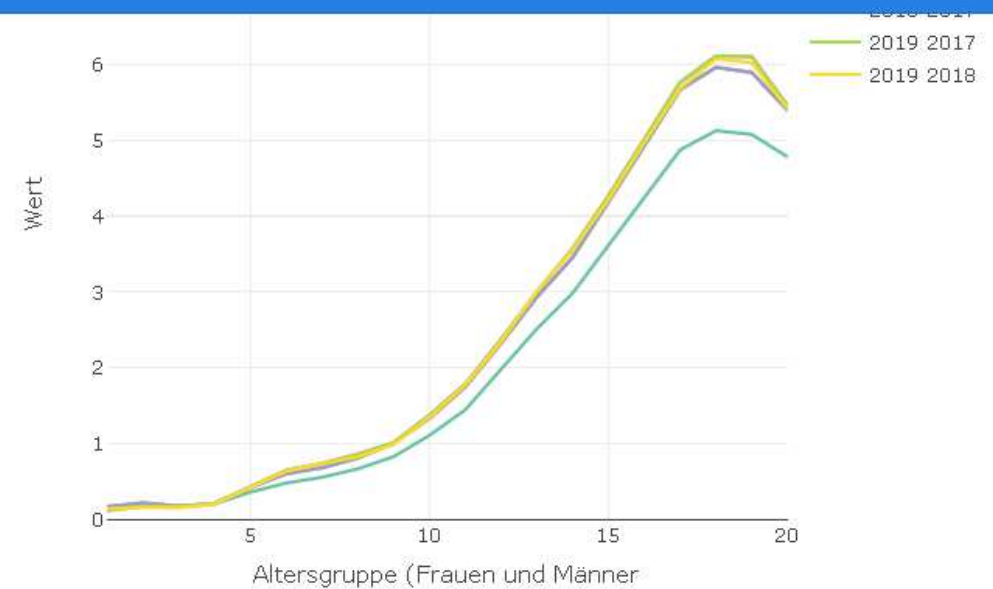
12:16 12.06.2019

Bremen Niedersachsen NordWest Rheinland / Hamburg Hessen Rheinland-Pfalz / Saarland Baden-Württemberg Bayern NordOst Sachsen-Anhalt
Plus

[Source Code](#)



Q1-Q3 - Ambulante Diagnosen



Q1-Q4 - Ambulante Diagnosen

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Evaluation of the layout

Psychiatrische Institutsambulanzen in
Baden-Württemberg
2016Q1
Hanna Tilmann, Hendrik Drüther (WiDO)
Stand: 13.05.2018

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Psychiatrische Institutsambulanzen in
Sachsen-Anhalt
2018Q2
Hanna Tilmann, Hendrik Drüther (WiDO)
Stand: 18.03.2019

WiDO | Wissenschaftliches Institut der IGO

Thank you very much

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