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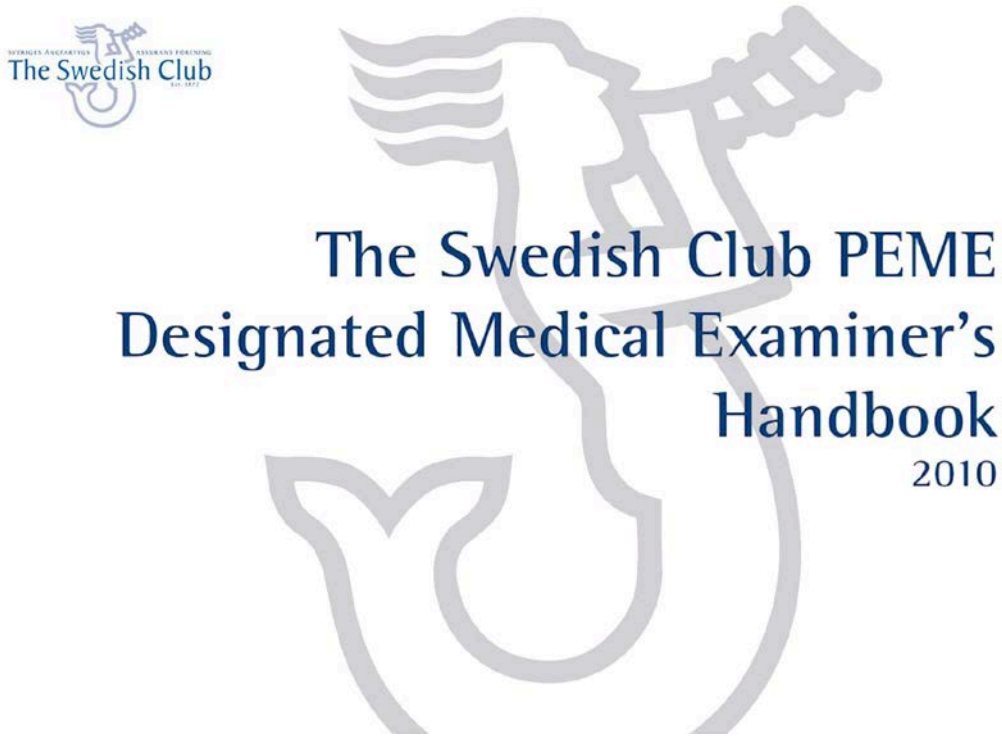

Can increased health requirements for seafarers decrease exposure to illness claims?

A cost benefit analysis of The Swedish Club's pre-engagement medical examination service

Bachelor thesis in the Shipping and Logistics Programme

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Gothenburg, Sweden 2015

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Abstract

The P&I Clubs have seen a significant increase in the cost of illness claims related to cases where seafarers have been contracted and deployed with undiscovered pre-existing medical conditions. As a preventive measure to this issue, The Swedish Club (TSC) offer the service to perform enhanced pre-engagement medical examinations (PEME) at any of the TSC accredited clinics in Manila to members before employing Philippine crew members.

This thesis investigates how the implementation of a PEME program affects The Swedish Club's and the member's exposure to costs related to illness claims by analysing statistics from performed *TSC PEMEs* and historical illness claims. In addition, members of The Swedish Club have been interviewed to create an understanding on how the club's members value this service.

The results show that the TSC PEME service offers a significant exposure reduction to The Swedish Club and the members who choose to use the service. Based on the cost benefit analysis, The Swedish Club and the participating members have reduced their exposure to illness claims, after additional expenses, by up to approximately USD 1.200.000. Moreover, the interviews showed that all parties have a positive attitude towards the purpose of implementing an *enhanced PEME*. However, there are differences in the opinions and in the experiences from TSC PEME or other enhanced PEMEs amongst the interviewed members.

Keywords: TSC PEME, Enhanced PEME, PEME, Illness claims, Cost benefit, seafarer.

Sammanfattning

P&I klubbarna har sett en betydlig ökning i kostnader av sjukdomsskadekrav relaterade till fall där sjöfarare har blivit kontrakterade och mönstrat på fartyg med latenta och befintliga hälsotillstånd. Som en förebyggande åtgärd för detta problem erbjuder The Swedish Club tjänsten att utföra utökade hälsoundersökningar (PEME) på någon av de av klubben ackrediterade klinikerna i Manila till medlemmar före anställning av filipinska sjömän.

Denna studie undersöker hur implementeringen av ett PEME program påverar The Swedish Clubs och medlemmens exponering mot kostnader relaterade till sjukdomskrav genom att

analysera statistik från utförda TSC PEME:er och historiska sjukdomsskadekrav. I tilläg till detta har medlemmar i The Swedish Club intervjuats för att skapa en uppfattning om hur klubbens medlemmar värdesätter denna tjänst.

Resultaten visar att TSC PEME tjänsten erbjuder betydliga exponeringsreduktioner för The Swedish Club och medlemmarna som använder sig av tjänsten. Baserat på kostnadsfördelsanalysen har The Swedish Club och de deltagande medlemmarna reducerat deras exponering mot sjukdomsskadekrav, efter extra utgifter, med upp till cirka USD 1.200.000. Intervjuerna visade att samtliga deltagare har en possitiv inställning till syftet med att implementera en utökad PEME. Det finns dock skillnader i åsikterna och erfarenheterna från TSC PEME och andra utökade PEME bland de intervjuade medlemmarna.

Nyckelord: TSC PEME, Utökad PEME, PEME, Hälsoundersökning, sjömän, sjukdomsskadekrav, kostnadsfördelsanalys,

Acknowledgments

Conducting this thesis would not have been possible without the great assistance and support that I have received from various persons. I would like to express my very great appreciation to Ms. Birgitta Hed and Mr. Anders Hultman at The Swedish Club for their kind and valuable assistance throughout the study. My grateful thanks are also extended to my supervisor Mr. Daniel Eriksson at Chalmers University of Technology for consulting me along the way.

I would like to thank Shipowner A, Shipowner B and Shipowner C for taking their valuable time to participate in the interviews.

I would also like to thank Dr. Antonio Roberto Abaya for sharing his study with me.

Gothenburg 28th of September 2015

Marcus Waserbrot

List of expressions and abbreviations

Club	A P&I Insurance association.
IG	The International Group of P&I clubs
Member	The party whose legal liabilities are insured with protection and indemnity insurance, for example a shipowner.
P&I	Protection and indemnity insurance
PEME	Pre Engagement Medical Examination
STCW	Standards of Training, Certification & Watchkeeping convention
TSC	The Swedish Club
TSC PEME	The Swedish Club Philippine Pre Engagement Medical Examination

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1 Introduction

Repatriation and replacement of ill crew members is a recurring problem for shipowners and P&I Clubs. Depending on the circumstances, illness of a crew member may cause various types of problems for the shipowner that are both costly and time consuming, for example medical care and repatriations.

As an attempt to reduce the amount of repatriations of ill crew members, The Swedish Club and a few other P&I Clubs have developed a program to increase the quality of medical examinations on seafarers. At The Swedish Club, this program is called *The Swedish Club Pre Engagement Medical Examination* (TSC PEME). The Swedish Club started their program 2011, which means it has been active for more than four years now. However, did the implementation of the PEME program actually reduce the Club's exposure and consequently reduce the amount of illness claims at The Swedish Club?

An ill crew member does not only expose the Club and the shipowner to financial risks, but the seafarer does also put him- or herself in a more vulnerable situation due to the fact that the possible medical treatment onboard is limited and the vessel may be far away from a hospital. Consequently, it may take several days before the crew member can have correct medical treatment, which in some cases may be a life threatening situation.

1.1 Purpose

The purpose of this bachelor's thesis is to investigate how the implementation of a PEME program affects the club's and the participating members' exposure to costs and time consuming administrative work that may arise as a consequence of an ill crew member. In addition, by interviewing members of The Swedish Club, this thesis aims to create an understanding on how the shipping industry values the PEME program in relation to the costs and benefits that the program offers to a participating member.

1.2 Questions

To fulfill the purpose of this bachelor's thesis, the following questions will be answered:

1. How does an implementation of TSC PEME affect the club's and a member's exposure to costs and claims that may arise when a crew member becomes ill?

2. What are the members' opinions on TSC PEME or other enhanced PEMEs and the effects that an implementation may have?

1.3 Delimitations

The cost benefit analysis is based on statistics that have been gathered by The Swedish Clubs two accredited clinics in the Philippines. Therefore, the cost benefit analysis will be delimited to the statistics received from these two clinics.

TSC PEME have been available since 2011 and the clinics have collected data about the performed medical examinations since then. The cost benefit analysis only includes the medical examinations for the completed years, more specifically 2011 – 2014.

The collection of costs and information for historical illness claims is delimited to the registered claims available in TSCs claim database.

Since The Swedish Club only offers TSC PEME in the Philippines today, the thesis is delimited to Filipino seafarers.

2 Background and Theory

2.1 Pre-engagement medical examination

People who work at sea are required to have a medical certificate that is specifically designed for service at sea, which is based on requirements from international regulations. In order to obtain such a medical certificate, the seafarer must undergo a *pre-engagement medical examination* (PEME). The PEME's design varies from country to country. In Sweden, according to the Swedish Transport Agency (2015), the PEME is divided into three different steps. Firstly, the seafarer shall fill in a health declaration. Secondly, the seafarer shall undergo a medical examination. Thirdly, the seafarer shall undergo a vision and hearing test. If the seafarer fulfils the requirements for every step of the PEME, he or she will be declared fit for duty and will receive a medical certificate that is valid from 1 to 4 years, depending on various circumstances (Swedish Transport Agency, 2015).

The Swedish Club Pre Engagement Medical Examination (TSC PEME) program started year 2011 with the purpose to decrease the Club's and their member's exposure to illness claims. TSC PEME has stricter criteria and is more extensive than the government required PEME, which is why this program is also called *enhanced PEME*. Furthermore, the tests included in TSC PEME were chosen to reflect the medical characteristics of Philippine seafarers (The Swedish Club PEME, 2015). TSC PEME shall not contravene the shipowner employer's legal obligations with regard to prohibition of discrimination in the employment process. Furthermore, the quality and ethics of all Club approved clinics and doctors are under on-going audit by The Swedish Club to ensure that they maintain the club's standards, have a full appreciation of the purposes of the PEME, and comply with the auditing Club's guidelines and instructions, according to B. Hed (personal communication, 4 November 2015)

2.1.1 Medical examination regulations

The fundamental international rules that require pre-engagement medical examinations can be found in the International Maritime Organization's (IMO) convention named International convention on Standards of Training, Certification and Watchkeeping for seafarers (STCW). Furthermore, the European Union has implemented the STCW regulations, which consequently makes the STCW requirements mandatory also for European Union member states that have not ratified the STCW convention.

The STCW convention does not specify what types of medical conditions that would make a seafarer to be qualified as unfit for duty, with an exception on eyesight and colour blindness. However, the convention has regulated minimum requirements that have to be fulfilled, where most of the requirements are linked to the seafarer's duties onboard and the safety of the vessel. Parts of the requirements are mentioned in STCW Section A-I/9 paragraph 2, which can be found in the appendix.

Furthermore, STCW Section A-I/9 paragraph 1 refers to guidelines regarding assessment of minimum physical abilities, which can be found in section B-I/9 and table B-I/9. The table B-I/9 illustrates what type of activities the seafarer need proper physical abilities for, but still provides room for interpretation. Table B-I/9 can be found in the appendix.

As a result, the minimum requirements and guidelines of STCW has been interpreted and implemented in the national regulations of every state that have ratified the STCW convention. Furthermore, a state is only required to implement STCWs minimum requirements. Hence, a state is free to set higher requirements in its national regulations.

2.1.2 Comparison between Government require PEME and TSC Enhanced PEME

Philippines government required PEME

- Medical History & P.E.
- Audiometry & Visual Examination
- Urine analysis
- CBC
- Psychometry
- VDRL
- Dental
- Chest X-ray

TSC PEME

Includes the government required PEME tests, plus:

1) ECG
2) HIV Test
3) Hepatitis –A, B and C
4) TPHA
5) Liver function test [SGPT, SGOT, GGT, Bilirubin (direct, indirect, total) Alkaline Phosphatase]
6) Fasting Serum Lipids including total cholesterol, high and low density lipoproteins, and cholesterol fractions
7) Kidney function test (BUN, Creatinine)
8) HbA1c
9) Malarial smear
10) Drug test, Cannabinoids, Amphetamine/Methamphetamine
11) Ultrasound (kidney, ureter, urinary bladder)
12) Peak flow meter
13) Cardiac risk factor assessment
14) Psychiatric assessment

Source: B. Hed (Personal communication, May 11th 2015)

2.2 P&I insurance and mutuality

The P&I insurance is essentially a liability insurance for shipowners, which have been available since the mid-19th century (Johansson, 2013). Approximately 90% of all P&I insurance for ocean-fairing ships is effected through thirteen mutual P&I clubs, which have an extensive co-operation through *The International Group of P&I clubs* (IG). Moreover, the basis for this cooperation is the pooling agreement. In short, the pooling agreement determines how large claims from a club shall be apportioned, the re-insurance purchase process and how to handle and apportion claims above the re-insurance cover (Falkanger, Bull & Brautaset, 2011).

Just like the other members of IG, The Swedish Club is structured as a mutual company. It is important to understand what a mutual company structure means, due to the fact that it affects the relevance and importance of the thesis's purpose.

A mutual company is a company which owners are also its clients (Farlex Financial Dictionary, 2009). In The Swedish Club's case, this means that each member is also a part of the company. Consequently, the member is affected by The Swedish Club's results and will therefore benefit from, for example, increasing The Swedish Club's profitability.

2.3 The basis for liability

Liabilities, costs or expenses that have been incurred due to illness of a crew member are covered under the P&I insurance. The Swedish Club's P&I conditions can be found in the Club's publication called Rules for P&I/FD&D 2015/16, which is referred to as TSC P&I Rules.

The terms that may be relevant for an illness claim can be found in TSC P&I Rules, Rule 3 section 1, 2, 4 and 11. When a crew member becomes ill, he/she may need to visit a hospital for further medical examination or treatment. Furthermore, depending on the crew member's medical condition, he/she may or may not be fit for duty. If the crew member is not fit for duty, he/she will be repatriated and might receive sick wages and disability benefits, if applicable. As a consequence of the illness, it might be necessary to replace the crew member with a substitute, which means that travelling expenses to get the substitute to the vessel may be incurred. These costs or expenses may be covered by the Club, according to TSC P&I Rules, Rule 3 section 1 and section 2.

2.4 How frequency and cost of claims affect the premium

In order to decide a proper premium for a new or renewed insurance contract, it is necessary to assess the risk of the deal. As a tool to assess the risk, a marine insurance underwriter often uses historic data, including but not limited to, claims records.

I have interviewed one of The Swedish Club's underwriters to get an understanding on how claims record are assessed and consequently affect the premium. According to F. Isaksson (personal communication, 4 May 2015), one of the key factors when analysing claims records are frequency of claims. The claim frequency can tell the underwriter more about the client or the vessel than only looking on total claim costs. For example, a client with a high frequency of injury claims indicates that something might be wrong onboard. Compared to a client with only one injury claim that was more expensive due to high medical expenses for a complicated injury.

The premium is determined by several factors amongst where a few of them are relevant for this thesis and may be affected by the use of enhanced PEME. Firstly, enhanced PEME might have an impact on the claims frequency. Secondly, it indicates that the shipowner tries to be proactive. Therefore, the implementation of enhanced PEME might have a positive impact on a member's premium.

2.5 Possible consequences of pre-sea illnesses

Illnesses or medical conditions affect us in different ways and may in some cases contribute to serious consequences that potentially might be life threatening. In order to understand why it is important to detect certain illnesses prior to employment at sea, information regarding a few relevant medical conditions and an example of a worst case scenario experienced at The Swedish Club will be presented.

2.5.1 Medical conditions

Hypertension, also known as high blood pressure, is a rather common medical condition. For example, about one third of the adult population in Sweden is suffering from hypertension. Moreover, medication is necessary in a majority of hypertension cases (1177 Vårdguiden, 2015). Studies of hypertension and its consequences have been performed by World Health Organization as a part of their report named Global health risks. According to World Health Organization (2009), cardiovascular diseases account for nearly 30% of death worldwide, where one of the risk factors are high blood pressure. Furthermore, the study shows that high blood pressure causes between 37% - 54% of cardiovascular deaths, which makes it the leading cause. As World Health Organization (2009) mentions, obesity is one factor that can raise blood pressure. Furthermore, obesity and too high or low body mass index (BMI) is another problem for seafarers and the safety onboard that enhanced PEME handles.

Kidney stones is a medical condition that about 3 in 20 men and 1 in 20 women from UK suffers from (Patient, 2014). The problem with kidney stones in seafarers is that the seafarer may suffer from it prior to employment, but might not suffer from any symptoms until a later time, possibly onboard. According to Patient (2014), this is due to the fact that a kidney stone that only lies in the kidney may not cause any symptom. In order to detect or confirm the presence of a kidney

stone the patient has to take special X-rays or scans, which is performed in The Swedish Club's enhanced PEME.

2.5.2 Worst case scenario

One of The Swedish Club's most expensive illness claims, for the period of year 2004 – 2015, arose during year 2015. According to the medical report, the crew member suffered from unspecified intestinal obstruction along with other conditions such as dehydration and hypertension. Furthermore, the doctor stated that the crew member would likely have died with 1 more day at sea. The doctor believe that a thorough pre-engagement medical examination would have revealed that the crew member had serious medical issues. As a result, the claim's total cost arose to approximately 600.000 USD. A cost that could have been saved had an enhanced PEME been conduct, not to mention the human suffering.

2.6 Repatriation study in Filipino seafarers

To get an understanding on why Filipino seafarers are repatriated, this sub-section presents the relevant parts of a study made on Repatriation rates amongst Filipino seafarers.

To determine the most common causes of repatriation among Filipino seafarers, Dr. Abaya et al. (2015) have studied data from medical repatriations during a period of five years, 2010 to 2014. In total, 6759 medical repatriations were collected during this study period. During this period, the number of deployments of Filipino seafarers amount to 388,963. As a result, the repatriation rate for the study period is calculated at 1,73%.

Due to the fact that injury claims is not relevant for this thesis, the 1450 cases of injury repatriations will not be included when presenting facts from Dr. Abaya et al. (2015). Consequently, percentage numbers in Figure 2.6.1 will differ since they are based on the 5309 illness repatriations instead of the total repatriation amount of 6759 cases presented in Dr. Abaya et al. (2015).

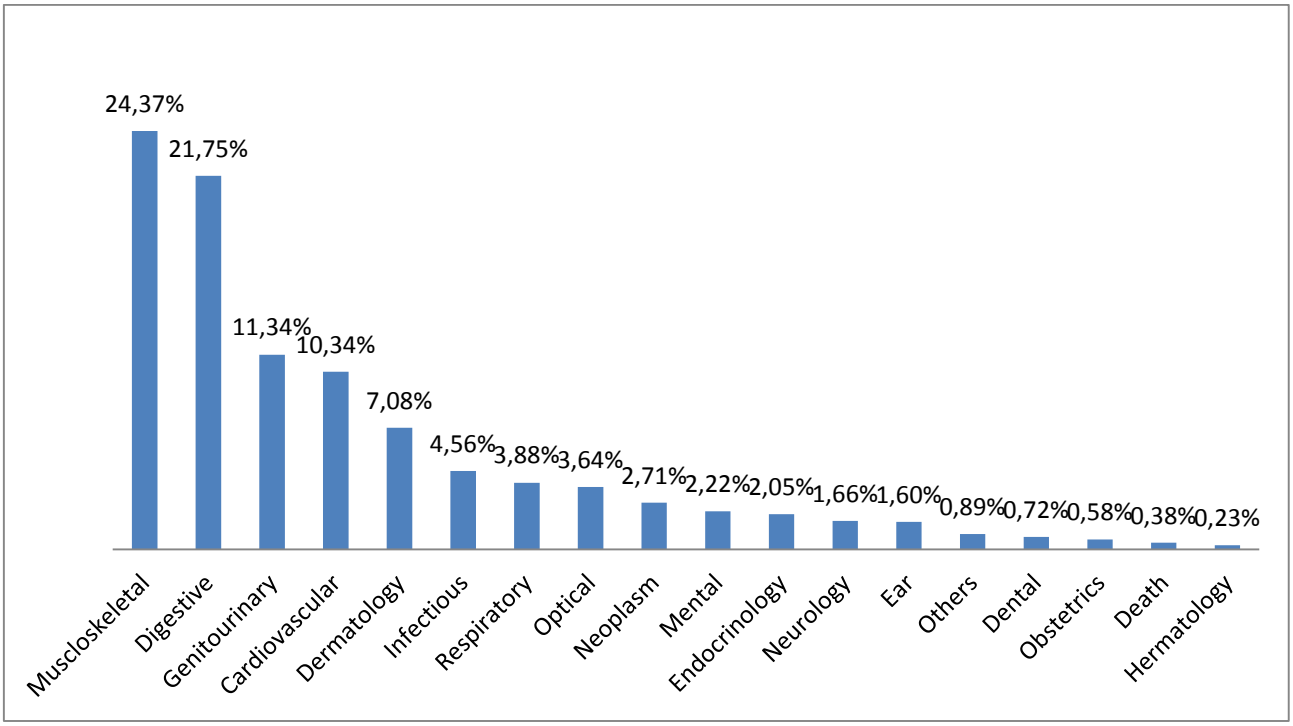

Figure 2.6.1 The distribution of illness repatriation cases. The category "Injury" is not included. Source: Dr. Abaya et al. (2015).

According to Dr. Abaya et al. (2015), the most common cause for illness repatriations is muscloskeletal conditions, for example lower back pain, which stands for 42,89% of the muscloskeletal conditions. The second most common cause for illness repatriations is gastrointestinal diseases. A total of 1155 seafarers were repatriated due to various types of gastrointestinal diseases. Moreover, gallbladder diseases, where gall polyps and gallstones are included, represent 11% of the gastrointestinal diseases with 130 cases. Repatriations due to genitourinary diseases is the third most common cause for illness repatriation and amounts to 602 cases, where 264 cases (43,85%) were repatriated due to kidney stones. The category of cardiovascular diseases, where hypertension is included, is the fourth most common cause for illness repatriations with a total of 549 cases. The most common medical condition within the cardiovascular diseases category is hypertension with 188 cases (34.24%) of repatriation.

3 Method

This bachelor's thesis has been approached with an exploratory research method (Höst, Regnell & Runeson, 2009) due to the fact that the TSC PEME program has not been analysed before. The research has been accomplished with three different approaches. Firstly, literature studies on fundamental regulations, medical conditions and a repatriation rate study. Secondly, a cost benefit analysis based on statistics from performed PEMEs and historical illness claims. Thirdly, interviews with shipowners or their crew management company.

3.1 Literature studies

The theory research of this thesis includes literature studies in the three following fields:

1. Fundamental regulations
2. Medical conditions
3. Repatriation rate study

The requirements for a pre-engagement medical examination have been studied through the STCW convention, which is the fundamental regulation, and the Swedish Transport Agency, which is the responsible authority for pre-engagement medical examinations in Sweden. Even though Swedish seafarers are not included in this study, the Swedish Transport Agency's website and documents provide relevant information on how a state can implement the STCW convention. Furthermore, literature on relevant medical conditions have been studied in order to create an understanding on how they work and their potential consequences. After contacting Dr Antonio Roberto Abaya, the author received a copy of *Repatriation rates in Filipino seafarers: A 5-year study of 6759* cases by Dr. Abaya et al. (2015). Parts of this study is presented in section 2.6 and have mainly been used as a tool to compare with the results in section 4.

3.2 Cost benefit analysis

The cost benefit analysis is based on reports from the Swedish Clubs two accredited clinics. These reports contain information from all the performed TSC PEMEs for the period 2011 to 2015. Since the all the TSC PEMEs for 2015 have not yet been performed, the author chose to only use the reports from completed years, which means 2011 – 2014.

The data gathered from each performed TSC PEME used in the cost benefit analysis is:

- If the seafarer was in compliance or not in compliance with TSC PEME.
- The reason why a seafarer was not in compliance with TSC PEME or the government required PEME.
- Did the seafarer pass or fail the government required PEME?

The reasons for not being in compliance with TSC PEME or the government required PEME were then categorized in the categories presented in section 4.

The Swedish Club's claim database was used to find the cost for historical illness claims. In order to set a cost for each type of category, the claims relating to each category were gathered. The cost for each category was then based on the average cost and the average deductible for the claims in each category. However, the average cost and average deductible for all The Swedish Club's illness claims were used for the category *Other* due to the spread of reasons included in this category.

3.3 Interviews

The interviews were approached with a qualitative and *semi-structured* method (Höst, Regnell & Runeson, 2009) where a prepared list of questions was used as support. The results from the cost benefit analysis were used to form most of the questions in the performed interviews. However, the questions asked were reformulated and adapted for the interviewed party's situation.

In order to increase The Swedish Club's members' interest in participating in the interviews, the members' company names are held anonymous. The members are presented as Shipowner A, Shipowner B and Shipowner C.

Four members were contacted and asked to participate in the interviews. In total, three members were interviewed at three different occasions. Firstly, Shipowner A was interviewed in their office at the date 2015-06-04. Secondly, Shipowner B was interviewed in their office at the date 2015-06-24. Lastly, Shipowner C was interviewed by telephone at the date 2015-07-21.

4 Results

In this section, the results from the statistical analysis and the interviews are presented. Moreover, this section aims to answer the questions stated in section 1.2.

4.1 The cost benefit analysis

The cost benefit analysis is based on reports from the two clinics that are accredited to perform enhanced PEME as a service for The Swedish Club's members (The Swedish Club, 2015). Furthermore, the reports used for this study contain information from all the performed enhanced PEMEs for the period 2011 to 2014.

A total of 3706 TSC PEMEs were performed at the two accredited clinics during 2011 to 2014. Out of these 3706 examinations, 196 or 5,28% of the seafarers were not in compliance with The Swedish Club's enhanced PEME test. However, this number cannot be used to analyse and calculate if the Club's and the members' exposure have been affected by the enhanced PEME program, due to the fact that it includes examinations that were not in compliance with the government required PEME. Therefore, it is necessary to look at the examinations that were in compliance with a government required PEME but not in compliance with the enhanced PEME. The reports show that 122 of the 196 (62%) examinations that were not in compliance with the enhanced PEME would have passed a government required PEME.

There are various types of medical conditions that can cause a person to fail an enhanced PEME. Therefore, it is necessary to examine why these examinations were not in compliance with the enhanced PEME's requirements. The different kinds of medical conditions have been categorised as similar as possible to The Swedish Club's illness claims *immediate cause* categories, which are based on the categories found in ILO and WHO's *Guidelines for Conducting Pre-sea and Periodic Medical Fitness Examinations for Seafarers*, Annex C. However, some medical conditions were found more frequently in the reports and will therefore be mentioned and analysed by medical conditions name instead of category. In figure 4.1.1, the division of reason for not being in compliance with the enhanced PEME is presented.

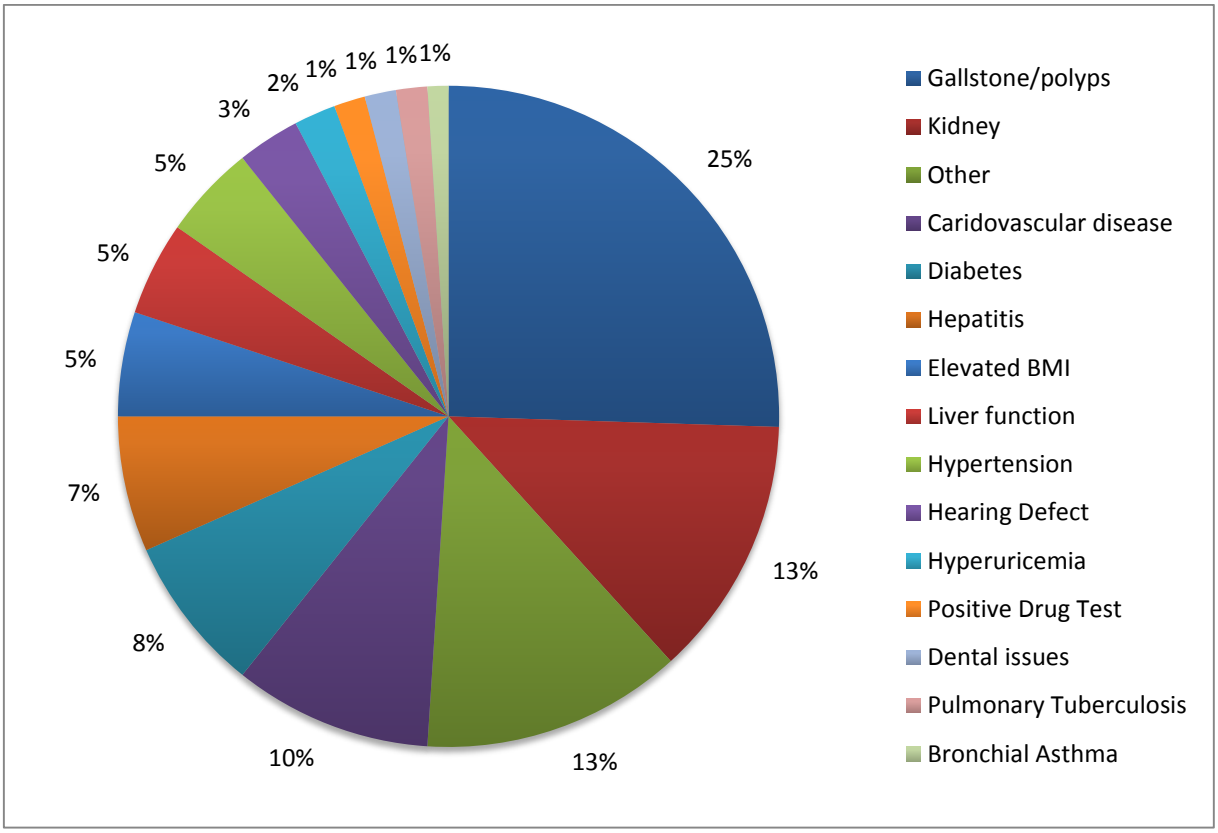

Figure 4.1.1. Division of reason for not being in compliance. Source: The Swedish Club database.

As can be seen from figure 4.1.1, the most common reasons for not being in compliance is related to gallstone or gall polyps and kidney conditions such as kidney stones or kidney disease. The third most common reason, called other, includes various types of medical conditions with low frequency that could not be categorised in remaining categories. In this case, cardiovascular disease could be seen as the second largest category if it would be combined with hypertension, which also is a condition of the cardiovascular system. Furthermore, claims related to conditions of the cardiovascular are the claim category with the highest frequency for illness claims, which also has a higher average claim cost at USD 47,115 in relation to other illness claim categories (The Swedish Club database).

The categorization has also been made for the examinations that were not in compliance with the enhanced PEME but would have passed a government required PEME. These examinations are the basis for the cost benefit analysis due to the fact that the examined persons would have been working onboard a TSC member's vessel without the enhanced PEME.

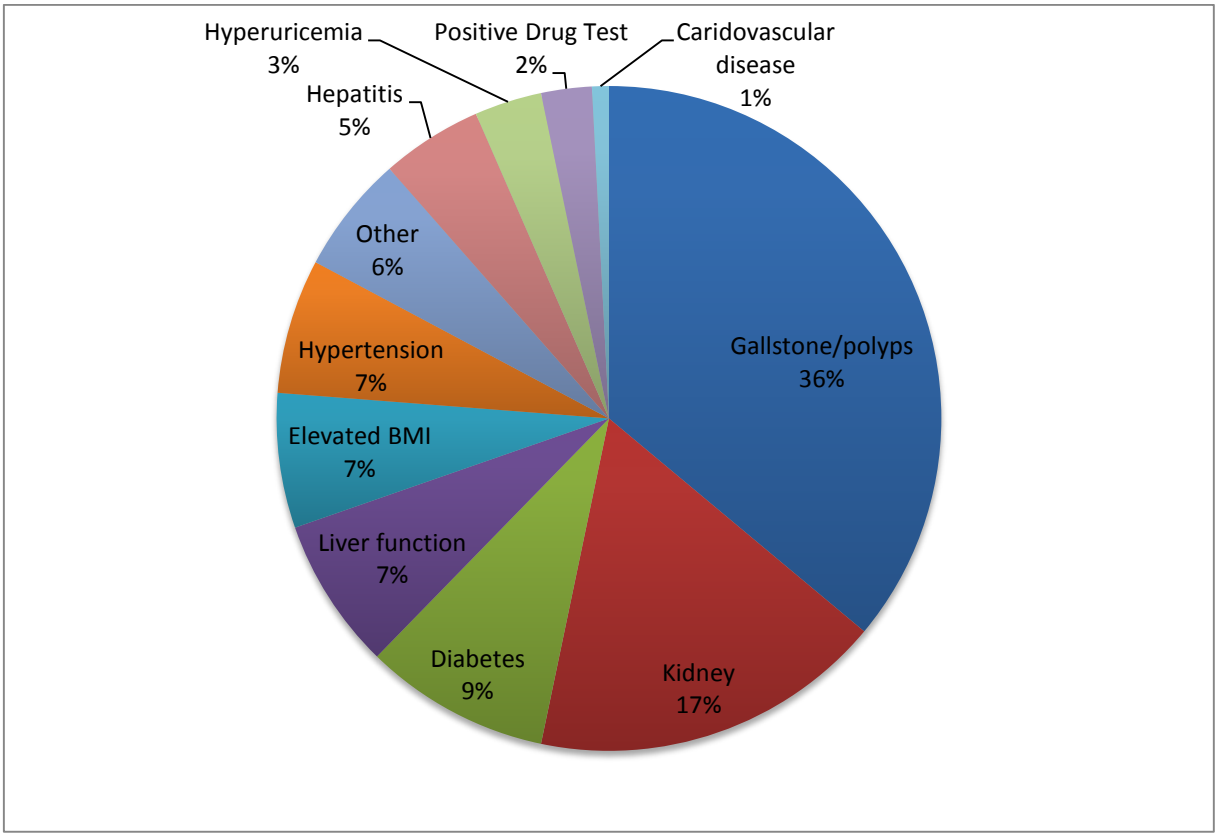

Figure 4.1.2 Division of reasons for not being in compliance, where the examined person would pass a government required PEME. Source: The Swedish Club database.

As presented in figure 4.1.2, the most common reason for not being in compliance with TSC's PEME, but would have passed a government required PEME is gallstone and gallbladder polyps. According to the statistical analysis, 50 out of the 196 not in compliance cases were related to gallstone or gallbladder polyps. Out of these 50 examinations, 44 examinations (88%) would have passed a government required PEME, as presented in table 4.1.1. The second most common reason is related to the category kidney, which consists of two medical conditions**,** namely kidney stones and kidney disease.

Table 4.1.1 presents the categories and count of examinations that were not in compliance with TSC's PEME, but would have passed a government required PEME. *Count avoided* presents the amount of examinations that were not in compliance with TSC's PEME, but would have passed a government required PEME. The row called *% of tot* indicates the percentage of not in compliance examinations within a category that would have passed a government required PEME.

If unfit/pending - reason	Count avoided	% of Tot
Gallstone/polyps	44	88%
Kidney	21	84%
Caridovascular disease	1	5%
Other	7	28%
Elevated BMI	8	80%
Liver function	9	100%
Hepatitis	6	46%
Hypertension	8	89%
Diabetes	11	73%
Hyperuricemia	4	100%
Positive Drug Test	3	100%
Hearing Defect	0	0%
Dental issues	0	0%
Pulmonary Tuberculosis	0	0%
Bronchial Asthma	0	0%

Table 4.1.1 Presents the reason for not being in compliance categories with Count avoided and % of total that would have passed a government required PEME. Source: The Swedish Club database.

4.1.1 Cost benefit results

The cost for a TSC PEME is higher than the cost for a government required PEME. A government required PEME in the Philippines costs approximately USD 12. This can be compared with the cost for a TSC PEME that costs USD 105, according to B. Hed (personal communication, 6 April 2015). As a result, the medical examination cost for a TSC PEME is increased by 875%, or USD 93.

The increased cost of USD 93 is the basis for the TSC PEME cost benefit analysis. The total extra cost for the 3706 TSC PEMEs amounts to USD 344.658. Therefore, the TSC PEME must reduce illness claims cost with more than USD 344.658 to be beneficial from an economic perspective. In order to get a number for the potential avoided illness claim costs, it is necessary to set a cost for each of the categories presented in Table 4.1.1.

The cost for the categories is based on the average claim cost for previous illness claims at The Swedish Club. These claims were categorized to fit the categories used for this study to get a more accurate average cost for each category, instead of using an average cost of all illness claims. However, the average cost of all The Swedish Club's illness claims have been used for the category *Other*. Moreover, the average illness claim cost at The Swedish Club amounts to USD 23.295. The total average cost for a category consists of the average cost for The Swedish Club, plus the average deductible cost for the member. In Table 4.1.2, the total average cost for each category is presented.

If unfit/pending - reason	Total Average cost	
Gallstone/polyps	$	8,926.00
Kidney	$	12,902.00
Caridovascular disease	$	54,196.00
Other	$	29,129.00
Elevated BMI	$	-
Liver function	$	20,444.00
Hepatitis	$	13,258.00
Hypertension	$	6,092.00
Diabetes	$	28,949.00
Hyperuricemia	$	-
Positive Drug Test	$	-
Hearing Defect	$	-
Dental issues	$	10,756.00
Pulmonary Tuberculosis	$	24,003.00
Bronchial Asthma	$	31,294.00

Table 4.1.2 presents the total average cost (Average claim cost + Average deductible) for previous claims related to a category. Source: The Swedish Club database.

According to Table 4.1.2, illness claims that arise due to cardiovascular diseases are, based on the average cost, the most expensive ones.

If unfit/pending - reason	Count avoided	Claim costs avoided
Gallstone/polyps	44	392744
Kidney	21	270942
Caridovascular disease	1	54196
Other	7	203903
Elevated BMI	8	0
Liver function	9	183996
Hepatitis	6	79548
Hypertension	8	48736
Diabetes	11	318439
Hyperuricemia	4	0
Positive Drug Test	3	0
Hearing Defect	0	0
Dental issues	0	0
Pulmonary Tuberculosis	0	0
Bronchial Asthma	0	0
Total	122	1552504

Table 4.1.3 The division and total claim costs avoided. Source: The Swedish Club database.

As can be seen in both Table 4.1.2 and Table 4.1.3, some categories have no cost presented. The categories Hearing Defect, Dental issues, Pulmonary Tuberculosis and Bronchial Asthma have no costs presented due to the fact that all of them would have also been found by a governmental require PEME, and can therefore not be counted as *avoided* by the enhanced

PEME. Furthermore, the categories Elevated BMI, Hyperuricemia and Positive Drug Test were not given a cost, even though they had 15 *Count avoided* combined, due to the fact that it was not possible to find claims in The Swedish Club's database immediately related to these categories. Consequently, the total *Claim costs avoided* of USD 1.552.504 does not include any potential costs avoided from Elevated BMI, Hyperuricemia and Positive Drug Test**.**

The figures presented in the Claim costs avoided column are based on the following mathematic formula:
Amount of Count avoided of a category, multiplied with total average cost for the same category.
As an example, using the figures from category Gallstone/polyps:
44 multiplied with USD 8.926 = USD 392744

In these calculations, it is assumed that every examination included in Count avoided would have led to an illness claim if the health condition had not been found by the enhanced PEME.

There are two cost categories that need to be compared in order to finalise the cost benefit analysis. These two categories are *Claim costs avoided* and *Extra costs for PEME.* Figure 4.1.3 presents a diagram where both categories are included to illustrate the difference between the extra PEME costs and the avoided claims cost.

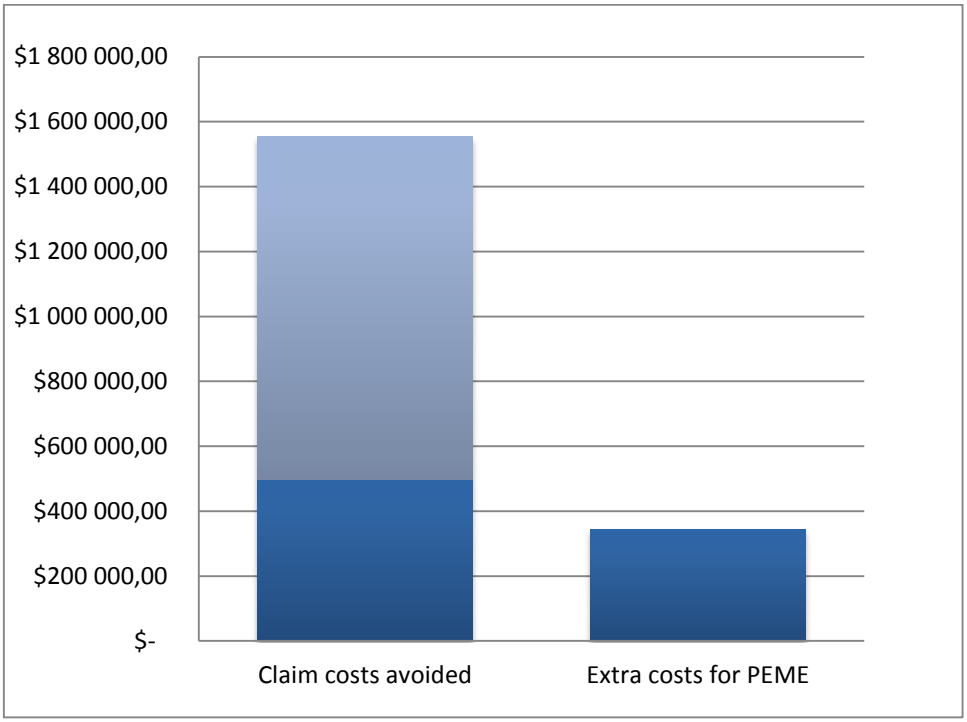

Figure 4.1.3 Cost benefit results. Source: The Swedish Club database.

According to the calculations, the total claim costs avoided for the 3706 performed enhanced PEMEs during the period 2011-2014 amounts to USD 1.552.504. Moreover, a portion of this

total amount consists of the total deductible costs avoided. The total deductible costs avoided for the assured member amounts to USD 498.601, which also is presented in Figure 4.1.3 as the lower part (in dark blue color) of the Claim costs avoided diagram.

As previously mentioned, 3706 TSC enhanced PEMEs has been performed during the period 2011-2014. As the TSC PEME is more expensive for the member, the total increased cost for performing TSC PEME's must be lower than the avoided claims cost in order to be economically beneficial. The total extra cost for these 3706 enhanced PEMEs amounts to USD 344.658.
Claim costs avoided = USD 1.552.504
Extra costs for PEME = USD 344.658
Total cost benefit for the period 2011-2014 = 1.552.504 – 344.658 = **USD 1.207.846**

As a result, the avoided claims costs are greater than the increased PEME costs. In addition, the total avoided deductible is greater than the increased PEME cost, which means that the enhanced PEME has a direct cost beneficial impact to the member alone.

4.2 Interview results

In this section, the result from the performed interviews some of The Swedish Club's members will be presented. The three shipowners who have participated have P&I insurance with The Swedish Club, which also makes them members of The Swedish Club. Furthermore, all interviewed shipowners has Filipino crew members onboard their vessels. The aim of these interviews is mainly to take part of the members' opinions regarding enhanced PEME, but also to increase their knowledge and awareness of what enhanced PEME is and how it can help them. In order to do so, the interviews were structured in the following way:

1. To get an understanding of their existing knowledge about enhanced PEME.
2. To give further information, based on their existing knowledge, about enhanced PEME and what it includes compared to a government required PEME.
3. To ask the interviewed to share and explain their opinion on enhanced PEME.
4. Present tables and figures from the cost benefit analysis (All of which can be found in previous part of this section). Also, mention that the enhanced PEME may have a positive impact on the safety onboard.
5. To ask the interviewed whether their opinion on TSC PEME has changed after presenting the tables and figures.
6. How many crew members do they have and how many of them are Filipino?
7. Calculate and present the extra cost TSC PEME would be for their company.
8. How many times per year do they repatriate a Filipino crew member due to illness and what is the average cost?

The results from the interviews will be presented anonymously. Therefore, the members will be presented as Shipowner A, Shipowner B and Shipowner C.

Shipowner A:

Shipowner A has good knowledge about enhanced PEME, but also experience from it, but not TSC's PEME.

Today, Shipowner A uses the Filipino government required PEME for their crew members. However, they are interested in using enhanced PEME if it can detect illnesses and medical conditions that have a high risk of leading to an illness claim. They are a bit sceptical to todays enhanced PEMEs since they include illnesses that rarely lead to an illness claim. Consequently, more seafarers than necessary will be rejected, and Shipowner A will have difficulties in finding new crew members.

During the interview, two questions arose from Shipowner A. Firstly, if a shipowner agrees to use TSC PEME, but wants to use a seafarer who was not in accordance with it, could it be used against the shipowner in a P&I claim? Secondly, if a shipowner agrees to use TSC PEME, but wants to use a seafarer who was not in accordance with it, could it be used by the seafarer's lawyer against the shipowner?

Due to the fact that many seafarers may be rejected by TSC PEME, Shipowner A says that they may face difficulties in finding new crew members to replace those who get rejected. Therefore, they think it is very important that the enhanced PEME does not give any false indication and therefore rejecting a seafarer wrongfully.

Regarding the cost benefit analysis, Shipowner A mentions that it is not possible to know how many of the Count avoided that actually would have led to a claim. Consequently, the cost benefit difference may not be as good as presented in the tables and figures.

Shipowner A have previously used their own enhanced PEME but went back to using the government required PEME again due to the fact that the amount of rejected seafarers was too large. As an example of why they are sceptical towards enhanced PEME, Shipowner A states that none of the cases where a seafarer was rejected due to gallstones have led to repatriations due to gallstones.

Regarding the possible positive impact the enhanced PEME may have on the safety onboard, Shipowner A thinks that it is a good benefit, but that it also may have a negative impact since it could reduce the number of experienced crew members on board.

Shipowner A did not change their opinion of enhanced PEME after the presentation. Shipowner A know that TSC PEME is available, and they know why they are not using it. Today, due to previously mentioned reasons, Shipowner A uses the government required PEME instead of their own enhanced PEME or TSC PEME.

In total, Shipowner A has 400 crew members employed, whereof 318 are from the Philippines. By using TSC's enhanced PEME, the PEME costs would increase by USD 29760.

Shipowner A had no information available at the time of the interview regarding repatriations per year and their average cost for repatriations.

Shipowner B:

Shipowner B knows what enhanced PEME is and the purpose of it. However, they do not know what kind of medical conditions TSC PEME aims to detect in addition to the governmental required PEME.

Shipowner B states that they have previously discussed the impact of an enhanced PEME and are interested in an enhanced PEME solution. Today, Shipowner B uses a slightly enhanced PEME for their crew members. No exact details were available at the time of the interview regarding what their enhanced PEME included. However, Shipowner B is fairly sure that TSC PEME is considerably more extensive.

During the presentation of the cost benefit analysis tables and figures, a few questions arose from Shipowner B. How do you treat gallstones and how long time does it take? Is it possible to treat gallstones onboard? Shipowner B is concerned about the fact that many crew members could be rejected due to gallstones, even though they do not suffer any pain and as a consequence lose many experienced crew members. Shipowner B is not aware of any case where a crew member had to be repatriated due to gallstones.

Shipowner B states that they are interested in TSC PEME. Although, they suggested that TSC PEME can be used for new employed crew members and crew members whom they suspect have a deteriorating health. The suggestion is based on the concern of losing crew members even though they might not be at any risk. In addition, Shipowner B mentions that losing experienced crew members has a negative impact on the vessels safety.

In total, Shipowner B has 130 Filipino crew members. By using TSC's enhanced PEME, the PEME costs would increase by USD 12090. According to Shipowner B, they have less than five repatriations due to illness per year.

Shipowner C:

Shipowner C knows what enhanced PEME is and is currently using their own kind of enhanced PEME, which they call FCE. We were not able to compare the differences between the FCE and TSC's enhanced PEME during the interview. The FCE is used for crew members from various countries, including the Philippines. The FCE's are performed at medical centres that have been approved by Shipowner C. Moreover, Shipowner C has personnel with experience and education in the medical field who, amongst other things, audits the approved medical centres.

According to Shipowner C, the FCE has had a positive impact on Shipowner C's repatriation rates. Prior to the implementation of the FCE, they had about 0.15 repatriations per 1000 man days. After implementing the FCE, the repatriations have decreased to about 0.08 repatriations per 1000 man days. The most common medical condition that is detected by and not in compliance with the FCE's requirements is the combination of hypertension and diabetes. Shipowner C stated that they do not have a problem with significant amounts of crew members being rejected due to gallstones or gall polyps.

Due to the increased requirements in the FCE, Shipowner C has seen an increase in the number of crew members that are not in compliance with these requirements. However, they have not experienced any drastic increase that made it difficult for Shipowner C to find new crew members to replace those who have been denied due to not being in compliance with the FCE requirements.

At the time of the interview, Shipowner C has about 3000 crew members employed, whereof 1000 comes from the Philippines.

5 Discussion

This chapter discusses the results presented in Chapter 4 and integrates them with the theory and existing empirical studies presented in Chapter 2.

5.1 The cost benefit analysis

The cost benefit results presented in section 4.1 and table 4.1.3 show that an implementation of TSC PEME can decrease the club's and its members' exposure to illness claims significantly.

Even though the cost benefit results show that the costs can be decreased by USD 1.207.846, it is not possible to confirm the validity of these numbers due to the method used. As mentioned in section 4.1, the calculations are based on the assumption that every examination included in Count avoided would have led to an illness claim if the health condition had not been found by the TSC PEME. Consequently, the actual decreased illness claims costs may differ to a large extent. However, the figures show that TSC PEME would be cost beneficial as long as about 22% of Count avoided would have led to a claim. In addition, it is important to highlight that the categories Elevated BMI, Positive Drug test and Hyperuricemia, which combined represents 12% of the Count avoided have not been given any cost due to the difficulty of finding an average cost for illness claims related to these categories. It is also important to consider the fact that no illness claims below deductible have been included in the cost benefit analysis since The Swedish Club are not informed about such claims. However, using TSC PEME should have a positive impact on claims below deductible, which is not included in the potential savings presented in section 4.1.

The medical repatriation study by Dr. Abaya et al. (2015) shows that several of the medical conditions found by TSC PEME are an existing health problem on Filipino seafarers. The categories of Gallbladder, Kidney and Hypertension, which combined represents 60% of the Count avoided by TSC PEME, are among the more common causes for illness repatriations of Filipino seafarers. However, both Kidney and Hypertension has a greater amount of repatriation cases than Gallbladder stones/polyps, even though Gallbladder stones/polyps seems to be a more common medical condition amongst Filipino seafarers.

The candidate noticed a considerable distinction in the data provided by the two accredited clinics. From one of the clinics, 100% of the seafarers who were not in compliance with TSC PEME due to diabetes would have passed the government required PEME. This can be compared with the other clinic, where the figure for the same type of cases is only 20%. This could be due to a misunderstanding on how to fill the 'would have passed the government required PEME' field in TSC's statistics sheet, or that the clinic with 100% have only stated diabetes as the reason for not being in compliance when the actual reason was a combination of medical conditions.

By the end of this study, the candidate was informed by The Swedish Club that the cost to perform a government required PEME was increased during year 2013. Consequently, the actual cost benefit for performing a TSC PEME is greater than presented in this thesis.

5.2 Interviews

The results from the interviews show that Shipowner A and B who have not implemented TSC PEME or similar methods have similar opinions on the risks/downsides of implementing it. On the other hand, Shipowner C has had a positive experience from the use of their FCE, which is similar to TSC PEME, and have seen a decreasing number of repatriations for their crew members.

Both Shipowner A and B mentioned their concern regarding the risk of losing too many crew members after implementing TSC PEME. As Shipowner A and Shipowner B have not had any or a very low amount of gallstone related illness claims, they believe that too many crew members who are no or a very low risk for an illness claim will be rejected by TSC PEME. When comparing Figure 4.1.2 with the diagnosis statistics in Dr. Abaya et al. (2015), it is shown that even though many Filipino seafarers have gallstones/polyps, it still is not one of the most common causes for illness related repatriations. However, it is important to note that it is not a non-existing problem. Both Shipowner A and Shipowner B states that if a significant amount of existing crew members would be rejected, they would have difficulties in finding replacing crew members. Moreover, losing a significant amount of existing crew members would mean a decrease of crew members with experience and familiarity to the shipowner's vessels. Consequently, various types of risk related to the operation of the vessel may increase.

In contrast to Shipowner A's and B's concerns about TSC PEME, Shipowner C did not mention any concerns or negative effects from implementing the FCE. The implementation of the FCE resulted in a 45-50% decrease of Shipowner C's repatriation per 1000 man days. Even though Shipowner C has seen a slight increase in the number of crew members that are not in compliance with their pre-engagement health requirements, they have not had problems in finding new crew members. Compared to TSC PEME where gallstones/polyps is the most common reason for not being in compliance, the FCE's most common reason for not being in compliance is the combination of hypertension and diabetes. In addition, gallstones/polyps do not seem to be a common reason for not being in compliance with the FCE. However, no details of the FCE or Shipowner A's enhanced PEME were provided. Therefore, it must be taken in to consideration that the requirements and included tests in these two PEMEs may differ, which makes their experience from gallstones incomparable.

Using a qualitative and semi-structured interview method worked well considering the purpose and outcome of the interviews. Since the interviewed members have very different experience and knowledge about enhanced PEME, especially Shipowner A and B compared to Shipowner C, it would not have been as effective to use a predefined list of questions that was strictly followed. Even though the interviews with Shipowner A and B were quite similar and followed

the list of questions with no or small adaptions, the interview with Shipowner C turned out to need a lot of adaptions as the interview lasted due to the fact that Shipowner C already had an enhanced PEME implemented. However, it was useful to have a prepared list of questions as a basis for the interviews.

5.3 Recommendations to The Swedish Club

The interviews show that all the interviewed parties have an interest in using an enhanced PEME instead of the government required PEME for their Filipino seafarers. Furthermore, all of the interviewed parties uses or have used some kind of enhanced PEME. Based on the comments from the members who do not have a fully developed enhanced PEME program, there seems to be a genuine interest in using TSC PEME if a few adaptions are made. Therefore, the candidate recommends The Swedish Club to develop customized solutions based on the member's wishes and needs. Below are two examples on possible customized solutions:

- A member could use TSC PEME only for newly hired crew members.
- TSC PEME is not used for every PEME, but for example every second or a suggested timeframe that is either more or less frequent than the government required PEME.

Two out of Three interviewed members commented and is concerned about the fact that gallstones is included in TSC PEME and that it is the most common cause for not being in compliance with TSC PEME. As both of these members mentioned, neither of them have had an illness claim related to gallstones. In addition, there is a significant difference in the high percentage of TSC PEME not in compliance gallstone cases and the actual repatriation rate due to gallstones in the Dr. Abaya et.al (2015) study, which may be an indication that the gallstones examinations are not completely accurate. The candidate therefore recommends The Swedish Club to make a further investigation, in co-operation with the two accredited clinics, on how gallstones shall be tested.

5.4 Recommendations for further studies

Except from the illness claim related costs, an ill crew member may be a risk for other types of costs that are related to the safety of the ship. For example, if an officer has a heart attack during his/her watch, navigation related issues such as the vessel running aground. Therefore, it would be interesting to study how pre-engagement illnesses may affect the safety onboard and the costs that may arise.

Another recommendation for further studies is to study how the lifestyle of seafares, onboard and home, is linked to the more common illnesses mentioned in this thesis.

6 Conclusions

The implementation of TSC PEME by a member of The Swedish Club has a positive impact for both the member and the club in terms of their exposure to costs due to illness claims related to TSC P&I Rule 3 sections 1, 2, 4 and 11. Based on all performed TSC PEMEs during the period 2011 – 2014, the cost benefit analysis show that The Swedish Club together with the members involved have prevented a significant amount of illness claims and thus reduced their exposure to claims costs, after additional expenses, up to USD 1.207.846. This figure is only an indication on potential cost reductions since it is not possible to say how many of the not in compliance with TSC PEME but would have passed a government required PEME cases that would have led to an illness claim. However, TSC PEME would be cost beneficial as long as at least 22% of these cases would have led to a claim.

In order to get an understanding on what The Swedish club's members' opinions are on TSC PEME, three members with different amount of employed Filipino seafarers were interviewed. All parties are using or have used some kind of enhanced PEME and has a positive attitude towards the purpose of implementing an enhanced PEME. Shipowner C which is a significantly larger organization than the other two interviewed parties has a well-developed enhanced PEME program called FCE. Moreover, the implementation of FCE resulted in a reduction of ill crew member repatriations by more than 80%. In contrast to Shipowner C, both Shipowner A and Shipowner B is slightly sceptical about a too extensive enhanced PEME due to the risk of incorrect assessments and as a consequence lose many experienced crew members. This concern is especially related to the fact that gall stones are included in the examination and that it is the most common reason for not being in compliance with TSC PEME.

Even if the gallstone related cases are disregarded, it is clear that TSC PEME can reduce the club's and a member's exposure related to illness claims. This have been achieved by increasing the health requirements to a level where medical conditions that have shown to be common reason for illness related repatriations amongst Filipino seafarers are included.

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Guidelines for Conducting Pre-sea and Periodic Medical Fitness Examinations for Seafarers, Annex C

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Appendix

STCW Section A-I/9 paragraph 2.

2 The standards of physical and medical fitness established by the Party shall ensure that seafarers satisfy the following criteria:
.1 have the physical capability, taking into account paragraph 5 below, to fulfil all the requirements of the basic training as required by section A-VI/1, paragraph 2;
.2 demonstrate adequate hearing and speech to communicate effectively and detect any audible alarms;
.3 have no medical condition, disorder or impairment that will prevent the effective and safe conduct of their routine and emergency duties on board during the validity period of the medical certificate;
.4 are not suffering from any medical condition likely to be aggravated by service at sea or to render the seafarer unfit for such service or to endanger the health and safety of other persons on board; and
.5 are not taking any medication that has side effects that will impair judgment, balance, or any other requirements for effective and safe performance of routine and emergency duties on board.

STCW B-I/9, Assessment.

Shipboard task, function, event or condition[3]	**Related physical ability**	**A medical examiner should be satisfied that the candidate**[4]
Routine movement around vessel: - on moving deck - between levels - between compartments *Note 1 applies to this row*	Maintain balance and move with agility Climb up and down vertical ladders and stairways Step over coamings (e.g., Load Line Convention requires coamings to be 600 mm high) Open and close watertight doors	Has no disturbance in sense of balance Does not have any impairment or disease that prevents relevant movements and physical activities Is, without assistance[5], able to: - climb vertical ladders and stairways - step over high sills - manipulate door closing systems

Routine tasks on board: - Use of hand tools - Movement of ship's stores - Overhead work - Valve operation - Standing a four-hour watch - Working in confined spaces - Responding to alarms, warnings and instructions - Verbal communication *Note 1 applies to this row*	Strength, dexterity and stamina to manipulate mechanical devices Lift, pull and carry a load (e.g., 18 kg) Reach upwards Stand, walk and remain alert for an extended period Work in constricted spaces and move through restricted openings (e.g., SOLAS requires minimum openings in cargo spaces and emergency escapes to have the minimum dimensions of 600 mm × 600 mm – SOLAS regulation 3.6.5.1) Visually distinguish objects, shapes and signals Hear warnings and instructions Give a clear spoken description	Does not have a defined impairment or diagnosed medical condition that reduces ability to perform routine duties essential to the safe operation of the vessel Has ability to: - work with arms raised - stand and walk for an extended period - enter confined space - fulfil eyesight standards (table A-I/9) - fulfil hearing standards set by competent authority or take account of international guidelines - hold normal conversation
Shipboard task, function, event or condition[3]	**Related physical ability**	**A medical examiner should be satisfied that the candidate**[4]
Emergency duties[6] on board: - Escape - Fire-fighting - Evacuation *Note 2 applies to this row*	Don a lifejacket or immersion suit Escape from smoke-filled spaces Take part in fire-fighting duties, including use of breathing apparatus Take part in vessel evacuation procedures	Does not have a defined impairment or diagnosed medical condition that reduces ability to perform emergency duties essential to the safe operation of the vessel Has ability to: - don lifejacket or immersion suit - crawl - feel for differences in temperature - handle fire-fighting equipment - wear breathing apparatus (where required as part of duties)