UNIVERSITY OF CAPE COAST

CONCERNS AND RESPONSES TOWARD TRAVEL VACCINATION AMONG INTERNATIONAL TOURISTS IN GHANA

BY

CHARLES ATANGA ADONGO

Thesis submitted to the Department of Hospitality and Tourism Management of the Faculty of Social Sciences, College of Humanities and Legal Studies, University of Cape Coast, in partial fulfillment of the requirements for award of Doctor of Philosophy in Tourism Management

APRIL 2019

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Name: Charles Atanga Adongo

Candidate's Signature:..... Date: 24/04/19

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Name: Dr. Edem Kwesi Amenumey

Signature: ..... Date: 24-4-19

Co-Supervisor's Name: Professor. Akwesi Kumi-Kyereme

Signature: ..... Date: 24/04/19

ABSTRACT

People's concern toward vaccination is increasingly a major contributor to poor vaccine uptake, coverage and disease outbreaks. Despite poor vaccine uptake among international tourists attributed to concerns, research has rarely empirically investigated what constitutes travel vaccination concerns and its relationship with uptake among tourists. This study sought to propose a scale for measuring travel vaccination concerns; explore the underlying reasons of these concerns; examine the relationship between concerns and vaccine uptake and; thus, propose a tourist typology based on their vaccination concerns. A mixed method approach was employed. Qualitative data were first collected through online data mining of 1, 235 posts and field in-depth interviews of 20 respondents. This was followed by a survey of 1,032 inbound tourists in Ghana, using a questionnaire to collect quantitative data. The qualitative data were analysed thematically while structural equation modelling, ratio and logistic regression, and cluster analysis were used in the analysis of the quantitative data. A six-dimensional travel vaccination concern scale was identified with its facets being efficacy, safety, cost, time, access and ethical concerns. These concerns were influenced by respondents' socio-demographic characteristics, tripographics, vaccination information seeking behaviour and vaccination literacy. A significant relationship also existed between concerns and vaccine uptake. Consequently, a typology of vaccination concerned tourists, which is made up of *Crits, Passives and Fluiders,* was identified. In view of this, travel medicine professionals, the World Health Organisation, governments and pharmaceutical companies need proper monitoring and understanding of tourists' travel vaccination concerns and targeted interventions to improve vaccine uptake.

KEYWORDS

Concern

Diseases

Tourist

Vaccines

ACKNOWLEDGEMENTS

I am grateful to my supervisors Dr. Edem Kwesi Amenumey, Prof. Kwesi Kumi Kyereme both of the University of Cape Coast, Ghana and Dr. Juame of the University of Girona, Spain for their guidance and constructive comments during the writing of this thesis. To the WHO SAGE group (Eve Dube and Heidi Larson), my profound gratitude for the reviews and conceptual guidance. I also acknowledge the support of the Erasmus Mundus Mobilities Programme.

To my advisors, Prof. K. A. A. Boakye, Dr. Taale, Dr. Dayour and Dr. Adam, I am most grateful for your assistance and scholarly guidance. I would also like to thank all the lecturers of the Department of Hospitality and Tourism Management, University of Cape Coast for their inputs during my progress presentations. To Mr. Baatiama Linus, Amoah Christian, Samuel, Millicent and Kamilo, your comments and contributions have been useful in the preparation of this thesis. My profound gratitude also goes to my wife Monica Tampuri, for her prayers and encouragement throughout the time of my studies. Next, I would like to thank my parents Adongo Atanga, Rhoda Yidana and Agnes Azambio, for their prayers and support.

I am also grateful to all the international tourists who spared their travel time to take part in the study. Finally, my gratitude goes to the anonymous reviewers for their constructive comments, and to all those who assisted me in one way or the other.

DEDICATION

To my family

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACROYNMS

AMOS	Analysis of Moment Structures
AGFI	Adjusted Goodness-of-Fit Index
ANOVA	Analysis of Variance
AVE	Average Variance Extracted
CB-SEM	Covariance-Based Structural Equation Modelling
CDC	Centres for Disease Control
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
DMOs	Destination Management Organisations
EFA	Exploratory Factor Analysis
GDP	Gross Domestic Product
GDSs	Global Distribution Systems
GFI	Goodness-of-fit Index
GSS	Ghana Statistical Service
GTA	Ghana Tourism Authority
GTB	Ghana Tourist Board
KMO	Kaiser-Meyer-Olkin
IDIs	In-depth Interviews
MOT	Ministry of Tourism
RMSEA	Root Mean Square Error of Approximation
SAGE	Strategic Advisory Group on Vaccination
SARS	Severe Acute Respiratory Syndrome
SEM	Structural Equation Modelling
SMS	Short Message Service
SPSS	Statistical Product for Service Solutions
TLI	Turker-Lewis Index
UNGA	United Nations General Assembly
UNDP	United Nations Development Programme
UNWTO	Unites Nations World Tourism Organisation
WHO	World Health Organisation
WTTC	World Travel and Tourism Council

CHAPTER ONE

INTRODUCTION

Background to the Study

Literature recognises that the travel and tourism industry is vulnerable to various hazards. These include natural disasters, terrorist attacks, financial crises and outbreak of diseases (Hajibaba, Gretzel, Leisch & Dolnicar, 2015; Quintal, Lee & Soutar 2010). Risk and tourism have, therefore, been identified as inseparable. Destinations that fall prey to these hazards become less attractive to tourists as they consider them unsafe and unsecured to visit. Fewer arrivals, in turn, have serious adverse implications on tourism revenue, particularly for tourism dependent economies (Boakye, 2010).

Unlike the other aforementioned hazards, vulnerability to health hazards, such as diseases during travel, is on the high side and common to all destinations (Chien, Sharifpour, Ritchie & Watson, 2017). Notwithstanding this, variations may exist for endemicity of diseases across destinations. From a list of 50 countries, respondents rated Canada, New Zealand, Switzerland, Sweden and Australia as the five safest countries (Sonmez & Graefe, 1998).

On the other hand, Iraq, Somalia, Libya, Lebanon, and Syria were identified as the five riskiest countries to visit. Asia and North America were considered to be riskier in terms of the frequency and severity of natural disasters, while Africa, South America, the Middle East and Asia are perceived to be risky for infectious diseases (Kozak, Crotts & Law, 2007). Cossens and Gin (1994) found that infectious pathogens caused by poor food, water and sanitation practices are perceived to be high in Africa and Asia than in Europe and Australia. Sub-Saharan Africa, in particular, is considered the

breeding ground for deadly diseases of all kinds and is thus, often referred to as the "Infectious Continent.". The prevalence of infectious diseases in the region is mainly attributed to poverty as well as climatic and other socioeconomic conditions (Seebaluck-Sandoram & Mahomoodally, 2017).

Epidemiological evidence acknowledges a critical link between human mobility and the spread of diseases (Dittmann, 2001). The movement of people from one geographical area to another is considered a channel through which pathogens are transmitted. The risk of spreading infections is especially significant when people travel across international borders. Aside migration, international tourism is one of the conduits facilitating the transmission and re-emergence of infectious diseases (Pavli, Silvestros, Patrinos, Lymperi & Maltezou, 2014; World Health Organisation, 2012). Infectious diseases are those caused by pathogenic microorganisms such as viruses, bacteria, parasites or fungi and which can be spread, directly or indirectly, from one person to another (WHO, 2015). Examples of such diseases are Zika, Ebola, Hepatitis, severe acute respiratory syndrome (SARS), bird flu, malaria and HIV and AIDS. The emergence and re-emergence of these worldwide pandemics, in part, have been attributed to international tourism (Aubry et al., 2012).

The growth in the number of international tourist flows globally reflects the rapid movement of people across boundaries. This may pose an increased risk of travel-related diseases, particularly infectious diseases if mitigation measures are not adopted. According to the World Tourism Organisation, international tourism involves the movement people outside their usual countries of stay across international borders in pursuit of leisure, religious, health and business purposes (UNWTO, 2018). For over 60 years,

international tourism arrivals have consistently increased. From 1950 to 1980, international tourism arrivals grew more than ten-fold from 25 million people in 1950 to 278 million in 1980. Between the periods of 1980 and 2000, arrivals had almost doubled, being about 674 million. Again, by 2014, it increased to 1,138 million indicating a 4.7 percent increase over the previous year. According to UNWTO, annual growth in tourism is estimated to increase by more than 3 percent each year reaching 1.8 billion arrivals in 2030 (UNWTO, 2018).

The intersection between international tourism and risk of infectious diseases is attributed to differences in environmental conditions (*i.e* weather conditions, water, sanitation and hygiene) between the tourists' countries of origin and their travel destinations, their travel attitudes and behaviours (Jonas, Mansfeld, Paz & Potasman, 2011). Travel to unfamiliar destinations exposes individuals to unexpected and significant variations in temperature, humidity and altitude which may predispose them to illnesses (WHO, 2012).

Risks of infectious diseases may also arise when people travel to destinations where accommodation and mode of transport are of poor quality, hygiene and sanitation are generally compromised, medical services are under-developed and access to clean and reliable food and water are unavailable (WHO, 2012). Finally, tourism offers a suitable environment for people to engage in sexually risky behaviour (especially casual sex), making those involved vulnerable to sexually transmitted infections. Tourism is considered a 'contranormative setting" for hedonism (Apostolopoulos, Sonmez & Yu, 2002). It provides a conducive environment and freedom for people to engage in behaviours, which at home, would have been frowned upon. These

behaviours range from excessive alcohol/drug use and tattooing to engaging in unprotected sex between fellow tourists as well as between tourists and local partners. Touristic environments, in particular, provide a sense of anonymity. This promotes a feeling of freedom which contributes to engagement in casual sex (Omondi & Ryan, 2017).

International tourists are not only vulnerable to infectious, but are themselves conduits for the spread of infectious disease (WHO, 2012). Research conducted in Australia reports that about 50 percent of travelers reported illness when traveling overseas (Behrens, 1997). In addition, based on data from the GeoSentinel Surveillance Network from 49 specialized travel/tropical medicine clinics on 6 continents, Boggild *et al.* (2010) reported on various vaccine preventable diseases (VPDs) among 37,542 travelers who returned ill. These ranged from enteric fever and viral hepatitis to influenza, varicella, measles, pertussis and bacterial meningitis.

Similarly, the GeoSentinel Surveillance Network indicated that 3 percent of all travelers who returned home with symptoms of fever had vaccine preventable diseases with rates of hospitalisation at about 60 percent (Centre for Disease Control, 2015). This pertains, particularly, to tourists who venture into remote areas and engage in various adventurous activities. This brings into perspective the purpose of visit, duration of stay and behaviour and lifestyle of the tourists as important factors in the international tourism and infectious disease nexus.

Tourists are considered vehicular bornes of infectious diseases, risking the health of not only host destinations but friends and relatives at home and the general public at large (Jonas et al., 2011). Infectious diseases jointly

account for the leading causes of death globally, being 13.4 million annually, while inflicting a hefty economic burden on individuals and societies (Seebaluck-Sandoram & Mahomoodally, 2017). An editorial by Nature Microbilogy notes that measles, for instance, is estimated to have been responsible for 134,200 deaths worldwide in 2015. Similarly, epidemiological data from the WHO showed about 28,616 cases and over 11,000 deaths in the 2014 Ebola outbreak in West Africa (WHO, 2015)

Vaccines have been identified as one of the prophylactic measures to infectious diseases (Larson, Jarrett, Eckersberger, Smith & Paterson, 2014). A vaccine is a biological preparation that improves immunity to a particular disease. It typically contains an agent that bears a resemblance to a disease-causing microorganism, and is made from weakened or dead forms of the infectious agent – bacterium, virus, fungus or parasite, its toxins or one of its surface proteins – that stimulate protective immunity against the pathogen when administered. Vaccines work by invigorating the body's immune system to recognise and respond to an agent as foreign, thereby destroying and remembering it and thus, enabling the immune system to easily recognise and destroy any related pathogens that it later encounters (WHO, 2015).

Vaccines have had a significant impact on human health across the globe, and are considered by public health practitioners to be the most cost effective and important public health intervention undertaken today. Through vaccines, small pox is virtually eradicated (WHO, 2015). Most of the world has been declared polio free, substantial progress has been made towards the global eradication of deaths associated with measles and disability associated with infectious diseases is being prevented. Research suggests that between

2010 and 2015, more than 5 million deaths were averted annually due to vaccinations (WHO, 2015).

Despite these successes, a significant number of people still die each year from infections which could be prevented by vaccination (Dube, Vivion & Mcdonald, 2015). Likewise, the diseases almost eradicated are re-emerging (ibid). The number of polio cases, globally, had decreased by 99% from an estimated 350,000 cases in 1988 to less than 37 reported cases in 2016; yet, a resurgence is being witnessed in parts of the world, principally Nigeria (Larson & Ghinai, 2011; WHO, 2017).

Several factors influence people's decision to engage in preventive health behaviours including uptake of vaccines. These include perceived vulnerability and severity of diseases, health beliefs, policies, vaccine safety and efficacy and perceived benefits of vaccination (Larson et al., 2014; Thompson, Robinson & Vallée-Tourangeau, 2016). Of these factors, systematic reviews have shown that concerns associated with vaccination are the major reasons for both under- and delayed vaccination globally (Karafillakis & Larson, 2017; Larson et al., 2014).

Vaccination concerns, in this context, refer to sentiments or misgivings, which are either perceptual, real or a combination that people have toward vaccines and/or related systems and organizations (*i.e* pharmaceuticals). Those concerns could also emanate from the individual; that is, they could be personal constraints, political and religious reasons. Vaccination concerns can result in loss of confidence in vaccines, lower vaccination rates and resurgence in vaccine-preventable diseases (Larson *et al.*, 2014). WHO (2017) notes that

vaccination concerns, regardless of the level and severity, forms the foundation for attitude, intention and behaviour toward vaccination.

Current vaccination programmes are characterised by misconceptions, medical controversies, false stories and rumours of negative side effects of vaccines, hesitancy and incompletion of vaccination (Larson, Jarrett, Eckersberger, Smith & Patterson, 2014; McGeorge, Grant & de Wildt, 2016). Hesitant attitudes are not confined to only those who refuse vaccination, but even those who are vaccinated. Suboptimal vaccination coverage and the emergence of unvaccinated clusters liable to disease outbreaks partly have been attributed to vaccine hesitancy (Dube, Vivion & Mcdonald, 2015; Dube, Gagnon & Mcdonald, 2015). This challenge the fundamental role of vaccines as public health interventions for controlling the spread of infectious diseases among populations.

Evidence suggests that people have four options when they have concerns toward a choice: minimise concerns by decreasing the likelihood that the choice will fail; move from one type of choice to another for which they think they have more tolerance; postpone decision making, or ignore the concerns by focusing attention elsewhere (Roselius, 1971). More specifically, Water Sanitation and Hygiene (WASH) practices and other behavioural adaption schemes, information seeking, insurance cover and immunization have been highlighted as measures through which health hazards can be prevented or their impacts minimised. Other people ignore the concerns and ultimately derive benefits from them (Durrheim & Foster, 1997). Against this background, this study sought to understand international tourists' concerns toward travel vaccination and uptake.

Statement of the Problem

Despite international tourism contribution to the global spread of infectious diseases, the literature indicates that most people still travel abroad, particularly to endemic destinations without the necessary vaccinations (Frew et al., 2016; Jonas *et al.* 2011; Lo, Cheung & Law, 2011; Lopez-Velez & Bayas, 2007). Frew *et al.* (2016), for instance, noted in their study that more than two-thirds of 1680 respondents were not vaccinated against Hepatitis B. In an attempt to provide explanations to the poor vaccine uptake behaviour among international travellers, extant studies in tourism have largely researched into tourists' perceived vulnerability to health risk at the destination and the severity of the illness and how that shapes their vaccination uptake (Behrens, 1997; Frew *et al.*, 2016; Lammert *et al.*, 2016).

The vaccine literature has concluded that the poor vaccination rates among people are because of several concerns (Karafillakis & Larson, 2017; Yaqub *et al.*, 2014;). For example, Pavli *et al.* (2015) found that about 85.6 percent of international tourists under-vaccinated against cholera, tetanus and typhoid. Similarly, 78.2 percent under-vaccination of the meningococcal vaccine among international tourists was also reported in Pavli *et al.*'s (2016) study. However, up till date, research in tourism and travel medicine in particular has rarely paid attention to what constitute tourists' concerns toward travel vaccination, its antecedents' and implications on their vaccine uptake.

In the context of international tourism, tourists are often recommended and sometimes mandated to take several vaccines at a go against various diseases they are likely to encounter. They are expected to take these vaccines in or on time before departure abroad so as to manage any adverse effects

following the vaccination while home. Unfortunately, some tourists only take the vaccines shortly before they travel abroad due to time constraints (Crockett & Keystone, 2005). These characterisations of travel vaccinations could lead to the nurturing of various context-specific concerns which border on side effects, cost, time and ethics which may be different to 'everyday' vaccination concerns.

To analyse and understand concerns and its implications for vaccine uptake during international travel, a context theoretical framework is required, but is rarely considered. Larson *et al.* (2014) stress the need for context-specific and multi-disciplinary research to unearth the reasons why people refuse vaccines. It is, therefore, surprising that researchers have yet to explore the concerns held by international tourists toward vaccination despite the implications such concerns could have on their vaccination acceptance behaviour.

Furthermore, from a theoretical perspective, the psychometric paradigm indicates that individuals' perceptions about objects including their concerns are multifaceted and should be studied accordingly to gain informed theoretical advancements and policy directions. According to the paradigm, risk concerns, for instance, manifest in various dimensions namely health, psychological, performance, social, safety and security, time and finance (William & Balaz, 2015). It implies that to have a proper and an in-depth understanding of vaccination concerns, a psychometric conceptually grounded approach to studying is required. The available travel medicine studies on vaccination concerns, nevertheless, have often conceptualised and measured the concept from a unidimensional perspective, meaning that individual's

misgivings toward vaccination have mostly being looked at as a single indicator, not as a multi-dimensional construct (Lammert *et al.*, 2016).

The investigation of vaccination concern as a single indicator arguably is not only conceptually narrow but may constrain an in-depth understanding of what constitutes travel vaccination concern, its antecedents and outcomes, which risks poor/inadequate clinical and theoretical usefulness of research findings on this subject. There is a dearth of a psychometric composite scale in the available literature that could be used to assess vaccination concerns of international tourists. While there are vaccination concern measurement items in the tourism literature, they are piecemeal in various articles and may do little to explain the concept.

The second acknowledgement is that there exist useful measures which relate to vaccination concerns in the general vaccine literature, including the vaccine confidence scale (Gilkey *et al.*, 2014), vaccine conspiracy belief scale (Shapiro *et al.*, 2017) and vaccine hesitancy scale (Larson *et al.*, 2015; Shapiro *et al.*, 2017), but beyond their slight relatedness, they are also not tourism and or travel context specific scales. Larson et al. (2014) posit that vaccination concerns are dynamic and context-specific and should be studied accordingly. Inferences can be drawn from the studies conducted in other contexts into tourism, but considering that tourism-related travels are unique to ordinary life (Chen, Bao & Huang, 2014), tourists' travel vaccination concerns may be unique relative to everyday life settings or children immunisation. Hence, a context-specific scale and underlying antecedents are desirable given that drawing an inference from other contexts for policy could be a misfit for the purpose.

Perceived concerns with vaccination are linked to vaccine reluctance, hesitation and refusal (Larson et al., 2016). Nevertheless, the travel medicine literature has hardly analysed vaccine uptake and its relationship with vaccination concern. Notable exceptions include Crockett and Keystone (2005) and Lammert *et al.* (2016) that highlighted vaccine vaccination concerns in addition to other factors as underlying reasons for refusals of recommended travel vaccines. These studies analysed uptake of some specific vaccines, but none modelled vaccination uptake as a rate. Vaccination uptake rate refers to the number of vaccines out of the total recommendable vaccines that the individual currently has taken. It is a measure of immunisation coverage, a key indicator of the level of immunity a population has against vaccine-preventable diseases. Uptake rate helps determine whether vaccination coverage is declining, stagnating or increasing in a given population (WHO, 2017).

Segmentation of the public into various clusters has been recognised and used as a strategy for targeting and tailoring public health interventions including behaviour change communication in vaccination (Padela, Malik, Vu, Quinn, & Peek, 2018). The segmentation is based on intrinsic characteristics of the population deemed useful to the intervention's health promotion goals. Some studies have attempted profiling segments of vaccinees by using spatial locational mapping and socio-demographic characteristics such as age, gender, education and income (Saha *et al.*, 2018), social and spatial factors (Onnela, *et al.*, 2016) and sentiments (Kang, Ewing-Nelson, Mackey, Schlitt, Marathe, Abbas & Swarup, 2017). Both classical (Plog, 1974; Cohen, 1972) and recent studies (see Cvelbar, Ljubica K., Grun, Bettina & Dolnicar, 2017;

Jonas, Mansfeld, Paz & Potasman, 2011) in tourism have also recognised the importance of typologies in understanding a tourist's behaviour. Plog (1974), for instance, proposed the allocentric-psychocentric typology of tourists based on their travel motivations. The current study discerns from the vaccine literature that a typology of tourist based on their vaccination attitudes and behaviour exists (Onnela *et al.*, 2016) but rarely has vaccination concerns been used as a segmentation variable to characterise international travel populations.

Objectives of the Study

The general objective of the study was to examine travel vaccination concerns and uptake among international tourists in Ghana

Specifically, the study seeks to:

1. Propose a travel vaccination concern measurement scale;
2. Explore the underlying factors of international tourists' travel vaccination concerns;
3. Examine the influence of international tourists' travel vaccination concerns on their vaccine uptake; and
4. Propose an international tourists' typology based on their travel vaccination concerns.

Hypotheses and Propositions of the Study

Two hypotheses and propositions each guided the study. The basis for each is provided in the literature review sections of this thesis. This means that each was decided after a review of the literature and retrospectively fed into this section. The hypotheses were:

H_1: the level of vaccination literacy level of international tourists has no significant negative effect on their concerns about vaccination.

H_2: the level of international tourists' vaccination concerns has no significant negative effect on their rate of uptake of vaccines.

The following propositions were tested:

H_3: international tourists' travel vaccination concerns are not multidimensional in nature.

H_4: a distinct segment of international tourists does not exist based on their travel vaccination concerns.

Significance of the Study

A number of researchers (see Lammert *et al.*, 2016; Larson *et al.*, 2016; Yaqub *et al.*, 2014) and organisations (WHO, Centre for Disease Control [CDC], Gavi Alliance) note the need for a comprehensive study into the concerns that people have about taking vaccines. This is to help allay those concerns for increased vaccine uptake. Therefore, unravelling this in the current study could contribute to theory, knowledge and practice discussed as follows.

Principally, this study contributes to the vaccine literature generally and travel medicine in particular in various ways. First, it provides a conceptual and methodological insight into travel vaccination concerns as a concept, its scope and specific dimensions by proposing a measurement scale through a synthesis of the literature and field data. This provides more conceptual clarity on vaccine concerns and minimises redundancies in its theoretical bases. The proposed scale would also serve as a handier tool for assessment of tourists' vaccination concerns allowing for comparison of

findings across personal characteristics, contexts and over time (Shapiro *et al.*, 2018).

Concerns, as mentioned earlier, are an integral part of people vaccination decision-making process. They can result in the consideration of alternatives, if unendurable to the individual (Roselius, 1971; Dube, Gagnon & Mcdonald, 2015). It is, therefore, important for researchers to continue to investigate and deal with those concerns in order to foster vaccination compliance. The development of a measurement scale on vaccination concerns could guide pharmaceutical companies in terms of travel health service delivery and marketing campaigns. Modifications could be made in instances where there are shortfalls while standards can also be maintained in situations of travellers' contentment. Insights into vaccination concerns can also offer those who manage vaccination programs, such as public health professionals, the opportunity to understand and engage with travelers on their vaccination concerns. This can aid them in the design of vaccination campaign messages, such as the writing of the content and framing of their delivery to help address those concerns that were misconceived.

The second aim of the study, which is to explore the underlying factors of tourists' vaccination concerns, such as their socio-demographic characteristics, trip characteristics (hereafter referred to as tripographics) and vaccination literacy constitute another significant contribution of the study to knowledge. The findings here could aid the targeting and tailoring of interventions for addressing specific vaccination concerns among specific categories of tourists. Targeted and tailored approaches are both deemed not only as effective and persuasive in addressing audience specific concerns

when compared to generic messages but useful for addressing health inequities because they engage individuals' values, beliefs and identity structures (Shirazi *et al.*, 2015; Padela, Malik, Vu, Quinn & Peek, 2018). Studies have for instance, noted that religiously-tailored health interventions have been proven more effective in eliciting desired behviours—e.g. compliance cancer screening, relative to non-tailored messages (Shirazi *et al.*, 2015). The aim of the current study is to cluster international tourists based on their concerns about vaccination uptake. This can be extremely relevant in the context of limited resource allocation and the institution of targeted behaviour change communication measures. Such interventions become effective and efficient when audiences are categorised into manageable, more homogeneous segments (Onnela *et al.*, 2016).

Finally, the study is consistent with the national and global efforts toward encouraging promotional health behaviour, particularly, vaccine uptake. Stakeholders intend to better vaccine development by reducing negative sentiments associated with them and increase vaccination coverage to eradicate infectious diseases (WHO, 2017). The United Nations Development Programme through its Sustainable Development Goal (SDG) 3, enjoins all stakeholders to "ensure healthy lives and promote the wellbeing for all at all ages". More specifically, stakeholders are charged to "support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries...," (3.a). This current study marks a good starting point of this call as it intends to assess tourists' concerns about vaccination, and based on the findings, offer practical steps and policy directions on how to deal with those concerns for

their vaccination compliance (United Nations General Assembly, 2015). By extension, this study would contribute to ensuring that there are 'healthy places to live, healthy places to visit' since vaccines save millions of lives from diseases and disability.

Structure of the Thesis

This thesis is organised into ten (10) chapters. Chapter One introduces the research by providing the background to the study, problem statement, research aim and objectives and rationale for the study, as well as the structure of this thesis. Chapter Two provides an understanding of the theoretical and conceptual perspectives on the study based on the objectives. It commences with a brief historical account on vaccination, what vaccines are as well as the types followed by the conceptualisation of vaccination concerns and its possible outcomes. It further appraises various theories proposed in the literature for examining vaccine adoption. Chapter Three provides a review of the empirical literature on vaccination concerns, its antecedents, mechanisms, and impact on people's responses toward vaccination with emphasis among international tourists. Chapter Four concentrates on the research methods, which are largely the research design, study area, population, methods of data collection and analysis. Chapter Five is devoted to a description of the sample along socio-demographic factors and travel characteristics. Chapter Six explores and validates the scale for measuring travel vaccination concerns. The underlying factors of the tourist's travel vaccination concerns are explored in Chapter Seven and the relationship between the concerns and vaccine uptake are analysed in Chapter Eight. Chapter Nine proposes a tourist typology, using their travel vaccination concerns as the main segmentation

variable. Finally, Chapter Ten, which is the last chapter, presents the summary, conclusions, and implications of the study.

CHAPTER TWO

THEORETICAL LITERATURE REVIEW

Introduction

To study vaccination concerns among international tourists and the impact of those on their responses towards vaccines, it is crucial to understand the concepts, definitions and theories surrounding the phenomenon. The chapter considers a brief historical account of vaccines, what vaccines, conceptualisation of vaccination concerns and its possible impacts. It further appraises various theories proposed in the literature for examining vaccine adoption. Three broad theoretical perspectives are considered including psychological, social and economic theories. The chapter concludes with the proposed conceptual framework for the study.

Brief Historical Overview of Vaccines

It is well acknowledged that idea of vaccination has a recognisable historical undertone that dates back several centuries, as far back to 430, but the first contemporary scientific evidence of vaccines is credited to Edward Jenner in 1796, a British physician (Stern & Markel, 2005). Following an outbreak of smallpox in the year 1796 Jenner observed that people who were exposed to the disease subsequently became immune to it. Inoculating an eight-year child, James Phipps on May 14, 1796, with a copy of cowpox virus from a milkmaid's skin lesions and successive exposure to fresh smallpox, the child developed immunity against the infection. This first clinical trial and subsequent others, as well as case histories, provided Jenner with sufficient empirical evidence of the efficacy of inoculation as a prophylactic measure against smallpox. The experimentation was called vaccination owing to the

fact it was designed to prevent the incidence of a virus affecting cows (termed Vacca in Latin).

The Latin word for cow is *vacca,* and cowpox is *vaccinia*; Jenner decided to call this new procedure *vaccination.* This implies that Jenner laid the first scientific evidence to vaccinology (Reidel, 2005). Reliance on indigenous knowledge, experimentation and observation, and rationalism were the key drivers of Jenner's success. By 1900, there were two human virus vaccines, against smallpox and rabies, and three bacterial vaccines against typhoid, cholera, and plague.

In 1979, the World Health Assembly officially declared smallpox eradicated — an achievement that remains one of history's greatest public health conquests. During the 20th century, other vaccines that protected individually against commonly fatal infections such as pertussis, diphtheria, tetanus, polio, measles, rubella, and several other communicable diseases were developed. As these vaccines became available, high-income industrial nations began recommending routine vaccination of their children. According to WHO (2018), there are currently over 20 certified vaccines against various infectious diseases, which are referred to vaccine-preventable diseases (See Table 1).

Vaccination

A vaccine is a biological preparation administered into a person's body with the intention to elicit an immune response(s) against the disease(s) for which the vaccine is intended for. "A vaccine typically contains an agent that resembles a disease-causing microorganism and is often made from weakened or killed forms of the microbe, its toxins or one of its surface proteins. The

agent stimulates the body's immune system to recognize the agent as foreign, destroy it, and "remember" it so that the immune system can more easily recognize and destroy any of these microorganisms that it later encounters" (WHO, 2018:1). Vaccines sometimes contain preservatives or antibiotics to preserve the vaccine or adjuvants to stimulate an immune response.

Drawing from the preceding WHO's definition of a vaccine, travel vaccination is therefore an attempt to expose the body to a hopefully benign form of the disease so that the body can respond defensively as if it were infected with the disease without getting sick and can hopefully have optimal memory on that infection for the future if it is exposed to the actual natural infection.

Stern and Markel (2005) are of the view that despite vaccination and immuinisation often used interchangeably in practice, the latter is a more inclusive term, which refers to the development of adequate immunity to a disease as a result of the administration of a vaccine. This immunity may vary based on the type of vaccine, number of doses received and vaccination history against the same disease (WHO, 2013). Travel vaccines may require single or multiple doses for adequate immunity depending on the age of the recipient and type of vaccine. For instance, the majority of child vaccines require multiple doses and sometimes a booster, when compared to adult vaccines, to rejuvenate declining immunity. Other vaccines such as the seasonal influenza vaccine require routine renewal because the circulating pathogens vary year to year (WHO, 2013).

How Vaccines Work

Vaccines work in two main ways to prevent disease incidence and spread among populations, both at the individual and community levels. At the individual level, vaccines stimulate the body to produce antibodies against the disease (s) vaccinated against. They work by priming the body's immune system to recognize and respond to the agent as foreign, destroy it, and keep a memory of it so that the immune system can easily recognize and destroy any related pathogens that it later encounters (WHO, 2018).

The immune system is colloquially referred to as the defense system of an organism. It comprises the various cells, tissues and organs that work together to protect one against disease-causing pathogens. Pathogens are a bacterium, virus, protozoa and other microorganisms that cause diseases. The immune system identifies antigens produced by pathogens and provides protection to the body by producing antibodies, a protective protein and distinct white blood cells called lymphocyte, which attacks and destroys the invading antigens. The immune system also neutralizes toxins that some of the pathogens produce.

There are two ways of acquiring immunity to a pathogen – by natural infection and by vaccination. "The goal of all vaccines is to elicit an immune response against an antigen so that when the individual is again exposed to the antigen, a much stronger secondary immune response will result" (WHO, 2013:16). Vaccines are made of the same antigens that are found on pathogens that cause the attendant disease, only that the antigens in vaccines are controlled. The diseases for which there exists a vaccine which provides

partial or complete immunity to the body are called vaccine-preventable diseases.

At the community level, vaccines create "herd immunity": the inability of a pathogen to spread within a population due to the majority of the people being immune to the pathogen. Herd immunity is especially important for safeguarding at-risk individuals including infants and immune-compromised persons (including the old and the sick). The implication here is that through herd immunity, vaccinated people protect themselves and those who cannot be vaccinated for various reasons. The threshold of vaccine coverage required for herd immunity depends on the disease, but it typically ranges between 80% - 90% vaccination of the population (Brewer *et al.*, 2017).

The concern, however, about herd immunity is free rider problem, where some people intentionally choose not to vaccinate with the intent of benefiting from those who are immune. Free riding is high when others conceive that the majority of the population have vaccinated. Increase in free riding is directly correlated with outbreaks implying that as the proportion free riders in a population increases, the chance of outbreaks is high.

Types of Vaccines

Vaccines are generally classified by mode of manufacture and administration. As regards manufacture, vaccines have been classified into four typologies based on the antigen used in their preparation. Antigens are the components derived from the structure of disease-causing organisms, which induces immune response in vaccinated population. According to the WHO (2017), there are four categories of vaccines, namely, life attenuated vaccines (LAVs), inactivated, subunit and toxoid. The vaccines made from dead forms

of the infectious agent are called inactivated-whole cell (killed antigen) vaccine (IWVs). IWVs have extremely low risk of inducing the disease they are given against since they contain dead antigens and also considered more stable than LAVs. These make IWVs safer and more suitable for immune-compromised persons. The drawbacks of IWVs are that immune response is not always guaranteed, especially at first dose and the response may not be sustainable implying that a number of doses might be required to induce a sufficient immune response over time

Those vaccines prepared from live or less virulent pathogens are termed life attenuated vaccines (LAV). LAVs confer excellent and sustainable immune response but the disadvantage is that since LAVs pose safety and stability concerns. Since they contain live organisms, they have the very rare possibility to mutate to a pathogenic form and cause disease. People who are immune-compromised, such as HIV patients and elderly people may not be able to respond satisfactorily to LAV posing potential harm. LAVs' are vulnerable to contamination by other viruses if grown in a contaminated tissue culture (e.g. retroviruses with measles vaccine) and have a significant chance for immunization errors.

Subunit vaccines are similar to IWVs, which is, they are manufactured from "killed" pathogens but differ from IWVs, by comprising only the antigenic fragments of the pathogen, which are required to evoke an immune response. The use of antigenic fragments requires precision which comes at a cost since the antigenic properties of the various potential sub-units of a pathogen must be studied in detail to identify which particular combinations will engender an effective immune response with the correct pathway. The

other issue with sub-unit vaccines is that but there is no assurance that immunological memory will be formed for future responses. Sub-unit vaccines can be further classified into protein-based subunit vaccines, polysaccharide vaccines and conjugate subunit vaccines.

Toxoid vaccines are produced using the toxins of pathogens (e.g. tetanus or diphtheria). The toxins are often inactivated or suppressed (toxoid) through formalin or heating but the antigenic properties are maintained to stimulate immunity. To increase immunogenicity, the toxoid usually requires adsorption in adjuvants such as aluminium or calcium salts and series of doses to elicit immunity. Toxoid vaccines are also safe since they have an extreme low of reversion to virulence, which is causing the disease it intends to prevent. Toxoid vaccines tend to cause very rare low adverse reactions and are very sustainable since they are less susceptible to changes in temperature, humidity and light.

Aside from the four main categories of vaccines, vaccines can also take the form of combination. Combination vaccines are made up of several antigens in the same preparation meant to offer protection against two or more diseases or against a particular disease caused by different strains of the same pathogen. The WHO (2017) posits that vaccines can also be monovalent or polyvalent. A monovalent vaccine contains a single strain of a single antigen (*e.g.* Measles vaccine), whereas a polyvalent vaccine contains two or more strains/serotypes of the same antigen (*e.g.* OPV). Examples include the combined diphtheria-tetanus vaccine for adult travellers or the combined diphtheria, tetanus and pertussis (DTP) and measles, mumps and rubella (MMR) vaccine for children. Potential benefits of combination vaccines to

travel clinics include reducing the cost of stocking and administering separate vaccines and to the traveler, they reduce the number of injections required (and associated fear and pains) and the extra cost that may be associated with clinic consultation fees in the case of vaccines in series (WHO, 2017).

Specific to travel, there are three classes of vaccines namely routine, required and recommended travel vaccines (Crockett & Keystone, 2005; WHO, 2013). Routine vaccines are those that are recommended for everyone and are usually part of most national childhood immunisation programmes. However, some routine vaccines are recommended for adults, and some are recommended every year (a flu vaccine) or every 10 years (a tetanus booster). Examples of routine vaccines are Hepatitis A and B, Rotavirus, DTaP, Tetanus, Pneumococcal, HPV, flu, polio, Meningococcal. Most adults in some countries have received all their routine vaccines as children, which has significantly provided herd immunity to populations in those countries to diseases prevented by routine vaccines. However, it is crucial for international travellers to be up-to-date on routine vaccines because under-vaccination rates are still common in some countries (CDC, 2017, WHO, 2017).

Required vaccines are mandatory vaccinations travelers are expected to take prior to entering certain designated destinations based on international health regulations. For example, yellow fever vaccination is required for travellers of over 9 months of age arriving or in transit of at 12 hours through at-risk countries to Ghana; and Meningococcal disease and polio are required for pilgrims to Saudi Arabia. Unlike required vaccines, recommended vaccines are not mandatory and are often suggested to international tourists

based on disease risk endemicity of country of origin or destination visited (Crockett & Keystone, 2005). In other words, recommended vaccines tend to be a region or country-specific depending on the level of endemicity. Table 1 below provides a summary of the various categories of travel vaccines.

Table 1: Summary of Vaccine Preventable Diseases and Nature of Vaccines

Type of disease	Category of vaccine[1]	Type	Route
Yellow fever	Mandatory /Recommended	LAV	SC
Hepatitis B	Routine	LAV	IM
Hepatitis A	Recommended	LAV	IM
Hepatitis E	Recommended		
Tetanus	Routine	ITV	
Diphtheria	Routine	ITV	
Meningococcal	Mandatory/Recommended		
Measles	Routine	LAV	SC
Typhoid fever	Recommended	LAV	ORAL & IM
Tuberculosis	Routine	LAV	
Poliomyelitis	Routine/Recommended/ Mandaory		
Cholera	Recommended		Oral
Rubella	Routine	LAV	IM
Mumps	Routine	LAV	
Rabies	Recommended		IM
Influenza	Routine		
Human Papillomavirus	Routine		
Pertussis	Routine		
Pneumococcal	Routine	Conjugate	
Japanese Encephalitis	Recommended	IAV, LAV	IM
Shingles / Zoster	Routine	LAV	
Rotavirus	Routine	LAV	Oral
Poliomyelitis	Mandatory		Oral/SC/IM
Varicella herpes	Recommended	LAV	

IM, Intramuscular; SC, subcutaneous; LAV, Live attenuated Vaccine; ITC, Inactivated Toxoid Vaccine
Source: WHO (2017)

Vaccine Concerns: Conceptualisation

This section of the literature review provides insights into the conceptual thoughts and dimensions of vaccination concerns by examining the nature with which concerns have been defined and measured in the literature. Similar to other psychological concepts, there is currently no commonly recognised definition for the term "concern". But, literally, it has been used variously in previous studies both as a verb: to relate to or be about, and a noun: denoting the state of an issue, one that matters or is of interest to someone. A concern could connote both positive and negative perceptual issues that matter to someone though its negative usage seems to dominate in the literature.

The literature provides evidence that people have concerns with vaccination. This has often been studied using related terms such as risk and uncertainty, worry, anxiety, fear, constraints and hesitancy (Crockett & Keystone, 2005; Karafillakis & Larson, 2017). Discerning vaccination concerns through its associated signals is understandable because it may be difficult to directly observe it. What matters is to operationally distinguish between these terms and use them in specific ways. But this appears not to be the case in the current vaccine literature.

Studies have used these concern-related terms interchangeably without providing their conceptual differences, which may not only result in conceptual inconsistencies but limit the comparison of research findings. For instance, Karafillakis and Larson (2017) make no differentiation between the terms albeit using them interchangeably in their study, which is quite problematic. Research in psychology indicates that terminologies: risk and

uncertainty, worry, anxiety and fear despite their similarities and relationships, have some subtle differences, which must be recognised (Fennell, 2017; Yang & Nair, 2014). These terms are adopted in the current but used in very specific ways to discern travel vaccination concerns.

Concern as Risk and Uncertainty

Risk and uncertainty apply virtually to all clinical situations encountered by people including vaccination (Hillen *et al.*, 2017). Nevertheless, it appears there is lack of a one size fit-for-all definition for these concepts, which may be attributable to differences in the social and cultural contexts within which it is studied. But, there is a conceptual consensus that they signify an expected but uncertain feeling of danger with the likelihood of loss (Bauer, 1960). A vaccination-associated risk is, therefore, the probability of occurrence of harm and its severity following immunization over time, which can either be perceived or real (Karafillakis & Larson, 2017).

Broadly, the literature classifies risk into absolute and perceived. Absolute risk denotes an objective assessment of potential hazards and the magnitude of their consequences whereas the perceived risk is the subjective estimation of the hazard and its associated adverse implications (Adam, 2015). In this view, absolute risk does not vary from person to person, but the subjective risk does. Risk and uncertainty towards immunisation is considered a growing problem because vaccines are administered to healthy individuals yet it is cautioned that vaccines are not 100 percent safe. In addition, it is difficult to optimally estimate all the long-term harms and implications of vaccines prior to their uptake. These together with rising medical

controversies in the media about vaccination lead to risk and uncertainty concerns (Hillen *et al.*, 2017).

A noticeable trend in the literature is the debate surrounding the usage of the terms risk and uncertainty. The first side of the debate has to do with that school of thought that views risk and uncertainty as related concepts, which often have subscribers, using both terms interchangeably. For them, a risk is viewed as an individual's unfavourable feeling of uncertainty about the outcome and consequence of an action (Quintal, Lee & Soutar, 2010). According to this school of thought, every consumption decision of the individual has an implicit risk, which manifests in two interrelated forms of uncertainties. First is uncertainty about the consumption decision, which often has one, for instance, questioning whether he or she needs a particular vaccine. The other form of uncertainty is the consequence of the action, that is, whether the vaccine will yield the desired result.

The second side of the debate argues for a distinction between risk and uncertainty. In differentiating between risk and uncertainty, Williams and Baláž (2014) denote risk as probably known uncertainties while uncertainty denotes unknown uncertainties. With uncertainty, there is partial knowledge or 'no known probabilities of outcome and severity of the perceived harm. Therefore, it is a situation in which anything can happen and one has little or no idea as to what it is or what it will be (Hillen *et al.*, 2017). Uncertainty is characterized by lack of surety or indeterminacy of future outcomes as either positive or negative whereas with risk some measure of likelihood can be assigned to the adverse possible outcome (An, Lee & Noh, 2010). However, common among the concepts is that both draw attention to some inherent loss

in a choice situation. This accord, however, only highlights the negative connotation of risk and uncertainty, which can be misleading and limiting. In clinical settings, people have pursued uncertainty and ultimately derive benefit from it (Hillen *et al.*, 2017).

Risk and uncertainty is multi-dimensional, meaning that people can associate different levels of it with the same event implying a varied conception of potential losses. The general literature mentions various dimensions of risk and uncertainty, namely, equipment (concerns about needles), financial (vaccines are expensive), physical (side effects), psychological (purchase does not commensurate the buyer's personality or values), satisfaction (low effectiveness of vaccines), social (purchase will adversely affect others' opinion about consumer), time (too much time or waste of time), privacy (lack of privacy when receiving vaccines) and safety and security (Roehl & Fesenmaier, 1992). However, rarely has the concept of risk and uncertainty in travel vaccination been explicitly and thoroughly studied despite its recognition as being multifaceted.

Concern as Worry

Worry is considered an outcome of risk and uncertainty but not always given that people may judge certain consumption decisions as risky or their outcomes as uncertain but may not worry about them while others may not evaluate them as risky yet worry about them (Larsen, Brun & Øgaard, 2009). Worry is defined as uncontrollable troubled thoughts about actual or would-be problems due to the individual's conscious or unconscious attempt to engage in mental problem solving about issues where outcomes are considered risky or uncertain. People worry because they think that worrying

buffers and or minimizes adverse outcomes associated with events (Larsen *et al*, 2009).

Concern as Anxiety

Vaccination anxiety refers to the expression of fear in response to the anticipation or experience of taking a vaccine including the equipment such as needles or consultative services that are conditioned upon uptake of a vaccine. It suggests that the onset of anxiety in vaccination may emerge in many varied ways perhaps depending on the type of vaccine, context factors and or personal characteristics. WHO identifies anxiety adverse events as one of the five adverse psychological issues associated with vaccination, apart from vaccine product-related reactions, vaccine quality defect-related reactions, immunization error related reactions and coincidental events (WHO, 2013).

Vaccines and vaccination procedures are characterized by various anxieties and related adverse events. Evidence exists that a significant number of people during pre-travel consultations are anxious about injections prior to actual vaccination. In Noble, Farquharson, O'Dwyer and Behrens' (2013) study sample, they estimated the prevalence of injection anxiety when taking travel vaccines to be more than 39 percent. A systematic review by Loharikar *et al.* (2018) identified fainting, dizziness, palpitations, fainting, giddiness, headache, hyperventilation, and weakness as some anxiety-related symptoms following immunization (Loharikar *et al.*, 2018). Implicated vaccines included tetanus, tetanus-diphtheria, hepatitis B, oral cholera, human papillomavirus and influenza A (H1N1).

Concern as Fear

Fear is an emotion all sentient beings at a point in life experience, and is often aroused in different ways and intensities at different stages depending on the situation at hand. It is a feeling of nervousness induced by perceived danger. Fear has been categorised into state fear, which is temporary in occurrence, and trait fear, which persists over time (Fennell, 2017). The anticipation of travel vaccination can elicit its own set of fears, as does taking the vaccine and after taking the vaccine. Expressing fear of watching others vaccinate, needles, blood-injection-injury and contracting the disease (s) vaccinated against has been noted (Nir, Paz, Sabo & Potasman, 2003).

Fear is differentiated from its often used closely related concept of anxiety such that the former is present-focused, brief in its arousal and tend to use a defensive reaction of escapism or avoidance (Sylvers, Lilienfeld & LaPrairie, 2011). Fennell (2017) surmises fear as a higher order emotional feeling structured into fear as nervousness, which is made up of anxiety, worry and constraints, and fear as horror consisting of shock, risk and panic.

Concern as Constraints

Constraints of vaccination are thought as the factors that may inhibit individuals who are willing to vaccinate. Crawford, Jackson and Godbey's (1991) tripartite hierarchical constraints typology remains the most referred to by studies analysing participation constraints. According to this model, there are three main categories of constraints, namely, intrapersonal, interpersonal and structural. Intrapersonal constraints are the individual-level (*i.e* characteristics, knowledge, attitudes, beliefs and personality traits) inhibitors of vaccination; interpersonal are the inhibitors that result from individuals'

relationships with others such as family members, friends and relatives, and structural constraints are the institutional, organization, community and policy environments level inhibitors (Crawford *et al.*, 1991). Drawing from Crawford *et al.'s* (ibid) model, vaccination constraints could range from lack of information, cultural and religious or philosophical beliefs, financial to time resources (Crockett & Keystone, 2005; Thomson *et al.*, 2016).

The review, conclusively, suggests that researchers have used and are still using different but interrelated terms in operationalising the term 'vaccination concern'. However, given the random and inconsistent nature of the terms, this current study draws on the preceding discussions to propose a broader and more overarching definition of vaccination concerns as views, which are either perceptual, real or a combination, which potentially limits people from embracing vaccination whole-heartedly.

Concerns toward vaccination can be cognitive or emotional or combination and are intricate and dynamic, which means that they may either stem from the individual, the vaccine, the purchasing context. It is reflected that those who vaccinate and those who refuse vaccines can both be concerned about certain aspects of vaccination (Yaqub *et al.*, 2014), and thus the concerns are cognitively interwoven along the vaccination uptake sequence including: (1) decision to vaccinate (2) after decision (3) during the vaccination process and (4) after vaccination and recollection.

Outcomes of Travel Vaccination Concerns

People respond in varied ways toward vaccination depending on the concerns in hand. These responses are regarded in the current study as the outcomes of concerns toward vaccination. These responses are cognitive,

emotional or behavioural and their valence could be positive, negative or a combination and may co-occur (Hillen *et al.*, 2017). The Strategic Advisory Group of Experts (*SAGE*) considers individuals' responses towards vaccine uptake as a continuum, oscillating between complete refusals of vaccine to outright acceptance and maybe context, time, population and vaccine-specific (WHO, 2013). Acceptance refers to the act of consenting to vaccination without any reservations. It involves adoption and endorsement of vaccination to other people. Refusal, on the other hand, refers to complete rejection of vaccination (McDonald, 2015). The SAGE identifies two forms each for acceptance and refusal of vaccination, which indicates some heterogeneity in these reactions. These are an outright refusal of some or all vaccines and outright acceptance of some or all vaccines (WHO, 2013).

In between vaccine refusal and acceptance is a third category known as vaccine hesitancy. The term 'vaccine' hesitancy in the literature is characterised with lack of conceptual clarity, which has been attributed to the attempt to use hesitancy to explain all partial or non-vaccination as well as a lack of a clear distinction in its determinants (Bedford *et al.*, 2017). The widely cited definition of vaccination hesitancy is the one by SAGE: "a delay in acceptance or refusal of vaccine despite availability of vaccine services" (WHO, 2013). The definition further outlines three broad factors as the determining reasons, specifically, confidence-do not trust vaccine or provider, complacency-do not perceive a need for a vaccine- and convenience-accessibility barriers to vaccines. Despite the usefulness of this definition, it is limited in two important ways: (1) hesitancy being considered a behaviour, though it is an attitude (2) the all-encompassing application of the term

hesitancy, in terms of conceptualization and an underlying reason, to non-vaccination, "when in fact some non-vaccinators are forthright in their refusal, and may never have been hesitant" (Bedford *et al.*, 2017: 1). A case in point is the consideration of physical availability, geographical accessibility and literacy as determinants of hesitancy when they are more of physical barriers than attitudinal barriers.

Yaqub *et al.* (2014) delineate hesitancy as doubting the benefits and worrying over the safety of vaccines, which reinforces the argument that hesitancy is an attitudinal trait. They further argue that hesitant attitudes are not confined only to those who refuse vaccination, but even those who are vaccinated. The preceding conceptual thinking is in sync with the SAGE working group's view that: "vaccine-hesitant individuals may refuse some vaccines, but agree to others; delay vaccines or accept vaccines but are unsure in doing so" (Larson *et al.*, 2014).

The current study, however, is of the view that doubts, worries and skepticism about usefulness and safety of vaccines are more of concerns, which at best are antecedents of hesitancy and should not be equated to hesitancy. Bedford *et al.*, (2017) caution that such vagueness of the use of the term hesitancy could result in accurate measurement and proposition of policy directions that are inappropriate for solving the problem. The writers have, however, acknowledged hesitancy as akin to delay in taking vaccines and recommends under-vaccination as the over-arching term that describes those who are unvaccinated or partially vaccinated for any reason.

Theoretical Perspectives of the Study

People's concerns toward vaccination are multifaceted and much more the underlying factors and outcomes are myriad and complex (Larson *et al.*, 2015); therefore, a single theoretical approach or lens may not be sufficient in explaining the issue. These require integration of several theoretical perspectives for possible explanations. A number of theories have been identified in literature, which based on their tenets offer, in part or holistically, possible explanations to people's vaccination concerns and their responses toward vaccination.

These include the health belief model (HBM), integrative model of uncertainty tolerance, the optimism-pessimism theory, the 3CS model of vaccine hesitancy, reflexive modernization theory, expected utility theory, cumulative prospect theory and ambiguity aversion theory. These theories broadly are psychological, social, economic, cultural and hybrid theories. Psychological theories, in this context, are referred to as the behavioural-based theories which focus on the cognitive and emotional processes underlying preventive health behaviour adoption. The social theories concentrate on the structural, environmental and societal influencers while economic theories emphasise the demand and supply market forces.

While it is conceded that these above-mentioned theories in their tenets appear not entirely mutually exclusive, each is briefly reviewed. The decision to triangulate theories which is to accommodate the different theories is to balance and optimise their unique perspectives to explaining individual's concerns and vaccination uptake. Second, it is intended to minimise the shortfalls that come with the use of a single theory. No theory can claim

exhaustiveness in explaining a social phenomenon in terms of breadth, depth, specificity, and precision. Some theories either sacrifice conceptual depth for breadth or the vice versa and may therefore be less useful in some contexts (Hillen *et al.*, 2017).

Psychological Theories

Health Belief Model

The Health Belief Model proposed in the 1950's remains the most cited and probably the most used framework for explaining health behaviours among healthy and ill populations including uptake of vaccination. Beyond proffering the underlying reasons to preventive health behaviours, its usefulness for designing intervention strategies has been widely acknowledged (Rosenstock, 1974). The HBM postulates that health behaviour is derived from the beliefs and attitudes of people. Therefore, preventive health behaviour is a function of perceptions about hazards and expectations about the preventive action (Rosenstock, 1974; Rosenstock, Strecher, & Becker, 1994). These two main factors could derive preventive health decisions singly or in combination. Perception about the hazard is categorised into perceived vulnerability and severity (jointly referred to as the burden of the threat).

Perceived vulnerability involves one's subjective assessment of probability being a victim of a health threat (Champion & Skinner, 2008; Rosenstock, 1974), with a strong conviction of vulnerability associated with an increased chance of engaging in measures to reduce the risk (Munro *et al.*, 2007). Perceived severity has to do with the belief about the seriousness of the consequences associated with the threat (Champion & Skinner, 2008). It involves an evaluation of the disease condition and the costs the person

believes could arise from it. The costs could be direct or indirect and range from worries, stigma, disability, the medical cost to even death. The stronger the perceived plausible costs associated with the hazard, the higher the motivation of adopting a preventive behaviour. Based on the burden of the threat, health behaviour options are weighed in terms of cost and benefits referred to as behaviour expectation.

Expectations about the behaviour are also a combination of two dimensions: perceived benefits and perceived cost/barriers. Perceived benefits relate to the belief that the one's action would yield useful outcomes in reducing the risk to the hazard or seriousness of its impact. If there is the belief that the intervention has the potential to reduce one's susceptibility to the condition, the likelihood of adoption is high (Champion & Skinner, 2008).

Though individuals may perceive some benefits with the recommended action, cost of the preventive action could undermine adoption (Champion & Skinner, 2008; Rosenstock, 1974). The perceived barrier element involves the potential constraints of the involved action including its cost, pain, side effects and inconvenience. These constitute the concerns associated with the action and undermine adoption of the action (Makarovs & Achterberg, 2017). Subsequently, both empirical and theoretical advancements saw the addition of cues to action and self-efficacy as important constructs that can influence health behaviour (Figure 1).

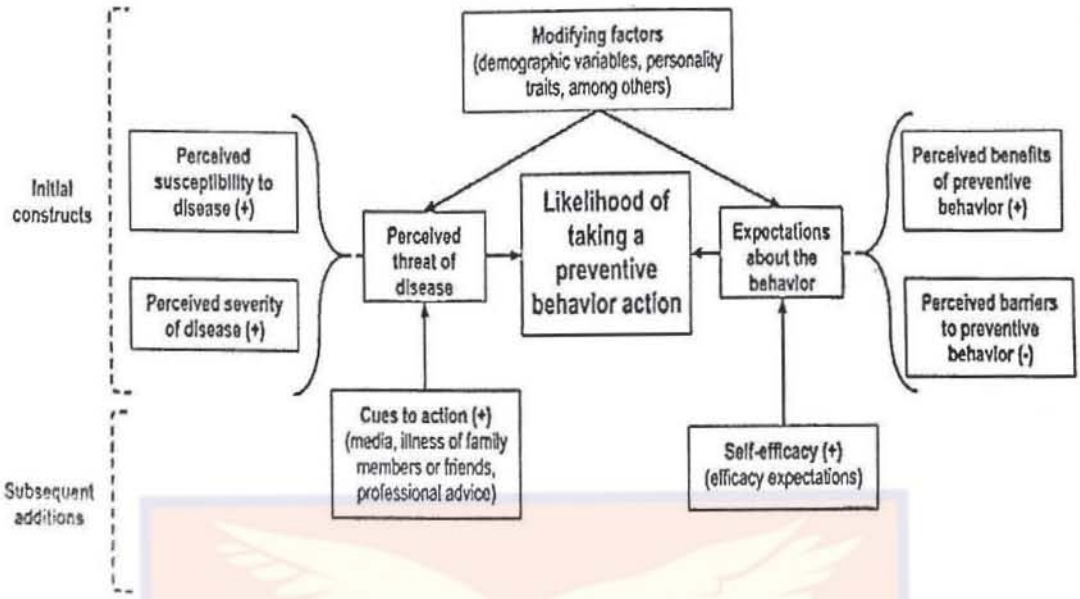


Figure 1: Health Belief Model
Source: Rosenstock (1974)

Rosenstock (1974) found that cues or triggers to act appear necessary in engaging in preventive behaviours, which are either internal or external. Medical advice, public awareness campaigns and previous experience with the disease are some noted cues to action (Claar, 2011). Self-efficacy is assumed as the confidence or belief in one's own abilities to engage in the desired promotional health behaviour, which emphasises the importance of knowledge and literacy in adopting a preventive measure(s) (Claar, 2011). Bandura (1977) notes four sources of efficacy: organic experience, vicarious experience, verbal persuasion, and physiological states. Therefore, HBM further suggests that while perceived vulnerability, severity, benefits, barriers and cues to action are considered primary predictors of health behaviour, other variables such as socio- demographic such as age, sex, educational attainment are potential modifiers of perceptions and beliefs which could possibly confound the relationships posited.

The HBM is deemed useful and has been applied in explaining underlying reasons for people's adoption of vaccination (Makarovs &

Achterberg, 2017). Makarovs and Achterberg (2017) observed that perceived vulnerability to flu increases the likelihood of vaccine uptake. Relying on the HBM, it is the expectation of the current study that tourists' responses toward vaccination will involve a cognition of one or some components of the HBM including their perceived vulnerability, perceived severity, perceived efficacy of the vaccine, and more particularly their concerns toward vaccination. Vaccination concerns could include the conviction that a vaccine would not be effective in buffering the aversive event; vaccination is not accessible or perhaps expensive. Arguably, all the other conditions necessary for a person to adopt a vaccine can be right but once there are concerns, they result in undesirable responses toward vaccination.

One of the specific limitations of the HBM is the failure to offer the various forms of barriers to adoption of a preventive action and underlying antecedents unlike Crawford *et al.'s* (1991) tripartite hierarchical constraints typology that preempt potential constraints as intrapersonal, interpersonal and structural. Another key limitation of HBM is its theorization of a direct linear relationship between the kinds of responses to preventive action, which is either adaptive or maladaptive and the antecedent factors. However, literature has noted that the association is not linear as theorized, prompting the need to isolate mediating and moderating factors (Tunner, Day & Crask, 1989).

The Integrative Model of Uncertainty Tolerance

The integrative model of uncertainty (IMUT) tolerance is proposed by Hillen, Gutheil, Strout, Smets and Han (2017). The axiom of this theory is that health care is characterised by several unknowns (uncertainties) with possible

positive and negative outcomes. The theory further asserts that uncertainty is not a monolithic phenomenon but multidimensional. IMUT is made up four main components, namely, stimulus, perceived uncertainty, moderators and appraisal/responses.

Uncertainty is a situation where the nature of events formed, their extent, conditions and consequences cannot be objectively predicted. Uncertainty is considered a function of ignorance, which is a tripartite stimulus: probability, ambiguity and complexity (Figure 2). Probability refers to the indeterminacy or randomness of future events (Han *et al.*, 2011). Ambiguity denotes the property of information about a phenomenon, which pertains to its lack of reliability, credibility, or adequacy, and complexity refers to the characteristics of a phenomenon that make it hard to understand. Each of these stimuli can result in the likelihood that people will hold certain concerns toward an object.

Mishel (1988) in her 'uncertainty in illness' theory argues that perceived uncertainty represents either danger or opportunity and that these evaluations lead to the usage of coping strategies which could be either emotion-focused or problem-focused. Hillen *et al.* (2017) refer to these coping strategies as cognitive-emotional-behavioral reactions to uncertainty. These responses are either positive or negative and might co-occur temporarily (Dugas *et al.*, 2001). Cognitive responses consist of a variety of appraisals, such as doubts, denials, opportunity, confidence and faith. Emotional reactions include varied states, namely, discomfort, anxiety, anger and excitement. Behavioural responses include information seeking and avoidance.

By this frame of thinking, when people experience worries or anxiety they are most likely to appraise uncertainty as a threat, and when they experience positive emotions they appraise it as an opportunity (Brashers, 2001). These appraisals, in turn, lead individuals to either avoid or seek information as a means of managing their uncertainty. According to IMUT (Figure 2), the relationships between stimuli, perceived uncertainty and response is not direct but moderated by a number of factors. Some of the moderators could be cultural (values and beliefs) and social factors, situational and individual characteristics (*e.g* gender and motivations).

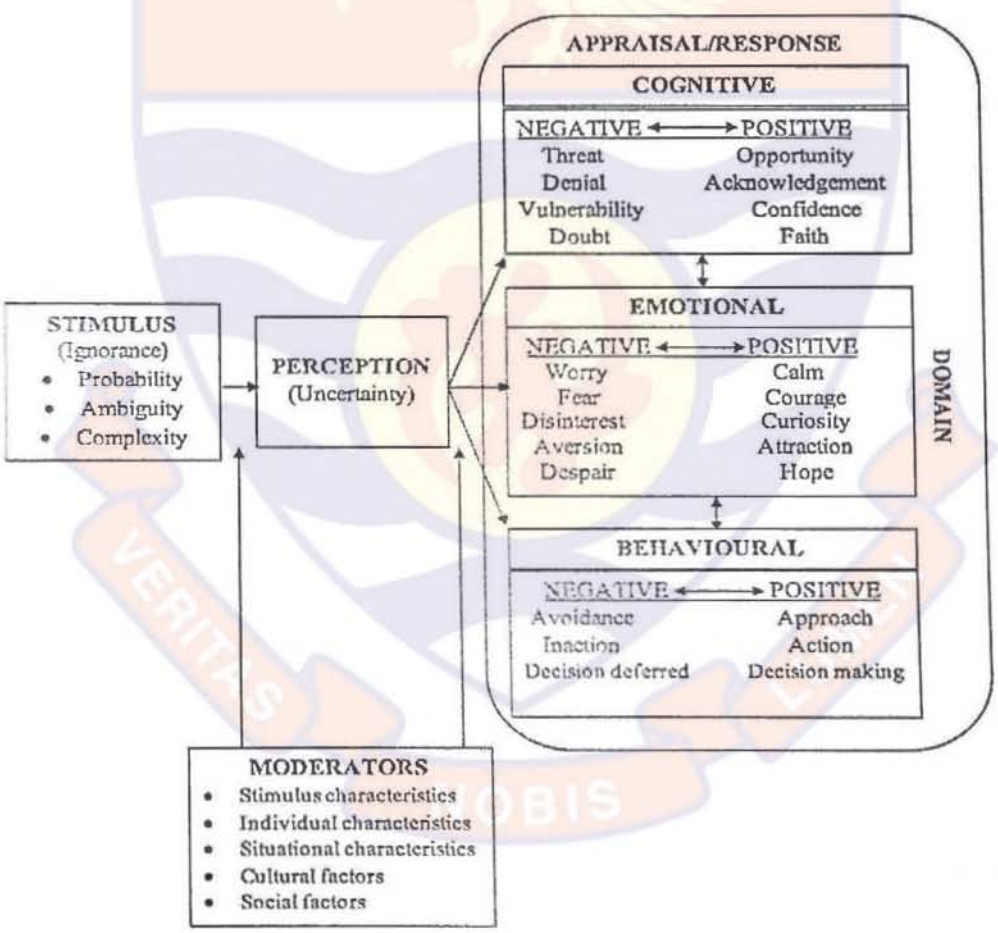


Figure 2: Integrative Model of Uncertainty Tolerance
Source: Hillen, Gutheil, Strout, Smets and Han (2017).

Given the recent nature of IMUT, it has not yet received wide applicability when compared to HBM. Nevertheless, the model appears comprehensive and easily adaptable for studying uncertainty concerns,

antecedents, as well as associated outcomes in contexts. The major strength of this theory lies on its overarching nature in explaining uncertainty in health decisions and its underlying antecedents and consequences.

The nature of vaccination involves a healthy person taking in a biological preparation whose impact, though touted to be positive, on one's body is futuristic and long term. That is, the impact on the involved individual cannot be determined forehand prior to administration and this could arouse uncertainty of outcome and associated concerns of fear, anxiety and worry. This uncertainty is likely to be intensified by the scientific debates by anti and pro-vaccines groups with conflicting information which surround the safety and efficacy of vaccines (Becker *et al.*, 2016). These concerns could in turn result in maladaptive or adaptive behaviours toward vaccination such as hesitancy, avoidance or acceptance of vaccination depending on one's uncertainty tolerance level.

The Optimism-Pessimism Theory

The dispositional bipolar optimism-pessimism theory is proposed by Scheier and Carver (1985) to provide an understanding of people's perspectives and cognitive expectancies from encounters and how those expectations influence their decisions. The theory groups human beings into two distinct clusters of pessimists and optimists. The optimists are more inclined to expect favourable outcomes from their encounters and, thus, are likely to experience positive mix of feelings than adversities. The pessimists, on the other hand, often expect unfavourable outcomes from their encounters, and are likely to be doubtful, uncertain and perceive risks, thus, experience negative feelings including anxiety, sadness and despair.

Scheier and Carver (1985) maintain that dispositional optimists imagine more good things to happen to them than bad while the contrary conclusion is expected of the pessimists. The optimism-pessimism scheme is illustrated with a glass that is half filled with water. While the optimist would view the glass as half full, the pessimist views it as half empty (Scheier & Carver, 1985). The optimism-pessimism worldviews are especially profound in situations of ambiguity or uncertainty, where the probabilities of outcomes are objectively unknown (Shepperd, Pogge & Howell, 2016).

Optimism is commonly associated with less concerns and more adaptive coping efforts (problem-solving and social support) resulting in positive outcomes. Pessimism, on the other hand, is with maladaptive coping efforts (problem avoidance and social withdrawal) leading to the negative outcomes. However, studies assert that some individuals tend to overly project the favourability of future outcomes despite risks being highly associated with the encounter (Shepperd, Pogge & Howell, 2016). For example, an individual demonstrates unrealistic optimism when he or she reports having a 3 percent chance of getting a disease whilst an objective measure predicts that true risk is 15 percent. This tendency to underestimate risk is termed unrealistic optimism (Shepperd *et al.*, 2016).

The optimism-pessimism theory has been applied in various settings and studies (Amuquandoh, 2011; Carver, Scheier & Segerstrom, 2010; Shields, Toussaint & Slavich, 2016) that sought to gain insights into the link between personality views and health decisions and outcomes. Amuquandoh (2011), for instance, sought to understand international tourists' concerns about traditional foods in Ghana. Though the theory has rarely been employed

in the study of vaccine concerns and adoption behaviour, it has been used to analyze related issues including risk perception and preventive behaviour (Adam, 2015), barriers to preventive action, insurance subscription and quitting of risk behaviours among tourist (Petersen, 2002).

In explaining preventive behaviour, researchers have often tested the effects of expected cost and benefits with the understanding that optimists demonstrate greater engagement in preventive health behaviours in comparison to optimists. Following this perspective and in the context of vaccination, the theory may suggest that optimists may tend to have less or no concerns with vaccines and on the average, have positive responses towards vaccination. They will generally have a positive disposition to take as well as support vaccination. Pessimists, on the hand, will tend to assume adverse outcomes with vaccine uptake. It is, however, possible for the pessimists to get vaccinated but it is expected that they will tend to be sceptical about the efficacy and safety of vaccination.

Notwithstanding the widespread applications of the theory, it has some shortcomings. First, optimism and pessimism are often viewed as opposite poles of the same continuum, but research findings note that the two dispositions can coexist in an individual depending on the context and situation. Second, the bipolar optimism-pessimism cannot be regarded as a personality trait given people's expectations are fluid and changes over time; rather, it is arguably an attitude which is subject to context and situation. Thus, there might not be a group of persons called 'optimists' or 'pessimists' whose behaviours are fixated because the environment can affect a person's behaviour and thus influence his or her decisions. In that regard, a person can

exhibit optimistic tendencies in one place and optimist tendencies in another environment given the environmental factors present.

Third, the conceptualisation of the two constructs as separate and independent outcomes poses some challenges because a person might be in a state of ambivalence of either being an optimist or a pessimist. In that case, when it comes to the issue of vaccination, some people will be optimistic about the vaccine, others will be pessimistic. Others will also be in a state of ambivalence-anticipating mixed outcomes of both positive and negative.

THE 3CS Model of Vaccine Hesitancy

The 3Cs model is proposed by Strategic Advisory Group of Experts (*SAGE*) on immunization in 2011 as part of its efforts to understand the underlying factors to vaccine acceptance. This model indicates that there are three main determinants of vaccine acceptance. Those are complacency, convenience and confidence, widely cited as the 3Cs.

Confidence deals with lack of trust for vaccines and any other services or system related to the development and administration of the vaccine. These include risk and uncertainty of the efficacy and safety of vaccines and lack of confidence in vaccine service providers including health professionals (MacDonald, 2015). Uncertainty (ambiguity and complexity of information on how vaccines are developed and work) (including transparency on side effects), and anti-information are some antecedents of vaccine confidence (Mendel-Van Alstyne *et al.*, 2017).

Complacency signifies a feeling of the needlessness of vaccines due to a number of reasons. These include low perceived vulnerability and severity of vaccine-preventable diseases, consideration for alternative measures and self-

efficacy. Convenience has to do with access to vaccines. The working group considers convenience as the degree to which factors including physical access, affordability, geographical accessibility and vaccine literacy influence uptake. Quality service, cultural landscape and unavailability of vaccines are other convenience related issues that could impact vaccination (MacDonald, 2015).

Social Theories

Reflexive Modernization Theory

The reflexive modernisation theory (RMT) is proposed by Becks (1992) to explain people's attitude towards science and technology. "Modernisation is a transition from 'traditional' to 'modern' societies — societies characterised by the search for knowledge, individualism, autonomy, and awareness and mindfulness of risks in all forms of life — created by the very successes of modernity in tackling the problem of human scarcity" (Carrier & Nordmann, 2011: 44).

Risk societies on the tenets of modernisation are preoccupied with the future and its safety and considerably are on the guard against hazards and insecurities and their associated losses (Beck, 1992). Put in another way, modernised societies are risk and uncertainty mindful. The 'knowledge society' nature of modernity leads to reflexivity—cause and effect relationships within societies (Beck, 1992). Unfortunately, advancement in science and technology meant to safeguard risk and uncertainty in modern societies is ironically held responsible for the woes in society—*science-confidence gap* (Giddens, 1994). Reflexive modernization suggests a continuous decline in public confidence for science and technology since

many are increasingly having the conviction that life threats cannot be buffered by science; it rather worsens it (Giddens, 1994). It is, however, argued that skepticism of reflexive modernity is not toward science as a whole but certain aspect of it (Achterberg *et al.*, 2017). For example, some people may believe in scientific products but distrust their associated institutions.

This new society of reflexivity presents a new citizen one who is cognitively well developed, well exposed to information, and better understands science and technology deciphering their cost and benefits. In the life of this modernised citizen, cultural and religious beliefs play less role as literacy takes over attitude and behavioural patterns (Beck, 1992). Wealthier and highly literate individuals in developed countries, particularly those in information societies where information is easily accessed via the internet, report less confidence in science compared to those in living in developing nations with less technology and greater health needs (Makarovs & Achterberg, 2017; Price & Patterson, 2016). This implies that highly educated or literate people in industrialized societies are likely to take the benefits of science for granted or perceive various lapses with scientific products compared to those in less industrialised societies.

Vaccines are one of the technological developments whose usefulness, safety and efficacy are increasingly questioned. Therefore, the RMT is considered useful for understanding vaccination attitude and behaviour because people's responses towards vaccination are based on their confidence and trust in the scientific principles and institutions surrounding vaccines (Makarovs & Achterberg, 2017; Price & Peterson, 2016).

Based on RMT, first, it is expected that vaccination reflexivity would be common among all international tourists visiting Ghana though not same in severity across them. Second, it is expected that tourists would express diverse concerns toward travel vaccination but from the perspective of reflexivity. Those concerns would be linked to a lack of confidence and distrust in scientists and the organizations responsible for vaccines, referred heretofore as *institutional concerns*, and lack of confidence and mistrust in the scientific principles and methods of vaccine development, *product concerns*. RMT could also provide hints on the pathways through which tourists' characteristics including their educational attainment, information exposure, knowledge and literacy are associated with their vaccination concerns and uptake behaviour.

Therefore, critical literacy which characterises reflexively modernised people would likely place them in a position with reflexive mindsets leading to varied concerns with vaccines. This could be more palpable among tourists since information search, especially using the internet, is a critical component of their pre-travel activities. Reflexive citizens tend to be internet savvy implying exposure to vast and diverse information (Makarovs & Achterberg, 2017). The internet exposes people to conflicting and controversial information on vaccines affecting their trust of the safety and efficacy of vaccination (Karafillakis & Larson, 2017). Consequently, reflexivity leads to relating to different discourses on vaccination and in due course formation of various opinions supported by a range of arguments (Makarovs & Achterberg, 2017). Based on this theory, it is expected that reflexively modernized tourists will not only tend to have various concerns with travel vaccination and be less

willing to vaccinate compared to the 'less reflexive' but its indicators will significantly moderate the effect of concerns on the uptake.

Behavioural Economic Theories

While there are several behavioural-economic theories to explain preventive health behaviours, it seems the most applied are the expected utility theory, cumulative prospects theory and ambiguity aversion theory. The Cumulative Prospect Theory (CPT) is one of the behavioural economic theories proposed by Amos Tversky and Daniel Kahneman in 1979 that seeks to explain how people make choices and decisions under risk and uncertainty (Tversky, Kahneman, 1992). CPT was proposed following shortfalls of the expected utility theory in explaining people's preferences and actions. CPT hinges on the assumption that people are risk-averse and possible outcomes are predicted relative to the status quo, a situation termed the framing effect, which is the subjective construction of social reality.

Kahneman and Tversky (1992) argue that individuals appraise losses and gains differently, and the use of heuristics to simplify individual risk calculations. They further assert that people are more concerned about potential losses when faced with a situation than they do for possible gains. That is, they experience more disutility for a loss than they experience utility for a gain of the same amount, a phenomenon referred to as loss aversion. Though both CPT and expected utility theory are both concerned with guarding losses, their framing of the losses and gains are different. The former argues that "feeling that a loss of a certain amount has been avoided gives more utility than simply gaining the same amount" (Platteau, Bock & Gelade & 2017: 142).

Based on CPT, it suggests that loss-aversion shapes vaccination behaviour depending on gains and losses with respect to an individual's perceived and expected desired states. Vaccination behaviour is, therefore, a product of interplay of various factors including perceived risk of disease, benefits of vaccination, vaccine concerns and framing of vaccine communication (Oraby & Bauch, 2015). For example, individuals who perceive high vulnerability to the disease are risk-averse, over-weigh potential benefits of vaccination and under-weigh vaccine concerns would tend to be accepting of vaccines.

Another alternative explanation for preventive health adoption is found in the ambiguity aversion theory. The theory of ambiguity aversion suggests that the majority of individuals tend to dislike uncertain outcomes of events. Ambiguity aversion has been employed to investigate the preventive health of which the argument is that ambiguity aversion is significantly related to less chance of adoption. Preventive health measures such as vaccination and insurance demand are characterized by some uncertainties ranging from the uncertainty of benefits, efficacy and risk of contracting the disease vaccinated against. Each of these ambiguities can limit demand for vaccination since people would want to avoid these uncertainties (Platteau *et al.*, 2017). These uncertainties that surround vaccines make vaccination itself somewhat risky and thus could motivate its avoidance and consideration of alternatives.

Nevertheless, an important limitation with these economic theories in explaining the adoption of preventive health decisions is the assumption of decision makers as rational entities. From this perspective, individuals are thought of as rational beings who in deciding on engagement in preventive

health activities or services, evaluate choices in terms of costs and benefits. A rational agent chooses those that provide the optimal benefit.

Herbert Simon in his bounded rationality theory cautions strongly that individuals' decision making is limited by a number of issues such as the amount of information at hand, cognitive limitations of their minds and the time available for decision making. Decision-makers in this viewpoint act as satisfiers in the quest of a satisfactory solution rather than a best one (Adongo, Amenumey & Amuquandoh, 2017).

Hybrid Model

Typological Theories

This section of the chapter reviews typologies which are referred to as hybrid theories. Since their evolution in the 1950s, typologies have been embraced and used in almost every discipline by famous writers including Miles, Mintzberg, Porter and Weber. The popularity of typologies has been attributed to them being able to describe, explain and predict complex and multifaceted phenomena by converting them into simple and easy-to-recall ideal types that linear or bivariate theories would not adequately do (Doty & Glick, 1994).

Fiss (2011) argues that typologies are unique kinds of hybrid theories because, instead of just simple correlations between a single construct and a dependent variable, they incorporate asymmetric causal relations in their configurational arguments which explain how ideal types are made. They provide a holistic and person-oriented approach to explaining the variances of an outcome as such are falsifiable-testable and subject to disconfirmation (Rantanen, Kinnunen, Mauno & Tement, 2013). In addition, typologies are

popular because of they being germane for targeted and tailored interventions allowing for efficiency in resource allocation given that a 'type' is assumed to contain people with similar characteristics (Padela *et al.*, 2018).

The terms 'classification scheme' and 'typology' are used interchangeably in the literature to imply the same meaning. However, differences exist between them and have been clarified yet seem overlooked in the tourism literature which could conceal theoretical development in the field. This implies that some prevailing "typologies" in tourism are not typologies but classification schemes and the reverse true (Doty & Glick, 1994).

Classification schemes refer to classing systems that categorise phenomena into mutually exclusive and exhaustive sets with a series of discrete decision rules. However, typologies in addition to being conceptually derived interrelated sets of ideal types predict the variance in a specified outcome because the types identified in typologies are developed with respect to that specified outcome. Therefore, typologies are extensions of classification systems. The underlying assumption of the typologies is that people are interrelated and so they can be sorted into ideal types based on a certain criterion (Doty & Glick, 1994). A systematic review of the literature by Dolnicar (2004) identified four main approaches for developing typologies. These are theory driven (common sense), data-driven, combinations of both where typically one common-sense segment is chosen and further split up into data-driven subgroups, and a sequence of two common sense segmentations. Any of these could be a priori and or post hoc.

Typologies have been widely applied in the context of tourism which leads to various types of tourists namely the wanderluster/sunluster typology

(Gray, 1970), the institutionalised/non-institutionalised typology (Cohen, 1972), and the psychocentric/allocentric typology (1991). But, typological analysis is yet to receive research attention in the literature on vaccination. The exceptional cases include the anti-vaccinationist and pro-vaccinationist classification scheme. The anti-vaccinationists refer to the social movement of people who oppose vaccination while pro-vaccinationists are those who promote vaccination.

A study by Velan, Boyko, Lerner-Geva Ziv, Yagar and Kaplan (2012) among general Israeli population also identified six attitude groups of vaccinees namely acceptors, judicious-acceptors, differentiators, soft individualists, hard-individualists and refuters. The classification was done based on four perceived issues: All eligible people should be vaccinated; only at-risk populations should be vaccinated; vaccination should be a personal choice; and no need for vaccination. Total refusal of vaccination was generally low. The acceptors think that all (all target groups or by targets at risk) should comply to recommended vaccines. Judicious-acceptors favour compliance of all with some vaccines. The Differentiators expressed different viewpoints on all the various attitudinal issues presented them. However, the soft and hard individuals favoured personal choice in vaccination with significant view expressed by the Hard individuals. Finally, the refuters favoured non-compliance with vaccination programs.

However, the study acknowledged being limited in the following ways: respondents were drawn from a single country; experiences of vaccinees (actual or perceived) were not incorporated into the analysis and other important determinants of vaccine uptake including perceptions of disease.

Furthermore, the shortfall with Velan *et al.* (ibid) argument is their consideration of the vaccination attitudes as traits. The use of the term 'trait' connotes vaccination attitudes as a genetically determined characteristic which maybe the case. It is clear that vaccination attitudes and behaviours are shaped by personal, socio-cultural, economic, religious, historical and political factors (Larson *et al.*, 2011).

Despite the advantages offered by typological theories, a major drawback of them is that they tend to be much more complex. Second, they are not always mutually exclusive and exhaustive since hybridisation is always possible. Hybridisation makes theoretical modelling and practical targeting of types complex (Niknazar & Bourgault, 2017). By using the typological theory, the expectation of the current study is to be able to classify international tourists into homogeneous segments based on their concerns and responses toward vaccination. In essence, the would-be type of tourists is assumed to explain travel vaccination uptake. Hence, those that share a certain degree of similarity in terms of specific characteristics can be considered as a vaccinee type.

Summary

This chapter critically discussed the theory and concepts of concerns, involving its antecedents, moderating factors and its impact on vaccination uptake. The chapter began with a brief historical account of vaccines, what vaccines are and conceptualization of vaccination concerns. It further appraises various theories proposed in the literature for examining vaccine adoption. Three broad theoretical perspectives are considered including psychological, social and economic theories. Some specific theories reviewed

are the health belief model, protection motivation theory, the optimism-pessimism theory, the reflexive modernization theory and the cumulative prospects theory.

CHAPTER THREE

EMPIRICAL REVIEW

Introduction

This chapter provides a review of the empirical literature on vaccination concerns, its antecedents, mechanisms and impact on people's responses toward vaccination with emphasis among international tourists. It specifically appraises the dimensions of travel vaccination concerns, its antecedents and its relationship with vaccine uptake. Given that the literature on the aforementioned issues in the context of travel and tourism is very scant, the chapter also gleaned on other related studies from the general vaccine literature.

Dimensions of Vaccination Concerns

Research suggests various facets of vaccination concerns some of which are related to vaccines, vaccination-related institutions and the involved individuals themselves. Though piecemeal across the various studies, the most common concerns include safety, efficacy, cost, access, time and stock out issues (Crockett & Keystone, 2005; Karafillakis & Larson, 2017; Lammert *et al.*, 2016). Among these concerns, different longitudinal systematic review studies among tourists and the general population across different vaccines (including seasonal and pandemic influenza, human papillomavirus (HPV), measles-mumps-rubella, Hepatitis A and B) and countries have noted that vaccine safety and efficacy concerns are the most reported (Crockett & Keystone, 2005; Karafillakis & Larson, 2017).

Vaccine safety concern is the feeling that travel vaccination results or will result in harm or injurious outcomes and efficacy concern is the fear that

vaccines do not or will not perform as desired or expected (Yaqub *et al.*, 2014). Vaccine safety and efficacy sentiments issues running through the findings of these travel and non-travel context studies imply that these concerns are common across travel and non-travel settings and different vaccines. The prominence of such concerns has been attributed to the general perception of people that the risks of vaccination outweigh their benefits (Karafillakis & Larson, 2017).

Different specific types of concerns about vaccine safety and efficacy are, however, identified for the different studies. For instance, Crockett and Keystone (2005) realised that travellers' vaccine safety and efficacy concerns manifest in the form of fear of side effects of vaccination, mistrust of vaccine efficacy and fear of the pain of injection. Karafillakis and Larson's (2017) synthesis of human vaccine studies between 2004 and 2014, on the other hand, noted perceived low effectiveness of vaccines, lack of evidence of the effectiveness of vaccines and injection pain as major concerns. The perception that vaccines cause the disease they prevent and worry about vaccine adjuvants were also noted. Anti-vaccine activists, for instance, claim that ingredients, such as mercury, ether, anti-freeze, formaldehyde and aborted fetal tissues contained in vaccines are toxic (Kata, 2012).

The literature further highlights the cost and time involved in vaccination as concerns. These two factors reflect affordability concerns, which are the inability of individuals to afford travel vaccination, both in terms of financial and non-financial cost (Thomson, Robinson & Vallée-Tourangeau, 2016). The financial affordability concerns relate with income scarcity while the non-financial relates with time scarcity (Thomson *et al.*,

2016), which are both socially patterned resource barriers to health (Venn & Strazdins, 2017). Scarcity is the relative feeling of having less than is desirable to satisfy one's needs determined by comparing one's disposable resource, time and income, to the demands placed on it (Mullainathan & Shafir, 2013). Here vaccinees have lamented of vaccines and vaccination services being expensive, time wasting and inconveniencing (Lammert *et al.*, 2016; Thomson *et al.*, 2016).

On a different viewpoint, vaccination cost and time concerns seem to mirror access concerns, which are monetary and time constraints to access to health services. Diverse interpretations have been provided to the concept of access, and researchers have acknowledged the lack of unanimity on describing and measuring health access (Dassah, Aldersey, McColl & Davison, 2018). Some have studied access as the availability of health services (Donabedian, 1973); entry into a health care system (Andersen, 1995) and recently Dassah *et al.* (2018) consider it as the availability and use of health services rather than mere presence of the services, suggesting realized access and not potential access. Therefore, access in the context of vaccination relates to the ability of individuals to easily reach and/or to be reached by recommended vaccines (Thomson *et al.*, 2016).

Access to health services is feasible but depends on income, which is unequally distributed across gender, age, educational attainment and time expenditure (Venn & Strazdins, 2017). Such inequalities in income distribution imply that monetary constraint is an important component of affordability and through it, vaccination inequalities. Similar to income, people require time to access vaccination. The start to finish of vaccination

involves time expenditure. This includes travel time to the clinic, consultation/examination, waiting for tests to be performed and results. Consequently, in the context of travel, individuals may consider it inconveniencing depending on disposal time and how compatible travel vaccination time requirements are with their available time and other schedules.

Worth noting is that akin to income, time is equally finite and its commitment and control are systematically and socially stratified with women, caregivers and employed likely to be more time poor. Time, however, differs from income in its distribution, given that everybody has 24 hours a day at his/her disposal (Venn & Strazdins, 2017). Other forms of access concerns mentioned in the literature are stock out of vaccines; cultural inappropriateness of vaccination; and location of vaccination. The latter concern is more of a geographical distance and mobility issue where vaccinees' location may not allow them to easily access vaccination services.

"The degree, to which individuals have knowledge of the need for, and availability of, recommended vaccines and their objective benefits and risks" is referred to as awareness (Thomson *et al.*, 2016: 1019). This factor reinforces the importance of cues to action in determining vaccination decisions, with optimal awareness positively motivating vaccine uptake. Awareness factors include availability information, knowledge of vaccines and vaccination schedule (Thomson *et al.*, 2016). Unfortunately, issues of vaccine information deficit (including not knowing where to locate relevant vaccines), information overload, conflict messages and misunderstanding of available information are increasingly reported in the literature (Karafillakis &

Larson, 2017). The import here is that while creation of vaccination awareness through information provision is a good tool for promoting uptake, it must be proactive, clear, succinct and unambiguous. Otherwise it will fail to achieve the intended purpose (Goldstein & MacDonald, 2015). Admittedly, with the proliferation of conflicting information in the internet, it has become extremely difficult to effectively communicate vaccine information (Makarovs & Achterberg, 2017).

Literature notes that mistrust and decreasing confidence in vaccines and vaccination-related institutions (including health professionals, pharmaceutical companies, researchers and governments) among the general public remain pronounced. The literature posits a positive relationship between trust and risk (Luo *et al.*, 2010). Trust is an individual's attitude based on personal beliefs about the features of another (Mayer, Davis & Schoorman, 1995), therefore, people may behave in a certain way while assuming others will react in accordance with their expectations. However, if others do not act according to their expectations it results in mistrust.

Vaccination trust concerns have hardly been studied among travelers but among the general population, studies have observed that the general public does not trust vaccines and their related institutions. They have often lamented that vaccination is a money-making venture for pharmaceuticals; doctors only discuss the benefits of vaccination. Likewise, researchers churn out findings that only highlight the benefits of vaccines (Ehrenstein *et al.*, 2010). Consequently, based on the theoretical and empirical review Table 2 presents a summarised list of the potential dimensions and their definitions of the travel vaccination concerns scale.

Table 2: Potential Constructs of the Travel Vaccination Concern Scale

Dimension	Dimension definition	Relevant literature
Mistrust/lack of confidence Trust/confidence concerns	Skeptical or doubtful of vaccines and or its related stakeholders including vaccinators, pharmaceuticals and policy makers.	Larson *et al.* (2016); Karafillakis and Larson (2017); Yaqub *et al.* (2014)
Safety concerns	Feeling that travel vaccination results or will result in harm or injurious outcomes	Barasheed *et al.*, (2014); Kennedy, LaVail, Nowak, Basket and Landry (2011); Lindsey, Rabe, Miller, Fischer and Staples (2016); Noble, Farquharson; Loharikar *et al.* (2018); Robinson and Vallée-Tourangeau (2015; O'dwyer and Behrens (2013); Sturkenboom (2016); Yaqub *et al.* (2014)
Efficacy/performance concerns	Concerned that vaccines do not or will not perform as desired or expected.	Karafillakis and Larson (2017); Yaqub *et al.* (2014)
Cost concerns	Concerned with the financial burden associated with accessing travel vaccination	Blank *et al.*, (2012); Crockett and Keystone (2005); Gautret, Tantawichien, Gautret and Parola (2012); Hai & Piyaphanee, (2011); Robinson and Vallée-Tourangeau (2015); Stokley *et al.* (2006)
Time concerns	Time waste or loss of convenience associated with travel vaccination	Crockett and Keystone (2005); Robinson and Vallée-Tourangeau (2015); Poulos *et al.* (2018); Tickner *et al.* (2006);
Access concerns	The difficulty or inability to access needed travel vaccines.	Crockett and Keystone (2005); Yaqub *et al.* (2014)
Information concerns	Lack/inadequate and or conflicting information on travel vaccination	Heywood *et al.* (2016); Karafillakis and Larson (2017)
Vaccination literacy concerns	Inability to optimally obtain, process, understand and make informed vaccination decision	Karafillakis and Larson (2017)
Paternalism	Feeling that vaccination and its related policies are limiting one's liberty, autonomy and or freedom	Attwell and Smith (2017); Dubov and Phung, 2015

Source: Author's construct (2018)

Antecedents of Vaccination Concerns

This section of the chapter reviews factors that shape concerns that people have toward vaccination. Past studies in the general vaccine literature indicate that vaccination concerns vary by specific vaccines, respondents' socio-demographic characteristics including the region of origin, sex, education, income, work type and religion (Larson *et al.*, 2015; Karafillakis & Larson, 2017). Others are vaccination information seeking behaviour (source of information and search intensity) and vaccination literacy (Heywood *et al.*, 2012; Heywood *et al.*, 2016). This is suggestive that three broad antecedents of vaccination concerns have currently been identified by previous studies.

Types of Vaccine and Concerns

Despite vaccine safety, efficacy, access and cost concerns are common among most vaccines, minor differences in severity of some of the concerns across vaccine type has been noted. A systematic literature review of studies from 2004 to 2014 on perceived risks of vaccines in European populations affirms the variation in concerns across types of vaccine (Karafillakis & Larson, 2017). An analysis of Twitter messages, for instance, by Becker *et al.* (2016) revealed safety concern to be predominant for the pentavalent and influenza vaccines.

Lammert *et al.* (2016) also observed that yellow fever attracted the most rated safety concern among outbound international travellers of the US when compared to influenza, meningococcal, typhoid, hepatitis, tetanus, rabies, polio and Japanese encephalitis. The researchers conjectured that the variation likely reflects the known risk of adverse events after the yellow vaccine among international travellers. Recently, it has been revealed that

people's apprehensions are higher for newer and combined vaccines because they feel the new ones lacked population-wide safety and efficacy assessment and the combined vaccination delivery overwhelms the immune system (Enkel, Attwell, Snelling, Christian, 2017).

Socio-demographic Characteristics and Concerns toward Vaccination

The literature on how socio-demographic characteristics shape concerns that people have about vaccination can be described as a budding, with particularly dedicated studies lacking. Saved the role of characteristics including gender, age, education, religion and education on concerns have been explored (Grabenstein, 2013; Larson's *et al.*, 2016). The limited studies could be largely due to the scarcity of studies on determinants of vaccination concerns.

The role of gender in explaining social issues and by extension health inequalities has received some attention in the literature (Hankivsky, 2012), but studies demonstrating its role in shaping vaccination concerns could be regarded as evolving. One major factor that could account for the dearth in gendered differences in vaccination-related issues is the overly focused nature of vaccination studies on childhood vaccination where women are often respondents.

However, men and women differ in their views about the importance of vaccines with women being more probable to view vaccines more important than men (Larson *et al.*, 2016). Vaccine safety, efficacy and faith compatibility concerns were, however, found not to vary by gender. Whereas gender differences have been identified, the major limitation of these studies is that the reasons for those differences are often not provided. Explanation of

those differences could be useful for crafting specific interventions. There is, therefore, the need for a more theoretically informed insight into men and women vaccination concerns. It is often argued for the specific use of the terms *gender* and *sex* in specific ways as they convey different meanings and implications, biological and social connotation respectively. Whereas this is instructive, the current study elects to use both terminologies interchangeably, on the backdrop that both biological and social construct perspectives may enrich the results that would ensue.

Concerns such as individuals' vaccine side effects may be more biologically produced though socially constructed while affordability concerns maybe socially inclined due to inequalities in access to income. An illustration to demonstrate this case is the so-called 'John-Jane effect', where men are argued to wield a higher chance of being appointed and/ or offered better job titles and wages than women (Pritchard & Morgan, 2017). Therefore, women are likely to report more vaccination cost constraints relative to men. Similarly, women are also more likely to be time constrained, and thus consider vaccination services as time demanding than men but their time management capability could moderate their time inequities.

Age and differences in vaccination concerns have also been noted. In Larson's *et al.* (2016) study, vaccine importance did not significantly differ by age category but safety, effectiveness and religious compatibility concerns did. Respondents aged 25-34 were more concerned about the safety of vaccines when compared to those aged 18-24, but those 65 years and above were positive about the efficacy of vaccines. Segmented age analysis is considered

useful because of the ability to tailor interventions in line with stages of development and aging.

The literature, however, seems unresolved as the best way to model age and its outcomes, giving rise to lack of consistency in age range definitions, potentially constraining comparison of results. The second limitation about categorisation is that they are premised on the assumption of homogeneity within clusters or segments (Dolnicar, 2008), which might not always be true. Health researchers nevertheless are of a consensus that varied age classifications are necessary due to differences in health contexts (Geifman, Cohen & Rubin, 2013). The other justification in favour of age categorisation, akin to other variables such as income, is more methodological and is meant to guard against the 'lying informants effect' or 'social desirability bias' (Bleek, 1987). It is generally agreed that respondents are uncooperative and/or uncomfortable reporting their age, particularly in continuous terms, and if agreed to report they are likely to lie, compared to offering them pre-defined age categories (Bleek, 1987).

Religiosity and spirituality transcend every aspect of society and define meaning and value that people attach to health, including vaccination (Padela *et al.*, 2018). On doctrinal bases, it has been reported that various religious fraternities (including, Hinsduism, Buddhism, Judaism, Christianity and Islam) regard vaccination contrary to their faith. This is because taking in vaccines is an indication of reliance on oneself or other human abilities and not God. It is also a violation of laws against taking life, dietary prohibitions and an interference with nature by not allowing things take their natural course. Themes of religious vaccination concerns revolve around the

ingredients used for vaccine formulation-*i.e* fetal, and blood components. Roman Catholicism and some other Christian denominations have expressed concern about some vaccines (*i.e.* tetanus and rubella) containing contraceptives or abortifacients agents (Grabenstein, 2013). Across nations, evidence of people questioning and declining vaccination on faith incompatibility reasons in Nigeria, Pakistan, Thailand and Afghanistan have been documented (Grabenstein, 2013; Larson *et al.*, 2016). Barasheed *et al.* (2014) established reliance on "natural immunity" as the major reason for those who refused Influenza Vaccination among Australian Hajj Pilgrims.

Grabenstein (ibid), however, argues that religion and/or spirituality type (and by extension religious reason) *per se* is unlikely to affect rejection of vaccination but that religion is mediated or moderated by other factors ranging from socio-economic, political, cultural orientations to historical reasons. He observed that the religious concerns cited by people for objecting vaccination rather reflect more of vaccine safety concerns and personal beliefs and not religious reasons. This argument has been confirmed by Larson *et al.* (2016) in a 67-country survey on the state of vaccine confidence. They observed that apart from faith compatibility concerns that differed by religion, the differences in perceived vaccine safety, importance and effectiveness across religion was also significant. Fournet *et al.* (2018) similarly established that some individuals have no faith compatibility issues with vaccination but refuse vaccines on the bases safety concerns- fear of vaccine-induced disease and side effects.

It has been reported that irrespective of one's region of origin, they turn to report more vaccine importance than safety concerns. But some notable

variations prevail across regions. Vaccine safety and efficacy concerns are widespread and pronounced among people in the European and Western Pacific regions including France and Italy while those within the South East Asian region tend to perceive vaccines to be safe. The European region, nevertheless, tends to have relatively less faith compatibility concerns (Larson *et al.*, 2015; Yaqub *et al.*, 2014). Larson and colleagues, however, caution that despite the low concerns of vaccination recorded in some regions, contamination from other regions is possible because of transnational influences. The import here is that vaccine concern has the potential of being a global issue. This can especially be true given the role of the internet in the proliferation of vaccine-related issues.

Educational attainment is considered another important factor that affects health outcomes, attitudes and behaviours such as vaccination. This factor is presumed to causally impact health because it "generally confers greater access to salubrious resources such as fulfilling jobs, economic security, social ties, healthy lifestyles, a sense of personal control, and learned effectiveness" (Montez, Zhang, Zajacova & Hamilton, 2018).

However, empirical studies present mixed findings on the relationship between vaccine concerns and educational attainment. Studies in vaccination that are rooted in the reflexive modernisation (Beck, 1962) or knowledge-based theories suggest that progression in education corresponds to having confident related issues with vaccines (Makrarovs & Acterberg, 2017). This hypothesised relationship is premised on knowledge and access to information. Informed individuals tend to rationalise and "develop new questions about product attributes and be better aware of problems that can

occur when purchasing and consuming" (Kerstetter & Cho, 2004:966). A 67-country global survey on the state of vaccine confidence realised that increasing educational attainment is associated with increasing confidence in vaccination. Specifically, vaccines tend to be considered very beneficial, safe and effective among the educated relative to those with no formal education (Larson *et al.*, 2016). On the contrary, a 27 country Euro survey realized that highly educated people, particularly those in reflexively modernised countries were more concerned and skeptical about vaccination than those who were less educated. Those educated, for example, critiqued vaccines as having long-term adverse effects (Makrarovs & Acterberg, 2017).

On the contrary, the least educated or those without formal education may not be able to grasp and understand the complexities surrounding vaccines, such as how vaccines function, differences between side effects and life-threatening adverse events following vaccination (Beck, 1992). This predisposes them to doubts, distrust and lack of confidence in vaccination.

Similarly, it is argued that education attainment would impact vaccination access concerns such that those with higher degrees may tend to be time concerned while those with little or no formal education being cost concerned due to inequalities in paid jobs attributable to educational differences. The mixed findings and debates surrounding the association between the education and vaccination concern, in part, could result from formal education being used as a proxy for vaccination knowledge or literacy in most of the studies. The current study questions this practice positing that general education is not the same or similar to being literate in vaccination. This certainly necessitates studies that probe for the relationship between vaccination literacy and

concerns. On the other hand, the mixed findings might be predicated on the moderating effect of broader contextual factors. For instance, educational attainment may have little or no effect on vaccination cost concern within environments where the majority of the people have their vaccines covered by insurance or subsidised.

Information Seeking and Concerns toward Vaccination

Information acquisition precedes vacation decision making. Information makes travellers aware of health risks that they are vulnerable to and the kind of coping strategies that they can adopt. Therefore, pre-travel health information search guides decisions on which vaccines are needed for a particular itinerary and where to acquire those vaccines (Heywood *et al.*, 2012; Heywood *et al.*, 2016). Information search effort is reflected in the number and variety of sources and time committed to searching for the information (Enkel *et al*, 2017). Significant variation exists in the literature on the proportion of travelers who seek pre-travel health advice. This ranges from as low as a third to over three quarters. For example, Gautret *et al.'s*, (2011) study among 869 among inbound backpackers to Bangkok observed pre-travel advice rate of about 85 percent from at least one source.

Sources consulted for vaccination information include health professionals and/or health clinics, travel related, agencies, travel related websites, radio and television, and travel peers as the sources of vaccination information for travellers. But health professionals and or clinics are the most relied on sources (Heywood *et al.*, 2012; Heywood *et al.*, 2016). The challenge with most of the studies on vaccination information sources is that it is not clearly reported on how respondents' consultation with each source was

differentiated from the other. For instance, it is possible to consult a travel clinic or physician or travel peers via the internet for vaccination information. In such a case, what is the source of the information?

Notwithstanding the usefulness of vaccination information in deriving uptake, vaccination information sources' contribution to nurturing and intensification of concerns that people have toward vaccination has been acknowledged. Depending on the information source (s) consulted, one is likely to encounter information content that is inaccurate, conflicting and misleading (Karafillakis & Larson, 2017). This is particularly the case for non-medical sources of vaccination information. The reason is that for the non-medical sources, the information providers are mostly people with medical expertise which predisposes them to offer incorrect and/or unbalanced information about vaccines resulting in misinformation (Yaqub *et al.*, 2014).

The media, in general, is noted to contribute to the global breeding, amplification and viral spread of vaccine rumors because of its global reach (Larson *et al.*, 2011). With the advent of the internet, information knows no borders. The internet has not only served as a platform (*i.e* via social media and blogs) for accessing and sharing vaccination information but connects other traditional media platforms (*i.e* radio, television) which hitherto had their waves restricted within certain geographical scope (Larson *et al.* 2015). Accordingly, the search for vaccination information, for instance, online is linked with nurturing of vaccine concerns and skepticism given that the internet is increasingly proliferated with debates about pro-vaccination and anti-vaccination, focusing on vaccine risks and safety-related issues (Marakrovs & Achterberg, 2017). In a study of about vaccination information

on the internet, Kata (2010) found that such information was focused on "the themes of safety and effectiveness, alternative medicine, civil liberties, conspiracy theories, and morality" (2010: 1709).

Despite health professionals being the most resorted to and adjudged reliable source of vaccine information, some people still are of the view that a sect of the medical fraternity is not well informed about vaccination issues. They tend to provide deficient and partisan information (Enkel *et al.*, 2017). Some of the health professionals also appear unprepared to properly answer questions posed by their patients about vaccination while others have their own reservations about vaccination (Yaqub *et al.*, 2014). These shreds of evidences are suggestive that medical professionals, despite their reliability, could be the contributors to the rising vaccination concerns among patients.

Literacy and Concerns toward Vaccination

Inadequate skills relating to searching, evaluating and understanding health-related information may constrain one's ability to make informed decisions concerning health (Furuya *et al.*, 2015). This in turn has implications for health empowerment, civic engagement, information sharing and health promotion behaviours (Savolainen, 2012). These competencies have especially become very important in this era of information-intensive societies, where people are yielded to diverse and competing health information (Hirvonen *et al.*, 2016).

The ability to use health information efficiently is influenced by an individual's level of health literacy (Reeve & Basalik, 2014). The concept of health literacy has attracted various definitions and measurements from different writers and disciplines. Of these, the one by Nutbeam (2000) is the

most cited. Health literacy (HL) refers to the ability to access, appraise, understand and use information effectively to make appropriate decisions related to one's health. Health literacy incorporates a range of abilities including the ability to retrieve information, decode the information, weigh risks and benefits and ultimately make informed decisions.

Nutbeam (2000) posits that health literacy manifests in three hierarchical components, namely, functional, communicative/interactive and critical literacy. Functional literacy refers to the ability to read, write and understand basic messages. Functional literacy is linked to declarative knowledge, which refers to awareness of factual and process about health and medicine, which can be expressed verbally or in writing. Skills such as reading and comprehending prescriptions, appointment slips, medical education leaflets and brochures, doctors' directions and consent forms form part of this dimension.

Communicative literacy refers to the interactional and social capabilities required to make meaning from different sources of information and apply it in a health situation as well being able to share the information; and finally, critical literacy deals with the ability to evaluate and synthesize information critically before applying it in the decision-making process.

Nutbeam (2000) indicates that critical literacy requires higher cognitive and social capacities in order to act on and negotiate complex social determinants of health. All three forms of literacies are required for one to be optimally functional in health decisions of which critical literacy is regarded the utmost. This draws attention to the fact that the three forms of literacy

represent a continuum of knowledge and skills of progressive mastery that supports autonomy and empowerment in health-related decision making.

A common trend in literature emphasises health literacy as an individual-level issue whose measurement reflects an individual's competencies in making informed choices (Freedman, Bess, Tucker, Boyd, Tuchman & Wallston, 2010). Thus everything "begins and ends with the patient" (Gazmararian & Parker, 2005). This viewpoint of health literacy is considered limiting because it concentrates on and appears to bind the issue of health literacy to the capacity and competence of the individual instead of it been viewed as both an individual and public-level issue.

Consequently, one's state of health literacy is attributed to his or her efforts although it may be possible that the role of other stakeholders in the health service setting is critical to the individual's literacy. For instance, a low level of health literacy is attributed to patients' deficits in reading, writing and synthesizing skills, though it could be as a result of health professionals' ineffective communication strategies (Freedman *et al.*, 2010).

In addition, current standpoints on health literacy have been criticized as being overly focused on the management, treatment and cure of diseases such as patients' adherence to medication regimens, recuperative behaviours and lifestyle changes after disease incidence rather than prevention (Pleasant & Kuruvilla, 2008). As a result, Zarcadoolas, Pleasant and Greer (2003) recommend that health literacy should be thought out as a public health issue, which involves applying health concepts and information to unique situations and being able to play a part in ongoing public and private dialogues concerning health and its influencers. This underscores the importance of

skills and abilities on the part of all stakeholders in the health space including patients, providers and health educators (Wang, Zhou, Leesa & Mantwill, 2018). Drawing on the various definitions, four-pronged issues are worth noting. (1) literacy as a conscious and unconscious learning process and thus progressive mastery, (2) literacy as applied, practiced and context specific, (3) literacy as consequential and (4) literacy as a public health issue.

It is acknowledged that health literacy, and by extension vaccination literacy, impacts people's concerns toward vaccination and outcomes. Nevertheless, empirical evidence generally on this hypothesis is extremely deficient but for a few notable studies (Aharon *et al.*, 2017; Pati *et al.*, 2011; Wang *et al.*, 2018). These studies point to varying impacts of literacy on vaccination perceptions, attitudes and behaviours. Pati *et al.'s* (2011) longitudinal cohort among Medicaid-eligible mother-infant dyads found no significant association between maternal functional health literacy and immunization compliance. On the other hand, a cross-sectional survey of parents of children aged 3-4 years realised that parents with high functional, communicative, and critical health literacy were more likely to under-vaccinate recommended vaccinations (Aharon, Nehama, Rishpon & Baron-Epel, 2017).

A cross-sectional study by Wang *et al.* (2018), which sought to find out the influence of vaccine literacy on parental trust and intention to vaccinate after vaccine scandal in Hangzhou, China, note that vaccine literacy reduces the negative effects of exposure to misleading reports on vaccination and thus an inverse relationship was found between health literacy and vaccination trust and hesitancy. It is clear that there is no unanimity in

findings of these studies regarding the relationship between literacy and vaccination outcomes. The remotest reason could be the differences in vaccination outcomes (*i.e* uptake, hesitancy) studied and measurements formats used. Another more compelling reason that might have accounted for the varying findings is that type of literacy studied in relation to vaccination.

Vaccination literacy was not directly measured in most of the above-mentioned studies. Rather proxies were used. A proxy of health literacy, public health or maternal health literacy for vaccination literacy could be problematic as these are too generic and far removed literacies forms, which outcomes of low, moderate or high literacy does not necessarily imply same for vaccination literacy. This calls for direct measurement of vaccination literacy, which is an adaptation of literacy to suit the context and peculiarities of the phenomenon under consideration. This consideration has been acknowledged by Aharon, Nehama, Rishpon and Baron-Epel (2016), which the researchers consequently adapted their measurement items to vaccination literacy to analyse parents' health literacy and vaccination of their children.

Analysing literacy specifically from the perspective of vaccination offers an opportunity to advance the study of vaccine literacy directly in line with the recommendation that measurement of the phenomenon should be context and situation specific. A further limitation of the current literature is the near absence of studies which research into the impact of literacy on vaccination concerns and outcomes among travel populations. Following on these preceding reviews on literacy and vaccination concerns the hypothesis put forward is that:

There is a significant relationship between international tourists' vaccination literacy and their concerns about vaccination.

Concerns and Responses toward Vaccination

This section reviews the relationships that have been found in studies between concerns that people have and their responses toward vaccination. The few available studies (including Crockett & Keystone, 2005; Karafillakis & Larson, 2017; Lammert *et al.*, 2016) have concluded that vaccine concerns reduce willingness to vaccinate. Nevertheless, the few studies that have tried to analyse the relationship between concerns and vaccine uptake have hardly measured the latter as a rate. Vaccine uptake rate is a measure of coverage that tries to understand the proportion of vaccines taken by an individual out of the number recommended (WHO, 2017). Uptake rate could particularly be important for understanding the extent to which the concerns that individuals harbour can undermine the acceptance of vaccination.

A review of the impact of specific concerns on vaccine uptake shows disparate and contradictory findings. As regards safety and efficacy concerns and vaccine uptake, Crockett and Keystone (2005) concluded that the more concerned travellers are about vaccination the higher their chance of refusing vaccines. The study identified lack of confidence in the efficacy of vaccines, perceived unsafety of vaccines, adverse effects, injection anxiety and cost as significant determinants of sub-optimal vaccination. Similarly, adopting a reflexivity analysis and education as a moderating factor, Marakrovs and Achterberg (2017) noted that those who doubted the effectiveness of the H1N1 and seasonal influenzas vaccines were more inclined to refuse the vaccines, particularly with increasing educational

attainment. The latter finding signals that the education-vaccine uptake nexus is moderated by other personal level and contextual factors. The implication, therefore, is that in a bid to understand the relationship between vaccine safety and efficacy concerns, and vaccine uptake, certain factors must be taken into consideration.

The next concern identified in the literature that impacts vaccine uptake is mistrust. Mistrust for vaccination is related to lack of confidence in vaccines, government and health professionals. Evidence suggests a significant inverse relationship between mistrust and acceptance of vaccination. For example, mistrust in health professionals and vaccine policy was found as a significant determinant of acceptance of MMR (Brown et al., 2012).

Among Hajj pilgrims, previous studies have found that doubts regarding vaccine effectiveness are a key reason that accounts for their low uptake of the influenza vaccine (Bish *et al.*, 2011; Ofstead *et al.*, 2008). Other researchers have argued that "it is not vaccines per se that are mistrusted; rather it is the institutions (through which information about vaccines is delivered) that are mistrusted" (Yaqub *et al.*, 2014:7). In that case, trust for the institutions involved in the manufacture and delivery of vaccines is as extremely important as the vaccines themselves. In their critical review, they (Yaqub *et al.*, ibid) realised 'distrust of doctors', government, and pharmaceutical companies' as a reason for hesitancy and outright refusal of vaccination.

Cost and time concerns have also been reported as limiting factors of vaccination adoption (Gautret, Tantawichien, Hai & Piyaphanee, 2011;

Goodman *et al.*, 2014; Poulos *et al.*, 2018). These two factors border on affordability (Thompson *et al.*, 2016). Cost especially is regarded as an important constraint to the uptake of vaccines among international travellers, because out-of-pocket expenditure is higher for travel-related vaccines than for routine vaccines. Routine vaccines are most often part of national immunization programmes, and thus profit from subsidies of governments and other funding agencies (Crockett & Keystone, 2005). A discrete choice experiment study by Poulos *et al.* (2018) report a significant inverse association between cost and German travellers' vaccine uptake and their preference decisions. However, those travelling for volunteerism and backpacking purposes were more likely to under-vaccinate when compared to those travelling for business, visiting friends and relatives (VFR) purposes.

A similar finding on cost concerns undermining vaccine uptake has been reported by Gautret, Tantawichien, Hai and Piyaphanee (2011) among backpackers though notable differences were realised across the country of origin. Backpackers and volunteer tourists are often budget constrained attributable to most being gap-year students and unemployed (Dayour, Adongo & Taale, 2016). Barasheed, *et al's.* (2014) study among Australian Hajj pilgrims and that of Goodman's (2014) among UK travellers to meningitis belts in Africa identified financial and time constraints as the underlying reasons for those who refused influenza and meningococcal vaccine respectively. The refusers indicated that they were too busy to get the vaccine prior to travelling likewise the vaccines were too expensive.

On the contrary, using data from the Global TravEpiNet, though Lammert et a. (2016) observed that cost and time were rarely cited as an

underlying reason for the refusal of the studied (Influenza, meningococcal, Typhoid, Hepatitis A, Tetanus, Polio, Rabies, Yellow Fever and Japanese encephalitis) vaccines among international travellers, except for Japanese encephalitis and influenza. Similar findings have been recounted by Duffy *et al.* (2014) in a survey among US travellers to Asia. None of these studies, however, pointed out why the Japanese encephalitis is considered expensive but the reason could be gleaned from Karafillakis and Larson (2017) assertion that the vaccine is difficult to produce and needed in multiple doses with several boosters for long-term protection. If Karafillakis and Larson (ibid) claim is anything to go by, it is safe to propose that a reduction in the cost of vaccination could be a viable means for motivating uptake.

Unfortunately, contrary evidence exists that vaccine demand reduces when vaccines are provided for free. Only 44 percent of parents in India vaccinated their children fully despite vaccines given for free (Cappelen, 2010). This observation questions the nature and usefulness of incentives in vaccination promotion. The variation in findings on the effect of time and cost concerns on vaccine uptake is an indication that much as these concerns could serve as obstacles to vaccination, there are variances across different travel populations.

Other Factors and Responses toward Vaccination

A number of other broad factors have been reported by past studies influencing people's responses toward vaccination. These include perceived threat of infectious diseases, perceived benefits of vaccination, self-efficacy, socio-demographic characteristics, tripographics and nudges (Pedersini *et al.*, 2016; Poulos *et al.*, 2018; Rosenstock, 1974). Though these factors are not the

main focus of the current study because of the extent of information available on their impact on vaccination outcomes, they are briefly reviewed so as to adjust for their interactional effect while modelling the relationship between concerns and vaccine uptake. This decision is to guard against omission bias and drawing of invalid conclusions (Thrane, 2016). This, however, does not mean that an exhaustive list of control variables would be considered

A review of the literature revealed that perceived vulnerability and perceived severity of infectious disease are the most researched determinants of vaccine uptake, both for tourists and other travel populations. With these studies, both actual (behaviour) and intention-based (attitude) studies on vaccine uptake point out that high perceived risk of contracting a vaccine-preventable disease and high perceived severity of the disease significantly increase one's chance of adopting the involved vaccine (Crockett & Keystone, 2005; Lammert *et al.*, 2016; Poulos *et al.*, 2018).

Adopting an intention-based approach, a survey of 3,337 Americans' intention to adopt the Zika vaccine realized that individuals' intention to adopt the vaccine increased as perceptions of the severity of the disease and personal vulnerability increased (Ophir & Jamieson, 2018). A major shortfall of intention studies is that the measurements are hypothetical and may not result in actual behaviour (Cvelbar, Grün & Dolnicar, 2017). This suggests that intentions are not good predictors of behaviour, especially behaviour that is shaped by societal expectations or social norms. Karlsson and Dolnicar (2016), for example, showed that most tourists who claim to consider the environment when making tourism-related decisions essentially fail to do so when their behaviour is observed.

Lammert *et al.* (2016) revealed that among U.S. international travellers to tropical countries, lack of concern about a particular illness was the common reason cited by travellers for declining recommended vaccines: influenza, meningococcal, Typhoid, Hepatitis A, Tetanus, Polio, Rabies, Yellow Fever and Japanese encephalitis vaccines. The positive relationship between perceived vulnerability and severity of a disease and vaccine uptake draw attention to the importance of risk and consequence appraisals in driving vaccination participation. However, studies that model the predictive value of the interactional effect of the two forms of appraisals on vaccination uptake are rare.

As regards demographic characteristics and vaccine uptake, the most researched factor is the educational status of the respondent. Educational attainment, often measured as levels attained or the number of years of schooling achieved is regarded as one of the significant social determinants of health. Theorisation of the link between education and adoption of promotional health measures is almost exclusively conceptualised as positive. From a human capital standpoint, this is expected because increasing educational attainment means access to higher incomes, better medical care, safer and cleaner living environments and more diverse social networks. Higher education could also mean improved ability to rationalize, evaluate and synthesising information for informed decision (Montez *et al.*, 2018).

The limitation, however, with measuring education as the number of years of schooling is that increasing number of years in school does not necessarily imply higher cognitive maturity in health decisions likewise lack of formal education may not mean the inability to make informed health decisions.

Evidence suggests that knowledge mastery and exposure to information may affect preventive health attitude positively but not adoption (behaviour), 'the knowledge-attitude-behavior gap effect' (Moreaux, Adongo, Mensah & Amuquandoh, 2018). As such, research on the adverse impacts of education on vaccination decision is gradually receiving attention.

Adopting a reflexive modernisation analysis, Marakrovs and Achterberg (2017), for instance, reported less vaccination compliance among people with higher education when compared to those with low or no formal education. This, they attributed to high reflexivity of those with higher education. The inconclusive nature of the relationship between education and vaccine uptake suggests that both those with formal and no formal education may have their own reasons for refusing certain vaccines and, therefore, empirical findings need to be interpreted in a particular context.

Previous studies in travel contexts have examined the relationship between some travel tripographics and vaccination uptake. Principal among such characteristics are travel frequency, the purpose of visit, length of stay, pre-travel health consultation, type of accommodation patronised and possession of travel insurance. The association between vaccination against meningococcal and type of destination, duration and purpose of travel, area of stay and type of accommodation among 5283 Greece travellers to developing countries was noted as statistically significant (Pavli *et al.*, 2016; Pedersini *et al.*, 2016).

Though rarely analysed, frequency of travel has been found to be one of the significant factors driving vaccination decisions among travellers. Findings from a national survey among 2,102 travellers across France,

Germany, Italy, Spain, and the UK revealed that increasing frequency of travel is associated with increased odds of being vaccinated against hepatitis A and B (Pederseni *et al.*, 2016).

Purpose of the visit deals with the reason for which the trip is undertaken and could be for leisure, visiting friends and relatives, business or religious purpose (UNWTO, 2018). It is expected that vaccination rates would be high among those travellers visiting friends and relatives (VFR) as they are considered at risk population due to significant local contact, complacency– low perceived vulnerability to diseases and "poor understanding of their risk of infection during travel" (Goodman, Masuet-Aumatell, Halbert & Zuckerman, 2014: 284). Lammert *et al.* (2016) confirmed this thought noting that VFR travellers were less probable to take all of the recommended vaccines, relative to non-VFR travellers. But, the reverse is the case in some studies.

In a study among UK outbound tourists to Africa, no significant variation was observed between persons visiting friends and relatives and other purposes of the visit on the uptake of the meningitis vaccine. This means that they had similar uptake levels, which the researchers ascribed to the common knowledge of the disease among the different purpose of travel population they studied (Goodman, *et al.*, 2014). A dissimilar finding is reported by Pavli et al. (2016) among Greece travellers to developing countries. Higher rates of meningococcal vaccination were observed among those for religious purposes followed by those visiting friends and relatives, recreation and the least being business (Pavli *et al.*, 2016).

Length of stay is one of the most studied tripographics in relation to vaccine uptake as since it predisposes tourists to disease infection at the destination. Studies on this subject, akin to the earlier reviewed ones on the other determinants, have reported inconsistent findings. Some studies observed an inverse relationship between the length of stay and uptake. Others observed a direct relationship while others established no significant relationship. Among 5,238 Greece travellers surveyed, the proportions of those who stayed less than a month and had received meningococcal vaccination were greater than those who stayed more than a month.

Conversely, Lammert *et al.'s* (2016) established that those who stayed for more than 27 days at the destination were more likely to refuse vaccines compared to those with trip durations lesser than 27 days. The relationship between the length of stay and vaccine uptake becomes more complex. However, among backpackers, vaccination against rabies is not markedly stratified by the purpose of visit and length of stay (Gautret *et al.*, 2011). More proportions of those who stayed in hotels had vaccinated compared to those in homestays, camps and ships. Meningococcal vaccination rates for travellers to urban areas were higher than those to rural and both rural and urban.

Pre-travel health consultation with a health professional or a travel clinic is directly linked to the adoption of preventive health behaviours while travelling abroad. Pre-travel consultation with a healthcare provider arguably allows for the provision of informed education and counseling as well as recommendation of preventive health measures on how to stay healthy to travellers (Pedersini *et al.*, 2016). This, in turn, nudges their adoption of

preventive medicine including vaccination. Whereas people may consult several sources during decision making on vaccination, pre-travel consultation with a health professional as a significant causal factor of vaccine uptake highlights the important role that health care providers play in ensuring vaccination acceptance among people. They only not educate patients on the benefits of vaccination but address their concerns about the risk of vaccination (Yaqub *et al.*, 2014). Vaccination against cholera, taking of prophylaxis against malaria and use of insect repellents were found to be associated with pre-travel counselling with a health professional (Tafuri *et al.*, 2014). Similarly, seeking consultation with travel clinic specialists or friends was significantly linked with a higher vaccination rate against rabies among backpackers to Bangkok, Thailand (Gautret *et al.*, 2011).

Despite the majority of studies affirming a positive impact of pre-travel consultation on the uptake, a few divergent findings are available in literature including those reported by Lammert *et al.* (2016). More than a quarter of their study sample who sought pre-travel health advice refused at least a vaccine during the pre-travel health consultation due to lack of concern about the involved diseases. A study by Frew *et al.*, (2016), for instance, also observed no statistical difference in completion HBV vaccination between backpackers who had consulted a travel clinic or their family doctor/nurse and those who had not. The explanation not offered in the study is why the health care professionals were not able to convince them to change their minds. But a number of plausible reasons have been proffered in the literature including they being sometimes time constraint and or knowledge deficit of certain

vaccines thus unable to convince non-compliant with vaccination (Yaqub *et al.*, 2014).

The influence of activation on vaccination uptake has been reported in literature. Activation refers to the degree to which individuals are nudged towards vaccination uptake" (Thomson *et al.*, 2016). It is a purposeful altering of the choice architecture of people such that their vaccination behaviour is directed towards socially desired outcomes. Nudges are useful in correcting bias and errors inherent in humans, which result in actions deemed socially acceptable. The processes and activities of inducing vaccination compliance through nudging is termed activation (Thomson, Robinson & Vallée-Tourangeau, 2016). Four main nudge tools have been proposed useful for influencing vaccine uptake. 1) Information provision 2) changes to the physical environment, 3) default choice, and 4) the use of social norms (Kasperbaue, 2017).

Information as a nudge tool involves more than the provision of information to include its framing and simplification. Informational nudging concerns creating awareness of vaccine availability and persuading people to adopt while policy nudging involves institution of vaccination legislation. Defaults, education, reminders, prompt, travel regulations, school and workplace mandates are some specific forms of nudges mentioned in literature with varied impacts (Thomson *et al.*, 2016). For instance, all tourists visiting Ghana are mandated to have vaccinated against yellow fever. "The Australian government vaccination policy, 'No Jab, No Pay,' which withdrew childcare subsidies and financial assistance from registered conscientious objectors" (Enkel *et al.*, 2017:4) is another example of vaccine mandate. Intuitively

mandates may tend to be more effective in inducing vaccination compared to recommendations only that they are limited by individual exemptions on various grounds such as medical and religious reasons.

Unfortunately, the positive impact of activation on vaccination is impeded by the increasing objections of nudges, especially mandatory nudges. Critiques claim that nudging is inherently paternalistic, dictatorial and insulting given that it is manipulative and considers individuals' decision and freedoms as irrational. Hausman and Welch (2010) contend that manipulation is totally different from rational persuasion or appealing to reasons, "To the extent that they are attempts to undermine that individual's control over her own deliberation, as well as her ability to assess for herself her alternatives, they are prima facie as threatening to liberty, broadly understood, as is overt coercion" (p.130).

These objections seem convincing and justifiable, but in principle, nudging is appropriate and legitimate when choosers are hesitant; when choices have potential delayed and collective effects (Kasperbaue, 2017). In the context of vaccination, whereas choice to accept a particular vaccine or not is an individual decision, adverse consequences resulting from refusal is a public issue with attendant consequences on government health expenditure. More importantly, vaccination nudges are socially desirable since people are generally uncooperative in finding a solution to social problems without any form of intervention (Cornell, 2015).

Aside from vaccination, tourists have available to them several other strategies to manage health risk before, during or even after traveling. These include insurance uptake, water, sanitation and hygiene practices. These

strategies are broadly categorised into (a) information related strategies meant to increase the certainty or enhance behaviour alignment, and (b) travel-specific strategies aimed to prevent or reduce the consequences of hazards (Lo, Law & Cheung, 2011). Specifically, these include information search from the internet, medical professionals and friends and relatives, insurance subscription, adoption of WASH (water, sanitation and hygiene measures).

These other health risk mitigation strategies could relate with vaccination adoption by either serving as substitutes or complements. However, the nature of relationships that exist among these coping strategies is largely overlooked in the travel medicine literature. Few studies have probed for the effect of insurance uptake on vaccination adoption, which the outcome has been positively deterministic (Lu, Byrd & Murphy, 2013; Pederseni *et al.*, 2016).

A multi-country study by Pederseni *et al.* (2016) across France, Germany, Italy, Spain, and the UK confirmed the positive association between insurance and vaccine uptake but noticed that the relationship statistically differs by type of insurance and vaccine. Uptake was significantly positive for HAV relative to HBV for those with private insurance coverage compared to those having public and strangely public with additional private insurance coverage. It is important to caution that causation may run from vaccination to insurance, suggesting a reverse possibility. Addressing endogeneity is extremely important for advancing evidence the relationships between insurance subscription and vaccination uptake.

Research attention on the kind of relationships that exist among the other health risk coping strategies and vaccine uptake could be described as

budding, which is probably due to the assumption that the relationship between them is positively complementary. A complementary relationship is thought as one of mutual beneficence or symbiosis. This is a situation where the coping strategies support and stimulate demand for each other, in other words referred to as the crowding in effect. The complementary relationship between insurance and vaccine uptake could be observed in situations where having insurance could be a motivation to vaccinate since certain concerns (*i.e* efficacy, safety and cost) which prevent people from taking vaccines are indemnified by insurance. For instance, out of pocket payment for vaccines tends to be very expensive and discourages people who intend to vaccinate (Pederseni *et al.*, 2016). Therefore, having an insurance cover promotes vaccine uptake since the insurance underwrites the cost of the vaccination, particularly for travelers on a limited budget.

Nevertheless, it is limiting to only assume that the relationship among the coping strategies is complementary. Health risk coping strategies can compete themselves resulting in a substitution effect or crowding out effect. This is a situation where demand for vaccination is undermined by the adoption of alternative coping measures. This could be as a result of the perceived benefits of the other measures outweighing the benefit of vaccination. Some people, for instance, believe that better sanitation and personal hygiene prevent the contraction of food and waterborne related infectious diseases (WHO, 2015).

Similarly, having an insurance cover while travelling abroad may also lead to an unintended downplay of diseases severity thereby restraining the need for a vaccine. Even if individuals perceive the medical costs associated

with a hazard to be high the fact that they have an insurance cover for such losses could be a demotivation for vaccination. This notion may be peculiar to people who do not support or are indifferent to vaccination. The major drawback however with insurance is that it is a reactionary measure while vaccination is a proactive measure. While vaccination provides immunity to future diseases insurance covers some of the future cost that may result from the disease incidence. Another limitation of insurance is that it provides no indemnification for the psychological cost and pain that might accompany a disease and may sometimes fail to pay-out claims (Platteau, 2017). Compliance with the WASH-related coping strategies is also subject to some individual and destination specific constraints including lack of potable water in some tourists' destinations (WHO, 2015).

Conceptual Framework

The foregoing theoretical analysis has shown that vaccine uptake behaviour adoption and its associated antecedents and outcomes are complex. This complexity makes it difficult to find one logically coherent theoretical model that provides a unified understanding of these issues. The reviews further suggest that there is currently no dedicated model that elucidates vaccination concerns, its determinants, mechanisms and outcomes.

The current study therefore takes an initial step towards addressing this research gap by accommodating a number of transdisciplinary theories and concepts to propose the useful building blocks, nature and mechanisms through which concerns act as barriers or facilitators of tourists' responses toward vaccination. This is deemed to offer an integrative, flexible and multi-dimensional model that guides the current study and amenable to future

empirical and theoretical research on vaccination concerns, in both travel medicine and general health settings. Despite the proposed conceptual framework may be comprehensive for explaining vaccination concerns and its associated mechanisms, this does not make it a "grand unifying theory" that entirely explains vaccination concerns, but it is considered as an exploratory framework for a better understanding of the phenomenon.

The current study adapts the health belief model (HBM) as the foundational model for the study. This means that the framework for the current study takes its building blocks and propositions largely from the tenets of the HBM. This choice was driven by its comprehensiveness, wide applicability and overarching thematic factors critical to vaccine uptake.

Choice of the HBM was also based on its flexible conceptual and theoretical paths and touch points that make it easy to fuse other theories. Furthermore, the model incorporates varied socio-psychological and economic dimensions and their casual interrelatedness to explain adoption behaviour. However, other useful context-specific factors are drawn from other theories as well as the literature to complement the conceptual framework for this thesis. These include tripographics, vaccination literacy and the competing role of other preventive measures, namely, travel insurance, water and sanitation and hygiene measures.

The framework labelled as the "integrative model of concerns and responses toward vaccination" is made up of four dimensions: (1) vaccination concerns; (2) antecedents, which consists of socio-demographic characteristics, tripographics, vaccination information seeking behaviour and vaccination literacy; (3) moderating factors and (4) responses toward

vaccination. The model is premised on the assumption that people have concerns toward vaccination, which are multiple and varied in nature (Figure 3).

This means that vaccination concern is not monolithic though in literature it currently lacks conceptual clarity in terms of its composition and breadth. Potential components of vaccination concerns identified in the literature include vaccine safety and efficacy, mistrust, cost, time and inaccessibility of vaccines.

Socio-demographic characteristics, tripographics, vaccination information seeking behaviour and vaccination literacy are considered stimulus of vaccination concerns (Larson *et al.*, 2015). This indicates that they are likely to influence the kind of concerns tourists may express about travel vaccination. A significant relationship is, therefore, postulated between these factors and vaccination concerns whose relationship can be positive or negative and varied depending on the composition of the factor.

The framework suggests that based on one's concerns toward vaccination, different valence of cognitive, emotional, and behavioural responses sets can be adopted toward vaccination (Hillen *et al.*, 2017). Implicitly, these responses can be unfavourable, aimed at averting, avoiding and mitigating the perceived concerns. They could also be favourable aimed at deriving benefits from vaccination despite concerns. In the case of the latter response, the perceived benefits of vaccination might outweigh the cost associated with the concerns. The favourable or unfavourable responses include the valence of hesitancy, uptake and recommendation of vaccines to others and the combinations therein (Bedford *et al.*, 2017).

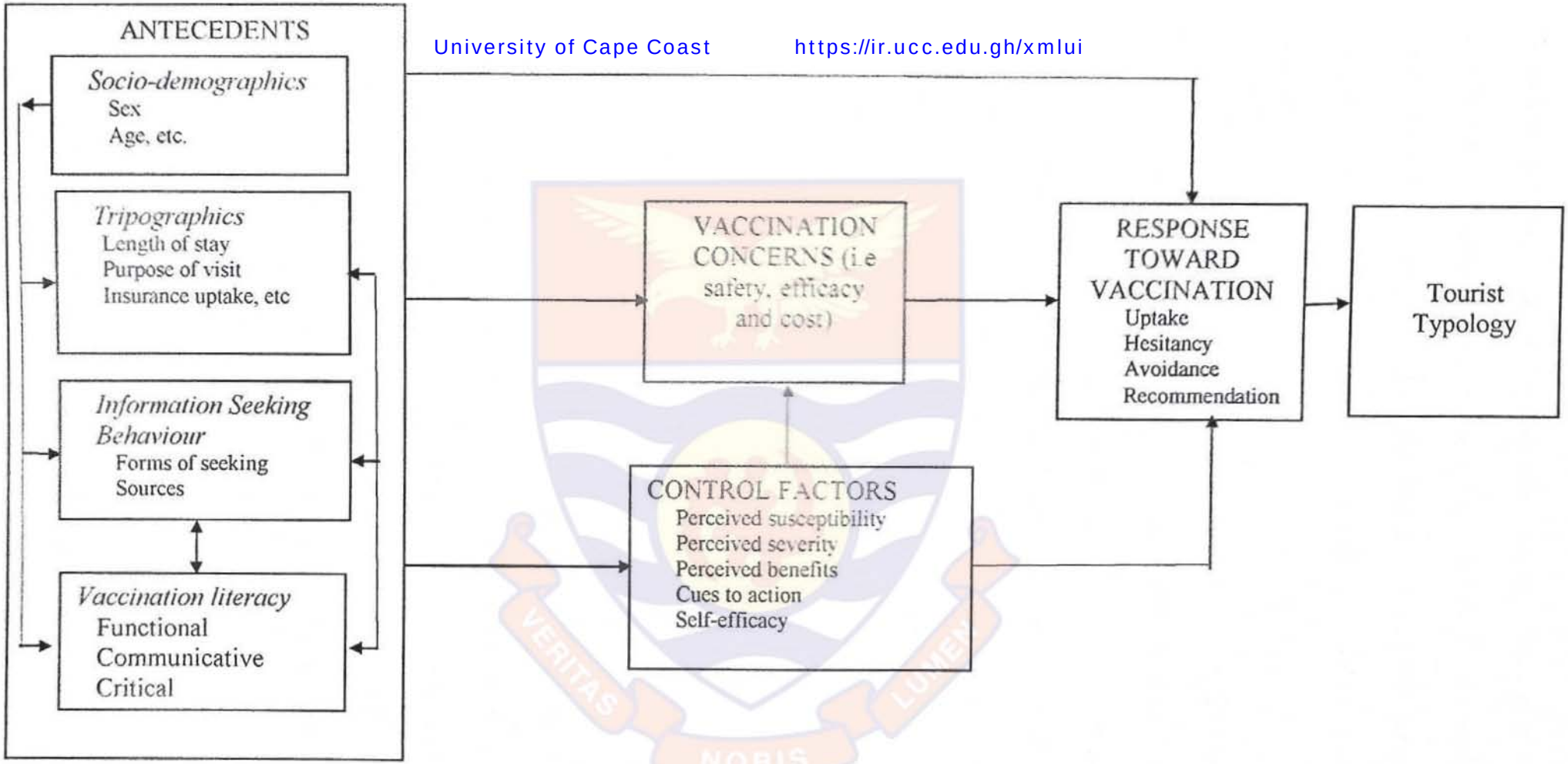


Figure 3: Integrated Model of Concerns and Responses toward Vaccination
Source: Adapted from Rosenstock (1978)

Overall, the supposition in the framework is that a significant relationship will exist between concerns and vaccination adoption behaviour. Because concerns are considered as constraints to uptake (Yaqub *et al.*, 2014; Larson *et al.*, 2015) it is expected that they would result in unfavourable behaviours toward vaccination.

However, the literature acknowledges that concerns are not the only determinants of vaccination adoption behaviour. There are other factors such as disease perception, cues to action, self-efficacy, perceived benefits of vaccination and adoption of other health preventive measures (Rosenstock, 1974; Makarovs & Achterberg, 2017). The framework, therefore, expects a direct causal relationship between these named factors and tourists' responses toward travel vaccination. But given that the thesis of the current study is to examine the effect of vaccination concerns on the uptake, it purposed to adjust for the other potential explanatory factors in the would-be estimation models so as to guide against omission bias in the conceptualisation (Thrane, 2016).

Based on the empirical review, the framework further proposes that a direct and indirect relationship could exist between individuals' socio-demographic characteristics (including sex, age, level of education and religious affiliation) and tripographics (including previous travel experience, level of stay), information search behaviour and response toward vaccination. The direct and indirect relationships mean that on one hand concerns are expected to solely influence the nature and severity of concerns expressed by tourists and, on the other hand, moderate the relationship between concerns and responses toward vaccination.

The conceptual framework is considered unique over the foundational model (HBM) in two main ways. First, it is overarching and conceptualises concerns as being multidimensional in determining vaccine uptake. This is envisaged to offer a more nuanced measurement of concerns and its corresponding consequence on vaccine uptake. Second, the uniqueness of the current framework lies in its inclusion of tourists' tripographics, vaccination literacy and information seeking behaviour as potential antecedents of their vaccination concerns and uptake behaviour. This introduces context in predicting vaccine uptake. The HBM appears not to have acknowledged the usefulness of these afore factors.

Summary

This chapter reviewed related previous empirical studies in the context of international travel on vaccination concerns, its underlying factors and its impact on vaccinees responses toward vaccination. However, given that the research effort on the subject under consideration is budding in the travel medicine literature, not much could be gotten on the various thematic issues afore mentioned hence the reviews also drew from the general vaccine literature. However, these concerns varied by type of vaccine. In addition, socio-demographic characteristics including sex, religion and educational attainment, tripographics such as length of stay, purpose of visit, information seeking behaviour and vaccination literacy are potential determinants of the concerns expressed by travellers. Furthermore, vaccination concerns significantly impact people uptake of vaccines. The chapter concluded by proposing the integrative model of concerns and responses toward vaccination as the conceptual framework for the study. The next chapter focuses on the

review of empirical studies that relate to vaccination concerns, its antecedents, mechanisms and impact on people's responses toward vaccination. The next chapter focuses on the methodology used in this thesis.

CHAPTER FOUR

RESEARCH METHODS

Introduction

The relevance of methods as the most vital and critical part of valid scientific research, particularly in the social sciences cannot be overemphasised. This chapter proceeds by presenting the philosophical thoughts that informed the chosen methods. It begins with a description of the setting where data were collected. It further addresses issues relating to the research philosophy and approach, target population, sample size and sampling procedure. Issues bordering on the data collection instruments, methods of data collection, data processing and analysis, techniques as well as the ethical issues and field challenges are also presented in this chapter.

Study Setting

Ghana in Relevant Context

Ecological, climatic and socio-economic factors shape a country's health profile including its disease burden (WHO, 2017). This section characterises Ghana as regards her location, topography, climate, vegetation and diseases. It also describes the state of water, sanitation and hygiene in the country. Situated in the Gulf of Guinea (at Latitude 80 00 N and Longitude 20 00 W), the Republic of Ghana is a West African tropical country located North of the equator (Ministry of Tourism [MOT], 2015).

Ghana occupies a total land area of about 238, 540 Km^2, and has a total population of over 24 million people with an annual average growth rate of 2.5 percent, and a male to female sex ratio of 95:100. Ghana has a youthful population with about 41.3 percent aged less than 15 years of age and 5.3

percent older than 64 years. Life expectancy in the country is about 60 years. There are over 100 ethnic groups in Ghana. More than half of the people in Ghana are educated only up to basic level. Administratively, the country is currently divided into ten (10) main regions (Ghana Statistical Service [GSS], 2014). Out of this number, three (3) of them (which are, Greater Accra, Ashanti and Central Regions) are collectively dubbed 'the tourism triangle' of the country because they jointly host a disproportionate percentage of tourists' attractions and number of arrivals (Boakye, 2010).

However, each of the ten (10) regions can boast of at least a tourist attraction ranging from ecological heritage (*i.e* Kakum National Park and Mole National Park), historical heritage (Cape Coast and Elmina Castles) to cultural heritage (Akyeampong & Asiedu, 2008).The country is generally low lying in nature with a greater portion of it around an elevation below 150 metres (MOT, 2015). The country also wields a 540km coastline of pristine beaches, particularly, the Central and Western Regions (Akyeampong & Asiedu, 2008).

The climate in Ghana is influenced by two major air masses, namely the Tropical Maritime Air Mass otherwise known as the Southwest monsoons and continental air mass also known as harmattan wind (Armah *et al.*, 2011). Whereas the Southwest monsoons originate from the ocean, therefore, warm and humid, the continental air mass enters the country from the core of the Sudan-Sahel Sahara Desert, which is dusty and dry. The Southern part of the country, which is closer to the ocean, experiences two wet seasons yearly with double maxima rainfalls between April and August, and then September and October. Northern Ghana, on the other hand, receives a single rainy season

beginning April to October followed by a dry season. Due to its closeness to the equator, Ghana's monthly average temperature seldom falls below 25^{0}C (Armah *et al.*, 2011). This makes the destination suitable for all-year-round tourism as evidenced by frequent tourist arrivals from temperate countries (Akyeampong & Asiedu, 2008). Unfortunately, the dry season (December–June) predisposes visitors to Ghana, particularly northern, to Meningitis disease (CDC, 2017). Therefore, visitors who plan to visit the country are recommended to take the meningococcal vaccine to guard them against the disease.

Certainly, tourism has become a very crucial element of Ghana's economy but worth mentioning is that the destination is still in the early stages of the destination area lifecycle proposed by Butler (1980). Ghana's tourist arrivals have been improving as far as the 1990s, except the early 2000s (Table 3). Attributable, the infamous 9/11 incident in 2001, which not only affected the USA but the travel industry of the world, might have accounted for such a growth trend. Since the year 2011, tourist arrivals have, incessantly, increased from 827,501 in 2011 to 1,093,000 in 2014 and at a stable annual growth rate of 10 percent (World Travel and Tourism Council [WTTC], 2015). This trend is equally reflective of tourists' receipts over the period contributing about 7.2 and 6.7 percent to GDP respectively. It is estimated that by 2024, the sector will inject about $3,041.8 million – with an expected contribution to GDP at 4.5 percent per annum (WTTC, 2014).

Table 3: Tourist Arrivals, Receipts and Contribution to GDP

Year	Arrivals ('000)	Change %	Receipts ($million)	Contribution to GDP (%)
1999	372, 653	7.1	304.1	3.9
2000	456,275	25.1	289.5	7.8
2001	609, 822	33.7	335.9	8.4
2002	584, 329	-4.2	389.7	8.4
2003	688,970	17.9	452.1	7.9
2004	582, 108	-15.5	487.0	7.3
2005	392, 454	-32.6	627.1	7.8
2006	508,895	22.7	740.1	4.8
2007	580, 898	10.8	879.0	4.8
2008	672, 434	13.6	1052.30	4.9
2009	667, 275	-0.7	1211.4	6.2
2010	746, 527	9.9	1406.3	5.8
2011	827, 501	9.7	1634.3	5.6
2012	903, 300	8.3	1704.7	5.7
2013	993, 600	9.1	1876.9	7.2
2014	1,093,00	9.1	2066.5	6.7

Source: WTTC (2014)

Table 4 indicates that the top markets for Ghana are USA, Nigeria in the same sub-region as Ghana, UK and Germany while France is catching up steadily (GTA, 2015). Ghanaians living abroad who come to Ghana for VFR form a significant part of the country's tourists' market. The US position as the leading generating region may be attributed to the activities of Peace Corps – a US volunteer organisation that places its volunteers in the country to work in various fields, especially education and health. The continuous influx of Africans in the diaspora "seeking to trace their roots and reconnect with their kith and kin" can also be a major factor accounting for the popularity of the US as a major supply market of tourists to Ghana (Mensah, 2015:213).

Table 4 : International Tourists Arrivals by Generating Markets

Country	2012 (000's)	2013(000's)	2014(000's)
USA	118.4	123.5	135.9
UK	77.6	82.7	91.0
Germany	33.6	37.6	41.4
France	19.9	21.6	23.8
Netherlands	28.2	30.7	33.8
Canada	25.1	26.8	29.5
Switzerland	4.5	5.0	5.5
Scandinavia	18.0	21.1	23.2
Italy	9.1	10.7	11.8
Cote D'Ivoire	40.5	50.5	55.6
Nigeria	102.2	112.4	123.6
Togo	26.5	31.3	34.4
South Africa	25.1	28.2	31.0
Ghanaians Abroad	106.6	113.3	124.6
Others	268.1	298.2	328.0
Total	903.3	993.6	1,093.0

Source: WTTC (2014)

People travel to Ghana for various reasons comprising business, VFR and holiday leisure while a chunk transit through the country as part of a longer trip in the region. The country is seemingly attractive to business professionals since 2009 and this could be ascribed to the new business phase it has assumed, particularly in the areas of petroleum and mineral exploration. But this has been lost to VFR (24.7%). Likewise, the third most favoured reason for visiting the country is holiday and leisure (19%) while the remaining visit for other reasons including conferences/meetings (GTA, 2015).

While Ghana as a destination has made remarkable socioeconomic and health gains in recent years in comparison to other countries in sub-Saharan Africa, there remain stark health challenges attributable to poverty, poor sanitation, and hygiene, inadequate accesses to clean water and toilets (WHO, 2015). Like other Sub-Saharan African destinations, Ghana is perceived to be a health risk-prone place given that the probability of infections from the

destination is high (Kozak, Metin, Crotts & Law, 2007). Travelers to Ghana risk contracting vaccine-preventable diseases such as yellow fever, malaria, cholera, typhoid, Hepatitis A and B, Meningitis, HIV and AIDs, Tuberculosis and Rabies (Centre for Disease Control, 2017; WHO, 2015). It is warned, for example, that Hepatitis A and Typhoid can be gotten through contaminated food or water in Ghana (CDC, 2017). Presently, the population with improved access to sanitation is 13%; 8% for rural residents and 19 percent for urban residents (Kumi-Kyereme & Amo-Adjei, 2016; WHO, 2015). However, not all the aforementioned diseases are preventable by vaccination.

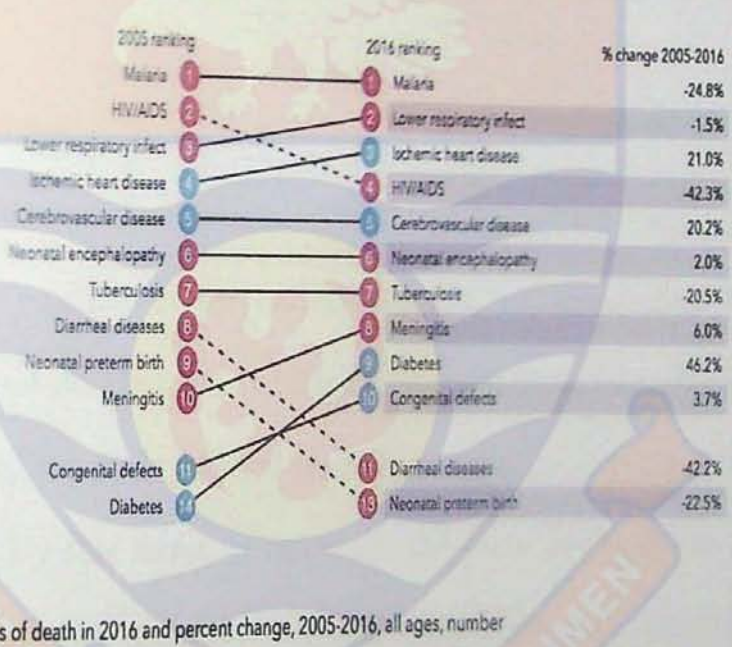


Figure 4: Top 10 Causes of Death in Ghana between the Years 2005-2016
Source: Global Health Data Exchange, Institute for Health Metrics and Evaluation (2018)

Consequently, the burdens of diseases, both communicable and non-communicable, are still soaring though the former dominates in terms of morbidity burden. For instance, out of the total mobility numbers, 53 percent of such deaths are accounted for by communicable diseases, maternal, perinatal and nutritional conditions. Figure 5 shows the top 10 causes of death and disability in Ghana and Figure 6 displays the contributory factors.

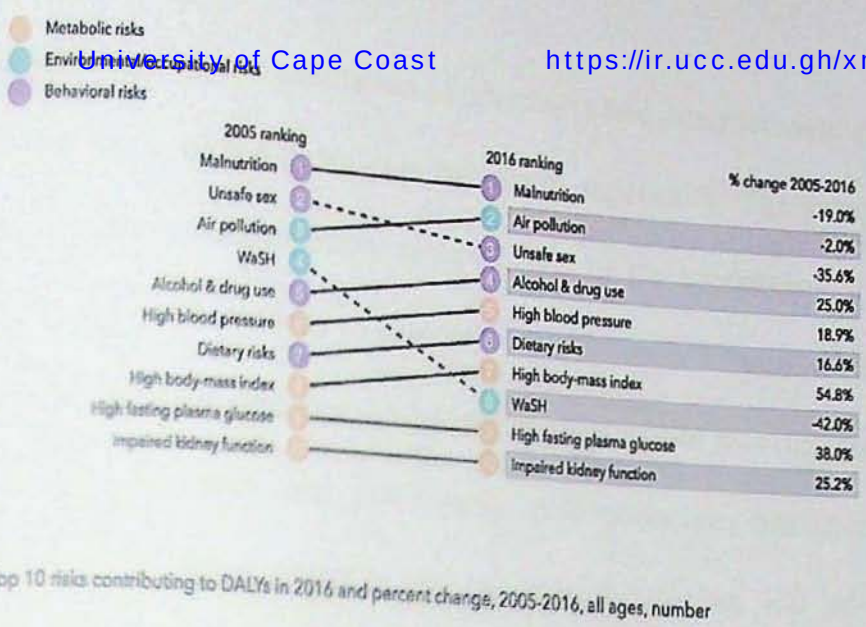


Figure 5: The Top 10 Risk Contributing to Disability-Adjusted Life (DALY)
Source: Global Health Data Exchange, Institute for Health Metrics and Evaluation (2018)

Research Paradigm

This section of the methods offers the philosophical, ontological and epistemological position of the current study in its knowledge research. Having considered the objectives of this study and with reference to previous empirical studies, the study adopted pragmatism as its underlying philosophy to the research. By this frame of reference, the study employed the mixed-methods approach to research involving positivism and interpretivism. Research founded on positivism emphasises conceptualisation, objective empirical observation of individual behaviour, testing of resulting behaviour in relation to a set of probabilistic causal laws and deductive logic to explaining the general pattern of a social phenomenon (Song, 2017). On the contrary, the interpretative approach to research assumes that reality is subjective and is mentally constructed by the individual (Creswell, 2012).

The choice of pragmatism was informed by three-pronged reasons. First as is the case of social science research including tourism, there is a re-

orientation towards a combination of positivism and interpretivism approaches given that none of the paradigms can claim superiority. The second was to profit from the complementary roles of each of the approaches which offer better insights and nuances to scientific research than a mono method. Song (2017:310) astutely captures the balancing roles of the two distinct methods asserting that interpretivism, particularly "phenomenology has advantages in the research of things' essences and behaviours' meaning, and positivism is useful in it being well understood in its methods and its discernment of the causation of a thing's development. Phenomenology must overcome the issue of not being able to generalise, and needs positivism's external observation as the support; positivism needs the inner experiences revealed by phenomenology to help it explain the consequences of concepts".

Ontologically, it is the belief of this study that there could be multiple realities – objective or subjective. Therefore, third, pragmatism was deemed suitable for the focus of this study, which is generally theory building and testing. On one hand, this study argues that a network of causal relationships exists among tourist vaccination concerns, vaccination literacy, information seeking behaviour on one hand and vaccine uptake on the other hand. These hypothesised relationships are consistent with the positivist ontological assumption which emphasises that real causes exist and causality is the rule of nature. On the other hand, it subscribes to the viewpoint that vaccination concerns could be socially constructed and subjective; this suggests that people living and sharing experiences could influence their explanations of social concepts. Although relatively new in the travel medicine literature, the pragmatic philosophy has been widely applied by previous related studies

(Chen, Bao & Huang, 2014; Kim, Ritchie & McCormick, 2012; Wen *et al.*, 2018) in theory development and testing, particularly scale development.

Research Design

Specifically, the quantitative-dominant exploratory sequential mixed-methods approach was adopted (Creswell, 2012). Accordingly, the qualitative method played a subsidiary role by enabling the gathering of qualitative data and assisted in the design of some sections of the survey questionnaire, precisely the Travac measure. Subsequently, some of the qualitative findings were also used to provide explanations to the quantitative results. It is acknowledged in the literature that perceptions of people in relation to an object, in this case vaccination concerns, are best explored with qualitative designs such as phenomenology (Sedgley, Pritchard, & Morgan, 2012). Therefore, qualitative data from the field complemented the measurement items drawn from the literature to develop the survey measurement scales for the quantitative design.

However, given that the interpretative perspective is limited in providing understanding on influences and relationships among variables, which is the main aim of the current study, the quantitative approach was incorporated. In view of that, issues including factor analysis of the dimensions of the Travac scale; testing of the relationships between tourists' concerns and their vaccine uptake were examined quantitatively. In sum, the study proceeded with the mixed methods with the conviction that it would allow for the triangulation of qualitative and quantitative data. This enhances the reliability, objectivity and validity of the study's results leading to a better understanding of concerns and vaccine uptake among international tourist. The

mixed methods started with qualitative approach to generate the needed data to inform the design of the quantitative survey instrument. This was the point of intersection of the two philosophical approaches.

Qualitative Methods

This section presents the specific qualitative methods employed in the study. These ranged from data and sources, sampling, trustworthiness to data processing and analysis.

Data and Sources

Both primary and secondary qualitative data were collected for the study. The primary data were obtained from In-depth interviews (IDIs) among international tourists whereas the secondary data consisted of sentiments expressed online which were obtained through online text mining. The two sources employed in the generation process of the qualitative data were deemed to grant the researcher access to wide-ranging sentiments about travel vaccination.

Principally, the online sentiments were drawn from the *Vaccine Sentimeter* via *Health Map*. The reason for this choice is because the *Vaccine Sentimeter* is the largest dedicated online automated media monitoring system which tracks, gleans and analyses real-time global conversations about vaccination. It aggregates and archives data from 100,000+ online sources ranging from social media (i.e facebook, twitter), news aggregators, blogs (*i.e* trip advisor), eyewitness reports, and expert-curated discussions to validated official reports. Based on text processing algorithm, HealthMap automatically assigns a title, date, source, uniform resource locator (URL), plain text

content, location(s), and disease to each report. Search was largely adapted to only reports relating to negative sentiments about human vaccines, with emphasis on travellers and tourists (Powell *et al.*, 2016). The search terms included a combination of Boolean terms such as travel immunisation or vaccination, and concerns, perceptions, worries, doubts, risks, uncertainties, safety concerns and sentiments.

Sentiments without time or language restriction were mined but all non-English comments were translated back to English using Google Translate in line with Larson *et al.* (2013). To get details of each report in *HealthMap*, the URL of the report was followed for further reading. Though the *HealthMap* dashboard currently hosts only comments between June 2012 and September 2014, up-to-date data was requested via info@epidemico.com. The *Vaccine Sentimeter* platform has been used by a number of vaccine studies including Larson *et al.* (2014), Larson *et al.* (2016), Powell *et al.* (2016) and its usefulness and reliability for tracking country level vaccine concerns have been confirmed. The data from the field interviews and the text-mining were primarily intended to tease out additional items to enrich the literature review for the design of the measure of the Travac scale.

Target Population

The target population for the IDIs was international tourists, who visited Ghana between April and June 2017. They were contacted at the Oasis Beach Resort in Cape Coast. The idea of the suitability of the resort for contacting the target population was gotten from Hiamey (2017). The online text mining also targeted vaccination sentiments expressed by international travellers latest July 2017.

Sample Size

The IDIs involved 20 respondents while 1,235 online posts (responses and counter responses) were mined. Termination of the data collection was guided by the theory of saturation, a situation where new ideas ceased to emerge (Guest, Bunce & Johnson, 2006; Mason, 2010). That is, the review saw a rapid day-by-day decay and saturation of the comments made about travel vaccines.

Sampling Procedure

The respondents for the in-depth interviews were accidently sampled. The accidental sampling made it possible to get interviewees who were willing and able to spend ample time for the interviews. Interviews were scheduled at the respondents' convenience, which was mostly at public areas of the resort or the restaurant area. Sometimes those respondents who had no immediate time to spare for the interviews gave their contact numbers and the interviews were subsequently conducted via WhatsApp. Verbal consent was sought from each respondent prior to the interview. None of the respondents declined participation and recording of the interviews.

The interviews lasted for between 30 to 50 minutes. A contact summary report was also compiled alongside with each interview to document non-verbal data, including nonverbal expressions, prolonged thinking and changing of ideas (Moreaux et al., 2018). The online-text mining, on the other hand, was purposively done whereby only negative sentiments posted by international travellers were considered.

Research Instrument

A semi-structured IDI guide with prompts and probes was used to collect the field-based qualitative data. The guide was designed and administered in the English Language. The guide was structured into two sections. The first had two domains (A and B) with domain A being an introductory section and B captured questions on the respondents' sex, educational status, country of origin and past vaccination status. The second section addressed questions that elicited their travel vaccination concerns. The guide-maintained flexibility and openness so that interviews were adapted to situations.

Trustworthiness

A series of measures, which bordered on reliability and validity of the data gathering and analysis, were adopted to ensure trustworthiness of the findings. First, unsolicited online qualitative data were drawn to corroborate, enrich and reduce the bias associated with field-based qualitative data (Powell et al., 2016). This was envisaged to enhance the credibility of the data collected. The exhaustiveness of the Boolean terms used for the online data mining was also reviewed by the supervisors of the thesis and two additional faculty members with expertise in qualitative research.

Similarly, the IDI guide for collection of the field interviews was assessed by them. This was meant for them to assess the extent to which the questions measure what they intend to, and whether the instrument comprehensively addresses the questions required for measuring the phenomenon. Subsequently, the IDI guide was pre-tested among three (3) international students who visited the University of Cape Coast in August

2016 for exchange programs. The assessment led to additions of probes where necessary. The pre-test, in particular, served as a mock orientation of the interviewing process to the researcher. The pre-test on the overall enhanced my skills in moderating the interviews. Other procedures used are explained in the data processing and analysis section.

Data Processing and Analysis

The field interview data was transcribed verbatim by listening to the tapes in Windows Media Player. The listening of the tapes via this player allowed for easy control of audio playback. The researcher and one of the field assistants independently coded transcripts to enhance the validity of the findings. The resulted transcripts were then read one after the other the second time along their corresponding audio to ensure that the responses of the interviewees were transcribed accurately. Both transcribers verified and resolved inconsistencies in codes.

With respect to the online comments, names to whom statements were directed were removed from the dataset. Likewise, all html tags were removed. However, all image files (largely 'meme' images) were retained. Meme image text was retained for analysis because they gave an indication as to the severity and varying opinions of negative comments in the language tourists choose to use when discussing vaccination sentiments.

The field interview transcripts were aggregated into a Microsoft Word file together with the minded text and loaded into NVivo 12 Pro for management and thematic analysis. Whereas thematic analysis offers the researcher ease of access to the dominant issues that characterise the phenomena, its focus on themes could mask shades of important findings

(Mason, 2010). Given that the qualitative data were meant to draw out additional measurement items for the Travac scale, the data processing began with the researcher independently gleaning and summarising out the statements with direct undertones of negative sentiments about travel vaccines. This was made possible by inspecting the most mentioned negative Boolen terms about vaccination (including side effects, safety, and efficacy, costly and expensive) in the word cloud and tree.

The results were organised into dimensions (parent-nodes) and underlying items (sub-nodes) as shown in Table 5. The resulted items were then re-worded to properly match the context of international tourism and incorporated into the survey questionnaire. Worth noting is that the dimensions were grouped based on their content and not based on the initial dimensions gotten from literature or theory. Comparison and integration, however, were only done with the earlier derived dimensions during the grouping stage (Juvan & Dolnicar, 2014). It is crucial to first "ignore the literature of theory and fact on the area under study, in order to assure that the emergence of categories will not be contaminated by concepts more suited to different areas. Similarities and convergences with the literature can be established after the analytic core of categories has emerged" (Glaser & Strauss, 1967: 37).

Table 5: Sample Sentiments by International Travellers about Travel Vaccination

Dimension	Underlying statements
Efficacy	-I sometimes wonder if travel vaccines work -I trust science, but I don't think science truly knows how interconnected our body is, so how can it really know the bad effects vaccines will have on me when am abroad. "I am just a bit wary of putting things like vaccines in mind body when travelling" -The thought of being injected microbes in my veins while I am travelling to a foreign country -I don't think vaccines must be taken all the time especially when travelling -I seriously doubt that taking travel vaccine is the best way to stay healthy when holiday basic sanitation should be enough - I don't believe in travel vaccinations. I don't just believe in getting vaccinated before travelling I'm not a conspiracy theorist, but neither will I dismiss the idea that not all travel vaccinations are recommended with our best intentions as the first priority. - No enough evidence of vaccination effectiveness
Safety	-I am afraid of the side effects of vaccines -I get flu and headaches from the yellow fever vaccine I took" -Vaccination injection is very painful", -I don't like needles -Scared of needles -The last time I took jabs I had redness and swelling at the injection site -I feel nervous when about to take an injection" -Too many travel vaccines to take -Am afraid of their effects on my body when abroad -Some travel vaccines bring me allergies -the anxiety behind vaccines -It is scary taking jabs -My arms will hurt -The side effects of malaria medication alone are not easy talk less several jabs - the vaccine might conflict with other medications I have taken - I just think that vaccines are not good for one when travelling - I don't believe we understand fully the residual effects heavy metals and synthetic preservatives have on the cellular system
Cost	- You pay about 500 dollars for a travel vaccine that is chunk of money, especially when you have not budgeted for it. - The cost involved is simply too much -is expensive especially yellow fever -the cost is high -Travel vaccines are way of making money by health organisations -They are expensive and usually not covered by insurance I think we travellers are just a means through big pharma and travel clinics make money. They really don't care about our health. -Just the expenses of them -In UK vaccines are expensive -Everything about travel vaccination is costly. It is especially worrying that they charge for every consultation you make on those vaccines.

Table 5 continued

	- Travel vaccinations are a money-grab strategy for health professionals as they use various fear mongering tactics about travel. -I had to fork out for few last year that were not available on NHS so ended up spending an extra 150 pounds on meds and vaccines. A pain in the ass literary. -Some years back I forked out about 400pounds or something ridiculous for some vaccines at a private clinic. ...Aside the travel clinic visit charges, it amounted to hundreds of dollars in vaccinations requiring multiple visits. - Doctors make money off of vaccines, why wouldn't they recommend a whole slew? -Doctors are but sales people of travel vaccines. I have experienced a lot more doctors trying to tote and defend their programming than actually make people better.
Time	-It is inconveniencing because the clinics are located farther away and you have to travel over distances -it is bothering and time wasting trying to access travel vaccines. And even if they are available some of the shorts are staggered and would often require that you repeat your visit to the facility. -Too busy to get the vaccine -The fact that you have to take them early enough is worrying -Time wasting
Access	-Sometimes the stock of travel vaccines becomes limited -You can't get everything done at one place -My clinic doesn't stock all these medications, so I have to go to multiple clinics - When I took off to travel full-time, I didn't know all the places I'd visit (I still don't) where to get all vaccines. No reliable information on where to find your needed travel vaccines
Ethics	-Why do I have to be forced to get the vaccine just because I am going on holiday -I think people should have a right to say yes or no to mandatory travel vaccines -Am not happy to being forced to take some vaccines -Nono, sorry I did vaccinate for yellow fever. as it is an obligation. But this is not fair as I just did not want to put any sometimes on body while travelling - Sometimes you travelling for few weeks holiday yet you are legally required to take some vaccines, c'mon this not fair -... why the push for vaccinations only if we travel?

Source: Field Survey, Adongo (2018)

Quantitative Methods

This section discusses the quantitative methods used. It focuses on issues relating to the data and sources, target population, sample size and sample size determination. It also tackles the data processing and analysis.

Data and Sources

The survey data were collected from international tourists who visited Ghana. Unavailability of quantitative secondary data that could assist in addressing the specific objectives of the study informed the gathering of primary data. A panel data consisting of two waves: exploratory, confirmatory (main data) was collected. Data collection for each occurred in the following sequence, June-August 2017, October-July 2018.

Target Population

The main target population for the survey was all international tourists of at least eighteen years of age, who visited Ghana for the period between June 2017 and July 2018. The age bracket of 18 years and above comprises persons most active in tourism (UNWTO, 2017) and the period June through to October is regarded as the peak season of tourism in Ghana (Ghana Tourism Authority [GTA], 2015). With recourse to the UNWTO, an international tourist, in the context of this study, refers to an inbound visitor who has spent at least 24 hours in a destination and whose purpose of visit is either for leisure, business, visiting friends and relatives and other personal purpose other than to be employed by a resident entity in the country or place visited.

Though if data from domestic tourists were incorporated into the study it could have added some more insights into the findings, the decision to focus on international tourists was based on the person and place argument in epidemiology. First, international tourists are highly vulnerable to infectious diseases during a vacation relative to domestic tourists since most of them are likely to travel to destinations where the climatic and general environmental

conditions are at variance to those of the originating region. Second, epidemics may tend to have far-reaching consequences in international tourism compared to domestic tourism given that in the former people are pooled from various geographical regions who subsequently can be vehicular borne of the involved disease. On that score, international tourism is considered a more suitable conduit for the global exposure and dispersal of infectious diseases hence the need to guard against.

Sample Size

Given that one main focus of this study was to make statistical inference on the subject under consideration among tourists, especially those to Ghana, the apriori G-power online sample estimation technique was used to estimate the sample size for the survey. G-power remains the most cited and used sample size estimator for structural equation modelling related studies (see Bryne, 2012; Kim, 2014; Westland, 2012) due to its ability to guard against type 1 and type 2 errors associated with estimation techniques (Cohen, 1988).The study envisaged, at maximum, to use 86 measurement items, 8 latent constructs, 86 error variances, an anticipated effect size and power of 0.95 and a Hoelter's statistic of 0.01 probability levels.

To enhance the reliability and robustness of the results, the thresholds for the aforementioned parameters were set to be higher than conventional thresholds. For instance, Fisher (1925) recommends a probability of 0.05 while Cohen (1988) suggests a statistical power value of 0.8. These parameters were substituted into G-power, which resulted in a sample size of 860. As a rule of thumb, regression-based statistical literature suggests that, at the very least, one measurement item (regression factor) should correspond to

10 sample cases (Bryne, 2012; Thrane, 2016). This means that the estimated sample size is deemed feasible, adequate and reliable for performing the proposed analysis. However, 20 percent of the 860 respondents, equivalent to 172 respondents was added to enhance the reliability of the sample and cater for any non-responses that might occur during the data collection. Thus, the actual total survey sample size for the main study was 1032.

Sampling Procedure

The study relied on the on-site approach for the data collection. This approach involved the collection of data while respondents are at the destination (Chien *et al.*, 2017). It was envisaged that the on-site approach would conceivably offer more reliable and accurate data on their travel vaccination concerns and uptake because they would have taken or refused the recommended vaccines for the itinerary and therefore be in the best position to respond to the questions. The on-site approach also guarded against the inherent likelihood of measuring some of the vaccination issues of the tourists as behavioural intentions when using the pre-travel approach.

Potential respondents were conveniently sampled at the visitor waiting areas of the most visited attractions (*i.e* the Kakum National Park, the Cape Coast and Elmina Castles) in Ghana while they were waiting to receive on-site orientations or during check-out of the facility. It has been established that the majority of international tourists to Ghana visit at least one of these attractions (Boakye, 2012; Deichmann & Frempong, 2016). For those who visited the attractions in groups, two people on average were chosen to participate in the study. This was to guard against potential group bias (Adongo, Taale & Adam, 2018). Those who provided consent were given a questionnaire to complete in

the facility and return to the researcher before leaving. The use of a convenience sampling technique, a non-probability sampling approach, for the survey was principally informed by the absence of a reliable sampling frame on international tourists to Ghana.

Research Instrument

The survey data was collected using a questionnaire. Its adoption was based on Creswell's (2012) assertion that the use of a questionnaire is best suited for collecting quantitative data and guarantees respondents' confidentiality and anonymity. The questionnaire was structured into four sections (Sections A to D) with open and close-ended questions. The introductory section explained the purpose of the study, the estimated time involved in filling out the questionnaire and the ethical considerations. This section also contained the consent form, which sought the respondent's consent of participation or otherwise and a filter question, which sought to find out whether the individual had been interviewed on the same subject in the other attraction sites in order to minimize surveying duplicate respondents.

The first section (A1) contained questions on their vaccines uptake. A checklist of vaccines that tourists to Ghana are expected to be up-to-date on was provided to the respondents to self-report by indicating those vaccines they had fully or partially taken or not taken at all. They were asked to provide a reason, which is either deliberate refusal or non-deliberate (such as, because they could not find the vaccine), if one's response status to a particular vaccine is partial vaccination or non-vaccinated though eligible. The list of vaccines was adapted from WHO's (2018) list of recommended vaccines for travellers to Ghana. These vaccines included routine vaccines (measles-mumps-rubella

(MMR) vaccine, diphtheria-tetanus-pertussis (DTP) vaccine, varicella (chickenpox) vaccine, and polio vaccine), mandatory (yellow fever) and recommended vaccines (Hepatitis A, Hepatitis B, Typhoid, Meningitis (Meningococcal disease) and Rabies.

Though respondents' vaccination history was captured using the self-reported method and could have some bias, they were advised to confirm their history from their vaccination cards. It is important to note that most of them had their immunisation history digitally stored (*i.e* via CDC's TravelWell App, e-mail and online hospital folders) and so was easy to retrieve. Others also had their history stored in both paper and digital versions. The elicitation method used for determining their vaccination status is similar to that employed by the WHO (2016) in the Demographic and Health Survey (DHS) in collecting immunisation data.

The section (A2) measured their travel vaccination concerns on a rating scale of 0 to 10, where 0 indicated no concern and 10 represented highly concerned. The measurement items were drawn principally from the literature review and the qualitative data: field interviews and online text-mining. The second section (B1) contained questions that elicited data on their responses toward vaccination including perceived benefits of vaccines, hesitancy toward vaccination and whether they would recommend vaccines to others almost measured on a ranking scale. The second part of the section collected data on their vaccination literacy, perceived vulnerability and severity of infectious diseases and perceived importance of vaccination. These were also gauged using a rating scale of 0 and 10. The items measuring their literacy on vaccination were adapted from the European Health Literacy scale. The last

sections (C and D) contained questions on respondents' and tripographics (travel experience, travel party size and length of stay) and socio-demographic (i.e sex, religion and region of origin). Appendix B contains the details of the questionnaire.

Validity Assessment of Survey Questionnaire

Two main procedures were used to ensure the measurement validity of the questionnaire, particularly the items intended for proposing the travel vaccination concern scale. The pool of items for the questionnaire was subjected to expert review to evaluate the face and content validity of the items. They were asked to indicate *yes or no* (with an appropriate comment where necessary), the suitability, representativeness, accuracy, clarity and redundancy of each item. The experts included two academics with expertise in travel vaccines studies and scale construction practices; two members of the Strategic Advisory Group of Experts (SAGE) on immunization and two travel medicine professionals. SAGE is the primary advisory group to the WHO on vaccines and immunization. A decision to refine or drop an item was based on an agreement between two or more judges.

A pre-test was carried out between 3rd June- 31st August 2017 at the Cape Coast Castle and Oasis Beach Resort using 300 respondents for the exploratory analysis as well as to verify clarity of the research questions in the instruments for the actual data collection. Furthermore, the pre-testing served as a mock administration of the research instrument to the field assistants. Thus, it afforded them the opportunity to familiarise themselves with the challenges they may encounter during the actual fieldwork.

From both the expert reviews and the pre-test exercise, it was generally realised that the questionnaire had no issues with content and facial validity issues except for two of the items of the travel vaccination concern measure that were found to be ambiguous and two of the items measuring vaccination literacy were also double-barreled, and hence were rephrased. Consequently, about 44 items were retained for the questionnaire (See Appendix).

Training of Field Assistants

Two graduate students with a tourism background assisted with the data collection. Their selection was based on past field experience and subsequently taken through two days of training encompassing issues on the objectives of the study, the content of the questionnaire, strategies for approaching respondents and observational skills. Other relevant issues including ethical considerations and role-plays in administering the research instruments were covered.

Data Processing and Analyses

Three software including STATA version 14, IBM Statistical Product for Service Solutions (SPSS), version 23 and Analysis of Moment Structures (AMOSS), version 14 were used to process the quantitative data. The combination of software is to harness the strengths of each of the software in answering the objectives of the study. Mainly, descriptive and inferential statistics were used to analyse the data. Percentages, means, and standards deviations were used to describe the socio-demographic characteristics, tripographics of the respondents as well as the other factors that served as explanatory variables. After the data cleaning, a total of 250 out of 300 cases

were used for the exploratory/ pre-test analysis while 905 complete cases out of 1032 were retained for the main analysis.

Objective 1

In psychometric scale proposition, previous studies (Bryne, 2010; Churchill, 1979; Hu & Bentler, 1999) recommend the use of two main interrelated techniques in analysing the data. These are Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) for exploring and confirming the psychometric structure of the scale in turn. In view of that, the EFA was used to explore the factor structure of the would-be Travac scale and remove poorly ('below par') fitting items. EFA is more suited for exploring the structure of scales that are in their initial stages of development (Byrne, 2010).

This analysis was done using the data from the 205 exploratory sample. Suitability and adequacy of the data for EFA was established on a Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy threshold of ≥ 0.80 and Bartlett's Test of Sphericity probability value of $p \leq 0.05$. The Promax rotation using maximum likelihood was used to evaluate the dimensional structure of the items. These rotational approaches are in sync with rotation use in AMOS, which is the software used to confirm the items in the second stage of the study. Eigen value ≥ 1 was the criteria for extracting factors with an additional criterion that each dimension must have at least three items. A ≥0.5 loading on a primary factor, communality of ≥ 0.6 and non-cross loading on any other factor at ≥0.40 were the thresholds for retaining an item (Hair, Black, Babin & Anderson, 2010). The items were repeatedly iterated until a clean pattern matrix was obtained.

However, the remaining analysis, including the three other objectives, but excluding the predictive and nomological validity analysis for the Travac scale, was carried out using the data from the main sample, which was 905 respondents after cleaning. A covariance-based CFA in AMOS was used to confirm and refine (where necessary) the structural validity of the factor solution extracted from the EFA. The covariance-based CFA technique was chosen over the alternative component-based CFA for three main reasons: The lead reason was that preliminary analysis of the data on the measurement items for the Travac scale was found to be normally distributed (Appendix C).

Covariance-based statistical techniques are parametric in nature and are appropriate when the data involved is normally distributed while component-based techniques are suitable for use when the data is not normally distributed (Byrne, 2010). Another reason was that the confirmatory data for this study is about 905 cases, one which exceeded the recommended sample size threshold for use of component-based CFA as it risks convergence validity and improper factor solutions (Byrne, Lam & Fielding, 2008). Component-based CFA works well with small sample sizes (less than 200 cases). The last reason was that covariance-based CFA is more robust and stringent for model validation (especially in the early stages of theory development) when compared to component-based CFA (Bryne, 2010), which is the case in this study.

Furthermore, Pearson correlation was used to establish the inter-relationships between the confirmed dimensions of the Travac scale. The resultant correlation matrix was subsequently compared with the average variance extracted for each dimension to determine the discriminant validity of

the would-be scale. Lastly, a second-order structural equation was modelled to determine the predictive share of each of the dimensions to the Travac scale.

Objective 2

To estimate the determinants of the travel vaccination concerns of the respondents, a series of ordinary least squares (OLS) regressions was estimated. This type of regression suited the continuous nature of measurement of the dependent variable, vaccination concerns because OLS is used when the dependent variable is continuous. In addition to the regressions, the multivariate analysis of variance (MANOVA) was used to compute mean variances to supplement understanding on the explanatory variables (i.e sex, marital status, region of origin and past travel experience) that were categorical in nature. The MANOVA was chosen over the conventional one-way analysis of variance (ANOVA) for the mean-variance estimation because the vaccination concern dimensions, which served as the dependent variables were multiple and interrelated (Pallant, 2010). A correlation matrix had shown significant interrelationships among the six dimensions of the Travac scale (Table 20).

Objective 3

Objective 3 sought to analyse the relationship between vaccination concerns and vaccine uptake. A fractional beta regression was used to analyse the effect of vaccination concerns on vaccine uptake rate due to the fractional nature of the variable. The binary logistic was also used to further explore the relationship between vaccination concerns and uptake of the specific vaccines. The link test, Hosmer-Lemeshow test and the Ramsey test as post-estimation tests were conducted for each of the regression models to check for

correctness in specifications and fitness. The nature of the variable 'uptake', which was either the individual has fully taken or under-vaccinated a particular vaccine characterised it as a dichotomous outcome (presence or absence of a phenomenon) hence made it suitable for the use of binary logistic and probit regressions.

The logistic regression was chosen over the alternative probit regression because of two reasons. First, the two regression techniques according to past studies though different in their link functions yield consistent signs and magnitude of the coefficients and by extensions the validity of the findings (Boakye, Annim & Dasmani, 2013). However, the current study acknowledges that the two techniques are primarily different in terms of parameterisation and therefore does not mean to convey that the output from the two estimation techniques is directly comparable in a strict statistical and quantitative sense.

The second reason was because the error distribution of the link function favoured the logistic regression. The probit regression did not meet the recommended threshold of the link test of *hat* less than the probability value ($p<0.05$) and *_hatsq* greater the probability value ($p>0.05$). This was further confirmed by the Hosmer and Lemeshow probability chi-square less than the probability values (Downward et al., 2011) Thrane (2016) posits that while there is yet no accord in the literature regarding which of the two estimation techniques is superior, selection of one over the other should be based on the error distribution of the dependent variable.

Cluster analysis was used to determine whether a typology of tourists based on their travel vaccination concerns could be identified. Topologies are advantageous because they provide a person-oriented approach and a simple classificatory scheme to grasp a complex phenomenon, such as attitudes and behaviours (Rantanen, 2013). Cluster analysis was chosen over model-based methods (such as discriminant analysis and density estimation) and Bayesian-based methods because the sample is relatively small, and these other alternate methods "perform better on large samples, which allow them to estimate all the required parameters" (Hajibaba et al., 2015: 52).

The dimensions of vaccination concerns identified in objective 1 were used as the marker variables for the segmentation. According to Dolnicar and Leisch (2013: 14), 'a variable is called a marker variable if the absolute deviation from the overall mean is 25% of the maximum value seen, or if the relative deviation is 50%.' Therefore, functionally a variable is regarded as a marker variable for a cluster if one of the following two conditions is satisfied:

$$|mg-mk| \geq 0.25|M| \text{ or } |mg-mk| \geq 0.5|mg|$$

Where m is the maximum value of a variable, mg the global mean of the variable, and mk the mean in the cluster.

Pie charts and bar graphs were used to present the types of tourists and their relations with the 'segmentation base' to understand what each type represented. Other additional characterisations, including the tourists' responses toward vaccination while travelling abroad, were also profiled with the aid of graphs. Graphs allow for easy visualizations, comparison of clusters and understanding by users who are not familiar with statistics (Dolnicar &

Leisch, 2013). Additional profiling of the would-be tourist typology was carried out using the respondents' demographic characteristics and tripographics and analysed using the chi-square test of difference. The Kruskal–Wallis test for mean differences of several groups, a non-parametric test was also used to determine possible differences in metric variables, such as concerns, past number of international trips, disease burden and vaccine literacy across the different tourists in the typology. Absolute Kruskal–Wallis test means were reported instead of rank sum of means for easy understanding of the results. The decision to use non-parametric techniques instead of parametric (such as ANOVA or MANOVA) for this analysis is because of the non-normal distributed nature of the clusters that were generated.

Challenges during Fieldwork

Convincing the respondents to spare some time to fill out the questionnaires was a challenge. Some of them complained of time constraints in answering the questionnaires. This was due to the fact that they had to move to the next activities in their itineraries. Others also felt the questionnaire was too voluminous and would cause delay in their scheduled activities. In these situations, the researchers made efforts to convince them and some granted participation.

Closely related was the fact that some partially filled out the questionnaires. This happened because some had abandoned the questionnaires to 'catch up' their tour buses, especially for those who visited the attraction sites in groups. These incompletely filled out questionnaires were excluded from the analysis. Statistical measures have often been used to manage the missing data, especially if at least 80 percent of the responses have

been provided by the respondent; the decision to use the exclusion approach is because of the largely exploratory nature of the study. Completeness of data is germane for drawing of reliable and valid conclusions based on exploratory studies (Moreaux *et al.*, 2018).

Getting the permission of some of the travel agencies, in case of the tourists who came on package tours, to allow their clients participate in the study was a bit difficult. The agents claimed they were time constrained and that some of the clients usually sanction afterwards.

Ethical Considerations

Ethical approval for the study was granted locally by the Ghana Health Service Ethical Review Committee (GHS-ERC), and internationally by the WHO Strategic Advisory Group on Vaccination (SAGE) Human Research Ethics Advisory Panel. Therefore, the conduct of both the quantitative and qualitative study complied generally with the ethical principles prescribed by the two bodies in the conduct of research involving human subjects. These included the right of entry, informed consent, anonymity and confidentiality.

The WHO SAGE as part of their ethical clearance procedures vetted the research instruments to ensure they were properly worded and without questions that would risk inciting unnecessary vaccination concerns as a result of the study. The right of entry was sought by sending introductory letters, given to me by the Department of Hospitality and Tourism Management, to the management of the tourism and hospitality sites used as the point of contact for recruiting the respondents. This letter identified the researcher and or the field assistants as well as the nature and essence of the study.

Subsequently, the actual fieldwork reiterated the purpose of the study to the respondents to obtain their consent. This covered what the research is about, who is undertaking it, why it is being undertaken and the implications of the study. This was done in an informed consent letter. Respondents were informed of the freedom to decline to participate in the study or in responding to questions they considered personal. Those who declined participation had their view respected and subsequently were thanked for being allowed to be confronted.

As regards the field qualitative data, verbal consent was sought from each respondent prior to the interview. They were informed the interviews would be tape recorded; three respondents declined participation because of lack of time, and two declined to tape-record interviews and hence had their responses recorded in a field notebook. Permission to use the *vaccine Sentimeter* platform for the online data mining was sought but no informed consent was sought from the individual commenters because the data was publicly available

The participants' confidentiality was assured. Information given was promised not to be divulged to persons not directly involved in the study. Finally, anonymity was ensured. This was done by designing the research instruments such that they were devoid of questions that require participants' identity or any contact information. For example, issues such as name, house number, postal and email address were not captured as part of the data. Instances, where telephone numbers were gotten for the purposes of some qualitative interviews via WhatsApp, the conversations were cleared on the

dashboard for both the researcher and the respondent with permission sought from the latter.

Summary

This chapter discussed the methodology used in carrying out the study. It handled among other issues the study area description and research design. The target population, data sources, sample size, sampling procedure, and research instruments were also discussed. Lastly, the chapter described the data processing and analytical techniques used, challenges encountered on the field as well as some ethical issues considered. The next chapter is the presentation of results and discussion for objective one of the thesis.

CHAPTER FIVE

PROFILE AND CHARACETERISTICS OF RESPONDENTS

Introduction

This chapter provides an analysis of the socio-demographic characteristics and tripographics of the 905 respondents for the main study including information on their: age, education, marital status, religion, employment status and past travel experience. Beyond these characteristics, the chapter also describes their perception of infectious disease burden and importance of vaccines and vaccination literacy. This analysis is deemed to provide information for understanding the psycho-socio-economic status of the respondents as well as provide background information on the aforementioned variables as they would potentially serve as explanatory factors to the respondents' travel vaccination concerns and vaccine uptake.

Socio-demographic Characteristics

Table 6 presents the socio-demographic characteristics of the respondents disaggregated by males and females. About 64.64 percent of the respondents were females and the remaining proportion (35.6%) being males. The majority of them had never married (69.83%) with similar proportions observed among males and females. About six in 10 females (67.81%) and se ven in 10 males (70.94%) were never married, though a slightly higher proportion of males (32.19%) than females (29.06%) were married. The age of the respondents varied from 18 years to 80 years with 30 years being the average age. Those within the age cohort of 20-29 accounted for the majority (50.39%) and the least being persons aged 40 years and older.

Education empowers people with the capabilities which are knowledge and skills, and these which lead to better employment opportunities, pro-health decisions and positive health outcomes (GDHS, 2014). All the respondents were "lettered" meaning they had some formal education [High school (28.84); Bachelor (40.11%) and Post-graduate (31.05%)]. Except for those who completed High School education, the proportion of males with Bachelor and Post-graduate degrees were slightly higher than the females.

Table 6: Respondents' Socio-demographic Characteristics by Sex (n = 905)

Demographic characteristics	Male (%) [n= 320]	Female (%) [n= 585]	Total (%) [n= 905]
Marital status			
Never married	67.81	70.94	69.83
Married	32.19	29.06	30.17
Age			
<20	5.63	12.65	10.17
20-29	46.25	52.65	50.39
30-39	26.56	20.34	22.54
>40	21.56	14.36	16.91
Education			
High School	24.38	31.28	28.84
Bachelor	41.25	39.49	40.11
Postgraduate	34.38	29.23	31.05
Religion			
Christianity	54.06	57.09	56.02
Atheism	24.06	17.09	19.56
Agnostic	8.44	12.48	11.05
Islam	2.50	1.71	1.99
Others	10.94	11.62	11.38
Employment status			
Employed	79.38	72.31	74.81
Unemployed	16.56	25.47	22.32
Retired	4.06	2.22	2.87
Region of origin			
South-East Asia	2.19	0.00	0.77
Africa	10.00	6.67	7.85
Europe	66.88	72.99	70.83
America	17.81	16.58	17.02
Western Pacific	3.13	3.76	3.54

Source: Field Survey, Adongo (2018)

More than half of them professed being Christians (56.02%) with comparable proportions observed among males and females. Atheism placed second (19.56%) suggesting that nineteen percent of the respondents do not believe in the existence of God or gods. The proportion of male (25.0%) atheists was more than female atheists (17.09%).

As regards the tourists' region of origin, the distributions of the respondents are compared to Ghana's tourism source market (UNWTO, 2017). The regions were grouped according to the WHO's classification: Africa region, America region, Eastern Mediterranean region, European region, South-East Asia region and Western Pacific region. The respondents from Europe (70.83) dominated the study with more than seven in 10 females (72.99%) and six in 10 males (66.88%) from the region. Those respondents from the Americas placed second (17.02%) and the minority being those from the South-East Asia region. They constituted less than one percent of the sample. Those who were currently employed (74.81%) are more than those unemployed (22.32%). More than three-quarters of the sampled males (79.38%) and females (72.31%) are currently employed, only that more males are employed than females (Table 6).

Respondents' Tripographics

Table 7 and 8 present the tripographics of the respondents disaggregated by sex. The majority of the respondents had visited Ghana (82.32%) for the first time, but in terms of international travel, about 92 percent had travelled in the past with the average past travel being 17 times. About 63 percent of them visited Ghana in groups of which more are females (64.44%). Most of them stayed in Guesthouses (43.32%) followed by

those who did homestays (36.93%). Cumulatively those who stayed in star-rated hotels were 25.79 percent.

Table 7: Tripographics of the Respondents' by Sex (n = 905)

Tripographics	Male (%) [n= 320]	Female (%) [n =585]	Total (%) [n = 905]
Length of stay in Ghana			
Less than 10 days	13.44	11.45	12.15
10-29 days	34.69	32.14	33.04
30-49	10.00	12.14	11.38
50 and above	41.88	44.27	43.43
Visitation status to Ghana			
First-time visit	81.56	82.74	82.32
Repeat visit	18.44	17.26	17.68
International travel history			
First-timers	9.38	7.86	8.40
Repeaters	90.63	92.14	91.60
Party size			
Alone	39.06	35.56	36.80
Group	60.94	64.44	63.20
Purpose of visit			
Leisure/recreation	80.00	84.62	82.98
VFR	10.94	8.72	9.50
Business	9.06	6.67	7.51
Trip arrangement			
Self	85.63	86.84	86.41
Travel agency/packaged	14.37	13.16	13.59
Risk taking behaviour			
Risk taker	40.00	30.26	33.70
Risk neutral	25.00	29.57	27.96
Risk averse	35.00	40.17	38.34

Source: Field Survey, Adongo (2018)

In terms of risk-taking behaviour, 33.70 percent described themselves as risk takers while 38.34 percent were risk-averse. The proportion of males (40%) being risk takers were more than the females (30.26%), with 4 in 10 females and 3 in 10 males reported being risk-averse.

On average, the respondents stayed for 37.63 days which is more than a month. But the proportion of those who stayed for 50 days and above was relatively high (41.88%) with similar proportions established for males and females. About 4 in 10 (41.88%) males and 4 in 10 (44.27%) females stayed

above 50 days. Those who stayed between 10 and 29 days placed second (34.69%) and the least were those who stayed between 30-49 days. The extended stays observed among the study participants maybe because most of them visited the destination for backpacking and volunteerism purposes. These segments of tourists tend to stay longer than the average conventional tourist due to the need for cultural immersion (Pearce, 1990). Otoo *et al.* (2016), for instance, established that volunteer tourist on average stayed for 47 days and a maximum of one year in Ghana.

Table 8 indicates that those who had never worked in the health sector were the majority (73.15%); likewise, those who had never contracted disease abroad (74.81%). In addition, the respondents typically had international health insurance covers while abroad (85.64%), which means that the majority of them engaged in externalisation of health risk, which is the transfer of risk to a third party (Hajibab *et al.*, 2015). More than 8 in 10 females and males alike were covered by health insurance. Private health insurance was the most subscribed type of health insurance (with a subscription rate of 59.50% for males and 55.23% for females) while public health insurance was the least subscribed. However, about 65 percent did not have their vaccination covered by their insurance.

More than half ((54.36%) of the respondents rated their health to be very good and the least being those who rated it as fair (3.87%). More males (60.62%) than females (50.94%) reported their health status as very good. The majority reported supporting vaccination (75.80%) while about 2.54 percent stated otherwise with which the proportion of females (2.91%) is slightly higher than the males (1.88%).

Table 8: Health-related Characteristics by Sex of Respondents (n = 905)

	Male (%) [n = 320	Female (%) [n = 585]	Total (%) [n = 905]
Work history in the health sector			
Worked before	21.88	29.57	26.85
Never worked	78.13	70.43	73.15
Disease history abroad			
Ever contracted	26.88	24.27	25.19
Never contracted	73.13	75.73	74.81
Health insurance subscription			
Subscribed	80.00	88.72	85.64
Unsubscribed	20.00	11.28	14.36
Type of health insurance			
Public	16.28	22.07	20.15
Private	59.30	54.70	23.62
Public and private	24.42	23.22	56.23
Insurance cover travel vaccines			
Covered	33.13	35.36	34.70
Not covered	66.88	64.44	65.30
Self-rated health			
Very good	60.62	50.94	54.36
Good	36.56	44.62	41.77
Fair	2.81	4.44	3.87
Pre-travel consultation on vaccination			
Consulted	84.06	88.03	86.63
Not-consulted	15.94	11.97	13.37
Information source on travel vaccination (N = 1851*)			
Health professional	45.27	44.70	44.90
Internet	33.64	36.15	35.30
Travel agents	6.18	6.13	6.15
Friend and relatives	14.91	13.01	13.65

Source: Field Survey, Adongo (2018)
*Multiple responses

Generally, the percentage of respondents who sought advice on vaccination was considerably high (86.33%) than those who did not (Table 8). Consistent with literature (Yaqub *et al.*, 2014; Pavli *et al.*, 2016), health professionals are identified in the current study as the most relied on information source on vaccination (44.90%) followed by the internet (35.30%) and then friends and relatives (13.65%).

Pre-travel Consultation

Table 9 and 10 further characterise the respondents who did pre-travel vaccination consultation with a health professional disaggregated by their background characteristics. Table 9 suggests that the share of females (82.22%) who consulted a health professional were more than the share of males who did same (77.81%) with variations in sex distribution across the regions of origin. No female Asian sought pre-travel advice (0.00%) from a health professional whereas the majority (91.91%) of females from the Western Pacific region did. More under 20s sought pre-travel advice from health professionals than those in the other age cohorts, particularly, among those between age 20 and 29 years.

Similarly, the proportion of high school graduates from the Western Pacific region (100%) and post-graduates (100%) from the South-East Asian region who consulted health professionals outnumbered their colleagues with same or different educational attainments in the other regions. For instance, among those with Bachelor degrees from Africa, about 67 percent of them got advice from a health professional.

Across all the regions, disease history abroad related with consultation with health professional prior to traveling to Ghana on vaccination except for those from the Americas. The proportion (80.33%) of those who consulted a health professional though had no history of contracted disease abroad were more than those with history (71.88%). The pattern is comparable to having insurance coverage for one's travel vaccination.

Table 9: Percentage of Respondents who Consulted Health Professionals by Socio-demographic Characteristics (n = 905)

Characteristics	N	Total (%)	South-East Asia region (%)	African region (%)	European region %)	American region (%)	Western Pacific region (%)
Gender							
Male	320	77.81	57.14	68.75	81.31	70.18	90.00
Female	585	82.22	0.00	69.23	82.67	83.51	91.91
Age							
<20	92	92.39	100.00	100.00	91.36	100.00	100.00
20-29	456	83.33	33.33	60.00	86.08	82.02	88.89
30-39	204	68.63	100.00	73.19	67.38	63.64	100.00
>40	153	81.70	50.00	71.43	85.50	82.76	80.00
Marital status							
Single	632	81.65	50.00	64.00	83.65	75.56	90.48
Married	273	78.39	66.67	71.74	78.24	82.81	90.91
Education							
High School	261	81.99	0.00	52.33	86.50	65.63	100.00
Bachelor	363	77.13	50.00	66.67	75.98	82.43	86.67
Postgraduate	281	83.99	100.00	76.32	86.10	81.25	80.00
Employment status							
Employed	677	78.58	57.14	69.49	79.75	77.39	90.91
Unemployed	202	87.62	0.000	66.67	89.74	84.62	87.50
Retired	26	80.77	0.000	69.01	81.82	76.92	100.00

Source: Field Survey, Adongo (2018)

Table 10: Percentage of Respondents who Consulted Health Professionals by Tripographics (n = 905)

Tripographics	N	Consulted (%)	South-East Asia region (%)	African region (%)	Europe region (%)	American region (%)	Western Pacific region (%)
Visitation status to Ghana							
First-time visit	745	80.67	40.00	63.16	82.54	77.52	89.66
Repeat visit	160	80.63	100.00	75.76	80.41	84.00	100.00
Length of stay							
Less than 10 days	110	80.00	100.00	68.42	86.89	70.37	100.00
10-29 days	299	84.95	75.00	83.33	84.19	93.02	75.00
30-49	103	83.50	0.00	66.67	83.10	87.50	100.00
50 and above	393	76.84	0.00	67.50	79.27	68.33	100.00
International travel history							
First-timer	76	64.47	-	42.86	69.57	57.14	100.00
Repeater	829	82.15	57.14	71.88	83.19	81.95	90.00
Purpose of visit							
Leisure/recreation	751	80.43	60.00	63.46	81.97	78.79	95.83
VFR	86	79.07	-	50.00	83.58	66.67	66.67
Business	68	85.29	50.00	93.33	83.33	84.62	100.00
Trip arrangement							
Self	782	81.71	60.00	71.43	82.28	83.62	89.29
Travel agency/packaged	123	73.98	50.00	50.00	81.69	63.16	100.00
Risk taking behaviour							
Risk taker	305	84.59	50.00	68.18	86.32	84.21	93.33
Risk neutral	253	72.33	33.33	73.33	73.27	65.52	100.00
Risk averse	347	83.29	100.00	67.65	86.35	77.55	84.62
Disease history abroad							
Ever contracted	228	83.33	-	90.63	83.87	71.88	88.89
Never contracted	677	79.76	57.14	51.28	81.69	80.33	91.30
Self-rated health							
Very good	492	84.15	100.00	64.29	87.33	77.50	85.71
Good	378	76.19	0.00	80.77	75.00	76.92	100.00
Fair	35	80.00	0.00	33.33	85.00	100.00	100.00

Source: Field Survey, Adongo (2018)

Respondents' Perception of Infectious Diseases

On a rating scale of 0 to 10, the respondents were asked to rate their vulnerability to and perceived severity of Infectious Diseases (IFDs). The results are presented in Table 11, 12 and 13. On average, it is observed that the respondents perceived less (mean = 4.40) IFDs burden with international travel. However, their perceived severity of IFDs (mean = 5.00) was greater

than their perceived vulnerability (mean = 4.32) with notable differences across sex (Table 11).

Table 11: Perceptions of Infectious Diseases by Respondents (N = 905)

Statements	Mean	Standard deviation
Perceived vulnerability to infectious diseases	4.32	3.40
International travel can lead to spread of infectious diseases	2.00	3.96
Most tourism destination are associated with infectious diseases	4.74	3.43
Travelling to Africa without any precautionary measures can easily make me contract diseases	6.79	3.51
I perceive Ghana as being associated with infectious diseases	5.65	3.73
I consider myself not too careful to contract diseases abroad	5.04	4.03
I think I am well not informed to protect myself from any disease abroad	1.74	3.83
Perceived severity of infectious diseases	5.00	3.42
Generally, infectious diseases are deadly	5.50	3.95
Generally, infectious diseases are very costly to treat	5.61	3.86
People will stigmatize me if I return home with disease(s)	2.59	3.80
Perceived infectious disease burden	4.40	3.83

The males had higher perceived vulnerability and severity than the females. Those married (mean = 4.02) had higher apprehensions than those who were not (mean = 3.76). As regards education and perception of IFDs, it is observed that increasing educational attainment is associated with decreasing perception of burden of IFD. The High School graduates perceived themselves more vulnerable (mean = 3.22) to IFDs than the other educational cohorts, especially for those respondents with post-graduate degrees (mean = 2.90). Matching trend is established for perceived severity of IFDs and educational status.

Table 12: Socio-demographics by Respondents' Perception of IFDs (n = 905)

Socio-demographics characteristics	Perceived vulnerability (mean)	Perceived severity (mean)	Disease burden (mean)
Sex			
Male	3.31	4.59	3.95
Female	3.00	4.57	3.78
Age			
<20	2.98	4.20	3.60
20-29	3.09	4.65	3.87
30-39	3.27	4.49	3.88
>40	3.01	4.70	3.85
Marital status			
Single	3.06	4.46	3.76
Married	3.21	4.83	4.02
Education			
High School	3.22	4.70	3.96
Bachelor	3.18	4.56	3.87
Postgraduate	2.90	4.49	3.69
Religion			
Christianity	3.11	4.67	3.89
Atheism	3.21	4.22	3.72
Agnostic	3.06	4.74	3.90
Islam	3.25	5.46	4.35
Others	2.94	4.46	3.70
Region of origin			
South-East Asia	2.15	7.08	4.62
African	2.77	3.86	3.31
Europe	3.12	4.47	3.79
America	3.10	5.12	4.11
Western Pacific	3.86	5.13	4.49
Overall	3.11	4.57	3.84

Source: Field Survey, Adongo (2018)

Figure 6 shows that significant differences existed on perceived burden of IFD across respondents' region of origin, notably, for those from the South-East Asia region. Although across the regions the perceived burden of IFDs was small (mean = 3.84), a slightly higher rating was noted for those from the South-East Asia region (mean = 4.62). Their perceived severity of it is strikingly high (mean = 7.08); whereas, the reverse is noted for their perceived vulnerability to IFDs (mean = 2.15).

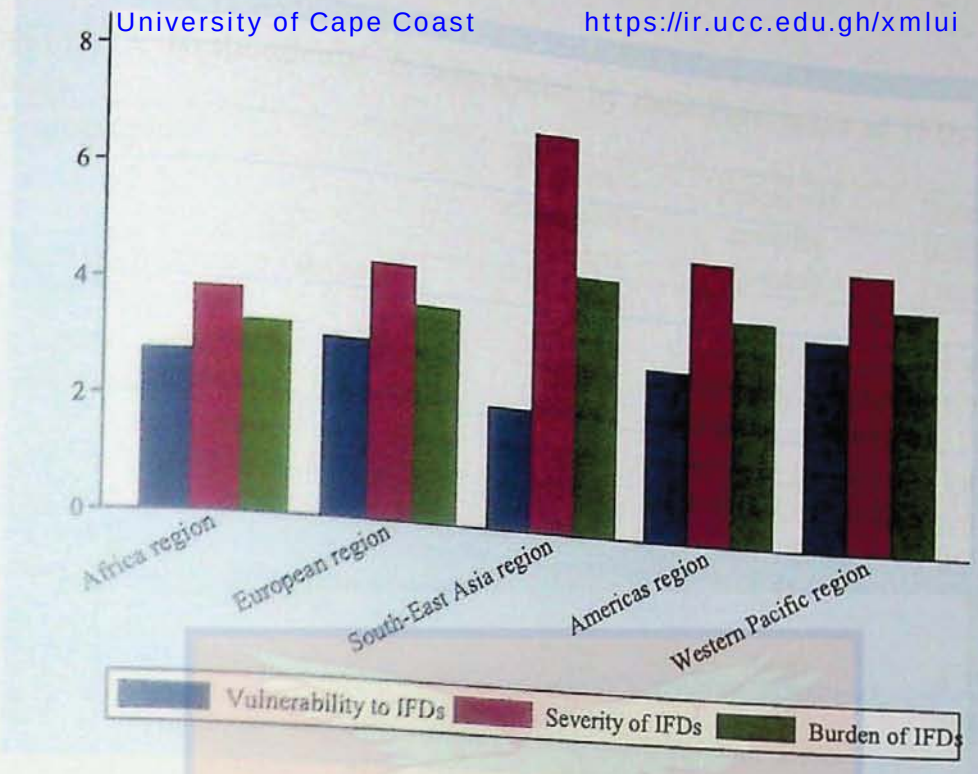


Figure 6: Respondents' Perceptions of Infectious Diseases by Region of Origin
Source: Source: Field Survey, Adongo (2018)

Table 13 shows that those who visited friends and relatives considered the threat of IFDs to be higher (mean = 4.19) than those who visited primarily for leisure (mean = 3.85) or those who visited for business (mean = 3.42). However, perceived severity (mean = 4.99) of IFDs among the VFR visitors was greater than their perceived risk of those diseases (mean = 3.77). Strangely the respondents who described themselves as risk takers had a relatively high rating for the burden of IFDs (mean = 4.09) than the risk neutrals or risk-averse. The risk takers did not only regard themselves at a greater risk of infections but perceived the impact associated with those diseases as severe (Table 13).

Table 13: Respondents' Tripographics by their Perception of IFDs (n = 905)

Tripographics	Perceived vulnerability (mean)	Perceived severity (mean)	Disease burden (mean)
Visitation status to Ghana			
First-time visit	3.12	4.60	3.86
Repeat visit	3.06	4.46	3.76
Length of stay			
Less than 10 days	3.02	4.62	3.82
10-29 days	3.03	4.64	3.84
30-49	3.06	4.36	3.71
50 and above	3.21	4.57	3.89
Past international travel			
First-timer	3.62	4.92	4.27
Repeater	3.06	4.55	3.80
Purpose of visit			
Leisure/recreation	3.10	4.59	3.85
VFR	3.37	4.99	4.19
Business	2.88	3.96	3.42
Trip arrangement			
Self	3.03	4.49	3.78
Travel agency/packaged	3.32	5.10	4.20
Risk taking behaviour			
Risk taker	3.33	4.86	4.09
Risk neutral	2.99	4.40	3.70
Risk averse	3.00	4.46	3.73
Disease history abroad			
Ever contracted	3.46	4.55	4.00
Never contracted	2.99	4.58	3.79
Pre-travel consultation			
Consulted	3.07	4.57	3.83
Not-consulted	3.31	4.64	3.99

Source: Feld Survey, Adongo (2018)
Scale: 0-10

Vaccination Literacy

The importance of vaccination literacy as an empowerment tool for informed vaccine uptake decisions has been acknowledged in the literature (Fadda et *al.*, 2015). The understanding of the extent of vaccination literacy and its distribution amount tourists could help public health and travel medicine professionals reach tourists with interventions that would help those with low literacy capabilities. The tourists' vaccination literacy was measured

by a series of vaccination literacy items adapted from the health literacy scale by the European Health Literacy scale and adapted into the three broad dimensions (functional, communicative and critical) of health literacy proposed by Nutbeam (2000).

Generally, the respondents reported moderate travel vaccination literacy (mean = 7.14) with similar distributions observed across the specific literacy dimensions namely functional (mean = 6.32), communicative (mean = 7.11) and critical (mean = 8.00). In relative terms, it is further noted that they had considerably more functional literacy skills when compared to the other literacy dimensions, principally, critical literacy (Table 14).

Table 14: Tourists Vaccination Literacy

Statements	Mean	Standard deviation
Functional literacy	6.32	3.54
In reading instructions regarding vaccines, I do not find the text difficult to understand	6.22	3.45
I know where to find reliable information about vaccines when travelling abroad	7.42	3.06
I can tell which vaccines I need when travelling abroad	5.32	4.12
Communicative/interactive	7.11	2.89
I understand what my doctor tells me about vaccines	8.05	2.28
In understanding information regarding vaccines, I usually do not require someone to help me read them.	5.23	4.11
I can easily explain the meaning of travel vaccination to friends and relatives	8.05	2.28
Critical	8.00	3.00
I can easily tell if information about travel vaccines in the media (eg. Social media) is reliable	7.42	4.13
I understand why I need vaccination against diseases when travelling abroad	8.28	2.44
I know when and how to question travel vaccination	8.29	2.43
Overall literacy	7.14	3.14

Adongo (2018); Scale: 0-10

Vaccination literacy levels varied by sex of the respondents, such that the average literacy score for the females (mean = 6.71) was greater (mean =

6.58) than their male counterparts. A similar distribution is established across sex for the specific literacy dimensions. Furthermore, both the overall and specific literacy dimensions mean scores suggest that literacy level increases steadily with educational attainment. For example, in Table 15 those with post-graduate degrees had high literacy rating (mean= 6.93) relative those with Bachelors (mean = 6.71) and Senior High certificates (mean = 6.31).

Table 15: Respondents' Socio-demographic Characteristics by their Vaccination Literacy (n = 905)

Socio-demographic characteristics	Functional (mean)	Communicative (mean)	Critical (mean)	Overall literacy (mean)
Sex				
Male	6.90	6.42	6.45	6.58
Female	7.06	6.64	6.46	6.71
Overall	7.00	6.56	6.46	6.67
Educational status				
High school	6.56	6.17	6.25	6.31
First degree	7.01	6.64	6.48	6.71
Post-graduate	7.39	6.81	6.61	6.93
Overall	7.00	6.56	6.46	6.67
Region of origin				
South-East Asia	7.67	5.59	5.53	6.17
Africa	6.24	5.85	5.70	5.91
Europe	7.11	6.74	6.62	6.82
America	6.87	6.29	6.25	6.47
Western Pacific region	6.89	6.00	6.13	6.29
Overall	7.00	6.56	6.45	6.66
Information search intensity				
Inactive seeker	6.35	6.56	6.11	6.41
Active seeker	7.12	6.53	6.53	6.70
Overall	6.99	6.54	6.46	6.65
Past international travel				
First-timer	6.28	5.62	5.80	5.90
Repeater	7.06	6.65	6.52	6.73
Total	7.00	6.56	6.45	6.66

Source: Feld Survey, Adongo (2018); Scale: 0-10

Regional differences as regards vaccination literacy are notable: literacy is high among respondents with European origin (mean = 6.82) and moderately low among those from Africa (mean = 5.91) followed by those from Asia (mean = 6.17). Uniquely, functional literacy is high among those from the South- East Asia region (mean = 7.67) while communicative (mean = 6.74) and critical literacies (mean = 6.62) are high for those from Europe (Table 13). By implication, the tourists from the European region were more likely to better access vaccine information and properly applied the information for informed vaccination decision than those from the other regions (Table 15).

In addition, the results suggest that vaccination literacy is stratified by information seeking behaviour. Active seekers of vaccination information reported high literacy levels (mean = 6.70), especially, on functional literacy then inactive seekers (mean = 6.41). In the same way, those with past international travel experience were more literate (mean = 6.73) than those who were travelling for the first time (mean = 5.90). Repeat travel could mean better exposure, familiarity and mastery of vaccination information over those travelling for the first time and thus more likely to report qualitatively higher levels of literacy than first-time travellers.

CHAPTER SIX

TRAVEL VACCINATION CONCERN SCALE

Introduction

This chapter presents the results and discussion on the proposed travel vaccination concern measure (which is the first objective of the study), herein, referred to as the Travac scale. A multi-stage recursive data analysis procedure involving exploratory and confirmatory factor analysis, discriminant validity, common method bias and predictive validity (Bryne, 2012) was adopted in developing the measure.

Exploration of the Travac Scale

Characteristics of the Exploratory Sample

An EFA precedes the analyses of the data in the cycle of the scale development process (Churchill, 1979). The EFA was carried out using data collected from 250 international tourists. Table 16 presents the characteristics of the exploratory sample. About 58 percent of the sample was females. The majority of the respondents were those who had never married (70.83%). The average age of the respondents was 28 years. Overall, the respondents had some formal education [High school (33.75); Bachelor (38.33%) and Post-graduate (27.92%)]. The majority was Christians (65.35%), employed (76.42%) and had ever travelled abroad (84.62%). The average number of past trips was 12. Most of the respondents had vaccinated against at least one disease (98%).

Table 16: Background Characteristics of the Exploratory Sample (n = 250)

Characteristics	N	%
Sex		
Male	106	42.23
Female	144	57.77
Mean age	250	27.87
Marital status		
Married	70	29.16
Never married	170	70.83
Education		
High School	81	33.75
Bachelor	92	38.33
Postgraduate	67	27.92
Religion		
Christianity	149	65.35
Atheism	45	19.74
Agnostic	26	11.40
Islam	6	2.63
Others	2	0.88
Employment status		
Employed	175	76.42
Unemployed	50	21.83
Retired	4	1.75
Past international travel experience		
Repeat visit	187	84.62
First-time visit	34	15.38
Past number of international trips	205	12.27
Party size		
Alone	56	25.23
Group	166	74.77

Source: Feld Survey, Adongo (2018)

Exploratory Factor Analysis Results

The results of the EFA are presented in Table 17. The Kaiser Mayor Oklin (KMO) value of 0.870 justified that the 250 exploratory sample size was adequate and suitable for the analysis (Kaiser, 1974), and the Bartlett's test of sphericity of 3868.12 ($p < 0.01$) indicated that factorability of the measurement items was possible. Factors were extracted based on an eigen value of ≥ 1, a communality threshold of ≥ 0.6 and non-cross loading on any other factor at

≥0.40 (Hair, Black, Babin & Anderson, 2010). In all, 42 measurement items were subjected to Promax rotation.

Consequently, six (6) unique dimensions with 22 well-fitted underlying items were extracted from the EFA, which explained approximately 76 percent variance of international tourists' travel vaccination concerns. The Cronbach's alpha score for each factor was greater than 0.70, suggesting satisfactory convergent validity (internal consistency) of each dimension (Hair, Black, Babin & Anderson, 2010). Given the exploratory nature of the first stage of the analysis, the factors were tentatively labelled *Dimension 1*, *Dimension 2*, through to *Dimension 6*. Details of the percentage of variance explained by each dimension and corresponding eigen values are presented in Table 17.

Table 17: Results of the Exploratory Factor Analysis (n=250)

	Observed variables	EFL	EV	%VE	α
I	*Dimension 1*		6.86	28.03	0.87
	I do not trust vaccines to effectively protect me from diseases while travelling abroad	0.81			
	I am not confident in vaccines helping me stay healthy while abroad	0.73			
	Multiple uptake of travel vaccines for different diseases can prevent my body from naturally fighting against diseases	0.63			
	I am worried about the long-term effects of travel vaccines on my health	0.57			
II	*Dimension 2*		1.43	20.40	0.79
	I am not sure of the safety of vaccines for travelers	0.78			
	I worry about the side effects of travel vaccines	0.72			
	Taking vaccines when travelling abroad makes me feel uncomfortable	0.68			
	I fear the injection when taking travel vaccines because of the pains.	0.68			
	I worry that the side effects of vaccines while abroad can decrease my enjoyment of the holiday experience	0.59			

Table 17 continued

	I fear that I may not readily get medical assistance if experiencing side effects of vaccines while abroad	0.53			
III	*Dimension 3*				
	Travel vaccines are expensive		1.09	9.38	0.74
	Taking vaccines during travel abroad increases the cost of travel	0.82 0.82			
	Consultations with health professionals on travel vaccinations cost a lot of money	0.62			
	Travel vaccines are a means through which health care providers make money from travelers	0.73			
	Travel vaccines are a means through which pharmaceuticals make money from tourists	0.73			
	Dimension 4				
IV	Travel vaccination can be time inconveniencing	0.79	1.06	7.75	
	Consultation with health care providers concerning travel vaccination can be time wasting	0.83			
	I am concerned that most travel vaccines have to be taken at least 2 months (early enough) prior to the actual travel.	0.82			
	The number of doses required for some travel vaccines delay travel time	0.79			
V	*Dimension 5*		1.03	5.75	0.72
	It is often difficult to find all vaccines in one clinic	0.76			
	No reliable information on where to find all needed travel vaccines	0.74			
	Sometimes travel clinics ran out of some vaccines	0.76			
VI	*Dimension 6*		1.01	4.78	0.78
	Travel is a means through which certain vaccines are forced on tourists	0.85			
	Travellers are not given the right/freedom to refuse certain vaccines	0.85			
	Making certain vaccines mandatory is unfair to tourists	0.79			
	Total Variance Explained			76.09	

Note: EFL: Exploratory factor loading; EV: Eigenvalue, VE: Variance extracted; α: Crobach alpha

Validation of the Scale: Dimensions Extracted from the EFA Model

In this section, the six dimensions and underlying items extracted from the EFA analysis were confirmed in terms of being multi-dimensional and well fitted. In addition, the scale's convergence and discriminant validity were evaluated. Convergent validity measures the extent to which the measures/indicators (of a dimension) relate to it (Hair *et al.*, 2010). In this study, the convergent validity was assessed by using the Average Variance Extract scores threshold of lower limit of 0.7 (Fornell and Larcker, 1981). Discriminant validity on the other hand measures how dimensions are truly different from each other empirically (Hair *et al.*, 2010). This was assessed using the Fornell-Larcker criterion. For there to be discriminant validity in a correlation matrix, the correlation within a construct should be higher than the intercorrelation between that construct and another. Put differently, the square root of the AVE of a construct should be higher than the intercorrelation among other constructs (Reich, Beck, Price & Lamberton, 2018).

Lastly, a second-order model was estimated to determine the predictive validity of the dimensions of the scale. These analyses formed the first-order model structure assessment of the scale. These aforementioned assessments were done using a Covariance-based Confirmatory Factor Analysis (CFA) technique in Amos 22. Based on completeness of responses, 905 observations were retained for the CFA analysis and the results are presented in Table 18. With six (6) latent dimensions and a ratio of 25 observed variables to 20 cases; an estimated statistical power of 0.95 and a Hoelter's statistic of 0.01

probability levels, the sample size and mode of division was deemed adequate and reliable for performing the CFA analysis.

As a lead to performing the CFA, Bryne (2010) recommends that for a measurement item to be included in the CFA analysis its univariate skewness and kurtosis scores should be within a threshold of - +(1) [normal distributed]. Inspection of the scores of the measures for univariate skewness and kurtosis showed that none of the scores is skewed or kurtotic (see Appendix C), and thus suitable for the co-variance-based CFA.

The confirmatory data was subsequently randomised into two equal sub-samples: comprising a calibration and validation samples using STATA case resampling technique. Similar sample splitting approaches have been used by previous scale development studies (Kim *et al.*, 2012; Chen, Bao & Huang, 2014).

An initial attempt to fit the calibration model showed that the loadings scores of an item each for the "*Dimension 2*" and '*Dimension 3*' was lesser than 0.50 hence modifications were conducted based on the indices. The modification involved covarying two error terms for the cost and side-effects constructs. Subsequently, all measurement items had significant regression coefficients which loaded significantly ($p < 0.001$) between 0.50 and 0.85. This is suggestive of the fact that the interrelationships between items and associated dimensions were high hence unidimensionality was confirmed among all dimensions (Table 18). The composite reliability scores of the dimensions in both the calibration and validation models also ranged between 0.70 to 0.85. This suggests that convergent validity for each dimension is attained (Hair et al., 2010).

Table 18: Results of Confirmatory Factor Analysis (First-Oder model)

		Overall sample (n= 905)		Calibration sample (n = 452)			Validation sample (n = 453)		
		Mean	SD	SDL	CR	AVE	SDL	CR	AVE
I	*Efficacy concern*	*2.22*	*1.60*		0.81	0.68		0.74	0.53
	I do not trust vaccines to effectively protect me from diseases while travelling abroad	1.89	0.94	0.73			0.74		
	I am not confident in vaccines helping me stay healthy while abroad	1.95	1.06	0.72			0.71		
	Multiple uptake of travel vaccines for different diseases can prevent my body from naturally fighting against diseases	2.28	1.14	0.65			0.67		
	I worry about the long-term effects of travel vaccines on my health	2.37	3.27	0.72			0.73		
II	*Safety concern*	*2.19*	*2.16*		0.78	0.52		0.78	0.50
	I am not sure of the safety of vaccines for tourists	2.04	1.02	0.72			0.77		
	I worry about the side effects of travel vaccines	3.33	2.45	0.72			0.73		
	Taking vaccines when travelling abroad makes me feel uncomfortable	1.71	3.04	0.79			0.76		
	I fear the injection when taking travel vaccines because of the pains.	1.39	2.80	0.50			0.50		
	I worry that the side effects of vaccines (if any) while abroad can decrease my enjoyment of the holiday experience	2.93	3.33	0.76			0.75		
	I fear that I may not readily get medical assistance when experiencing side effects of vaccines while abroad	1.76	3.04	0.56			0.57		
III	*Cost concern*	*5.19*	*3.54*		0.79	0.50		0.85	0.66
	Travel vaccines are expensive	6.44	3.54	0.70			0.84		
	Taking vaccines during travel abroad increases the cost of travel	6.43	3.56	0.70			0.83		
	Consultations with health professionals on travel vaccinations cost a lot of money	4.94	3.78	0.85			0.85		

Table 18 continued

	Travel vaccines are a means through which health care providers make money from tourists	2.56	3.37	0.68			0.75		
	Travel vaccines are a means through which pharmaceuticals make money from international tourists	5.56	3.47	0.68					
	Time concern	*2.93*	*3.39*		0.81	0.51		0.78	0.50
IV	Consultation with health care providers concerning travel vaccination can be time wasting	2.56	3.40	0.62			0.75		
	I am concerned that I have to take vaccines early enough before I can travel abroad	4.27	3.70	0.50			0.76		
	The number of doses required for some travel vaccines delay travel time	2.49	3.13	0.60			0.60		
	Travel vaccination can be time wasting as it is often difficult to find all vaccines in one clinic	2.39	3.33	0.75			0.84		
	Access concern	*6.49*	*3.47*		0.73	0.56		0.74	0.59
	It is often difficult to find all vaccines in one clinic	6.81	3.42	0.70			0.73		
	No reliable information on where to find all needed travel vaccines	6.83	3.06	0.69			0.67		
	Sometimes travel clinics ran out some vaccines	5.84	3.94	0.73			0.74		
V	*Ethical concern*	*4.34*	*3.35*		0.70	0.50		0.70	0.50
	Travel is a means through which vaccines are forced on us	4.67	3.52	0.79			0.80		
	Travellers are not given the right/freedom to refuse certain vaccines	3.67	3.02	0.69			0.67		
	Mandatory travel vaccines are unfair to international tourists	4.67	3.51	0.79			0.72		

Note: SDL: standardized loading; CR = Composite Reliability; Average Variance Extracted;
Source: Feld Survey, Adongo (2018)

Based on the content of each dimension, they were labelled *efficacy, safety, cost, time, access and ethical concerns.* Altogether the six dimensions of the scale comprised of 25 measurement items. The first dimension, *efficacy concern*, entailed four (4) items including doubt about the effectiveness of vaccines and not being confident in the usefulness of vaccines.

The second dimension included six items connected to vaccination safety concerns. Here the respondents indicated being doubtful about the safety of vaccines and worried about side effects of vaccines. The third dimension, *cost concern*, revolved around matters about travel vaccination being expensive; vaccine uptake increasing the cost of travel; and concern that travel vaccination is a conduit for money making by health care professionals and pharmaceuticals. This loaded in the third factor and labelled as cost concerns. The fourth dimension included statements that bordered on travel vaccination being time wasting and inconveniencing. The fourth dimension had to do with travel vaccination being time wasting and inconveniencing. Vaccine access concerns (which principally related to difficulty in finding needed travel vaccines) and ethical concerns towards mandatory vaccinations constituted the fifth and sixth factors respectively.

However, per the average ratings provided (Table 18), the most rated concern was access concern (mean = 6.49) followed by cost concern (mean = 5.19) and ethical concern (mean = 4.67) with the least being safety concern (mean = 2.19).

Fitness of the Travac Scale

The fitness of the measurement models (both the calibration and validation models) to the data was assessed using the most recommended

model fit indices namely the goodness-of-fit index [GFI] (≥ 0.90), comparative fit index [CFI] (≥ 0.90), Turker-Lewis index [TLI] (> 0.95), and root mean square error of approximation [RMSEA] (< 0.08) (Hu & Bentler, 1999; Hair *et al.*, 2010). Accordingly, the overall model fit indices (CFI =0.96, IFI=0.96, TLI = 0.95, RMSEA=0.05) of the calibration sample indicate an optimally fitted model. Similarly, the goodness-of-fit indices of the validated CFA model suggest a satisfactory fitted model (Table 19).

Table 19: Post-estimation Fit Indices of CFA Models

Type of model	GFI	CFI	TLI	IFI	NFI	RMSEA
First order calibration model	0.94	0.96	0.96	0.95	0.93	0.05
First order validation model	0.93	0.96	0.96	0.95	0.96	0.03
Second order validation model	0.92	0.96	0.94	0.96	0.94	0.02

Source: Feld Survey, Adongo (2018)

Discriminant validity

Adequate discriminant validity is also attained since each vaccination concern dimension shared more variance with its observed variables than it did with items of other factors as shown by the inter-correlation scores and the square root of the Average Variances Extracted in Table 20 (Fornell & Larcker, 1981).

Table 20: Inter-construct Correlation by Square Root of Average Variance Extracted (AVE)

	Efficacy concern		Safety concerns		Cost concern		Time concern		Access concern		Ethical concerns	
	CS	VS	CS	VS	CS	VS	CS	VS	CS	VS	CS	VS
Efficacy concern	*0.82*	*0.79*										
Safety concerns	0.57**	0.30**	*0.72*	*0.70*								
Cost concern	0.31**	0.30**	0.31**	0.38**	*0.70*	*0.81*						
Time concern	0.31**	0.45**	0.47**	0.46**	0.31*	0.30**	*0.71*	*0.70*				
Access concern	0.21*	0.27**	0.11	0.22**	0.04	0.07	0.19*	0.20**	*0.74*	*0.72*		
Ethical concerns	0.11	0.12*	0.08	0.01	0.13	0.12*	0.04	0.06	0.06	0.05	*0.70*	*0.70*

Note: CS = calibration sample; VS = validation sample; Values on the diagonal (in italicises) represent the square root of the AVEs

** p<0.01, * p<0.05

Source: Feld Survey, Adongo (2018)

Common Method Biases

It is extremely important to guard against method biases when investigating behavioural research with psychometric scales (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Accordingly, both pre and post measures were used to minimise and check for the presence of method biases in the models. First, as indicated early in the methodology section, potential measures were subjected to expert querying to ensure clarity and avoidance of item social desirability. Second, measurement items were intermixed to minimise consistency motif (*Adongo et al.*, 2018). Third, a Harman's single-factor test where all items were constrained to load on one factor was conducted during the EFA and CFA stages. In the EFA, an unrotated factor solution was employed while in the CFA, a marker factor approach was used (Podsakoff *et al.*, 2003). Both estimations justified that a single factor did not sufficiently capture the covariance of the items. With the measures adopted, it is trusted that method bias was minimized and would not risk the conclusions drawn from the study. This implies that each concern dimension is distinct from other dimensions in the measurement model.

Second-order Calibration Model

Further a second-order hierarchical CFA model, where all the six-factor structure formatively predicts the higher-order travel vaccination concerns, is estimated to confirm the theoretical parsimony of the dimensions. This also provided an indication of the relative contributions of each of the distinct but related dimensions to the latent construct vaccination concern. Largely, all the five fit indices showed that the second-order factor structure fitted both the calibration and validation samples set very well demonstrating

structural validity of the hierarchical CFA (Table 20). This suggests that all vaccination concern dimensions significantly matter to tourists. The squared multiple correlations showed that each dimension of concern explained more 50 percent of the variance in the overall travel vaccination concerns expressed by the respondents. However per figure 7, in order of magnitude, efficacy concern is the most salient predictor of the Travac measure ($\beta = 0.89$; $p<0.01$) followed by cost concern ($\beta = 0.86$; $p<0.01$).

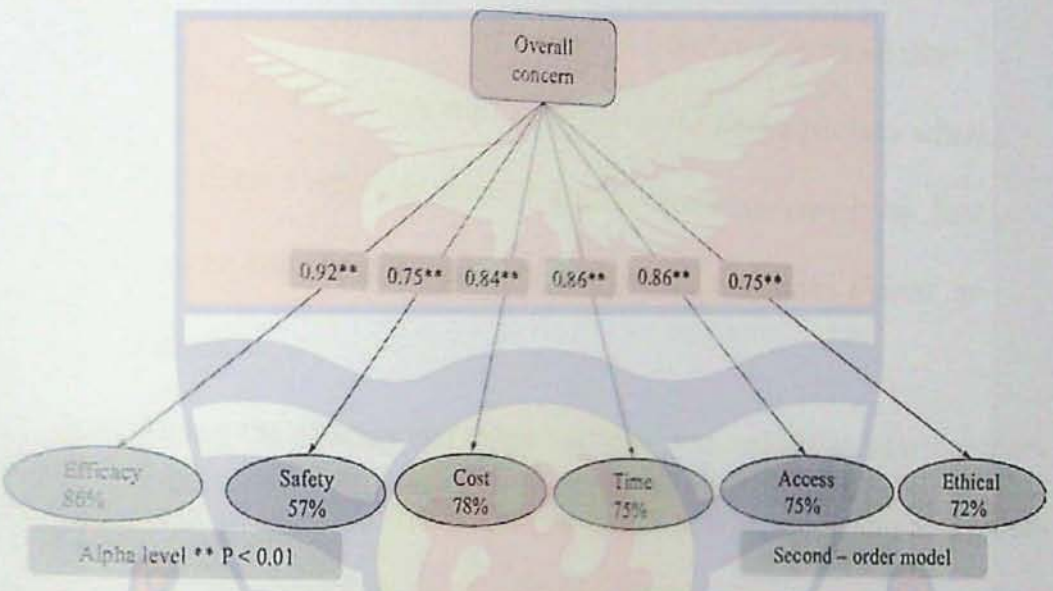


Figure 7: Second-order CFA Model of Travel Vaccination Concerns (n = 905)
Source: Feld Survey, Adongo (2018)

Discussion

Vaccination against infectious diseases is one of the surest ways by which tourists can safeguard themselves against these diseases abroad. However, people remain concerned about various aspects of vaccination. The EFA and CFAs conducted converged to provide evidence that a six-factor solution best explained the Travac scale. Consequently, the study failed to reject the hypothesis that: *international tourists' travel vaccination concerns are multidimensional.* It is clear from the results that international tourists' travel vaccination concerns manifested in six dimensions: efficacy, safety, cost, time,

access and ethical concerns. These concerns have been reported in the travel medicine literature (notably Crockett & Keystone, 2005; Lammert *et al.*, 2016), though sporadic and not psychometrically analysed.

Vaccine efficacy and safety concerns have been identified across most studies as the commonest vaccination concerns (Karafillakis & Larson, 2017). Efficacy concern is a feeling that vaccines do not or will not perform as desired and safety concern is the feeling that vaccination results or will result in harm or injurious outcomes. A 36-year-old British tourist noted that:

> *I don't think vaccines must be taken all the time especially when travelling. I seriously doubt that taking travel vaccine is the best way to stay healthy when holiday basic sanitation should be enough.*

Questioning the efficacy and safety vaccines is an indication of uncertainty of the benefit of vaccines. Uncertainty in health care is a continuous problem because development of new medical technologies including vaccines outpaces the development of proofs regarding their benefits, harms, and implications; increasing knowledge of the shortfalls in medical developments coupled with medical controversies about vaccines in the media and the emphasis on evidence-based and patient-centered medicine (Hillen *et al.*, 2017). This is what a 26-year-old Australian volunteer tourist mentioned:

> *I trust science, but I don't think science truly knows how interconnected our body is, so how can it really know the bad effects vaccines will have on me when am abroad for holiday.*

The cost and time concerns expressed about travel vaccination largely hinged on unaffordability. Unaffordability denotes the inability of individuals to afford vaccination, both in terms of financial and non-financial costs (Thompson *et al.*, 2016). Cost sources of travel vaccination include transport fares to travel clinics, fees paid for acquiring vaccines and administrative services. In the words of a 56-year-old German tourist:

> *Everything about travel vaccination is costly. It is especially worrying that they charge for every consultation you make on those vaccines. Even when you repeat your visit for vaccines which have to be taken in series you are billed. This is ridiculous and cheating.*

Though financial cost was a major affordability concern for the respondents, their rating on the non-financial (time concern) aspect was lesser. Time concern — which denotes the time inconvenience of travel vaccination may equally depend on a multiplicity of factors such as distance to clinic, waiting time in consultation and type of vaccine involved. For instance, it may sometimes require extra time for travel health practitioners to educate patients about the safety, efficacy and usefulness of vaccines prior to administration, which has implications on time convenience.

In a relevant context, though tourism is a discretionary time and income activity, but time and cost considerations could, particularly, be important factors to tourist at the trip planning stage as they strive to plan varied and complex things (Wang *et al.*, 2018). Aside vaccinations, available time and income resources are competed for by other activities such as planning for flights and accommodation. And so, any activity that has the

potential to limit the optimal use of these resources, depending on priorities, would raise concerns. The finding on cost and time concerns could also be indicative that tourists' do not significantly allocate their disposable time and income on vacation to vaccination relative to other components (such as airfares) —crowding out effect, during trip planning. Previous studies (including Dolinicar *et al.*, 2008) in other travel settings have noted competing relationships among discretionary income and time expenditure components.

On average, the tourists were more concerned about the inability to access travel vaccines and its related information. Access concern denotes the inability of individuals to reach/find needed vaccines, and or information relating to vaccination. A male American travel blogger, for instance, noted that;

> *when I took off to travel full-time, I didn't know all the places I'd visit (I still don't) where to get all vaccines. In such case, it becomes frustrating and time wasting moving from one clinic to another to look for travel vaccines.*

In the context of travel vaccination, this finding provides an answer to Lydon *et al. 's* (2017) questioning that "are essential vaccines always available when needed? Particularly, the tourists lamented that it is often difficult to find all vaccines in one clinic. Meanwhile, no reliable information existed on alternative places to find the needed vaccines.

The observation on access concerns reinforces that access to vaccines remains a major constrain to vaccination among international tourists, an observation supported by previous studies (Lammert *et al.*, 2016; Lydon *et al.*, 2017). Lydon *et al. (*ibid*)* for example, note that vaccine stock out remains a

pervasive challenge both at national and subnational levels. The tourists' concern in the present study about the inaccessibility of travel vaccination services signals their admittance of the need for vaccination. It could also be an indication of their readiness to adopt vaccines if vaccines are made available. The likely impacts of unreliable vaccine supplies are heightened cost and time concerns risking under-vaccinations.

The last vaccination concern dimension, ethics, is a long-standing issue in healthcare, but more palpable today, maybe, because of the revolution of patient-centered medicine which calls for provider-patient active co-creation of health and freedom of choice for the patient (Elg *et al.*, 2012). This freedom has become a central part of individual's health decisions with any potential inhibitions to this freedom likely to face resistance. Vaccine mandates have received contestations principally as a bridge of human rights in settings such as schools and workplaces where they have been employed, as is the case in this study (Dubov & Phung, 2015). Respondents, for instance, described mandatory travel vaccines (*e.g.* Yellow fever) as coercive, unethical and unfair. A 34-year-old female tourist from the United Kingdom remarked that:

> *Nono!, sorry I did vaccinate for yellow fever, as it is an obligation. But this is not fair as I just did not want to put any substance into my body while travelling abroad. You cannot tell what may happen while you are away in a different country.*

The respondents claimed that international travel is a conduit that "immunization social order"— institutions, laws, pharmaceuticals biotechnologies, and social practices" (Kirkland, 2016) use to impose certain vaccines on people. A 42-year-old tourist from Germany lamented that:

why the push for vaccinations only if we travel? Sometimes you travelling for few weeks holiday yet you are legally required to take some vaccines, c'mon this not fair.

These sentiments somewhat reflect Kirkland's (2016) view of rising 'vaccine social activism and critical movements' against vaccination. Those who oppose vaccine mandates justify that it is unethical to decide for people on their health choices (Dubov & Phung, 2015). While the opposition of mandatory vaccination maybe legitimate in principle, they are deemed appropriate where there are potentials of hesitancy and suboptimal decisions due to bounded bias and cognitive errors resulting in collective effects (Kasperbaue, 2017). From a human right standpoint, the choice to accept a particular vaccine or not is an individual decision, but the underlying of consequences linked to the decision is a collective issue.

Summary

This chapter dealt with the analysis and discussion of the results aimed at proposing the *Travac* scale. The results suggested that international tourists travel vaccination concerns are stratified into six-dimensions namely efficacy, safety, cost, time, access and ethical concerns. Discriminant, nomologiocal and predictive validities of the scale were also confirmed. The findings, on the overall, confirmed the proposition of the current study that travel vaccination concerns are multi-dimensional in occurrence and should be studied as such. The next chapter explores the factors explaining the concerns expressed by the respondents regarding travel vaccination.

CHAPTER SEVEN

UNDERLYING FACTORS OF TOURISTS' TRAVEL VACCINATION CONCERNS

Introduction

This chapter presents the results and discussion on the factors associated with international tourists' travel vaccination concerns. The results on the factors influencing tourists' overall vaccination concerns are first presented followed by the results on the factors influencing their specific vaccination concerns which include efficacy, safety, cost, time, access and ethical concerns. The potential explanatory variables considered included socio-demographic characteristics, tripographics and perceived benefits of vaccination. Selection of the variables for each dependent variable was based on the empirical and theoretical reviews as well as 'common sense'. Sound econometrics must not only be preceded by theory but 'common sense' (Kennedy, 2002). To facilitate understanding of the results, both OLS regression coefficients and MANOVA mean values on the explanatory variables are presented. After the results section is a section on the discussion of the ensued findings and a summary of the chapter.

Regression Results on Factors Influencing International Tourists' Vaccination Concerns

In all, seven (7) separate unique regression models were estimated and the results are displayed in Table 21. The least amount of variance explained in each concern dimension is 14 percent. These were for the ethical and cost concerns respectively. The maximum variance explained is 38 percent, which is for vaccination safety concerns.

On the overall, none of the explored variables consistently predicted the travel vaccination concerns expressed by the respondents. No significant relationship was observed between sex and vaccination concerns expressed by the respondents, except for safety concern, which females were less likely to be concerned with when compared to the males ($\beta = -0.32$; $p < 0.05$). Table 20 shows that the average safety concern rating for the females (mean = 2.29) was lower than that of their male counterparts (mean = 2.54). On the average, this is suggestive of more vaccine safety consciousness among males relative to females.

An inverse relationship is observed between respondents' educational attainment and their vaccination concerns ($\beta = -0.12$; $p > 0.05$) implying that increasing educational attainment is likely to elevate tourists' positive sentiments towards immunisation (Table 21). However, few notable variations existed in the relationship when the analysis is disaggregated by the specific concerns. While the inverse relationship is maintained for education and vaccine efficacy, significant difference is noted across the different levels of education such that those with bachelor ($\beta = -0.50$; $p < 0.05$; mean =1.97) and post-graduate degrees ($\beta = -0.57$; mean =1.97; $p < 0.05$) were less sentimental about the efficacy of vaccines relative to those with high school education (mean =2.59).

Table 21: Factors Underlying Respondents' Travel Vaccination Concerns (n = 905)

	Overall concern	Efficacy concern	Safety concern	Cost concern
Sex (ref. male)				
Female	-0.11(0.12)	0.14(0.17)	-0.32(0.13) *	0.33(0.19)
Age	-0.01(0.01)	0.00(0.02)	-0.02(0.01)	-0.03(0.02)
Age (ref <20)				
20-29	0.22(0.21)	0.24(0.31)	0.31(0.24)	0.25(0.35)
30-39	0.33(0.28)	0.34(0.43)	0.28(0.33)	0.70(0.47)
40 and above	0.41(0.48)	0.32(0.73)	0.54(0.53)	0.88(0.76)
Marital status (ref single)				
Married	0.07(0.12)	0.00(0.19)	0.03(0.14)	0.12(0.19)
Education				
First degree	-0.20(0.14)	-0.50(0.22) *	-0.31(0.17)	0.18(0.23)
Post-graduate	-0.25(0.15)	-0.57(0.24) *	-0.28(0.18)	0.18(0.25)
Religion				
Christian	0.12(0.18)	0.23(0.26)	0.08(0.19)	-0.27(0.32)
Muslim	0.65(0.37)	1.14(0.56)*	-0.32(0.42)	-0.28(0.57)
Atheist	-0.08(0.20)	-0.13(0.30)	-0.12(0.23)	-0.01(0.35)
Agnostic	0.28(0.23)	0.17(0.33)	0.12(0.25)	0.64(0.39)
Employment status				
Employed	0.05(0.38)	0.02(0.50)	-0.42(0.46)	0.12(0.56)
Unemployed	0.33(0.41)	0.37(0.55)	-0.35(0.49)	0.57(0.60)
Region (south-East Asia Region)				
African region	-1.73(0.63) **	2.44(0.70) **	0.05(1.03)	-2.22(0.96) *
European region	-1.37(0.62) *	-2.68(0.66) **	0.23(1.01)	-1.45(0.92)
American region	-1.53(0.62)*	-3.43(0.66)**	0.38(1.02)	-1.26(0.94)

Table 21 continued

Western Pacific region	-0.94(0.68)	-2.57(0.80)**	0.38(1.06)	-0.25(1.02)
Purpose of visit (ref. business)				
Leisure	-0.39(0.20)*	-0.45(0.32)	-0.22(0.20)	0.09(0.35)
VFR	-0.51(0.25)*	-0.62(0.40)	-0.18(0.27)	-0.40(0.43)
Travel experience to Ghana				
First-timer (ref)				
Repeater	-0.10(0.15)	-0.14(0.23)	0.01(0.16)	-0.05(0.24)
International travel history				
First-timer (ref)				
Repeater	-0.11(0.26)	0.05(0.37)	-0.01(0.29)	0.95(0.37)*
Number of past international trips	-0.00(0.00)	-0.00(0.00)	-0.00(0.00)	-0.00(0.00)
Trip arrangement				
Intermediary (ref)				
Self	-0.19(0.15)	-0.35(0.26)	0.14(0.19)	-0.13(0.25)
Vaccine information seeking				
Inactive seeker				
Active seeker	0.67(0.14)**	0.75(0.20)**	0.35(0.15)*	0.84(0.23)**
Number of sources	0.02 (0.06)	-0.03(0.09)	0.04(0.07)	0.05(0.08)
Source of vaccine information				
Internet (ref. no)	0.01(0.12)	-0.13(0.17)	-0.01(0.13)	0.28(0.19)
Health professional (ref. no)	-0.33(0.16)*	-0.08(0.24)	-0.24(0.17)	-0.33(0.23)
Travel agents (ref. no)	0.04(0.16)	-0.04(0.26)	0.21(0.17)	-0.23(0.24)
Friends and relatives (ref.no)	0.20(0.12)	0.11(0.18)	0.17(0.14)	0.18(0.19)
Risk attitude (ref. risk neutral)				
Risk-taker	0.10(0.12)	0.31(0.19)	-0.04(0.13)	-0.23(0.20)
Risk-averse	-0.14(0.13)	0.05(0.20)	0.06(0.15)	-0.52(0.21)*

Table 21 continued

Disease experience abroad				
Ever experienced (ref)				
Never experienced	0.02(0.12)	-0.04(0.20)	0.10(0.14)	0.16(0.19)
Self-rated health (ref. Fair)				
Good	-0.38(0.27)	-0.33(0.46)	-0.29(0.37)	-0.62(0.46)
Very good	-0.38(0.26)	-0.26(0.45)	-0.50(0.37)	-0.42(0.45)
International health insurance				
Not insured				
Insured	-0.13(0.19)	-0.60(0.30)*	0.01(0.19)	0.50(0.29)
Insurance covered vaccination				
Vaccination not covered				
Vaccination covered	-0.09(0.11)	0.11(0.17)	-0.09(0.13)	-0.41(0.18)*
Vaccination literacy	-0.19(0.03)**	-0.23(0.05)**	-0.10(0.03)**	-0.21(0.05)**
Perceived benefits of vaccines	-0.32(0.04)**	-0.54(0.07)**	-0.14(0.05)**	-0.22(0.07)**
_cons	8.30(0.95)**	10.35(1.26)**	4.28(1.39)**	7.64(1.45)**
$\bar{R}^2$	0.25	0.24	0.38	0.14

Robust standard errors in parentheses; ** p<0.01, * p<0.05

Source: Feld Survey, Adongo (2018)

The results on the effect of religion on travel vaccination, generally, signal an inverse relationship but with some inconsistent observations within the specific religious affiliations, prominent among the Muslims, Agnostics and Christians when compared to the other religions. Likened to the other religions, the respondents who professed being Muslims were more likely to significantly express efficacy ($\beta = 1.14$; $p < 0.05$) and time ($\beta = 1.33$; $p < 0.05$) concerns toward vaccination. Their average time concern rating was 4.59 while that for the overall sample by religion was 2.63.

Similarly, the Muslim respondents recorded the maximum average rating for vaccine efficacy sentiments (*Mean* = 3.89) whereas Atheist had the minimum mean rating (*Mean* = 1.68). The Agnostics ($\beta = 1.08$; *Mean* = 4.78; $p < 0.05$) and the Christians alike compared to the other forms of religion ($\beta = 0.86$; *Mean* = 4.85; $p < 0.05$) had significant ethical concerns towards mandatory travel vaccination (Appendix D).

Travel vaccination insurance status affected the nature of efficacy and cost concerns that the respondents had about travel vaccination. Those who had their travel vaccines covered by health insurance were significantly less concerned about the cost of vaccination than those who did not have insurance covers for their travel vaccines ($\beta = -0.41$; $p < 0.05$). With recourse to mean difference results in Appendix E, whilst both cohorts moderately rated cost concerns, the mean rating for those who did not have their vaccination covered by health insurance (mean = 4.79) was considerably higher than that of their counterparts (mean = 4.37).

Table 21 continued:

	Time concern	Access concern	Ethical concern
Sex (ref. male)			
Female	-0.26(0.17)	0.03(0.04)	-0.09(0.27)
Age	-0.00(0.02)	-0.00(0.00)	-0.02(0.03)
Age (ref <20)			
20-29	0.09(0.30)	0.10(0.08)	-0.38(0.46)
30-39	-0.03(0.43)	0.18(0.11)	-0.57(0.65)
40 and above	-0.40(0.66)	0.11(0.17)	0.08(1.08)
Marital status (ref. single)			
Married	0.15(0.18)	-0.02(0.05)	-0.11(0.29)
Education			
Bachelor's degree	0.18(0.20)	-0.07(0.06)	-0.15(0.32)
Post graduate degree	-0.12(0.21)	-0.06(0.06)	-0.25(0.35)
Religion			
Christian	0.02(0.26)	-0.06(0.07)	0.86(0.43) *
Muslim	1.43(0.52)**	-0.21(0.18)	0.80(0.82)
Atheist	-0.27(0.29)	-0.11(0.07)	0.54(0.49)
Agnostic	-0.12(0.33)	-0.07(0.08)	1.08(0.55) *
Employment status			
Employed	0.36(0.54)	0.10(0.13)	0.10(0.78)
Unemployed	0.63(0.57)	0.07(0.14)	0.14(0.83)
Region (ref. Asia)			
Africa	-2.02(0.76) **	-0.18(0.20)	-0.18(1.15)
Europe	-2.32(0.72)**	-0.17(0.19)	1.22(1.07)
America	-2.24(0.73)**	-0.13(0.19)	0.03(1.10)
Western pacific	-2.32(0.82)**	-0.16(0.24)	2.22(1.20)

Table 21 continued

Purpose of visit (ref. Business)			
Leisure	-0.75(0.31)*	0.05(0.09)	0.51(0.49)
VFR	-0.42(0.39)	0.11(0.11)	0.52(0.59)
International travel history			
First timer (ref)			
Repeater	-0.56(0.33)	-0.13(0.09)	1.34(0.48)**
Number of past international trips	-0.00(0.00)	-0.00(0.00)	0.00(0.01)
Length of stay	0.00(0.00)	0.00(0.00)	0.01(0.00)
Trip arrangement			
Intermediary (ref)			
Mostly by self	-0.45(0.22)*	-0.02(0.06)	0.05(0.37)
Vaccination information seeking			
Inactive seeker (ref)			
Active seeker	0.16(0.23)	-0.04(0.06)	-0.25(0.37)
Number of sources	0.05(0.09)	-0.01(0.02)	0.05(0.13)
Source of vaccine information			
Internet (ref. no)	-0.04(0.16)	0.02(0.04)	0.33(0.26)
Health professional (ref. no)	-0.21(0.22)	-0.11(0.06)*	-0.69(0.34)*
Travel agents (ref. no)	0.08(0.24)	0.07(0.07)	-0.33(0.41)
Friends and relatives (ref.no)	0.29(0.17)	0.01(0.05)	0.39(0.27)
Risk attitude (ref. risk neutral)			
Risk-taker	0.21(0.18)		0.04(0.28)
Risk-averse	-0.25(0.17)		-0.26(0.30)
Disease history abroad			
Ever experienced (ref)			
No disease from abroad	-0.08(0.18)		-0.46(0.27)

Table 21 continued

Self-rated health (ref. fair)			
Good	-0.37(0.35)		-0.32(0.59)
Very good	-0.43(0.35)		-0.31(0.59)
International health insurance			
Not insured			
Insured	-0.11(0.24)	0.00(0.06)	0.40(0.39)
Insurance covered vaccination			
Vaccination not covered (ref)			
Vaccination covered	-0.23(0.16)	0.06(0.04)	0.11(0.26)
Vaccine literacy	-0.15(0.04) **	-0.14(0.01) **	0.04(0.07)
Perceived benefits of vaccines	-0.16(0.06) **		0.37(0.10) **
_cons	7.97(1.38)**	3.10(0.32) **	-2.09(2.59)
R^2	0.18	0.22	0.14

Robust standard errors in parentheses; P-value is significant at, * $p \leq 0.05$; ** $p \leq 0.01$

Source: Feld Survey, Adongo (2018)

The impact of vaccine information seeking on tourists' vaccination concerns was looked at in terms of the type of source used and search effort (intensity of seeking and the number of sources used). Tourists' travel vaccination concerns were not significantly stratified by their reliance on friends and relatives and travel agents for vaccination information but did for health professionals and the internet. Consistently, tourists who relied on health professionals commonly had less negative views about travel vaccination (β = -0.33; $p < 0.01$), predominantly for availability and ethical concerns, comparative to those who did not rely on them. For example, those who relied on health professionals had an overall average concern rating score of 2.69 while those who did not scored 3.31 (Appendix E).

As regards intensity of information seeking, those who described themselves as active seekers had more concerns than those who considered themselves passive seekers ($\beta = 0.67$; $p < 0.01$). Similar observation is made for tourists' concerns on vaccine efficacy ($\beta = 0.75$; $p < 0.01$) and safety ($\beta = 0.35$; $p < 0.05$), cost of vaccination ($\beta = 0.84$; $p < 0.01$) and time albeit the latter is not significant. While the results on the effect of the number of sources used on concerns expressed are erratic, it appeared not to be a significant predictor for overall and specific dimensions of vaccination concern.

Any level of perceived benefit of vaccination decreased the chance of tourists' negative sentiments towards travel vaccination (β = -.33; < 0.01). This outcome is consistent for both the aggregated and disaggregated regression models on vaccination concerns apart from the model on ethical concern, which is positive and significant (β = 0.37; < 0.01). Similarly, the

results show a significant inverse relationship between vaccination literacy and level of concerns toward travel vaccination, both general and some specific concerns, implying that increasing literacy corresponds significantly to fewer concerns with travel vaccination. For instance, literacy promotes positive views towards vaccine efficacy (β = -0.19; < 0.01), cost (β = -0.10; < 0.01) and availability (β = -0.14; < 0.01). However, Table 21 indicates that its impact on ethical concerns is positive but not considerable (β = 0.04; > 0.05).

Discussion

Religious related concerns and contestations of vaccination are recognised in the literature with varying degrees. These contentions often result from the perceived incompatibility of vaccination with doctrinal beliefs or faiths that individuals profess. A section of Christians (*e.g* Church of Christ) consider spiritual or faith healing of disease is an important aspect of their belief (Grabenstein, 2013). Except for time and ethical concerns, which evidence in this study suggests, are typical of the respondents who profess Islam and Christianity respectively, the remaining findings are diverse and inconsistent across religious affiliation. Islamic religious scriptures highlight the importance of time recommending its effective use. The Christians also expressed marked concerns about the efficacy of vaccines than the other faiths. These varied and inconsistent outcomes provide evidence that tourists' vaccination concerns are not uniquely stratified by religious affiliation but moderated by several other factors: personal beliefs, political, cultural and historical (Grabenstein, 2013, Larson *et al.*, 2015).

Past travel experience is an important factor that impacts decision making processes in tourism and tourists views about their encounters

(Kerstetter & Cho, 2004). Experience is a mark of knowledge and familiarity with events (Zalatan, 1996). Repeat-visitors lamentations of the cost associated with travel vaccination could be explained by their history of travel vaccination. Chances are that such individuals would have historical knowledge on travel vaccination and are more able to appreciate the associated costs involved in travel vaccination. Granted that this claim is true, it would mean their cost of vaccination would seem high accompanied by a higher likelihood of being cost concerned compared to those without previous international travel experience. The number of vaccines recommended to first-time travellers could induce probability of being concerned with accounting for the significant ethical concerns reported by first-timers toward travel vaccination.

Information seeking is a 'double edge sword' with positive and negative impacts (Price & Peterson, 2016), and this has been confirmed in the current study. Whereas some seeking behaviours correlated with positive sentiments about vaccination others lead to negative sentiments. Respondents who indicated relying on health professionals for travel vaccination information largely reported fewer vaccination concerns. This underscores the resourcefulness and usefulness of health care professionals in allaying vaccination concerns among travellers. Medical professionals are better suited to handle individual special needs and questions due to immediate feedback and attention (Johnson & Meischke, 1993; Wilson, 1997). Yaqub *et al.* (2014) opine that they do not only ensure that patients have access to vaccines but serve as 'honest brokers' and 'instillers' of vaccination confidence in patients.

Conversely, the evidence of friends and relatives as potential sources of vaccination concerns among some travellers is a worrying outcome. Tourists value and trust the opinions of social networks including friends and relatives when taking holiday decisions (Kerstetter & Cho, 2004). The downside of social networks as a source of vaccine information is that they are mostly non-medical experts and likely to offer incorrect and or unbalanced information about vaccines resulting in misinformation and heightening concerns (Yaqub *et al.*, 2014). The relatively high vaccination concerns among active seekers of information compared to the passive seekers could be linked to their likelihood of being exposed to diverse discourse on vaccines making them liable of being critical or questioning certain aspects of vaccination (Kata, 2010). Intense seekers of information are also prone to cognitive dissonance and selective exposure: these are conflicting thoughts and beliefs about events which subsequently motivate one to search for more information that reinforces existing mindset (Rogers, 1983; Wilson, 1997).

Contrary evidence is found to the apriori expectation that those who rely on the internet for vaccination information would significantly express more concerns toward travel vaccination than those who did not. Additional analysis showed that the majority of those who searched for vaccine information online consulted pro-vaccination institutional-based websites such as those by the CDC, WHO, travel clinics and governments, which conceivably explained the counter results. These are pro-vaccination sites and therefore users are likely to be oriented towards appreciating the benefits of vaccination, thus, positive sentiments. The current finding cautions that much as the argument in the literature (Kata, 2010; Makarovs & Achterberg, 2017)

that search of information via the internet could lead to nurturing or heightening of negative vaccine sentiments among people, the type of website (s) consulted and perhaps the intensity of information search matters.

Another noteworthy finding is the considerable impact of information search on time concerns. Tourists who never searched for information on travel vaccines were less likely to express time concerns than those who searched. Information retrieval on all aspects of travel vaccination involves time expenditure and so it was not out of place to have those who reported that they searched for information having time concerns. This preceding assertion is reinforced as the findings indicate that availability concern, in turn, also heightened concerns about time committed to travel vaccination. Constrained with information as to the place to go and acquire eligible vaccines would mean that one has to do an intense search, which is mirrored in the amount of time committed for the search.

The emergence of perceived vaccine benefits eliciting fewer concerns towards vaccination among the respondents seems intuitive. This is because, from a utility frame of reference, the more individuals are inclined to think that vaccines are important the fewer their negative sentiments (Larson *et al.*, 2016; Yaqub *et al.*, 2014). But it is striking that perceived vaccine benefits surged ethical concerns. This outcome implies that perceived benefit may be a sufficient, but not a necessary, condition to reduce or stop the ethical concerns that travellers have toward certain aspects of vaccination. At other times people may still express concerns even though perceived benefits are enormous because doing so may facilitate their realisation of some desired goals. Presumably, such concerns could be regarded as libertarian motives.

The results further suggest that a multiplicity of factors accounted for the cost concerns associated with travel vaccination with the primary reason being insurance coverage for vaccination. Having an insurance cover for one's travel vaccination was associated with fewer cost concerns and the reverse true. Not having an insurance cover for travel vaccination implies that the individual had to do out-of-pocket payment for all the monetary cost associated with vaccination. This could especially be expensive because most travel vaccines are currently not under coverage of routine vaccination programmes (WHO, 2017)

Along the tenets of the reflexive modernisation theory, it was hypothesised in the current study that: *there is a significant direct relationship between international tourists' vaccination literacy level and their concerns about vaccination*. Contrary to this hypothesis, vaccine literacy led to fewer travel vaccination concerns. This outcome gives credence to the fact that among travellers the more literate one becomes the lesser the chance of having concerns with travel vaccination. The observed significant direct influence of vaccine literacy on concerns towards vaccination is further supported in its disaggregated analysis.

Summary

The analysis in this chapter explored the determinants of tourist travel vaccination concerns using OLS regression. Overall travel vaccination concerns are significantly influenced by region of origin, the purpose of travel, individual's vaccination literacy status, perceived benefits of vaccines and information seeking behaviour. The findings on the specific concerns generally showed that factors that shape tourists' travel vaccination concerns

are diverse and complex. This confirms the argument of the conceptual framework that guided the study. Contrary to the framework, however, is that the impact of these factors is not consistent across specific concerns and thus highly differentiated.

CHAPTER EIGHT

INFLUENCE OF TOURISTS' CONCERNS ON THEIR VACCINE UPTAKE

Introduction

This chapter presents the results and discussion on the relationship between international tourists' vaccination concerns and their vaccine uptake while controlling for several other potential confounding factors including their socio-demographic characteristics, tripographics and infectious disease perceptions. The dependent variable vaccine uptake is analysed, both as the number of vaccines (rate) and specific vaccines taken, using beta fractional regression for the former and multivariate logistic and probit regressions for the latter. The chapter ends with a discussion of the ensued results and summary of the key findings.

Results

Descriptive Statistics of the Dependent Variable

Table 22 and 23 present the descriptive statistics results on uptake rate of the various vaccines recommended for inbound visitors to Ghana. Only respondents eligible for at least a vaccine of the 10 vaccines recommended for visitors to Ghana were included in the analysis. Those considered not eligible for the analysis were (1) those that had pre-existing immunity as defined by a positive serology, a history of vaccination or (2) if a health professional considered them immune based on their clinical review or had a medical contraindication to the vaccine

The average vaccination eligibility rate was 5.47 with those eligible for six (6) vaccines the majority (18.78). About 17.46 percent of the respondents

were eligible to take seven (7) vaccines next to those qualified for five (5) vaccines while those not eligible for any of the vaccines being 3.76 percent (Table 22).

Table 22: Descriptive Statistics for Vaccine Eligibility Rate (N = 905)

Number	Frequency	Percentage (%)
0	34	3.76
1	20	2.21
2	51	5.64
3	62	6.85
4	108	11.93
5	129	14.25
6	170	18.78
7	158	17.46
8	115	12.71
9	58	6.41

Source: Feld Survey, Adongo (2018)

In relative terms, Table 24 indicates that the vaccine that most of the respondents were eligible for was the Yellow fever vaccine (14.79%) followed by Hepatitis B (13.40%), Hepatitis A (13.13%) and the least being Seasonal influenza vaccine (4.25%). As regards uptake, the majority (95.03%) of those eligible for the Yellow Fever vaccine had vaccinated. It is quite surprising to note that some people still visited Ghana without taking the yellow fever vaccine despite it being mandatory. The next highest uptake proportion is observed among those who were eligible for Hepatitis B (86.08%), Hepatitis A (84.31%) and the DTP vaccine (73.81%).

However, with regards to under-vaccinations, the most under-vaccinated was the seasonal flu vaccine (72.71%). The Rabies vaccine placed second (66.52%) followed by Polio (48.40%) and Typhoid (38.45%) vaccines.

Lammert et al., (2016) in a similar study among outbound travellers from the US identified the meningococcal and rabies vaccines as two of the three most refused vaccines, aside from the Japanese Encephalitis vaccine (Table 23).

Table 23: Descriptive Statistics for Uptake of Specific Vaccines (N = 905)

Type of vaccine	Relative eligibility		Absolute uptake	
	Eligible respondents (n)	%	Under vaccinated (%)	Fully Vaccinated (%)
Yellow fever	860	14.79	4.97	95.03
Hepatitis A	763	13.13	15.69	84.31
Hepatitis B	779	13.40	13.92	86.08
Rabies	303	5.21	66.52	33.48
Polio	467	8.03	48.40	51.60
Seasonal influenza vaccine	247	4.25	72.71	27.29
Typhoid fever vaccine	557	9.58	38.45	61.55
Meninngicoccal vaccine	566	9.74	37.46	62.54
DTP vaccine	668	11.49	26.19	73.81
MMR	603	10.37	33.37	66.63

Source: Feld Survey, Adongo (2018)

Concerns and Vaccine Uptake Rate

Table 24 presents the fractional beta regression results on the effects of international tourists' travel vaccination concerns on their vaccine uptake rate. As indicated earlier, tourists to Ghana are recommended to be up-to-date on 9 vaccines aside from Yellow fever vaccines. Meanwhile, the respondents had varied vaccine uptake eligibility rates based on their past immunity and or medical exemption. This suggests differentiation in the vaccination eligibility thresholds for the respondents and thus no common denominator. In such an instance, computation of fractional responses and use of fractional regression models (including fractional logit and probit and fractional beta regression) are suggested because of the absence of a common denominator. Fractional response regressions fit models on continuous response outcomes between zero and one [0, 1].

To determine the vaccination uptake rate for each eligible respondent for the current trip/itinerary, the number of vaccines taken by him or her for the itinerary (denoted as Y) was divided by the number of vaccines eligible for the trip (denoted as X). The fractional regression technique based on its high stability and robustness was chosen over the other alternative techniques for the estimation of the influence of vaccination concerns on uptake rate.

Three hierarchical models were estimated. Model 1 focused on the independent influence of vaccination concern on uptake rate, Model 2 isolated the influence of the confounding factors considered, and Model 3 looked at the combined effects of both the main and controlled factors. Broadly, socio-demographic characteristics, tripographics, infectious disease perceptions, perceived vaccine importance, and vaccination literacy were adjusted for as control variables. Instead of the conventional coefficients, margins predictions are computed to facilitate easy interpretation and understanding of the results (Long, Long & Fresse, 2006).

Model 1 indicates that the vaccine concerns expressed by the respondents altogether explained their vaccine uptake rate by 12 percent. The controlled for factors, on another hand, altogether explained 23 percent of the variance in uptake (Table 24). In model 3, the joint effect of the control factors and the concern factors is analysed. The first thing to note is that the model, as envisaged, provides a better fit to the data than model 1 and 2 as indicated by the R^2, which is 25 percent, only that the increased variance explained over Model 2 is very marginal. The second thing to note is the change in the magnitude of coefficients of all the vaccination concern factors, particularly for time concerns in Model 3 when compared to Model 1. The coefficient

changed from -0.10 to 0.04, though the latter coefficient is not significant ($p>0.05$). The change in the magnitude of the effects of the vaccination concern factors when the other factors are adjusted for implies some interactional effects by the control factors on the main explanatory variables. More broadly, this is suggestive that the control variables and the concern factors are complementary in providing a better statistical explanation for the vaccination rate among the study sample.

Since the vaccine literature has hardly modelled vaccine uptake rate, there is no established criterion for what model may pass as an acceptable model. However, recourse is made to the general econometric rule of using R-squares as the basis for differentiating performance of models (Thrane, 2016). Following on this rule and for statistical and theoretical significance, the model 3 is considered the most fitted and acceptable model for the interpretation and discussion of the results (Table 24).

Table 24: Influence of Vaccination Concern on Uptake Rate (n = 905)

	Model 1	Model 2	Model 3
Efficacy concern	-0.13(0.04) **		-0.09(0.04)*
Safety concern	-0.11(0.04)**		-0.09(0.04)*
Cost concerns	0.12(0.03) **		0.05(0.03)*
Time concern	-0.10(0.04) **		0.04(0.04)
Access concern	-0.48(0.12)**		-0.25(0.13)*
Ethical	0.03(0.02)		-0.02(0.02)
Sex (ref. male)			
Female		0.30(0.16)	0.20(0.15)
Age		0.02(0.02)	0.01(0.02)
Marital status (ref. single)			
Married		0.16(0.17)	0.07(0.17)
Education (ref. High School)			
Bachelor's degree		-0.06(0.19)	-0.17(0.19)
Post-graduate degree		0.19(0.21)	0.08(0.21)
Religion (ref. others)			
Christian		0.13(0.24)	0.15(0.24)
Muslim		-0.16(0.50)	-0.09(0.50)
Atheist		-0.05(0.27)	-0.11(0.26)
Agnostic		0.52(0.30)	0.13(0.29)
Employment status (ref. retired)			

Table 24 continued

Employed		
Unemployed	-0.34(0.52)	-0.50(0.51)
Region (ref. Asia)	-0.36(0.55)	-0.52(0.54)
Africa		
Europe	1.21(0.98)	1.72(0.66) **
America	1.22(0.94)	1.97(0.59) **
Western pacific	1.76(0.95)	2.25(0.61) **
Past travel to Ghana (ref.)	1.44(0.98)	2.12(0.66) **
First-timer		
Past international travel	-0.11(0.21)	-0.17(0.20)
First-timer (ref.)		
Repeater		
Number of past trips	0.45(0.32)	0.19(0.31)
Purpose of visit	0.01(0.00)	0.01(0.01)
Business (ref)		
Leisure		
VFR	-0.26(0.28)	-0.54(0.28) *
Trip arrangement (ref	-0.73(0.35) *	-0.82(0.35) **
Intermediary)		
Self		
Length of stay in Ghana	0.45(0.22) *	0.42(0.21) *
Pre-travel advice (ref. Yes)	0.01(0.01)	0.01(0.01)
Vaccination information	-0.21(0.24)	-0.23(0.24)
seeking		
Inactive seeker (ref)		
Active seeker	0.08(0.19)	0.18(0.19)
Vaccination information		
source		
Internet (ref. no)	0.10(0.15)	0.03(0.14)
Health professional (ref.no)	0.86(0.23)	0.87(0.22) **
Travel agents (ref. no)	-0.23(0.22)	-0.16(0.22)
Friends and relatives	-0.16(0.17)	-0.02(0.16)
(ref.no)		
Risk attitude (ref. risk		
neutral)		
Risk-taker	-0.52(0.17)**	-0.38(0.16) *
Risk-averse	-0.33(0.17) *	-0.25(0.16)
Disease history abroad		
Ever experienced (ref)	-0.24(0.17)	-0.09(0.16)
Never experienced		
Self-rated health (ref. fair)	-0.28(0.35)	-0.20(0.33)
Good	-0.61(0.35)	-0.58(0.32)
Very good		
International health		
insurance		
Not insured (ref.)	0.38(0.27)	0.45(0.26)
Insured		
Insurance covered		
vaccination		
Vaccination not covered		
(ref)	-0.03(0.15)	-0.02(0.14)
Vaccination covered		

Table 24 continued

Perception of VPD			
Perceived vulnerability		0.10(0.08)	0.16(0.08) *
Perceived severity		0.10(0.05)	0.15(0.05) **
Perceived disease burden		-0.02(0.02)	-0.03(0.01)
Vaccination literacy		0.18(0.04) **	0.10(0.04) **
Perceived benefits of vaccines		0.17(0.05) **	0.08(0.05)
WASH doesn't replace vaccines		0.15(0.04) **	0.11(0.04)**
_cons	7.23 (0.29) **	9.70(1.24) **	7.91(1.37) **
$\bar{R}^2$	0.12	0.23	0.25

P-value is significant at, * $p \leq 0.05$; ** $p \leq 0.01$
Source: Feld Survey, Adongo (2018)

This is because of its relatively higher R-square value over the other two models. This choice is reinforced by the Ramsey's test of misspecification of the model, which is insignificant ($F = 0.31$; $p = 0.82$). Each post-estimation tests conducted proved that all the models are correctly specified. For example, the link test of [hat ($p > |z| = 0.012$) and_hatsq ($p > |z| = 0.460$)] for model 3 was within the recommended threshold of a fitted model (Downward et al., 2011). This was further confirmed by the Hosmer and Lemeshow *Prob>chi2 test* of ($\chi^2 = 6.81$; $p = 0.748$).

As regards to the Model 3 in Table 25, it is noted that the coefficient for vaccine efficacy and safety concerns is -0.09 respectively. *Citeris paribus, it implies that* for every unit increase in the safety or efficacy concern that tourists have about travel vaccines, the likelihood of under-vaccinating increases by 0.09. In addition, the results indicate that an inverse relationship existed between vaccination access concern and vaccine uptake rate (β = -0.25; $p<0.01$). This is suggestive that increasing vaccination concerns correspond with a reduction in the probability of uptake by a factor 0.25, all other things being equal. Though, there is a reduction in the effect of cost concerns on vaccine uptake rate from β= 0.12($p<0.01$) in Model 1 to β=

0.05($p<0.01$) in Model 3, its impact on uptake was still positive and significant. This is indicative that cost concern towards vaccination does not necessarily result in under-vaccination.

Vaccination Concerns and Respondents' Uptake of Specific Vaccines

Tables 25, 26 and 27 present the results of the logistic regression on the effect of tourists' vaccination concerns on their uptake of specific vaccines: Hepatitis A, Hepatitis B, Rabies, Polio, Seasonal Flu, Typhoid, meningococcal meningitis, DTP and MMR. The Yellow fever vaccine was not analysed with inferential statistics because the number of under-vaccinations were extremely low for such statistics. The second reason was because it is a mandatory vaccine and so the reason for its uptake is largely known.

In addition to the odd ratios, percentage change in odds for a unit increase in each of the explanatory variables is provided in the logistic regression output to ease understanding of the results (Thrane, 2016). All the post-estimation tests (Omnibus tests of model coefficients and Hosmer and Lemeshow tests) showed that all the estimated models were well specified and fitted. Altogether, the set of explanatory variables accounted for between a minimum of 8 percent and a maximum of 19 percent of the variation in uptake of each of the vaccines (Table 25, 26 and 27).

Table 25: Respondents' Vaccination Concerns by their Uptake of Hep A and B and Rabies Vaccines

	Hep A		HepB		Rabies	
	OR (SE)	%	*OR (SE)*	%	*OR (SE)*	%
Efficacy concerns	0.92(0.05)	-8.50	0.95(0.05)	4.7	1.02(0.04)	2.3
Safety concerns	0.96(0.06)	-4.00	0.96(0.06)	-3.6	0.94(0.05)	-6.3
Cost concerns	1.05(0.05)	4.90	1.05(0.05)	5.5	1.01(0.04)	0.3
Time concerns	0.92(0.05)	-8.30	0.90(0.05)	-10.2	0.99(0.04)	-1.4
Vaccine availability concerns	1.13(0.23)	13.10	0.88(0.17)	-11.7	0.63(0.09)**	-36.9
Ethical concerns	1.05(0.03)	4.80	1.02(0.03)	1.9	0.99(0.02)	-1.3
Sex (ref. male)						
Female	1.20(0.27)	20.00	1.32(0.31)	32.0	1.27(0.22)	26.9
Age in continuous years	1.02(0.03)	2.00	0.97(0.01)**	-4.0	1.03(0.02)	2.6
Marital status (ref. single)						
Married	0.69(0.18)	-30.60	1.32(0.39)	32.2	1.19(0.22)	19.4
Education (ref. High School)						
Bachelor's degree	0.78(0.22)	-22.10	0.77(0.22)	-23.4	1.02(0.23)	1.6
Post-graduate degree	0.63(0.19)	-37.50	0.83(0.26)	-17.1	1.06(0.26)	6.5
Religion (ref. others)						
Christian	1.21(0.46)	21.5	1.77(0.67)	76.8	0.75(0.20)	-25.0
Muslim	0.77(0.63)	-22.8	0.96(0.80)	-4.1	0.89(0.55)	-10.6
Atheist	1.40(0.61)	39.7	0.97(0.40)	-3.1	0.79(0.24)	-20.9
Agnostic	2.29(1.14)	129.4	0.84(0.36)	-15.6	0.93(0.31)	-7.2
Employment status (ref. retired)						
Employed	1.18(0.84)	17.50	0.94(0.68)	-5.9	0.97(0.57)	-2.9
Unemployed	1.80(1.41)	80.20	1.05(0.82)	5.1	0.90(0.57)	-10.2
Region (ref. Asia)						

Table 25 continued

African region	1.68(1.62)	67.80	0.61(0.52)	-39.0	3.81(4.52)	281.1
European region	3.28(2.92)	228.20	1.20(0.98)	20.2	1.47(1.72)	47.4
American region	3.11(2.83)	211.40	0.78(0.65)	-21.5	1.72(2.03)	71.9
Western Pacific region	1.88(1.92)	88.40	4.13(5.45)	313.5	0.48(0.63)	-52.1
Past travel to Ghana (ref. Repeater)						
First-timer	0.49(0.14)*	-51.10	1.05(0.33)	5.2	0.97(0.22)	-2.6
History of international travel						
First-timer						
Repeater	3.96(1.65)**	296.3	1.57(0.67)	57.0	1.11(0.37)	11.4
Number of past international trips	1.01(0.01)	0.60	1.01(0.01)	0.8	0.99 (0.00)	-0.1
Purpose of visit						
Business (ref)						
Leisure	0.63(0.25)	-37.00	0.47(0.24)	-53.1	1.13(0.36)	12.9
VFR	0.76(0.43)	-24.20	0.73(0.45)	-27.3	0.73(0.31)	-27.4
Trip arrangement (ref Intermediary)						
Self	0.99(0.31)	-1.3	2.63(1.13)*	163.4	0.85(0.22)	-14.9
Length of stay in Ghana	1.00(0.00)	0.4	1.00(0.00)	0.1	1.01(0.00)*	0.5
Vaccination information seeking						
Inactive seeker (ref)						
Active seeker	0.92(0.27)	-7.6	1.51(0.43)	50.6	1.10(0.24)	10.2
Pre-travel advice (ref. Yes)	0.90(0.26)	-9.7	0.78(0.22)	-22.0	0.97(0.24)	-3.3
Internet (ref. no)	1.07(0.25)	6.6	1.01(0.25)	1.4	1.11(0.19)	11.3
Health professional (ref.no)	1.68(0.45)	68.1	2.01(0.56)*	100.9	1.57(0.36)*	56.8
Travel agents (ref. no)	0.86(0.31)	-14.5	1.40(0.64)	39.5	1.03(0.27)	3.5
Friends and relatives (ref.no)	0.86(0.24)	-13.7	0.61(0.16)	-38.6	1.07(0.20)	7.3
Risk attitude (ref. risk neutral)						

Table 25 continued

Risk-taker	0.55(0.15)*	-45.2	0.83(0.23)	-16.7	0.79(0.14)	-21.1
Risk-averse	0.84(0.25)	-15.7	1.19(0.37)	19.1	0.89(0.18)	-10.8
Disease history abroad						
Ever experienced (ref.)						
Never experienced	0.60(0.17)	-39.5	0.89(0.26)	-10.6	0.87(0.16)	-12.6
Self-rated health (ref. fair)						
Good	1.13(0.65)	12.8	1.80(0.90)	80.3	0.98(0.43)	-2.2
Very good	0.89(0.52)	-10.7	1.90(0.94)	90.1	0.67(0.29)	-32.9
International health insurance						
Not insured (ref.)						
Insured	1.97(0.59) *	97.1	1.65(0.49)	64.9	1.05(0.27)	5.3
Insurance covered vaccination						
Vaccination not covered (ref)						
Vaccination covered	0.68(0.16)	-32.4	1.28(0.32)	28.1	1.11(0.18)	11.0
Perceived vulnerability	0.92(0.10)	-8.4	0.99(0.11)	-0.7	1.03(0.09)	2.6
Perceived severity	0.99(0.08)	-1.4	1.01(0.08)	1.3	1.00(0.06)	-0.0
Perceived disease burden	1.01(0.02)	0.7	1.01(0.02)	0.6	1.00(0.02)	-0.3
Vaccination literacy	1.07(0.07)	6.6	1.19(0.09)*	19.2	1.08(0.05)	8.0
Perceived benefits of vaccines	1.15(0.10)	14.7	1.12(0.10)	12.1	1.01(0.07)	1.3
WASH doesn't replace vaccines	0.99(0.07)	-0.60	1.08(0.08)	8.3	1.01(0.05)	1.5
N	875		875		875	
R^2	0.19 (136.69)		0.19(148.03)		0.08(71.07)	

Note: % = Percentage change in odds for unit increase in X; Robust standard errors in parentheses;
P-value is significant at, * p≤ 0.05; **p ≤ 0.01
Source: Feld Survey, Adongo (2018)

For example, vaccination concern explained about 19 percent of the variance in uptake of the Hepatitis A and B vaccines respectively and 11 percent of the uptake of the Typhoid vaccine. As regards the specific effects, it is observed that the adverse impact of vaccine efficacy concern on uptake is considerable for the Typhoid and MMR vaccines (Table 25). Tourists who had vaccine efficacy concerns had a decreased probability of 8 percent of under-vaccinating the Typhoid and MMR vaccines respectively (Table 27). In the case of safety concern, the odd ratios generally suggest that it constrained uptake of each of the vaccines except for the Meningitis vaccine. The negative effect of safety concern on vaccine uptake is noteworthy for the Polio and Flu vaccines. The results indicate that the more concerned individuals were about the safety of vaccines their odds of uptake for the Polio vaccine decreased by 10.7 percent while that of the Flu vaccine reduced by 11.4 percent (Table 26).

Vaccine availability concern also significantly undermined the vaccine uptake rate among the respondents (β =0.25; p <0.01). For those who under-vaccinated against Rabies and MMR, availability concern was one of their likely reasons. The odds of not vaccinating against Rabies based on access concerns is about 37 percent and that of the MMR vaccine is about 33 percent. Even though the respondents' ethical concern towards travel vaccination generally elicited unfavourable vaccine uptake behaviour, the effect was insignificant (β =-0.01; p <0.01) except for their uptake of the Seasonal Flu. Ethical concerns led to a considerable reduction in the respondents' odds of uptake of the Flu vaccine by 6 percent. However, no decreasing odds was observed for any of the relationships between vaccination cost concern and uptake of the specific vaccines.

Table 26: Respondents' Vaccination Concerns by their Uptake of Polio, Flu and Typhoid Vaccines

	Polio		Flu		Typhoid	
	OR (SE)	%	*OR (SE)*	%	*OR (SE)*	%
Efficacy concerns	1.02(0.04)	1.8	0.95(0.05)	-4.7	0.92(0.04)*	-8.4
Safety concerns	0.89(0.04)*	-10.7	0.89(0.05)*	-11.4	0.99(0.05)	-0.8
Cost concerns	1.04(0.03)	3.6	1.02(0.04)	2.4	1.05(0.04)	4.7
Time concerns	0.99(0.04)	-1.1	1.08(0.05)	8.1	1.00(0.04)	0.2
Availability concerns	0.95(0.13)	-4.6	0.75(0.13)	-24.7	1.18(0.17)	18.2
Ethical	1.00(0.02)	-0.4	0.94(0.02)*	-6.1	0.98(0.02)	-2.3
Sex						
Female	1.30(0.21)	29.9	0.90(0.17)	-10.1	1.13(0.19)	12.7
Age in continuous years	1.04(0.02)*	4.1	0.98(0.02)	-1.6	0.98(0.01)	-1.7
Marital status (ref. single)						
Married	0.85(0.15)	-14.6	1.63(0.33)*	63.2	1.02(0.19)	2.0
Education (ref. High school)						
Undergraduate	0.66(0.14) *	-33.6	0.98(0.25)	-2.1	1.15(0.25)	15.0
Post graduate	0.73(0.16)	-26.7	1.29(0.35)	29.0	1.39(0.32)	38.8
Religion (ref. others)						
Christian	1.36(0.35)	36.4	1.39(0.45)	38.9	1.45(0.39)	45.1
Muslim	0.97(0.64)	-3.0	1.28(0.93)	28.3	3.69(2.20)*	269.3
Atheist	1.24(0.35)	23.8	0.91(0.35)	-8.8	1.20(0.36)	20.1
Agnostic	1.50(0.49)	49.6	2.23(0.87)*	123.4	2.83(1.03)**	183.2
Employment status (ref. retired)						
Employed	1.51(0.86)	51.2	0.27(0.15)*	-72.5	0.27(0.17)*	-73.4
Unemployed	1.32(0.79)	31.6	0.24(0.14)*	-75.7	0.27(0.18)*	-72.8
Region (ref. Asia)						

Table 26 continued

African region	1.30(1.35)	29.9	0.29(0.31)	-71.2	5.86(7.18)	485.5
European region	1.01(1.03)	0.7	0.42(0.44)	-58.5	3.95(4.72)	295.4
American region	0.81(0.83)	-19.4	2.04(2.18)	103.7	6.12(7.37)	511.7
Western Pacific region	1.47(1.60)	46.6	0.53(0.62)	-46.6	9.99(12.78)	898.6
Past travel to Ghana (ref. Repeater)						
First-timer	0.76(0.16)	-23.8	1.39(0.34)	38.6	0.98(0.22)	-2.2
Purpose of visit (ref. Business)						
Leisure	1.55(0.51)	54.9	0.72(0.26)	-27.6	0.47(0.17)*	-53.1
VFR	1.32(0.54)	32.4	0.40(0.20)	-59.9	0.28(0.12)**	-72.0
History of international travel						
First-timer						
Repeater	1.08(0.32)	8.0	0.71(0.26)	-29.2	1.55(0.52)	54.7
Number of past international trips	1.00(0.00)	0.4	0.99(0.00)	-0.6	1.00(0.00)	0.5
Trip arrangement						
Self	0.70(0.17)	-30.3	0.43(0.12)**	-59.6	0.93(0.22)	-6.7
Length of stay in Ghana	1.00(0.00)*	0.5	1.00(0.00)	-0.1	0.99(0.00)	-0.1
Pre-travel advice (ref. Yes)	0.78(0.18)	-21.5	1.09(0.29)	8.6	0.80(0.19)	-2.2
Internet (ref. no)	0.98(0.16)	-1.8	0.83(0.16)	-17.2	1.05(0.18)	5.1
Health professional (ref.no)	1.96(0.41)**	95.9	1.02(0.26)	1.9	1.29(0.27)	28.7
Travel agents (ref. no)	0.93(0.23)	-6.6	1.05(0.30)	4.8	0.98(0.24)	-1.9
Friends and relatives (ref.no)	1.37(0.24)	37.0	0.96(0.20)	-3.8	0.89(0.16)	-11.2
Vaccination information seeking						
Inactive seeker (ref)						
Active seeker	0.99(0.20)	-1.2	0.99(0.25)	-0.7	1.03(0.22)	2.6
Risk attitude (ref. risk neutral)						-20.4
Risk-taker	0.69(0.12)*	-31.1	0.61(0.13)*	-38.7	0.74(0.14)	-25.9

Table 26 continued

Risk-averse	0.92(0.17)	-8.2	0.97(0.22)	-3.4	0.60(0.12)*	-39.7
Disease history abroad						
Ever experienced (ref)						
Never experienced	0.67(0.12)*	-33.2	0.63(0.13)*	-37.2	0.94(0.17)	-6.3
Self-rated health (ref. fair)						
Good	1.03(0.40)	2.6	0.64(0.30)	-35.5	0.45(0.22)	-54.8
Very good	0.89(0.35)	-11.1	0.64(0.30)	-36.5	0.32(0.16)*	-68.5
International health insurance						
Not insured						
Insured	0.89(0.23)	-11.4	0.65(0.19)	-34.8	1.55(0.38)	54.6
Insurance covered vaccination						
Vaccination not covered (ref)						
Vaccination covered	1.15(0.19)	14.9	0.94(0.18)	-5.6	0.74(0.12)	-26.3
Perceived vulnerability	1.19(0.10)*	18.6	0.99(0.11)	-1.3	1.25(0.12)*	24.7
Perceived severity	1.09(0.06)	9.2	1.06(0.08)	6.0	1.16(0.07)*	16.5
Perceived disease burden	0.98(0.01)	-2.4	1.01(0.02)	0.7	0.97(0.02)*	-3.4
Vaccination literacy	1.14(0.05)**	14.0	1.02(0.06)	2.4	1.10(0.05)	9.5
Perceived benefits of vaccines	1.00(0.06)	0.0	1.00(0.07)	0.3	1.12(0.08)	11.9
WASH doesn't replace vaccines	1.07(0.05)	7.3	1.08(0.06)	7.9	1.06(0.05)	6.1
N	875		875		875	
R^2 (Wald X2)	0.09 (102.18)		0.17 (153.21)		0.11 (99.90)	

Note: % = Percentage change in odds for unit increase in X; Robust standard errors in parentheses; P-value is significant at, * p≤ 0.05; **p ≤ 0.01

Source: Feld Survey, Adongo (2018)

Relationship between Control Variables and Vaccination

Turning to the controlled for factors and vaccine uptake rate, significant results are observed for age, the region of origin, the purpose of visit, trip arrangement, risk attitude, vaccination information source, perceived severity of vaccine-preventable diseases, vaccination literacy and perceived vaccine importance (Table 25, 26, 27). Table 25 shows that no significant relationship existed between ageing and rate of vaccine uptake (β = 0.01; p >0.01). However, its impact on uptake of the specific vaccines is varied. For instance, the odds of taking the Hepatitis B vaccine reduced significantly by 4 percent and 8 percent for the MMR vaccine. In contrast, ageing increased the uptake of the Polio by 4 percent (Table 26).

In addition, a significant relationship existed between vaccine uptake rate and respondents' purpose of travel, such that those who came to Ghana for the purpose of visiting friends and relatives (β = -0.82; p<0.01) and leisure (β = -0.54; p<0.05) had a higher likelihood of not taking the recommended vaccines relative to those who visited purposively for business (Table 27). A coefficient of difference test showed that higher likelihood of under-vaccination is higher among the VFR visitors when compared to the leisure visitors, though both VFR and leisure visitors had a higher chance of declining vaccines than those who visited for business purposes. It is evident that decreased chance of uptake of the Typhoid and MMR vaccines is high for both the leisure and VFR-related visitors, but more pronounced for the latter, when compared to those who visited for business-related reasons. The odds of taking the Typhoid vaccine decreased by 53.1 percent for the leisure visitors

and by 72 percent for the VRF-related visitors when compared to those whose main purpose of the visit was for business.

Consistent with literature (Gautret *et al.*, 2011; Tafuri *et al.*, 2014), pre-travel consultation with health professionals is strongly associated with high vaccination compliance ($\beta = 0.87$; $p<0.01$). The import of the finding is that under-vaccination rate tended to be low among tourists who sought pre-vaccination advice from health professionals when compared to those who did not. That is, those who consulted health professionals were considerably more likely to have taken all the recommended doses of the analysed vaccines relative to those respondents who did not. Their odds of uptake ranged from 1.9 percent for the Flu vaccine to 136.9 percent for the Meningitis vaccine in comparison with their counterparts. Literature attributes pre-travel health care provider consultation to increase vaccination compliance among tourists due to their advice being a cue to action, which is it instils tourists' confidence in vaccines and also nudges behaviour (Gautret *et al.*, 2011).

Furthermore, risk-taking attitude significantly influenced vaccine uptake rate. The respondents who described themselves as risk takers had a significantly lower likelihood of adopting vaccines ($\beta = -0.38$; $p <0.05$) than those who considered themselves risk ambivalent; but the rate of uptake for the risk-averse was not markedly different from those who described themselves as risk ambivalent (neutral). Nevertheless, risk taking attitude did not result in considerable variations in uptake of the specific vaccines but for uptake of the Polio, Typhoid and MMR Vaccines.

Table 27: Respondents' Vaccination Concerns by their Uptake of Meningitis, DTP and MMR Vaccines

	Mening		DTP		MMR	
	OR (SE)	%	*OR (SE)*	%	*OR (SE)*	%
Efficacy concerns	0.94(0.04)	-5.7	1.01(0.05)	1.2	0.92(0.04)*	-7.3
Safety concerns	1.05(0.05)	4.6	0.93(0.05)	-6.8	0.94(0.05)	-5.5
Cost concerns	1.01(0.04)	0.7	1.09(0.04)*	9.5	1.02(0.04)	2.3
Time concerns	0.99(0.04)	-0.8	0.91(0.04)*	-8.8	0.96(0.04)	-4.0
Availability concerns	0.96(0.14)	-4.0	0.79(0.12)	-21.4	0.67(0.10)**	-32.8
Ethical	0.99(0.02)	-1.4	1.02(0.03)	1.6	1.01(0.03)	1.5
Sex (ref. male)						
Female	1.49(0.25)*	48.9	1.17(0.22)	16.9	0.93(0.17)	-2.7
Age in continuous years	1.01(0.02)	0.8	1.02(0.02)	2.1	0.97(0.01)**	-0.8
Marital status (ref. single)						
Married	1.11(0.21)	11.0	1.34(0.29)	33.8	1.16(0.23)	16.0
Bachelor	1.05(0.23)	5.4	0.90(0.20)	-10.0	0.85(0.19)	-14.9
Post-graduate	1.07(0.25)	6.8	1.41(0.38)	41.0	1.14(0.27)	13.6
Religion (ref. others)						
Christian	1.18(0.33)	17.9	0.81(0.25)	-18.9	0.75(0.21)	-25.1
Muslim	0.99(0.62)	-1.1	0.51(0.36)	-49.2	0.52(0.26)	-47.9
Atheist	0.73(0.23)	-26.7	0.67(0.24)	-33.2	0.83(0.26)	-17.0
Agnostic	0.95(0.33)	-5.2	1.06(0.42)	5.8	1.24(0.45)	24.0
Employment status (ref. retired)						
Employed	2.43(1.50)	142.8	0.21(0.20)	-78.8	0.86(0.46)	-13.6
Unemployed	2.28(1.49)	127.9	0.29(0.29)	-70.7	0.84(0.48)	-15.5
Region (ref. Asia)						
African region	2.31(1.93)	131.0	3.09(2.92)	209.0	0.90(0.95)	-9.5

Table 27 continued

European region	2.42(1.94)	142.3	3.83(3.50)	283.1	1.00(1.02)	0.4
American region	3.65(2.98)	24.9	3.99(3.73)	299.3	1.41(1.44)	41.2
Western Pacific region	3.98(3.68)	298.2	8.31(8.93)*	731.4	0.53(0.58)	-47.1
Past travel to Ghana (ref. Repeater)						
First-timer	1.19(0.27)	18.9	0.71(0.18)	-28.5	1.00(0.23)	-0.1
Purpose of visit (ref. Business)						
Leisure	0.99(0.33)	-0.3	0.66(0.25)	-34.2	0.68(0.24)	-31.6
VFR	0.59(0.24)	-41.2	0.65(0.31)	-35.5	0.44(0.18)*	-55.7
Past international travel						
First-timer (ref.)						
Repeater	1.09(0.35)	9.0	1.56(0.52)	56.1	0.81(0.28)	-19.4
Number of past international trips	1.00(0.00)	-0.2	1.00(0.00)	0.1	0.99(0.00)	0.6
Trip arrangement						
Self	0.59(0.14)*	-41.1	0.62(0.14)*	-38.4	0.67(0.16)	-32.8
Length of stay in Ghana	1.01(0.00)*	0.6	1.00(0.00)	-0.2	0.99(0.00)	0.0
Pre-travel advice (ref. Yes)	1.03(0.24)	2.7	1.18(0.32)	18.0	0.72(0.18)	
Internet (ref. no)	1.03(0.18)	2.6	1.16(0.22)	16.0	1.19(0.21)	18.5
Health professional (ref.no)	2.37(0.51)**	136.9	1.75(0.40)*	75.3	1.69(0.38)*	69.3
Travel agents (ref. no)	0.67(0.16)	-33.0	0.69(0.19)	-30.8	0.92(0.23)	-7.7
Friends and relatives (ref.no)	0.95(0.18)	-5.2	0.76(0.16)	-24.3	0.74(0.14)	-25.6
Vaccination information seeking						
Inactive seeker (ref)						
Active seeker	0.88(0.19)	-11.9	1.58(0.35)*	57.7	0.98(0.22)	-1.6
Risk attitude (ref. risk neutral)						
Risk-taker	0.70(0.13)	-30.2	0.89(0.18)	-11.1	0.81(0.16)	-18.5
Risk-averse	1.03(0.21)	2.8	0.84(0.19)	-16.0	0.59(0.12)*	-40.5

Table 27 continued

Disease history abroad						
Ever experienced (ref)						
Never experienced	0.82(0.15)	-18.2	1.14(0.24)	14.5	1.29(0.25)	29.2
Self-rated health (ref. fair)						
Good	0.78(0.36)	-21.5	0.75(0.35)	-25.4	0.72(0.33)	-28.1
Very good	0.74(0.34)	-26.4	0.45(0.21)	-55.0	0.54(0.25)	-46.1
International health insurance						
Not insured (ref.)						
Insured	1.57(0.40)	56.5	1.30(0.33)	30.3	1.10(0.28)	10.0
Insurance covered vaccination						
Vaccination not covered (ref)						
Vaccination covered	0.95(0.16)	-4.6	1.19(0.23)	19.1	1.01(0.18)	1.3
Perceived vulnerability	1.04(0.10)	4.0	1.09(0.10)	9.2	1.08(0.10)	8.3
Perceived severity	1.10(0.07)	10.0	1.10(0.07)	9.7	1.12(0.07)	11.7
Perceived disease burden	0.99(0.02)	-0.7	0.98(0.02)	-1.6	0.98(0.02)	-2.1
Vaccination literacy	1.16(0.06)**	16.0	1.03(0.05)	3.0	1.04(0.05)	3.8
Perceived benefits of vaccines	1.10(0.07)	9.8	1.03(0.07)	3.2	1.04(0.07)	3.9
WASH doesn't replace vaccines	1.11(0.06)*	11.0	1.07(0.06)	7.5	1.09(0.06)	8.9
N	875		875		875	
R^2	0.14(142.57)		0.13(111.17)		0.13(118.26)	

Note: % = Percentage change in odds for unit increase in X; Robust standard errors in parentheses;
P-value is significant at, * $p \leq 0.05$; ** $p \leq 0.01$
Source: Feld Survey, Adongo (2018)

The risk takers significantly under-vaccinated against Polio (odds = 0.69; $p<0.05$) whereas the risk-averse did for Typhoid (odds = 0.60; $p<0.05$) and MMR (odds= 0.59; $p<0.05$) when compared to the risk neutrals (Table 28). Consistent with the health belief model (Rosenstock, 1974) and the conceptual framework of the study, the respondents' perceived vulnerability (β = 0.16; $p <0.05$) and severity (β = 0.15; $p <0.01$) of infectious diseases significantly increased their vaccination uptake rate.

Strangely, their perceived burden of infectious diseases yielded an inverse impact on uptake rate albeit insignificant (β = -0.03; $p.>0.05$). This means that increased perceived burden of the vaccine-preventable disease is likely to be associated with refusal of vaccines. Whereas the outcome could, in part, be ascribed to the generic nature (non-specificity) of the questions that estimated the respondents' perceived vaccine-preventable disease burden with international travel, further scrutiny of the data revealed that the impact of disease burden on the respondents' vaccination uptake was moderated by other factors such as the type of disease, past disease experience and pre-travel advice.

Finally, increasing vaccination literacy and perceived importance of vaccines on the overall corresponded significantly with vaccination rate and increased odds of uptake of the specific vaccines (Tables 25, 26, 27). This outcome supports the thesis of the vaccine literacy theory that the more people are able to access, process and understand reliable information on how vaccines work, the better empowered they are to appreciate the risks and benefits(importance) of vaccination and hence greater compliance (Fadda, Depping & Schulz, 2015). The current study also observed that literacy, even

its basic form, which is functional literacy leads to fewer tourists' negative sentiments towards travel vaccination implying reduced barriers, cues to action and reasoned action (Rosenstock, 1974), which further justifies why vaccination literacy promotes vaccine uptake.

Discussion

Public health practitioners attempt to address under-vaccination has not only done that using global strategies but also with context-specific ones. Global efforts have been evident in the formulation of plans, such as The Global Vaccine Action Plan, and research groups, such as the World Health Organization Strategic Advisory Group of Experts on Immunization to specifically address vaccine under-vaccination (Shapiro *et al.*, 2017).

This need has also been appreciated by scholars and so this study contributes to this literature through an estimation of the intersection between concerns and under-vaccination among international tourists. It also explicated the mechanisms through which concerns towards vaccination affect uptake through a series of control variables moderation analysis. The findings complement previous studies (Lammert *et al.*, 2016; Frew *et al.*, 2016) that investigated the determinants of vaccine uptake among international travellers.

Tourists adopted varied behaviours in various combinations towards the 10 specific vaccines studied based on their concerns and other reasons. Some tourists accepted all recommended vaccines, others partially vaccinated, others delayed vaccination and others refused some or all vaccines. These are summed up as optimal and sub-optimal vaccination behaviours (Bedford *at al.*, 2017). Optimal vaccination is the most desirable as it guarantees individual and community herd immunity, particularly for children and other

people who cannot be vaccinated due to age or medical reasons, and therefore the most desired (Bedford *at al.*, 2017). These responses toward vaccination resonate with Roselius (1971) risk reduction strategies. He noted that when people have concerns regarding a decision, they are likely to resort to four response strategies: (1) reduce the concerns by decreasing the probability that the decision will fail; (2) shift from one type of perceived loss to one for which they have more tolerance; (3) defer the action; or (4) take the action and absorb the perceived concern or loss.

Overall, there was a statistically significant inverse relationship between the tourists' travel vaccination concern and vaccine uptake. This finding confirms the proposition made that: *vaccination concerns have a significant inverse relationship with the rate of vaccine uptake.* This implies that heightening concerns towards travel vaccination is associated with an increased likelihood of under-vaccination. Wide-ranging outcomes are, however, identified in the associations between the specific concern dimensions with under-vaccination, both as a count and specific vaccines. That is, varied effects within and across models, are noticed when the causal relationships between concerns and vaccination uptake are disaggregated.

Safety and efficacy concerns were the principal determinants of the rate of under-vaccination. This outcome is consistent with the literature (Crockett & Keystone, 2005; Heywood *et al.*, 2016; Karafillakis & Larson, 2017). A synthesis of travel vaccine literature by Crockett and Keystone (2005), for example, identified the concern about vaccine safety as the most dissuading reason for vaccination among travellers. However, Lammert *et al's* (2016) study on refusals of recommended travel vaccines among

outbound travellers in the US established safety concern aplaying a less role. Their sample, on the overall, cited lack of concern for the diseases as the reason for their decline. Concerns about safety and efficacy of vaccines signal tourists' lack of confidence in vaccination, an increasingly observed reason why the general public decline vaccination (Larson *et al.*, 2011; Larson *et al.*, 2015). The evidence that safety concern was one of the reasons that accounted for under-vaccination of polio and influenza vaccines could be connected to the general historical public perception that the vaccines (the influenza vaccine in particular) have serious adverse effects. Evidence indicates that majority of health and non-health workers alike have often refused the influenza vaccines on safety grounds (Karafillakis & Larson, 2017; Rubin, Potts, & Michie, 2011).

People engage in motivated reasoning and simultaneous weighing of cost and benefits when deciding on vaccination (Karafillakis & Larson, 2017). They seek to optimise benefits and minimise cost because the value of losing is usually high than the satisfaction of an equivalent gain (Kahneman & Tversky, 1979). An evaluation that leads to perceived harms outweighing the benefits of vaccination may result in delay, drop-out or outright refusal as a loss aversion measure. This form of reasoning might have influenced the positive relationship between perceived efficacy and under-vaccination of Typhoid and MMR vaccines by tourists. Following the seminal research by Andrew Wakefield which suggested a link between the MMR vaccine and autism, albeit debunked, decrease in public confidence in the safety and efficacy of the MMR vaccine and its refusal has been acknowledged. A similar decline in acceptance of the polio vaccine following rumours of the

vaccine causing sterilization among men and women in some communities in Nigeria and India has been documented (Larson *et al.*, 2015).

Furthermore, the positive effect of time and access concerns on the under-vaccination border on affordability as a constraint of vaccine uptake. That is under-vaccination resulting from individuals' inability to afford vaccination, both in terms of financial and or non-financial costs (McDonald, 2015; Thomson *et al.*, 2015; Heywood *et al.*, 2016). It is therefore clear that money and time constraints are two critical factors that account for inequalities in vaccination uptake among international tourists. Multiple doses or series-vaccines such as MMR and DTP have implications for monetary and time expenditures, both for patients and physicians. To the patient, particularly those distant from travel clinics, extra time and money would be required to fulfil the repeated consultative and administrative fees that characterise these vaccines. Similarly, vaccinators will require series of schedules to attend to patients implying extra budgets to pay personnel fees (McHugh, Guarecuco, Langer & Jaklenec, 2015), though most likely this extra budget will be indirectly borne by the patients.

However, across all the multivariate regression models, no support is found for cost concern as a significant demotivator of under-vaccination. This suggests that regardless of the negative sentiments that tourists may have about the cost of vaccination, it might not be a disincentive to uptake. This evidence run counter to the study's proposition of a direct positive influence of cost concerns on sub-optimal vaccination but reinforces Lammert *et al.*, (2016) conclusion that cost concern is less likely to promote vaccine refusal. Whereas Lammert *et al.'s* (ibid) provided no reason to explain why cost of

vaccination did not affect uptake adversely, further examination of the current data show that the relationship between cost concern and under-vaccination is moderated by several factors including insurance cover for vaccines (with those having covers understandably having high uptake rates relative to those without), perceived usefulness of vaccines and perceived vaccine preventable disease burden. A case in point, perceived benefit of vaccines strengthened the direct negative effect of cost concern on under-vaccination by raising the coefficient from -0.10 to -0.01. This implies that perceived vaccine importance can compensate for the perceived cost of vaccination and hence promote uptake. A 32-year-old south African tourist commented that;

> *What matters is that vaccines are protective so cost is not issue. As much as none of us like to pad our travel budget, you shouldn't be a skinflint when it comes to your health. Yes, vaccines are a pain (in the shoulder* and *the wallet) but contracting an illness like yellow fever would surely cost more in both money and misery than a pricey shot in the arm.*

The moderation results are suggestive of a non-linear relationship between cost concerns and vaccine uptake, which requires incorporation of context-specific factors to reveal its actual effect.

The observation of low uptake of vaccination among tourists' who were ethically concerned about mandatory vaccination corroborates Attwell and Smith's (2017) argument that though mandates may be effective in guiding and constraining individual's vaccination decisions for communal welfare, they can generate bad publicity and refusals of vaccines when individuals perceive being coerced. What is surprising, however, is the fact

that ethical concerns toward mandatory vaccination affected uptake of other non-mandatory vaccines (*eg.* Flu, Typhoid), but his finding may be related to 'contagion effect. Tourists who are concerned about vaccine mandates may be predisposed to refuse other vaccines as a way of signaling their displeasure, denoting that discontentment with mandatory travel vaccines (such as Yellow fever) can drive unfavourable behaviours toward other vaccines. A study by Peretti-Watel *et al.*, (2013) found the ripple effect of opposition to the influenza A (HINI) on negative attitudes and behaviours towards vaccination in general in France.

Summary

This chapter sought to understand whether tourists' travel vaccination concerns contribute to their vaccination uptake after controlling for their socio-economic, tripographics and other psychographic factors. The study first modelled uptake by looking at the rates of under-vaccination in relation to tourists' travel vaccination concerns. Second, uptake on each of the nine (9) different vaccines recommended for travellers to Ghana was modelled in relation to concerns. Accordingly, it was found that tourists' vaccine uptake is driven by vaccinations concerns: including vaccine safety and efficacy concerns. However, the effect of concerns on vaccine uptake varies not only with the number of under-vaccination but with respect to the specific type of vaccine modelled.

CHAPTER NINE

A TOURIST TYPOLOGY BASED ON TRAVEL VACCINATION CONCERNS

Introduction

The objective of this chapter is to explore whether a tourist typology could be identified based on their vaccination concerns. It further describes the resulted tourists' type, each, in terms of perceptions of infectious diseases, vaccination literacy and responses toward vaccination. Finally, the socio-demographic characteristics and tripographics of each type of tourist are profiled. The types of tourist are subsequently named after understanding the characterization of each type based on the results (Font, Garay & Jones, 2016).

Cluster Analysis of Tourist Typology by Travel Vaccination Concerns

The current sample size was deemed sufficient for the cluster analysis because a minimum respondent of 70 times the number of segmentation variables is recommended (Dolnicar, Grün, Leisch, & Schmidt, 2013), which in the case of this study are six in number. A series of cluster algorithms, including neural gas, were computed; but the k-means output was chosen because it generated the most theoretical and practically relevant clusters. The suitability of the number of clusters extracted by the original data was confirmed using a bootstrapped sample of a million tourists, which assumes what would happen if new data was clustered (Hajibaba *et al.*, 2015).

A three-cluster solution was deemed suitable and stable after a careful assessment of various competing solutions. The proportional distributions of the types of tourists are displayed in Figure 8. The respondents are fairly distributed across the segments (Type 1: 41.66%, Type 2: 36.46% and Type 3:

21.88%). The Type 1 tourists were the majority in the sample while the Type 1s were the minority. The key characteristics of each type of tourist are presented in the subsequent sections.

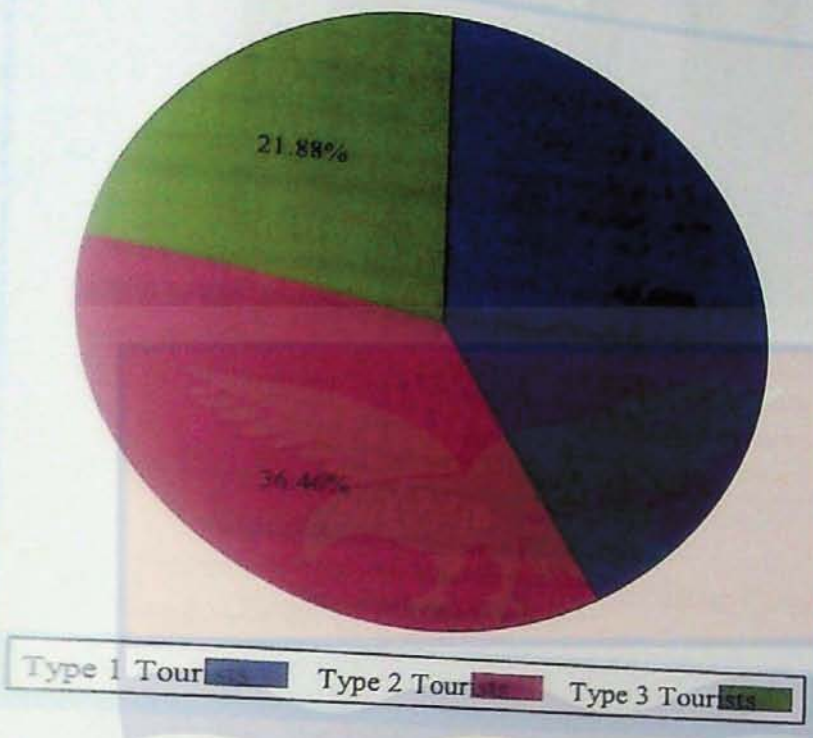


Figure 8: Types of Tourists by Travel Vaccination Concerns.
Source: Feld Survey, Adongo (2018)

Travel vaccination Concerns of Tourists' Types

Figure 8 illustrates the respondents' average ratings of the six vaccination concerns. The Type 1 Tourists segment generally is made of people with relatively moderate concerns but these concerns are oscillating in nature, which is their concern ranged from low to high depending on the dimension. On one hand, they are akin with the Type 3s on cost concerns (mean = 5.87 versus 6.12) but significantly different to the Type 2s (mean = 2.36). On other hand, their access concerns of travel vaccination are similar to the Type 2s (mean = 7.25 versus 7.28) but significantly different to the Type 3s (mean = 5.23).

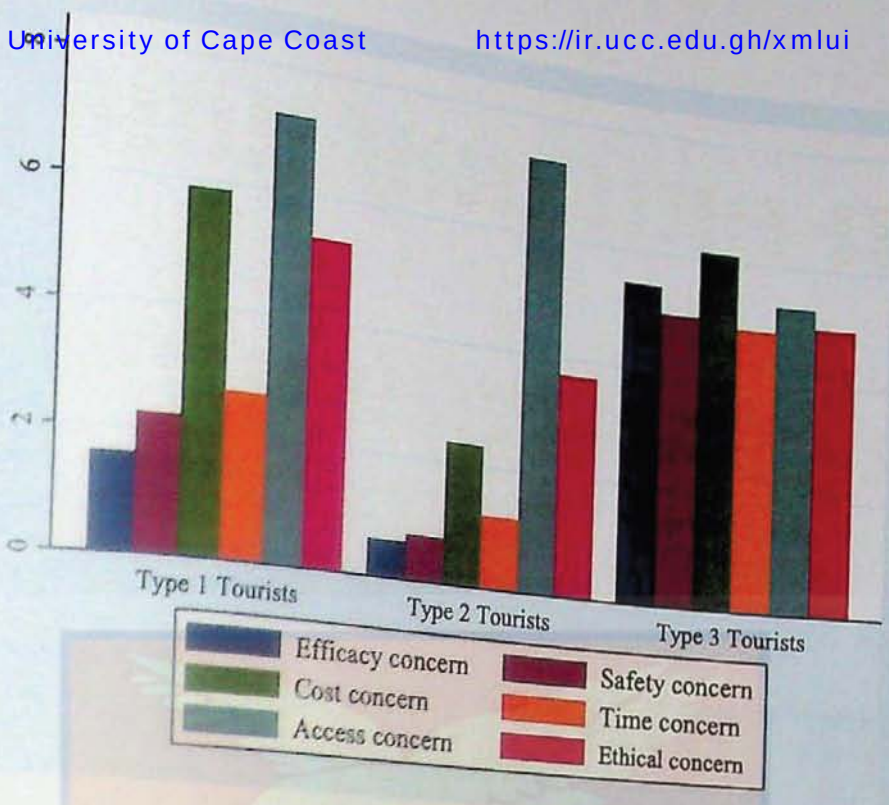


Figure 9: Types of Tourists by Dimensions of Vaccination Concerns
Source: Adongo (2018)

Even though, the Type 1s similar to the Type 2s were relatively less concerned about the efficacy (mean = 1.59 versus 0.61) and safety (mean = 2.44 versus 0.91) of vaccines, but the ratings of the former is markedly higher than those of the former (Table 28).

The Type 2s seem to be the opposite of the Type 3s given that they generally had low concerns toward travel vaccination (Mean = 1.09). Precisely, they were less likely to regard travel vaccines not effective (*mean* = 0.43) or perceive that multiple travel vaccinations for different diseases can prevent their bodies from naturally fighting against diseases (*mean* =0.86). Furthermore, they had fewer doubts about the safety of vaccines for travellers (*mean* = 0.43) and had less fear regarding vaccination injection (mean = 1.48).

Table 28: Comparisons of Tourists Types by Vaccination Concerns

Concern dimension	Typology	Mean score	Reference Typology	Comparison group	Mean Difference	P-value.
Efficacy concern	Type 1 Tourists	1.59	Type 1 Tourists	Type 2 Tourist	0.98*	0.00
				Type 3 Tourist	-3.85*	0.00
	Type 2 Tourists	0.61	Type 2 Tourists	Type 1 Tourist	-0.98*	0.00
				Type 3 Tourist	-4.83*	0.00
	Type 3 Tourists	5.44	Type 3 Tourists	Type 1 Tourist	3.85*	0.00
				Type 2 Tourist	4.83*	0.00
Safety concern	Type 1 Tourists	2.24	Type 1 Tourists	Type 2 Tourist	1.49*	0.00
				Type 3 Tourist	-2.75*	0.00
	Type 2 Tourists	0.75	Type 2 Tourists	Type 1 Tourist	-1.49*	0.00
				Type 3 Tourist	-4.24*	0.00
	Type 3 Tourists	5.00	Type 3 Tourists	Type 1 Tourist	2.75*	0.00
				Type 2 Tourist	4.24*	0.00
Economic concern	Type 1 Tourists	5.87	Type 1 Tourists	Type 2 Tourist	3.52*	0.00
				Type 3 Tourist	-0.24	0.41
	Type 2 Tourists	2.36	Type 2 Tourists	Type 1 Tourist	-3.52*	0.00
				Type 3 Tourist	-3.76*	0.00
	Type 3 Tourists	6.12	Type 3 Tourists	Type 1 Tourist	0.24	0.41
				Type 2 Tourist	3.76*	0.00
	Type 1 Tourists	2.70	Type 1 Tourists	Type 2 Tourist	1.49*	0.00
				Type 3 Tourist	-2.16*	0.00

Table 28 continued

Time concern	Type 2 Tourists	1.21	Type 2 Tourists	Type 1 Tourist	-1.49*	0.00
				Type 3 Tourist	-3.65*	0.00
	Type 3 Tourists	4.86	Type 3 Tourists	Type 1 Tourist	2.16*	0.00
				Type 2 Tourist	3.65*	0.00
Access concern	Type 1 Tourists	7.25	Type 1 Tourists	Type 2 Tourist	-0.04	1.00
				Type 3 Tourist	1.94*	0.00
	Type 2 Tourists	7.28	Type 2 Tourists	Type 1 Tourist	0.04	1.00
				Type 3 Tourist	1.97*	0.00
	Type 3 Tourists	5.31	Type 3 Tourists	Type 1 Tourist	-1.94*	0.00
				Type 2 Tourist	-1.97*	0.00
Ethical concern	Type 1 Tourists	5.33	Type 1 Tourists	Type 2 Tourist	1.60*	0.00
				Type 3 Tourist	0.35	0.75
	Type 2 Tourists	3.73	Type 2 Tourists	Type 1 Tourist	-1.601*	0.00
				Type 3 Tourist	-1.25*	0.00
	Type 3 Tourists	4.98	Type 3 Tourists	Type 1 Tourist	-0.35	0.75
				Type 2 Tourist	1.25*	0.00

Note: *asterisk mean cluster (s) accounting for difference; Note: P-value is significant at ≤ 0.01; Source: Feld Survey, Adongo (2018)

They however had high vaccines access concerns (mean = 7.28) though not unique to this segment. That is, they lamented about vaccines and related information sometimes now readily available (Table 29). The key feature of the Type 3 Tourists is that, on the overall, they had relatively high average vaccination concerns (mean = 5.23; on a 10-point ranking scale) when compared to the other tourists' types, especially Type 2 Tourists. The Type 3 Tourists are also significantly distinct on vaccine efficacy (*mean* = 5.44) and safety (*mean* = 5.00) concerns as well as time concern (mean = 4.86).

Table 29 further highlights that on safety and efficacy concerns. For instance, the Type 3s were worried about the side effects of travel vaccines (*mean* = 5.00) and that the side effects (if any) of vaccines, while they are abroad, can decrease the enjoyment of their vacation (*mean* = 6.21). They think that multiple uptakes of travel vaccines for different diseases can prevent their bodies from naturally fighting against diseases (*mean* = 6.00). In addition, they were concerned that most travel vaccines have to be taken at least 2 months (early enough) prior to the actual travel (*mean* = 6.28)

Table 29: Disaggregated Vaccination Concerns by Types of Tourists

Concern dimensions and specific concerns	Type 1 Tourists (N = 377)	Type 2 Tourists (N = 330)	Type 3 Tourists (N = 198)	F (*p-value*)
Efficacy concern				
I do not trust vaccines to effectively protect me from diseases while travelling abroad	0.71	0.43	4.12	197.96(0.00)
I doubt travel vaccines are effective in helping me stay healthy while abroad	0.89	0.37	4.96	260.48(0.00)
Multiple uptakes of travel vaccines for different diseases can prevent my body from naturally fighting against diseases	2.29	0.86	6.00	205.86(0.00)
I worry about the long-term effects of travel vaccines on my health	2.28	0.87	5.66	201.84(0.00)
Safety concern				
I am not sure of the safety of vaccines for travellers	1.50	0.49	5.12	253.00(0.00)
I worry about the side effects of travel vaccines	2.54	0.64	5.00	
Taking vaccines when travelling abroad makes me feel uncomfortable	1.19	0.64	4.72	166.95(0.00)
I fear the injection when taking travel vaccines because of the pains.	0.97	0.48	3.69	109.29(0.00)
I worry that the side effects of vaccines while abroad can decrease my enjoyment of the holiday experience	2.08	0.76	5.24	149.67(0.00)
I fear that I may not readily get medical assistance if experiencing side effects of vaccines while abroad	5.16	1.48	6.21	207.17(0.00)
Cost concern	8.19	4.17	6.89	152.(0.00)
Taking vaccines during travel abroad increases the cost of travel	6.83	1.91	6.37	263.40(0.00)
Consultations with health professionals concerning travel vaccinations cost a lot of money				

Table 29 continued

Travel vaccines are a means through which health care providers make money from travellers	2.60	0.99	5.09	112.71(0.00)
Travel vaccines are a means through which pharmaceuticals make money from travellers	2.68	0.84	5.22	113.71(0.00)
Time concern				
Travel vaccination can be time inconveniencing	2.33	0.91	5.01	118.12(0.00)
Consultation with health care providers concerning travel vaccination can be time wasting	2.67	0.83	5.21	132.92(0.00)
I am concerned that most travel vaccines have to be taken at least 2 months (early enough) prior to the actual travel.	4.89	2.28	6.28	99.82(0.00)
The number of doses required for some travel vaccines delays travel time	0.90	0.45	3.30	89.83(0.00)
Access concern				
It is often difficult to find all vaccines in one clinic	7.25	7.28	5.31	112.92(0.00)
No reliable information on where to find all needed travel vaccines	3.91	0.44	5.30	98.82(0.00)
Sometimes travel clinics ran out of some vaccines	7.27	7.21	5.32	87.83(0.00)
Ethical concern				
International travel is a means through vaccines are forced on people	5.33	3.73	4.98	19.96(0.00)
Travellers are not given the right/freedom to refuse certain vaccines	5.34	3.63	4.97	18.06(0.00)
Making certain vaccines mandatory is unfair to travellers	5.00	3.71	4.92	17.96(0.00)

P-value is significant at ≤ 0.01
Source: Feld Survey, Adongo (2018)

Disease Beliefs, Literacy and Responses toward Vaccination

This section of the thesis further characterised the typology in terms of disease beliefs, literacy and responses toward vaccination and the results are presented in Table 30 and Figure 10. Across the typology, the Type 3s rated the burden of infectious diseases associated with international tourism higher (mean = 4.21; particularly perceived severity [mean = 0.54]) than the Type 1s (mean = 3.85) and Type 2s (mean = 3.61). This implies that the Type 3s are exceptional in their perception of infectious diseases. The segments further varied significantly on their vaccination literacy. The Type 2 Tourists reported being more vaccination literate (mean = 7.19) than the other two types. Similar results are observed when disaggregates of vaccination literacy are considered; that is functional, communicative and critical. The Type 1s in turn are more vaccination literate than the Type 3s (Table 30).

Table 30: Disease Beliefs, Vaccination Attitudes and Behaviours by Types of Tourists

	Type 1 Tourists (N = 377)	Type 2 Tourists (N =330)	Type 3 Tourists (N = 198)	*F* (p-value)
Perceived vulnerability to IFD	3.00	3.07	3.39	2.763(0.06)
Perceived severity of IFD	4.71	4.16	5.04	8.495(0.00**)
Disease burden of IFD	3.85	3.61	4.21	8.46(0.00**)
Benefits of vaccination	6.74	6.93	5.66	64.20(0.00**)
Despite proper WASH, vaccination is still needed	6.47	6.80	5.20	60.15(0.00**)
Overall vaccine literacy	6.74	7.19	5.65	45.81(0.00**)
Functional literacy	7.20	7.45	5.85	26.13 (0.00**)
Communicative literacy	6.56	7.14	5.60	27.91(0.00**)
Critical literacy	6.54	7.00	5.37	31.32(0.00*)

P-value is significant at, * $p \leq 0.05$; ** $p \leq 0.01$

Source: Feld Survey, Adongo (2018)

The tourists' types also differed significantly by their perceived benefit of vaccination and response towards vaccination (*i.e* uptake, hesitancy) while travelling abroad. For example, relative to the other types of tourists, the Type 3 tourists were less inclined to think that vaccines are beneficial to travellers (mean = 5.66) likewise agree to the viewpoint that irrespective of an individual's ability to adopt good water, sanitation and hygiene (WASH) practices while abroad vaccines are still needed (*mean* = 5.20). And so, it was anticipated that the Type 2 Tourists would perceive vaccines to be more beneficial to travellers (mean = 6.93) than the Type 3s.

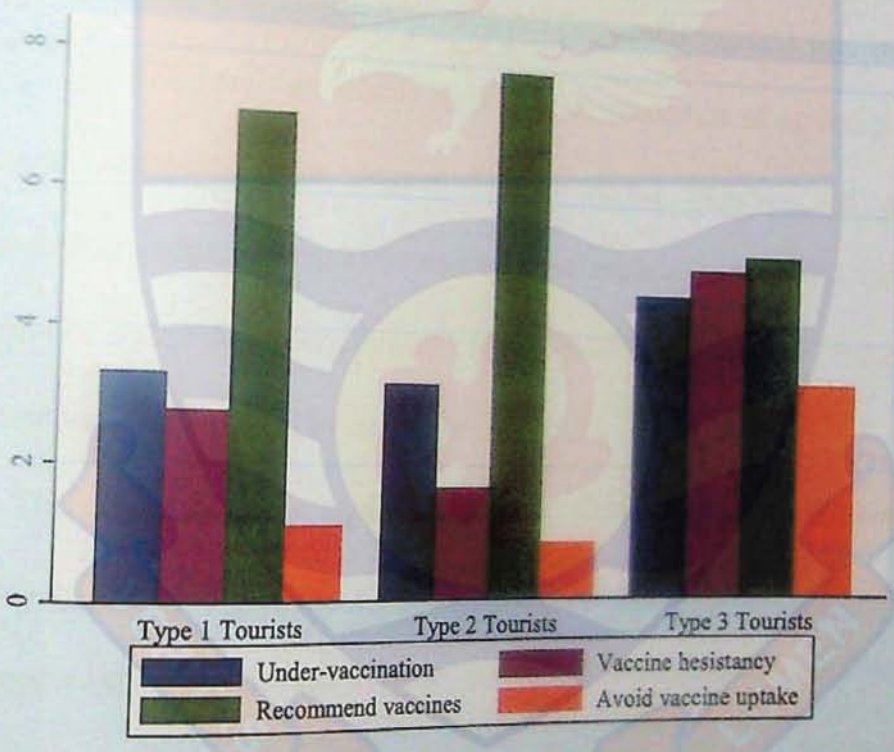


Figure 10: Responses toward Vaccination by Segments
Source: Feld Survey, Adongo (2018)

Figure 10 shows that the Type 2s were less hesitant towards vaccination (mean = 1.68) and so had low under-vaccination rates. On average, they under-vaccinated 3 eligible vaccines while the Type 3s under-vaccinated 5 vaccines. The Type 1s perceived benefit and response towards

travel vaccination was also relatively akin to the Type 2s but somewhat less in terms of magnitude.

Background Characteristics of the Types of Tourist

To profile the background characteristics of the three types of tourists, the cluster solution was cross-tabulated with respondents' socio-demographic characteristics and tripographics with statistically significant differences between the groups of tourists determined using the Pearson Chi-square. The results are shown in Table 32 and 33. It is observed that the *Type 1 Tourists* were dominated by females (69.76%). The members in this segment who were agnostics (12.47%) are significantly more than the proportion of agnostics in the other segments. Few originated from Africa (4.51%) and are predominantly people with past international travel experience (94.96%). Only a few do not undertake pre-travel health advice (9.02%). The majority did not have their vaccines covered by insurance (70.03%).

The *Type 2s* were significantly those aged 40 years and above (20.61%) but relatively less of people with high school education (23.33%). The proportion of atheists (23.94%) in this cluster is considerable, and was passive seekers of vaccination information (23.58%), but if they do, they were less likely to rely on travel agents (7.58%). Other characteristics of them are shown in Table 31.

Table 31: Demographic Characteristics of the Types of Tourist

	Type 1 Tourists (N = 377)	Type 2 Tourists (N = 330)	Type 3 (N = 198)	χ^2 (p-value)
Sex				
Male	30.24	38.18	40.40	7.67 (0.02*)
Female	69.76+	61.82	59.60	
Age				
<20	12.73	8.79	7.58	12.53(0.05*)
20-29	53.05	47.58	50.00	
30-39	19.89	23.03	26.77	
40+	14.32	(+)20.61	15.66	
Marital status				
Single	68.48	66.16	72.94	3.28(0.19)
Married	31.52	33.84	27.06	
Education				
High School	30.50	23.33(-)	34.85 (+)	10.98(0.02*)
First degree	38.73	41.52	40.40	
Postgraduate	30.77	35.15	24.75	
Religion				
Christianity	57.03	53.64	58.08	24.29(0.00**)
Atheism	18.04	23.94 (+)	15.15	
Agnostic	12.47(+)	10.61	9.09	
Islam	0.80	1.21	5.56 (+)	
Others	11.67	10.61	12.12	
Employment status				4.52(0.33)
Employed	73.47	77.58	72.73	
Unemployed	24.14	18.79	24.75	
Retired	2.39	3.64	2.53	
Region of origin				27.59(0.00**)
African region	4.51(-)	9.39	11.62	
European region	71.09	73.64	65.66	
South-East Asia region	0.80	0.00 (-)	2.02	
American region	18.04	15.76	17.17	
Western Pacific region	5.57	1.21	3.54	
	Mean	Mean	Mean	F(p)
Past number of international trips	31.66	32.75	32.97	0.235 (0.791)
Length of stay	27.50	24.15	33.71	4.384 (0.013**)
Travel group size	7.63	6.39	5.15	48.21(0.000**)

P-value is significant at, * $p \leq 0.05$, ** $p \leq 0.01$

Source: Feld Survey, Adongo (2018)

The Type 3 Tourists were people with high school education (34.85%), professed Islam as their religion (5.56%) and were mostly first-time travellers (14.14%). Their average length of stay in the destination was longer (mean = 33 days) than their counterparts. A significant number of them had their trip to Ghana arranged by an intermediary (19.19%). Similarly, an appreciable number of them had no travel insurance (19.67%) and or international health insurance (24.24%) for their current trip to Ghana (Table 32). Furthermore, the Type 3s *are* distinct by their source of information on vaccination: they sought information on vaccination from travel agents (14.14%) and friends and relatives (24.24) but less of health professionals (42.42%).

Table 32: Tripographics of the Types of Tourist

	Type 1 Tourists (N = 377)	Type 2 Tourists (N = 330)	Type 3 Tourists (N = 198)	χ^2 (p-value)
International tourist visitation status				14.08(0.00**)
First-time visit	5.04	8.79	14.14 (+)	
Repeat visit	94.96(+)	91.21	85.86	
Party size				1.35(0.50)
Alone	37.40	34.55	39.39	
Group	62.60	65.45	60.61	
Purpose of visit				7.34(0.11)
Leisure/recreation	84.88	82.42	80.30	
VFR	9.55	10.30	8.08	
Business	5.57	7.72	11.62	
Trip arrangement				6.90(0.03*)
Self	87.53	88.48	80.81	
Travel agency/packaged	12.47	11.52	19.19 (+)	
Risk taking behaviour				0.56(0.96)
Risk taker	34.22	32.73	34.34	
Risk averse	27.06	29.39	27.27	
Risk neutral	38.73	37.88	38.38	
Work history in the health sector				5.08(0.07)
Worked before	24.67	31.21	23.74	
Never worked	75.33	68.79	76.26	
Disease history abroad				1.27(0.53)
Ever contracted	23.34	26.06	27.27	
Never contracted	76.66	73.94	72.73	

Table 32 continued

Travel insurance				
Insured	89.01	87.12	80.33	8.03(0.01)
Not –insured	10.99	12.88	19.67 (+)	
International health insurance subscription				
Insured	88.06	88.79	75.76	20.17(0.00**)
Not –insured	11.94	11.21	24.24 (+)	
Type of health insurance				
Public	20.00	15.33	30.13	20.21(0.02*)
Public and private	24.85	22.65	23.72	
Private	55.76	67.72 (+)	47.44	
Insurance cover travel vaccines				
Covered	29.97	39.09	36.36	6.76(0.00**)
Not covered	70.03 (+)	60.91	63.64	
Pre-travel consultation				
Consulted	90.98	87.58	76.77	23.04(0.00**)
Not-consulted	9.02	12.42	23.23	
Self-rated health				
Very good	55.17	56.36	49.49	15.05(0.00**)
Good	41.11	42.11	42.42	
Fair	3.71	1.52	8.08 (+)	
Information search on vaccination				9.49(0.00**)
Search	85.12	76.42	84.02	
Did not	14.88	23.58 (+)	15.98	
Information seeking personality type				9.49(0.00**)
Passive seeker	14.88	23.58 (+)	15.98	
Active seeker	85.12	76.42	84.02	
Health advice				23.04(0.00**)
Yes	90.89	87.58	76.77	
No	9.02 (-)	12.42	23.23 (+)	
Vaccination information search				31.83(0.00**)
Health professional				
Yes	84.62	84.55	66.67	4.84(0.08)
No	15.38	15.45	33.33 (+)	
Internet				
Yes	66.84 (+)	63.03	57.58	6.74(0.03*)
No	33.16	36.97	42.42(-)	
Travel agents				
Yes	12.47	7.58 (-)	14.14	2.08(0.35)
No	87.53	92.42	85.86	
Friends and relatives				
Yes	26.79	22.12	24.24	
No	73.21	77.88	76.76	

P-value is significant at, * $p \leq 0.05$; ** $p \leq 0.01$

Source: Feld Survey, Adongo (2018)

This objective sought to propose a tourist typology based on their concerns toward travel vaccination. Accordingly, it was theorised that: *a typology of tourists exists based on their travel vaccination concerns.* The findings confirm that indeed a travel vaccination concerned tourists exist and are stratified into three distinct types: Type 1 Tourists named *Fluiders*, Type 2 named *Passives* and Type 3 Tourists *Crits*. The main defining and differentiating characteristic for these types of tourists is the nature and extent of concerns toward travel vaccination. The *Crits* consist of tourists who generally have high concerns toward travel vaccination. These concerns range from vaccine safety and efficacy concerns to ethical concerns.

The emergence of the *Crits* means that some tourists are generally sensitive and conscious about travel vaccination issues. In stark contrast to the *Crits* are the *Passives*, who generally had few concerns about travel vaccination. Sandwiched between the two extremes of segments, the *Crits* and *Passives*, are the *Fluiders* who exhibit parasitic but inconsistent and unstable characters of the Crits and *Passives*. This is a type of 'self' marks multiple identities in vaccination concerns, an identity which cannot be bounded but situational, evolving and reactive to one's environment. As a result, the *Fluiders* can be said to exist in a state of almost continual wavering.

Another key finding of this study is that vaccination literacy is an important underlying factor of the various types of tourists identified. The *Passives* are more vaccination literate followed by the *Fluiders* and then the *Crits*. This observation is in line with the health literacy hypothesis that increasing literacy is associated with awareness and positive reflexivity which

in turn lead to fewer or no concerns toward preventive health interventions (Beck, 1992; Kickbusch & Nutbeam, 1998). The better vaccination literates are arguably more able than the less literate to access vaccine information and functionally and critically make sense of the science and usefulness of vaccines. Alternatively, poor vaccine literacy and its associated reflexive mindset predispose one to misinformation and ignorance. This lead to distrust for the science of vaccines and vaccine institutions, and heightened risk which result in concerns towards vaccination.

The segments are further differentiated by their perception of disease burden (risk of infectious disease and severity) associated with international tourism. Perceived infectious disease burden is significantly high among the *Crits* than the *Fluiders* and *Passives*. This implies that *Crits* are non-complacent about the burden of vaccine-preventable diseases. However, the *Passives and Fluiders* are more probable to think that vaccines are important than *Crits*, which reinforces the argument that the more beneficial people think vaccines are, the lesser their negative sentiments about vaccination (Yaqub *et al.*, 2014).

Furthermore, the results suggest that vaccination/immunisation misconception is one of the factors that accounted for the different types of tourists with the most tenable reason being their varying vaccination literacies. Vaccination misconceptions are commonly held beliefs about vaccination that have no scientific basis (CDC, 2017). While the *Crits* demonstrated high chance of having misconception about vaccination, the *Passives* and *Fluiders* were less likely to do so. The *Crits* for instance strongly disagreed to the "view that despite the ability of one to adopt proper personal WASH practices

(water, sanitation and hygiene) while abroad, vaccination is still relevant". Also, they were worried that multiple uptakes of travel vaccines for different diseases can overload their immune systems and prevent their bodies from naturally fighting against diseases. These two issues are among the six common misconceptions noted among the general public (WHO, 2018). WHO notes for instance that while WASH measures are useful for disease control and prevention the downside to their alone adoption is that their impacts are variable and unreliable, particularly among travellers, because of varied constraints including poor compliance and lack of access to potable water in some destinations (WHO, 2012).

The notion of substitutability of WASH practices for vaccination among some of the respondents is indicative that such individuals consider preventive health measures as substitutes. This was perhaps driven by cost-benefit analysis while the *Passives* thought of them as complements-jointly demanded interventions for optimal health.

Last but not least, the study observed that vaccination hesitancy, under-vaccinations, intention to recommend travel vaccines to others vary among the types of tourist such that higher degrees of those are noted among the *Crits* and less of among the Passives. This outcome confirms that vaccination concerns breed unfavourable attitudes and behaviours towards uptake (Yaqub *et al.*, 2014) and further hints an association between tourists' vaccinee types and their responses toward vaccination. Additionally, the finding signals that different magnitudes of vaccination concerns have corresponding responses toward vaccination.

However, a contradiction to the widely held normative thought and evidence that perceived risk of disease burden is directly associated with vaccine uptake (Lammert *et al.*, 2016; Poulos *et al.*, 2018; Poulos *et al.*, 2018;) is established among the *Crits*, who despite their high perceived risk of infectious disease burden with international travel recorded more under-vaccinations. What is to be learnt from this finding is that disease burden is not always a motivation for vaccination compliance.

The segments identified correlated significantly with some specific socio-demographic (sex, age, education, religion, continent of origin) and tripographics characteristics (travel experience, trip arrangement, insurance uptake, pre-travel health advice and information search behaviour) suggesting that the types of tourists are not personality types or universal traits but shaped by personal and context factors.

Overall, the observation of the three tourists' types with dissimilar levels of vaccination concerns, perceptions of infectious diseases, vaccination literacy and responses toward vaccination confirms the theory of social representation. The theory posits the existence of sub-groups with different views, attitudes and behaviours in every population. Table 33 summaries the characteristics of the types of tourists identified.

Table 33: Summary Characteristics of the Extreme two Types of Tourists

Crits	Passives
Have high concerns toward travel vaccination	Have less concerns travel vaccination
High chance of misconceiving vaccination issues	Low chance of misconceiving vaccination issues
Have high unfavourable opinions about travel vaccination	High favourable opinions about travel vaccination
Uncertain about the importance of vaccination	Certain about the importance of vaccination
Less likely to think that vaccines are beneficial	More likely to think that vaccines are beneficial
Prefer other preventative health measures (i.e WASH measures) to vaccination	Regard other preventative health measures as complimentary to vaccination
Perceive high infectious disease burden with international tourism	Perceive low infectious disease burden with international tourism
Less literate on travel vaccination	More literate on travel vaccination
More likely to refuse vaccination	Less likely to refuse vaccination
More likely to be vaccine-hesitant	Less likely to be vaccine-hesitant
Less likely to recommend vaccines to fellow tourists	More likely to recommend vaccines to fellow tourists

Note: Intersections of the Crits and Passives constitute the Fluiders

Summary

The main aim of this objective is to propose a tourists' typology using their vaccination concerns. The most salient conclusion is that three spectrums of tourist types exist based on their concerns toward travel vaccination. They range from *Crits* at one extreme to *Passives* at the other end. This is revealing of two identities to travel vaccination concerns, 'simple identity', one which is easily predictable and 'fluid identity', one highly unpredictable.

CHAPTER TEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter summarises the entire study on international tourists' travel vaccination concerns and their vaccine uptake. It summarises the methods employed to undertake the study, the main findings, and the conclusions of the study. Recommendations are then offered towards improving the theoretical and clinical practice of travel vaccination uptake among international tourists. Finally, the contribution of this study to both theory and practice is also discussed in this chapter.

Summary

This study was motivated by the limited theoretical and empirical insights on international tourists' travel vaccination concerns and their uptake behaviour. Therefore, the study sought to propose a measurement scale for international tourists' travel vaccination concerns; explore the determinants of their vaccine uptake concerns; examine the relationship between uptake concerns and uptake behaviour and finally, explore whether a typology of tourists based on concerns for uptake could be identified. To achieve these objectives, several psycho-social and economic theories including the health belief model, reflexive modernization theory and cumulative prospects theory were employed.

A quantitative-dominant exploratory sequential mixed-methods design was used. The study commenced with the collection of qualitative data through online text mining and field interviews (32 respondents), which informed the design of the questionnaire for the survey and explanations of

some of the quantitative results. Two waves of quantitative data were collected from tourists' who visited Ghana between June-August 2017, October-March 2018 and May-July 2018 in that order. The data included an exploratory sample of 250 respondents and the main sample of 905 respondents. The qualitative data were processed and analysed using NVIVO while STATA and the AMOS 22 were used for the quantitative data. A series of statistical techniques were used including the Chi-square Test of Independence, K-means cluster analysis, Multivariate Analysis of Variance (MANOVA) and the Structural Equation Modelling (SEM).

A multi-dimensional international tourists' travel vaccination concern scale was identified. The dimensions were safety, efficacy, cost, time, access and ethical concerns. However, systematic differences existed in the underlying factors that accounted for the specific dimensions of vaccination concerns with the common ones being pre-travel consultation with health professionals, vaccination literacy and perceived benefits of vaccines.

Furthermore, international tourists' vaccination concerns significantly influenced their vaccine uptake behaviour. And at the disaggregated level, a considerable impact was exerted by safety, efficacy, availability concerns and cost concerns after adjusting for other confounding factors. The study further identified three distinct clusters of tourists based on their travel vaccination concerns. They include the *Crits, Fluiders and Passives*. The *Fluiders* are the majority in the sample and the Passives are the minority in the sample. The segments differed by socio-demographic characteristics (sex, age, education, religion, the region of origin; and travel characteristics) (length of stay, travel group size, information seeking behaviour, travel experience, trip

arrangement, and insurance status). The segments are also distinguished by their perception of risk and severity of vaccine-preventable diseases, vaccination attitude and uptake behaviour.

Conclusions and Implications

The study found six main facets of international tourists' concerns towards travel vaccination which are safety, efficacy, cost, time, access and ethical concerns. This confirms the hypothesis of this study that tourists' vaccination concerns are multi-dimensional in nature, and should be studied as such. Practically, the scale could represent a comprehensive, much handier and useful tool for tracking travellers' vaccination concerns aimed at bettering vaccination uptake. Proper gauging of travellers' vaccination concerns marks a core basis upon which appropriate behaviour change strategies can be formulated and executed to resolve those concerns about vaccines.

Tourists' vaccine uptake is neither driven by socio-demographic characteristics, tripographics, disease perceptions, self-efficacy nor cues to action alone, but is also driven by a multiplicity of concerns over safety and efficacy of vaccines, affordability and access to vaccines, and ethical reasons. This is suggestive that all of these factors must be taken into consideration by researchers when analysising the determinants of vaccine uptake or must be understood and accounted for in policy directions toward promoting vaccine uptake among tourists. However, the effects of the facets of vaccination concerns on vaccine uptake vary not only with the rate of uptake but also with specific vaccines. This outcome is also a demonstration of the complexity of the underlying reasons for vaccine uptake. Theoretically, this conclusion emphasises the call by Adongo *et al.*, (2017) on the need for decompositional

analysis and use of estimation techniques that handle shades of heterogeneity to properly isolate the implications of travel vaccination concerns on international tourist's vaccine uptake attitude and behaviour.

Heightening vaccination concerns among international tourists undermines vaccination coverage efforts and thus immunisation. In view of this to increase vaccination coverage the identified concerns in this study must be solved. It is again concluded that a network of tourists exists based on their vaccination beliefs, attitudes and behaviours. They range from *Crits* at one extreme to *Passives* at the other end. This is revealing of two identities to travel vaccination concerns, 'simple identity', one which is easily predictable and 'fluid identity', one highly unpredictable.

Finally, the pragmatist philosophy and the quantitative-dominant exploratory sequential mixed-methods design are useful for scale building, testing and offering of explanations to ensued results. Similarly, the integrated model of concerns and responses to vaccination and HBM are useful theories for understanding international tourist's vaccination attitudes and behaviours.

Recommendations, Contributions to Policy and Practice

Based on the main findings of this study and the conclusions drawn, the ensuing recommendations are offered for policy and clinical practice in order to increase vaccination uptake among international tourists.

Provision of evidence-based, accessible and clear information on vaccine risk and benefits could be useful in correcting vaccine safety and efficacy concerns that assume the form of misconceptions, falsehoods and myth. First, the WHO needs to institutionalise a dedicated system (potentially similar to the *Vaccine Sentimeter*) for continuous surveillance of tourists'

vaccination concerns. The proposed travel vaccination scale by this study could represent a comprehensive, much handier and useful framework for organising and comparing the concerns that would be drawn from the suggested platform. Second, instead of countering on safety and efficacy sentiments by myth-busting measures, these concerns need to be surrounded with appropriate information, 'information that appeal to heart and minds', in support of vaccination by leveraging existing information channels including its own official websites or those of government consulates, travel clinics and CDC. An understanding of how tourists' use social media platforms, such as Facebook, Twitter and travel-specific web platforms such as trip advisor, and capitalising on their ubiquity could be useful in listening to and tactically resolving concerns.

Given that the tourists are heterogeneous with respect to their perceived travel vaccination concerns, much attention should be devoted to the segment-based tailoring of messages. Here the proposed tourists' typology could be very useful. However, the volatile nature of vaccination concerns by the *Fluiders* denotes that targeting them would not only be resource demanding but extremely difficult to achieve. It is therefore recommended that interventions aimed at addressing concerns should be directed at the *Crits* and *Passives* as they are easily identifiable and targetable. By implication, solving concerns of the two extreme segments would invariably cater for the *Fluiders*.

In addition to focusing on those tourists with negative sentiments about travel vaccinations (*Crits*), those with positive sentiments' and behaviours should not be taken for granted. Measures should be adopted to capitalise on

school) curricula could help promote vaccination literacy and early habit formation on vaccine uptake.

This study also supports the call for pharmaceutical companies and biomedical engineers to introduce smart, needle-free injection devices as well as reduce dose regimens into single-administration vaccines without compromising efficacy. This would help to reduce the fear and anxiety associated with vaccines given by injections, shorten administration time, reduce vaccination cost and improve patient adherence as fewer shots and visits would be required to provide immunity (McHugh *et al.*, 2015; Taberner & Hogan & Hunter, 2012). This is also beneficial from a healthcare expenditure and financial sustainability perspective *cetris paribus*, as patients would have to pay for fewer travel clinical visits as it would be for low upfront financial investments (*i.e.* procurement, delivery and reimbursement) by governments and insurance companies (McHugh *et al.*, 2015).

As part of dealing with the cost concerns, more financial incentive measures could be adopted by the WHO and Gavi (Global Alliance for Vaccines and Immunisation) to make vaccines more affordable and accessible. Travel vaccines can be offered for free or at discounted rates. Though some sporadic studies have pointed out the potential crowding-out effects of incentives, evidence indicates that compliance and coverage increase when vaccines are offered at discounted rates (Blank *et al*, 2012). In addition, travellers should be strongly advised and encouraged to take up insurance schemes that cover most or all travel vaccines. This certainly reduces the cost concerns of travel vaccination when compared to doing out-of-pocket payment.

Tourists could also adopt advanced pre-holiday vaccination research and discount/subsidies-hunting methods. Prospective travellers should endeavour to consult trusted online sites and smart systems (such as that HealthMap Vaccine Finder by WHO) that would enable them to search and identify clinics that stock all needed vaccines, and those clinics that do not charge a fee for follow up visits for vaccines in a series as well as compare prices for best deals. A British travel blogger recommended that:

> *the most important thing is to shop around. Don't settle for the first quote you are given, look at lots of different companies and try to find the best prices. I started with my doctor's surgery and found them to be extremely expensive, and after looking around for a bit, I managed to find the same vaccinations for half the price! Prices obviously will vary from place to place, and this is only speaking for the UK.*

By implication, search would, for instance, help one to avoid paying for two or more clinic visits and administrative fees, not to mention the time and inconvenience of having to make several trips to the clinics. This would require publicity campaigns on the *Vaccine Finder* by the WHO through its Strategic Advisory Group of Experts on immunisation (SAGE), CDC and travel clinics in order to popularise it among tourists.

In addition, aside from budgets for flights, the UNWTO, travel agencies and destination management organisations should educate tourists in order for them to think of their health first and the obligation to see travel vaccination as one of the components of their travel budgets in order to safeguard their health.

The WHO, Gavi, pharmaceutical companies and travel clinics should work towards ensuring that travel vaccines are readily available and accessible. This can be done by improving on the forecasting accuracy of demand and supply and stock management of vaccines to minimise stockouts or at best eliminate them (Lydon, Schreiber, Gasca, Dumolard, Urfer & Senouci, 2017).

Finally, whereas vaccination mandates are useful for compliance, provision of opt-out opportunities to individuals based on genuine medical, religious or personal reasons could be beneficial in managing tourists concerns about mandatory vaccines and their associated adverse impacts. Beyond making this provision, tourists should be informed of its availability and how to seek for it in clear and unambiguous terms.

Contribution to Knowledge

Generally, this study has made several novel contributions to the vaccination literature and travel vaccination medicine and infectious diseases in particular. First and more broadly, this study represents one of the comprehensive exploratory studies on international tourists' travel vaccination concerns but more specifically its uniqueness lies in the proposed psychometric scale for measuring international tourists travel vaccination concerns. The proposed measure represents a significant contribution to a growing body of literature on vaccination concerns since prior to now no composite measure existed for theorising the phenomenon

In addition to characterising what travel vaccination concerns are, insights have been provided on the reasons underlying the general and specific concerns that international tourists' have toward travel vaccination. These

include socio-demographic, economic and travel-related characteristics, vaccination information seeking behaviour, perceived importance of vaccines and vaccination literacy. These insights on the theoretical antecedents of travel vaccination concerns add conceptual clarity to modelling its casual linkages.

Furthermore, this study has contributed to the growing literature on travel vaccination by offering understandings on the causal linkages of the various facets of vaccination concerns on vaccination uptake rate and uptake of series of specific vaccines while adjusting for other factors. Beyond its methodological novelty and rigour, which is a decompositional modelling of vaccine uptake adds to the theoretical clarity of the subject.

Finally, this study uniquely contributes to the travel medicine literature by being the first (to the best of the author's knowledge) to conceptualise and empirically propose a tourists' typology based on travel-vaccination concerns. It further contributed to the literature by ascertaining the factors that drive such segments of the typology as well as the responses of those segments toward vaccination.

Limitations of the Study and Suggestions for Future Research

As with all studies, the current study has some limitations worth acknowledging but these limitations in turn could be a source of motivation for future research. Though the study took into consideration concerns toward a wide range of specific travel vaccines, its attempt to propose a generic measurement for gauging international tourists travel vaccination concerns could be an over simplification of the reality. Further vaccine-specific dedicated studies are required to validate various aspects of the scale given that perceptions and attitudes vary a lot with different vaccines. Beyond

specific vaccines, future research could also explore the utility of the scale among different typologies of tourists such as Cohen's Allocentric and Pyschocentric tourists or other travel groups including pilgrims and migrants in other destination settings.

The proposed clusters of vaccine concerned tourists' typology at best exploratory. Therefore, there is the need to further test the conceptualisation of the typology for its reliability and validity or otherwise and to further characterise the distinctiveness of the segments. The study is also limited by its reliance on self-reported marker variables; that is vaccination concerns for the identification of the segments, which may be biased. Future research could employ more objective measurement criteria, such as experimental measurement, for capturing the data.

The current study was only able to identify two main predictors of tourists concerns about the unavailability of vaccines when they need them. These were their vaccination information seeking behaviour and vaccine literacy. Understandably, vaccine stock-outs are more of service provision lapses (supply challenges) and may have little bearing on demand-related factors, in this case, personal level factors. Dedicated future research is, therefore, required to unravel the supply related factors that account for the unavailability of vaccines when tourists' need them.

This study has offered insights into the relationship between tourists' concerns and their responses toward vaccination. However, it is worth noting that the composition of the variable on uptake included the respondents' past vaccination history, and therefore, it is possible that other factors either than their current vaccination concerns might have accounted for their past uptake

behaviour. Therefore, the findings should be taken with caution – at best understood as relationships and not causality. Nevertheless, the validity of the findings is relatively assured given that several possible confounding factors including socio-demographic characteristics, tripographics, and perception of infectious diseases, were taken into consideration in the analysis.

Inbound tourists to Ghana are required to take yellow fever vaccine unless in possession of a valid waiver certificate. Meanwhile, about 45 of the surveyed tourists still entered the country without any proof of the vaccination or a waiver. The current study could not account for the reasons why the 45 people were not able to take the vaccine but were able to access the destination. While the most likely reason for this issue could be poor enforcement of immigration laws in the country, evidence-based research on this issue would be worthwhile.

REFERENCES

Achterberg, P., de Koster, W., & van der Waal, J. (2017). A science confidence gap: Education, trust in scientific methods, and trust in scientific institutions in the United States, 2014. *Public Understanding of Science, 26*(6), 704-720.

Adam, I. (2015). Backpackers' risk perceptions and risk reduction strategies in Ghana. *Tourism Management, 49*, 99-108.

Adongo, C. A., Amuquandoh, F. E., & Amenumey, E. K. (2017). Modelling spa-goer's choices of therapeutic activities. *Journal of Hospitality and Tourism Management, 31*, 105-113.

Adongo, C. A., Badu-Baiden, F., & Boakye, K. A. A. (2017). The tourism experience-led length of stay hypothesis. *Journal of Outdoor Recreation and Tourism, 18*, 65-74.

Adongo, C. A., Taale, F., & Adam, I. (2018). Tourists' values and empathic attitude toward sustainable development in tourism. *Ecological Economics, 150*, 251-263.

Aharon, A. A., Nehama, H., Rishpon, S., & Baron-Epel, O. (2017). Parents with high levels of communicative and critical health literacy are less likely to vaccinate their children. *Patient Education and Counseling, 100*(4), 768-775.

Akyeampong, O. A., & Asiedu, A. B. (Eds.). (2008). *Tourism in Ghana: A modern synthesis*. Assemblies of God Publishing: Accra.

Amuquandoh, F.E. (2011). International tourists' concerns about traditional foods in Ghana. *Journal of Hospitality and Tourism Management, 18*(1), 1–9.

An, M., Lee, C., & Noh, Y. (2010). Risk factors at the travel destination: Their impact on air travel satisfaction and repurchase intention. *Service Business, 4*(2), 155-166.

Andersen, R.M. (1995). Revisiting the behavioral model and access to medical care: does it matter? *J. Health Soc. Behav. 36* (1), 1–10.

Apostolopoulos, Y., Sonmez, S., & Yu, C. H. (2002). HIV-risk behaviours of American spring break vacationers: a case of situational disinhibition? *International Journal of STD & AIDS, 13*(11), 733-743.

Armah, F. A., Odoi, J. O., Yengoh, G. T., Obiri, S., Yawson, D. O., & Afrifa, E. K. (2011). Food security and climate change in drought-sensitive savanna zones of Ghana. *Mitigation and Adaptation Strategies for Global Change, 16*(3), 291-306.

Attwell, K., & Smith, D. T. (2017). Parenting as politics: social identity theory and vaccine hesitant communities. *International Journal of Health Governance, 22*(3), 183-198.

Aubry, C., Gaudart, J., Gaillard, C., Delmont, J., Parola, P., Brouqui, P., & Gautret, P. (2012). Demographics, health and travel characteristics of international travellers at a pre-travel clinic in Marseille, France. *Travel Medicine and Infectious Disease, 10*(5), 247-256.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-1910.

Barasheed, O., Rashid, H., Heron, L., Ridda, I., Haworth, E., Nguyen-Van-Tam, J., ... & Hajj Research Team. (2014). Influenza vaccination among Australian Hajj pilgrims: uptake, attitudes, and barriers. *Journal of Travel Medicine, 21*(6), 384-390.

Bauer, R. (1960). *Consumer behavior as risk-taking. In R. S. Hancock (Ed.), Dynamic marketing for a changing world* (pp. 389–398). Chicago, IL: American Marketing Association.

Beck, U. (1992). From industrial society to the risk society: questions of survival, social structure and ecological enlightenment. *Theory, Culture & Society, 9*(1), 97-123.

Beck, U., (1992). *Risk Society*. Sage Publications, London.

Beck, W. A. (1962). *New Mexico: A History of Four Centuries* (pp. 1846-1912). Norman: University of Oklahoma Press.

Becker, B. F., Larson, H. J., Bonhoeffer, J., Van Mulligen, E. M., Kors, J. A., & Sturkenboom, M. C. (2016). Evaluation of a multinational, multilingual vaccine debate on Twitter. *Vaccine, 34*(50), 6166-6171.

Bedford, H., Attwell, K., Danchin, M., Marshall, H., Corben, P., & Leask, J. (2017). Vaccine hesitancy, refusal and access barriers: The need for clarity in terminology. *Vaccine, 36*, 6556-6558.

Behrens, R. (1997). *Important issues influencing the health of travellers.* In S. Clift, & P. Grabowski (Eds.), Tourism and health: Risks, research and responses (pp. 38–47). London: Pinter.

Bish, A., Yardley, L., Nicoll, A., & Michie, S. (2011). Factors associated with uptake of vaccination against pandemic influenza: a systematic review. *Vaccine, 29*(38), 6472-6484.

Blank, P., Schwenkglenks, M., & Szucs, T. D. (2012). The impact of European vaccination policies on seasonal influenza vaccination coverage rates in the elderly. *Human Vaccines & Immunotherapeutics, 8*(3), 328-335.

Bleek, W. (1987). Lying informants: a fieldwork experience from Ghana. *Population and Development Review, 13*(2), 314-322.

Boakye, K. A. (2010). Studying tourists' suitability as crime targets. *Annals of Tourism Research, 37*(3), 727-743.

Boakye, K. A. (2012). Tourists' views on safety and vulnerability. A study of some selected towns in Ghana. *Tourism Management, 33*(2), 327-333.

Boakye, K. A. A., Annim, S. K., & Dasmani, I. (2013). An econometric analysis of internal travel patterns in Ghana and the implications for domestic tourism. *Tourism Economics, 19*(5), 1155-1171.

Boggild, A. K., Castelli, F., Gautret, P., Torresi, J., von Sonnenburg, F., Barnett, E. D., ... & Wilson, M. E. (2010). Vaccine preventable diseases in returned international travelers: results from the GeoSentinel Surveillance Network. *Vaccine, 28*(46), 7389-7395.

Brashers, D. E. (2001). Communication and uncertainty management. *Journal of Communication, 51*(3), 477-497.

Brewer, N. T., Hall, M. E., Malo, T. L., Gilkey, M. B., Quinn, B., & Lathren, C. (2017). Announcements versus conversations to improve HPV vaccination coverage: a randomized trial. *Pediatrics, 139*(1), 26-34.

Brown, K. F., Long, S. J., Ramsay, M., Hudson, M. J., Green, J., Vincent, C. A., ... & Sevdalis, N. (2012). UK parents' decision-making about measles–mumps–rubella (MMR) vaccine 10 years after the MMR-

autism controversy: A qualitative analysis. *Vaccine, 30*(10), 1855-1864.

Butler, R. W. (1980). The concept of a tourist area cycle of evolution: implications for management of resources. *Canadian Geographer/Le Géographe Canadien, 24*(1), 5-12.

Byrne, B. M. (2012) *A primer of LISREL: Basic applications and programming for confirmatory factor analytic models*. Springer Science & Business Media.

Byrne, B. M., Lam, W. W., & Fielding, R. (2008). Measuring patterns of change in personality assessments: An annotated application of latent growth curve modeling. *Journal of Personality Assessment, 90*(6), 536-546.

Byrne, B.M. (2010). *Structural equation modelling with AMOS: Basic concepts, applications and programming* (2nd ed). New York: Routledge.

Cappelen, A., Mæstad, O., & Tungodden, B. (2010). Demand for childhood vaccination–insights from behavioral economics. In *Forum for Development Studies, 37*(3), 349-364.

Carrier, M., & Nordmann, A. (Eds.) (2011). *Science in the context of application: Methodological change, conceptual transformation, cultural reorientation*. Dordrecht: Springer.

Carver, C. S., & Scheier, M. F. (2002). The hopeful optimist. *Psychological Inquiry, 13*(4), 288-290.

Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review, 2*(3), 12-18.

Centers for Disease Control. (2017). Prevention (CDC). *Symptoms, Testing, & Treatment. Retrieved April, 2017.*

Champion, V. L., & Skinner, C. S. (2008). The health belief model. *Health behavior and health education: Theory, research, and practice, 4*, 45-65.

Chen, G., Bao, J., & Huang, S. (2014). Developing a scale to measure backpackers' personal development. *Journal of Travel Research, 53*(4), 522-536.

Chien, P. M., Sharifpour, M., Ritchie, B. W., & Watson, B. (2017). Travelers' health risk perceptions and protective behavior: a psychological approach. *Journal of Travel Research*, *56*(6), 744-759.

Churchill Jr, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 64-73.

Claar, C. L. (2011). The adoption of computer security: an analysis of home personal computer user behavior using the health belief model. *Journal of Computing and Informatics*, *3*, 14-23.

Cohen, E. (1972). Towards a sociology of international tourism. *Sociological Research, 39*,164–182.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. 2nd.

Cohen, J. (1992). A power primer. *Psychological bulletin*, *112*(1), 155-165.

Cornell, N. (2015). A third theory of paternalism. *Mich. Law. Rev.*, *113*, 1295–1336.

Cossen, J., & Gin. S. (1994). Tourism and AIDS: The perceived risk of HIV infection and destination choice. Journal of Travel and Tourism Marketing, *3*(4), 1–20.

Crawford, D. W., Jackson, E. L., & Godbey, G. (1991). A hierarchical model of leisure constraints. *Leisure sciences*, *13*(4), 309-320.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed). Bosten, USA. Pearson Education Inc.

Crockett, M., & Keystone, J. (2005). "I hate needles" and other factors impacting on travel vaccine uptake. *Journal of Travel Medicine*, *12*, s41-s46.

Cvelbar, L. K., Grün, B., & Dolnicar, S. (2017). Which hotel guest segments reuse towels? Selling sustainable tourism services through target marketing. *Journal of Sustainable Tourism*, *25*(7), 921-934.

Dassah, E., Aldersey, H. M., McColl, M. A., & Davison, C. (2018). 'When I don't have money to buy the drugs, I just manage.'—Exploring the lived experience of persons with physical disabilities in accessing

primary health care services in rural Ghana. *Social Science & Medicine, 214*, 83-90.

Dayour, F., Adongo, C. A., & Taale, F. (2016). Determinants of backpackers' expenditure. *Tourism Management Perspectives, 17*, 36-43.

Deichmann, J. I., & Frempong, F. (2016). International tourism in Ghana: A survey analysis of traveller motivations and perceptions. *Journal of Hospitality and Tourism Management, 29*, 176-183.

Dittmann, S. (2001). Vaccine safety: risk communication—a global perspective. *Vaccine, 19*(17), 2446-2456.

Dolničar, S. (2004). Beyond "commonsense segmentation": A systematics of segmentation approaches in tourism. *Journal of Travel Research, 42*(3), 244-250.

Dolnicar, S. (2008). Market segmentation in tourism. *Tourism Management, Analysis, Behaviour and Strategy*, 129-150.

Dolnicar, S., & Leisch, F. (2013). Using graphical statistics to better understand market segmentation solutions. *International Journal of Market Research, 56*(2), 207-230.

Donabedian, A. (1973). *Aspects of medical care administration: specifying requirements for health care*. Harvard University Press.

Doty, D. H., & Glick, W. H. (1994). Typologies as a unique form of theory building: Toward improved understanding and modeling. *Academy of Management Review, 19*(2), 230-251.

Downward, P., Lera-Lopez, F., & Rasciute, S. (2011). The zero-inflated ordered probit approach to modelling sports participation. *Economic Modelling, 28*(6), 2469-2477.

Dubé, E., Gagnon, D., & MacDonald, N. E. (2015). Strategies intended to address vaccine hesitancy: Review of published reviews. *Vaccine, 33*(34), 4191-4203.

Dubé, E., Vivion, M., & MacDonald, N. E. (2015). Vaccine hesitancy, vaccine refusal and the anti-vaccine movement: influence, impact and implications. *Expert Review of Vaccines, 14*(1), 99-117.

Dubov, A., & Phung, C. (2015). Nudges or mandates? The ethics of mandatory flu vaccination. *Vaccine, 33*(22), 2530-2535.

Duffy, J., Weintraub, E., Vellozzi, C., & DeStefano, F. (2014). Narcolepsy and influenza A (H1N1) pandemic 2009 vaccination in the United States. *Neurology*, 10-12-22.

Dugas, M. J., Gosselin, P., & Ladouceur, R. (2001). Intolerance of uncertainty and worry: Investigating specificity in a nonclinical sample. *Cognitive Therapy and Research, 25*(5), 551-558.

Durrheim, K., & Foster, D. (1997). Tolerance of ambiguity as a content specific construct. *Personality and Individual Differences, 22*(5), 741-750.

Ehrenstein, B. P., Hanses, F., Blaas, S., Mandraka, F., Audebert, F., & Salzberger, B. (2010). Perceived risks of adverse effects and influenza vaccination: a survey of hospital employees. *European Journal of Public Health*, 20(5), 495-499.

Elg, M., Engström, J., Witell, L., & Poksinska, B. (2012). Co-creation and learning in health-care service development. *Journal of Service Management*, *23*(3), 328-343.

Enkel, S. L., Attwell, K., Snelling, T. L., & Christian, H. E. (2017). 'Hesitant compliers': Qualitative analysis of concerned fully-vaccinating parents. *Vaccine. 36, 6459-6463.*

Fadda, M., Depping, M. K., & Schulz, P. J. (2015). Addressing issues of vaccination literacy and psychological empowerment in the measles-mumps-rubella (MMR) vaccination decision-making: a qualitative study. *BMC Public Health, 15*(1), 836.

Fennell, D. A. (2017). Towards a model of travel fear. *Annals of Tourism Research, 66*, 140-150.

Fisher, R. A. (1925). Theory of statistical estimation. In *Mathematical Proceedings of the Cambridge Philosophical Society*. Cambridge University Press.

Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal, 54*(2), 393-420.

Font, X., Garay, L., & Jones, S. (2016). A social cognitive theory of sustainability empathy. *Annals of Tourism Research, 58*, 65-80.

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research, 18* (13), 382-388.

Fournet, N., Mollema, L., Ruijs, W. L., Harmsen, I. A., Keck, F., Durand, J. Y., ... & Smit, E. G. (2018). Under-vaccinated groups in Europe and their beliefs, attitudes and reasons for non-vaccination; two systematic reviews. *BMC Public Health, 18*(1), 196-201.

Freedman, D. A., Bess, K. D., Tucker, H. A., Boyd, D. L., Tuchman, A. M., & Wallston, K. A. (2010). Public health literacy defined. *American journal of preventive medicine, 36*(5), 446-451.

Frew, G., McGeorge, E., Grant, S., & de Wildt, G. (2016). Hepatitis B: A cross-sectional survey of knowledge, attitudes and practices amongst backpackers in Thailand. *Travel Medicine and Infectious Disease, 15*, 57-62.

Furuya, Y., Kondo, N., Yamagata, Z., & Hashimoto, H. (2015). Health literacy, socioeconomic status and self-rated health in Japan. *Health Promotion International, 4*, 5-10.

Furuya, Y., Kondo, N., Yamagata, Z., & Hashimoto, H. (2015). Health literacy, socioeconomic status and self-rated health in Japan. *Health Promotion International, 30*(3), 505-513.

Gautret, P., Tantawichien, T., Hai, V. V., & Piyaphanee, W. (2011). Determinants of pre-exposure rabies vaccination among foreign backpackers in Bangkok, Thailand. *Vaccine, 29*(23), 3931-3934.

Gazmararian, J. A., & Parker, R. M. (2005). Overview of health literacy in health care. *Understanding health literacy: Implications for Medicine and Public Health*, 2,2-24.

Geifman, N., Cohen, R., & Rubin, E. (2013). Redefining meaningful age groups in the context of disease. *Aging, 35*(6), 2357-2366.

Ghana Demographic and Health Survey 2014. Rockville, Maryland, USA: GSS, GHS, and ICF International.

Ghana Statistical Service (2014). *Ghana Living Standards Survey Round 6 (GLSS 6). Poverty profile in Ghana (2005-2013)*. Ghana Statistical Service.

Ghana Tourism Authority (2016). Tourism Facts Sheet on Ghana. Accra: Ghana Tourism Authority.

Giddens, A. (1994). Risk, trust, reflexivity. *Reflexive modernization*, 184-197.

Gilkey, M. B., Magnus, B. E., Reiter, P. L., McRee, A. L., Dempsey, A. F., & Brewer, N. T. (2014). The Vaccination Confidence Scale: a brief measure of parents' vaccination beliefs. *Vaccine*, *32*(47), 6259-6265.

Glaser, B. G., & Strauss, A. L. (1967). The discovery of grounded theory: strategies for qualitative theory. *New Brunswick: Aldine Transaction*.

Goldstein, S., MacDonald, N. E., & Guirguis, S. (2015). Health communication and vaccine hesitancy. *Vaccine*, *33*(34), 4212-4214.

Goodman, A. L., Masuet-Aumatell, C., Halbert, J., & Zuckerman, J. N. (2014). Awareness of meningococcal disease among travelers from the United Kingdom to the meningitis belt in Africa. *The American Journal of Tropical Medicine and Hygiene*, *91*(2), 281-286.

Grabenstein, J. D. (2013). What the world's religions teach, applied to vaccines and immune globulins. *Vaccine*, *31*(16), 2011-2023.

Gray, H. P. (1970) *International travel – international trade.* Lexington: Heath Lexington Books.

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, *18*(1), 59-82.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis*: A global perspective.

Hajibaba, H., Gretzel, U., Leisch, F., & Dolnicar, S. (2015). Crisis-resistant tourists. *Annals of Tourism Research*, *53*, 46-60.

Han, J., Pei, J., & Kamber, M. (2011). *Data mining: concepts and techniques*. Elsevier.

Hankivsky, O. (2012). Women's health, men's health, and gender and health: Implications of intersectionality. *Social Science & Medicine*, *74*(11), 1712-1720.

Hausman, D. M., & Welch, B. (2010). Debate: To nudge or not to nudge. *Journal of Political Philosophy, 18*(1), 123-136.

Heywood, A. E., Watkins, R. E., Iamsirithaworn, S., Nilvarangkul, K., & MacIntyre, C. R. (2012). A cross-sectional study of pre-travel health-seeking practices among travelers departing Sydney and Bangkok airports. *BMC Public Health, 12*(1), 321-334.

Hiamey, S.E. (2017). International tourists' experiences with Ghanaian cuisines: Implications for food tourism development. Unpublished thesis: University of Cape Coast.

Hillen, M. A., Gutheil, C. M., Strout, T. D., Smets, E. M., & Han, P. K. (2017). Tolerance of uncertainty: Conceptual analysis, integrative model, and implications for healthcare. *Social Science & Medicine, 180*, 62-75.

Hirvonen, N., Ek, S., Niemelä, R., Pyky, R., Ahola, R., Korpelainen, R., & Huotari, M. L. (2016). Everyday health information literacy in relation to health behavior and physical fitness: A population-based study among young men. *Library & Information Science Research, 38*, 308-318.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: A Multidisciplinary Journal, 6*(1), 1-55.

Johnson, J. D., & Meischke, H. (1993). A comprehensive model of cancer-related information seeking applied to magazines. *Human Communication Research, 19*(3), 343-367.

Johri, M., Subramanian, S. V., Sylvestre, M. P., Dudeja, S., Chandra, D., Koné, G. K., ... & Pahwa, S. (2015). Association between maternal health literacy and child vaccination in India: a cross-sectional study. *Journal of Epidemiology and Community Health, 1*. 1-8.

Jonas, A., Mansfeld, Y., Paz, S., & Potasman, I. (2011). Determinants of health risk perception among low-risk-taking tourists traveling to developing countries. *Journal of Travel Research, 50*(1), 87-99.

Juvan, E., & Dolnicar, S. (2014). Can tourists easily choose a low carbon footprint vacation? *Journal of Sustainable Tourism, 22*(2), 175-194.

Kahneman, D., & Tversky, A. (1973). On the psychology of prediction. *Psychological Review, 80*(4), 237.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika, 39*(1), 31-36.

Kang, G. J., Ewing-Nelson, S. R., Mackey, L., Schlitt, J. T., Marathe, A., Abbas, K. M., & Swarup, S. (2017). Semantic network analysis of vaccine sentiment in online social media. *Vaccine, 35*(29), 3621-3638

Karafillakis, E., & Larson, H. J. (2017). The benefit of the doubt or doubts over benefits? A systematic literature review of perceived risks of vaccines in European populations. *Vaccine, 35*(37), 4840-4850.

Karlsson, L., & Dolnicar, S. (2016). Does eco certification sell tourism services? Evidence from a quasi-experimental observation study in Iceland. *Journal of Sustainable Tourism, 24*(5), 694-714.

Kasperbauer, T. J. (2017). The permissibility of nudging for sustainable energy consumption. *Energy Policy, 111*, 52-57.

Kata, A. (2010). A postmodern Pandora's box: anti-vaccination misinformation on the Internet. *Vaccine, 28*(7), 1709-1716.

Kata, A. (2012). Anti-vaccine activists, Web 2.0, and the postmodern paradigm–An overview of tactics and tropes used online by the anti-vaccination movement. *Vaccine, 30*(25), 3778-3789.

Kennedy, P. E. (2002). Sinning in the basement: What are the rules? The ten commandments of applied econometrics. *Journal of Economic Surveys, 16*(4), 569-589.

Kerstetter, D., & Cho, M. (2004). Tourists' information search behavior: The role of prior knowledge and perceived credibility. *Annals of Tourism Research, 31*(4), 961-985.

Kickbusch, I., & Nutbeam, D. (1998). Health promotion glossary *Geneva: World Health Organization, 14-23.*

Kim, J. H., Ritchie, J. B., & McCormick, B. (2012). Development of a scale to measure memorable tourism experiences. *Journal of Travel Research*, *51*(1), 12-25.

Kim, Y. (2014). Convolutional neural networks for sentence classification. *arXiv preprint arXiv:1408.5882*.

Kirkland, A. (2016). *Vaccine court: the law and politics of injury*. Carbondale, IL: NYU Press.

Kozak, M., Crotts, J. C., & Law, R. (2007). The impact of the perception of risk on international travellers. *International Journal of Tourism Research*, *9*(4), 233-242.

Kumi-Kyereme, A., & Amo-Adjei, J. (2016). Household wealth, residential status and the incidence of diarrhoea among children under-five years in Ghana. *Journal of Epidemiology and Global Health*, *6*(3), 131-140.

Lammert, S. M., Rao, S. R., Jentes, E. S., Fairley, J. K., Erskine, S., Walker, A. T., ... & LaRocque, R. C. (2016). Refusal of recommended travel-related vaccines among US international travellers in Global TravEpiNet. *Journal of Travel Medicine*, *24*(1), 1-7.

Larsen, S., Brun, W., & Øgaard, T. (2009). What tourists worry about–Construction of a scale measuring tourist worries. *Tourism Management*, *30*(2), 260-265.

Larson, H. J., & Ghinai, I. (2011). Lessons from polio eradication. *Nature*, *473*, 446-447.

Larson, H. J., Cooper, L. Z., Eskola, J., Katz, S. L., & Ratzan, S. (2011). Addressing the vaccine confidence gap. *The Lancet*, *378*(9790), 526-535.

Larson, H. J., de Figueiredo, A., Xiahong, Z., Schulz, W. S., Verger, P., Johnston, I. G., ... & Jones, N. S. (2016). The state of vaccine confidence 2016: global insights through a 67-country survey. *EBioMedicine*, *12*, 295-301.

Larson, H. J., Jarrett, C., Eckersberger, E., Smith, D. M. D., & Paterson, P. (2014). Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007–2012. *Vaccine*, *32*, 2150–2159.

Larson, H. J., Jarrett, C., Schulz, W. S., Chaudhuri, M., Zhou, Y., Dube, E., ... & Wilson, R. (2015). Measuring vaccine hesitancy: the development of a survey tool. *Vaccine*, *33*(34), 4165-4175.

Larson, H. J., Smith, D. M., Paterson, P., Cumming, M., Eckersberger, E., Freifeld, C. C., ... & Madoff, L. C. (2013). Measuring vaccine confidence: analysis of data obtained by a media surveillance system used to analyse public concerns about vaccines. *The Lancet Infectious Diseases*, *13*(7), 606-613.

Larson, H. J., Wilson, R., Hanley, S., Parys, A., & Paterson, P. (2014). Tracking the global spread of vaccine sentiments: the global response to Japan's suspension of its HPV vaccine recommendation. *Human Vaccines & Immunotherapeutics*, *10*(9), 2543-2550.

Larson, H., Paterson, P. B., & Erondu, N. (2012). The globalization of risk and risk perception. *Drug Safety*, *35*(11), 1053-1059.

Lo, A. S., Law, R., & Cheung, C. (2011). Segmenting leisure travelers by risk reduction strategies. *Journal of Travel & Tourism Marketing*, *28*(8), 828-839.

Loharikar, A., Suragh, T. A., MacDonald, N. E., Balakrishnan, M. R., Benes, O., Lamprianou, S., ... & McNeil, M. M. (2018). Anxiety-related adverse events following immunization (AEFI): A systematic review of published clusters of illness. *Vaccine*, *36*(2), 299-305.

Long, S. J., Long, J. S., & Freese, J. (2006). *Regression models for categorical dependent variables using Stata*. Stata press.

Lopez-Velez, R., & Bayas, J. M. (2007). Spanish travelers to high-risk areas in the tropics: airport survey of travel health knowledge, attitudes, and practices in vaccination and malaria prevention. *Journal of Travel Medicine*, *14*(5), 297-305.

Lu, P. J., Byrd, K. K., & Murphy, T. V. (2013). Hepatitis A vaccination coverage among adults 18–49 years traveling to a country of high or intermediate endemicity, United States. *Vaccine*, *31*(19), 2348-2357.

Luo, X., Li, H., Zhang, J., & Shim, J. P. (2010). Examining multi-dimensional trust and multi-faceted risk in initial acceptance of emerging

technologies: An empirical study of mobile banking services. *Decision Support Systems, 49*(2), 222-234.

Lydon, P., Schreiber, B., Gasca, A., Dumolard, L., Urfer, D., & Senouci, K. (2017). Vaccine stockouts around the world: Are essential vaccines always available when needed? *Vaccine, 35*(17), 2121-2126.

MacDonald, N. E. (2015). Vaccine hesitancy: Definition, scope and determinants. *Vaccine, 33*(34), 4161-4164.

Makarovs, K., & Achterberg, P. (2017). Contextualizing educational differences in vaccination uptake: A thirty nation survey. *Social Science & Medicine, 188*, 1-10.

Mason, M. (2010, August). Sample size and saturation in PhD studies using qualitative interviews. In *Forum qualitative Sozialforschung Forum: qualitative social research 11*(3).

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of management review, 20*(3), 709-734.

McHugh, K. J., Guarecuco, R., Langer, R., & Jaklenec, A. (2015). Single-injection vaccines: Progress, challenges, and opportunities. *Journal of Controlled Release, 219*, 596-609.

Mendel-Van Alstyne, J. A., Nowak, G. J., & Aikin, A. L. (2017). What is 'confidence' and what could affect it?: A qualitative study of mothers who are hesitant about vaccines. *Vaccine, 36*(44), 6464-6472.

Mensah, I. (2015). The roots tourism experience of diaspora Africans: A focus on the Cape Coast and Elmina Castles. *Journal of Heritage Tourism, 10*(3), 213-232

Ministry of Tourism (2015). *National Tourism Development Plan.* Accra: Ministry of tourism.

Mishel, M. H. (1988). Uncertainty in illness. *Image: The Journal of Nursing Scholarship, 20*(4), 225-232.

Montez, J. K., Zhang, W., Zajacova, A., & Hamilton, T. G. (2018). Does college major matter for women's and men's health in midlife?

Examining the horizontal dimensions of educational attainment. *Social Science & Medicine, 198*, 130-138.

Moreaux, S. O., Adongo, C. A., Mensah, I., & Amuquandoh, F. E. (2018). There is information in the tails: Outliers in the food safety attitude-behaviour gap. *Food Control, 87*, 161-168.

Mullainathan, S., & Shafir, E. (2013). *Scarcity: Why having too little means so much*. Macmillan.

Munro, S., Lewin, S., Swart, T., & Volmink, J. (2007). A review of health behaviour theories: how useful are these for developing interventions to promote long-term medication adherence for TB and HIV/AIDS? *BMC public health, 7*(1), 104.

Niknazar, P., & Bourgault, M. (2017). Theories for classification vs. classification as theory: Implications of classification and typology for the development of project management theories. *International Journal of Project Management, 35*(2), 191-203.

Nir, Y., Paz, A., Sabo, E., & Potasman, I. (2003). Fear of injections in young adults: prevalence and associations. *The American Journal of Tropical Medicine and Hygiene, 68*(3), 341-344.

Noble, L. M., Farquharson, L., O'dwyer, N. A., & Behrens, R. H. (2013). The impact of injection anxiety on education of travelers about common travel risks. *Journal of Travel Medicine, 21*(2), 86-91.

Nutbeam, D. (2000). Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International, 15*(3), 259-267.

Ofstead, C. L., Tucker, S. J., Beebe, T. J., & Poland, G. A. (2008). Influenza vaccination among registered nurses: information receipt, knowledge, and decision-making at an institution with a multifaceted educational program. *Infection Control & Hospital Epidemiology, 29*(2), 99-106.

Omondi, R. K., & Ryan, C. (2017). Sex tourism, romantic safaris, prayers and witchcraft at the Kenyan coast. *Tourism Management, 58*, 217-227.

Onnela, J. P., Landon, B. E., Kahn, A. L., Ahmed, D., Verma, H., O'Malley, A. J., ... & Christakis, N. A. (2016). Polio vaccine hesitancy in the

networks and neighborhoods of Malegaon, India. *Social Science & Medicine, 153*, 99-106.

Ophir, Y., & Jamieson, K. H. (2018). Intentions to use a novel Zika vaccine: the effects of misbeliefs about the MMR vaccine and perceptions about Zika. *Journal of Public Health, 1*, 1-7,

Oraby, T., & Bauch, C. T. (2015). Bounded rationality alters the dynamics of paediatric immunization acceptance. *Scientific Reports, 5*, 1-12.

Otoo, F. E., Agyeiwaah, E., Dayour, F., & Wireko-Gyebi, S. (2016). Volunteer tourists' length of stay in Ghana: Influence of socio-demographic and trip attributes. *Tourism Planning & Development, 13*(4), 409-426.

Padela, A. I., Malik, S., Vu, M., Quinn, M., & Peek, M. (2018). Developing religiously-tailored health messages for behavioral change: Introducing the reframe, reprioritize, and reform ("3R") model. *Social Science & Medicine, 204*, 92-99.

Padela, A. I., Malik, S., Vu, M., Quinn, M., & Peek, M. (2018). Developing religiously-tailored health messages for behavioral change: Introducing the reframe, reprioritize, and reform ("3R") model. *Social Science & Medicine, 204*, 92-99.

Pallant, J. (2010). SPSS survival manual: A step by step guide to data analysis using SPSS. Maidenhead.

Pati, S., Feemster, K. A., Mohamad, Z., Fiks, A., Grundmeier, R., & Cnaan, A. (2011). Maternal health literacy and late initiation of immunizations among an inner-city birth cohort. *Maternal and Child Health Journal, 15*(3), 386-394.

Pavli, A., Katerelos, P., Smeti, P., & Maltezou, H. C. (2016). Meningococcal vaccination for international travellers from Greece visiting developing countries. *Travel Medicine and Infectious Disease, 14*(3), 261-266.

Pavli, A., Maltezou, H. C., Papadakis, A., Katerelos, P., Saroglou, G., Tsakris, A., & Tsiodras, S. (2016). Respiratory infections and gastrointestinal illness on a cruise ship: a three-year prospective study. *Travel Medicine and Infectious Disease, 14*(4), 389-397.

Pavli, A., Silvestros, C., Patrinos, S., Lymperi, I., & Maltezou, H. C. (2014). Pre-travel preparation practices among business travellers to tropical and subtropical destinations: results from the Athens International Airport Survey. *Travel Medicine and Infectious Disease, 12*(4), 364-369.

Pearce, P. L. (1990). *The backpacker phenomenon: Preliminary answers to basic questions*. Department of Tourism, James Cook University of North Queensland.

Pedersini, R., Marano, C., De Moerlooze, L., Chen, L., & Vietri, J. (2016). HAV & HBV vaccination among travellers participating in the National Health and Wellness Survey in five European countries. *Travel Medicine and Infectious Disease, 14*(3), 221-232.

Peretti-Watel, P., Verger, P., Raude, J., Constant, A., Gautier, A., Jestin, C., & Beck, F. (2013). Dramatic change in public attitudes towards vaccination during the 2009 influenza A (H1N1) pandemic in France. *Eurosurveillance, 18*(44), 20-23.

Petersen, R. D. (2002). *Understanding ethnic violence: Fear, hatred, and resentment in twentieth-century Eastern Europe*. Cambridge University Press.

Platteau, J.P., De Bock, O., & Gelade, W., (2017). The Demand for microinsurance: a literature review. *World Development. 94*, 139–156.

Pleasant, A., & Kuruvilla, S. (2008). A tale of two health literacies: public health and clinical approaches to health literacy. *Health Promotion International, 23*(2), 152-159.

Plog, S. (1974). Why destination areas rise and fall in popularity, *The Cornell Hotel and Restaurant Administration Quarterly, 14*(3), 55–58.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies *Journal of applied Psychology, 88*(5), 879-882.

Poulos, C., Curran, D., Anastassopoulou, A., & De Moerlooze, L. (2018). German travelers' preferences for travel vaccines assessed by a discrete choice experiment. *Vaccine*. 36, 969–978.

Powell, G. A., Zinszer, K., Verma, A., Bahk, C., Madoff, L., Brownstein, J., & Buckeridge, D. (2016). Media content about vaccines in the United States and Canada, 2012–2014: An analysis using data from the Vaccine Sentimeter. *Vaccine*, *34*(50), 6229-6235.

Price, A. M., & Peterson, L. P. (2016). Scientific progress, risk, and development: Explaining attitudes toward science cross-nationally. *International Sociology*, *31*(1), 57-80.

Pritchard, A., & Morgan, N. (2017). Tourism's lost leaders: Analysing gender and performance. *Annals of Tourism Research*, *63*, 34-47.

Quintal, V. A., Lee, J. A., & Soutar, G. N. (2010). Risk, uncertainty and the theory of planned behavior: A tourism example. *Tourism Management*, *31*(6), 797-805.

Quintal, V. A., Lee, J. A., & Soutar, G. N. (2010). Tourists' information search: the differential impact of risk and uncertainty avoidance. *International Journal of Tourism Research*, *12*(4), 321-333.

Rantanen, J., Kinnunen, U., Mauno, S., & Tement, S. (2013). Patterns of conflict and enrichment in work-family balance: A three-dimensional typology. *Work & Stress*, *27*(2), 141-163.

Rantanen, T. (2013). Promoting mobility in older people. *Journal of Preventive Medicine and Public Health*, *46*-S50.

Reeve, C. L., & Basalik, D. (2014). Is health literacy an example of construct proliferation? A conceptual and empirical evaluation of its redundancy with general cognitive ability. *Intelligence*, *44*, 93-102.

Reich, B. J., Beck, J. T., Price, J., & Lamberton, C. (2018). Food as Ideology: Measurement and Validation of Locavorism. *Journal of Consumer Research, 1, 33-56.*

Riedel, S. (2005). Edward Jenner and the history of smallpox and vaccination. In *Baylor University Medical Center Proceedings*. Taylor & Francis, *18* (1), 21-25.

Rochl, W. S., & Fesenmaier, D. R. (1992). Risk perceptions and pleasure travel: An exploratory analysis. *Journal of Travel research*, *30*(4), 17-26.

Rogers, R. W. (1983). Cognitive and psychological processes in fear appeals and attitude change: A revised theory of protection motivation. *Social Psychophysiology: A sourcebook*, *3*, 153-176.

Roselius, T. (1971). Consumer rankings of risk reduction methods. *The Journal of Marketing*, 56-61.

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs*, *2*(4), 328-335.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1994). *The health belief model and HIV risk behavior change*. In *Preventing AIDS* (pp. 5-24). Springer, Boston, MA.

Rubin, G. J., Potts, H. W., & Michie, S. (2011). Likely uptake of swine and seasonal flu vaccines among healthcare workers. A cross-sectional analysis of UK telephone survey data. *Vaccine*, *29*(13), 2421-2428.

Saha, A., Hayen, A., Ali, M., Rosewell, A., MacIntyre, C. R., Clemens, J. D., & Qadri, F. (2018). Socioeconomic drivers of vaccine uptake: An analysis of the data of a geographically defined cluster randomized cholera vaccine trial in Bangladesh. *Vaccine*, *36*(31), 4742-4749.

Savolainen, H., Engelbrecht, P., Nel, M., & Malinen, O. P. (2012). Understanding teachers' attitudes and self-efficacy in inclusive education: Implications for pre-service and in-service teacher education. *European Journal of Special Needs Education*, *27*(1), 51-68.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: assessment and implications of generalized outcome expectancies. *Health Psychology*, *4*(3), 219-311.

Sedgley, D., Pritchard, A., & Morgan, N. (2012). Tourism poverty' in affluent societies: Voices from inner-city London. *Tourism Management*, *33*(4), 951-960.

Seebaluck-Sandoram, R., & Mahomoodally, F. M. (2017). Management of Infectious Diseases in Africa. In *Medicinal Spices and Vegetables from Africa* (pp. 133-151).

Shapiro, G. K., Holding, A., Perez, S., Amsel, R., & Rosberger, Z. (2017). Validation of the vaccine conspiracy beliefs scale. *Papillomavirus Research*, *2*, 167-172.

Shapiro, G. K., Tatar, O., Dube, E., Amsel, R., Knauper, B., Naz, A., ... & Rosberger, Z. (2018). The vaccine hesitancy scale: Psychometric properties and validation. *Vaccine*, *36*(5), 660-667.

Shepperd, J. A., Pogge, G., & Howell, J. L. (2016). Assessing the consequences of unrealistic optimism: Challenges and recommendations. *Consciousness and Cognition*, *1*, 1053-8100.

Shields, G. S., Toussaint, L. L., & Slavich, G. M. (2016). Stress-related changes in personality: A longitudinal study of perceived stress and trait pessimism. *Journal of Research in Personality*, *64*, 61-68.

Shirazi, M., Engelman, K. K., Mbah, O., Shirazi, A., Robbins, I., Bowie, J., ... & Dobs, A. (2015). Targeting and tailoring health communications in breast screening interventions. *Progress in community health partnerships: Research, Education, and Action*, *9*(2), 83-89.

Song, Z. (2017). The debate between empirical and broader phenomenological approaches to research. *Tourism Management*, *58*, 307-311.

Sönmez, S. F., & Graefe, A. R. (1998). Determining future travel behavior from past travel experience and perceptions of risk and safety. *Journal of Travel Research*, *37*(2), 171-177.

Stern, A. M., & Markel, H. (2005). The history of vaccines and immunization: familiar patterns, new challenges. *Health Affairs*, *24*(3), 611-621.

Sylvers, P., Lilienfeld, S. O., & LaPrairie, J. L. (2011). Differences between trait fear and trait anxiety: Implications for psychopathology. *Clinical Psychology Review*, *31*(1), 122-137.

Taberner, A., Hogan, N. C., & Hunter, I. W. (2012). Needle-free jet injection using real-time controlled linear Lorentz-force actuators. *Medical Engineering & Physics*, *34*(9), 1228-1235

Tafuri, S., Guerra, R., Gallone, M. S., Cappelli, M. G., Lanotte, S., Quarto, M., & Germinario, C. (2014). Effectiveness of pre-travel consultation in the prevention of travel-related diseases: a retrospective cohort study. *Travel medicine and Infectious Disease*, *12*(6), 745-749.

Thomson, A., Robinson, K., & Vallée-Tourangeau, G. (2016). The 5As: A practical taxonomy for the determinants of vaccine uptake. *Vaccine, 34*(8), 1018-1024.

Thrane, C. (2016). Modelling tourists' length of stay: A call for a 'back-to-basic' approach. *Tourism Economics, 22*(6), 1352-1366.

Thrane, C. (2016). Students' summer tourism: Determinants of length of stay (LOS). *Tourism Management, 54*, 178-184.

Tunner Jr, J. F., Day, E., & Crask, M. R. (1989). Protection motivation theory: An extension of fear appeals theory in communication. *Journal of Business Research, 19*(4), 267-276.

Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty, 5*(4), 297-323.

United Nations General Assembly [UNGA] (2015). *Transforming Our World: The 2030 Agenda for sustainable development*. Draft resolution referred to the United Nations summit for the adoption of the post-2015 development agenda by the General Assembly at its sixty-ninth session. UN Doc. A/70/L.1 of 18 September.

United Nations World Tourism Organisation. (2017). Tourism highlights 2018. Madrid, Spain: Author.

United Nations World Tourism Organisation. (2018). Tourism highlights 2018. Madrid, Spain: Author.

Velan, B., Boyko, V., Lerner-Geva, L., Ziv, A., Yagar, Y., & Kaplan, G. (2012). Individualism, acceptance and differentiation as attitude traits in the public's response to vaccination. *Human Vaccines & Immunotherapeutics, 8*(9), 1272-1282.

Venn, D., & Strazdins, L. (2017). Your money or your time? How both types of scarcity matter to physical activity and healthy eating. *Social Science & Medicine, 172*, 98-106.

Wang, X., Zhou, X., Leesa, L., & Mantwill, S. (2018). The Effect of Vaccine Literacy on Parental Trust and Intention to Vaccinate after a Major Vaccine Scandal. *Journal of health communication*, 1-9.

Wen, J., Meng, F., Ying, T., Qi, H., & Lockyer, T. (2018). Drug tourism motivation of Chinese outbound tourists: Scale development and validation. *Tourism Management, 64*, 233-244.

Westland, J. C. (2012). The adoption of social networking technologies in cinema releases. *Information Technology and Management, 13*(3), 167-181.

Williams, A. M., & Baláž, V. (2014). Mobility, risk tolerance and competence to manage risks. *Journal of Risk Research, 17*(8), 1061-1088.

Williams, A. M., & Baláž, V. (2015). Tourism risk and uncertainty: Theoretical reflections. *Journal of Travel Research, 54*(3), 271-287.

Wilson, T. D. (1997). Information behaviour: an interdisciplinary perspective. *Information processing & management, 33*(4), 551-572.

World Health Organisation (2012). *International travel and health*. Geneva: World Health Organisation.

World Health Organisation (2013). *International travel and health*. Geneva: World Health Organisation.

World Health Organisation (2016). Situation Report: Ebola Virus Disease. Retrieved from the WHO website. http://apps.who.int/iris/bitstream/10665/208883/1/ebolasitrep_10Jun2016_eng.pdf?ua¼1.

World Health Organisation (2017). *International travel and health*. Geneva: World Health Organisation.

World Health Organisation (2018). *International travel and health*. Geneva: World Health Organisation.

World Health Organisation (2015). *Guidelines for the treatment of malaria*. Geneva: World Health Organisation.

World Travel and Tourism Council (WTTC) (2014) 'Travel and tourism economic impact 2015 world', Available at: https://www.wttc.org/-/media/files/reports.

World Travel and Tourism Council [WTTC] (2014). Travel & tourism economic impact 2017 Thailand. *WTTC Travel & Tourism Economic Impact 2014*.

World Travel and Tourism Council [WTTC] (2015). 'Travel and tourism economic impact 2015 world', https://www.wttc.org/-/media/files/ reports.

Yang, C. L., & Nair, V. (2014). Risk perception study in tourism: Are we really measuring perceived risk? *Procedia-Social and Behavioral Sciences*, *144*, 322-327.

Yaqub, O., Castle-Clarke, S., Sevdalis, N., & Chataway, J. (2014). Attitudes to vaccination: a critical review. *Social Science & Medicine*, *112*, 1-11.

Zalatan, A. (1996). The determinants of planning time in vacation travel. *Tourism Management*, *17*(2), 123-131.

Zarcadoolas C, Pleasant A, & Greer, D. S. (2003): Elaborating a definition of health literacy: a commentary. *J Health Commun*, *8*(3):119-120.

APPENDICES

APPENDIX A

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF HOSPITALITY AND TOURISM MANAGEMENT
INTERVIEW GUIDE

Introduction

Hello, my name is Charles Atanga Adongo, a Doctor of Philosophy (PhD) student carrying out research on concerns and responses toward travel vaccination among international tourists. This research is part of the requirements for the award of a PhD degree at the University of Cape Coast, Ghana. I guarantee that all responses provided would be strictly anonymous, handled in confidence and used for academic purposes only. Please, your participation in this study is voluntary but, your decision to participate will be highly appreciated. This interview will take between 60 and 90 minutes of your time. I will be recording this interview, so that I won't miss anything you say. After our meeting today, I will transcribe the recording of our conversation. However, no names or identifying information will be included in the transcript.

Interviewer: Check this box ☐ to indicate that the respondent provided verbal consent.

I will now turn on the digital recorder as we begin the interview. Are you ready?

SECTION A: SOCIO-DEMOGRAPHIC PROFILE

I would first like to ask you a few questions about your background information

1. Sex: Male ☐ Female ☐
2. What is your age in completed years.....
3. What is your marital status? Married ☐ Not married ☐ Widowed ☐ Divorced/separated ☐
4. What is the highest level of education? High School ☐ First Degree ☐ Post graduate degree ☐ Other (specify).....
5. What is your religion? Christian ☐ Islam ☐ Atheism ☐ Other (specify).....
6. What is your current employment status? Employed ☐ Unemployed ☐ Retired ☐
7. Country of residence.....

SECTION B: INTRODUCTORY ISSUES

Okay, great! thank you. Now I'd like to ask you some questions about infectious diseases and travel abroad

a. What are your views about travel abroad and contracting infectious diseases (interviewer: Mention examples of infectious diseases?
b. Do you consider yourself vulnerable to such diseases when travelling abroad (probe for details and reasoning)?

c. How would you describe the seriousness of infectious diseases (probe for any death, medical or economic related cost)?

d. What are your strategies for staying healthy while travelling or abroad (probe for WASH-water, sanitation and personal hygiene, travel insurance, risky behaviours)? How best do you see yourself implementing these strategies?

SECTION C: VACCINATION AND CONCERNS

e. Have you ever taken a vaccine?

If yes (probe),

More specific probes

- Was it during travel abroad or part of general immunisation?
- Which diseases did you vaccinate against?
- Why did you decide to vaccinate?
- But have you ever refused/delayed or felt reluctant towards travel vaccination (Probe based on answer?
- Reasons? (Probe for details and reasoning)

f. Do you have any concerns with travel vaccinations?

- Reasons? (Probe for details and reasoning: **safety, efficacy, cost, access and time** etc)

Great, thank you. That is very helpful. But before we finish, the very last thing I'd like to know is whether there is anything I have missed. Is there anything else that you think I should know? (If not: Thank you for your time!)

Thank you so much.

APPENDIX B

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF HOSPITALITY AND TOURISM MANAGEMENT

SURVEY QUESTIONNAIRE

INTRODUCTION

Hello, my name is Charles Atanga Adongo, a Doctor of Philosophy (PhD) student carrying out research on concerns and responses toward travel vaccination among international tourists. This research is part of the requirements for the award of a PhD degree at the University of Cape Coast, Ghana. I would be grateful if you spend **15 minutes** of your time to fill out this questionnaire. I guarantee that all responses provided would be strictly anonymous, handled in confidence and used for academic purposes only. Please, your participation in this study is voluntary but, your decision to participate will be highly appreciated. If you encounter any difficulty in the process of responding to the questionnaire, please do not hesitate to ask. Thank you.

SECTION A1: VACCINES AND OTHER PREVENTIVE MEASURES

1. Have you ever vaccinated or taken prophylaxis against any disease before?
   Yes ☐ No ☐
2. **If YES**, please respond to the questions in the Table below by ticking *[√]*.

	Disease	Which of these diseases have you completely vaccinated against for this current trip to Ghana? Tick many as applied *[√]*	Which of these diseases have you completely vaccinated against as part of general health vaccinations or previous visits to other destinations/countries ? *[√]*
1	Cholera		
2	Malaria		
3	Yellow fever		
4	Poliomyelitis		
5	Measles		
6	Tuberculosis		
7	Meningococcal meningitis		
8	Hepatitis B		
9	Hepatitis A		
10	Human papillomavirus (HPV)		

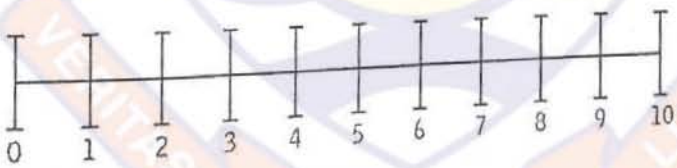
11	Rotavirus			
12	Influenza			
13	Influenza			
14	Japanese encephalitis			
15	Pneumococcal disease			
16	Rabies			
17	Rubella			
18	Tetanus			
19	Typhoid			
20	Shingles			
21	Pertussis			
22	Other specify			

3. Do you have travel insurance for this trip to Ghana? Yes ☐ No ☐
4. If you have travel insurance, did the insurance cover any of the vaccines you took before travelling to Ghana? Yes ☐ No ☐
5. If you do not have travel insurance for this trip to Ghana, please provide reason(s) why you did not buy travel insurance

.....

SECTION A2: VIEWS ABOUT TRAVEL VACCINATION

Please rate how much you agree with the following statements concerning travel vaccination – using a scale of **0 to 10**, where 0 means not concerned and 10 highly concerned



Please indicate your rating for each statement by entering the value in the space provided

	STATEMENTS	Rank score
1	I worry that taking vaccines can endanger my health during travel	
2	I worry that the side effects of travel vaccines while abroad can decrease my enjoyment of the holiday experience	
3	I fear the injection when taking travel vaccines because of the pains.	
4	I am concerned that most travel vaccines have to be taken at least 2 months (early enough) prior to the actual travel.	
5	I am not sure of the safety of vaccines for travellers	
6	Vaccination cause pain at the site of injection	

7	Taking vaccines when travelling abroad makes me feel uncomfortable	
8	I fear that I may not readily get medical assistance if experiencing side effects of vaccines while abroad	
9	I am worried about the long-term effects of travel vaccines on my health	
10	Multiple uptake of travel vaccines for different diseases can prevent my body from naturally fighting against diseases	
11	I am not confident in vaccines helping me stay healthy while abroad	
12	I do not trust vaccines to effectively protect me from diseases while travelling abroad	
13	Travel is a means through which certain vaccines are forced on travellers	
14	Travel vaccination can be time inconveniencing	
15	Consultation with health care providers concerning travel vaccination can be time wasting	
16	The number of doses required for some travel vaccines delay travel time	
17	I fear that I have to take several injections when taking travel vaccines because of the pains	
11	I think that vaccines are a means through which health care providers (i.e. pharmaceuticals and hospitals) make money from travellers	
20	I doubt travel vaccines are effective in helping me stay healthy while travelling abroad	
21	I worry that travel vaccines are usually manufactured in a rush	
22	I am not confident that travel vaccines will perform as expected	
23	Sometimes travel clinics ran out of some vaccines	
24	I doubt the safety of vaccines for human use	
25	Travellers are not given the right/freedom to refuse certain vaccines	
26	Travel vaccines are expensive	
27	Taking vaccines during travel abroad increases the cost of ravel	
28	Consultation with health care providers concerning travel accination can be time wasting	
29	It is often difficult to find all needed travel vaccines in one clinic	
30	I fear that the number of vaccines I take when travelling abroad can prevent my body from naturally fighting against diseases	
31	I am worried about the repeated uptake of vaccines each time I have to travel	
32	No reliable information on where to find all needed travel accines	
33	Making certain vaccines mandatory is unfair to travellers	
34	I worry that taking in vaccines can compromise my immune	

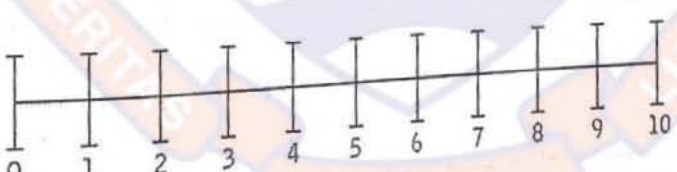
	system	
35	Taking vaccines is inconveniencing to me	
36	I have the feeling that taking in vaccines can overload my immune system	
37	I think that vaccines are expensive	
38	I am often concerned that taking vaccines before travelling can lead to increase in my travel cost	
39	I believe that vaccines are a means through which pharmaceutical and governments make money from people	
40	I worry that taking vaccines when going on holiday can result in various side effects decreasing my enjoyment.	
41	I feel that vaccines are a means through which governments wipe out certain human race/population	
42	Travel vaccines are a means through which pharmaceuticals make money from travellers	
43	I have the feeling that pharmaceuticals do not communicate all the life-threatening side effects of vaccines to vaccinees	
44	I am concerned that I have to take vaccines early enough so that vaccines have time to start working before I can travel abroad	

6. Are there anything else you do not like about vaccines when travelling for holiday, state those below?

.....

SECTION B: RESPONSE TO VACCINES

Please rate how much you agree with the following statements concerning travel vaccination – using a scale of **0 to 10**.

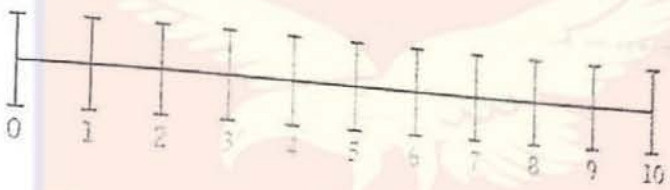


	STATMENTS	Rank score
1	I have confidence that vaccines can protect me against diseases when travelling abroad	
2	I often recommend vaccines to my fellow travellers, friends and relatives	
3	Before taking a vaccine, I make sure that I first confirm that most people have taken it.	
4	I avoid vaccines as much as possible when travelling abroad	
5	I sometimes feel reluctant to take vaccines or certain vaccines when travelling abroad	

6	I think travellers are being forced to take certain vaccines (eg. Yellow Fever)	
7	I make sure I take recommended vaccines before travelling abroad	
8	I do not believe in the claims made about vaccines for travellers	
9	With proper personal care, hygiene and sanitation, vaccines are not needed for me to stay healthy while I travel abroad	
10	Before taking a particular vaccine, I need adequate information to thoroughly verify before taking it	

B1: VIEWS ABOUT DISEASES AND TRAVEL ABROAD

Please rate how much you agree with the following statements– using a scale of **0 to 10**;

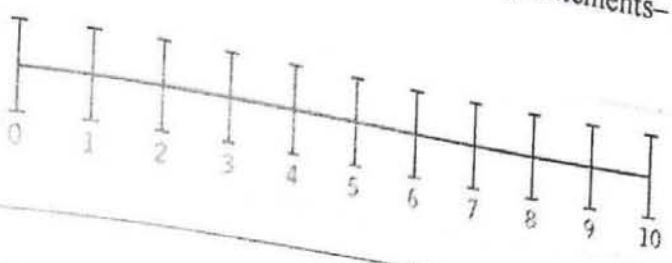


Please indicate your rating for each statement by entering the value in the space provided

	STATEMENTS	Rank score
1	International travel can lead to spread of diseases	
2	Most tourism destination are associated with infectious diseases	
3	Most destinations have poor sanitary conditions	
4	Travelling to Africa without any precautionary measures can easily make me contract diseases	
5	I perceived Ghana as being associated with infectious diseases	
6	Generally, infectious diseases are deadly	
7	Generally, infectious diseases are very costly to treat	
8	People (including friends and relatives) will stigmatize me if I return home with disease(s)	
9	I consider myself too not careful to contract diseases abroad	
10	I think I am not well informed to protect myself from any disease abroad	

SECTION D: VACCINATION LITERACY AND EFFECTIVENESS OF VACCINE COMMUNICATION

Please rate how much you agree with the following statements– using a scale of **0 to 10**;



Please indicate your rating for each statement by entering the value in the space provided

STATEMENT	Rank score
In reading instructions regarding vaccines, I find the text difficult to understand	
In understanding information regarding vaccines, I usually require someone to help me read them.	
I know where to find reliable information about vaccines when travelling abroad	
I understand what my doctor tells me about vaccines	
I can easily tell if information about travel vaccines in the media (eg. Social media) is reliable	
I understand why I need vaccination against diseases when travelling abroad	
I can easily explain the meaning of travel vaccination to friends and relatives	
I can tell which vaccines I need when travelling abroad	
Evidence of the benefit of vaccines is not convincing enough	
I know when and how to question travel vaccination	

SECTION C1: TRAVEL CHARACTERISTICS

1. Have you ever contracted any disease after travelling abroad	Yes ☐ No ☐
2. Do you have health insurance for this trip to Ghana?	Yes ☐ No ☐
3. If yes, what kind of health insurance do you have? Tick as many as applied	Public ☐ Public and Private ☐ Private ☐ None ☐ Other (specify):
4. Did your health insurance cover any of your travel vaccines?	Yes ☐ No ☐
5. Did you receive any health advice about Ghana before your departure?	Yes ☐ No ☐
6. If yes, from where/whom?	Friends/relatives ☐ Health Professional ☐ Friends at destination ☐ internet ☐ Other (specify).....
7. How is your general health?	Very good ☐ Good ☐ Fair ☐ Bad ☐

8. How would you rate yourself in terms of risk taking?	Very bad ☐ I am a risk taker ☐ I hate taking risk ☐ I am indifferent to risk ☐
9. Please indicate the sources you used in assessing information on vaccines	Health professional ☐ Internet ☐ Travel blogs ☐ Travel agent ☐ Friends and relatives ☐ Government website ☐
10. Do you or have you ever worked in the health sector?	Yes ☐ No ☐

SECTION D: SOCIO-DEMOGRAPHIC PROFILE OF RESPONDENTS

8. Sex: Male ☐ Female ☐
9. What is your age in completed years.?.....
10. What is your marital status? Married ☐ Not married ☐ Widowed ☐ Divorced/separated ☐
11. What is the highest level of education? : High School ☐ First Degree ☐ Post graduate degree ☐☐ Other (specify.....
12. What is your religion? Christian ☐ Islam ☐ Atheism ☐ Other (specify).....
13. What is your current employment status? Employed ☐ Unemployed ☐ Retired ☐☐
14. Country of residence.....
15. What is your intended duration of days of stay in Ghana.....
16. Is this our first trip to Ghana? Yes ☐ No ☐
17. If **no**, how many times have you visited in the past, including this trip?.....
18. Is this your first international trip? Yes ☐ No ☐
19. If **No**, how many international trips have you undertaken so far?.....
20. Did you visit Ghana alone? Yes ☐ No ☐
21. If No, how many are you in your group?.....
22. Purpose of visit to Ghana? Leisure/Recreation ☐ Education/research ☐ Volunteerism ☐ Visiting friends and relatives ☐ Business ☐ Others (specify.....)
23. Which kind of accommodation facility do you patronise most in Ghana Guest house ☐ 1-star hotel ☐ 2-star hotel ☐ 3-star hotel ☐ 4-star hotel ☐ 5-star hotel ☐ Homestay☐
24. Who sponsored the majority of your trip/ vacation expenditure to Ghana? Self ☐ Employer ☐ Family member/Relative ☐ Non-governmental organization ☐ International organization ☐
25. How did you arrange your trip to Ghana? Self-arrangement ☐ Travel agency (Packaged tour) ☐

Appendix C: Descriptive Statistics of Measurement Items of the Travac scale

Dimensions and underlying items	Confirmatory sample (n = 905)			
	M	SD	Skewness	Kurtosis
Efficacy concern	*2.22*	*1.60*	*0.79*	*-0.07*
I do not trust vaccines to effectively protect me from diseases while travelling abroad	1.89	0.94	1.04	0.74
I am not confident in vaccines helping me stay healthy while abroad	1.95	1.06	1.08	0.41
Multiple uptake of travel vaccines for different diseases can prevent my body from naturally fighting against diseases	2.28	1.14	0.48	-0.84
I worry about the long-term effects of travel vaccines on my health	2.37	3.27	0.56	-0.58
Safety concern	*2.19*	*2.16*	*0.52*	*-0.52*
I am not sure of the safety of vaccines for travelers	2.04	1.02	0.72	-0.25
I worry about the side effects of travel vaccines	3.33	2.45	0.45	-0.54
Taking vaccines when travelling abroad makes me feel uncomfortable	1.71	3.04	0.88	-0.03
I fear the injection when taking travel vaccines because of the pains.	1.39	2.80	0.50	-0.58
I worry that the side effects of vaccines (if any) while abroad can decrease my enjoyment of the holiday experience	2.93	3.33	0.61	-0.74
I fear that I may not readily get medical assistance when experiencing side effects of vaccines while abroad	1.76	3.04	-0.06	-0.96
Cost concern	*5.19*	*3.54*	*-0.16*	*-0.65*
Travel vaccines are expensive	6.44	3.54	-0.78	-0.35
Taking vaccines during travel abroad increases the cost of travel	6.43	3.56	-0.79	-0.36
Consultations with health professionals on travel vaccinations cost a lot of money	4.94	3.78	-0.24	-1.02

Travel vaccines are a means through which health care providers make money from travelers	2.56	3.37	0.51	-0.75
Travel vaccines are a means through which pharmaceuticals make money from travellers	5.56	3.47	0.51	-0.75
Time concern	*2.93*	*3.39*	*0.59*	*-0.33*
Consultation with health care providers concerning travel vaccination can be time wasting	2.56	3.40	0.62	-0.57
I am concerned that most travel vaccines have to be taken at least 2 months (early enough) prior to the actual travel.	4.27	3.70	-0.11	-1.13
The number of doses required for some travel vaccines delay travel time	2.49	3.13	0.54	-0.70
Travel vaccination can be time wasting as it is often difficult to find all vaccines in one clinic	2.39	3.33	1.32	1.08
Access concern	*6.49*	*3.47*	*-0.87*	*1.42*
It is often difficult to find all vaccines in one clinic	6.81	3.42	-1.23	1.12
No reliable information on where to find all needed travel vaccines	6.83	3.06	-1.48	1.02
Sometimes travel clinics ran out some vaccines	5.84	3.94	0.10	1.13
Ethical concerns	*4.34*	*3.35*	*-0.53*	*1.04*
International travel is a means through vaccines are forced on people	4.67	3.52	-0.58	1.06
Travellers are not given the right/freedom to refuse certain vaccines	3.67	3.02	-0.51	1.06
Making certain vaccines mandatory is unfair to travellers	4.67	3.51	-0.50	1.00

Source: Feld Survey, Adongo (2018); Scale: 0-to-10

Appendix D: Respondents' Demographic Characteristics by Travel Vaccination Concerns

	N	Efficacy Concern	Safety Concern	Cost concern	Time Concern	Access concern	Ethical concern	Wilks Lamda (F-value)
Sex								0.98(3.46)*
Male	320	2.02	2.54	4.38*	2.85*	6.86	4.57	
Female	585	1.89	2.29	4.79*	2.51*	6.81	4.73	
Age								0.96 (2.28) *
<20	92	1.86	2.45	4.75	2.64	6.86	5.60*	
20-29	456	1.92	2.47*	4.71	2.78*	6.84	4.78	
30-39	204	2.09	2.25	4.82*	2.68	6.46	4.11*	
40+	153	1.81	2.19	4.17*	2.09*	7.22	4.57	
Marital status								0.99(0.71)
Married	273	1.96	2.34	4.51	2.62	6.91	4.45	
Never married	607	1.92	2.39	4.70	2.64	6.79	4.82	
Education								0.95(3.87)*
High School	261	2.56	2.85	4.66	2.78	6.45	5.21	
First degree	363	1.90	2.26	4.76	2.79	6.88	4.58	
Postgraduate	281	1.69	2.06	4.47	2.29	7.10	4.30	
Religion								0.93(3.17)*
Christianity	507	2.05	2.51	4.48	2.73	6.68	4.85	
Atheism	177	1.58	2.07	4.66	2.28	7.27	4.76	
Agnostic	100	1.64	2.27	5.21	2.41	7.01	4.78	
Islam	18	3.88	3.00	4.63	4.59	6.17	3.56	
Others	103	1.95	2.22	4.89	2.61	6.69	3.76	
Employment status								0.98(1.86)
Employed	677	1.89	2.30	4.53	2.59	6.85	4.56	

Unemployed	202	2.10	2.60	5.09	2.87	6.67	5.14	
Retired	26	1.83	2.43	3.99	1.96	7.40	3.88	
Continent of residence								0.91(3.93) *
Africa	71	2.28	2.34	4.07	3.00	6.11	3.32	
Europea	641	1.87	2.33	4.58	2.48	6.99	5.00	
South-East Asia	7	4.40	3.91	6.29	5.57	6.42	4.42	
American	154	1.86	2.44	4.83	2.93	6.59	3.62	
Western Pacific	32	2.30	2.63	6.00	2.69	6.37	6.12	

P-value is significant at, * $p \leq 0.05$; ** $p \leq 0.01$
Source: Feld Survey, Adongo (2018)

Appendix E: Respondents' Tripographics by Travel Vaccination Concerns

	N	Efficacy concern	Safety concern	Cost concern	Time Concern	Access concern	Ethical concern	Wilks Lamda (F-value)
International travel history								0.93(12.16) **
First-time visit	76	1.85	2.32	4.70	2.51	5.66	4.77	
Repeat visit	829	2.84	2.93	4.01	3.92	6.93	3.52	
Purpose of visit								
Leisure/recreation	751	2.06	2.28	4.71	6.82	6.82	4.71	
VFR	86	1.85	2.24	4.08	6.86	6.87	4.80	
Business	68	2.46	2.51	4.54	6.8	6.87	4.05	
Trip arrangement								0.96(6.42) **
Self	782	1.81	2.33	4.64	2.50	6.92	4.70	
Travel agency/packaged	123	2.74	2.63	4.70	3.46	6.21	4.52	
Risk taking behaviour								0.98(1.74)
Risk taker	305	2.08	2.33	4.63	2.84	6.78	4.73	
Risk neutral	253	1.84	2.31	4.84	2.58	7.00	4.75	
Risk averse	347	1.88	2.50	4.39	2.44	6.61	4.49	
Disease history abroad								0.99(1.90)
Ever contracted	228	2.09	2.72	4.45	2.72	6.84	4.95	
Never contracted	677	1.88	2.40	4.70	2.60	6.82	4.57	
Health insurance								0.95(7.82)**
Subscribed	775	2.74	2.77	4.46	3.05	6.34	3.74	
Unsubscribed	130	1.80	2.30	4.67	2.56	6.89	4.82	
Insurance covered travel vaccines								0.90(1.45*)
Covered	314	1.90	2.35	4.37	2.55	6.63	4.79	
Not covered	591	1.95	2.38	4.78	2.67	6.93	4.60	

Pre-travel consultation								0.96(6.41)**
Consulted	784	1.82	2.30	4.68	2.54	6.88	4.77	
Not-consulted	121	2.71	2.87	4.43	3.21	6.48	4.03	
Self-rated health								0.98(1.64)
Very good	492	1.85	2.21	4.63	2.52	7.02	4.73	
Good	378	1.96	2.48	4.58	2.67	6.56	4.61	
Fair	35	2.79	3.45	5.41	3.63	6.87	4.74	

P-value is significant at, * $p \leq 0.05$; ** $p \leq 0.01$
Source: Feld Survey, Adongo (2018)