Attitudes and Experiences of TK Insurants Concerning EU-wide Electronic Exchange of Health Data

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Abstract

Information and communication technology (ICT) is becoming increasingly important in healthcare as in all other areas of everyday life, but the implementation of new structures also poses problems concerning data safety and interoperability of systems if introduced EU-widely. The implementation of new systems for health data exchange is costly and will only be profitable if they are widely accepted and applied. In order to get an impression of opinions on electronic health data exchange a questionnaire was sent to TK insurants who have experience with EU cross-border treatments. The questionnaire included questions on attitudes concerning data safety, confidentiality, need for more information on ICT in the EU and further questions on experiences with treatments in the EU. Results showed that the majority agrees that ICT is useful, but experiences showed that only 12 % of the respondents would have wanted better data exchange. An unanticipated after-treatment in combination with dissatisfaction with the data exchange only occurred in 3.4 % of the cases, which shows that the assumed utility of EU-wide ICT is fairly low. Further research on the cost-effectiveness of EU-wide health ICT is necessary and as only TK insurants have been included so far, it should include patients from other nations and other social groups, as well.

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i. Tables

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EB10 – Europabefragung 2010; TK's EU cross-border healthcare survey 2010

EB12 – Europabefragung 2012; TK's EU cross-border healthcare survey 2012

EU CBT – EU cross-border treatment

AMTS – Arzneimitteltherapiesicherheitsprüfung; assessment of safety of medication therapy)

BITCOM – Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e.V.; German Association for Information Technology, Teledata exchange and New Media

BKK – Betriebskrankenkasse; company owned health insurance

BMG – Bundesministerium für Gesundheit; German Ministry for Health

DAE – Digital Agenda for Europe

eGK – Elektronische Gesundheitskarte; Electronic health card

eHAP – eHealth Action Plan

EHIC – European Health Insurance Card

ENED – European Network for Electronic Data exchange in the health care sector

EPR – Electronic patient record

GKV – Gesetzliche Krankenversicherung; Statutory Health Insurance

ICT – Information and Communication Technology

KVK – Krankenversichertenkarte; health insurance card

SNOMED – Systematized Nomenclature of Human and Veterinary Medicine

TI – Telematik-Infrastruktur

VdAK/ AEV – Verband der Angestellten-Krankenkassen e. V.; Association of employees' health insurances

1 Introduction | Electronic Health Data Transfer in the EU

Today 80 % of German households have access to the internet and half of these internet users use online banking[1] which shows that a large share of the German public trusts the current online security measures. However, there is an intensive debate about online safety of health and patient data.

Medical practices and hospitals already use electronic data processing for coordination of appointments, for electronic patient files and for documentation. Most medical examination results are available in the digital form today. MRT scans, x-rays and blood results can be viewed on the screen and are stored on the hospitals' or practices' hard drive or server. Some data are sent by fax or email if they are required somewhere else. Yet, the transfer of data always depends on two persons: one person who asks for the data and one who sends it. In many cases there will be problems with the data transmission, possibly due to holidays or because the new physician simply does not know that relevant data are stored somewhere else. This may lead to unnecessary double examinations, dangerous pharmacological interactions or adverse reactions of medication, which is dangerous for the patient and also causes additional costs.

In the EU different national and international solutions are applied to enable safe online exchange and storage of health data. Member states are implementing their own systems. Some systems work fairly well, others have major problems and are delayed for years. The German eGK (elektronische Gesundheitskarte – electronic health card) is one example of a rather controversial system, which is criticized for its lack of data security as well as its complicated and cost intensive structures.

For patients who travel and who get treated abroad – in emergencies or due to planned treatments – it is even more difficult to transfer and access their different health data. Therefore, the EU supports international projects to enable the exchange of health data between member states. As projects on a national level are already problematic, an international system for health data exchange will be even harder to introduce, due to a lack of interoperability, different data protection regulations, and language barriers. These obstacles will make the development difficult, time-consuming and expensive. Financially the project may be profitable after a while, due to a decrease of unnecessary examinations and possibly even maltreatment. Yet, a health data exchange system can only pay off if patients use it. Therefore, German patients have been asked about their impression of the eGK and it turned out to be rather positive. Nevertheless, these results

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[1] cf. Eurostat 2012, 142p

cannot be applied to a European system which is based on different regulations. Patients who trust the German health system and online security do not necessarily trust the EU. Those patients who do not trust the system will not use it, i.e. the system would not pay off, but would rather end up as an expensive failure.

In order to find out whether German patients would welcome this new development in the EU, this survey examines attitudes and experiences concerning health data exchange in the EU among German patients who have experience with medical treatments in a foreign EU country. The survey is a part of a series of questionnaire surveys on EU cross-border treatments (CBT) performed by the Techniker Krankenkasse (TK) among their insurants.

The following chapter will clarify the objectives of this survey. Subsequently a short overview will be provided on the current development of Information and Communication Technologies (ICT) in European health systems, with a focus on the German eGK, followed by a description of the method, the results and finally the discussion of results.

2   Objectives | Attitudes and Experiences

The goal of this thesis is to explore the potential of Information and Communication Technologies (ICT) from the perspective of insurants with at least one EU cross-border treatment (CBT), no matter whether it was a planned treatment or an emergency.

First of all, the current status of ICT development in the EU will be assessed in order to compare Germany to other countries and to find the position Germany has within the EU concerning the topic of health ICT.

This information will serve as a background for the basis of the analyses, which will be the examination of the insurants' general attitudes towards data safety, the legislation by and for the EU, ICT in the EU, as well as their experiences with treatment quality and data exchange during EU CBTs. From the background information seven hypotheses are formed (H1-H7). These are described below.

Fear for data safety and confidentiality is one of the most important topics in Germany concerning the eGK and the exchange and storage of personal data in general. Therefore, in order to introduce an EU-wide system that people should actually use, the insurants' attitudes on data safety need to be taken into account. It is crucial that insurants feel that their data are safe in the system and that they know where their data are and for what they are being used. Accordingly the insurants were asked whether they agree to the following statements:

F27.1[2] In Germany my health data are safe from misuse.

F27.2 In the EU country of my last cross-border treatment my health data are safe from misuse.

F27.5 Concerning my health data confidentiality is very important to me.

F27.3 I require more information on the use of my health data by others.

F27.4 I require more information on my own options to use my health data.

Besides the attitude towards data security the general opinion on the EU and EU-wide legislation may play an important role when considering EU-wide ICT structures.

> → **H1: Those insurants who do not consider EU-wide regulations useful do not agree that their data are safe in other EU countries.**
>
> → **H2: Those insurants who do not consider EU-wide regulations useful do not agree with ICT**

Therefore the insurants were asked:

F29 What is your opinion on the fact that the EU enacts legal regulations for all European health systems?

Finally, the central question concerning the introduction of ICT structures in the EU was again posed as a statement and the insurants were asked whether they would agree with it:

F27.6 EU-wide physicians should be networked in order to have access to my health data in case of a treatment.

F27.7 If the EU physician could access my health data in Germany treatment quality would be improved.

Former surveys have shown that age and area of residence (German federal state split into Eastern and Western states) seem to have an influence on insurants' opinions (see Chapter 3.1, page 10 for further information). The first resulting hypothesis states that younger insurants and those from the new Bundesländer are more open towards ICT in the healthcare system. As the insurants' personal background seems to influence their opinions the hypothesis assumes that the socio-economic status (SES) also has an influence on the insurants' opinions. Therefore, a regression will be run on the influence of age, sex, area of residence and SES on the attitudes of insurants.

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[2] This is the number of the question ("Frage 27.1"). The entire questionnaire with the original German questions can be viewed in the appendix.

→ **H3: Age, area of residence, SES and sex have an influence on the opinions of insurants concerning data safety.**

It is more likely that insurants would use the ICT structures if they were not satisfied with the data exchange as it is, except of course if ICT were already applied, but these cases are extremely rare up to now.

→ **H4: Those insurants who were not satisfied with the data exchange have a more positive opinion of ICT.**

Another reason for a positive opinion on ICT is the chance to profit from the system. This is the case if patients often require EU CBTs, which would apply to chronically ill patients.

→ **H5 Chronically ill insurants have a better opinion of ICT.**

In order to assess the status quo and the need for change concerning medical data exchange between EU countries the insurants' experience with data exchange and quality of treatment was requested. Therefore, the first set of questions on experience deals with the insurants' perception and satisfaction with physicians' data exchange:

F25 Did the EU physician and your German physician exchange information?

F26 Would you have wanted a better exchange of data between your German and your EU physician?

As the EU countries have different health systems and are at different stages of health ICT development differences in experiences with data exchange are expected.

→ **H6: The amount and quality of data exchange depend on the country of treatment.**

It is often stated that ICT development will have a positive effect on the quality of treatment (see Chapter 3.1, pp. 6 for further information). This means that low treatment quality would be partially attributable to a lack of data exchange between the treating physicians.

→ **H7: Insurants who had a treatment of low quality were less satisfied with the data exchange between their physicians.**

In this case quality of treatment was operationalised in a subjective and in an objective way. Patient satisfaction with the treatment result was used as a subjective measure of quality:

F11.1 How satisfied were you with the treatment result?

Necessity of an unanticipated after-treatment was used as an objective quality measure:

F10 Was an after-treatment necessary?

3   Background | Current ICT Development in the EU

Information and communication technologies (ICT) used in eHealth have a high potential of generating value for the health care sector, not solely financially, but also by improving quality of care. According to the OECD Health Policy Studies[3] ICT can help to

- increase quality of care and efficiency
- reduce operating costs of clinical services
- reduce administrative costs
- enable entirely new modes of care.

All over the world ICT are increasingly introduced in health care in the form of telemedical applications, electronic patient records in hospitals and in many other forms.
But at the same time, there is a debate on ICT's security concerning data protection and a possible influence on the relationship between physician and patient. In Europe many countries work on the introduction of systems that work nationwide to make patient data available to different physicians. In Germany the method of choice is an electronic health insurance card which can store different health data of the patient.

3.1   The German Electronic Health Card eGK

The implementation of an electronic health card (eGK) in Germany was determined in the Statutory Health Insurance Modernisation Act (Gesundheitsmodernisierungsgesetz) in 2004. By the year 2006 by law all German insurants were supposed to have an electronic health insurance card in order to "improve efficiency, quality and transparency of treatments"[4]. This card has to contain the following data: name, date of birth, sex and address of insurant, as well as name, number, status and duration of insurance. Additionally there is a photograph of the insurant on the plastic card and the card has to be able to store medical data for emergencies, diagnostic findings, diagnoses, recommendations of therapy, electronic medical reports and records, medication, data provided by or for the insurant him-/herself and data on medical services and costs.[5] The card can only be used with the insurant's consent and only medical staff may access the data.

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[3] OECD, 2010 p. 32

[4] "Verbesserung von Wirtschaftlichkeit, Qualität und Transparenz der Behandlung" SGB V § 291a Elektronische Gesundheitskarte

[5] SGB V § 291 Krankenversichertenkarte

This is specified in SGB V § 291 and 291a. However, due to objections mainly concerning data safety the introduction of the card was postponed several times. Numerous press releases and publications around the year 2006 either praised the eGK and its multiple advantages or condemned the collection of data, lack of data safety and the high costs of development.

A look at the press releases on the eGK in the last seven years gives the impression that members of government, gematik[6] and health insurances tend to see the theoretical advantages of the eGK and have a lot of confidence in it, while physicians and journalists have a rather critical view that also covers the practical use of the card.

In 2005, for example, Dr. Frank Hackenberg who is responsible for the project Telematik at the Verband der Angestellten-Krankenkassen e. V. (VdAK/AEV)[7] emphasized that the eGK would lead to the "availability of patient data independently of place and time", especially of emergency data. Health data would be available for the patient him/herself and the overall availability would lead to a decrease of unnecessary double examinations. Prescriptions could be transferred without media discontinuity and at the same time pharmacists could easily check the security of prescribed medication concerning interactions and incompatibilities.[8] Negative aspects were not mentioned, no problems were seen with the implementation and he did not consider the possibility that some of these functions may not be necessary in many cases, because data can be faxed, the patient might have a folder and collect his/her health data at home and double examinations may sometimes be helpful and necessary. At the same time not only the eGK itself will be more expensive than the Krankenversicherungskarte[9] (KVK), but also the whole implementation will be fairly costly due to the newly developed card readers and connectors. This certainly is always the case with newly implemented technologies, but the cost dimension has to be considered in relation to the utility of the technology. In the case of the eGK it is still unclear how high the cost will be and when it will be profitable (cf. page 10 for further information).

In the following year Norbert Paland from the Federal Health Ministry (Bundesministerium für Gesundheit, BMG) also stressed these advantages of avoiding double examinations and media discontinuity, having compatible documentation and improved care due to

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[6] Gesellschaft für Telematikanwendungen der Gesundheitskarte mbH (Association for telematics of the health card ltd.)

[7] Association of employees' health insurances

[8] cf. Hackenberg & Bether, 2005

[9] Health insurance card

safer prescriptions of medication. According to Paland more people die from unintended results of medication than in traffic. Finally he anticipates a strengthening of patient rights from the improved knowledge of their own health status.[10] Yet, better knowledge of one's health status might only be a result for very few people. Those who care about their health data can already ask their physician for a copy and keep their data in a safe folder at home. The insurant may have to pay for the copy and it may take quite some effort to get access to the file, but it is possible. Those who do not care as much about access to their health data may not check the data on their card anyway.

Pablo Mentzinis from BITCOM[11] sounds even more questionable when he expresses that the eGK makes it easier for the physician to see the patient as a whole with the complete medical background[12]. A good physician would always ask for the patient's medical history and consider the "whole patient" and not merely the current symptoms. If results from former examinations were necessary the physician would ask for them; if not, they would probably be no help even if they were available on the eGK. It may only be few cases which would actually result in better treatment due to the eGK, but this was not considered by these three examples from the press.

In the general press and among physicians the trust into the functions of the eGK is by far lower. There is a lot of criticism and several risks are pointed out.

In the Frankfurter Rundschau from October 2011 the use of a server for the storage of health data was criticized. The editor pointed out that even the military does not manage to achieve absolute data safety and there is always a chance of hacking the server and using the health data in an illegal way. Furthermore, a card for sensitive data would require intricate safety measures, which would make the card difficult to use and the possibility to decide who may see which part of the card might ask too much of many patients.[13]

This sounds dangerous for patients and therefore it may have led to more people buying the Frankfurter Rundschau, but at the same time it is not completely true and logical. Certainly there can never be absolute safety on a server, not even for the military, but hospitals and private practices are using electronic data processing and the internet as well. Health data are online already and it is unknown how safe each hospital's servers

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[10] cf. Paland, 2006

[11] German Association for Information Technology, Teledata exchange and New Media (Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e.V.)

[12] cf. Mentzinis, 2006

[13] Baumann, 2011

are. Data scandals like that of Rebus Consulting- und Verwaltungs GmbH in Rendsburg which became public in November 2011[14], show that not all hospitals and practices have secured their patients' data sufficiently. The patient data stored on the eGK would in fact be by far safer and more difficult to hack than many current systems of hospitals, because safety standards will be used that are not compulsory for hospitals today and these standards are updated regularly. The high safety standards will indeed make the use of the card more complicated, but the possibility to decide who may exit the data and to personally have access to it also strengthens patients' rights and empowers them.

Dr. Bernd Hontschick who is a surgeon in Frankfurt also does not like the idea of patient data in a central server. He criticizes that patients and physicians cannot decide whether they want to participate or not. He fears the transparent citizen and a surveillance society. In his eyes the arguments for the eGK are specious: Emergency data cannot help an emergency physician during reanimation, double examinations only mean costs for the physician prescribing them and the losses from misusage of the KVK are lower than the cost of applying a photograph on the card. He calls eHealth in general destructive, since data are mistaken for information and information for data exchange, patient-physician confidentiality is not respected and loses its intimacy.[15]

When reading this article one might wonder, whether Hontschik actually understood the function of the emergency data. The eGK certainly would not help during reanimation, but it might help the physician to know about an important allergy, diabetes or epilepsy of a patient who is in shock or unable to speak. Double examinations only cause costs for the physician in special cases. At least when prescribed in the inpatient and outpatient sector the hospitals and physicians will get paid for treatments.

Obviously some (groups of) people do not support the eGK and others do so very much. There is hardly any article in the press that shows a differentiated picture of the eGK with all its advantages, disadvantages, opportunities and risks. Of course at first it is easy to only see the advantages, but those who need to work with the card, will soon think about possible problems as well.

By law functionality, interoperability, compatibility, stability, safety and suitability for daily use of the eGK had to be tested[16]. This happened in pilot projects which started in 2007 and went on until 2009. Seven test regions (Heilbronn, Ingolstadt, Wolfsburg, Bochum-

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[14] taz.de, 2011

[15] Hontschik, 2009

[16] Dritte Verordnung zur Änderung der Verordnung über Testmaßnahmen für die Einführung der elektronischen Gesundheitskarte (3. EGKTestVÄndV; V. 11.01.2011 BGBl. I S. 39 (Nr. 2); 25.01.2011

Essen, Trier, Löbau-Zittau and Flensburg) tested the reading of the data, the application of an emergency dataset and the electronic prescriptions with up to 10,000 insurants.

During the pilot tests several problems turned up. In Baden-Württemberg for example it turned out that older patients often had a problem to remember the PIN code. Yet, the older patients are those who are most likely suffering from multiple diseases and could therefore have the most advantages from the eGK. Without a PIN they can only use the standard functions, though[17].

Electronic prescriptions took too much time and required simplifications concerning the signature and task sharing in the practice[18].

In the end electronic prescriptions and the emergency data set were not applied in the first version of the eGK. Almost six years after the statutory date of introduction the roll-out of the eGK started in October 2011. By the end of the year 2012 70 % of the German insurants are required to have the eGK. Yet, so far there is hardly any additional information stored on the new card. Only the photograph of the insurant provides a potential for improved efficiency, since misuse of the card by other patients is hindered. Additionally, the card has a potential to store further data, but no satisfactory way has been developed to actually use these applications. Five additional functions are still being prepared by gematik[19]:

- emergency dataset
- online update of basic data
- data exchange between physicians
- electronic case file (eFA - elektronische Fallakte)
- assessment of safety of medication therapy (AMTS - Arzneimitteltherapiesicherheitsprüfung)

It is unsure when these additional functions will be added to the eGK, and when it will actually start to improve quality, reduce costs and increase transparency.

The high cost of the card can be guessed from a report for gematik by Booz Allen Hamilton which was published by the Choas Computer Club[20]. According to this report the cost will not be as low as the original EUR 1.4 billion, but rather EUR 3.9 to 7 billion. The highest cost will be the development of the "Konnektor" which is needed for the online

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[17] cf. Zens, 2009, 37

[18] cf. Zens, 2009, 142

[19] gematik, 2010

[20] Bernnat, 2012

connection of the card in the practice. Even after five years the total net benefit would still be negative (EUR 800 million). Only after an additional five years there might be a positive net benefit of EUR 500 million, if the voluntary functions are used sufficiently by the insurants. This unofficial report was used in "Gesundheit und Gesellschaft" to investigate whether the investment was worthwhile.[21]

A look at the English system confirms that an implementation might become much more expensive than anticipated and also that the systems may collapse when operated under full load[22].

Different methods of calculation and different orderers of investigations will make it very difficult to get reliable data on the final cost of the implementation of the eGK. However, today we can say for sure that the eGK as it is now does not provide sufficient potential savings to account for the investments. An implementation of an unfinished card seems overhasty and does not comply with the preference of the insurants. According to a survey by the association of employees' health insurances 75 % of insurants would prefer a later implementation of the full version of the eGK[23]. The assessment of acceptance by the insurants has to be considered as well[24]. The German public has a rather positive perception of the eGK. According to a survey by the F.A.Z.-Institut and Techniker Krankenkasse from 2009 especially the younger people think the eGK would be helpful. 85 % of those aged 18 to 29 years consider the implementation of the eGK reasonable while 74 % of all respondents (n=1,006) think that way[25]. The younger ones also have the least objections concerning data safety[26]. Also it seems that insurants from Eastern Germany agree a little more than those from Western Germany[27].

One result of the survey was also that 82 % of the respondents would prefer a card that was thoroughly developed and tested to a card that is introduced soon and at an early stage[28].

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[21] cf. Schellhase, 2007

[22] cf. Meyer, 2007

[23] VdAK/AEV, 2008

[24] Dritte Verordnung zur Änderung der Verordnung über Testmaßnahmen für die Einführung der elektronischen Gesundheitskarte (3. EGKTestVÄndV; V. 11.01.2011 BGBl. I S. 39 (Nr. 2); 25.01.2011

[25] Gangl & Birkner, 2009, 13

[26] Gangl & Birkner, 2009, 18

[27] Gangl & Birkner, 2009, 14

[28] Gangl & Birkner, 2009, 26

3.2 EU Specifications

According to the principle of subsidiarity the EU is not responsible for the national health systems, but the EU is responsible for information systems. Therefore, according to Gérard Comyn (head of the eHealth department of the EU Directorate General Information Society and Media), the EU is responsible for eHealth-Systems.[29]

The first eHealth Action Plan (eHAP) of the European Commission was conducted for the years 2004 to 2010. The plan includes an "adoption of implementation of an electronic health insurance card by 2008"[30]. Yet this card would only contain data on the insurance status of the patient, just like the German KVK which has been in use since the 1990s. The European Health Insurance Card (EHIC) was developed and is used today, but it is not electronically usable and therefore does not completely fulfill these requirements.

Furthermore, "activities will be launched to support common approaches in Member States that are related to electronic health records, emergency data sets, and electronic patient identifiers"[31]. This is realised in the German eGK. However, it is only a national card and cannot be used abroad. A common approach in the EU is tested in different pilot projects, but these have not been very successful yet.

Another specification by the EU can be found in the Digital Agenda for Europe (DAE), which is not a health topic in the first place, but also includes ICT aspects of health care.

> "The Digital Agenda for Europe is the European Union's roadmap for bringing the benefits of a digital society and economy to Europe's citizens."[32]

Some of the goals in the DAE are "to undertake pilot actions to equip Europeans with *secure online access to their medical health data by 2015* and to achieve by 2020 widespread deployment of telemedicine services". Another key action is to "propose a recommendation defining a minimum common set of patient data for *interoperability of patient records to be accessed or exchanged electronically across Member States by 2012*"[33]. Yet, even a minimum common set seems to be very hard to find, or at least the accessibility will present a major problem due to data protection issues.

In the directive of 2011 on the application of patients' rights in cross-border healthcare it is stated that the EU will "support Member States in developing common identification and

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[29] Grätzel von Grätz, 2007

[30] European Commission, 2004

[31] European Commission, 2004

[32] European Commission, 2012a

[33] European Commission, 2010; European Commission, 2010

authentication measures to facilitate transferability of data in cross-border healthcare", which "shall be pursued in due observance of the principles of data protection"[34].

The implementation however, has to be coordinated by the member states themselves and data privacy protection is explicitly mentioned as an important feature. From the experience with the eGK in Germany it can be anticipated that it will be extremely difficult for all the different EU member states with their different health systems and data protection laws to define, develop and implement a usable system for the international exchange of health data.

In the List of Actions on the DAE website three of the multiple actions concern eHealth issues. These are[35]

- Action 75: Give Europeans secure online access to their medical health data
- Action 76: Propose a recommendation to define a minimum common set of patient data
- Action 77: Foster EU-wide standards, interoperability testing and certification of eHealth

However, these actions state that certain steps are planned for the years 2010 to 2012. Results cannot be found anywhere though. It seems that not only in Germany, but in the EU in general the implementation of eHealth and ICT will be by far more challenging than expected. Some countries may have found applicable ways to use eHealth and ICT, but in most European countries the implementation still denotes a problem.

3.3   Electronic Exchange of Health Data in other EU Member States

Germany is not the only country in Europe which is working on health ICT and eHealth structures. Most EU-countries are developing ICT structures for their health systems as well. Yet, in many other countries there is not as much resistance concerning data privacy as in Germany. The eastern countries, e.g. Bulgaria, Slovenia and the Baltic states very much look into the future and are therefore quick to develop modern ICT solutions. Most countries apply server solutions that do not need a card. This makes the procedures a lot simpler.[36]

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[34] Official Journal of the European Union, 2011 article 14, 2c

[35] European Commission, 2012b

[36] Grätzel von Grätz, 2007, 33

In this chapter the systems of Denmark and Austria will be introduced. Denmark, on the one hand, provides an example for a server solution which is completely different to the German approach. Austria, on the other hand, has a system similar to the German one.

In Denmark an eHealth system has successfully been implemented in the year 2003 when IBM developed an online health portal which is now used in the whole country. The portal has been relaunched by Microsoft in 2010 which raised the utilization even more[37].

On the platform multiple services are available to the public. There is a directory of names and addresses including a health appointment calendar, the possibility to make appointments with the GP and to receive prescriptions and other functions. There is medical information available, but also waiting list information from hospitals, health laws and regulations and a patient to patient dialogue in online patient networks. Patients have access to their personal health data in the form of an online electronic health record from hospitals, an overview of personal medical history since 1977 (hospital) and 2003 respectively (primary sector). An online organ donor registration can be used, as well as an online living will. Finally, of course, the patient can see which physicians have accessed their personal data.[38]

For physicians there is general information available, e.g. an online medical handbook, encyclopedias (Cochrane etc.), International Classification of Primary Care (ICPC) search of diagnoses and a list of health and prevention programs, but also regional information on authorities, departments, health personnel, preventive medicine, health laws and regulations, laboratories and consultants and regional health reports. The access to patient data includes online electronic health records from hospitals, electronic medicine profiles, web access to laboratory data and treatment feedback regarding current patients with certain chronic diseases.[39]

The Danish system is part of an international cooperation with the Norwegian and Swedish national Health Data Networks. Even regional networks in Estonia and Lithuania, are connected. This network is called the Baltic Health Network (BNH) and it allows the transmission of data and images in a closed and secure way. This cooperation is used for diagnoses in mammogram screening or reports on x-rays images. The original data are sent abroad where the reports are made and the results are transmitted back to the Danish hospital.[40]

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[37] Microsoft, 2010

[38] sundhed.dk, 2012a

[39] sundhed.dk, 2012b

[40] sundhed.dk, 2008,13

The system is very successful, but compromises had to be accepted concerning data privacy. Most physicians and all hospitals and pharmacies are connected to a database. This means that every user's medical data are available to every physician in the country and in some cases even to people in Sweden or Estonia. The professionals are only allowed to access the data if the patient gives his/her consent, but the patient cannot hinder the physician from accessing the data without consent. Yet, he/she can see who had access and accordingly the patient could investigate a possible abuse.[41] A system like this is probably not applicable in Germany, because of data privacy restrictions and concerns. The Danish healthcare system is very homogeneous and the citizens seem to have a high level of trust in the government. With a small population of only 5.5 million inhabitants and with 84 % (EU27 average 73 %)[42] of these having access to the internet, the Danish population is rather trustful and open for new developments.

As can be concluded from the cooperation with other Scandinavian countries Denmark is not the only country which is further developed in the area of health ICT than Germany. In Sweden, for example, there is a very positive feedback on e-prescriptions. In a survey with 180 participating Swedish physicians their attitudes towards ePrescribing were assessed. The results turned out fairly positive as 88 % of the respondents confirmed that the system was easy to use for the prescribing of drugs. 92 % agreed that they were able to provide better service by ePrescribing. 91 % considered it time saving and 83 % thought it was safer than handwritten prescriptions. Some weaknesses were stated too. One was that ePrescriptions did not clearly display the price of drugs (43%) and that the drug choice was complicated (21%). 62% were missing the receipt from the pharmacy after successful transmission of an ePrescription.[43]

These results are extremely positive compared to Germany where the ePrescription is not going to be implemented in the near future due to problems during the first tests. One problem in Germany is that a card can always be lost or forgotten or the card terminal may not work. In all these cases a paper prescription is needed. With a server solution like in Denmark there is only a problem if the internet connection breaks down.

Most European countries are going for a server-based ICT structure. There are only a few exceptions which develop a card. One of them is Austria.

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[41] cf. Grätzel von Grätz, 2007

[42] Eurostat, 2012, 1

[43] Hellström et al., 2009

The Austrian "eCard" was already introduced in the year 2005. The card is equipped with a photograph and with the possibility to store data, just like the German eGK. The card can also be used as a "Bürgerkarte" (cititzen card) for electronic signatures in bureaucratic procedures and the electronic prescription is already in use. By 2013 the electronic health file (ELGA - elektronische Gesundheitsakte) will be introduced.

The health minister Alois Stöger (SPÖ) expects ELGA to charge off after one year. He points out that the storage of data would be safer and that patients could oversee who had accessed their data. The data themselves would be stored in the hospital or practice where they were generated, but they would be available to other physicians via the eCard. However, Erwin Rasinger (ÖVP) strongly criticizes Stöger's course of action and calls it grossly negligent. He expects much higher costs of around half a million EUR for the implementation of ELGA.[44]

Overall the situation is fairly similar to the German one. Even though in both countries the population agrees with the implementation of an electronic card, it has to be delayed again and again. In Austria a majority of 87 % of insurants (n=176) approves of the implementation of ELGA at least under certain conditions and 86 % have doubts concerning data privacy.[45] In Germany the doubts seem to be lower, at least according to the study by TK where only 63 % of respondents think it is possible that their health data might get into the hands of an unauthorized person[46]. Yet, in both countries a lack of experience and over optimistic promises by the responsible institutions have led to an underestimation of risks and complexity[47]. Therefore in spite of the positive opinion of the population the system is not ready for implementation and yet it has been introduced already.

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[44] Heigl, 2011

[45] Hörbst, Schabetsberger, & Ammenwerth, 2008

[46] Gangl & Birkner, 2009

[47] Artmann, Stroetmann, & Giest, 2010

3.4   EU-wide Projects

The intention to introduce smartcards in European health care systems is not a new one. Several projects have been started in the past, beginning in the early 1990s.

3.4.1   DIABCARD

The DIABCARD, for example, was started in 1992. It was a smartcard with a 16 kB microprocessor, funded by the EU and evaluated by the Helmholtz Zentrum München[48]. The card was designed for diabetics and other chronically ill patients. It provided a data set with administrative data, emergency data, a basic information sheet, the German Diabetes Passport, WHO's ophthalmological documentation, foot-specific data and further medical data relevant for diabetes patients. The data were secured by the patient's PIN code and a DIABCARD Access Card (similar to today's health professional card).

The project took place from 1994 to 2000. The final evaluation lasted from December 1999 until April 2000 and was performed at four European sites – Athens, Munich, Thessaloniki, and Vienna. In total 73 patients and 20 physicians participated.[49]

The results among the patients were very positive. Patients expressed a high acceptance, improved care and usefulness of the card. Birkmann et al. discuss that the high acceptance might be due to a perceived chance of patient empowerment. Concerning the health care professionals, the evaluation of the DIABCARD system was better in Greece than in Germany and Austria where the professionals seemed to be more critical and demanding.[50]

These results might be a hint that in fact (chronically) ill insurants might be more in favour of improved ICT systems in health care. Additionally, the study supports the impression that in Germany it is more complicated to establish a commonly accepted system than in many other systems (see above Grätzel von Grätz 2007, chapter 3.3, p. 13).

3.4.2   NETLINK

NETLINK was a project by the European Commission that has taken over former projects with international card systems. Four countries (France, Germany, Italy and Quebec Canada) participated and worked on interoperable ICT structures in the health sector. The main goal was to allow physicians to access patient data and to safely exchange documents by using smartcards for physicians and patients and by the establishment of

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[48] HelmholtzZentrum münchen, 2012

[49] Birkmann, Demski, & Engelbrecht, 2006, 74

[50] Birkmann et al., 2006, 77

large networks and security architectures. The project was taken over by a new project called Netc@rds which started in September 2002.[51]

3.4.3 Netc@rds

The EU-funded project used the results from projects like NETLINK to establish an electronic system for the EHIC that allows electronic identification of foreign EU patients. The system was supposed to provide a reliable method of identification of the patient, verification of entitlement to treatment and the the necessary data for interstate-billing.[52]
The project started in September 2002. In June 2007 the implementation phase started[53] and was successfully ended in the year 2011. 16 EU member states and Switzerland participated. Altogether 300 hospitals and more than 600 service points were involved.[54]
When the project was finished in June 2011 seven of the participating countries decided to keep providing the netc@rds services. Therefore, the structures were taken over by the "European Network for Electronic Data exchange in the health care sector" (ENED).[55]

3.4.4 epSOS

EpSOS is the main project of the EU concerning the development of health ICT that can be used internationally. While Netc@rds (and now ENED) only tested the electronic use of the EHIC, which allows easier identification of the patient and simplified payment procedures, the project "European Patient Smart Open Services" (epSOS) tries to introduce structures that enable physicians to exchange patient data internationally within the EU. The project started in July 2008 and is supposed to last until the end of 2013. The assumed cost for the epSOS project is EUR 36.5 million. 23 countries are participating, 20 of them are EU member states. Altogether 183 hospitals, 2,149 pharmacies and 1,113 points of care are included.
The most important features of epSOS are the electronic patient summary and the electronic prescription. In Germany the electronic prescription is not functioning and many other aspects of the eGK are still problematic. Most likely it will be very difficult for epSOS to develop an applicable system that can be accepted in the whole EU. Later on epSOS is

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[51] GIE SESAM-Vitale, 2002

[52] NETC@RDS, 2007

[53] NETC@RDS, 2007

[54] Communication with Noël Nader (Project Coordinator Netc@rds)

[55] NETC@RDS, 2011

supposed to additionally test the integration of the 112 emergency services, the integration of the EHIC and patient access to their data.

The arguments for epSOS are just the same as for ELGA and eGK: With these new ICT structures the EU plans to increase "safety by reducing the frequency of medical errors and by providing quick access to (…) life-saving information and reducing the (sometimes needless) repetition of diagnostic procedures."[56] Therefore, the same questions, doubts and problems can be expected concerning safety, necessity, practicability and interoperability.

3.4.5 Challenges of EU-wide systems

As can be seen in the cases of Germany and Austria, there are several barriers and obstacles on the way to a functioning and safe electronic health data card. One major problem is the interoperability of card systems. Therefore the International Organization for Standardizations (ISO) has a Technical Committee (TC) on health informatics. The group TC 215 is concerned with a standardization of Health ICT in order to

> "promote interoperability between independent systems, to enable compatibility and consistency for health information and data, as well as to reduce duplication of effort and redundancies"[57].

Health Cards are the topic of working group 5 of ISO/TC 215.[58] However, in the past decade no solution could be developed that would allow reliable and safe electronic identification and data exchange for patients internationally.

Another problem is not just the technical side of interoperability, but also the question of a practicable international coding language.

EpSOS uses SNOMED CT which stands for Systematized Nomenclature of Medicine - Clinical Terms. SNOMED CT is a multilingual clinical healthcare terminology owned by the International Health Terminology Standard Development Organisation (IHTSDO) since 2007[59]. Its forerunner was the Systematized Nomenclature of Pathology (SNOP) which was started in 1965. In 1999 the English National Health Service (NHS) and the College

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[56] epSOS, no year

[57] ISO, 2011

[58] Sembritzki, 2004

[59] ihtsdo, 2012b

of American Pathologists (CAP) developed SNOMED CT by joining SNOMED RT (Reference Terminology) and the United Kingdom's Clinical Terms Version 3 (formerly known as the Read Codes).[60] Apparently SNOMED CT has a long history of improvements and adjustments, which has led to a practicable system.

However, the international introduction may still pose several problems, because national translations of the Codes are needed and also it is yet another coding system besides the DRG, ICD and OPS. It is very likely that physicians will not want to do additional administrative and coding work.

Data safety certainly is another important aspect. Attitudes towards data safety and confidentiality are different in European countries. One example is Denmark, where insurants use their health data online and accept the fact that physicians all over the country and possibly even abroad could access their data. In Germany it would be rather difficult to introduce similar structures, because insurants request more intricate safety measures. This is one of the reasons for the slow progress and development of the eGK in Germany.

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[60] ihtsdo, 2012a

4   Method and Material | The EU Cross-Border Health Care Survey

The data were collected in a questionnaire survey which is performed by the Techniker Krankenkasse (TK) on a regular basis.

4.1   Short History of TK's EU Cross-Border Health Care Surveys

TK has conducted different surveys on EU cross-border care for several years, starting with general questions on attitudes and expectations concerning EU cross-border treatments (CBT) in the year 2000 and 2003.

The first survey with insurants who had actually received treatments in foreign EU countries was done in the year 2008. In that year a questionnaire was sent to 34.000 TK members who had been treated abroad in the EU. The goal was to find out why these TK members were treated abroad and what kind of treatment they had. The response rate was 35 %. One of the main results was an unexpectedly high rate of 40 % planned treatments.[61]

Therefore in the following year the focus was on a comparison between planned and unplanned treatments. Another objective was to characterize the group of TK members who were treated abroad in the EU in order to get information on their needs and to improve TK services accordingly. This time around 47.000 members were asked to fill out a questionnaire based on their experiences with an EU CBT. Again the response rate was at 35 %. Results showed that insurants with planned treatments often came from the Eastern part of Germany and had a rather low income.[62]

The EU Cross-Border Health Care Survey 2010 did not only address TK members, but also their family, i.e. all TK insurants. This survey focused on quality and service aspects as well as the future potential of EU CBTs. 40.000 insurants with EU CBTs were asked to fill out a questionnaire and additionally 10.000 insurants who had not been treated abroad in that year were included. The second group received a different questionnaire with questions concerning their expectations regarding cross-border treatments.[63] This time the response rates were a little lower with 33 % for the group with EU CBTs and 27 % for the group without. The main result showed that 30 % of the insurants without a cross-border treatment could imagine having one in the future and that this group rather cares about quality of the treatment instead of costs.

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[61] Wagner & Schwarz, 2008

[62] Wagner & Verheyen, 2009

[63] Wagner, Dobrick, & Verheyen, 2011

4.2   EU Cross-Border Health Care Survey 2012

The new survey for 2012 is again conducted by the scientific institute of TK (WINEG), but this year the project is carried out in cooperation with the Technische Universität (TU) Berlin. The "Fachgebiet Management im Gesundheitswesen" (MiG)[64] covers several work packages of the project "Evaluating Care Across Borders" (ECAB)[65] by the "European Union Cross Border Care Collaboration" as a part of the seventh framework programme (FP7) of the European Commission[66]. The EU Cross-Border Health Care Survey 2012 covers topics of work packages 2 "Treatment Pathways in Different Countries" and 9 "Cross-border Care in Dentistry".

The questionnaire was developed based on an item-analysis of the former surveys and several new questions were included to shift the focus towards chronically ill insurants and opinions on ICT. It consists of 40 questions concerning different aspects of EU CBTs. 13 of these questions cover topics related to ICT and will be examined in this thesis. Another seven questions cover personal data of the participant: sex, age, income, employment status, area of residence, education and family status. The entire questionnaire can be found in the appendix.
A pre-test for the questionnaire was carried out in February 2012 with 29 participants.

In order to select the sample TK insurants whose EU CBT had been registered by TK in 2010 were identified. About half of them were excluded, because they:
-   are no longer insurants of TK
-   declared special data protection
-   have a legal guardian
-   are employees of TK
-   live abroad
-   do not wish to be included in surveys
-   have a carelevel
-   are hospice cases
-   had been included in a survey less than 180 days ago
-   or are younger than 18 years.

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[64] For more information see http://www.mig.tu-berlin.de/zielgruppen/whocc/

[65] For more information see www.ecabeurope.eu

[66] For more information see http://cordis.europa.eu/fp7/home_en.html

In March 2012 the questionnaires were sent to the recipients. Due to a technical error no stamped envelope was included. The envelope was sent three working days later. Yet, by the time the second letter was produced several insurants of the sample were no longer insurants of TK, leaving a final sample of 44,501 insurants. Another 89 letters returned to TK unopened because they were undeliverable.

The time for responses was set to five weeks from the initial letter, which was the 28th of April 2012. Due to the continuously arriving returns the time was extended by almost two weeks until the 9th of May. By that time more than 18,000 questionnaires were returned. The data were entered into SPSS Statistics 20 and invalid respondents and data were cleared. Respondents were considered invalid if they stated an age younger than 18 (among the older respondents no clearings were necessary, because the oldest was only 96 years old and therefore realistic) or if they did not answer the question whether their treatment was planned or unplanned, because this was a central topic throughout the questionnaire and it would make the interpretation of several questions very difficult if that answer were missing. Furthermore, this question was one of the first questions on the first page. It was a simple question with only two options of answers. If a participant did not answer this question it is most likely that this person had only vague memories of the last treatment or did not even know which treatment he or she was asked for, which would lead to unclear answers and high missing values. Therefore the data quality of these cases was expected to be low and thus the cases were deleted. After the deletion 17,543 participants were left in the sample, which left a share of valid responses of 39.4 %. Furthermore, answers were deleted in the second part of question 7 and question 10 if the first answer was "nein" (no) (26) or missing (303), respectively different from "ja, unvorhergesehen" (yes, unanticipated) (1,828).

For the analysis of the attitudes and expectations concerning electronic health data exchange all of the 17,543 respondents were considered, regardless of whether their treatment was planned or unplanned. Even though this is an important variable in the questionnaire and basic for the further analyses, it is of minor importance for the analyses of this topic. The objective is to find out the attitudes towards cross-border electronic health data exchange by those who have experienced cross-border care, regardless of the treatment and whether it was planned or not.

The more important variables for this topic were the personal data of the participants, such as sex, age, income and other factors that determine the socio-economic status and characterize the participants. These data are described in the following subchapters. First, the quality of the sample is assessed by comparing age and distribution of males and females to the original sample. Subsequently in chapter 4.4 a general overview shows

basic characteristics which define the insurants from EB12. These characteristics will be identified by comparing the insurants' attributes (sex, age, income, employment status, area of residence and education) to a group of TK insurants who were not treated abroad.

4.3 Quality of the Sample

The outcome of a survey very much depends on the sample used and therefore it is prone to selection bias. In order to get an estimation of the extent of selection bias central characteristics (sex and age) of the respondents will be compared to the originally selected sample.

Data on the 44,501 originally selected insurants (original sample) are available for sex, age, area of residence and reason for selection. However, only sex, age and area of residence can be compared to the respondents' data, because these were specifically asked for in the questionnaire. A comparison of the reasons for selection would be rather inaccurate, because firstly some insurants were selected for two or more reasons and secondly this question was not part of the questionnaire, because many insurants would not know how to answer the question. Yet, a rough overview might still be possible from looking at different questions like the type of disease, treatment institution, use of TK contractual hospital and method of payment.

From these results it will be possible to draw conclusions on the quality of the sample and possibly on adjustments that might be necessary in certain analyses which are highly influenced by one of these characteristics.

4.3.1 Sex

In the original selection there were 51.9 % females and 48.1 % males. Out of the 17.543 participants left in the sample 47.3 % are male, 50.7 % are female and 1.9 % did not state their sex which leaves 48.3 valid % males and 51.7 valid % females. Apparently there has been only a small change in the distribution of sexes among the respondents compared to the original sample (0.2 % more females among the respondents). This small difference is very unlikely to lead to a considerable bias and will therefore not be considered in further analyses.

4.3.2 Age

Unlike in the distribution of sexes there is a considerable difference in the age groups of respondents and the original sample. The mean age among respondents is 57.2 years with a standard deviation of 17.4 and a range from 18 to 96 years. In the original sample

the mean age is only 50.5 years with a standard deviation of 18.5 and a range from 18 to 96 years. This means that on average the respondents are almost seven years older than the original sample. The most likely reason behind this shift is that retired persons have more time or motivation to fill in questionnaires than the working younger ones.

The age structures are also illustrated by figure 1.
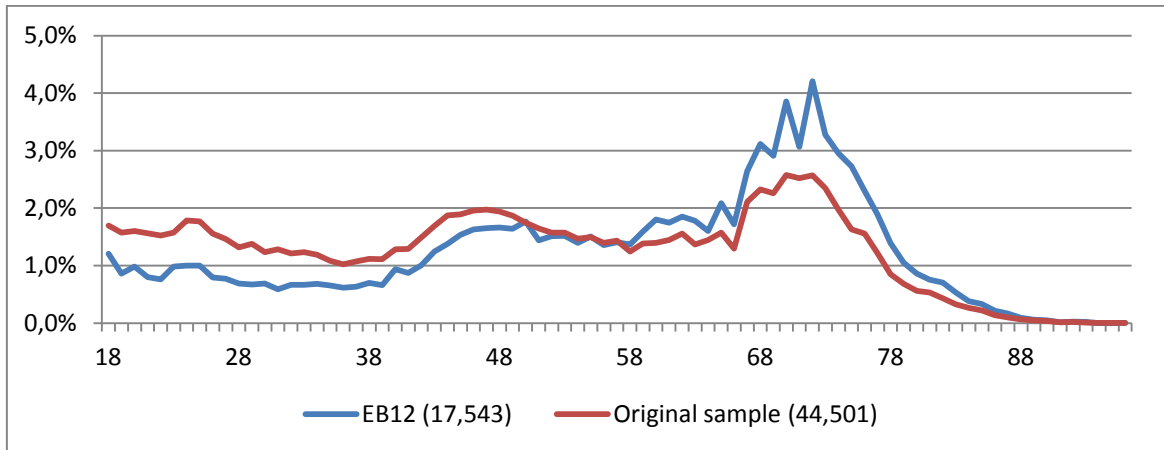
Figure 1 Age distribution: Comparison of respondents, original sample and EB10_2

The graphs show that among the younger respondents of EB12 it is less likely that they answer the questionnaire, as the blue line is always significantly below the red line. The lines cross where the insurants are in their fifties. In this age group the share of respondents represents the original sample. Therefore adjustments for age might be necessary for further analyses.

4.3.3   Area of residence

7.9 % of the original sample are from the new Bundesländer (Mecklenburg Western Pomerania, Brandenburg, Saxony-Anhalt, Saxony or Thuringia). Still, 9.2 % of the respondents were from the new Bundesländer. It seems that insurants from Eastern Germany are slightly more likely to answer questionnaires than those insurants from the West.

4.4   General Overview

In order to identify basic characteristics which define the insurants from EB12 results on sex, age, income, employment status, Bundesland and education need to be compared to data of TK insurants who did not have a cross-border treatment in the EU. In the EU

Cross-Border Health Care Survey 2010 a second group of insurants was included in in the survey besides those who had a treatment (EB10_2). This group of 10,000 insurants was randomly selected from all TK insurants who did not have an EU cross-border treatment (CBT) in 2009. Certainly this group had a different answering pattern, because the questionnaire and the reason for participation were different from the first group who was specifically asked about their treatment in the EU. The response rate was lower in the second group and it is likely that the two groups are affected by different selection biases, which makes it difficult to compare them. However, for some variables EB10_2 is the best comparison there is. Therefore, these data will serve as the reference value for TK data in order to compare the results from EB12.

For EB10_2 there are data available on sex, age, income, employment status and Bundesland. For education there are no data available from EB10_2. Therefore, education will be compared to the results by Hoffmann and Icks[67] (TK_survey) who did a survey on the insurants of different German health insurances. As the results are from a survey as well, there will once again be differences due to effects of selection bias. Additionally, the sample by Hoffmann and Icks consists of only 1,350 TK insurants, therefore further data concerning age and sex will not be used from this study, because more exact data are available from TK routine data.

4.4.1 Sex

The distribution of males and females among TK insurants can be considered equal with a slight tendency towards a male majority (50.2 %). Since only 48.3 % of respondents and 48.1 % of the original sample are male it seems that females get treated abroad in the EU a little more often than males.

4.4.2 Age

Too few young insurants answered the questionnaire, while the older insurants above 60 years are overrepresented. While it looks like there were almost four times as many people in their seventies as in their thirties, this is actually attributable to selection bias. In fact 12 % of insurants with EU CBT are in their thirties and only 18 % are in their seventies.

The peak among the very young ones might occur due to the fact that this group includes two more years than the others. But a look at figure 1 shows that among those with EU CBT there really is a small peak among the 18-year-olds.

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[67] Hoffmann & Icks, 2012
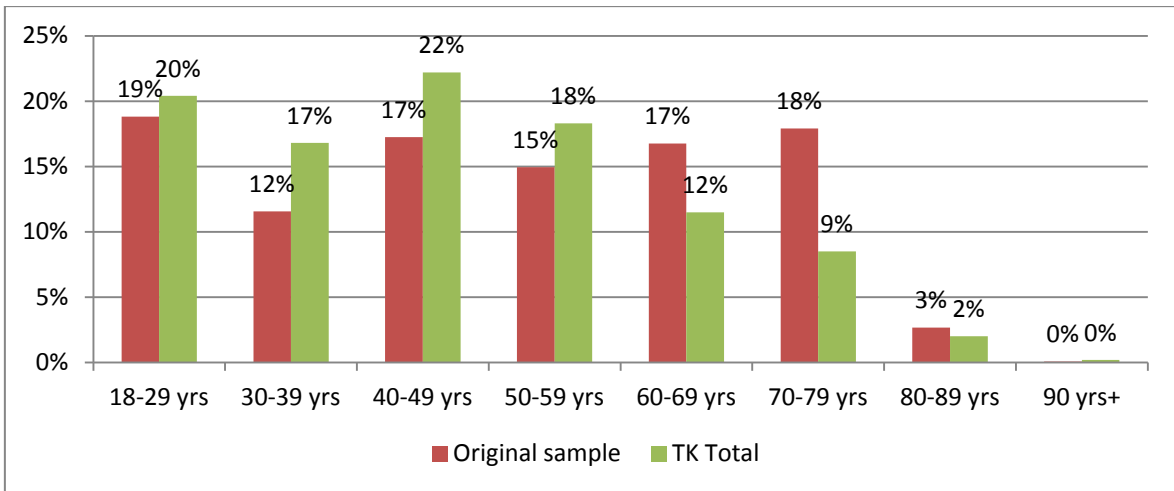
Figure 2 Age groups of original sample and TK Total

Compared to the total TK insurants the original sample is older; the age groups in the sixties and even more so in the seventies are by far larger. Among the respondents these differences are even larger. Adjustments will be necessary if a variable of interest turns out to be highly dependent on the age of the insurants.

4.4.3 Income

Income does correlate with age significantly with $p<0.001$, but the correlation is so low ($R=0.087$) that adjustments are not necessary in this case.
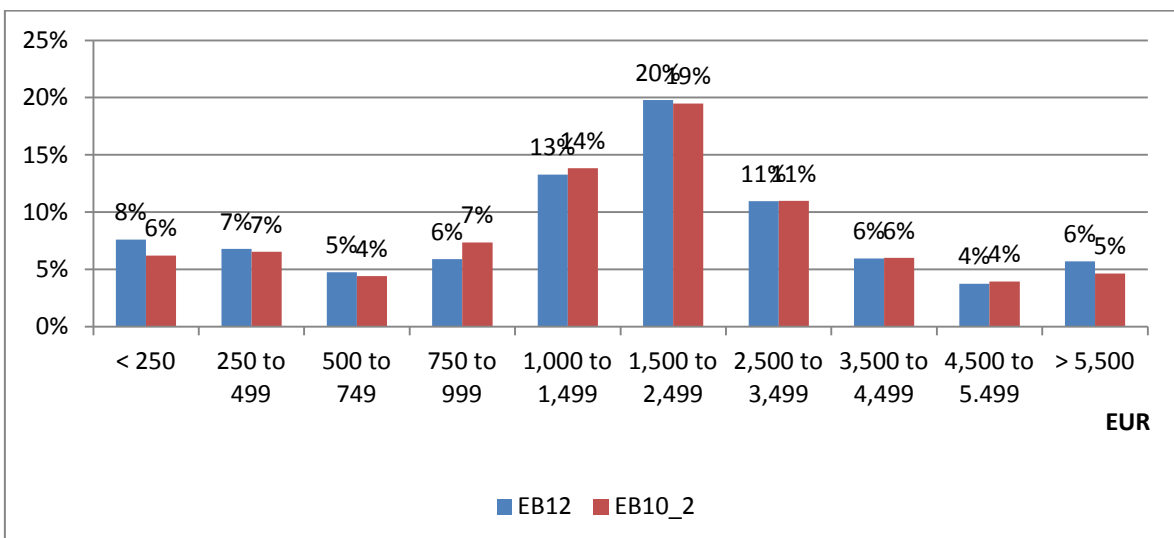
Figure 3 Gross income in EUR

This year's survey (EB12) does not differ much from EB10_2. EB12 is slightly higher in the first and last income group, so the standard deviation is slightly higher in EB12. Yet, the overall mean is the same. The ten income categories are coded from 1 to 10 and the mean values for EB12 and EB10_2 are 5.44 and 5.45 and a t-test showed that the means do not differ significantly with p=0.810. However, compared to the EB10_1 group with a mean of 5.25 there is a larger difference between incomes. Apparently, the insurants who had an EU CBT in 2010 on average have a higher income than those who had their EU CBT in 2009.

4.4.4   Employment status

Only 37.6 % of the respondents are working (employed or self-employed workers). The larger share of 62.4 % is either retired, unemployed or still learning. These numbers vary in the old and new Bundesländer. The percentage of non-working respondents of 68.2 % is by far higher in the new Bundesländer than in the old ones where it is only 60.5 %.

From the age structures a high share of retirees was expected. Yet, the overall share of German citizens aged 65 years and older is only 20.7 %[68]. Certainly, some of Germany's retirees might be of a younger age than 65 years. In the survey 9.3 % of the retirees are in fact younger than 65 years, while only 5.8 % of the working respondents (382) are above retirement age. Yet even if the additional 3.5 % (9.3 %-5.9 %) are added to the mean German retiree population the share of 44 % in the survey is extremely high and clearly above 24.2 % (20.7 % + 3.5 %).

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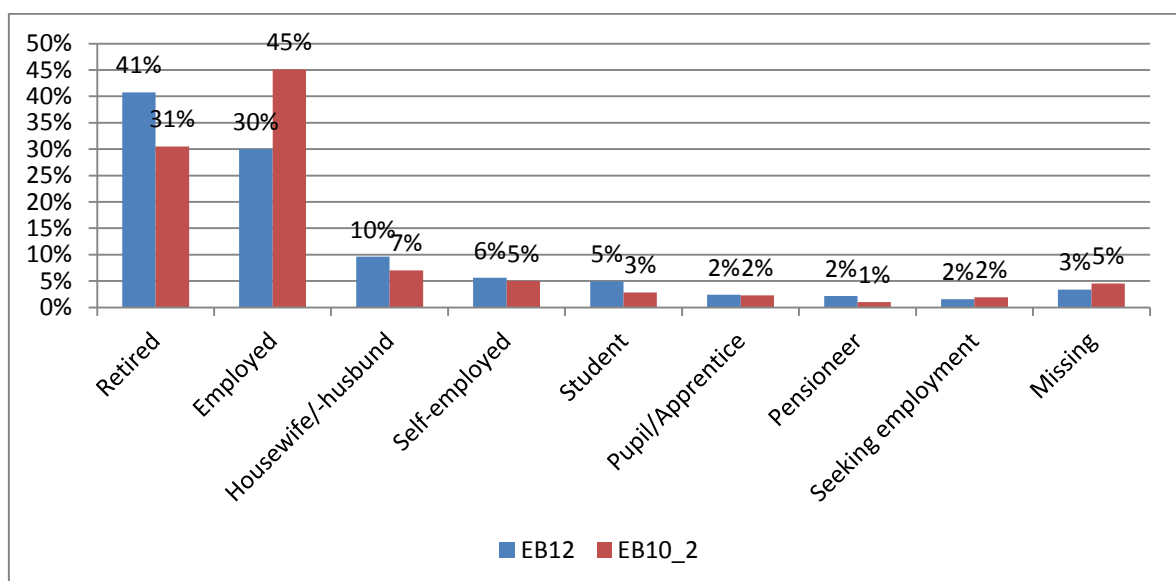
[68] Statistisches Bundesamt, 2010

Figure 4 Employment status

A look at the original sample of selected insurants shows that the share of at least 65-year-olds is only 29.8 % and thus by far lower than among the respondents. If the 3.5 % are added to assume the share of retirees it adds up to 33.3 %. This is one fourth less than among the respondents.

This means that if an analysis turns out to strongly depend on age or profession it might be biased. Therefore adjustments will be used in these cases.

4.4.5 Area of residence

17.3 % of all TK insurants are from one of the new Bundesländer and this has been constant from 2010 to 2012. However, only 7.9 % of the original sample are from the new Bundesländer. Apparently, EU CBTs are less frequent among inhabitants of the new Bundesländer than among those from the old ones.

4.4.6 Education

On the first glance the respondents seemed to be fairly educated. 31 % stated that their highest degree of education was a university degree, which is far more than twice as many as in the overall German population where only 13 % have a University degree (including Fachhochschule and physicianate)[69]. However, TK insurants are known for their higher than average degree of education, which was confirmed by Hoffmann and Icks. Regrettably their data do not supply any information on university degrees, but only on the three categories of Hauptschule or no certificate at all, Realschule and Abitur.
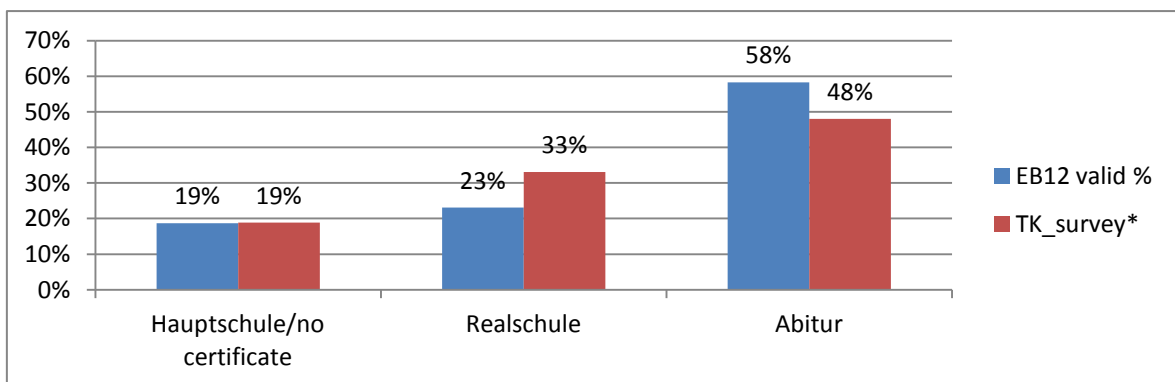
Figure 5 Comparison of education with TK_survey[70]

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[69] Statistisches Bundesamt, 2011, 17

[70] TK_survey* data from Hoffmann & Icks, 2012

Assuming that all university degree holders among the EB12 also have Abitur it can be said that respondents of EB12 do, on average, indeed have a higher education than other TK insurants. However, these data resulted from different surveys with different contexts and different response rates. Therefore, the data can only show a trend and cannot be taken as reliable results.

There is a correlation of education and age with R=-0.176, but it is correlated negatively: the higher the age, the lower the education. As the age tends to be too high in this survey and education is also higher than expected the tendency is clear and no adjustment for age will be applied.

4.4.7 Findings of chapter 4.4

Compared to the general TK insurants those who had an EU CBT

- have the same distribution of sexes or slightly more females
- are older
- have the same income
- are more often retired
- are more often from the old Bundesländer
- have a higher education

4.5 Development of an Index for Socio-Economic Status (SES)

The socio-economic status (SES) characterizes a person and might be a variable that determines attitudes and expectations. However, there are several single variables that make up the SES of a person. A person is better described by his or her profession, income and education than by one of these variables alone. Therefore an index was built in order to combine income, education and employment status. The Winkler-Index was applied as a basis[71]. Winkler used three variables: education, income and professional status with seven categories each. For this new index, specific for the EU cross-border survey the same variables were used, but the categories were designed to match the survey. In order to keep the questionnaire as simple as possible only five relevant categories of education were covered. Therefore an index with only five steps each instead of seven is applied. The five categories of education in the questionnaire are: no certificate (incomplete Hauptschule), Hauptschule (9 years of schooling), Realschule (10

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[71] Winkler, 1998

years of schooling), Abitur (at least 12 years of schooling) and University degree. Winkler also applied a combination of Haupt- or Realschule with an apprenticeship or school of engineering, but these two middle categories were left out, because they would have made the questionnaire unnecessarily complicated. Having dropped two middle categories, leaving the relation of top and bottom untouched should not lead to a biased result.

For Winkler's index the number of categories was determined by the number of income categories coded in steps of 1000 DM. Taking the change of currency and the overall economic changes since 1998 into account these categories were no longer considered sensible. Therefore the 10 income categories from the questionnaire were aggregated into 5 categories with close to equally sized groups of respondents: 0-750€, 750-1500€, 1500-2500€, 2500-3500€ and above 3500€.

Finally the group of professional status was built. The eight items from the questionnaire (self-employed, employee, seeking employment, retiree, pensioner, housewife/-husband, student and apprentice) had to be sorted into five ordinal groups. In order to do this, income and education were considered again. Winkler only used income to sort his categories of profession. However, in this case it turned out that the weight of income was too high, because the categories of employment status are not differentiated enough. While Winkler determined the profession in 20 categories with five sub-groups each, this was not possible in the questionnaire on EU CBTs. Therefore not only income was used to build categories, but also the degree of education.

First of all, the employment status of each person had to be defined. Since multiple answers were possible in that question an order had to be found that would allow to decide whether a retiree who is also working as a self-employed would count as a retiree or self-employed. In order to find this order the income was applied. The mean income was calculated for each category and thus ranked accordingly. It was assumed that the employment status which provides the highest amount of income could be considered the primary status. This resulted in the following ranking: employed, pensioner, self-employed, retiree, seeking employment, housewife/-husband, student, pupil/apprentice. Thus the retiree working as a self-employed would be considered a self-employed, because on average this status provides a higher income.

Once every respondent had exactly one employment status the mean income and education for each category was calculated and the categories were assigned values from 1 to 8 in both groups.

Table 1 Mean income and education values by professional status

Professional Status	Mean Income		Mean Education	
Employed	6.89	8	4.02	5
Pensioner	6.71	7	4.14	6
Self-employed	6.32	6	4.26	7
Student	2.28	2	4.32	8
Seeking employment	3.75	4	3.98	4
Retiree	5.06	5	3.53	2
Housewife/-husband	3.33	3	3.26	1
Pupil/apprentice	1.9	1	3.57	3

The sums of these values result in an order of five different groups which are assigned numbers from 1 to 5 as a value for the index of SES. As can be seen in table 2 the highest rank of SES is formed by employees, pensioners and self-employed workers, the second group by students, the third group by employment seeking respondents, the forth group by retirees and the last group contains housewives or househusbands as well as pupils and apprentices.

Table 2 Results of ranking professional statuses

	Income Rank	Education Rank	Sum of Points	Index Value
Employed	8	5	13	5
Pensioner	7	6	13	5
Self-employed	6	7	13	5
Student	2	8	10	4
Seeking employment	4	4	8	3
Retiree	5	2	7	2
Housewife/-husband	3	1	4	1
Pupil/apprentice	1	3	4	1

The index for SES is built by addition of the three values of income, education and professional status. Therefore the results lie between three and fifteen points, with a low value indicating a low SES and a high value indicating a high SES.

5 Results | Experience, Attitudes and Expectations

The aim of this study is to find out whether insurants who get treated abroad are in favour of electronic data exchange between their different treating physicians. There will be several different opinions and therefore only a tendency can be determined. Certainly results are only valid for this special group of TK insurants and cannot be projected to the whole German population, not even to all TK insurants, but from tendencies in this sample considering age, education etc. a trend for the rest of the population might be estimated.

In the results chapter, first results from all relevant questions are described and shown graphically. Finally the main part in chapter 5.4 will show the results from the analyses of the hypotheses H1 to H7.

5.1 Description of Primary Results

This sub-chapter lists the results of the relevant questions of the questionnaire including missing values and first impressions. The questions are sorted into the categories general results, attitudes and experiences. The general results are variables which were calculated from other questions.

5.1.1 General Results

Area of residence

For the analyses of H3 it is necessary to know whether the insurants live in the new or old Bundesländer. Therefore a dichotomous variable was created from question 39 (see appendix p. 73). It turned out that 87.3 % of respondents live in the old Bundesländer and only 9.2 % in the new ones. The rest did not name a Bundesland and cannot be grouped by this variable.

Low Quality Treatment

A treatment is considered to be of low quality if the insurant either stated that he or she was not satisfied with the treatment result or if an unanticipated after-treatment was necessary. The complete answers to these questions can be found below (on page 39 and 40). Altogether 8 % were not satisfied with the result and also 8 % had an unanticipated after-treatment. However, the sum of insurants with a low quality treatment is only 12.9 %. This is not surprising, as it is likely that a patient who needs an unanticipated after-treatment is also not satisfied with this result.

The new variable (lowq) is dichotomous and only states whether the treatment quality was low or not. There are no missing values, because the quality is either considered low or not low. There is no definition for high quality.

Socio-Economic Status (SES)

The SES was calculated on the basis of the Winkler Index, as mentioned above. Missing values were replaced by the mean of the other two values. Therefore, the values 4.5, 7.5, 10.5 and 12.5 also exist in the index. There values are low, though, because they only occur in case of missing values.
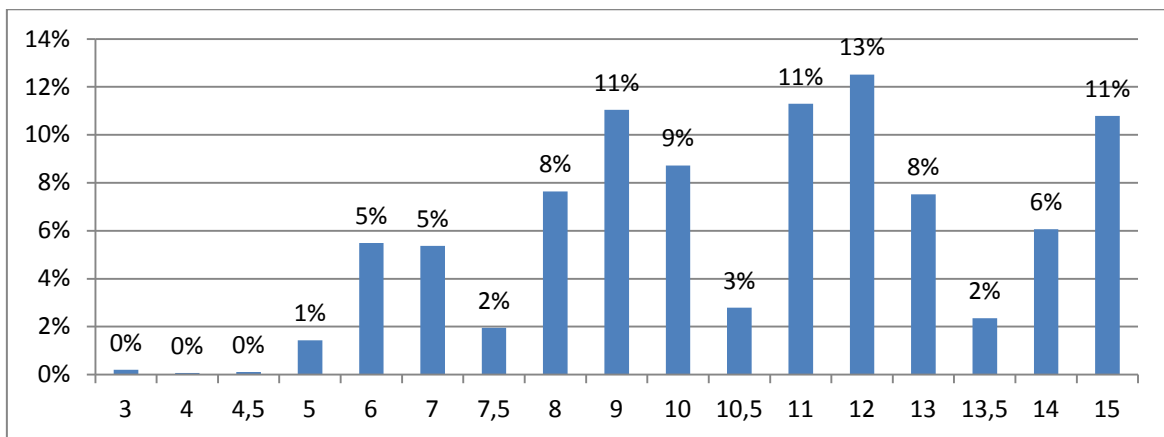
Figure 6 SES

Chronically ill insurants

For H5 chronical illness has to be defined. The new variable (chron) was created from F5 and F7. Those insurants were considered chronically ill who were subscribed to a DMP (Disease Management Program), this was the case for 10 %. Additionally those insurants who stated that their last EU CBT was due to a chronical illness were considered in this varibable, this was the case for 18 %. Overall 24.7 % fall into this category of chronically ill insurants.

Country of Treatment

Most of the treatments took place in Austria, Spain and Italy. These are some of the most popular countries for holidays among Germans.
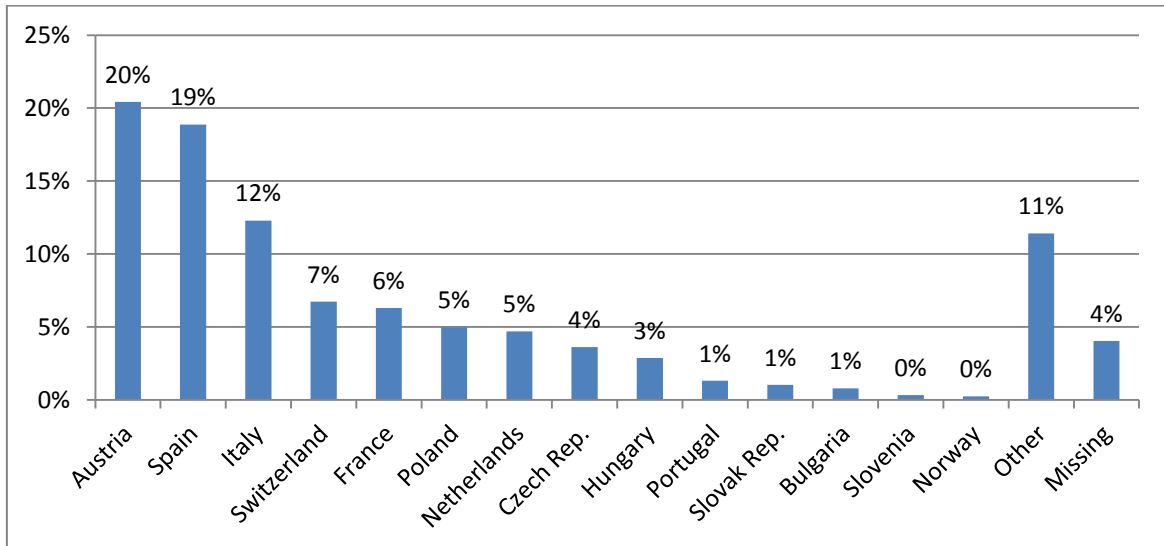
Figure 7 Country of treatment

5.1.2 Attitudes

Attitudes on data safety

In the following questions on data safety and the insurants' opinions there are high levels of missing values. This may mean that insurants do not care about this topic very much or, more likely, it is too complicated and many insurants do not have an opinion. 17 % of the insurants did not state an opinion on "My health data are safe from misuse in Germany", but on the statement "My health data are safe from misuse in the country of my last EU CBT" the rate of missing values is an even considerably higher 24 %. Apparently, the insurants have problems forming an opinion on data safety abroad, because they know less about what happens to their data.

Apparently, data are considered safer in Germany. This may be due to better knowledge about what happens to the data or also due to a higher trust into the German health system and general data safety in Germany. However, results for the EU countries are not bad either. More than half of the insurants consider their data safe in the EU country of last treatment, while only 23 % do not.
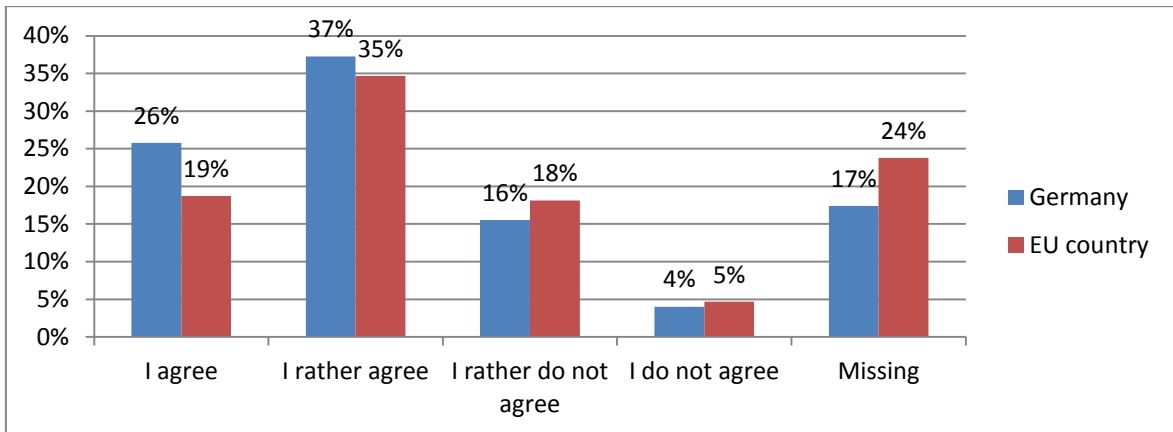
Figure 8 Results of F27.1 and F27.2: "My health data are safe from misuse."

Attitudes on Confidentiality

Confidentiality is an important requirement for the communication between patient and physician. It is unlikely that patients would abdicate confidentiality completely. Therefore it is not surprising that the majority of 65 % states that confidentiality concerning their health data is important to them. However, still several have not answered and probably do not have an opinion (16 %) and some even agree or rather agree that it is not very important to them (4 %).
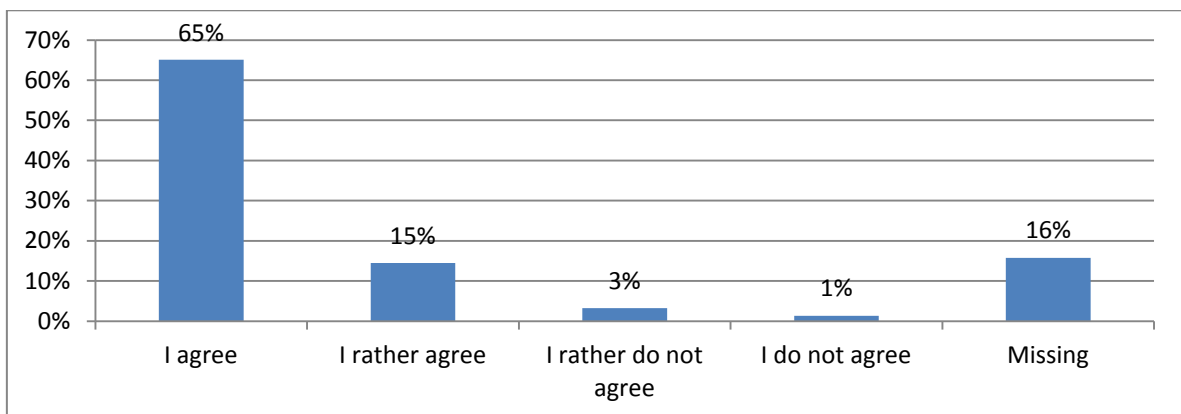
Figure 9 Results of F27.5: "Confidentiality is very important to me."

Need for more information on health data use

Even though the two questions F27.3 and F27.4 were very similarly posed, the resulting answers were quite different. Considerably more insurants want more information on their own options to use their health data than on what others might do with their data. Missing values are similarly high, so the difference of results is not due to distortions from missing values. Results are displayed in figure 10.

Apparently, insurants are curious to find out about more options to use their health data for their advantage, while their mistrust towards others who may use their data is distinctly lower.
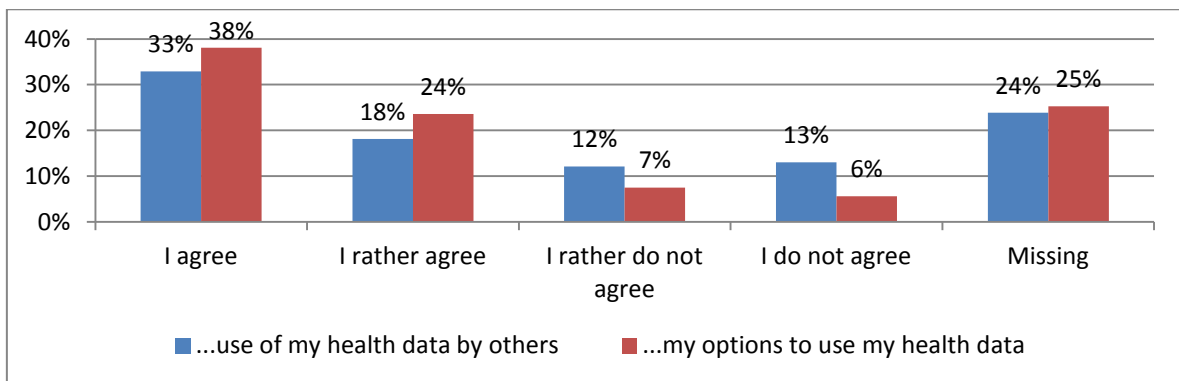
Figure 10 Results of F27.3 and F27.4: "I require more information on..."

Attitudes on EU legislation

Not only does the majority consider their data safe in other EU countries, they also agree with legal regulation by the EU for all member states. A large majority of 73 % state that they think legal regulations by the EU are useful and the number of those who do not think so is lower than the number of those without an opinion. In general the insurants seem to have a fairly positive attitude towards the EU, so this should not be the reason for a possible failure of an EU wide system of health ICT.
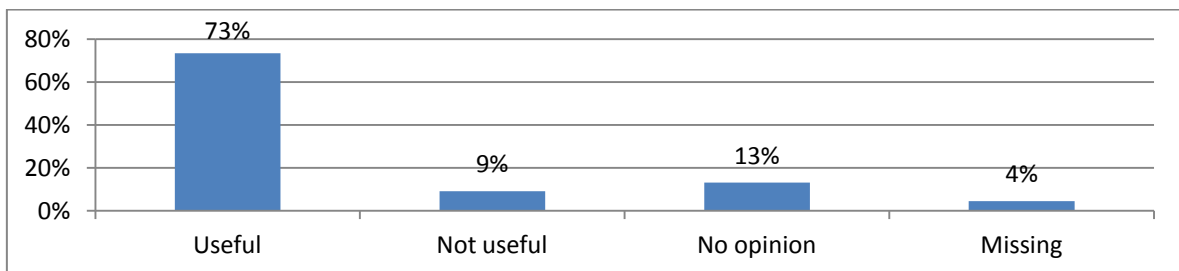
Figure 11 Results of F29: "What is your opinion on the fact that the EU enacts legal regulations for all European health systems?"

Attitudes on ICT

The majority supports EU wide networks for health data exchange and also believes that access to health data would improve treatment quality. Nevertheless, there are still 26 % of the respondents who do not believe that ICT would be helpful and also there are high missing values which show that the question was difficult to answer, possibly due to lack of information or lack of interest by the insurants. This would mean that even though there is a supportive majority a large share of insurants would object to a health data ICT system and therefore would not use its possibilities or they would be indifferent and not use it either.
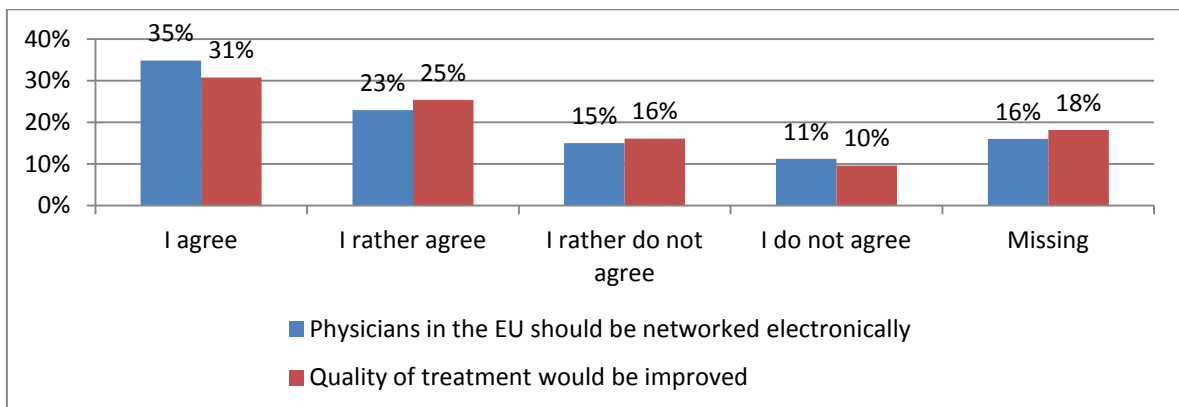
Figure 12 Results of F27.6 and 27.7: "Physicians in the EU should be networked electronically in order to have access to my health data in case of a treatment." and "If the EU physician could access my health data the quality of treatment would be improved."

Attitudes on the German health system

The satisfaction with the German health system is rather good. It has improved significantly compared to last year's survey where one third was not satisfied and only 13 % were very satisfied[72]. This might be due to the health reform of 2011. In the beginning of that year several changes took place, mainly concerning additional costs for insurants in the form of "Zusatzbeitrag" (additional premium) and "Beitragserhöhung"(increased contribution). This may have led to worse results in the EU cross-border healthcare survey 2010, which took place from December 2010 to February 2011. That was exactly the time when the new reform was introduced. In the beginning of the year 2012 it turned out that the German health insurances actually had a surplus, which might have led to a higher satisfaction. One major change that was relevant for the insurants was the introduction of the eGK in late 2011. Apparently, the satisfaction with the system was not afflicted by the controversial innovation of the eGK.

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[72] Wagner et al., 2011, 24
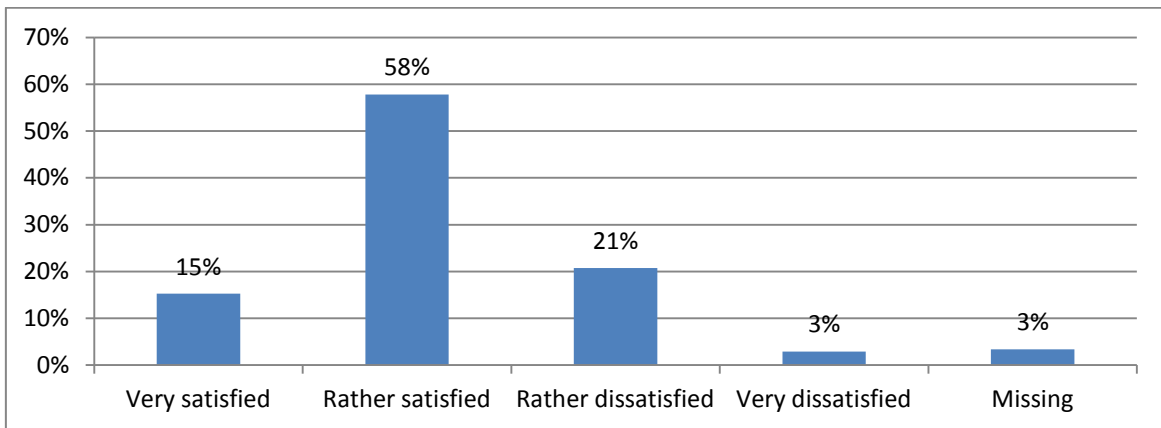
Figure 13 Results of F30 Satisfaction with the German health system

5.1.3   Experiences

Experiences with data exchange

In three quarters of the cases there was no data exchange at all between the physicians in Germany and the EU. If there was any transfer of health data most patients (9 %) carried their own documents with them and personally gave them to the treating physician. Letters were also sent in several cases (5 %). Other methods of data exchange were rather rare.
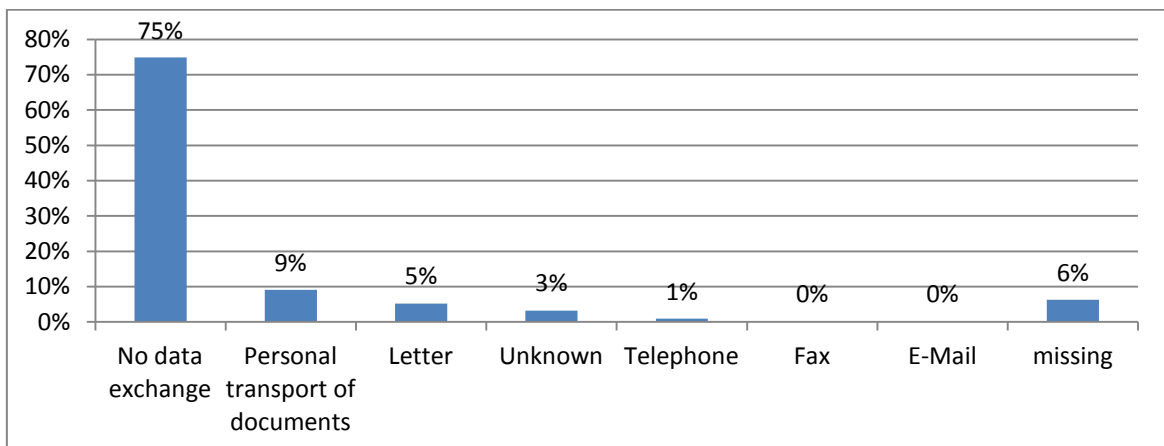
Figure 14 Results of F25: Data exchange of physicians

Satisfaction with data exchange

Overall 12.2 % of all respondents would have wished for better data exchange between their physicians. 74.3 % were satisfied.

Surprisingly, among those insurants whose physicians did not exchange any data the satisfaction was just the same: 12.4 % would have liked better exchange of data and 75.6 % were satisfied. Obviously the actual extent of data exchange between the physicians does not have any influence on the wish for better data exchange.

These results rather suggest the assumption that an ICT system is not necessary, as three quarters of the insurants were satisfied with data exchange as is was and only 12 % were not.
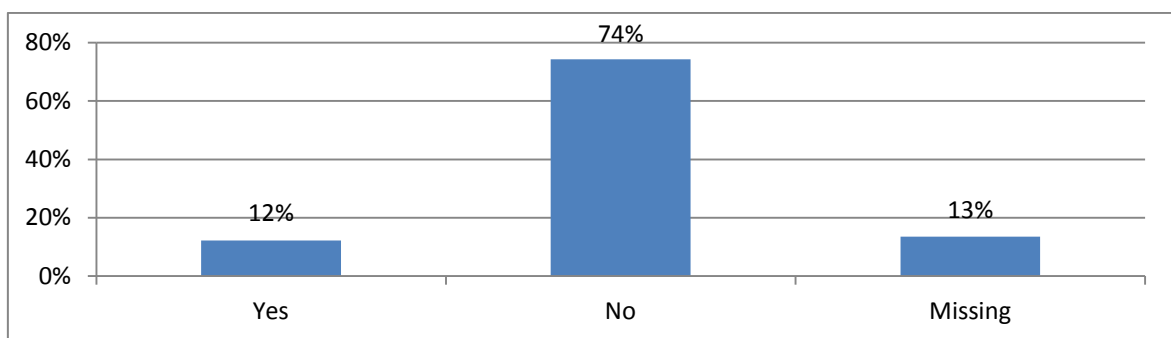
Figure 15 Results of F26: "Would you have wanted a better exchange of data between your German and your EU physician?"

Satisfaction in general and satisfaction with treatment results

The mean values for the different aspects of satisfaction are very similar for satisfaction with the general treatment and satisfaction with the treating physician. 50 % of the respondents were very satisfied, 28 % were rather satisfied, 7 % were rather dissatisfied and 3 % were dissatisfied.

The satisfaction with treatment results turns out even higher than the overall satisfaction, as figure 16 shows. As a subjective quality measure patient satisfaction is one of the two variables that define a low quality treatment in this thesis (cf. p. 32). The other variable is the necessity of unanticipated after-treatments.
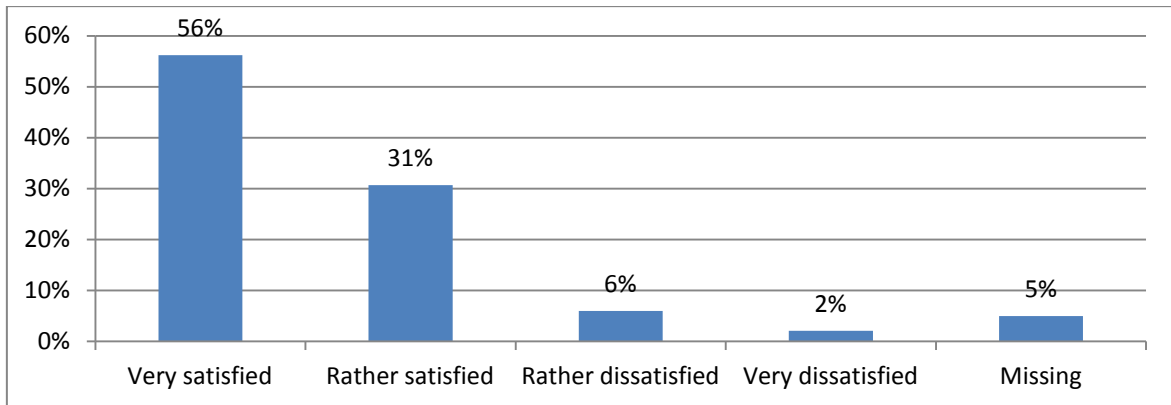
Figure 16 Results of F11.1: Satisfaction with treatment result

After-treatments

In 58 % of the cases there was no after-treatment necessary. 29 % of the respondents knew that they would need an after-treatment. As they were anticipated one cannot draw any conclusions from it on the quality of the treatment. Nevertheless, in 1,379 cases, which equates to 8 % of respondents, an unanticipated after-treatment became necessary.
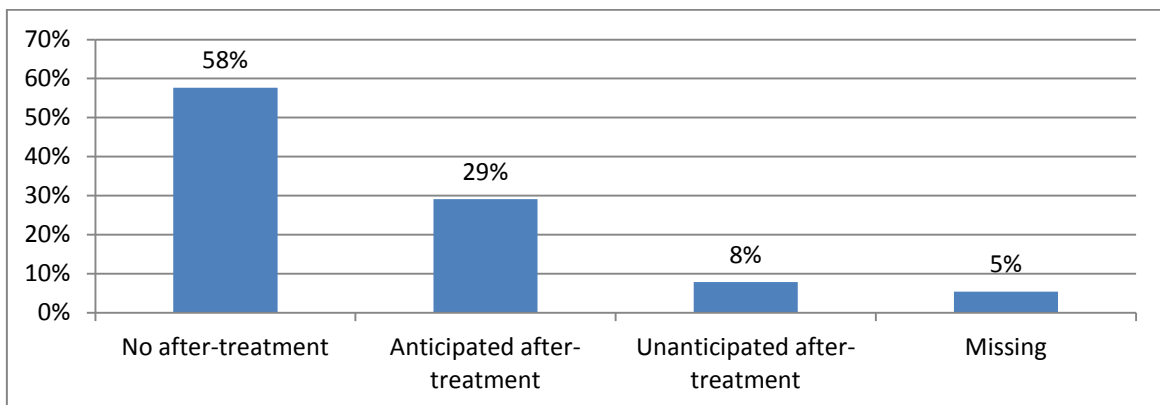
Figure 17 Results of F10: Necessity of after-treatment

Most of the after-treatments were performed by physicians in Germany, which means that data exchange was probably necessary between the treating physicians. Still, even in case of unanticipated after-treatments there was no exchange of data in 76 % of the cases, which is even a little higher than the overall average and even among these the majority was satisfied with the data exchange. Only 26 % would have wanted better data exchange between their physicians. This is more than twice the percentage of the average, but considering that there were problems occurring during the treatment it is an extremely low rate. Even among those who had an after-treatment and no data exchange

at all, 29 % wanted better exchange. These cases with an unanticipated after-treatment and no exchange of data were mainly treatments in a GP's practice or outpatient treatments in a hospital (27 % each). 12 % took place at dentists' practices and 7 %, respectively 6 % in a specialist's practice and in a hospital (inpatient).

5.1.4 Findings of chapter 5.1

- The opinion of insurants concerning data safety in Germany and in the EU country of last treatment is rather positive.
- Confidentiality is very important.
- More information on data use is required, especially on options to use one's own data.
- Legal regulations by the EU are considered useful.
- ICT developments are seen positively by the majority.
- Satisfaction with the German health system is rather good.
- Exchange of patient data between physicians across borders is rare.
- Most insurants were satisfied with the data exchange.
- Treatment results were good in most cases, but 8 % were not satisfied.
- After-treatments were mostly not necessary or they were anticipated, but in 8 % of the cases an unanticipated after-treatment was necessary.

5.2 Analysis

In this chapter the Hypotheses are tested and results are shown in diagrams and tables to provide a thorough overview.

5.2.1 Attitudes

→ **H1: Those insurants who do not consider EU-wide regulations useful do not agree that their data are safe in other EU countries.**

The opinions on data safety were measured on an ordinal scale with 4 answer options, with 1 representing the opinion that the data are safe and 4 that the data are not safe.

For the opinion on data safety in Germany the mean values are 1.91 for those who find EU regulations useful and 2.30 for those who do not. For the opinion on data safety in the EU country of the last treatment the means are 2.06 and 2.41 respectively. An independent-samples t-test showed that the means are significantly different with $p < 0.001$ for the opinion on data safety in Germany as well as in the EU country of the last treatment. In both cases the difference between the means amounts to half a standard deviation (see appendix p. 74 for complete SPSS output).
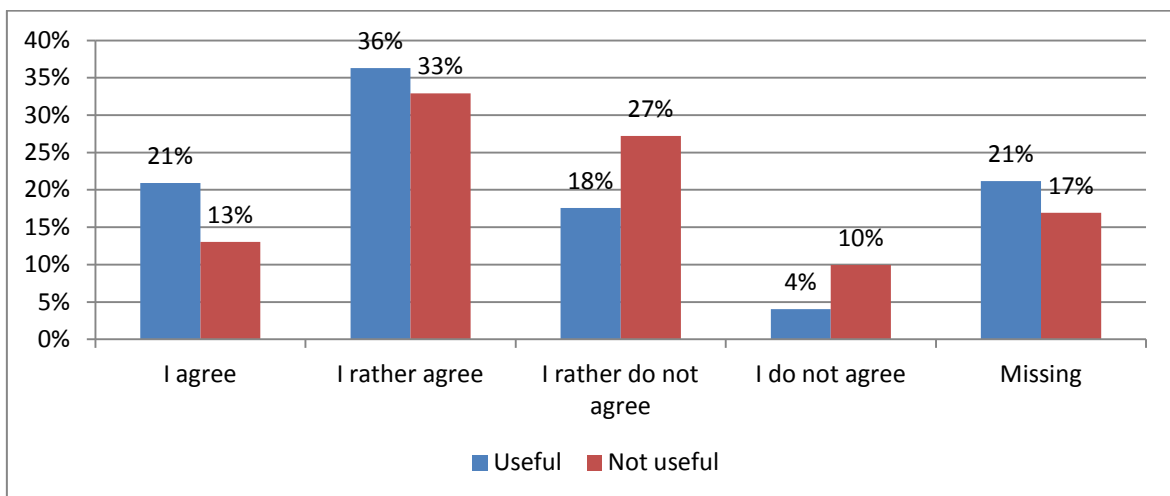
Figure 18 H1: Those insurants who do not consider EU-wide regulations useful do not agree that their data are safe in other EU countries.

Apparently, those who find EU regulations useful rather agree that their data are safe than those who do not find them useful. Therefore, the hypothesis seems to be confirmed. However, the same is true for the opinion on data safety in Germany. Overall insurants think their data are safer in Germany than in the EU country of their last treatment, but the difference between the means of those who do and those who do not find EU regulations useful are almost the same. Therefore, insurants who reject the EU legislation not only

consider other EU countries less safe for their data than other insurants, but they also consider data safety in Germany lower than others do. This group of insurants seems to be more critical in general and not only towards the EU.

→ H2: Those insurants who do not consider EU wide regulations useful do not agree with ICT.

Again a t-test confirmed that the mean opinions of those who do not find EU regulations useful and those who do differ concerning the questions whether physicians should be networked in the EU (F27.6) and whether treatment would be improved if the physicians could access health data electronically (F27.7). For F27.6 the means are 1.89 for those who consider it useful and 2.69 for those who do not. For F27.7 the means are 1.93 and 2.66 respectively. For both questions the difference between the means is around three fourths of the standard deviation (see appendix pp. 75 for complete SPSS output), which is considerable. Apparently, insurants who reject EU regulations for the whole EU do rather not agree with ICT. Therefore, H2 is confirmed.
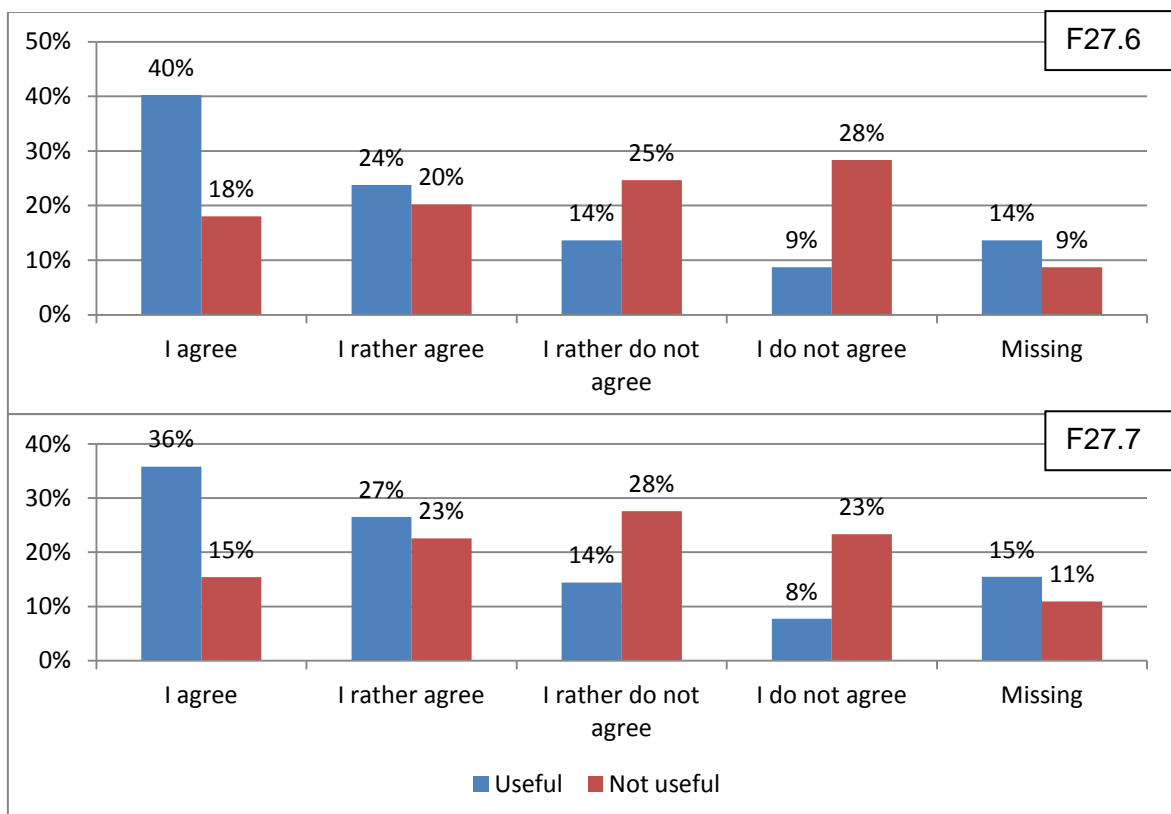
Figure 19 H2: Those insurants who do not consider EU wide regulations useful do not agree with ICT.

→ H3: Age, area of residence, SES and sex have an influence on the opinions of insurants concerning data safety.

The analysis was done using a stepwise (backward) linear regression model with the four independent variables age, area of residence, SES and sex and the dependent variables of all seven questions of F27.

The adjusted R^2 values show that for all seven dependent variables none of the models can explain a large portion of the variance. The highest explained variance is that of F27.6 (physicians should be networked EU-wide) where 3.0 % of the variance can be explained by age, SES and sex. For F27.1 R^2 is also fairly high: the model explains 2.4 % of the variance. The lowest values for R^2 are those of F27.3 and F27.4 concerning the need for more information where only 0.9 %, respectively 0.4 % of variance is explained by the model. Basically, the regression analysis shows that the influence of age, sex, SES and area of residence on the attitudes of insurants is very low (see appendix pp. 77 for complete SPSS output). Detailed results, including R^2, p-value and standardized beta coefficients, are displayed in table 3.

The lowest influence is that of the area of residence. This variable was only included in two out of the seven models and even in these two cases its beta coefficient was the lowest. Apparently there is a very small tendency that those insurants from the new Bundesländer rather agree that their data are safe abroad in the EU and they put a little less emphasis on confidentiality than those insurants from the old Bundesländer.

Sex also has very little influence on all dependent variables. Concerning data safety in the EU there is no significant influence by sex at all, in this case sex in not even included in the model. Yet, data safety in Germany is rated a little better by men than by women. Women tend to rather not agree with ICT (F27.6. and F27.7) and they require more information on the use of their data (F27.3 and F27.4). Also confidentiality is more important to them than to men. Even though the results concerning sex only describe a minor tendency, they are very consistent and show clearly that women rather tend to protect their data and reject new ICT measures.

SES turned out to have no influence on opinions on confidentiality, but on all other independent variables SES had a high influence, compared to sex and area of residence. SES reaches the highest value on the questions concerning ICT (F27.6 and F27.7). In this case the higher the SES the more the insurants reject the statement and do not agree that ICT would be helpful. Additionally, insurants with a higher SES rather do not agree that their health data are safe in Germany and the EU and they require more information on the use of their health data (F27.3 and F27.4). Apparently a higher SES has a similar influence as being a female.

Table 3 Results of linear regression for H3

Question	Step	Model	Standardised beta coefficient	Sig	Adjusted R^2
F27.1 Data safety Germany	1	Constant		.000	.024
		age	-.120	.000	
		sex	.023	.012	
		SES	.105	.000	
		area	-.008	.321	
	2	Constant		.000	.024
		age	-.120	.000	
		sex	.023	.000	
		SES	.105	.013	
F27.2 Data safety EU country	1	Constant		.000	.011
		age	-.076	.000	
		sex	-.002	.839	
		SES	.070	.000	
		area	-.024	.007	
	2	Constant		.000	.011
		age	-.075	.000	
		SES	.071	.000	
		area	-.024	.007	
F27.3 Require more information on data use by others	1	Constant		.000	.009
		Age	.034	.000	
		Sex	-.020	.033	
		SES	-.094	.000	
		area	.013	.142	
	2	Constant		.000	.009
		Age	.035	.000	
		sex	-.020	.033	
		SES	-.094	.000	
F27.4 Require more information on my options	1	Constant		.000	.004
		age	-.043	.000	
		sex	-.035	.000	
		SES	-.052	.000	
		area	.001	.948	
	2	Constant		.000	.004
		age	-.043	.000	
		sex	-.035	.000	
		SES	-.052	.000	
F27.5 Confi-dentiality	1	Constant		.000	.011
		age	.053	.000	
		sex	-.072	.000	
		SES	.000	.960	
		area	.037	.000	
	2	Constant		.000	.011
		age	.053	.000	
		sex	-.072	.000	
		area	.037	.000	
F27.6 EU wide Physician networks	1	Constant		.000	.030
		age	-.101	.000	
		sex	.085	.000	
		SES	.137	.000	
		area	.004	.589	
	2	Constant		.000	.030
		age	-.101	.000	
		sex	.085	.000	
		SES	.137	.000	
F27.7 Improved quality by ICT	1	Constant		.000	.019
		age	-.068	.000	
		sex	.069	.000	
		SES	.123	.000	
		area	.006	.490	
	2	Constant		.000	.019
		age	-.067	.000	
		sex	.069	.000	
		SES	.123	.000	

The independent variable age is included in every model and often has the strongest influence, besides the SES. The older insurants rather tend to agree that their data are safe in Germany and in the EU and that ICT (F27.6 and F27.7) would be helpful and they do not require information (F27.3 and 27.4) as much as the younger insurants. Also, confidentiality is not as important to them.

Overall it seems that a young female (from the old Bundesländer) with a high SES would more likely reject ICT and be skeptical about data safety than an old male (from the new Bundesländer) with a low SES. These variables were used to define and compare two groups of insurants graphically. For age and SES the mean values were applied to categorise into old and young, respectively low SES and high SES. Any insurant younger than 50.7 years was considered young[73]. An SES lower than 10.7 was considered low. Figure 17 shows the mean values of answers of young females with high SES compared to those of old males with low SES. As the area of residence hardly seems to play a role, this variable will not be included.

In general the hypothesis was confirmed: there is an influence of age, SES, sometimes sex and rarely area of residence, but the influence is very small and can only explain between 0.4 % and 2.4 % of the variance of the answers to the statement in F27.

For in the influence of age, sex, SES and area of residence on the attitude towards EU-wide legislation a stepwise logistic regression was performed, again using the backwards method. The R^2 was low again in this case, with Cox & Snell $R^2=0.03$ and Nagelkerke $R^2=0.005$. In this model the variable age is excluded. Sex has an influence. Apparently women are 1.161 as likely as men to reject EU-wide legislation. Insurants from the old Bundesländer rather tend to agree with EU-wide legislation, but the results are only significant with p=0.043, so they are still questionable. Insurants with a higher SES rather reject EU-wide legislation, but the difference is extremely small.

This part of Hypothesis 3 is also confirmed, but again the influence is fairly small.

Table 4 Results of logistic regression for H3

Question	Step	Model	Exp(B)	sig	R^2
F29	1	Constant	.057	.000	Cox&Snell
		age	1.001	.439	.003
		sex	1.172	.008	Nagelkerke
		SES	1.064	.000	.005
		area	.816	.037	
	2	Constant	.063	.000	Cox&Snell
		sex	1.161	.011	.003
		area	.821	.043	Nagelkerke
		SES	1.063	.000	.005

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[73] The mean of the original sample was applied to avoid the bias that resulted from the higher age of the respondents.
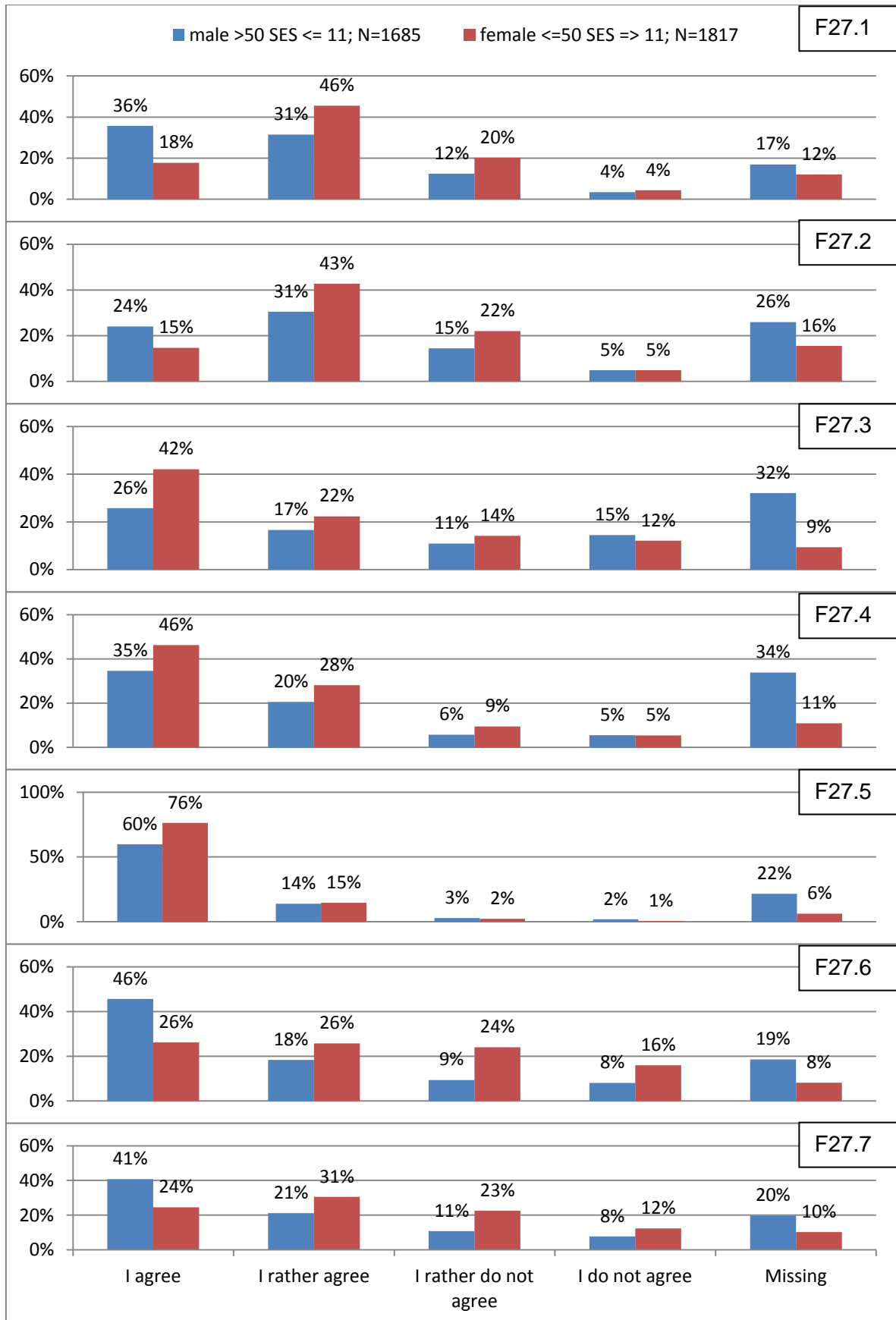
Figure 20 Comparison of attitudes by sex, age and SES for H3

→ H4: Those insurants who were not satisfied with the data exchange have a more positive opinion of ICT.

A t-test with p<0.001 confirmed that there is a significant difference between the means of the opinions on ICT of those who were satisfied with data exchange and those who were not. However, the differences are below one third of the standard deviation. The mean value of F27.6 among satisfied insurants is 2.08. This is significantly higher than 1.80, which is the mean value for those insurants who were not satisfied with the data exchange as it was.

For F27.7 the mean values are 2.11 for satisfied insurants and 1.79 for those who were not satisfied. In both cases the difference is a little lower than a third of the standard deviation (see appendix pp. 90 for complete SPSS output) and thus H4 is confirmed. This is also obvious from the graphs in figure 21.
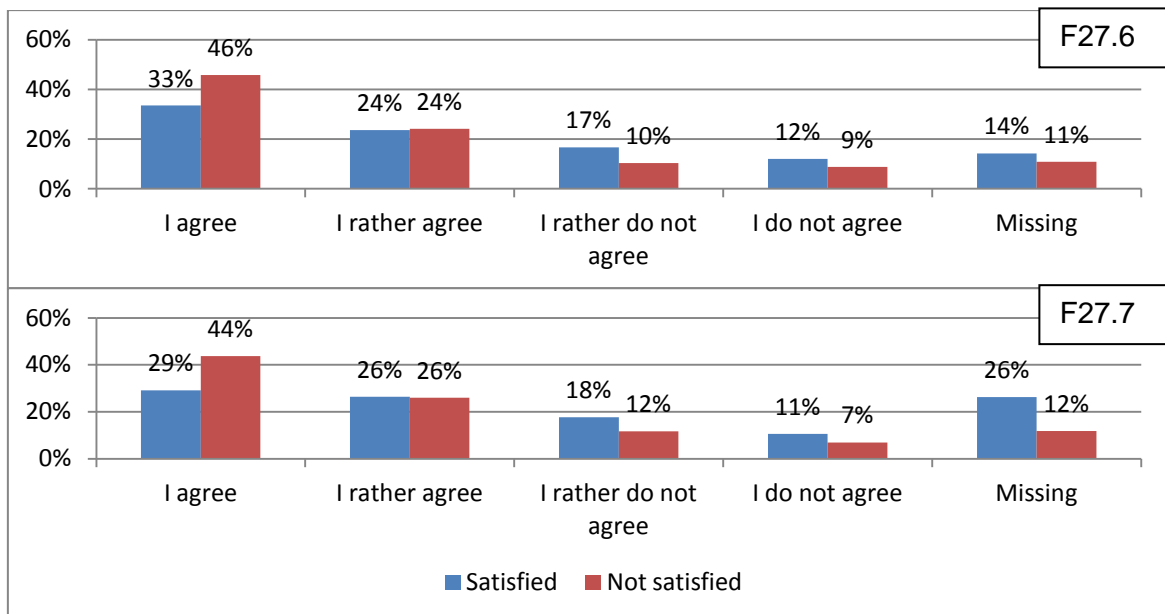
Figure 21 H4: Opinion of ICT (F27.6 and F27.7) by satisfaction with data exchange

→ H5: Chronically ill insurants have a better opinion of ICT.

Respondents were considered chronically ill if they stated that their last EU CBT was due to a chronic illness or if they were subscribed to a DMP. An independent-samples t-test was performed to detect differences between the means of the chronically ill insurants and the other ones concerning their opinions on ICT (F27.6 and F27.7). The t-test is significant with p<0.001, but the difference of the means is very small for both questions. For F27.6 the mean value of the chronically ill insurants is 1.94 while the other insurants had a mean value of 2.06 which means that the difference is just above one tenth of the standard deviation (see appendix p. 91 for complete SPSS output). The difference of means for

27.7 is even lower with 2.00 for the chronically ill compared to 2.07. So there is no big difference between the opinions of chronically ill insurants and the others on ICT, but the tiny tendency confirms H5.
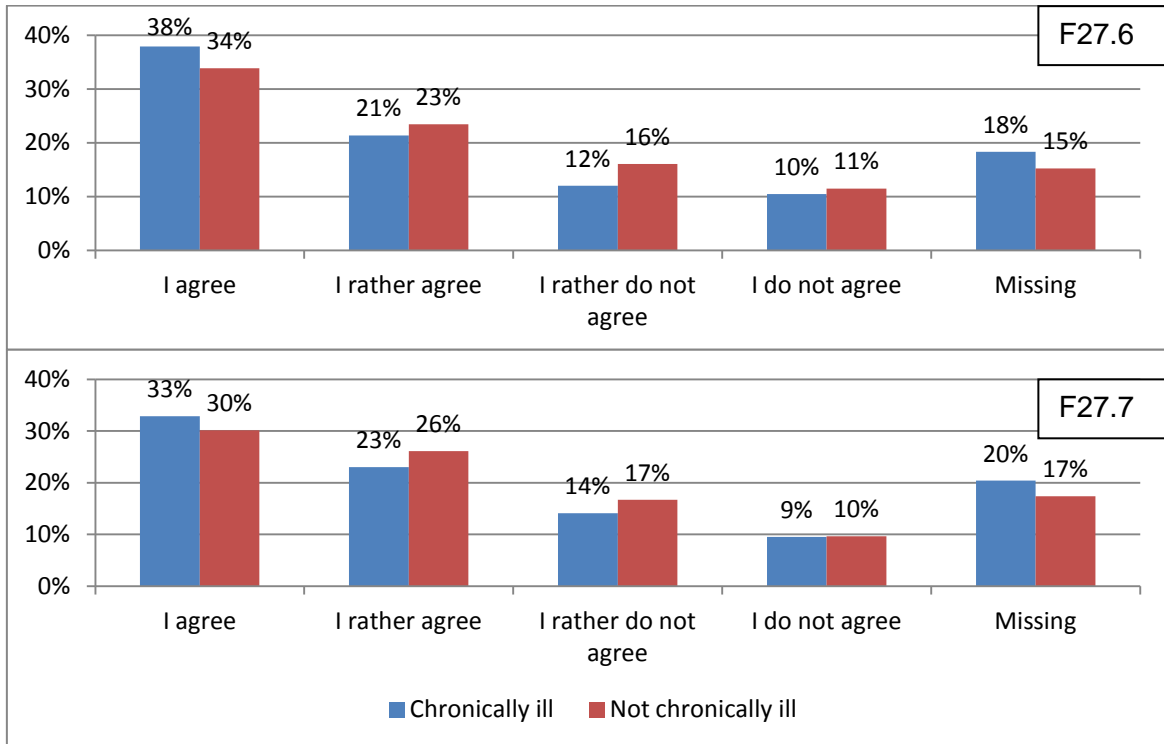
Figure 22 H5: Opinion of ICT (F27.6 and F27.7) by satisfaction chronically ill

5.2.2 Experiences

→ **H6: The amount and quality of data exchange depend on the country of treatment.**

Not only different health systems of countries might turn out to have an influence on the amount and quality of data exchange. The treatments, which may be specific for a country, may also require different amounts of data exchange. As some countries are very typically visited for specific treatments, treatments may well be a confounder in this context. Therefore it will also be included in the analysis for the frequency of data exchange.

The variable "country of treatment" has fourteen categories and is measured on a nominal scale just like the form of treatment which has seven categories. Therefore, statistical tests can only be applied by using dummy variables, which requires a reference category or control group. Yet, in this case there is no control group. Therefore, the most frequently

named category should be defined as a reference. This would be Austria for the countries and the GP for the treatments. As the regression would only show the significant differences of the other countries and treatments to Austria and GP treatments all those countries and treatments that have outcomes similar to Austria and GP treatments would not be included in the model. Therefore, the results are not presented in the form of a logistic regression analysis, but rather as simple frequencies shown in a graph (figure 23 to figure 26). Considering the large sample, differences of means between countries will be significant even if they are small.

The distribution of communication methods hardly changes between different countries. It is mostly personal transport of documents and in second place via letter. In no country the use of telephone is ever higher than 1 %. Communication via fax rarely reaches 1 % and E-Mail is hardly ever used in any country. Apparently, the distribution is very similar to the overall distribution displayed in figure 14 and therefore, it will not be part of the further analyses for H6.
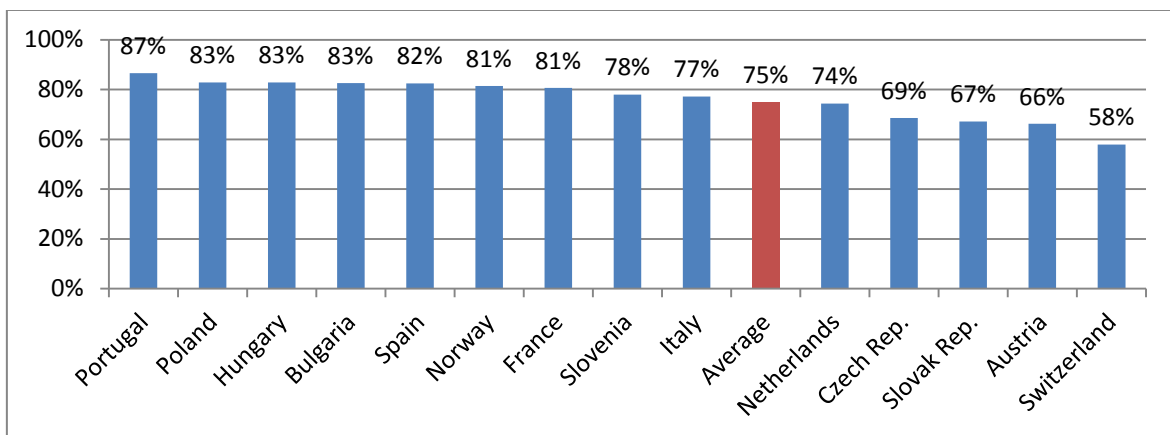
Figure 23 H6: No data exchange split by country

The share of cases with no communication at all between the treating physicians does change considerably, though. It ranges from 58 % in Switzerland to 87 % in Portugal, as can be seen in figure 23.
Yet, even though in many cases there was no data exchange at all, the large majority of respondents were satisfied with their physicians' exchange of data. This is displayed in figure 24.

In Poland there was little exchange and a high proportion of 24 % of insurants are not satisfied. Yet, in Portugal there was the least amount of data exchange and still 13 % of

the insurants are satisfied. In the Czech and the Slovak Republic there was more communication than average, but still a relatively high amount of 20 %, and 17 % respectively, were not satisfied.
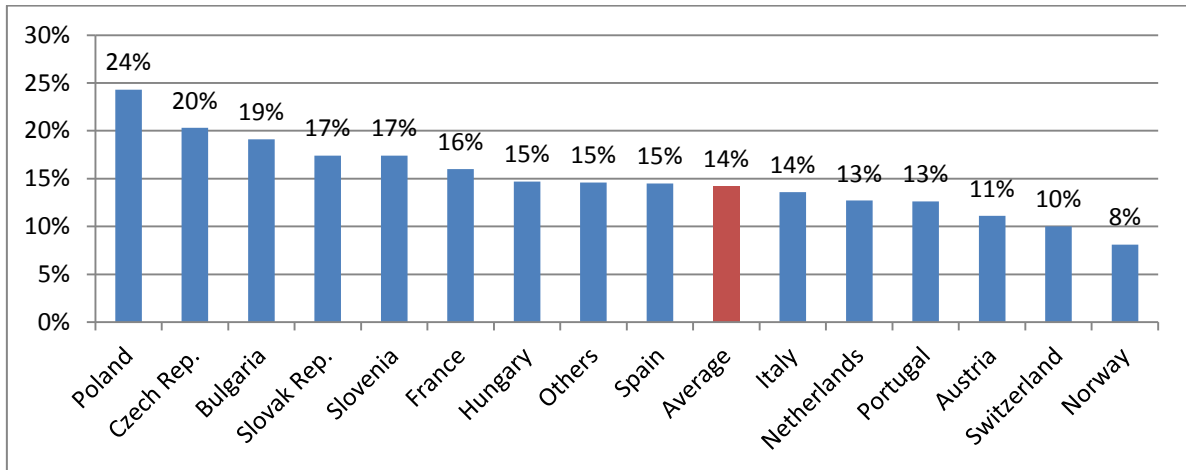
Figure 24 H6: Dissatisfaction with data exchange split by country

Satisfaction with data exchange certainly depends on other factors, too. In this case it might be important whether the treatment was planned or an emergency. Yet, the analysis shows that after planned treatments in 69 % of the cases there was no exchange of data and after emergency treatments there was no exchange in 76 % of the cases. Apparently there is a difference, but it is not very large and it is by far smaller than the difference between countries.

Results for the satisfaction with data exchange are very similar as well. Insurants with planned treatments were not satisfied with the data exchange in 15 % of the cases and those with an emergency treatment were not satisfied in 12 % of the cases. Again these results are different, but by far closer together than the results from the comparison of countries.

Apparently, the quality of data exchange (operationalised as satisfaction with data exchange) is closely connected to the country of treatment. In this case it is even independent from the kind of treatments, because if the insurant has a treatment which does not require data exchange, he or she would not be dissatisfied if there was no data exchange. Therefore, data exchange seems to be considered better in the Western European countries and worse in the Eastern ones. Except for Norway, the highest satisfaction was found in the German speaking countries. Certainly, in these countries data exchange is by far simpler, because there are no language barriers which would make data exchange more complicated. However, many insurants stated that they spoke

German with their physicians in Poland or the Czech Republic and still there is a comparatively low satisfaction with the data exchange. Especially, since there is more exchange of data in the Czech or Slovak Republic than in Spain, for example, and still the insurants were less satisfied. This clearly shows that compared to most Western European countries the satisfaction with, and possibly quality of, health data exchange is worse in the Eastern European countries.

Concerning the frequency of data exchange the kind of treatment is an important factor as well. In the appendix (p. 92) a graph shows the distribution of treatments per country. For example, spa treatments mostly take place in the Slovak Republic, Czech Republic, Hungary, Netherlands and Poland, while dentist visits are frequent in Hungary and Poland as well, and also Bulgaria and Portugal. Therefore, in these countries a lower rate of data exchange is expected, as these treatments have the lower rates of data exchange, including the GP treatments (see figure 25).
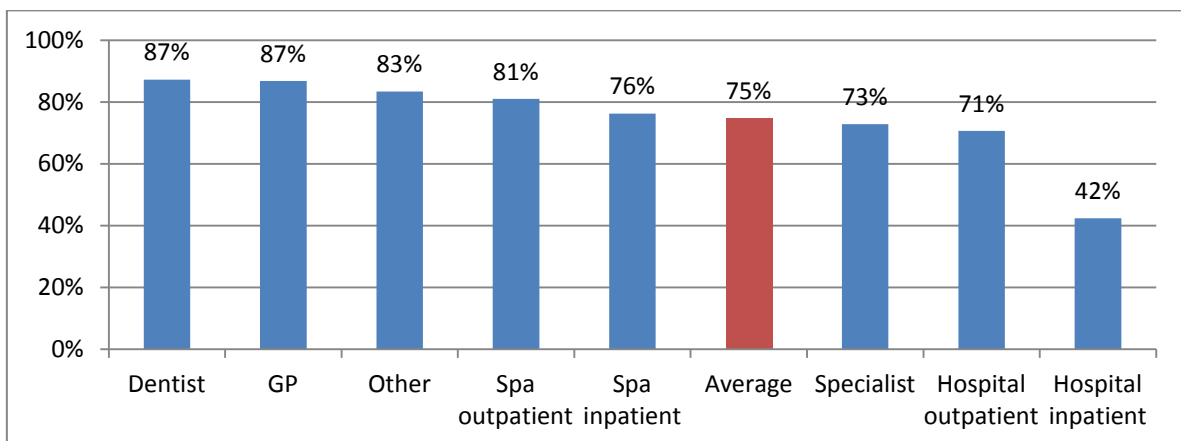
Figure 25 H6: No data exchange split by treatment

Generally rates of no data exchange are very high. The one exception is the inpatient hospital treatment. In these cases data exchange takes place in the majority of cases. Only in 42 % of cases there was no exchange of data. After an inpatient hospital treatment there was a personal exchange of documents among 21 % and a discharge letter in 14 %. Even the phone was used in 4 % of these cases. Fax and E-Mail were still rare with 0.6 % and 0.2 %.

Figure 26 shows that the satisfaction with data exchange is highest after GP treatments, even though it has one of the lowest data exchange rates. In most cases of GP treatments data exchange does not seem to be necessary.

Surprisingly, results are similar for treatments at the dentist: data exchange is rare, but still insurants are satisfied. Apparently, data exchange is not needed after most dentist treatments either.

Results are different for spa treatments and outpatient hospital visits. In these cases insurants are least satisfied with the data exchange. This corresponds to the low satisfaction in Eastern European countries, because these are the countries with the most spa treatments.

Certainly, it cannot be said for sure whether satisfaction with data exchange during spa treatments is low, because spa treatments are mostly performed in countries with low rates of data exchange or whether data exchange is generally bad during spa treatments and therefore insurants are rather not satisfied in "spa countries". However, in the Netherlands, the only Western "spa country", there are overall higher rates of satisfaction with data exchange. The same is true for Italy, which also has some spa treatments. Therefore, it is rather likely, that the satisfaction with data exchange depends more on the country than on the treatment. Furthermore the ranges of satisfaction are larger among countries (8 % to 24 % were not satisfied) than among treatments (8 % to 18 % were not satisfied).
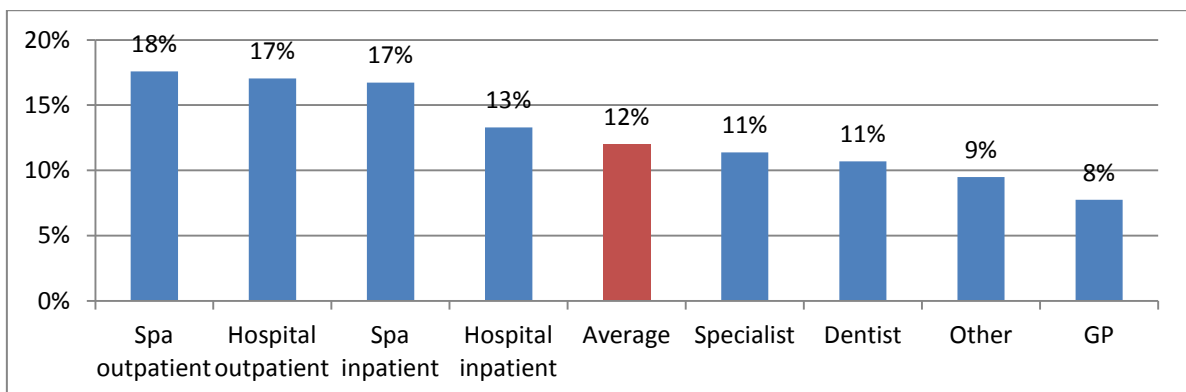
Figure 26 H6: Dissatisfaction with data exchange split by treatment

It can be concluded that the kind of treatment partly determines satisfaction with the data exchange. The planning of the treatment only plays a minor role. The most important factor is the country of treatment, with the Western European countries having the highest rates of satisfaction.

→ H7: Insurants who had a treatment of low quality were less satisfied with the data exchange between their physicians.

A treatment is considered to be of low quality if the insurant is not satisfied with the treatment result or if a unanticipated after-treatment was necessary. The treatment quality of all other cases is unknown and cannot be considered high. Therefore, it is considered "not low".

A Chi^2 test with Pearson's chi^2=509.67 (df=1) was applied to compare the results of these to binary variables.

Table 5 Chi^2 for H6

			better exchange wanted		Total
			No	Yes	
Quality	not low	Count	11639	1537	13176
		% within quality	88,3%	11,7%	100,0%
	low	Count	1389	611	2000
		% within quality	69,4%	30,6%	100,0%
Total		Count	13028	2148	15176
		% within lowq	85,8%	14,2%	100,0%

Almost three times as many insurants wanted better data exchange between their physicians in the group that had stated to either not be satisfied or to have had an unanticipated after-treatment (11.7 % compared to 30.6 %).

These results could also be confirmed by a t-test which showed a significance of p<0.001 and a difference of means of about half a standard deviation. Therefore, H7 is confirmed.

The low rates of dissatisfaction with data exchange give the impression that data exchange only plays a minor role during treatments, even if problems occur.

5.2.3 Findings of chapter 5.2

All seven hypotheses were generally confirmed by the data, but effects and correlations were often small.

H1: Insurants who consider EU-wide regulations useful rather agree that their data are safe in the EU country of their last treatment than those insurants who do not. Means differ by half a standard deviation, but the same is true for the opinion on data safety in Germany, so the rejection of EU-wide regulations is not specific for badly perceived data safety in the EU.

H2: Insurants who do not consider EU-wide regulations useful do not agree with ICT as much as those who do consider it useful. Means differed by three quarters of a standard deviation.

H3: The area of residence hardly has any significant influence on opinions. Sex only has a very small one. Age and SES have the largest effect and altogether these models can explain 0.4-2.4 % of the variance of the attitudes.

H4: Insurants who were not satisfied with the data exchange have a more positive opinion of ICT than those who were satisfied. Means differ by less than one third of a standard deviation.

H5: Chronically ill insurants hardly have a different opinion of ICT than the other insurants, but there is a small tendency which confirms the hypothesis.

H6: The differences of frequency and quality of data exchange are largest between countries, but the kind of treatment also plays a role. Satisfaction with data exchange is lower in Eastern European countries.

H7: Insurants with a treatment of low quality are less satisfied with the data exchange. Means differ by half a standard deviation.

6 Discussion

6.1 Interpretation of Results

Overall it seems that the majority of insurants are in favour of the idea of ICT. After the introduction of the eGK in Germany the satisfaction with the German health system was higher than in the previous year. The rise of satisfaction cannot be explained by the eGK alone, but rather by several negative financial changes that occurred in early 2011 and were partly changed again in early 2012. It cannot be said whether the eGK had a positive or negative effect on the attitudes towards the German health care system, but at least there was no major dissatisfaction with the eGK which would have lowered satisfaction with the health system.

Furthermore, the majority thinks that their data are safe in Germany (63 %) or in the EU country of their last treatment (54 %).The reason for a higher trust in the German data safety may well be that insurants have more information about their data, the data safety regulations and also understand certain information better than in a country with a different language. It is easier to trust familiar structures. Furthermore, data safety is an important topic in Germany and even though scandals on data safety are in the media from time to time, this might just show the insurants that there are people who care about their data safety and who try to improve it. This may actually improve the trust of insurants.

It turned out that there is a connection between the opinion on data safety and the opinion about the EU-wide legislation, which is fairly popular with 73 % of the respondents. Even in the time of a financial European crisis almost three fourths of the respondents have a positive opinion about the EU legislation. Insurants who consider the EU-wide legislation useful probably see personal advantages from the EU structures, including medical treatments and health care in general.

ICT is not quite as popular as the EU-wide legislation in general, but still the majority agrees that physicians should be networked (58 %) and that ICT would improve treatment quality (56 %). Certainly, the exact form of data exchange between physicians was not described in the questionnaire and therefore it is unsure whether these 58 %, respectively 56 %, would actually agree with systems like epSOS or an electronic EHIC. Data safety and means of data compilation are unknown to the insurants, but they play an important role for the formation of an opinion. Accordingly, it can only be concluded that there is a positive attitude towards ICT in general, but the best form of implementation cannot be named yet.

Another result that supports the introduction of ICT is the curiosity of the insurants towards their health data. Most insurants want more information on the use of their health data by

others (51 %) and especially on their own possibilities to use them (62 %). This means that the majority of insurants who had an EU cross-border treatment (CBT) are interested in their health data and in possibilities to use or manage them themselves. Yet, at the same time confidentiality concerning their health data is extremely important to them. Therefore, data use with ICT has to be safe and trustworthy in order to be accepted and used by the insurants. This shows again, that an implementation has to be carefully planned, transaprent and well communicated to the insurants.

The fact, that in most cases (75 %) there was no data exchange at all, suggests that it would be useful in three quarters of cases to introduce ICT to enable data exchange where it has not taken place up to now. However, only 12 % of the respondents stated that they would have wanted better data exchange. These insurants who were not satisfied with data exchange are more likely to use ICT, which was confirmed by the results for H4, but 12 % is not very many. Even if there was no communication and an after-treatment was necessary, only 29 % would have wanted better communication between their physicians. This is considerably more than 12 % and H7 was also confirmed by a Chi^2-test with a very similar result. Nevertheless, the amount of insurants who would have wanted better data exchange and therefore are more likely to use ICT, if it were available, was as low as 12 %. This is a potential and it might be enough for a first introduction of an ICT system, which would slowly grow and become better known over time and in the end insurants might get used to the application of ICT structures. This way there is a good possibility that more than just these 12 % would make use of ICT, but using ICT alone does not pay for the financial investments into the development of ICT. In order to have a financial advantage either it would need to make communication cheaper (reduce costs of paper, letters, telephone calls etc) or the treatment would need to be improved, which would lead to lower costs for after-treatments and a better outcome for the patient. Costs of communication cannot be calculated from this survey, but the chance for an improvement of treatment quality from improved data exchange can be estimated from the cases in which treatment quality was low and the insurants were dissatisfied with the data exchange between their physicians. This was the case in 3.4 % of all cases. Of course, this number is not reliable and not representative for the EU or for Germany. It only shows the potential of those insurants who were in this survey and they are objective views of the insurants. There might be more cases in which treatment quality would be improved from better data exchange and as was stated above, the majority believes that their treatment would in fact be better if their physicians had access to their data. Further studies will need to show whether this percentage is a reliable number and representative for all cross-border EU-patients. In the end it is important to know whether improved

quality in the resulting percentage of all EU CBTs would be sufficient to make the introduction of ICT structures financially efficient.

Apparently, chronically ill insurants hardly have a better opinion of ICT than others do, which suggests that these insurants would not use ICT more frequently than others and therefore, they would not profit from any additional utility. This result is rather surprising, because the older insurants are the ones who are rather in favour of ICT and they are also the ones who are more often chronically ill. Furthermore, it was expected, that a person, who is chronically ill, would want the treating physician to know his or her medical history in order to receive optimal treatment. Obviously, this is not the case for many patients. The reason might be that those who are ill also have more medical data they would not want everyone to know. For a healthy person without any sensitive health data, safety should not be a big issue. Therefore, the opinion of the ill insurants might end up just the same as that of the other insurants.

The results produced by the EB12 concerning certain characteristics of insurants with EU CBT are different from those of EB10, because insurants with unplanned treatments were included in this year's analysis. This may have led to a higher average income, a younger average age and a lower number of insurants from the new Bundesländer.

Otherwise, the results of this survey mostly confirmed the Hypotheses based on former surveys on the German eGK. It had been found that the generation above 60 years of age had less concerns on data safety[74], which was confirmed in the analysis for H3, as the older ones rather agree with ICT and value confidentiality less. Higher agreement of males[75] was confirmed, too.

Former surveys also found that a higher income corresponded with a better rating of eGK functions, but in this case a high SES rather led to lower agreement. Furthermore, a higher acceptance among insurants from the new Bundesländer could not be confirmed. Yet, the different surveys are very difficult to compare, because specific topics, as well as the construction of questions, were very different. The former survey by F.A.Z. and TK specifically asked about functions of the eGK and not about ICT in the EU in general. This may have led to very different results, because people may approve of some functions and still reject the general idea, because they fear problems with the use and introduction.

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[74] Gangl & Birkner, 2009, 20

[75] Gangl & Birkner, 2009, 13

6.2 Limitations

There are several limitations to this study. First of all the dataset can only be representative for TK insurants with EU CBTs and not for the German public or even the whole EU. And even for this group the sample does not represent a perfect sample, due to selection bias which resulted in a shifted age structure. It is also possible that insurants who are rather satisfied tend to answer questionnaires more often than insurants who were either not satisfied with their treatment, or with the TK in general, or possibly with the EU. This would mean that the opinions of insurants in the survey have the tendency to be better than the overall opinion of the insurants. Yet, the contrary may also be the case, if insurants rather answer if they have a strong opinion and possibly strongly reject ICT developments.

Concerning the analyses there are several limitations as well. In some cases parametric tests were applied even though the data were not perfectly normally distributed. This is the case especially for the analyses on the questions F27.3 to F27.7. This was necessary in order to receive interpretable results and the high sample size may account for the inaccuracy. A logarithmic transformation would have made the interpretation of results very difficult and also inaccurate.

Furthermore, group sizes were unequal in t-tests performed for H1, H2, H4, H5 and H7. Therefore, graphical results or non-parametric tests were supplied additionally and due to the large sample size results are very likely to be significant in any case.

The results concerning the SES cannot be compared to results of other surveys, because the index was modified to fit the data of this survey. It was changed from seven to only five categories and the category of profession was essentially different from Winkler's original index.

The interpretation of results also has its limitations. It is difficult to conclude from F27.6 and F27.7 that insurants would or would not use ICT. They may have a positive opinion in general, but reject ICT for themselves for some reason. Yet, it was not possible to ask directly whether the insurant would use an ICT system, because this would have required information on the functioning of the system, data safety and other aspects which was not possible for the following reasons. Firstly, there is no fully developed ICT system for the EU which would provide the necessary information on how it would work. Secondly, the questionnaire would have become too long and too complicated.

Furthermore, the study is only a cross-section for the beginning of the year 2012. Opinions may change due to political discussions or due to new developments and experiences.

7 Conclusion and Outlook

This thesis showed that EU-wide ICT in health care is mostly accepted by insurants of TK who were at least once treated abroad in the EU. Nevertheless, further research will be necessary to quantify the utility of ICT structures and to include other groups than only TK insurants and possibly even extend the survey to a European sample. From the results of this thesis it can only be said that there probably will be a utility, but as it looks it may be small.

For further research more exact characteristics of ICT structures would need to be assessed. Method of storage, measures for data safety, accessibility and obligation to use it are only some of them.

While there are several different possibilities to introduce ICT structures in European health care, there are also still several possible alternatives to official ICT structures. Personal online solutions may provide an anonymous platform for insurants who want to store their health data in a place that can be accessed from everywhere at any time. Contact details of other treating physicians could also be stored. This would make the networking of all physicians in the EU unnecessary. The solution would be less costly and the health data would be safer, because the platform could be used anonymously, without a name or identification number. Certainly, this would not solve the problem concerning the translation of health data, and also the payment for treatments would still have to be processed in the conservative way, because an anonymous platform would not allow contact with the health insurance.

In order to find the preferences concerning simplicity of data exchange and data safety further research will be necessary, as mentioned above. In a subsequent survey the questionnaire should include specific questions on possibilities of ICT. One of the main problems with the eGK is to find a way that enables both, data safety and simple access to the data. Therefore, a survey should try to find preferences of insurants concerning these two topics. A survey on data safety and simplicity of data exchange could be done with a smaller sample size than the EB12. Once different possibilities for EU-wide ICT structures have been developed and planned, a Discrete-Choice-Experiment might be a helpful instrument to identify insurants' preferences and priorities.

No matter, whether ICT structures will be profitable and useful in the end or not, from this survey it can be concluded, that at the moment there is no major demand for ICT, but generally there is acceptance. Therefore, the introduction should take place slowly. Over time demand may grow and further studies may show a higher potential.

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9 Eidesstattliche Erklärung

Ich versichere, dass ich die vorliegende Arbeit ohne fremde Hilfe selbständig verfasst und nur die angegebenen Hilfsmittel benutzt habe. Wörtlich oder dem Sinn nach aus anderen Werken entnommene Stellen sind unter Angabe der Quelle kenntlich gemacht.

9 Eidesstattliche Erklärung

10 Appendix

10.1 Questionnaire for „Europabefragung 2012"

Techniker Krankenkasse
Stichwort: Europabefragung 2012
22291 Hamburg

Europabefragung 2012 – unsere Fragen an Sie

In diesem Fragebogen geht es um Ihre geplanten und ungeplanten Behandlungen im EU-Ausland. Dies schließt hier die Staaten der Europäischen Union, den Europäischen Wirtschaftsraum (EWR: Island, Liechtenstein und Norwegen) und die Schweiz ein. Bitte beantworten Sie alle Fragen. Kreuzen Sie hierzu die Antwortmöglichkeiten an, die am besten auf Sie zutreffen. Am Ende des Fragebogens können Sie Ihre Anmerkungen machen.

Im Folgenden werden Sie nach Ihren <u>Behandlungen</u> im europäischen Ausland befragt. Hierunter sind alle ärztlichen Leistungen zur Behandlung <u>einer Krankheit</u> zu verstehen. Mehrfachbehandlungen oder Mehrfachanwendungen während eines Aufenthaltes werden dabei zu <u>einer Behandlung</u> zusammengefasst. Beispiel: Massagen, Bäder und Fango-Packungen während einer Kur bilden dementsprechend <u>eine</u> Behandlung.

1. **Wie oft wurden Sie im Jahr 2010 aufgrund einer plötzlichen Erkrankung oder eines Unfalls im EU-Ausland behandelt? (UNGEPLANTE BEHANDLUNGEN)**

   ☐ Nie   ☐ 2-mal   ☐ 4-mal
   ☐ 1-mal   ☐ 3-mal   ☐ Mehr als 4-mal

2. **Wie oft haben Sie sich im Jahr 2010 gezielt im EU-Ausland behandeln lassen (Dialyse-Behandlungen mit eingeschlossen)? (GEPLANTE BEHANDLUNGEN)**

   ☐ Nie   ☐ 2-mal   ☐ 4-mal
   ☐ 1-mal   ☐ 3-mal   ☐ Mehr als 4-mal

3. **Lassen Sie sich regelmäßig GEPLANT im EU-Ausland behandeln?**

   ☐ Ja, jedes Jahr   ☐ Ja, ca. alle zwei Jahre   ☐ Ja, ca. alle drei Jahre   ☐ Nein

4. **Bitte erinnern Sie sich an Ihre <u>letzte</u> EU-Auslandsbehandlung: War es eine geplante oder ungeplante Behandlung?**

   ☐ Geplant   ☐ Ungeplant

1

5. Fand Ihre _letzte_ EU-Auslandsbehandlung aufgrund einer chronischen Erkrankung statt?
   (chronisch = andauernd oder wiederkehrend)
   ☐ Nein ☐ Ja ☐ Weiß ich nicht

6. Welche medizinische Ursache war der Grund für Ihre _letzte_ EU-Auslandsbehandlung?
   (Mehrfachnennungen sind möglich.)

   ☐ Erkrankung der Atemwege
   ☐ Erkrankung des Herz-Kreislaufsystems
   ☐ Schlaganfall oder Schlaganfall-Folgen
   ☐ Diabetes
   ☐ Stoffwechselerkrankung (ohne Diabetes)
   ☐ Krebs-Erkrankung
   ☐ Erkrankung des Verdauungssystems
   ☐ Erkrankung des Nervensystems
   ☐ Erkrankung der Muskeln/Knochen/Gelenke
   ☐ Seltene Erkrankung, und zwar: _____

   ☐ Unfallbedingte Verletzung/Vergiftung
   ☐ Hauterkrankung
   ☐ Augen- oder Ohrenerkrankung
   ☐ Zahnerkrankung
   ☐ Dialyse-pflichtige Niereninsuffizienz
   ☐ Psychische Erkrankung
   ☐ HIV/AIDS
   ☐ Geschlechtsanpassung/-umwandlung
   ☐ Schwangerschaft und/oder Geburt
   ☐ Künstliche Befruchtung
   ☐ Sonstige

7. Nehmen Sie am TK-Plus-Programm teil? (Disease-Management-Programm, DMP, der TK)

   ☐ Nein ☐ Ja, für…
   ☐ …Typ I Diabetes
   ☐ …Typ II Diabetes
   ☐ …Asthma
   ☐ …Brustkrebs
   ☐ …Koronare Herzkrankheit
   ☐ …Chronisch obstruktive Atemwegserkrankungen (COPD)

8. In was für einer Einrichtung fand Ihre _letzte_ EU-Auslandsbehandlung statt?

   In einem Krankenhaus
   ☐ ambulant (ohne Übernachtung) ☐ stationär (mit Übernachtung)

   In einer Kureinrichtung
   ☐ ambulant (ohne Übernachtung) ☐ stationär (mit Übernachtung)

   In einer Praxis bei einem
   ☐ Allgemeinmediziner ☐ Facharzt ☐ Zahnarzt oder Kieferorthopäden

   ☐ Andere

   Falls Ihre _letzte_ EU-Auslandsbehandlung eine Zahnbehandlung war:
   Um welche Behandlung(en) handelte es sich? _(Mehrfachnennungen sind möglich.)_

   ☐ Zahnreinigung ☐ Wurzelbehandlung ☐ Implantate
   ☐ Füllungen ☐ Kronen oder Brücken ☐ Andere

9. In welchem Land fand Ihre _letzte_ EU-Auslandsbehandlung statt?

   ☐ Bulgarien ☐ Norwegen ☐ Schweiz ☐ Tschechien
   ☐ Frankreich ☐ Österreich ☐ Slowakei ☐ Ungarn
   ☐ Italien ☐ Polen ☐ Slowenien ☐ Anderes Land:
   ☐ Niederlande ☐ Portugal ☐ Spanien _____

2

10. War im Anschluss eine Nach- oder Weiterbehandlung erforderlich?

☐ Nein (bitte weiter mit Frage 11)
☐ Ja, bereits eingeplant (bitte weiter mit Frage 11)
☐ Ja, unvorhergesehen aufgrund von Komplikationen oder einer Fehlbehandlung

<u>Falls</u> eine <u>unvorhergesehene</u> Nachbehandlung stattfand: Wer hat diese durchgeführt?
(Mehrfachnennungen sind möglich.)
☐ Ein Arzt in Deutschland
☐ Derselbe Arzt im EU-Ausland, der die Erstbehandlung vorgenommen hat
☐ Ein anderer Arzt im EU-Ausland

11. Wie zufrieden waren Sie mit folgenden Aspekten Ihrer <u>letzten</u> EU-Auslandsbehandlung?
(Unzutreffendes bitte frei lassen)

	sehr zufrieden	eher zufrieden	eher unzufrieden	sehr unzufrieden
Behandlungsergebnis	☐	☐	☐	☐
Organisation der Abläufe in der Einrichtung	☐	☐	☐	☐
Wartezeiten auf einen Termin	☐	☐	☐	☐
Sauberkeit der Räume	☐	☐	☐	☐
Technische Ausstattung der Einrichtung	☐	☐	☐	☐
Atmosphäre in der Einrichtung	☐	☐	☐	☐
Abwicklung der Kostenerstattung zwischen Ihnen und der TK	☐	☐	☐	☐
Höhe der Kosten, die Sie selbst übernehmen mussten	☐	☐	☐	☐

12. Wer hat Sie während Ihrer <u>letzten</u> EU-Auslandsbehandlung hauptsächlich behandelt?

☐ Ein Arzt   ☐ Eine andere medizinische Fachkraft:

_____

Wie zufrieden waren Sie mit der Person, die Sie <u>hauptsächlich</u> behandelt hat, in Bezug auf folgende Aspekte? *(Unzutreffendes bitte frei lassen)*

	sehr zufrieden	eher zufrieden	eher unzufrieden	sehr unzufrieden
Medizinische Kompetenz	☐	☐	☐	☐
Verständlichkeit der Informationen	☐	☐	☐	☐
Gründlichkeit und Sorgfalt bei der Untersuchung bzw. Behandlung	☐	☐	☐	☐
Erklärung aller Behandlungsmöglichkeiten mit deren Nutzen und Risiken	☐	☐	☐	☐
Aufklärung über Nebenwirkungen der verordneten Medikamente	☐	☐	☐	☐
Informationen darüber, was Sie selbst zur Vorbeugung o. Heilung tun können	☐	☐	☐	☐

3

13. Wurden Ihnen im Rahmen der <u>letzten</u> EU-Auslandsbehandlung Medikamente verschrieben, die Sie in Deutschland weiterhin einnehmen sollten?

☐ Nein (Bitte weiter mit Frage 14)   ☐ Ja

<u>Wenn ja</u>, traten dabei Probleme auf? *(Mehrfachnennungen sind möglich.)*

☐ Nein   Ja   ☐ In Deutschland erhalte ich normalerweise ein anderes Medikament.
                  ☐ Ich hatte in Deutschland Schwierigkeiten beim Einlösen des Rezepts.
                  ☐ Das verschriebene Medikament war in Deutschland nicht erhältlich.
                  ☐ Andere Probleme, und zwar

_____

14. Welche Beträge haben Sie für Behandlung und Zuzahlungen am Ende der Abrechnung tatsächlich selbst für Ihre <u>letzte</u> EU-Auslandsbehandlung gezahlt?

Behandlungskosten (ohne Reisekosten, Übernachtung etc.):   ca. _____ €

Zuzahlungen (z. B. Praxisgebühren):   ca. _____ €

15. Sind weitere Kosten von einer Versicherung übernommen worden?

☐ Nein   ☐ Ja

Wenn ja: Wie viel hat die Versicherung jeweils gezahlt?

	nichts	weniger als ich	mehr als ich	alles
TK (über nachträgliche Kostenerstattung)	☐	☐	☐	☐
TK (direkt über Versichertenkarte)	☐	☐	☐	☐
Private Zusatzversicherung	☐	☐	☐	☐
Andere	☐	☐	☐	☐

Bitte beantworten Sie die Fragen 16 bis 23 nur, wenn Ihre letzte EU-Auslands-behandlung <u>geplant</u> war (bei <u>ungeplanter</u> Behandlung bitte weiter mit Frage 24)

16. Hatten Sie vor der <u>letzten</u> EU-Auslandsbehandlung einen Kostenvoranschlag bei der TK eingereicht?

☐ Nein   ☐ Ja

17. Wie hoch waren die <u>Behandlungs</u>kosten Ihrer <u>letzten</u> EU-Auslandsbehandlung im Vergleich zu den <u>Reise</u>kosten (Anreise und Übernachtungen)?

☐ Die Behandlungskosten waren höher.   ☐ Die Reisekosten waren höher.
☐ Die Kosten waren jeweils ungefähr gleich hoch.

4

18. Warum haben Sie sich für Ihre letzte Behandlung
im EU-Ausland entschieden? *(Mehrfachnennungen sind möglich.)*

☐ Kosteneinsparungen
☐ Kombination der Behandlung(en) mit einer Urlaubsreise
☐ Inanspruchnahme neuer oder seltener Behandlungsverfahren
☐ Inanspruchnahme eines bestimmten europäischen Spezialisten
☐ Vertrauensverhältnis zu einem bestimmten Arzt / Einrichtung im EU-Ausland
☐ Nutzung einer TK-Vertragsklinik (TK-EuropaService), -Kureinrichtung oder -Zahnklinik
☐ Nutzung der freien Arztwahl in der EU
☐ Suche nach besserer medizinischer Qualität
☐ Suche nach besserem Komfort (z. B.: freundlichere, zeitintensivere Betreuung)
☐ Gute Erfahrungen bei früheren Behandlungen
☐ Die Behandlung wird in Deutschland nicht angeboten.
☐ Ich habe zu dem Zeitpunkt im EU-Ausland gewohnt.
☐ Ich habe zu dem Zeitpunkt im EU-Ausland gearbeitet.
    ☐ Ich war auf einer Dienstreise.
    ☐ Ich wurde von meinem deutschen Arbeitgeber ins EU-Ausland entsendet.
    ☐ Ich habe grenznah in Deutschland gewohnt und im EU-Ausland gearbeitet.
☐ Aus anderen Gründen

19. Haben Sie sich bei Ihrer letzten geplanten EU-Auslandsbehandlung in einer speziellen Ein-
richtung behandeln lassen, die einen Vertrag mit der TK hat (TK-Vertragseinrichtung)?

☐ Nein (bitte weiter mit Frage 20)
☐ Ja, TK-Klinik (TK EuropaService)   ☐ Ja, TK-Kureinrichtung   ☐ Ja, TK-Zahnklinik

In welchem Ort befand sich die TK-Vertragseinrichtung? _____

20. Haben Sie sich vor Ihrer letzten EU-Auslandsbehandlung informiert?

☐ Nein (Bitte weiter mit Frage 23)   ☐ Ja

21. Worüber haben Sie sich vor Antritt Ihrer letzten EU-Auslandsbehandlung informiert?
(Mehrfachnennungen sind möglich.)

☐ Bestehen des Anspruchs auf EU-Auslandsbehandlung
☐ Möglichkeiten, die EU-Auslandsbehandlung mit einem Urlaub zu kombinieren
☐ Möglichkeiten, Kosten zu sparen
☐ Anteile der Kostenübernahme durch mich und die TK
☐ Abrechnungsmodalitäten mit der TK
☐ Zahlungsmodalitäten im EU-Ausland
☐ Leistungsangebot im EU-Ausland
☐ Medizinische Qualität im EU-Ausland
☐ Qualifikation des behandelnden Arztes
☐ Sprachkenntnisse der Ärzte/Mitarbeiter
☐ Ausstattung der Einrichtung
☐ Wartezeiten für einen Behandlungstermin
☐ Erfahrungen anderer Patienten im EU-Ausland
☐ Risiken der EU-Auslandsbehandlung
☐ Andere als die genannten Aspekte

5

22. Welche dieser Informationsquellen haben Sie vor Ihrer <u>letzten</u> EU-Auslandsbehandlung genutzt und wie zufrieden waren Sie mit den Beratungs- bzw. den Informationsangeboten?

	sehr zufrieden	eher zufrieden	eher unzufrieden	sehr unzufrieden
TK-Kundenberatung	☐	☐	☐	☐
TK-ServiceTelefon	☐	☐	☐	☐
TK-ReiseTelefon	☐	☐	☐	☐
Internetseiten der TK	☐	☐	☐	☐
Andere Internetseiten	☐	☐	☐	☐
Haus- oder Facharzt	☐	☐	☐	☐
Freunde/Verwandte	☐	☐	☐	☐
Hotel vor Ort	☐	☐	☐	☐
Reisebüro/-veranstalter	☐	☐	☐	☐
Zeitung/Zeitschriften	☐	☐	☐	☐

23. Würden Sie sich wieder geplant im EU-Ausland behandeln lassen?

☐ Ja, ganz bestimmt ☐ Eher ja ☐ Eher nein ☐ Ganz bestimmt nicht

24. Welche Sprache haben Sie zur Verständigung während Ihrer <u>letzten</u> EU-Auslandsbehandlung <u>hauptsächlich</u> genutzt?

	mit Ärzten	mit anderen Mitarbeitern
Deutsch	☐	☐
Deutsch mit einem Dolmetscher der Einrichtung	☐	☐
Englisch	☐	☐
Die Landessprache	☐	☐
Eine andere Sprache	☐	☐

25. Hat ein Informationsaustausch zwischen dem behandelnden EU-Auslandsarzt und einem Ihrer deutschen Ärzte stattgefunden?

☐ Nein ☐ Ja, per Telefon ☐ Ja, per E-Mail
☐ Ja, per Brief ☐ Ja, per Fax ☐ Ja, per Übergabe der Unterlagen durch mich
☐ Weiß ich nicht

26. Hätten Sie sich einen besseren Informationsaustausch zwischen EU-Auslandsarzt und Ihrem Arzt in Deutschland gewünscht?

☐ Nein ☐ Ja

6

27. Wie stehen Sie zu Fragen der Datensicherheit und des Datenaustauschs in Deutschland und der EU?
(Bitte kreuzen Sie an, inwieweit Sie den folgenden Aussagen zustimmen.)

	stimme zu	stimme eher zu	stimme eher nicht zu	stimme nicht zu
Meine Gesundheitsdaten sind in Deutschland vor Datenmissbrauch sicher.	☐	☐	☐	☐
Meine Gesundheitsdaten sind im Land meiner letzten EU-Auslandsbehandlung vor Datenmiss-brauch sicher.	☐	☐	☐	☐
Ich wünsche mir mehr Information zur Nutzung meiner Gesundheitsdaten durch Dritte.	☐	☐	☐	☐
Ich wünsche mir mehr Information zu meinen Nutzungsoptionen meiner Gesundheitsdaten.	☐	☐	☐	☐
Ich lege großen Wert auf die streng vertrauliche Behandlung meiner Gesundheitsdaten.	☐	☐	☐	☐
Ärzte sollten EU-weit elektronisch vernetzt sein, damit sie für eine Behandlung auf meine Gesundheitsdaten zugreifen können.	☐	☐	☐	☐
Wenn der EU-Auslandsarzt elektronisch auf meine Gesundheitsdaten aus Deutschland zugreifen könnte, würde die Behandlungsquali-tät verbessert.	☐	☐	☐	☐

28. Ist Ihnen bekannt, dass Sie einen Anspruch auf EU-Auslandsbehandlungen haben?

☐ Nein
☐ Ja, bei ungeplanten Not- und Akutbehandlungen
☐ Ja, bei allen ambulanten Behandlungen
☐ Ja, bei allen Behandlungen

29. Wie stehen Sie generell dazu, dass die EU gesetzliche Regelungen erlässt, die für die Gesundheitssysteme aller EU-Länder gelten?

☐ Finde ich sinnvoll   ☐ Finde ich nicht sinnvoll   ☐ Dazu habe ich keine Meinung

30. Wie zufrieden sind Sie mit dem deutschen Gesundheitswesen?

☐ Sehr zufrieden   ☐ Eher zufrieden   ☐ Eher unzufrieden   ☐ Sehr unzufrieden

31. Wie würden Sie im Allgemeinen Ihren gegenwärtigen Gesundheitszustand beschreiben?

☐ Sehr gut   ☐ Gut   ☐ Zufriedenstellend   ☐ Weniger gut   ☐ Schlecht

32. Wie alt sind Sie?

_____ Jahre

33. Welches Geschlecht haben Sie?

☐ Männlich   ☐ Weiblich

7

34. Welchen beruflichen Status haben Sie? *(Mehrfachnennungen sind möglich.)*

- ☐ Selbstständige/r
- ☐ Angestellte/r
- ☐ Arbeitsuchend
- ☐ Rentner/in
- ☐ Pensionär/in
- ☐ Hausfrau/Hausmann
- ☐ Studierende/r
- ☐ Auszubildende/r, Schüler/in

35. Welchen höchsten Bildungsabschluss haben Sie?

- ☐ Hauptschulabschluss
- ☐ Realschulabschluss
- ☐ (Fach-)Abitur
- ☐ Hochschulabschluss
- ☐ Promotion
- ☐ keinen Abschluss

36. Wie oft nutzen Sie das Internet?

- ☐ Täglich
- ☐ Mehrmals pro Monat
- ☐ Mehrmals pro Woche
- ☐ Selten bis Nie

37. Ich wohne... *(Mehrfachnennungen sind möglich.)*

- ☐ ...allein.
- ☐ ...mit meinem Partner.
- ☐ ...mit Kind(ern).
- ☐ ...mit meinen Eltern.
- ☐ ...in einer Wohngemeinschaft.

38. Wie weit entfernt wohnen Sie vom nächsten Grenzübergang zum europäischen Ausland?

- ☐ Bis zu 30 km
- ☐ 30 bis 60 km
- ☐ 60 km oder mehr

39. In welchem Bundesland wohnen Sie?

- ☐ Baden-Württemberg
- ☐ Bayern
- ☐ Berlin
- ☐ Brandenburg
- ☐ Bremen
- ☐ Hamburg
- ☐ Hessen
- ☐ Mecklenburg-Vorpommern
- ☐ Niedersachsen
- ☐ Nordrhein-Westfalen
- ☐ Rheinland-Pfalz
- ☐ Saarland
- ☐ Sachsen
- ☐ Sachsen-Anhalt
- ☐ Schleswig-Holstein
- ☐ Thüringen

40. Wie hoch ist Ihr durchschnittliches monatliches Bruttoeinkommen?

- ☐ Unter 250 Euro
- ☐ 250 bis unter 500 Euro
- ☐ 500 bis unter 750 Euro
- ☐ 750 bis unter 1.000 Euro
- ☐ 1.000 bis unter 1.500 Euro
- ☐ 1.500 bis unter 2.500 Euro
- ☐ 2.500 bis unter 3.500 Euro
- ☐ 3.500 bis unter 4.500 Euro
- ☐ 4.500 bis 5.500 Euro
- ☐ über 5.500 Euro

Haben Sie noch Anmerkungen oder Mitteilungen für uns?

_____

_____

Herzlichen Dank für Ihre Teilnahme an unserer Befragung. Sie sind uns damit eine wertvolle Hilfe.

Mit freundlichem Gruß

Ihre Techniker Krankenkasse

8

10.2 SPSS Output for H1

```
T-TEST GROUPS=f29(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=f27.1 f27.2
  /CRITERIA=CI(.95).
```

	29. Wie stehen Sie generell dazu, dass die EU gesetzliche Regelungen erlässt, die für die ...	N	Mean	Std. Deviation	Std. Error Mean
27.1. Meine Gesundheitsdaten sind in Deutschland vor Datenmissbrauch sicher Wie stehen Sie zu Fragen der Datensicherheit	Finde ich sinnvoll	10960	1,91	,811	,008
	Finde ich nicht sinnvoll	1425	2,30	,898	,024
27.2. Meine Gesundheitsdaten sind im Land meiner letzten EU-Auslandsbehandlung ... Wie stehen Sie zu Fragen der Datensic	Finde ich sinnvoll	10152	2,06	,831	,008
	Finde ich nicht sinnvoll	1321	2,41	,892	,025

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
27.1. Meine Gesundheitsdaten sind in Deutschland vor Datenmissbrauch sicher Wie stehen Sie zu Fragen der Datensicherheit	Equal variances assumed	87,642	,000	-16,820	12383	,000	-,389	,023	-,434	-,344
	Equal variances not assumed			-15,552	1739,500	,000	-,389	,025	-,438	-,340
27.2. Meine Gesundheitsdaten sind im Land meiner letzten EU-Auslandsbehandlung ... Wie stehen Sie zu Fragen der Datensic	Equal variances assumed	86,859	,000	-14,275	11471	,000	-,350	,025	-,398	-,302
	Equal variances not assumed			-13,522	1632,534	,000	-,350	,026	-,401	-,299

10.3 SPSS Output for H2

```
T-TEST GROUPS=f29(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=f27.1 f27.2 f27.6 f27.7
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	29. Wie stehen Sie generell dazu, dass die EU gesetzliche Regelungen erlässt, die für die ...	N	Mean	Std. Deviation	Std. Error Mean
27.1. Meine Gesundheitsdaten sind in Deutschland vor Datenmissbrauch sicher Wie stehen Sie zu Fragen der Datensicherheit	Finde ich sinnvoll	10960	1,91	,811	,008
	Finde ich nicht sinnvoll	1425	2,30	,898	,024
27.2. Meine Gesundheitsdaten sind im Land meiner letzten EU-Auslandsbehandlung ... Wie stehen Sie zu Fragen der Datensic	Finde ich sinnvoll	10152	2,06	,831	,008
	Finde ich nicht sinnvoll	1321	2,41	,892	,025
27.6. Ärzte sollten EU-weit elektronisch vernetzt sein, damit sie für eine ... Wie stehen Sie zu Fragen der Datensicherh	Finde ich sinnvoll	11124	1,89	1,009	,010
	Finde ich nicht sinnvoll	1451	2,69	1,109	,029
27.7. Wenn der EU-Auslandsarzt elektronisch auf meine Gesundheitsdaten aus ... Wie stehen Sie zu Fragen der Datensicherh	Finde ich sinnvoll	10873	1,93	,978	,009
	Finde ich nicht sinnvoll	1413	2,66	1,047	,028

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
27.1. Meine Gesundheitsdaten sind in Deutschland vor Datenmissbrauch sicher Wie stehen Sie zu Fragen der Datensicherheit	Equal variances assumed	87,642	,000	-16,820	12383	,000	-,389	,023	-,434	-,344
	Equal variances not assumed			-15,552	1739,500	,000	-,389	,025	-,438	-,340
27.2. Meine Gesundheitsdaten sind im Land meiner letzten EU-Auslandsbehandlung ... Wie stehen Sie zu Fragen der Datensic	Equal variances assumed	86,859	,000	-14,275	11471	,000	-,350	,025	-,398	-,302
	Equal variances not assumed			-13,522	1632,534	,000	-,350	,026	-,401	-,299
27.6. Ärzte sollten EU-weit elektronisch vernetzt sein, damit sie für eine ... Wie stehen Sie zu Fragen der Datensicherh	Equal variances assumed	83,826	,000	-28,063	12573	,000	-,800	,028	-,855	-,744
	Equal variances not assumed			-26,086	1776,937	,000	-,800	,031	-,860	-,739
27.7. Wenn der EU-Auslandsarzt elektronisch auf meine Gesundheitsdaten aus ... Wie stehen Sie zu Fragen der Datensicherh	Equal variances assumed	59,236	,000	-26,258	12284	,000	-,732	,028	-,787	-,677
	Equal variances not assumed			-24,904	1746,994	,000	-,732	,029	-,790	-,674

10.4 SPSS Output for H3

```
*F27.x
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT f27.1
  /METHOD=BACKWARD f32 f33 SES BL.
```

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	neu oder alt, Welches Geschlecht haben Sie? , 32. Wie alt sind Sie? , SES	.	Enter
2	.	neu oder alt	Backward (criterion: Probability of F-to-remove >= ,100).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	,156	,024	,024	,819	,024	86,932	4	13886	,000
2	,156	,024	,024	,819	,000	,983	1	13886	,321

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	233,090	4	58,273	86,932	,000
	Residual	9308,072	13886	,670		
	Total	9541,162	13890			
2	Regression	232,431	3	77,477	115,582	,000
	Residual	9308,731	13887	,670		
	Total	9541,162	13890			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,915	,056		34,291	,000

32. Wie alt sind Sie?	-,006	,000	-,120	-13,928	,000
Welches Geschlecht haben Sie?	,038	,015	,023	2,502	,012
SES	,032	,003	,105	11,832	,000
neu oder alt	-,024	,024	-,008	-,992	,321
(Constant)	1,892	,051		37,303	,000
32. Wie alt sind Sie?	-,006	,000	-,120	-14,075	,000
2 Welches Geschlecht haben Sie?	,038	,015	,023	2,497	,013
SES	,031	,003	,105	11,808	,000

Excluded Variables

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
2 neu oder alt	-,008	-,992	,321	-,008	,991

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT f27.2
  /METHOD=BACKWARD f32 f33 SES BL.
```

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	neu oder alt, Welches Geschlecht haben Sie? , 32. Wie alt sind Sie? , SES	.	Enter
2	.	Welches Geschlecht haben Sie?	Backward (criterion: Probability of F-to-remove >= ,100

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	,104	,011	,011	,838	,011	35,083	4	12825	,000
2	,104	,011	,011	,838	,000	,042	1	12825	,839

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	98,649	4	24,662	35,083	,000
	Residual	9015,514	12825	,703		
	Total	9114,162	12829			
2	Regression	98,620	3	32,873	46,767	,000
	Residual	9015,543	12826	,703		
	Total	9114,162	12829			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,165	,059		36,582	,000
	32. Wie alt sind Sie?	-,004	,000	-,076	-8,405	,000
	Welches Geschlecht haben Sie?	-,003	,016	-,002	-,204	,839
	SES	,021	,003	,070	7,511	,000
	neu oder alt	-,070	,026	-,024	-2,681	,007
2	(Constant)	2,157	,045		48,135	,000
	32. Wie alt sind Sie?	-,004	,000	-,075	-8,530	,000
	SES	,021	,003	,071	8,035	,000
	neu oder alt	-,070	,026	-,024	-2,683	,007

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
2	Welches Geschlecht haben Sie?	-,002	-,204	,839	-,002	,853

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT f27.3
  /METHOD=BACKWARD f32 f33 SES BL.
```

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	neu oder alt, Welches Geschlecht haben Sie? , 32. Wie alt sind Sie? , SES	.	Enter
2	.	neu oder alt	Backward (criterion: Probability of F-to-remove >= ,100).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,096	,009	,009	1,121	,009	29,531	4	12823	,000
2	,095	,009	,009	1,121	,000	2,156	1	12823	,142

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	148,508	4	37,127	29,531	,000
	Residual	16121,434	12823	1,257		
	Total	16269,943	12827			
2	Regression	145,798	3	48,599	38,652	,000
	Residual	16124,145	12824	1,257		
	Total	16269,943	12827			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,366	,079		30,133	,000
	32. Wie alt sind Sie?	,002	,001	,034	3,788	,000
	Welches Geschlecht haben Sie?	-,046	,021	-,020	-2,136	,033
	SES	-,038	,004	-,094	-10,093	,000
	neu oder alt	,052	,035	,013	1,468	,142
2	(Constant)	2,417	,071		34,240	,000
	32. Wie alt sind Sie?	,002	,001	,035	3,918	,000

Welches Geschlecht haben Sie?	-,045	,021	-,020	-2,130	,033
SES	-,037	,004	-,094	-10,048	,000

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
2	neu oder alt	,013	1,468	,142	,013	,992

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT f27.4
  /METHOD=BACKWARD f32 f33 SES BL.
```

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	neu oder alt, Welches Geschlecht haben Sie? , 32. Wie alt sind Sie? , SES		. Enter
2	.	neu oder alt	Backward (criterion: Probability of F-to-remove >= ,100).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,066	,004	,004	,913	,004	13,641	4	12583	,000
2	,066	,004	,004	,912	,000	,004	1	12583	,948

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	45,434	4	11,358	13,641	,000
	Residual	10477,553	12583	,833		
	Total	10522,986	12587			
2	Regression	45,430	3	15,143	18,188	,000
	Residual	10477,556	12584	,833		
	Total	10522,986	12587			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,139	,065		33,153	,000
	32. Wie alt sind Sie?	-,002	,000	-,043	-4,768	,000
	Welches Geschlecht haben Sie?	-,064	,018	-,035	-3,637	,000
	SES	-,017	,003	-,052	-5,511	,000
	neu oder alt	,002	,029	,001	,065	,948
2	(Constant)	2,141	,058		36,966	,000
	32. Wie alt sind Sie?	-,002	,000	-,043	-4,778	,000
	Welches Geschlecht haben Sie?	-,064	,018	-,035	-3,637	,000
	SES	-,017	,003	-,052	-5,512	,000

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
2	neu oder alt	,001	,065	,948	,001	,992

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT f27.5
  /METHOD=BACKWARD f32 f33 SES BL.
```

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	neu oder alt, Welches Geschlecht haben Sie? , 32. Wie alt sind Sie? , SES	.	Enter
2		. SES	Backward (criterion: Probability of F-to-remove >= ,100).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,107	,011	,011	,619	,011	40,733	4	14147	,000
2	,107	,011	,011	,619	,000	,003	1	14147	,960

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62,436	4	15,609	40,733	,000
	Residual	5421,202	14147	,383		
	Total	5483,638	14151			
2	Regression	62,435	3	20,812	54,313	,000
	Residual	5421,203	14148	,383		
	Total	5483,638	14151			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,244	,042		29,888	,000
	32. Wie alt sind Sie?	,002	,000	,053	6,213	,000
	Welches Geschlecht haben Sie?	-,090	,011	-,072	-8,014	,000
	SES	,000	,002	,000	,051	,960
	neu oder alt	,080	,018	,037	4,396	,000
2	(Constant)	1,245	,032		39,081	,000
	32. Wie alt sind Sie?	,002	,000	,053	6,213	,000
	Welches Geschlecht haben Sie?	-,090	,011	-,073	-8,527	,000
	neu oder alt	,080	,018	,037	4,400	,000

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
2	SES	,000	,051	,960	,000	,884

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
```

```
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT f27.6
/METHOD=BACKWARD f32 f33 SES BL.
```

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	neu oder alt, Welches Geschlecht haben Sie? , 32. Wie alt sind Sie? , SES	.	Enter
2	.	neu oder alt	Backward (criterion: Probability of F-to-remove >= ,100).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,174	,030	,030	1,044	,030	110,228	4	14115	,000
2	,174	,030	,030	1,044	,000	,292	1	14115	,589

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	480,225	4	120,056	110,228	,000
	Residual	15373,500	14115	1,089		
	Total	15853,725	14119			
2	Regression	479,907	3	159,969	146,881	,000
	Residual	15373,818	14116	1,089		
	Total	15853,725	14119			

Coefficients

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	1,522	,071		21,530	,000
	32. Wie alt sind Sie?	-,006	,001	-,101	-11,957	,000
	Welches Geschlecht haben Sie?	,179	,019	,085	9,415	,000
	SES	,052	,003	,137	15,509	,000
	neu oder alt	,017	,031	,004	,540	,589
2	(Constant)	1,538	,064		24,006	,000
	32. Wie alt sind Sie?	-,006	,001	-,101	-11,955	,000
	Welches Geschlecht haben Sie?	,179	,019	,085	9,419	,000
	SES	,052	,003	,137	15,535	,000

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
2	neu oder alt	,004	,540	,589	,005	,991

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT f27.7
  /METHOD=BACKWARD f32 f33 SES BL.
```

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	neu oder alt, Welches Geschlecht haben Sie? , 32. Wie alt sind Sie? , SES	.	Enter
2		. neu oder alt	Backward (criterion: Probability of F-to-remove >= ,100).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,141	,020	,019	1,007	,020	69,286	4	13758	,000
2	,140	,020	,019	1,007	,000	,476	1	13758	,490

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	281,148	4	70,287	69,286	,000
1	Residual	13956,813	13758	1,014		
	Total	14237,961	13762			
	Regression	280,666	3	93,555	92,226	,000
2	Residual	13957,295	13759	1,014		
	Total	14237,961	13762			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	1,555	,069		22,542	,000
	32. Wie alt sind Sie?	-,004	,001	-,068	-7,845	,000
1	Welches Geschlecht haben Sie?	,141	,019	,069	7,579	,000
	SES	,045	,003	,123	13,673	,000
	neu oder alt	,021	,030	,006	,690	,490
	(Constant)	1,575	,062		25,254	,000
	32. Wie alt sind Sie?	-,004	,001	-,067	-7,815	,000
2	Welches Geschlecht haben Sie?	,141	,019	,069	7,582	,000
	SES	,045	,003	,123	13,705	,000

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
2	neu oder alt	,006	,690	,490	,006	,992

```
*F29
LOGISTIC REGRESSION VARIABLES f29
  /METHOD=BSTEP(COND) f32 f33 BL SES
  /CRITERIA=PIN(.05) POUT(.10) ITERATE(20) CUT(.5).
```

Logistic Regression

Case Processing Summary

Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	13853	79,0
	Missing Cases	3690	21,0
	Total	17543	100,0
Unselected Cases		0	,0
Total		17543	100,0

Block 0: Beginning Block

Classification Table

	Observed		Predicted		
			29. Wie stehen Sie generell dazu, dass die EU gesetzliche Regelungen erlässt, die für die ...		Percentage Correct
			Finde ich sinnvoll	Finde ich nicht sinnvoll	
Step 0	29. Wie stehen Sie generell dazu, dass die EU gesetzliche Regelungen erlässt, die für die ...	Finde ich sinnvoll	12341	0	100,0
		Finde ich nicht sinnvoll	1512	0	,0
	Overall Percentage				89,1

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-2,099	,027	5937,279	1	,000	,123

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	f32	,000	1	,989
		f33	,429	1	,512
		BL	3,645	1	,056
		SES	25,327	1	,000
	Overall Statistics		36,587	4	,000

Block 1: Method = Backward Stepwise (Conditional)

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	37,061	4	,000
	Block	37,061	4	,000
	Model	37,061	4	,000
Step 2	Step	-,603	1	,438
	Block	36,459	3	,000
	Model	36,459	3	,000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	9513,922	,003	,005
2	9514,525	,003	,005

Classification Table

	Observed		Predicted		
			29. Wie stehen Sie generell dazu, dass die EU gesetzliche Regelungen erlässt, die für die ...		Percentage Correct
			Finde ich sinnvoll	Finde ich nicht sinnvoll	
Step 1	29. Wie stehen Sie generell dazu, dass die EU gesetzliche Regelungen erlässt, die für die ...	Finde ich sinnvoll	12341	0	100,0
		Finde ich nicht sinnvoll	1512	0	,0
	Overall Percentage				89,1
Step 2	29. Wie stehen Sie generell dazu, dass die EU gesetzliche Regelungen erlässt, die für die ...	Finde ich sinnvoll	12341	0	100,0
		Finde ich nicht sinnvoll	1512	0	,0
	Overall Percentage				89,1

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)

	f32	,001	,002	,600	1	,439	1,001
	f33	,159	,060	7,091	1	,008	1,172
Step 1	BL	-,204	,098	4,352	1	,037	,816
	SES	,062	,011	32,280	1	,000	1,064
	Constant	-2,866	,236	147,427	1	,000	,057
	f33	,149	,058	6,546	1	,011	1,161
Step 2	BL	-,197	,097	4,101	1	,043	,821
	SES	,061	,011	32,000	1	,000	1,063
	Constant	-2,772	,202	189,196	1	,000	,063

Model if Term Removed

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
	f32	-4757,262	,603	1	,438
	f33	-4760,515	7,108	1	,008
Step 1	BL	-4759,237	4,553	1	,033
	SES	-4773,449	32,975	1	,000
	f33	-4760,538	6,551	1	,010
Step 2	BL	-4759,406	4,286	1	,038
	SES	-4773,471	32,418	1	,000

Variables not in the Equation

		Score	df	Sig.
Step 2	Variables f32	,600	1	,439
	Overall Statistics	,600	1	,439

10.5 SPSS Output for H4

```
T-TEST GROUPS=f26(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=f27.6 f27.7
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	26. Hätten Sie sich einen besseren Informationsaustausch zwischen EU-Auslandsarzt ...	N	Mean	Std. Deviation	Std. Error Mean
27.6. Ärzte sollten EU-weit elektronisch vernetzt sein, damit sie für eine ... Wie stehen Sie zu Fragen der Datensicherh	Nein	11174	2,08	1,067	,010
	Ja	1912	1,80	,994	,023
27.7. Wenn der EU-Auslandsarzt elektronisch auf meine Gesundheitsdaten aus ... Wie stehen Sie zu Fragen der Datensicherh	Nein	10925	2,11	1,024	,010
	Ja	1894	1,79	,947	,022

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
27.6. Ärzte sollten EU-weit elektronisch vernetzt sein, damit sie für eine ... Wie stehen Sie zu Fragen der Datensicherh	Equal variances assumed	23,948	,000	10,874	13084	,000	,284	,026	,233	,336
	Equal variances not assumed			11,437	2721,629	,000	,284	,025	,236	,333
27.7. Wenn der EU-Auslandsarzt elektronisch auf meine Gesundheitsdaten aus ... Wie stehen Sie zu Fragen der Datensicherh	Equal variances assumed	19,070	,000	12,730	12817	,000	,321	,025	,272	,370
	Equal variances not assumed			13,445	2717,804	,000	,321	,024	,274	,368

10.6 SPSS Output for H5

```
T-TEST GROUPS=chron(0 1)
  /MISSING=ANALYSIS
  /VARIABLES=f27.6 f27.7
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Chroniker	N	Mean	Std. Deviation	Std. Error Mean
27.6. Ärzte sollten EU-weit elektronisch vernetzt sein, damit sie für eine ... Wie stehen Sie zu Fragen der Datensicherh	nicht chronisch krank	11197	2,06	1,061	,010
	chronisch krank	3534	1,94	1,058	,018
27.7. Wenn der EU-Auslandsarzt elektronisch auf meine Gesundheitsdaten aus ... Wie stehen Sie zu Fragen der Datensicherh	nicht chronisch krank	10911	2,07	1,015	,010
	chronisch krank	3440	2,00	1,034	,018

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
27.6. Ärzte sollten EU-weit elektronisch vernetzt sein, damit sie für eine ... Wie stehen Sie zu Fragen der Datensicherh	Equal variances assumed	,672	,412	5,950	14729	,000	,122	,020	,082	,162
	Equal variances not assumed			5,960	5945,113	,000	,122	,020	,082	,162
27.7. Wenn der EU-Auslandsarzt elektronisch auf meine Gesundheitsdaten aus ... Wie stehen Sie zu Fragen der Datensicherh	Equal variances assumed	,097	,756	3,467	14349	,001	,069	,020	,030	,108
	Equal variances not assumed			3,434	5681,534	,001	,069	,020	,030	,109

*Experiences

10.7 SPSS Output for H6
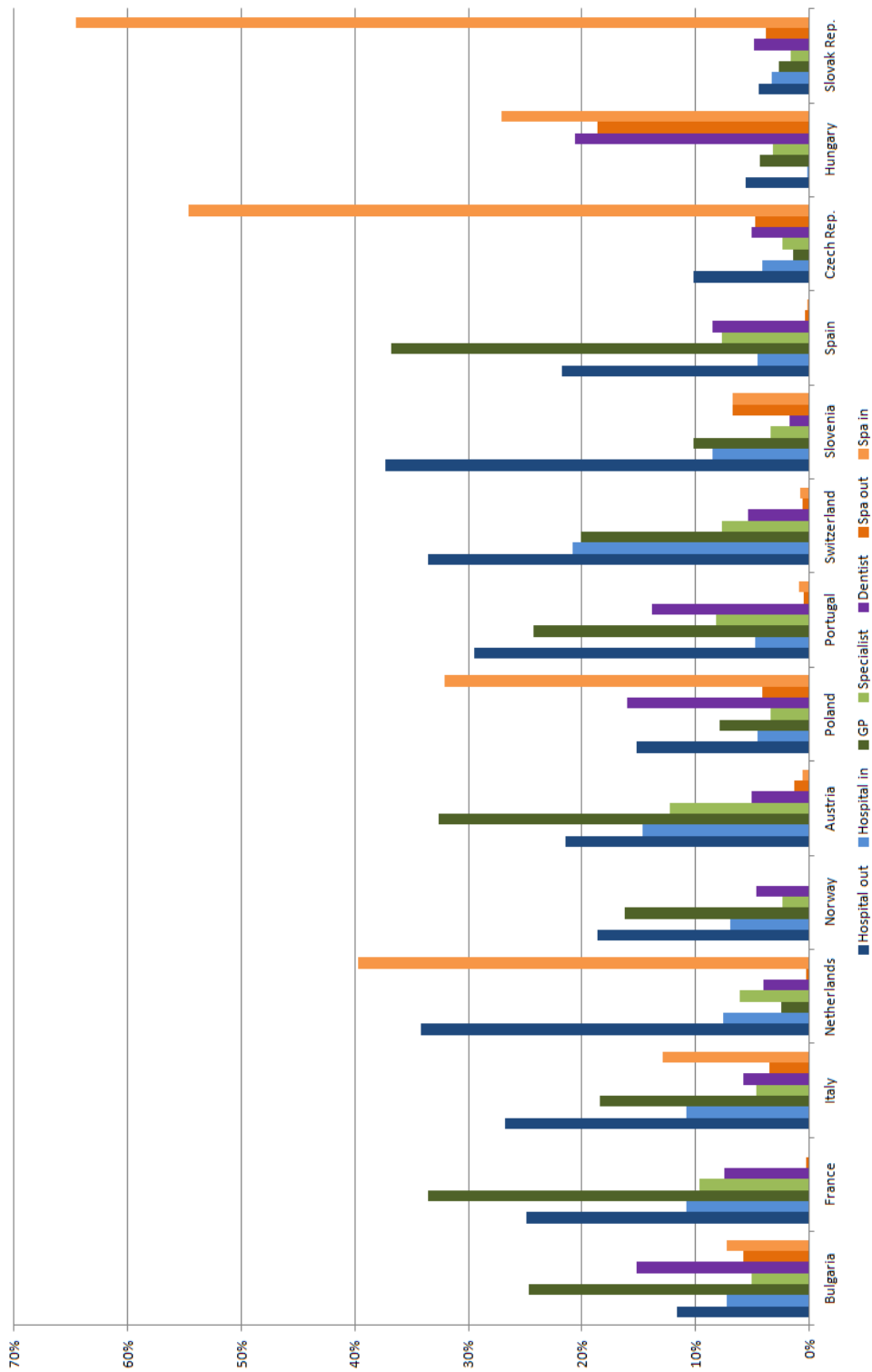
10.8 SPSS Output for H7

```
- There is a Connection with data exchange (patients with low quality are
less satisfied with dataex)

CROSSTABS
  /TABLES=f26 BY lowq
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.
```

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
26. Hätten Sie sich einen besseren Informationsaustausch zwischen EU-Auslandsarzt ... * lowq	15176	86,5%	2367	13,5%	17543	100,0%

26. Hätten Sie sich einen besseren Informationsaustausch zwischen EU-Auslandsarzt ... * lowq Crosstabulation

			lowq		Total
			not low quality	low quality	
26. Hätten Sie sich einen besseren Informationsaustausch zwischen EU-Auslandsarzt ...	Nein	Count	11639	1389	13028
		% within 26. Hätten Sie sich einen besseren Informationsaustausch zwischen EU-Auslandsarzt ...	89,3%	10,7%	100,0%
	Ja	Count	1537	611	2148
		% within 26. Hätten Sie sich einen besseren Informationsaustausch zwischen EU-Auslandsarzt ...	71,6%	28,4%	100,0%
Total		Count	13176	2000	15176

	% within 26. Hätten Sie sich einen besseren Informationsaustausch zwischen EU-Auslandsarzt ...	86,8%	13,2%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	509,666	1	,000		
Continuity Correction	508,113	1	,000		
Likelihood Ratio	422,169	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	509,633	1	,000		
N of Valid Cases	15176				