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Expectations and subjective quality  
evaluations of travellers from the pre-  
travel consultation.  
A quantitative analysis.

Master Thesis

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## List of abbreviations

BNI	Bernhard-Nocht-Institute
GP	General Practitioner
HBM	Health Belief Model
UNWTO	World Tourism Organization

# 1 Background

International travel and travel to far-distant places like tropical areas have increased during the last years and this trend is still continuing. The globalised world opens possibilities for trade, business and casual travel. A total of one billion travellers crossed international borders in 2012, a growth of 4% compared to 2011 (UNWTO, 2012). Especially less developed countries and low-income countries are visited frequently by around 80% of travellers, with an increasing tendency. Solely the African region showed a growth in visitors of 6%. Nevertheless, Asia and the Pacific area also become more and more popular (UNWTO, 2012). In these countries, life circumstances, health conditions and diseases are very different compared to the European situation which entails a certain risk.

Due to these observed developments, a risen risk concerning infectious diseases and non-vaccine preventable risks have to be faced, which travellers might also bring home with them. Additionally, travel-related morbidities are on the rise, too.

Several studies have shown that not only infectious diseases need consideration but also common diseases like cold and gastro-intestinal illnesses which are the most frequent occurrences. Diarrhoea affects between 20% and 50% of people travelling to tropical countries (von Sonnenberg et al, 2000). Nevertheless, causes of mortality are usually coronary-heart diseases with underlying pre-existing conditions as well as road accidents or accidents in dangerous adventure sports (Wolfe Acosta and Wolfe 2004; Bazemore and Huntington 2009). In addition, medical care in foreign countries often shows a lack of quality. They are often short of staff and the necessary medications or medical equipment are missing. Clinics and hospitals cannot be compared to European standards. Therefore, it is essential to gain as much education as possible beforehand and be best prepared to avoid any medical discomforts or doctor's visits. Only by being aware of risks, diseases and accidents can be prevented.

According to Hoveyeda (2004), risk assessment, risk communication, health education and health promotion are significant areas associated with travel morbidities. As many travel-related illnesses are preventable, travellers should be

advised with information and also take precautionary measures like vaccinations or prophylactic medication.

Pre-travel consultation is a possibility to instruct and inform travellers about potential diseases and other risk factors as well as promoting the use of precautionary actions, e.g., immunisations. Moreover, the aim of the consultation is to influence the individual's behaviour in order to prevent illnesses and accidents. Paying attention to food and water quality can help to avoid "unnecessary" stomach troubles. Hence, this is just one example how medical conditions can be related to personal behaviour. This relationship will be further discussed in the following chapter 1.1.

It has been proven that risk and morbidity are partly related to traveller's perception of risk and their adherence to prophylaxis measures (Wolfe Acoste and Wolfe 2004; Carroll et al. 2008). That is the case because every individual has own personal perceptions about disease risks or other hazards. The pre-existing attitudes are often affected by previous travels and experiences with prevention methods. Further influencing factors are costs of medications or vaccines as well as fears of side effects. All these aspects have to be taken into account when dealing with travellers who seek pre-travel consultation, to give them the best available advice and protection and make them stick to the recommendations of professionals.

Additionally, 74% to 83% of the travellers believe vaccinations to be protective (Hamer and Connor 2004; Van Herck et al. 2004). This comprises possible risks, as people might think they are protected against "everything" during their travel which could lead to thoughtless behaviour. As an example, previous surveys on European and American travellers showed that only 15% to 26% intended to completely avoid the intake of possible hazardous food. Other authors reported about only 50% to 60% of travellers sticking to their medications of malaria prophylaxis (Hill 2004).

As a result, the relation between pre-travel consultation and the travellers behaviours during the trip should be studied more in-depths: How does the consultation affect the traveller's behaviour? How do travellers stick to preventive measures?

Overall, it is assumed that travel is often beneficial for health. However, it has not been investigated yet, if the pre-travel consultation has any effects on health, whether in a positive or a negative direction (Fleck, Jäger, Zeeb 2005; Bazemore, Huntington 2009).

This study examines the subjective risk perception of patients who were seeking advice from the pre-travel consultation. At the same time, the consultations' quality is also been evaluated by asking the patients for their expected and their actual perceived quality.

### 1.1 Risk perception and personal behaviour

In general, risk is defined as “a probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through pre-emptive action” (The Business Dictionary 2013). Risk has been examined in many different fields, for example in economy, finance and psychology, regarding people's attitude towards the visible or invisible risk.

Applied to health, Menon (2008) specifies risk perception as the “perception of the subjective likelihood of the occurrence of a negative event related to health for a person or a group of people over a specified time period”. In other words, subjective risk is the combination of the probability of a negative occurrence for health or well-being and the perceived severity. Furthermore, it is known that the estimation of risk is often biased. Car accidents are often overrated as a cause for death, whereas diseases are mostly underestimated in this relation (Hammelstein et al. 2006).

According to several authors, there is a linking between risk perception and health behaviour (Weinstein 2003; Brewer et al. 2004). Studies have shown how people behave when knowing the risk of a certain manner and how this knowledge may influence their future actions (Weinstein 2003). In general, people also tend to underestimate their personal risk which is known as unrealistic optimism. Very often travellers have the subjective perception of not being at high risk for an illness (Hill 2004). Additionally, when people finally take precautions to reduce

their risks, they should feel being at a lower risk than before (Weinstein 2003). Therefore, it is important to provide explicit, personalised feedback about a person's relative risk and evaluate existing preconceptions.

The relation between risk perception and health behaviour can be illustrated for example with the health belief model (HBM). This is a model from health psychology explaining the individual's likelihood to undertake a preventive health action (Wolfe Acosta and Wolfe 2004). The basic hypothesis is that health-seeking behaviour is influenced by a person's perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat (Hammelstein et al 2006). More precisely, people assess the benefits and hurdles to taking a suggested health action and if the benefits outweigh the hurdles, the HBM predicts a greater probability of taking and sticking to the recommended precaution measures.

As a result, quality information involvement and risk communication, including the significance of risks as well as previous experiences, will influence the traveller's decision-making regarding recommended vaccinations and medications.

Furthermore, it has been shown that the physician-patient relationship has profound consequences for future behaviour. Not only communication skills and gestures of the doctor play an important role, but also a certain inclusion in decisions of patients. Studies revealed that calm and clear articulations, as well as co-determination, are beneficial for compliance (Häuser, Hansen, Enck, 2012; Thygeson et al. 2010; Jäger H. 2010). The contact of a physician can lead to a change in the patient's attitude and therefore, can positively impact henceforth behaviour.

This relationship between communication skills and risk perception is known from general medicine. Drawing the line to travel and health, it can be assumed that several factors influence people's risk perception. One of the factors is the given information and knowledge of travellers which they acquire from pre-travel consultation (Senn et al. 2007). As pre-travel consultation has also a medical background, similar relations between the physician and the traveller can be expected.

Moreover, these changes in the belief system of patients caused by interventions can be quantified with mathematical models such as Bayesian probabilities: The demand for vaccinations is depending on the perceived risk of acquiring a serious disease and the expected protective effect. Baye's theorem (1764) shows that the probability for an event of an individual (incidence) is dependent on the size of the probability that the event will occur in the total population (prevalence). A Brazilian study demonstrates how people react on an emergent disease threat on the example of yellow fever vaccinations and a person's adherence to a vaccination program (Coelho and Codeço 2009). The survey showed that willingness to vaccinate is more driven by disease scare instead of considerations about vaccine safety. This observation should be taken into account when dealing with pre-travel consultation.

## 1.2 Quality evaluations

A vital prerequisite for efficient health care is quality assurance, which can be defined as assurance and improvement of quality, physicians and nursing activities in particular. Quality assurance means that patients can be supplied on their demands as well as on economic aspects (Federal Ministry of Health 2013).

Until now, priorities in health care are usually determined by professionals and health authorities. However, studies have shown that there are differences between views of patients and professionals. Therefore, it is crucial to include the patient's perspective of health care into practice (Grol et al. 1999). As patients expectations are on the rise, quality management becomes an important tool to meet patient's demands. Including a patient's point of view within the frame of quality assurance can help to identify problems and gaps which would not have been obvious from the physician's perspective (Klingenberg et al. 1996).

Moreover, it is the patient who determines whether the given care helped to improve their health status or cured their illnesses. Not only the results of care in terms of health improvements or needs met are crucial in this respect, but also the ways in which care is provided: the organisation of services, the atmosphere, as well as the communication between the physician and the patient (Grol and Wensing 2000).



In general, quality evaluations are still rare in the medical context. However, some hospitals and general practitioners have started to regularly evaluate their work, atmosphere and administration processes in order to improve patient's satisfaction. They have come to an increasing awareness that including patients in improving quality plays a central role in this process. When patients are given the opportunity to specify their experiences and wishes, health care providers could learn a lot and improve their practices and ways of care. At the end of the day, the patient is a co-producer of the outcomes of care and outcome is influenced by a huge amount on patient features, patient behaviour and compliance (Grol and Wensing 2000).

Common instruments in quality assurance are validated written questionnaires which help to gain useful information about the current situation of the clinic in the patient's view. Although expectations and satisfaction of patients are very subjective, interviews or questionnaires should be taken into account in quality management. The patients will be given the opportunity to express discontent and satisfaction and afterwards the significance of the mentioned aspects should be discussed critically (Faller 2012).

Grol and Wensing (2000) performed a literature review in order to identify the most important aspects for patients with respect to primary care. On the basis of 19 studies, the following aspects were rated as most significant by patients in at least 50% of the studies:

- humaneness
- competency/ accuracy
- patient involvement in decisions
- time for care provision
- availability/ accessibility
- informativeness
- exploring patient's needs
- availability of special services.

Moreover, the table below shows the top ten of priorities of patients in Europe regarding general practice care and what they expect of their general practitioner

(GP). This survey was conducted by Grol et al. (1999), using a validated instrument, the EUROPEP questionnaire. Patients of eight different countries were included to rate different aspects of general practice care in order to find out what is most important to them.

1. During the consultations a GP should have enough time to listen, talk and explain to me.
2. A GP should be able to provide quick services in case of emergencies.
3. A GP should guarantee the confidentiality of information about all his/her patients.
4. A GP should tell me all I want to know about my illness.
5. A GP should make me feel free to tell him or her about my problems.
6. It should be possible to make an appointment with a GP at short notice.
7. A GP should go to courses regularly to learn about recent medical developments.
8. A GP should not only cure diseases, but also offer services to prevent diseases.
9. A GP should critically evaluate the usefulness of medicine and advice.
10. A GP should explain the purpose of tests and treatment in detail.

**Table 1: Patients' priorities in Europe<sup>1</sup>**

According to Faller (2012), the most crucial need is information. Patients are confronted with a lot of questions and hope to get answers from a professional. In the context of a pre-travel consultation, information is the most vital part: the most frequently asked questions are concerning health risks and diseases in the country of destination. Patients are interested in honest recommendations about medications and vaccines as well as in the underlying advantages and disadvantages.

A further very important aspect is putting the patient in the centre of focus. Listening to the individual needs of the patient and including his personal opinion will profoundly affect the perceived quality. The patient wants to feel individually cared for and that the physician is interested in his personal situation. Moreover, he will be pleased when he can share his point of view, expectations and worries. As a result, a consultation will be perceived as satisfactory, if the patient had the opportunity to express all his questions, expectations and fears (Faller, 2012).

<sup>1</sup> Source: Grol et al. (1999): Patients' priorities with respect to general practice care: an international comparison. Oxford University Press, Vol. 16, No. 1, p. 7.

Furthermore, physician patient communication has not only a profound impact on compliance (see chapter 1.1) but also a large influence on the patient's satisfaction (Klingenberg, Bahrs, Szecsenyi 1999). This is rated even more important than the organisation and the procedure within a practice and should therefore get special attention when dealing with quality evaluations.

All in all, using surveys among patients is one of the most widespread methods for quality assurance in health care. However, as validated questionnaires do only exist for the evaluation of family practices or GPs, the developed questionnaire in this survey had to be adapted to the environment of a pre-travel consultation, including some changes in questions and items. More detailed information regarding the content of the questionnaire will be found in the following chapters.

### 1.3 Research question

The previous demonstrations showed the importance of pre-travel consultation, personal behaviour and risks, travellers have to face during their trip. Not only the health is affected from a traveller's behaviour but also the economic system. Costs for treatment and medication after travel-related illnesses can have impacts on the personal level. Additionally, the corporate level is influenced by lost productivity and worker's compensation (Hudson and Fortuna 2008).

The pre-travel consultation is a simple and cost-effective method to educate travellers and provide prophylactic medication with the aim to influence the future behaviour and to prevent illnesses. In order to meet the specific expectations, needs and priorities of travellers, the subjective perceived quality of the consultation should also be taken into account.

The following research question includes the essence of the study:

*Is there any effect on subjective risk perception of travellers after having received pre-travel consultation?*

With the purpose of answering the research question, the hypotheses below have been phrased:

1. Risk perception of travellers will change after having visited a pre-travel consultation.
2. The perceived risk will be lower *after* the pre-travel consultation (t=2)<sup>2</sup> compared to t=0.
3. There is a relation between the subjective risk perception (t=0) and vaccination status at t=2.
4. The perceived subjective quality of the pre-travel consultation is satisfactory.

#### 1.4 Aim of the study

The first aim is to measure the perceived quality within the pre-travel consultation and as a result give recommendations to improve the aspects which have been considered as negative. Additionally, it will be identified if pre-travel consultation has any effects on the subjective risk perception of travellers. Associations between personal risk perception and the pre-travel consultation will be examined, expecting a decrease after having received the consultation. Moreover, relations between the perceived risk right before the consultation and the vaccination status will also be analysed. These results can serve as a basis for further follow-up studies concerning the actual behaviour of people during their trips.

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<sup>2</sup> t = point of time with t=0 before entering the consultation, t=1 after the consultation and t=2 telephone interview one to three days after the consultation

## 2 Methods and material

### 2.1 Study design

The study followed a prospective longitudinal design using quantitative questionnaires. Three different points of interviews were chosen to measure the individual risk perception as well as the overall subjective quality. Patients were asked to complete the questionnaire before receiving the consultation (t=0), then directly after the consultation (t=1) and were called again one to three days after the appointment for a third interview (t=2). A more detailed description of the questionnaires can be found in the following paragraph.

### 2.2 The quantitative instrument

#### **Quality evaluations**

The developed questionnaire consisted of three parts: The first part asked about the subjective quality perception. As satisfaction is achieved by meeting people's expectations, the importance of the items was compared to the evaluated items at the third point of interview.

Previous surveys concerning quality management developed validated questionnaires in order to measure their patient's satisfaction. Therefore, existing items and scales were used extracted from a literature review to achieve measurable results. The European Community Study by the AQUA institute<sup>3</sup> was a useful basis in which aspects like processes, waiting times, atmosphere and friendliness of doctors and nurses have been included. Moreover, the EUROPEP instrument developed by Grol and Wensing (2002) gave also valuable information in how to create the items and scales. In the years 1999 and 2000, they investigated the most important aspects of general practice care of patients and built up a validated questionnaire out of this information. The developed questionnaire in this survey is linked to this example of good practice.

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<sup>3</sup> Institute for applied quality promotion and research in health care = Institut für angewandte Qualitätsförderung und Forschung im Gesundheitswesen

However, to be able to adapt the questionnaire for this study, some characteristics had to be rearranged to apply the instrument to the specific setting of a pre-travel consultation. The resulting ten items dealt with the following topics:

As information is the most important aspect for patients, two items asked about sufficient transparency and information. Furthermore, patients were requested to evaluate the organisation of the consultation, the atmosphere and the perceived quality of the service. The last four questions dealt with the costs, waiting times, confidential handling of the data and inclusion in decision making of the medical treatment.

Firstly, travellers were asked to rate how important these aspects are to them using ten point answering scales ranging from “*not important at all*” to “*very important*”. These two endpoints were the only labels on the Likert scale<sup>4</sup> used in this study and which were applied throughout the whole questionnaire. For means of comparison, and to measure their satisfaction, travellers had to evaluate these aspects in the telephone interview after having received the consultation on a scale from “*very poor*” to “*very good*”. In another question, patients were asked to estimate their knowledge regarding infectious diseases in their chosen country of destination. This question was asked before and after the consultation in order to detect possible increases in knowledge, functioning as an additional quality indicator.

At the end of the questionnaire, two last general questions were asked to find out if the travellers feel overall well informed and if they would like to add anything. Therefore, the last question was an open question to give them the opportunity to mention anything which has not been asked before. This is a crucial aspect in quality assurance to obtain specific indications of existing problems (Klingenberg, Bahrs, Szecsenyi 1999).

When travellers got out of the consultation (t=1), they were asked for their overall satisfaction. They were asked to state their personal satisfaction on a scale from zero “*not satisfied at all*” to ten “*very satisfied*”.

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<sup>4</sup> Likert, R. (1932). "A Technique for the Measurement of Attitudes". *Archives of Psychology* 140: p. 1–55.

### **Subjective risk perception**

The second part of the questionnaire consisted of the items regarding the perceived risk of the patients. In order to perform comparisons, patients were asked about their subjective risk perception right before they entered the pre-travel consultation and were then asked again one to three days after the appointment. As a result, differences in risk perception before and after the consultation could be identified, with the purpose of drawing conclusions about the effects of pre-travel consultation.

The first question focused on the personal perceived risk concerning high temperature or fever, diarrhoea and bronchitis or other respiratory symptoms. Travellers should estimate their personal risk on a point scale from zero (*“very low”*) to ten (*“very high”*). In the next question, patients were asked to write down the three events or occurrences they worry about most during their trip. This kind of open question gives travellers the opportunity to mention another perceived risk which has not been asked before. The final item dealt with the subjective risk concerning different incidences which were the following: accidents (including smaller injuries), the event of visiting a physician and a hospital stay or a return ahead of time to Germany. Again, travellers had to indicate their estimations on a scale from zero to ten as used before. These questions were asked at  $t=0$  and at  $t=2$  in both points of interviews. By doing this, the questionnaire would reveal changes in the belief system of the patient, i.e. to see if there is a risk reduction or an increased estimated risk.

Further questions at the third point of interview dealt with the kind of consultation, given vaccinations and received prescriptions for malaria prophylaxis. Travellers were asked to state if they have received a short or an extensive consultation, as there were differences in length and price. Moreover, it was necessary to ask if the participants received a vaccination in order to be able to investigate possible relations between the risk perception and the vaccination status in the analysis.

## Socio-demographic data

The third and last part of the questionnaire consisted of questions concerning the socio-demographic background of the participants asking for their age and sex. This data was used later on to control the results concerning possible correlations.

### 2.3 Participants

Travellers who visited the pre-travel consultation at the Bernhard-Nocht-Institute (BNI) were randomly asked to participate in the survey. Participants were inquired to provide information about their subjective risks concerning the upcoming travel and the expected and final experienced quality via telephone at t=2.

Inclusion and exclusion criteria have also been defined which are displayed in the table 2 below. It was crucial to only include patients who visited the pre-travel consultation for the very first time and for the only reason to receive a consultation. People coming already for the second or third immunisation or who came for follow-up care after travel were excluded from the survey, as they already got an impression when they visited the institute for the first time. Due to legal reasons, only patients from 18 years of age were allowed to participate. Below this age, an affirmation of a parent would have been necessary. Additionally, it was just possible to include people who were able to speak either German or English as the questionnaire was only available in these languages. Travellers who did not give written consent or withdrew consent on telephone contact, were also excluded. A total of 116 travellers met the inclusion criteria.

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"><li>• Patients going to the consultation for the first time</li></ul>	<ul style="list-style-type: none"><li>• Patients coming for 2<sup>nd</sup> or 3<sup>rd</sup> vaccination; already had consultation somewhere else</li></ul>
<ul style="list-style-type: none"><li>• Patients coming to receive pre-travel consultation</li></ul>	<ul style="list-style-type: none"><li>• Patients visiting ambulance for other reasons, e.g. follow-up after travel</li></ul>
<ul style="list-style-type: none"><li>• Patients aged 18 and older due to legal reasons</li></ul>	<ul style="list-style-type: none"><li>• Patients younger than 18 years</li></ul>
<ul style="list-style-type: none"><li>• Patients with knowledge of German or English language</li></ul>	<ul style="list-style-type: none"><li>• Patients without knowledge of German or English language</li></ul>

**Table 2: Inclusion and exclusion criteria**



## 2.4 Data collection

Firstly, the data collection started with a pre-test regarding acceptance, comprehensibility and possible mistakes. Throughout a period of one week, 15 questionnaires were handed out randomly to travellers visiting the pre-travel consultation at the outpatient clinic of the Bernhard-Nocht-Institute; the return rate was 12.

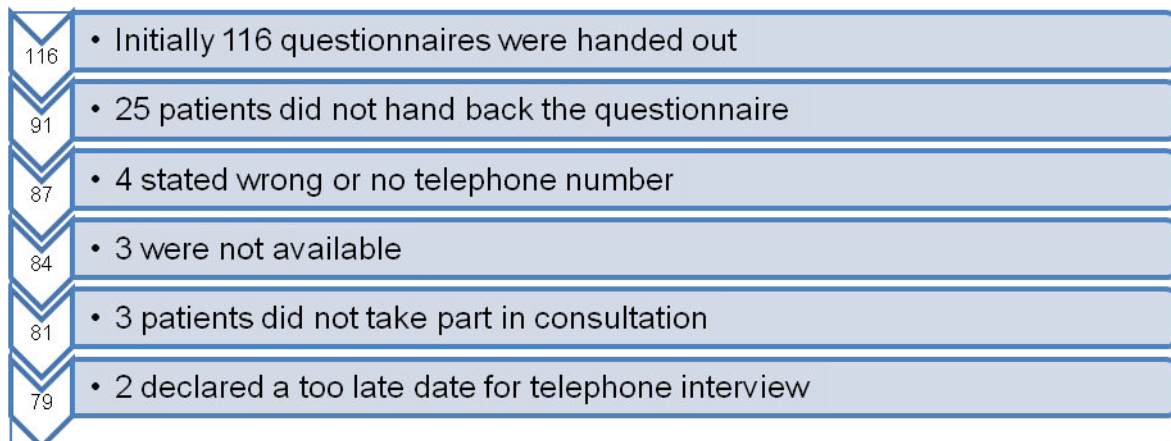
The pre-test phase revealed difficulties in understanding. Therefore, the aspects “Effectiveness of the product” and “Interest in your personal situation” from the quality evaluation part were deleted as people usually left out the question or were not able to answer it.

Secondly, after revising the pre-tested questionnaires, the main data collection started by distributing a total of 116 questionnaires. During a period of eight weeks, patients were interviewed at three different points in time:

1. Personal interviews of waiting patients *before* entering the pre-travel consultation at the BNI (t=0)
2. Patients had to evaluate the subjective overall quality directly *past* the consultation (t=1)
3. Telephone based interviews for a second survey *one to three days after* the pre-travel consultation (t=2)

The total response rate was 68%. Before starting to complete the written questionnaire, travellers were given information about the scientific study on an additional paper sheet. All necessary information about the survey and the confidential handling of the data were provided as well as contact information. Finally, the patients were asked to give written consent to participate and that they agreed to be called again one to three days later. The two documents can be found in the appendix IV and V.

Of 116 patients who agreed to be interviewed, 79 were interviewed completely. Reasons for not participating in the survey in general were either no interest or no willingness to provide personal confidential data. However, some participants agreed to fill out the first questionnaire but then did not hand them back in or did not fill in their contact number for the essential second interview. A complete overview of the response rate and reasons for the incomplete data can be seen in figure 1 below.



**Figure 1: Flow chart of response rate**

Of initially 116 distributed questionnaires, 25 patients did not return their form which led to a rest of 91 questionnaires. Additionally, four patients did not write down their telephone number, by leaving out the field or stating a wrong number. Only 87 questionnaires were left. Three patients were not available by phone at all, thus 84 forms remained. Another reason for invalid questionnaires was when travellers, who initially came for consultation, left the institute earlier, without receiving the consultation. This was mainly due to long waiting times, so 81 questionnaires were left. Two other participants declared a too late date for the telephone interview which would have falsified the results. As other participants were called one to three days after the consultation, these two cases were left out. In the end, 79 forms remained for the analysis.

## 2.5 Statistical analysis

The collected data will be analysed by using the statistical analysis software IBM SPSS Statistics, version 19. First of all, descriptive statistics will be carried out for socio-demographic data, perceived quality and changes in the subjective risk perception. This includes means and the standard deviations. A t-test will also be performed to investigate differences regarding sex and age.

Furthermore, the website tool [www.openepi.com](http://www.openepi.com) will be used in order to calculate cross tables and odds ratios regarding the risk perception and the vaccination status of the travellers.

### 3 Results

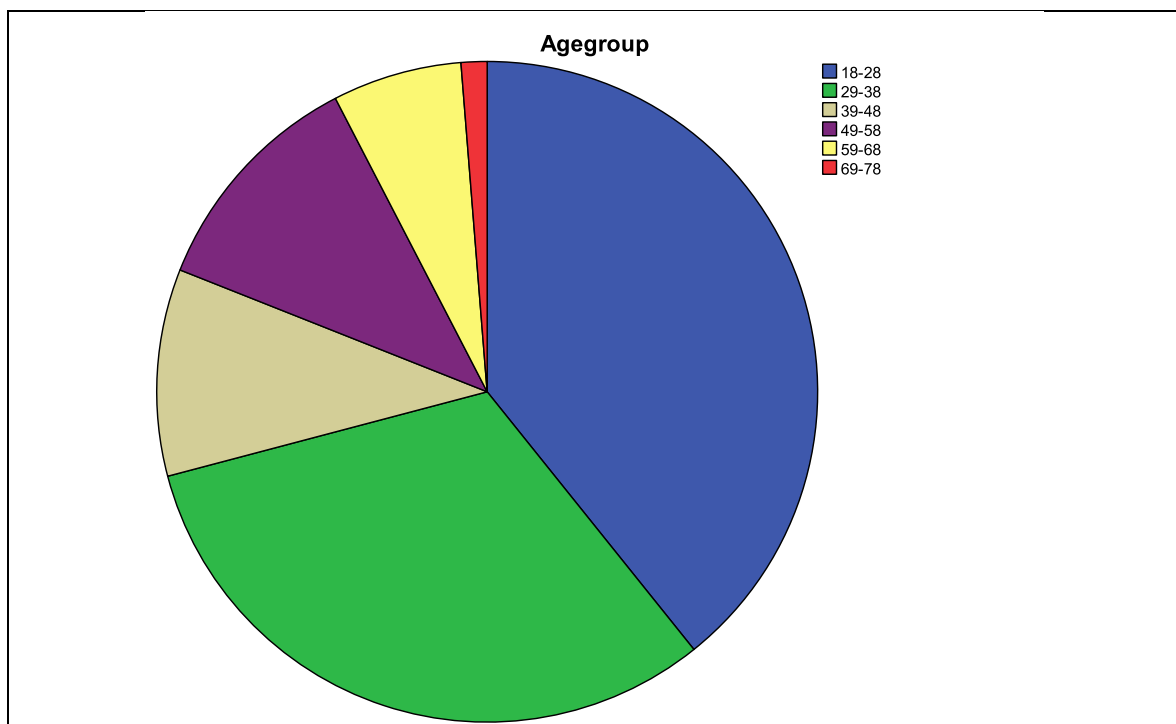
#### 3.1 Socio-demographic data

First of all, the socio-demographic data has been analysed to get a clear picture of the study population. The descriptive statistics have shown that sex is nearly equally distributed within the participants. Of all 79 participants, 47 patients are female and 32 are male with the age ranging from 18 to 69 years.

	<b>N</b>	<b>Minimum age</b>	<b>Maximum age</b>	<b>Mean age</b>	<b>Standard Deviation</b>
<b>Age</b>	79	18	69	35,68	12,52
<b>Females</b>	47	18	67	35,15	13,64
<b>Males</b>	30	23	69	36,53	11,03

**Table 3: Sex and age distribution of participants**

The average age for women is 35 years, for men 36 years which is also a similar plotting. It is also visible that only participants were included who had a minimum age of 18. The oldest female person was 67 and the oldest male person 69.



**Figure 2: Age groups of participants**

Another variable was generated (age group) in order gain a better overview of the age distribution. The largest group consists of participants aged between 18 and 28 years old (39%), followed by 31% of patients between 29 and 38 years (see figure 2).

		<u>Age group</u>						total
		18-28	29-38	39-48	49-58	59-68	69-78	
<b><u>Sex</u></b>	female	21	14	2	5	5	0	47
	male	10	11	6	4	0	1	32
	total	31	25	8	9	5	1	79

**Table 4: Sex and age group cross table**

In order to contrast the sex and age distribution, a cross table has been established. Table 4 shows that most of the participants were within the two youngest age groups and that with increasing age the fewer patients participated.

### 3.2 Quality of the pre-travel consultation

For the analysis of the quality of the pre-travel consultation, frequencies and descriptive statistics were carried out for the nine different quality aspects. The variables were supplemented with “-PRE” for the rated aspects before the consultation and “-POST” for the evaluated aspects after the consultation. The results are displayed in table 5.

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>OrganisationPRE</b>	76	0	10	7.22	1.740
<b>AtmospherePRE</b>	79	1	10	5.14	2.229
<b>ServicequalityPRE</b>	78	4	10	7.79	1.445
<b>TransparencyPRE</b>	79	0	10	8.70	1.371
<b>ExplanationPRE</b>	79	5	10	8.85	1.051
<b>CostPRE</b>	78	0	10	6.54	2.272
<b>WaitingtimesPRE</b>	79	1	10	6.29	1.896
<b>Confident.HandIPRE</b>	78	0	10	8.27	1.849
<b>InclusionPRE</b>	77	4	10	8.43	1.129
<b>Valid cases</b>	72				

**Table 5: Quality expectations towards the pre-travel consultation**

The most important aspect in quality was explanation of treatments, examinations and side effects (mean = 8.85). Second most important to the participants were transparency and information concerning the up-coming travel and possible risks (mean = 8.70) and inclusion in the decision making of the medical treatment (mean = 8.43).

When the participants were asked to evaluate the quality aspects according to their subjective opinion in the telephone based interview **after** the consultation (see table 6), the confidential handling of their data (mean = 8.52) and inclusion in medical decisions (mean = 7.79) were rated the best. The aspect they had chosen before to be the most important one (explanation of treatments, examinations and side effects), was only rated on the sixth place (mean = 7.08). Waiting times (mean = 5.68) and atmosphere (mean = 6.37) were given the poorest results.

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>OrganisationPOST</b>	72	2	10	7.35	2.001
<b>AtmospherePOST</b>	72	0	10	6.49	1.808
<b>ServicequalityPOST</b>	72	2	10	7.69	1.667
<b>TransparencyPOST</b>	71	4	10	7.85	1.841
<b>ExplanationPOST</b>	71	0	10	7.30	2.357
<b>CostPOST</b>	72	0	10	6.96	2.146
<b>WaitingtimesPOST</b>	72	0	10	5.86	2.718
<b>Confident.HandIPOST</b>	70	5	10	8.64	1.330
<b>InclusionPOST</b>	70	3	10	7.97	1.761
<b>Valid cases</b>	72				

**Table 6: Quality outcomes after the telephone interview**

The statistical results are also reflected in the mentioned statements from the last open question where the participants had the opportunity to make further comments concerning the experience within the pre-travel consultation (see table 7). Due to long waiting times, people had the feeling that the consultation itself passed very quickly and they had to rush through their concerns and questions. Moreover, they complained about the too long waiting times themselves. However, eight patients also announced that the consultation was a positive experience.

Do you have any further comments? (n=45)	Stated x times
The consultation was too fast/ got the impression that it had to be fast	12
Bad or too long waiting times	11
Without any problems/ positive	8
Bad organisation/ procedure	6
Insufficient information/ consultation	4
Well informed/ qualified physician	3
Unkindliness/ bad service	2
One has to be prepared in advance/ ask specific questions because physician does not give information on his own initiative	2
Payed 10€ although did not want a consultation	1
Vaccinations well tolerated	1
Old equipment	1
Bad atmosphere	1
It seems as if the consultation depends on the responsible physician	1
Would like to have more security through consultation but knows that it is impossible	1
Three men in the treatment room were too many	1

**Table 7: Answers of the open question**

All in all, patients were overall satisfied when they were asked for the general quality evaluation directly after the consultation (t=1). They were asked to rate their satisfaction on a scale from zero (*“not satisfied at all”*) to ten (*“very satisfied”*), with a mean of 7.07 (see table 8).

	N	Minimum	Maximum	Mean	Standard Deviation
<b>Where you satisfied with the quality?</b>	71	2	10	7.07	1.922
<b>Valid cases</b>	71				

**Table 8: Satisfaction with the pre-travel consultation**

A further indicator for quality is an increase in knowledge. Therefore, participants were asked in the first questionnaire (t=0) how high they estimate their knowledge concerning infectious diseases in their chosen destination. Afterwards, the question was raised again in the third questionnaire (t=2), in order to determine



whether there is an increase or decrease in knowledge after the consultation. It was expected that the patients will know more about risks and diseases after having consulted a physician and this was reflected in the results. This expectation was met as there was an increase in the mean from 5.24 to 6.62 (see table 9 below).

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>KnowledgePRE</b>	79	1	9	5.24	2.083
<b>KnowledgePOST</b>	79	1	10	6.62	1.963

**Table 9: Increase in knowledge**

Furthermore, people felt in general well informed, with a mean of 7.08, when they were asked on a scale from zero (“not informed at all”) to ten (“very well informed”).

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Level of information</b>	66	1	10	7.08	2.221

**Table 10: General level of information**

### 3.3 Risk perception

First of all, frequency analyses were carried out for the six categories of risk perception (high temperature, diarrhoea, bronchitis, accidents, visit a physician and hospital stay). Again, the aspects were supplemented with the wordings “-PRE” and “-POST” to clearly show the comparisons.

When travellers were asked before they entered the pre-travel consultation, they estimated their personal risk on a scale between one and ten concerning the different fields of disease and incidents. There were only little distinctions between the different aspects. The highest risk was announced regarding diarrhoea with a mean of 5.75, the lowest risk was perceived regarding a possible hospital stay during the trip (mean = 1.33).

In the follow-up interview one to three days after the consultation, the subjective risk concerning diarrhoea was still perceived as the highest (mean = 6.63) and the risk of a hospital stay as the lowest (mean = 1.65). A complete comparison is presented in table 11 below.

<b>Risk Perception PRE</b>	<b>Mean</b>	<b>Risk Perception POST</b>	<b>Mean</b>
High_TempPRE	3,53	High_TempPOST	4,39
DiarrhoeaPRE	5,75	DiarrhoeaPOST	6,63
BronchitisPRE	2,21	BronchitisPOST	2,27
AccidentsPRE	3,58	AccidentsPOST	4,80
PhysicianPRE	2,52	PhysicianPOST	3,55
HospitalPRE	1,33	HospitalPOST	1,65

**Table 11: Change in subjective risk perception**

Regarding the direction of change in the subjective risk perception, there was a slight raise in all types of diseases and incidents. The perceived risk of accidents and smaller injuries showed the sharpest increase (from 3.58 to 4.80) after having received the consultation. The smallest increase was identified regarding bronchitis and other respiratory syndromes.

Travellers were also asked to name incidents they worry about most. Table 12 below shows the most numerated incidents which were named five times or more. Diseases in general were the most stated which were named 21 times. Diarrhoea or stomach troubles and violent crimes as well as burglary and assault were announced 18 and 15 times, respectively.

Which 3 concrete incidents do you worry about most?	Stated x times
Diseases	21
Diarrhoea, stomach troubles	18
Violent crimes, burglary, assault	15
Malaria	15
Accidents, maritime disaster	11
Mosquitos (bites)	7
Bad medical supply, hygiene, organisation	6
Dengue fever	5
Animal bites/contacts	5

**Table 12: Most feared incidents during travel**

The data was then analysed concerning a possible relation between the vaccination status after the consultation and the change in risk perception. At t=2, 63% (n = 66) of the respondents had received a vaccination, men and women nearly equally distributed with 26 females and 24 males.

	Frequency	Valid percentages	Cumulated percentages
<b>Valid Vaccinated</b>	50	63.6	75.8
<b>Not Vaccinated</b>	16	20.3	24.2
<b>Total</b>	66	83.5	100,0

**Table 13: Vaccination status at t=2**

Travellers who perceived themselves at a high risk, which means having a subjective risk of 5 or above, were compared to the travellers who perceived a lower risk (below 5). Afterwards, the odds ratio was calculated, using [www.openepi.com](http://www.openepi.com), in relation to their vaccination status.

The following paragraph will give detailed information regarding the likelihood of dependence between risk perception and vaccination status. As the participants were always asked to estimate their personal perceived risk concerning specific incidents, the results of high temperature or fever showed that of all 79

participants, 26 announced a risk of 5 or above. Of these 26, 18 travellers got vaccinated (69%) at t=2. Compared to the group who estimated a relatively low risk for elevated temperature, the odds ratio is 1.4. The same amount of people got vaccinated when announcing a high perceived risk for diarrhoea: 55 of the 79 participants perceived a risk of 5 or higher regarding possible diarrhoea during their travel. Of these 55, 38 participants got a vaccination (69%) which results in an odds ratio of 2.2. 80% of the travellers who estimated a high risk concerning bronchitis had been given a vaccination at t=2, with an odds ratio of 2.6.

Of the 79 participants, 24 announced a high risk regarding accidents and smaller injuries during their trip. 58% of them got vaccinated at t=2, compared to 65% of those travellers who perceived a lower risk, with a resulting odds ratio of 0.7. Similar observations can be made when travellers were asked regarding their subjective of visiting a physician during their travel. Out of 10 participants who indicated a high risk, 5 received a vaccination at t=2 (50%), compared to 65% who perceived themselves to be at a lower risk. The odds ratio was 0.5.

Finally, the smallest odds ratio could be found when asking about a possible hospital stay. Only three participants announced a high risk of which one traveller got vaccinated (33%), compared to 65% of those who perceived a lower risk, with an odds ratio of 0.2. A summary of the results can be found in the table 14 below.

<b>Exposure (Risk perception)</b>		<b>Patients who got vaccinate d</b>	<b>Odds ratio</b>	<b>95% CI</b>	<b>Significan ce</b>
<b>High temperature</b>	High risk	18	1.4	0.5 - 4.0	0.4 n.s.
	Low risk	32			
<b>Diarrhoea</b>	High risk	38	2.2	0.8 - 5.9	0.1 n.s.
	Low risk	12			
<b>Bronchitis</b>	High risk	8	2.6	0.5 - 13.3	0.2 n.s.
	Low risk	41			
<b>Accidents</b>	High risk	14	0.7	0.2 - 1.9	0.5 n.s.
	Low risk	36			
<b>Visit physician</b>	High risk	5	0.5	0.1 - 2.0	0.3 n.s.
	Low risk	45			
<b>Hospital stay</b>	High risk	1	0.2	0.0 - 3.0	0.2 n.s.
	Low risk	49			

**Table 14: Relation of risk perception and vaccination status**

The data was also examined regarding possible differences in sex and age. A t-test was performed as a sub-analysis of the cross tables, to see if men and women differ in their vaccination attitude. No differences could be found, neither in sex nor in age separations (see appendix VII and VIII).

## 4 Conclusion

### 4.1 Critical reflection

This study was a first and innovative step regarding risk perception of travellers and the influence of a pre-travel consultation. With 68%, a comparably high return rate was achieved which can be assumed to be caused by the relatively short questionnaire. Travellers agreed most of the time to participate and provided their answers easily.

Furthermore, the evaluation of the quality of the pre-travel consultation has provided a useful overview about existing gaps and discontents in patients. This survey can be used as a framework for quality assurance and should be considered as a tool to improve the quality and value of care within the pre-travel consultation. As a result, the first of aim of the survey has been achieved. The subjective perceived quality has been measured and recommendations for improvement will be made in chapter 5.1.

As the increases in risk perception cannot be explained so far, a further population-based study is needed to examine significant effects. Moreover, it could not be identified yet if these effects have any resulting impacts on the travellers' behaviours. To study this in more detail, travellers should be interviewed on a fourth point of time, after having returned home from their travel. Only by investigating their actual behaviour during the journey, as well as any possible diseases they have experienced abroad or even after coming back home, further conclusions on if and how the pre-travel consultation affects them can be drawn.

### 4.2 Limitations

Some limitations have to be considered in this survey. Firstly, there was a pre-selection of patients who were already willing to seek information from a pre-travel consultation. Consequently, they must have seen a risk already, otherwise they would not have gone to see a physician. It can be assumed that people who visit the pre-travel consultation are already more aware and concerned about possible health risks. As a result, they already showed the willingness to take precautionary

measures and to seek information. Therefore, the presented sample might be biased.

For the future, it would be better to have a rather unselected study population. A possible environment could be, for example, a travel agency. This is where travellers come in the first place to get information or book their journeys usually without having received any information on protective measures, yet.

Secondly, there might have been a social desirability bias of the interviewees, so the participants crossed the answers they thought the interviewer wanted to hear. Moreover, as the physicians knew about the study beforehand, they might have acted better than usual and thus led to a biased result in terms of quality.

Thirdly, there may have been difficulties in estimating the perceived risk and specifying the risk in figures. It was also not possible to make a general statement concerning risk perception as the questionnaire only asked for specific incidents. Hence, a conclusion about the overall risk perception could not be made.

Finally, it may be possible that certain aspects were not covered with the questionnaire, either because the items were missing or the patients were not able to formulate further comments spontaneously. These aspects should be taken into account when further studies are conducted in this field.

## 5 Discussion

### 5.1 Impacts on quality aspects of the pre-travel consultation

After having examined the subjective quality of the pre-travel consultation, it can be stated that the results are satisfactory. Therefore, the fourth hypothesis can be confirmed. Nevertheless, the overall quality was perceived to be in the upper third (mean = 7.07) and hence, some of the quality aspects should still be improved.

Suggestions regarding the waiting times and the atmosphere could be the following: As the waiting time was the worst aspect, the institute should modify its approach of letting patients wait. Travellers complained most about the waiting procedure itself, as they were first sitting in the waiting room and when their number was announced, which they had to pull when they entered the room, they had to wait again directly in front of the physician's room for quite a long time. Calling in the patients directly from the waiting room and not let them wait again in front of the physician's room could be a first improvement. Moreover, it would be a good idea to have more than one physician working at the same time to speed up the waiting process.

As some travellers complained that they had to wait in general far too long, the consultation needs to be shortened to the most elementary contents. However, it is known that extending the actual consultation length will increase information transfer, problem identification and preventive activity. As a result, it is essential to find a compromise which considers both sides. Giving appointments would be a first step, so the traveller knows the exact time when to be there and also approximately how much time to spend there. Additionally, filling out documents concerning the up-coming trip and pre-existing medical conditions before the consultation would save time during the consultation itself. These documents could be sent beforehand via email or directly filled in at the website in an online web form. By doing this, the physician can prepare himself for the session with the patient and will not lose time during the consultation but can concentrate straight on the traveller's questions and needs. Still, consultations should be perceived as unhurried and thorough by patients. This was the most often mentioned negative statement in the open question, so the physician should take this into account when treating the traveller.



Furthermore, the atmosphere within the institute which was rated second-worst could be enhanced very easily. As the walls are all painted in white, it has quite a cold ambience like in a hospital. Colouring a wall in green or with the logo of the Bernhard-Nocht-Institute could be a first improvement.

In order to meet the patient's needs, the categories "explanation of treatments, examinations and side effects" and "transparency and information concerning the up-coming travel and possible risks" should get special attention. These were the most important aspects to the people but were not evaluated the best. Consequently, the physician should take more time to explain treatments and examinations and give more information according to the traveller's individual case. Only by doing this, the satisfaction with the pre-travel consultation can be increased. This also matches to the results of previous studies about the most important aspects for patients. Number one out of the top ten was the wish that the physician has enough time to talk and listen during the appointment (see table 1, page 7).

Moreover, the main focus of the consultation should lie on information flow and transparency. As former studies have already shown, another very important aspect for patients is to get answers to all the questions they have.

Overall, these investigations should provide insights in what patients expect of a pre-travel consultation and which aspects make them feel satisfied or discontent. Consequently, the Bernhard-Nocht-Institute should consider the suggestions of the travellers of this survey and fit the consultation to their needs and wishes.

All in all, the Bernhard-Nocht-Institute should follow a continuous monitoring of the quality. Including patient's opinions will help to further improve the consultation and treatment in the future. The focus will be on the patient and priorities will not be set by professionals anymore. Additionally, they might already feel more satisfied because they were asked about their opinions and were given the possibility to express their satisfaction, discontent and needs. This quantitative questionnaire was a reasonable method to evaluate the subjective quality of the pre-travel consultation.

At last, it can be expected that a satisfied traveller will also stick more consequently to given advice and medication rules and thus, influence the

outcome of care. To sum up, a satisfied traveller will probably adjust his behaviour and hopefully remind all what has been said in the consultation so that he will not get sick or be involved in any accidents during travelling.

## 5.2 Change in subjective risk perception of travellers

By comparing the means of the subjective risk perception before and after the consultation, the first hypothesis was supported by the data. There was a change in risk perception after having visited the pre-travel consultation: All means have actually changed.

Contrary to the assumption that the subjective perceived risk would be lower after the consultation, it actually increased. Patients perceived a higher subjective risk in all aspects although they have taken precaution measures like receiving consultation or even vaccinations and medications. This is a conflicting result, as e.g., Weinstein (2003) mentioned that when people take precautions to reduce their risk, they should feel to be at a lower risk than before (see chapter 1.1, page 4). Therefore, the second hypothesis cannot be confirmed; on the contrary, it has to be rejected. The risk perception is not lower but higher after the consultation (at  $t=2$ ).

Interestingly, accidents showed the sharpest increase in risk perception, even though this is an aspect which is usually not mentioned during pre-travel consultation. Nevertheless, also in the most feared incidents stated by the patients, accidents were indicated eleven times and thus, travellers seem to be very aware of this risk. Indeed, the risk of accidents is very high, even higher than getting ill (see chapter 1, page 1). However, it does not explain the sharp increase in accidents and the increase in all other aspects of risk.

Furthermore, the results support the hypothesis of Hill (2004) and other authors, who report that travellers generally underestimate their risk for diseases during travel. The average perceived risk concerning all types of risk was stated in the lower third with the exception of diarrhoea. It should be discussed whether travellers felt overall safe because they were now going to take precaution measures at this very moment or if they generally undervalue their personal risk..

Nevertheless, there is an existing defined risk of infectious diseases as well as accidents and people should be aware of that.

According to the HBM, people seek preventive health measures when they perceive a health threat and when the benefits of preventive measures outweigh the hurdles. In this context, it seems as if most of the travellers perceive themselves to be at a risk and that the benefits of medications and vaccines seem to outweigh the risk of diseases. As a result, most of the travellers decided to get vaccinated. Similar results have been shown by Coelho and Codeço in 2009. The willingness to vaccinate is driven by disease scare, i.e. perceiving a high risk regarding a possible health threat like the participants in this study.

However, cases have to be distinguished where specific vaccines are mandatory, for example yellow fever vaccination when wanting to travel to Madagascar. In this case, it is not the perceived risk which led travellers to the decision to get vaccinated but obligations from the outside.

Furthermore, the relation between the subjective risk perception at  $t=0$  and the vaccination status at  $t=2$  has been investigated. The results showed that travellers who perceived themselves to be at a higher risk regarding high temperature, diarrhoea and bronchitis were more likely to have been vaccinated after the consultation compared to those who announced to perceive a lower risk. However, when participants were asked to estimate their perceived risk concerning accidents, a possible visit at the physician or a hospital stay, the odds ratio showed no relation.

As a result, the fourth hypothesis can be confirmed, at least for some risk factors: There is a relation between a high subjective risk perception concerning high temperature, diarrhoea and bronchitis of travellers and their vaccination status.

When the vaccination status was analysed regarding possible differences in sex and age, no differences could be found. This was already foreseeable from the cross tables which showed that vaccines were nearly uniformly distributed in men and women. Thus, it seems that women and men do not differ in their attitude of risk perception and vaccination habits. Although one could have estimated that women in general would perceive a higher risk, as they are often called to be more

anxious, this was not the case. Hence, it can be concluded that women are no longer the “weak” gender, which was a prejudice for a very long time.

A further interesting observation is that it seems as if travellers are more concerned of diseases like fever which is often connected to Malaria or diarrhoea, compared to accidents or injuries. Of course, these aspects are one of the most discussed during a pre-travel consultation and the logical conclusion is that people are more aware of their risk after the consultation. This could be an explanation for the rise in the perceived risk in all asked fields. Nevertheless, accidents are rarely mentioned in a consultation and therefore, this remains an open question so far why the perceived risk has also increased afterwards. Moreover, it can be noted that the first three items (fever, diarrhoea, bronchitis) are all related to diseases, whereas the last three items (accidents, visit a physician, hospital stay) are more of a general kind and not directly connected to a certain disease.

It can be concluded that travellers are in general more concerned of diseases and due to the awareness of a higher risk they are also more likely to get vaccinated. Of course, there is no possible vaccine against the three last incidents. Plus, having booked a package holiday in five-star hotel would not necessarily lead to a hospital stay which explains the very little estimated risk. Travellers perceived this occasion to happen as very rare.

It can be questioned if travellers did remember how they estimated their perceived risk before entering the pre-travel consultation. Consequently, they might just have named any number which came into their minds when they were asked for the second time. Nevertheless, it can be assumed that the participants were educated and honest people who were willing to participate and contribute to this survey.

However, none of the statistical results showed empiric significance but this could also be due to the relatively small sample size. In a future study, a larger sample size should be recruited to identify possible significant effects of a pre-travel consultation. Additionally, it was not possible in this survey to monitor the actual behaviour of the travellers during their trip. This would be a fundamental next step in order to detect how the consultation influenced people’s behaviour and if they stuck to advice and medications. A question which still has to be answered is the following. *Did the consultation lead travellers to behave more cautiously?* The

contrary could also be the case, namely when they feel completely safe due to given vaccinations which could lead to imprudent behaviour and even thoughtless actions.

It would be a dangerous field for researcher to enter as the pharmaceutical industry that produces the vaccines is huge with an immense influence and great marketing campaigns. *What if it turns out that vaccinations are not even necessary in some parts but a detailed and individual consultation would be sufficient to prevent diseases?* This would mean a big loss for the pharmaceutical industry and would lead to a new discussion of advantages and disadvantages of vaccines of the ground again. Former studies examining the placebo effect in medicine should be taken into account as similar effects might be possible within travel medicine. *Does a placebo vaccine have the same effects like the real serum?* Investigations have shown that placebo effects are optimised when learning (conditioning) or expectancy are enhanced (Schneider, Kuhl 2012). In this context it would mean that if a traveller expects the vaccine or the medications to be safe, it would be more likely to keep the promised effect. Additionally, the physician-patient relationship would be more put into focus and regain importance. The treating doctor would be the trusted person who could influence the traveller's beliefs and expectations.

Anyhow, these demonstrations are only assumptions so far as no valid proof could be given. However, it is a serious topic which has not been examined in depths until now. As a conclusion, this study can be seen as a first approach of identifying the significance of pre-travel consultation and risk perception of travellers and should get more attention in future studies.

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## Appendix

I First questionnaire

II Second questionnaire

III Third questionnaire

IV Information of scientific study

V Consent form

VI Cross tables and OR from openepi.com

VII T-test sex and vaccination status

VIII T-test age groups and vaccination status

Fragebogen\_1

VPN\_114

1. Wie wichtig sind Ihnen folgende Aspekte der reisemedizinischen Beratung?

	überhaupt nicht wichtig	sehr wichtig
Organisation		
Atmosphäre		
Servicequalität		
Transparenz und Information über die Reise und mögliche Risiken		
Aufklärung über Behandlungen, Untersuchungen und Nebenwirkungen		
Kosten der Beratung		
Wartezeiten		
Vertrauliche Behandlung Ihrer Daten		
Einbeziehung in die medizinische Behandlung und Entscheidung		
	überhaupt nicht wichtig	sehr wichtig

2. Wie hoch schätzen Sie Ihr Wissen bezüglich Infektionskrankheiten in Ihrem gewählten Reiseland ein? Skala 0 „sehr gering“ bis 10 „sehr hoch“



3. Geben Sie bitte das am stärksten für Sie zutreffende Gefühl an, wie Sie sich jetzt im Moment fühlen.

	ganz wenig oder gar nicht	ein bisschen	einigermaßen	erheblich	äußerst
aktiv	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
bekümmert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
interessiert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
freudig erregt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
verärgert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
stark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
angeregt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
gereizt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
begeistert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
wach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
nervös	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
entschlossen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aufmerksam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
durcheinander	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ängstlich	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Wie hoch schätzen Sie jetzt Ihr persönliches Risiko ein, während Ihrer Reise an einer der folgenden Krankheiten zu erkranken? *Skala 0 „sehr gering“ bis 10 „sehr hoch“*

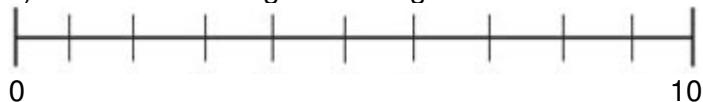
a) erhöhte Temperatur/Fieber



b) Durchfall



c) Bronchitis/ sonstige Atemwegsbeschwerden

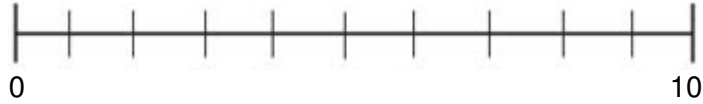


5. Welche 3 konkreten Ereignisse befürchten Sie am meisten?

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

6. Wie hoch schätzen Sie Ihr Risiko für folgende Ereignisse während Ihrer Reise ein?  
Skala 0 „überhaupt kein Risiko“ bis 10 „sehr hoch“

a) Unfälle (inkl. kleinerer Verletzungen)



b) Arztbesuch



c) Krankenhaus/Rückführung



---

Angaben zur Person

7. Geschlecht

weiblich     männlich

8. Alter

\_\_\_\_\_ Jahre

---

Vielen Dank, dass Sie sich für das Ausfüllen des Fragebogens Zeit genommen haben.  
Selbstverständlich versichern wir Ihnen die Achtung Ihrer Anonymität.

Ihr Studienteam vom Bernhard-Nocht-Institut

**Fragebogen\_2**

VPN\_114






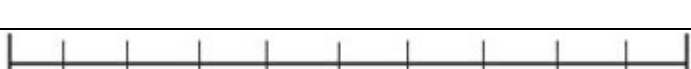


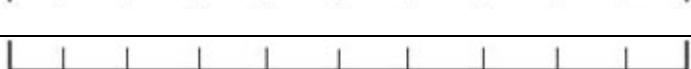
1. Waren Sie mit der Qualität der Reiseberatung zufrieden?  
*Skala 1 „überhaupt nicht zufrieden“ bis 10 „sehr zufrieden“*



**Fragebogen\_3**

VPN\_114

1. Wie beurteilen Sie die Qualität der Reiseberatung an Hand der folgenden Aspekte? *Von 0 sehr schlecht bis 10 sehr gut*

	sehr schlecht	sehr gut
Organisation		
Atmosphäre		
Servicequalität		
Transparenz und Information über die Reise und mögliche Risiken		
Aufklärung über Behandlungen, Untersuchungen und Nebenwirkungen		
Kosten der Beratung		
Wartezeiten		
Vertrauliche Behandlung Ihrer Daten		
Einbeziehung in die medizinische Behandlung und Entscheidung		
	sehr schlecht	sehr gut

2. Wie hoch schätzen Sie Ihr Wissen bezüglich Infektionskrankheiten in Ihrem gewählten Reiseland ein? *Skala 0 „sehr gering“ bis 10 „sehr hoch“*



3. Geben Sie bitte das am stärksten für Sie zutreffende Gefühl an, wie Sie sich jetzt im Moment fühlen.

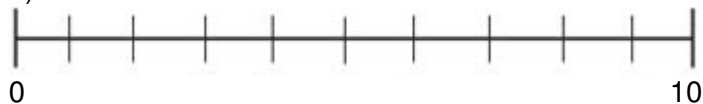
	ganz wenig oder gar nicht	ein bisschen	einigermaßen	erheblich	äußerst
aktiv	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
bekümmert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
interessiert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
freudig erregt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
verärgert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
stark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
angeregt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
gereizt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
begeistert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
wach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
nervös	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
entschlossen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aufmerksam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
durcheinander	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ängstlich	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Wie hoch schätzen Sie jetzt Ihr persönliches Risiko ein, während Ihrer Reise an einer der folgenden Krankheiten zu erkranken? *Skala 0 „sehr gering“ bis 10 „sehr hoch“*

a) erhöhte Temperatur/Fieber



b) Durchfall

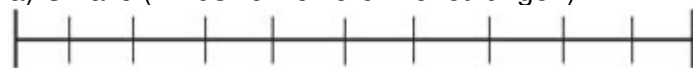


c) Bronchitis/sonstige Atemwegsbeschwerden



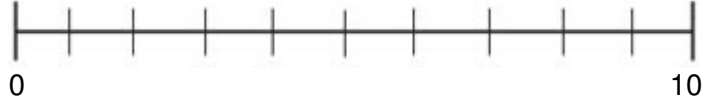
5. Wie hoch schätzen Sie Ihr Risiko für folgende Ereignisse während Ihrer Reise ein? *Skala 0 „überhaupt kein Risiko“ bis 10 „sehr hoch“*

a) Unfälle (inklusive kleinerer Verletzungen)



0 10

b) Arztbesuch



c) Krankenhaus/Rückführung



6. Welche Art der Beratung haben Sie in Anspruch genommen?

Art der Beratung	Kosten	Ja/nein
Kurzberatung	5,00€	
Eingehende Beratung	10,00€	

7. Haben Sie Impfungen erhalten?

nein  ja

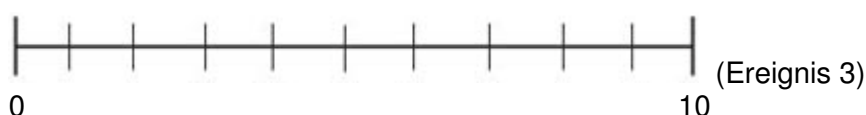
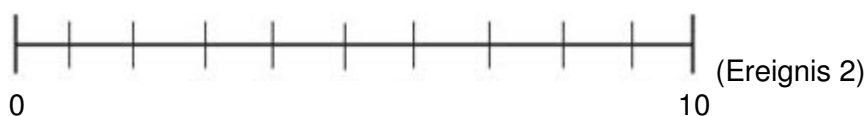
wenn ja, welche:

8. Haben Sie ein Rezept für Malariaphylaxe erhalten?

nein  ja

wenn ja, haben Sie es eingelöst bzw. werden Sie es einlösen:  ja  nein

9. Wie hoch schätzen Sie Ihr Risiko für die drei genannten Ereignisse jetzt ein (nach der Impfung bzw. dem Medikamenteneinsatz)? Skala 0 „überhaupt kein Risiko“ bis 10 „sehr hoch“







10. Fühlen Sie sich ausreichend über Risiken und übertragbare Krankheiten informiert?  
*Skala 0 „überhaupt nicht informiert“ bis 10 „ausgezeichnet informiert“*



11. Haben Sie weitere Anmerkungen?

-  
-  
-  
-



Informationen zur Wissenschaftlichen Untersuchung

## „Erwartungen und Bewertung von subjektiver Qualitäts- und Risikowahrnehmung bei Reisenden im Rahmen der reisemedizinischen Beratung“

**Sehr geehrte Reisende, sehr geehrter Reisender,**

Sie befinden sich gerade in Ihrer Urlaubsvorbereitung und wir möchten Sie bitten, uns bei einer Studie zur Optimierung der reisemedizinischen Beratung zu unterstützen.

**Wie gestaltet sich die Befragung?**

**Es gibt drei Befragungszeitpunkte während dieser Studie.**

Der **erste** Zeitpunkt ist vor dem Reiseantritt, und wir möchten Sie dafür bitten, den beiliegenden Fragebogen auszufüllen. Es werden Fragen zu Ihrer Person, zur Risikoeinschätzung und zur Qualitätserwartung gestellt. Des Weiteren bekommen Sie einen kleinen Ankreuzbogen, den Sie bitte **direkt nach** der Reiseberatung ausfüllen und wieder abgeben. Dabei handelt es sich um die Qualitätsbewertung der reisemedizinischen Beratung.

Der dritte Untersuchungszeitpunkt wird **1 – 3 Tage** nach der Reiseberatung **telefonisch** stattfinden, zu einem mit Ihnen abgestimmten Termin.

### **Aufklärung zum Datenschutz**

Die im Rahmen der Studie nach Einverständniserklärung erhobenen persönlichen Daten, insbesondere Befunde, unterliegen der Schweigepflicht und den **datengesetzlichen Bestimmungen**.

Sie werden in Papierform und auf Datenträgern im Bernhard-Nocht-Institut aufgezeichnet und für die Dauer von drei Jahren gespeichert.

**Persönliche Angaben** (Einverständniserklärung) und **Daten** (Fragebögen) werden durchgängig separat voneinander verwahrt und sind nur dem Studienteam zugänglich.

Die Auswertung und Nutzung Ihrer Daten durch den Studienleiter und seine Mitarbeiter erfolgt in vollständig **anonymisierter** Form.

Auch eine Weitergabe der Daten im Rahmen des Forschungszweckes oder zur Veröffentlichung der Forschungsergebnisse erfolgt nur in **anonymisierter** Form.

Die Studienteilnehmer haben das Recht, über die von ihnen erhobenen personenbezogenen Daten Auskunft zu erlangen und über möglicherweise anfallende personenbezogene Ergebnisse der Studie informiert zu werden.

Diese Studie ist durch die zuständige Ethik-Kommission beraten worden. Der zuständigen Landesbehörde kann geg. Einsichtnahme in die Studienunterlagen gewährt werden.

Die Teilnahme an der Studie ist **freiwillig** und Sie können jederzeit, auch nach voriger Einwilligung, die Teilnahme abbrechen. Es entstehen Ihnen dadurch keine Nachteile und Ihre Daten werden unwiderruflich gelöscht. Mit Ihrer Unterstützung kann es uns gelingen, die Qualität der reisemedizinischen Beratung zu optimieren.



## Telefoninterviews

Nach der telefonischen Drittbefragung werden die erhobenen Daten schriftlich vom Studienteam dokumentiert und mit einer Studiennummer bezeichnet. Die Telefonnummer wird sofort nach dem Interview vernichtet, so dass ein erneuter Anruf nicht mehr möglich sein wird.

Sie haben das Recht, über die von Ihnen erhobenen personenbezogenen Daten Auskunft zu verlangen und über möglicherweise anfallende personenbezogene Ergebnisse der Studie informiert zu werden. Ist dies der Fall, wird die Telefonnummer als Ausnahmeregelung aufbewahrt, um Sie auf Ihren Wunsch hin kontaktieren zu können.

Nachdem Sie diese Erklärungen gelesen haben und an der Studie teilnehmen möchten, bitten wir Sie, die beigefügte Einverständniserklärung zu unterschreiben.

Sollten Fragen oder Unklarheiten auftreten, können Sie uns gerne via Email oder Telefon kontaktieren:

Karoline Bloch  
Praktikantin am BNI  
Master Health Sciences  
HAW Hamburg

Tel.: 0621-4590-2014  
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Dr. Helmut Jäger  
MD Medicus Reise- und Tropenmedizin GmbH  
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Bernhard-Nocht-Str. 74  
20359 Hamburg

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Email: jaeger@gesund-es-reisen.de

## EINVERSTÄNDNISERKLÄRUNG

zur Teilnahme an der wissenschaftlichen Untersuchung  
„Erwartungen und Bewertung von subjektiver Qualitäts- und Risikowahrnehmung bei  
Reisenden im Rahmen der reisemedizinischen Beratung“

---

Meine Teilnahme an dieser Studie ist freiwillig und ich wurde vollständig über Inhalt und Zweck der Studie aufgeklärt. Ich konnte dabei alle offenen Fragen stellen. Des Weiteren hatte ich die Gelegenheit das Aufklärungsformular genau zu lesen und auch hierzu Fragen zu stellen. Ein Exemplar der Aufklärung/Einverständniserklärung ist mir zum Verbleib ausgehändigt worden.

Ich bin darüber informiert, dass die im Rahmen der Studie erhobenen Daten der Schweigepflicht und den datenschutzrechtlichen Bestimmungen unterliegen. Diese werden in Papierform bzw. elektronisch aufgezeichnet und anonymisiert gespeichert und verwendet.

Mir wurde mitgeteilt, dass meine persönlichen Daten nur zu wissenschaftlichen Zwecken erhoben wurden.

Eine Weitergabe der Daten an Dritte oder eine Veröffentlichung der Studienergebnisse erfolgt nur in anonymisierter Form. Bei Widerruf der Einverständniserklärung werden die bereits erhobenen Daten unwiderruflich gelöscht.

Ich bin mit einem telefonischen Zweitgespräch **in 1-3 Tagen** einverstanden, meine persönlichen Daten werden nach dem Gespräch unwiderruflich gelöscht bzw. anonymisiert.

Datum und Unterschrift  
(des Studienteilnehmers)

.....

Datum und Unterschrift  
(des Aufklärenden)

.....

Vereinbarte Rückrufzeit (zwischen 8:00 und 19:00 Uhr):

Datum: .....

Uhrzeit oder Zeitraum: .....

Telefonnr.: .....

### Kontaktinformationen:

Karoline Bloch  
Praktikantin am BNI  
Master Health Sciences  
HAW Hamburg

Tel.: 0621-4590-2014  
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Tel.: 0621-5490-2022  
Email: jaeger@gesundes-reisen.de

## 2 x 2 Table Statistics

### Single Table Analysis

	Disease		
	(+)	(-)	
(+)	18	8	26
Exposure(-)	32	2153	
	50	2979	

### Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	0.5885	0.2215	0.4430
Yates corrected chi square	0.2691	0.3020	0.6039
Mantel-Haenszel chi square	0.581	0.2230	0.4459
Fisher exact		0.3043	0.6085
Mid-P exact		0.2296	0.4592

All expected values (row total\*column total/grand total) are  $\geq 5$   
OK to use chi square.

### Risk-Based\* Estimates and 95% Confidence Intervals (Not valid for Case-Control studies)

Point Estimates	Confidence Limits			
	Type	Value	Lower, Upper	Type
Risk in Exposed		69.23%	49.85, 83.66	Taylor series
Risk in Unexposed		60.38%	46.92, 72.43	Taylor series
Overall Risk		63.29%	52.26, 73.09	Taylor series
Risk Ratio		1.147	0.819, 1.605 <sup>1</sup>	Taylor series
Risk Difference		8.853%	-13.24, 30.95 <sup>o</sup>	Taylor series
Etiologic fraction in pop.				

(EFp)	4.604%	-7.034, 16.24
Etiologic fraction in exposed(EFe)	12.79%	-22.1, 37.71

### Odds-Based Estimates and Confidence Limits

Point Estimates		Confidence Limits	
Type	Value	Lower, Upper	Type
CMLE Odds Ratio*	1.469	0.5426, 4.174 <sup>1</sup>	Mid-P
		0.495, 4.653 <sup>1</sup>	Exact Fisher Exact
Odds Ratio	1.477	0.5442, 4.007 <sup>1</sup>	Taylor series
Etiologic fraction in pop. (EFp OR)	11.62%	-15.43, 38.67	
Etiologic fraction in exposed(EFe OR)	32.28%	-83.77, 75.04	

\*Conditional maximum likelihood estimate of Odds Ratio (P) indicates a one-tail P-value for Protective or negative association; otherwise one-tailed exact P-values are for a positive association.

Martin,D; Austin,H (1991) An efficient program for computing conditional maximum likelihood estimates and exact confidence limits for a common odds ratio. Epidemiology 2, 359-362.

<sup>o 1</sup> 95% confidence limits testing exclusion of 0 or 1, as indicated

P-values < 0.05 and confidence limits excluding null values (0,1, or [n]) are highlighted.

LookFirst items: Editor's choice of items to examine first.

Results from OpenEpi, Version 3, open source calculator--TwobyTwo  
Print from the browser with ctrl-P  
or select text to copy and paste to other programs.

## 2 x 2 Table Statistics

### Single Table Analysis

		Disease	
		(+)	(-)
Exposure	(+)	1	2
	(-)	49	2675
		50	2878

### Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	1.284	0.1291	0.2581
Yates corrected chi square	0.2697	0.3018	0.6036
Mantel-Haenszel chi square	1.267	0.1306	0.2612
Fisher exact		0.2915(P)	0.5830
Mid-P exact		0.1673(P)	0.3346

At least one expected value (row total\*column total/grand total) is < 5

Fisher or Mid-P exact tests are recommended rather than chi square.

### Risk-Based\* Estimates and 95% Confidence Intervals (Not valid for Case-Control studies)

Point Estimates	Confidence Limits			
	Type	Value	Lower, Upper	Type
Risk in Exposed		33.33%	5.628, 79.75	Taylor series
Risk in Unexposed		65.33%	54.03, 75.14	Taylor series
Overall Risk		64.1%	53.01, 73.87	Taylor series
Risk Ratio		0.5102	0.1021, 2.549 <sup>1</sup>	Taylor series
Risk Difference		-32%	-86.42, 22.42 <sup>o</sup>	Taylor series

Prevented fraction in pop. (pfp)	1.884%	-2.054, 5.529
Prevented fraction in exposed(pfe)	48.98%	-154.9, 89.79

**Odds-Based Estimates and Confidence Limits**

Type	Point Estimates	Confidence Limits	
	Value	Lower, Upper	Type
CMLE Odds Ratio*	0.2701	0.008831, 3.691 <sup>1</sup>	Mid-P Exact
Odds Ratio	0.2653	0.004409, 5.416 <sup>1</sup>	Fisher Exact
Prevented fraction in pop(PFpOR)	5.248%	0.02296, 3.065 <sup>1</sup>	Taylor series
Prevented fraction in exposed(PFeOR)	73.47%	-6.474, 14.64	
		-206.5, 97.7	

\*Conditional maximum likelihood estimate of Odds Ratio (P)indicates a one-tail P-value for Protective or negative association; otherwise one-tailed exact P-values are for a positive association.

Martin,D; Austin,H (1991) An efficient program for computing conditional maximum likelihood estimates and exact confidence limits for a common odds ratio.

Epidemiology 2, 359-362.

<sup>o 1</sup> 95% confidence limits testing exclusion of 0 or 1, as indicated

[P-values < 0.05 and confidence limits excluding null values \(0,1, or \[n\]\) are highlighted.](#)

LookFirst items: Editor's choice of items to examine first.

Results from OpenEpi, Version 3, open source calculator--TwobyTwo  
 Print from the browser with ctrl-P  
 or select text to copy and paste to other programs.

**2 x 2 Table Statistics**

**Single Table Analysis**  
 Disease



	(+)	(-)
(+)	5	5 10
Exposure(-)	45	2469
	50	2979

### Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	0.8705	0.1754	0.3508
Yates corrected chi square	0.3388	0.2803	0.5605
Mantel-Haenszel chi square	0.8595	0.1769	0.3539
Fisher exact		0.2758(P)	0.5517
Mid-P exact		0.1885(P)	0.3770

At least one expected value (row total\*column total/grand total) is < 5

Fisher or Mid-P exact tests are recommended rather than chi square.

### Risk-Based\* Estimates and 95% Confidence Intervals (Not valid for Case-Control studies)

Point Estimates	Confidence Limits			
	Type	Value	Lower, Upper	Type
Risk in Exposed		50%	23.66, 76.34	Taylor series
Risk in Unexposed		65.22%	53.42, 75.41	Taylor series
Overall Risk		63.29%	52.26, 73.09	Taylor series
Risk Ratio		0.7667	0.4029, 1.459 <sup>1</sup>	Taylor series
Risk Difference		-15.22%	-48.18, 17.75 <sup>o</sup>	Taylor series
Prevented fraction in pop. (pfp)		2.954%	-3.982, 9.022	
Prevented fraction in exposed(pfe)		23.33%	-45.87, 59.71	

## Odds-Based Estimates and Confidence Limits

Point Estimates	Confidence Limits		
Type	Value	Lower, Upper	Type
CMLE Odds Ratio*	0.5378	0.1322, 2.185 <sup>1</sup>	Mid-P
		0.1115, 2.588 <sup>1</sup>	Exact Fisher Exact
Odds Ratio	0.5333	0.1404, 2.026 <sup>1</sup>	Taylor series
Prevented fraction in pop(PFpOR)	8.046%	-13.53, 22.73	
Prevented fraction in exposed(PFeOR)	46.67%	-102.6, 85.96	

\*Conditional maximum likelihood estimate of Odds Ratio (P) indicates a one-tail P-value for Protective or negative association; otherwise one-tailed exact P-values are for a positive association.

Martin,D; Austin,H (1991) An efficient program for computing conditional maximum likelihood estimates and exact confidence limits for a common odds ratio. Epidemiology 2, 359-362.

<sup>1</sup> 95% confidence limits testing exclusion of 0 or 1, as indicated

[P-values < 0.05 and confidence limits excluding null values \(0,1, or \[n\]\) are highlighted.](#)

LookFirst items: Editor's choice of items to examine first.

Results from OpenEpi, Version 3, open source calculator--TwobyTwo

Print from the browser with ctrl-P

or select text to copy and paste to other programs.

## 2 x 2 Table Statistics

### Single Table Analysis

	Disease	
	(+)	(-)
(+)	14	1024
Exposure(-)	36	1955
	50	2979

### Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	0.3647	0.2730	0.5459
Yates corrected chi square	0.1226	0.3631	0.7262
Mantel-Haenszel chi square	0.3601	0.2742	0.5485
Fisher exact		0.3604(P)	0.7208
Mid-P exact		0.2777(P)	0.5554

All expected values (row total\*column total/grand total) are  $\geq 5$   
OK to use chi square.

### Risk-Based\* Estimates and 95% Confidence Intervals (Not valid for Case-Control studies)

Point Estimates	Confidence Limits		
	Type	Value	Lower, Upper Type
Risk in Exposed		58.33%	38.8, 75.56 Taylor series
Risk in Unexposed		65.45%	52.22, 76.68 Taylor series
Overall Risk		63.29%	52.26, 73.09 Taylor series
Risk Ratio		0.8912	0.6041, 1.315 <sup>1</sup> Taylor series
Risk Difference		-7.121%	-30.51, 16.26 <sup>o</sup> Taylor series
Prevented fraction in pop. (pfp)		3.305%	-8.58, 12.85
Prevented fraction in exposed(pfe)		10.88%	-31.47, 39.59

### Odds-Based Estimates and Confidence Limits

Point Estimates	Confidence Limits		
	Type	Value	Lower, Upper Type
CMLE Odds Ratio*		0.7418	0.2739, 2.036 <sup>1</sup> P Mid-

		0.2492, 2.249 <sup>1</sup>	Exact Fisher Exact Taylor series
Odds Ratio	0.7389	0.2763, 1.976 <sup>1</sup>	
Prevented fraction in pop(PFpOR)	9.004%	-32.95, 30.83	
Prevented fraction in exposed(PFeOR)	26.11%	-97.57, 72.37	

\*Conditional maximum likelihood estimate of Odds Ratio (P) indicates a one-tail P-value for Protective or negative association; otherwise one-tailed exact P-values are for a positive association.

Martin,D; Austin,H (1991) An efficient program for computing conditional maximum likelihood estimates and exact confidence limits for a common odds ratio.

Epidemiology 2, 359-362.

<sup>o 1</sup> 95% confidence limits testing exclusion of 0 or 1, as indicated

[P-values < 0.05 and confidence limits excluding null values \(0,1, or \[n\]\) are highlighted.](#)

LookFirst items: Editor's choice of items to examine first.

Results from OpenEpi, Version 3, open source calculator--TwobyTwo  
Print from the browser with ctrl-P  
or select text to copy and paste to other programs.

## 2 x 2 Table Statistics

### Single Table Analysis

	Disease	
	(+)	(-)
(+)	8	2 10
Exposure(-)	41	2768
	49	2978

### Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	1.449	0.1146	0.2292
Yates corrected chi square	0.7285	0.1967	0.3934
Mantel-Haenszel chi square	1.431	0.1161	0.2322
Fisher exact		0.1994	0.3988
Mid-P exact		0.1266	0.2533

At least one expected value (row total\*column total/grand total) is < 5  
Fisher or Mid-P exact tests are recommended rather than chi square.

**Risk-Based\* Estimates and 95% Confidence Intervals**  
(Not valid for Case-Control studies)

Point Estimates		Confidence Limits	
Type	Value	Lower, Upper	Type
Risk in Exposed	80%	47.94, 95.41	Taylor series
Risk in Unexposed	60.29%	48.4, 71.08	Taylor series
Overall Risk	62.82%	51.72, 72.72	Taylor series
Risk Ratio	1.327	0.9211, 1.911 <sup>1</sup>	Taylor series
Risk Difference	19.71%	-7.676, 47.09 <sup>o</sup>	Taylor series
Etiologic fraction in pop. (EFp)	4.022%	-2.119, 10.16	
Etiologic fraction in exposed(EFe)	24.63%	-8.568, 47.68	

**Odds-Based Estimates and Confidence Limits**

Point Estimates		Confidence Limits	
Type	Value	Lower, Upper	Type
CMLE Odds Ratio*	2.605	0.5521, 19.15 <sup>1</sup>	Mid-P
		0.469, 27.02 <sup>1</sup>	Exact Fisher Exact
Odds Ratio	2.634	0.5193, 13.36 <sup>1</sup>	Taylor series
Etiologic fraction in pop. (EFp OR)	10.13%	-4.112, 24.37	

Etiologic fraction in exposed(EFe|OR) 62.04% -92.55, 92.52

\*Conditional maximum likelihood estimate of Odds Ratio (P) indicates a one-tail P-value for Protective or negative association; otherwise one-tailed exact P-values are for a positive association.

Martin,D; Austin,H (1991) An efficient program for computing conditional maximum likelihood estimates and exact confidence limits for a common odds ratio.

Epidemiology 2, 359-362.

° 1 95% confidence limits testing exclusion of 0 or 1, as indicated

P-values < 0.05 and confidence limits excluding null values (0,1, or [n]) are highlighted.

LookFirst items: Editor's choice of items to examine first.

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Print from the browser with ctrl-P  
or select text to copy and paste to other programs.

## 2 x 2 Table Statistics

### Single Table Analysis

	Disease	
	(+)	(-)
Exposure(+)	38	1755
Exposure(-)	12	1224
	50	2979

### Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	2.621	0.05274	0.1055
Yates corrected chi square	1.864	0.08618	0.1724
Mantel-Haenszel chi square	2.588	0.05386	0.1077
Fisher exact		0.08689	0.1738
Mid-P exact		0.05916	0.1183

All expected values (row total\*column total/grand total) are  $\geq 5$   
OK to use chi square.

**Risk-Based\* Estimates and 95% Confidence Intervals**  
(Not valid for Case-Control studies)

Point Estimates		Confidence Limits	
Type	Value	Lower, Upper	Type
Risk in Exposed	69.09%	55.91, 79.78	Taylor series
Risk in Unexposed	50%	31.43, 68.57	Taylor series
Overall Risk	63.29%	52.26, 73.09	Taylor series
Risk Ratio	1.382	0.8923, 2.14 <sup>1</sup>	Taylor series
Risk Difference	19.09%	-4.345, 42.53 <sup>o</sup>	Taylor series
Etiologic fraction in pop. (EFp)	21%	-5.37, 47.37	
Etiologic fraction in exposed(EFe)	27.63%	-12.07, 53.27	

**Odds-Based Estimates and Confidence Limits**

Point Estimates		Confidence Limits	
Type	Value	Lower, Upper	Type
CMLE Odds Ratio*	2.211	0.8164, 6.053 <sup>1</sup>	Mid-P
		0.7426, 6.678 <sup>1</sup>	Exact Fisher
Odds Ratio	2.235	0.836, 5.976 <sup>1</sup>	Exact Taylor series
Etiologic fraction in pop. (EFp OR)	42%	3.927, 80.07	
Etiologic fraction in exposed(EFe OR)	55.26%	-19.61, 83.27	

\*Conditional maximum likelihood estimate of Odds Ratio (P) indicates a one-tail P-value for Protective or negative association; otherwise one-tailed exact P-values are for a positive association.

Martin,D; Austin,H (1991) An efficient program for

computing conditional maximum likelihood estimates and exact confidence limits for a common odds ratio.

Epidemiology 2, 359-362.

° 1 95% confidence limits testing exclusion of 0 or 1, as indicated

P-values < 0.05 and confidence limits excluding null values (0, 1, or [n]) are highlighted.

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## VII

### T-test age groups and vaccination status

#### Group statistics

Vaccination_Status	N	Mean	Standard deviation	Standard error of mean
Agegroup 1	50	2,18	1,320	,187
2	16	2,00	1,155	,289

#### Test for independent samples

		Levene Test for equality of variances		T-Test for mean equality						
		F	Significance	T	df	Sig. (2-tailed)	Mean difference	Standard error of difference	95% Confidence interval of difference	
									Lower	Upper
Agegroup	Variations are equal	1,724	,194	,488	64	,627	,180	,369	-,556	,916
	Variations are unequal			,524	28,636	,605	,180	,344	-,523	,883

## VIII

### T-test age groups and vaccination status

#### Group statistics

Vaccination_Status	N	Mean	Standard deviation	Standard error of mean
Sex 1	50	,48	,505	,071
2	16	,38	,500	,125

#### Test for independent samples

		Levene Test for equality of variances		T-Test for mean equality						
		F	Significance	T	df	Sig. (2-tailed)	Mean difference	Stanadar d error of difference	95% Confidence intervall of difference	
									Lower	Upper
Sex	Variance s are equal	2,828	,098	,726	64	,471	,105	,145	-,184	,94
	Variance s are unequal			,729	25,43	,472	,105	,144	-,191	,401