

Development and Testing of a Framework for the Assessment of Health-Related Risks Among Travellers by Pharmacists in Ontario

by

Heidi Victoria Joanna Fernandes

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Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

Heidi Fernandes was the sole author for Chapters 1 and 3 which were written under the supervision of Dr. Sherilyn Houle and were not written for publication. Portions of Chapter 1 that contextualize the research project are repeated in Chapter 2, a research article reprinted verbatim.

Research presented in Chapter 2:

The contents of Chapter 2 are reflective of an original manuscript published by the MSc candidate (Heidi Fernandes) in *Pharmacy*. The contributions are as follows:

- Conceptualization – Houle
- Methodology – Fernandes and Houle
- Validation – Fernandes
- Formal Analysis – Fernandes
- Investigation – Houle
- Data Curation – Fernandes
- Writing, original draft preparation – Fernandes
- Writing, review and editing – Fernandes and Houle
- Visualization – Fernandes
- Supervision – Houle
- Project administration – Houle
- Funding acquisition (through educational support from Valneva Canada, Inc. in the form of funding for a graduate student) – Houle

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Abstract

As pharmacists move away from traditional dispensary roles and towards more clinical services, a therapeutic realm that pharmacists are exploring is travel medicine. However, travel medicine can be challenging to beginners in the field. Despite an expansion in scope in December 2016 allowing pharmacists in Ontario, Canada, to administer a broader range of vaccines including many indicated for travel, the uptake of these services by pharmacists has been slow. Key reasons include a lack of confidence in travel medicine knowledge and challenges integrating the service into existing workload.

To assist with identifying patients who may be manageable by pharmacists without additional travel medicine training, versus those who may benefit from referral, we developed and validated a clinical practice framework. A panel of experts, comprised of physicians and pharmacists holding a Certificate in Travel Health™ from the International Society of Travel Medicine, generated the initial content on information gathering and assessing risk in a travelling patient. The initial list of 114 items was then judged by the panel to remove non-essential items, resulting in 64 items proceeding to content validation, organized into 5 ‘W’ domains: Who, What, Where, When, and Why. Each item was ranked by the experts according to its relevancy, resulting in an Average Content Validity Index of 0.91. The resulting framework was titled “The 5W Approach to Travel Risk Identification.” This clinical practice framework is the first published assessment tool for travel medicine tailored for pharmacy’s scope of practice that has been content validated.

The tool allows pharmacists inexperienced in travel medicine to collect information required to use their professional judgement when assessing travelling patients as either high-risk (requiring a referral to a travel medicine specialist) or low-risk. With the aim of supporting

pharmacists to be more confident in caring for travelling patients and increasing their involvement in travel medicine, this framework was then piloted in 8 pharmacies in Ontario, Canada, from March to August 2019. Pharmacists completed pre- and post-test phase surveys to determine the utility of the framework. Pharmacists reported that the framework is simple to use and provides structure for interactions with travelling patients. However, it may not be as beneficial for those with a higher level of travel medicine expertise than the average pharmacist, and improvements to its design were suggested. This feasibility study is the first to trial the use of a validated risk assessment framework for pharmacists to use when providing care to travelling patients. To further understand its potential in community pharmacies, this work will be further expanded to pharmacists across Canada.

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List of Abbreviations

ISTM – International Society of Travel Medicine

CTH[®] - Certificate in Travel Health[™]

CDC – Centers for Disease Control and Prevention

CVI – Content Validity Index

I-CVI – Item Content Validity Index

Ave-CVI – Average Content Validity Index

OCP – Ontario College of Pharmacists

Chapter 1: Introduction

1.1 Travel Medicine

Travel medicine is defined as “the field of medicine concerned with the promotion of health...for the peoples, cultures and environment of regions being visited in addition to the prevention of disease or other adverse health outcomes in the international traveller.”¹ The terms “travel medicine” and “travel health” are often used interchangeably and refer to the same clinical speciality referenced previously. It is a unique therapeutic area requiring a high level of individualization for each traveller’s health needs and level of risk during travel. A travelling patient’s risk can vary depending on their trip itinerary and patient characteristics, and there is limited existing information regarding actual risk for travellers (often expressed as number of events per 100,000 travellers).² Common health-related considerations within travel medicine include, but are not limited to: immunizations, travellers’ diarrhea, malaria chemoprophylaxis, and insect bite prevention. Rising rates of international tourism – projected to reach 2 billion arrivals annually by the year 2030 – coupled with increasing diversification of destination countries (for example, increasing travel to Asia, the Middle East, and Africa),² are likely to make travel medicine consultations a service sought out by many patients. As a continually evolving and highly dynamic specialty, health professionals providing travel health services must be up-to-date on a variety of topics, including global epidemiology of infectious and non-infectious health risks, health regulations, and immunization requirements and recommendations.³

1.1.1 Travel Medicine Body of Knowledge

Clinical knowledge related to travel health is often self-acquired by those with a strong interest, mainly through learning activities such as workshops, online continuing education programs, and clinical readings. Most travel medicine practitioners gain their skillset

through practical experience in providing travel consultations. The largely self-taught avenue of learning may be attributed to the fact that travel medicine is not a core component of many healthcare professional schools across Canada and the United States.⁴⁻⁶ The majority of travel medicine courses are offered to postgraduates or licensed professionals, as opposed to students or trainees.⁷⁻⁹

The organization central to travel medicine practice for healthcare professionals – the International Society of Travel Medicine (ISTM) – advises that at least 3 years of travel medicine experience is recommended in order to gain the body of knowledge required for their Certificate in Travel Health™ (CTH®) examination.¹⁰ The breakdown of the examination content can be found in Appendix A.

1.2 Pharmacy Practice & Travel Medicine

Pharmacist involvement with the delivery of travel health services is a relatively new but developing field. Community pharmacists have always been available to help travelling patients by recommending products for minor ailments (e.g., motion sickness, mosquito bite prevention) and dispensing medications when needed for travel (e.g., malaria chemoprophylaxis, antibiotics for travellers' diarrhea). However, offering comprehensive travel health services including pretravel consultations and vaccinations has been only recently adopted by pharmacists. Despite its infancy, its uptake has been seen both in Canada and internationally, particularly among pharmacists in developed countries, as evidenced by the creation of a Pharmacist Professional Interest Group within the ISTM.¹¹

1.2.1 Canadian Pharmacist Scope of Practice & Travel Medicine

Pharmacy practice in Canada is evolving, as pharmacists are stepping out of their traditional dispensary-based role and positioning themselves as key players in a patient's circle of care. Depending on provincial legislation as indicated in Figure 1, pharmacists may be able to perform more clinical patient care duties including prescribing, administering drugs and vaccines by injection, assessing and treating minor ailments, and ordering and interpreting laboratory tests, among others.¹² Pharmacists are a frequent first point of contact with the healthcare system for many patients. It is not unusual for a request of advice on the selection of a non-prescription product to result in the identification of a sign or symptom that requires further assessment or referral to another primary care professional. This is expected to also be the case with travellers, who may request advice on sunscreen, or present with a prescription for an antibiotic for the treatment of traveller's diarrhea without having received a comprehensive evaluation of their travel health risks. With a recent scope expansion in December 2016 allowing Ontario pharmacists to administer a number of vaccines commonly used for travel,¹³ pharmacists can expect to

encounter more opportunities to identify patients who would benefit from a comprehensive pre-travel consultation. Evidence has found that only a small proportion of individuals who are travelling receive a pre-travel consultation to consider their individual health risks.^{14,15} As the most accessible healthcare professional, with flexible hours of operation, and broad geographic distribution including rural communities that may not have a specialized travel clinic, this convenient access to travel advice is expected to positively impact the proportion of travellers who can access this care.

Figure 1 – Summary of Pharmacists’ Scope of Practice in Canada¹²

Scope of Practice ¹		Province/Territory												
		BC	AB	SK	MB	ON	QC	NB	NS	PEI	NL	NWT	YT	NU
Prescriptive Authority (Schedule 1 Drugs) ¹	Independently, for any Schedule 1 drug	X	✓ ⁵	X	X	X	X	X	X	X	X	X	X	X
	In a collaborative practice setting/agreement	X	✓ ⁵	✓ ⁵	✓ ⁵	X	X	✓	✓	X	X	X	X	X
	Initiate ²													
	For minor ailments/conditions	X	✓	✓	✓ ⁵	P	✓	✓	✓	✓ ⁵	✓	X	X	X
	For smoking/tobacco cessation	X	✓	✓	✓ ⁵	✓	✓	✓	✓	✓ ⁵	✓	X	X	X
	In an emergency	✓	✓	✓	✓	X	X	✓	✓	✓	X	X	X	X
Adapt ³ / Manage	Independently, for any Schedule 1 drug ⁴	X	✓ ⁵	X	X	X	X	X	X	X	X	X	X	X
	Independently, in a collaborative practice ⁴	X	✓ ⁵	✓ ⁵	✓ ⁵	X	X	✓	✓	X	X	X	X	X
	Make therapeutic substitution	✓	✓	✓ ⁷	X	X	P	✓	✓	✓	✓	X	X	X
	Change drug dosage, formulation, regimen, etc.	✓	✓	✓ ⁷	✓	✓	✓	✓	✓	✓	✓	X	X	X
	Renew/extend prescription for continuity of care	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X
Injection Authority (SC or IM) ^{1,5}	Any drug or vaccine	P	✓	✓	✓	X ⁸	P ⁹	✓	X	✓	✓	X	X	X
	Vaccines ⁶	✓	✓	✓	✓	✓	P	✓	✓	✓	✓	X	X	X
	Travel vaccines ⁶	✓	✓	✓	✓	✓	P	✓	✓	✓	✓	X	X	X
	Influenza vaccine	✓	✓	✓	✓	✓	P	✓	✓	✓	✓	X	X	X
Labs	Order and interpret lab tests	X	✓	P ¹⁰	✓ ¹¹	X	✓	P	P ¹⁰	P	X	X	X	X
Techs	Regulated pharmacy technicians	✓	✓	✓	✓ ¹²	✓	X	✓	✓	✓	✓	X	X	X

As seen in Figure 1, there is a wide provincial/territorial variation in the extent of travel health care that can be provided by a pharmacist. Furthermore, jurisdictional differences also exist regarding which patients may qualify to receive certain services from pharmacists (e.g., minimum age for immunization), access to patient’s health records, and remuneration for services.¹² For example, in Alberta, pharmacists that have met the requirements for Additional Prescribing Authorization can independently prescribe any vaccines or medications used for travel.¹⁶ Pharmacists with at least 1 year of clinical experience can apply; the application includes describing their practice, preparedness, and judgment and submitting 3 actual patient cases within the past 2 years which is then reviewed by at least 2 pharmacists against activities and indicators such as patient assessment, developing a care-plan and following up, collaboration, and documentation.¹⁶ However, legislation in other provinces is not as broad. In Manitoba, pharmacists have the option to apply to be an Extended Practice Pharmacist as long as the applicant has their CTH[®] and ≥ 1000 hours of experience.¹⁷ Once approved, the pharmacist can prescribe drugs or vaccines “within the scope of their specialty practice.”¹⁷ Extended Practice

Pharmacists must meet the condition of having a collaborative practice with a medical doctor, nurse practitioner, or a registered nurse with Extended Practice designation, which involves the two parties having mutual patients, acknowledging shared risk and responsibilities in the care of the patient(s), and having immediate access to the patient's diagnostic and health information.¹⁷ In New Brunswick, the legislation is divided based on pharmacists with and without their CTH[®].^{18,19} Any pharmacist, regardless of CTH[®] status, can prescribe for “preventable disease” including vaccines for cholera, hepatitis, measles, mumps, and rubella, and drugs for malaria and travellers' diarrhea.¹⁸ However, pharmacists with CTH[®] have additional prescribing authority for vaccines against rabies, typhoid, Japanese encephalitis, and yellow fever.¹⁹ However, a gap exists with this legislation as pharmacists are limited in their prescribing to specific travel health conditions, being unable to prescribe for common ailments and prevention of other conditions such as altitude illness or doxycycline for leptospirosis.

1.2.2 Ontario Pharmacy Practice and Travel Medicine

Ontario pharmacists have been authorized as immunizers against influenza for patients aged 5 years and older since 2012. This authorization is contingent on successful completion of an immunization training program and obtaining a valid certification in cardiopulmonary resuscitation and first aid.²⁰ In December 2016, pharmacists' scope was expanded to include authority to immunize against 13 additional vaccine-preventable diseases. Many of the vaccines included are travel-related (Table 2). While pharmacists have the authority to immunize, the caveat is that the majority of the vaccines that are allowed to be administered by pharmacists must first be prescribed, and pharmacists in Ontario currently only have prescribing rights for medications involved in smoking cessation.²¹ Vaccinations that do not require a prescription are limited to those involved in Ontario's routine immunization schedule.

Table 1 – Vaccines authorized to be administered by an injection-certified pharmacist in Ontario²²

Vaccine	Prescription Required
Bacillus Calmette-Guerin	Yes
<i>Haemophilus influenzae</i> type B	No
Meningococcal	No
Pneumococcal	No
Typhoid	Yes
Typhoid/Hepatitis A Combination	Yes
Hepatitis A	Yes
Hepatitis B	Yes
Hepatitis A&B Combination	Yes
Herpes zoster	Yes
Human papillomavirus	No
Japanese Encephalitis	Yes
Rabies	Yes
Varicella	Yes
Yellow Fever	Yes

1.3 Clinical Practice Frameworks

Pharmacists currently utilize various frameworks to guide patient assessments across a number of therapeutic areas. These frameworks are especially helpful to those new to these services such as students and new practitioners; however, even experienced clinicians continue to refer to these to ensure a consistent approach to their patient assessments and documentation. For example, assessments related to patient self-care of common ailments often follow the “SCHOLAR” (**S**ymptoms, **C**haracteristics, **H**istory, **O**nset, **L**ocation, **A**ggravating factors, **R**emitting factors) and “MACS” (**M**edications, **A**llergies, **C**onditions, **S**ocial history) mnemonics.²³ Similarly, the “OPQRST” (**O**nset, **P**alliation and provocation, **Q**uality and quantity, **R**egion and radiation, **S**igns and symptoms, **T**emporal relationship) mnemonic is valuable to the assessment of pain.²⁴ These frameworks provide health professionals with a structure to perform these assessments upon, adding to their confidence that their assessment will not miss any important elements that may affect their clinical decision-making.

A review of the literature in PubMed, using search terms “travel medicine,” “risk assessment,” and “triage,” did not identify any published triaging tools or frameworks available to assist healthcare professionals with both information gathering and clinical decision making when performing pre-travel consultations. While a number of clinical practice guidelines^{3,25,26} and publications such as the Centers for Disease Control and Prevention’s (CDC) *Yellow Book: Health Information for Travelers* exist, little guidance is provided on how to interpret and implement this information into practice. This results in a wide variation of treatment experiences and recommendations for the travelling patient and inconsistencies in the assessment of a travelling patient’s healthcare needs.

As previously mentioned, there are many articles reviewing the therapeutics of travel medicine for both pharmacists and physicians. In both the American Family

Physician and Canadian Family Physician journals, review articles were published that detail how to conduct a pretravel consultation.^{3,26} Information is presented on immunization and travel-related conditions, but the key component missing is how to ascertain and manage a travelling patient's individual risks. Although the Canadian Family Physician article does provide a travel medicine triage algorithm and sample pretravel risk assessment questionnaire,³ its use in practice is uncertain as it has not been tested for validity, comprehensiveness, and feasibility. Moreover, its applicability to pharmacists in the community setting is uncertain due to differences in practice sites, scope of practice, and approach to patient assessments from those used by family physicians who are the intended audience of the article.

1.4 Pharmacists' Interventions in Travel Medicine

A review of the known literature regarding pharmacists' interventions on travel-related health conditions yields few results. Most articles are comprised of reviews detailing the therapeutics of travel medicine for pharmacists (e.g., treatment of travellers' diarrhea, malaria chemoprophylaxis). Few studies explore the health outcomes of pharmacist care towards travelling patients or pharmacists' competence in travel medicine. Of the known literature, the research results surrounding pharmacists' interventions related to travel medicine can be categorized into two themes:

1. Given extensive postgraduate training and experience in practice, pharmacists can positively impact health outcomes among travellers.²⁷⁻³¹
2. Given the minimal competencies required for pharmacists to practice, pharmacists are inadequately prepared to care for travelling patients. Further education and training regarding travel medicine for pharmacists are also often discussed in the studies within this theme.³²⁻³⁴

1.4.1 Pharmacists with Travel Medicine Expertise

Pharmacists whose travel-related care has been studied can simply be divided into two types: those with or without travel medicine expertise. This expertise is often defined as individuals with CTH[®] designation, and/or those who have completed a post-baccalaureate Doctor of Pharmacy (PharmD) with or without a hospital-based or primary care residency. These pharmacists who have travel medicine experience appear confident in their care, as exhibited through creating their own travel health clinics, and demonstrate strong patient outcomes and pharmacist competence. Durham et al., demonstrated that pharmacists provided more consistent evidence-based care concordant with guideline recommendations when comparing pharmacist travel health specialists versus primary care providers with no travel health expertise.²⁷ Specifically, antibiotics for the prevention and treatment of

travellers' diarrhea, malaria chemoprophylaxis, and immunizations against vaccine-preventable diseases were prescribed more appropriately under pharmacist travel health care than primary care.²⁷ Primary care providers were more inconsistent with the guidelines, defined as either ordered a drug when not indicated (e.g. 21% vs. 3% for travellers' diarrhea, $p < 0.0001$) or did not order a drug when indicated (e.g. 49% vs. 6% for travellers' diarrhea, $p < 0.0001$).²⁷ Patient receipt of recommended vaccinations was also higher among patients cared for by the travel health pharmacists (mean= 2.77 vs. 2.31, $p=0.0039$).²⁷ Furthermore, a study of a telepharmacy travel clinic estimated a saving of \$47,000 annually (based on ~720 consults) in unnecessary vaccinations when compared to a nurse-based travel clinic, such as vaccinations for travel to countries with a low risk for travel-related vaccine preventable disease, or for patients with itineraries that place them at low risk of exposure.³⁰ However, the generalization of these savings is potentially limited due to the fact that the study focussed on a single site - the Clinical Pharmacy International Travel Clinic serving the Kaiser Permanente Colorado Region. The cost-analysis of pharmacist interventions on travel medicine have not been extensively studied and no definitive recommendations for its implications can currently be made.

Studies have also demonstrated a high level of patient satisfaction and acceptance of recommendations made by a pharmacist with CTH[®] designation. A retrospective cross-sectional study by Tran et al. found that pharmacist recommendations in a pretravel supermarket pharmacy clinic were well accepted, including a 79.4% acceptance rate for hepatitis A vaccine.³¹ Overall satisfaction was rated at 94% for the pharmacist-provided travel clinic. Tran et al.'s results correlate closely with Hess et al.'s high patient acceptance rates of their comprehensive pre-travel health clinic.^{28,31} Notably, both studies have practice settings that reflect those of Canadian community pharmacies, as opposed to primary care clinics where pharmacists operate under medical directives in other studies. A recent

Canadian cohort study conducted in Alberta, a province where pharmacists have been practicing with broad scopes related to administering immunizations and prescribing for a more extensive period than Ontario, provides further evidence supporting the role of pharmacists in travel medicine. Of a convenience sample of patients presenting to a pharmacist-managed travel clinic, positive patient satisfaction and health status while travelling was found, with 94% of participating patients reporting being either very satisfied or satisfied with the care delivered, with infrequent health concerns occurring during travel.²⁹ Among patients who did have a health concern while travelling, 93% felt adequately prepared by the pharmacist to manage the condition.²⁹

1.4.2 Pharmacists without Travel Medicine Expertise

However, the literature has identified areas for improvement when evaluating care provided by pharmacists without additional travel medicine training.³²⁻³⁵ In a pilot study examining pharmacist-provided education and adherence rates for the oral typhoid vaccine, 59% of travellers did not report having received any verbal education from the dispensing pharmacies.³² Furthermore, while 80% of travellers received written material from the pharmacy, such as product monographs or patient education sheets, only 37% of patients found this information helpful.³² Although this hospital-based clinic located in rural Colorado, named the Traveler's Clinic, states that patients were given education in both written and oral formats during their visit, the study's findings are limited by potential recall bias, as data was collected through a retrospective telephone survey where travellers were contacted within 6 months of receiving their prescription.³² Nonetheless, because the vaccine has a unique dosing schedule and subsequent compliance issues, appropriate measures should be undertaken, such as follow-up strategies, to ensure travellers have received and understood its education and instructions for use.³² Even when pharmacists self-identified as experienced travel health advisors (although not supported by ISTM's

CTH[®] designation), their recommendations for rabies pre- and post-exposure prophylaxis were generally discordant with guidelines.³³ Ross et al., demonstrated that travel medicine topics such as rabies pre- and post-exposure prophylaxis can exhibit flaws even with an “experienced” group of healthcare professionals,³³ highlighting the need for a standardized approach to travel medicine patient cases that will be discussed further. The assessment of answers from their internet-based questionnaire scenarios found that the participants do not inform travellers equally about the risk of rabies in countries where the disease is enzootic, with only 35-60% of the advisors providing this information to those planning business trips, packaged tours, or travel to urban centres.³³ It is important to note that this data includes both pharmacists and physicians and no specific analysis was done to single out pharmacist care. Lastly, in a questionnaire by Teodosio et al. surveying Portugal pharmacists’ travel advice for the tropics, many responses contained incomplete and/or incorrect travel advice.³⁴ For example, when asked to identify which Portuguese-speaking countries warrant yellow fever vaccination, only 8 out of 91 pharmacists (8.8%) could correctly do so.³⁴ However it is interesting that pharmacists’ personal interest in travel medicine even without additional training appeared associated with more appropriate recommendations.³⁴ In another telephone questionnaire of pharmacists in Switzerland by Kodkani et al., when spontaneously asked to provide advice on malaria protection for travellers to Thailand and Kenya only 19% and 31% of pharmacists gave accurate advice on those travel destinations, respectively.³⁵ A similar trend can be exhibited in Canada, where many pharmacists have an interest in travel medicine but do not feel they are currently adequately prepared for such clinical scenarios.³⁶ It is important to note that although pharmacists may not feel confident in providing travel health advice unaided, pharmacists are confident in knowing which sources to consult for travel health information if an answer needed to be looked up.³⁶ This is notable as the accuracy of advice in Kodkani

et al.'s study increased when pharmacists were allowed to consult their resources, particularly for malaria prevention with accuracy rates of 74% for Thailand and 93% for Kenya.³⁵

A sub-theme relating to pharmacists' preparedness when caring for travelling patients is the need for further training or education in travel medicine. Due to travel medicine's complexity, need for individualized care, and unfamiliarity to the average pharmacist, this lack of education could be a key barrier stopping pharmacists from providing even basic travel medicine services. Many preliminary studies have identified this barrier, and suggest that a gap in training in pharmacy school curricula is a contributor.^{4-6,36} Pharmacy schools across the US and Canada do not have robust travel medicine competencies built into their core curricula, apart from immunization training, which tends to focus on influenza vaccination.^{4-6,36} This lack of exposure during pharmacists' training years as students likely impacts the provision of these services upon licensure. Further investigations into the scope of this problem need to be completed in order to make a definitive conclusion.

1.5 Current Landscape and Associated Challenges of Travel Medicine Scope for Ontario Pharmacists

As previously mentioned, in December 2016 the Ontario government expanded the scope of pharmacists' immunizations to include 13 vaccine-preventable diseases in addition to the influenza vaccine.²¹ The focus of these vaccines is largely travel-related. Although expansions in scope are generally well-received, legislative changes do not directly result in practice changes. As observed with previous expansions to scope (e.g. adapting and renewing prescriptions or conducting medication reviews), pharmacist uptake of new roles and responsibilities can be a gradual process and there may be hesitation to implement it into practice.³⁷⁻⁴⁰ A number of practical factors such as increased workload, patient safety concerns, and complexity of the clinical area coming into scope can make pharmacists hesitant to change.⁴¹ Additionally, questions can linger on how employers will support pharmacists in a new scope of practice or whether or not decision makers have taken into account the infrastructure, remuneration, or workflow considerations unique to the pharmacy profession.⁴¹ This culture of slow pharmacy practice change can also be linked to pharmacists' personality traits related to patient care, including: lack of confidence, fear of new responsibility, paralysis in the face of ambiguity, need for approval, and risk aversion.⁴² The traditional scientific nature of the profession and its education emphasizing memory and adherence to procedures, as opposed to application of knowledge and clinical judgment, leading pharmacists to not take action until their arguments or conclusions are fully solidified.⁴³

1.5.1 Ontario's Uptake of Expanded Immunization Services

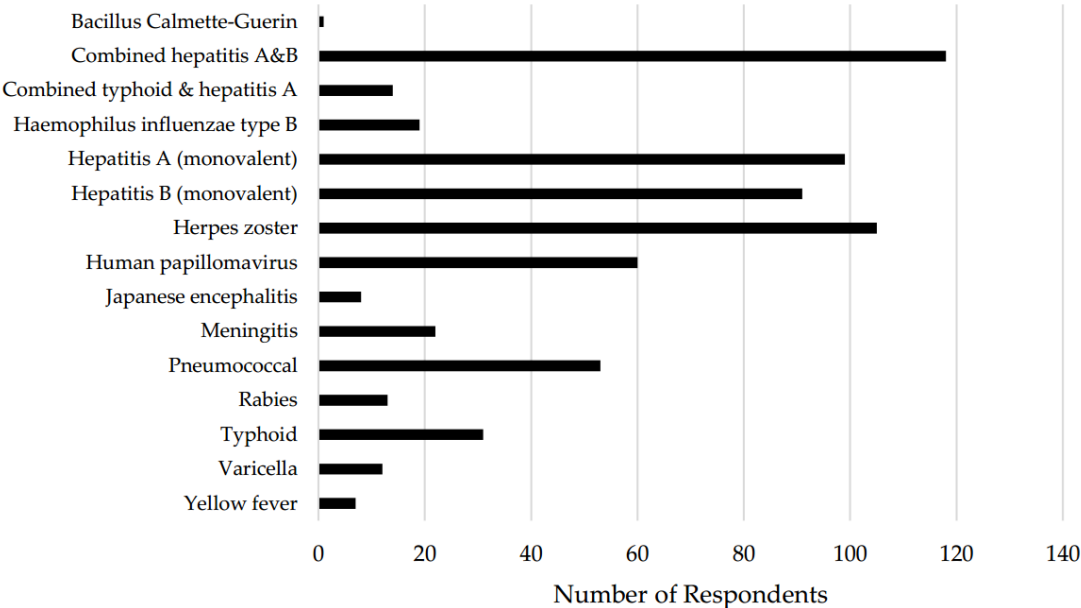
In an online survey released 1-2 years after the expansion of Ontario pharmacists' scope, input from 205 pharmacist respondents was gathered to understand how the change in scope was being used among Ontario pharmacists. Following the online survey, telephone

interviews were conducted with 6 participants until saturation was reached. The results are as follows:

1.5.1.1 Vaccination

87% (n=178) of respondents were injection-certified by the college and, of these, 78% reported personally administering travel vaccines at their pharmacy (defined as any vaccines currently within their scope other than influenza).⁴⁴ Vaccination was most commonly performed by walk-in (69%), followed by appointment (24%) and during set days or hours such as a clinic day (6%). However, the preferred method by 54% of respondents was appointment-based, with 17% preferring walk-in.⁴⁴ Figure 2 illustrates the self-reported breakdown of vaccines administered since the expansion of scope. 94% of respondents reported administering fewer than 10 of these vaccines per month in total, indicating a slow uptake of this service.⁴⁴ It is important to note that this number can also include non-travel vaccines, such as herpes zoster and human papillomavirus.

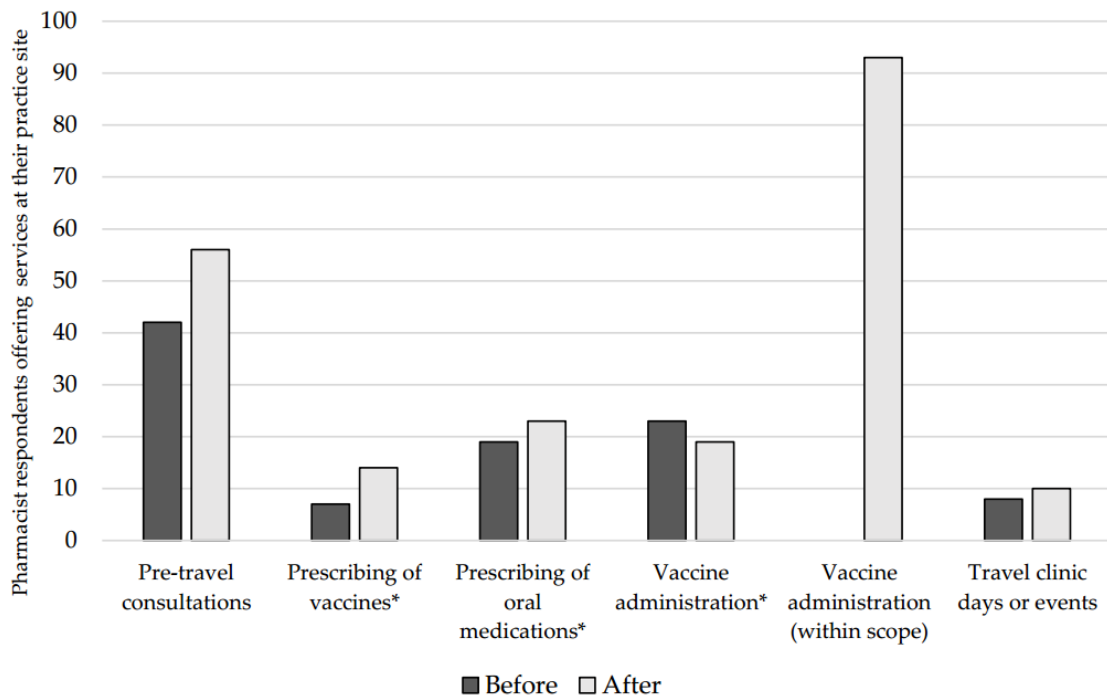
Figure 2 – Self-report of vaccinations administered by pharmacists since scope expansion in December 2016⁴⁴



1.5.1.2 Pretravel Consultations

Pre-travel consultations were offered by roughly 1 in 4 respondents (n=56, 27%).⁴⁴ Similar to vaccination administration, consultations were most commonly done via walk-in (55%), followed by appointment-based (40%). Again, pharmacists preferred to do consultations via appointment (62%), with only 16% preferring walk-in.⁴⁴ Aside from vaccination, pretravel consultations were the most frequent service offered, and had a relative increase in frequency of 33% two years following scope expansion versus before (see Figure 3).⁴⁴ Patients requiring travel advice and/or vaccinations were identified in one of three ways: 1. Patients self-identifying (e.g. patient presents to pharmacy asking what vaccinations are needed for an upcoming trip); 2. Referral from other healthcare professionals who were aware of the pharmacists' scope; 3. Pharmacists' identification based on incoming prescriptions related to travel (e.g. travellers' diarrhea, malaria chemoprophylaxis).⁴⁴ In terms of future thinking, "71% of respondents indicated an interest in receiving their Certificate in Travel Health[®] designation from the International Society of Travel Medicine within the next 5 years."⁴⁴

Figure 3 – Travel related services offered by pharmacists pre- and post- scope expansion⁴⁴



Asterisk denotes activity requiring delegation or medical direction.

1.5.1.3 Confidence with New Scope

While pharmacists are highly confident in immunization against influenza, varying confidence levels were found with the additional vaccinations added to their scope.

Confidence levels could be attributed to:⁴⁴

- “Lower demand for non-influenza vaccinations.”⁴⁴ In Ontario, there is a universal influenza immunization campaign, with vaccination recommended for all residents without contraindications to the vaccine. However, the other vaccines do not have such universal recommendations resulting in less indications and lower demand to be vaccinated.
- “Confidence is directly related to level of exposure.”⁴⁴ The lower demand meant less opportunities for pharmacists to administer the additional vaccinations and determining their clinical appropriateness. One pharmacist that had been practicing with a medical directive to administer non-influenza vaccinations since 2012

reported high confidence, which was not seen with the other respondents. Others had varying confidence depending on the vaccine (e.g. more confidence with herpes zoster than yellow fever).

- “Duration of available scope:”⁴⁴ Influenza vaccination by pharmacists has been authorized for a longer time than the new additional vaccinations (2012 vs. 2016). Time has allowed pharmacists to become more comfortable with all the parameters involved in vaccination against influenza (e.g., volume, route, adverse effects). However, pharmacists’ familiarity is not the same for the additional 13 vaccines because there hasn’t been a long enough duration of exposure to become comfortable with the knowledge associated with these additions to scope.

1.5.1.4 Barriers and Facilitators

Survey respondents cited a number of barriers and facilitators impacting uptake of these immunization services. As seen by Figures 4 and 5, respectively, more barriers were mentioned than facilitators. Education in travel medicine and prescribing authority were seen to be 2 factors that can most help with pharmacists’ uptake of this scope. In terms of travel health training, one pharmacist reported “[it’s] kind of like you need to go above and beyond what is out there to make sure you have the background information....it’s not like every day practice.”⁴⁴ However, time to provide services, lack of training and lack of awareness of the new scope among the public were seen as the top barriers. As one pharmacist said, “I don’t think [regulation change] had a big change. I don’t know if the patients are even aware about it or if it’s advertised.”⁴⁴ A strong facilitator mentioned across all pharmacists that were interviewed was the convenience that pharmacist-provided services offers for patients. As one pharmacist said “you can wait and go to your doctor, if you like, go book an appointment, take another day off work...Or you can get them right here, right now, and maybe wait for five minutes or ten minutes for me.”⁴⁴ Despite this

positivity, uptake of these services is still deemed slow and receptiveness is not as open as other pharmacist activities (e.g., influenza immunization).

Figure 4 – Barriers affecting pharmacist offering of travel-related services⁴⁴

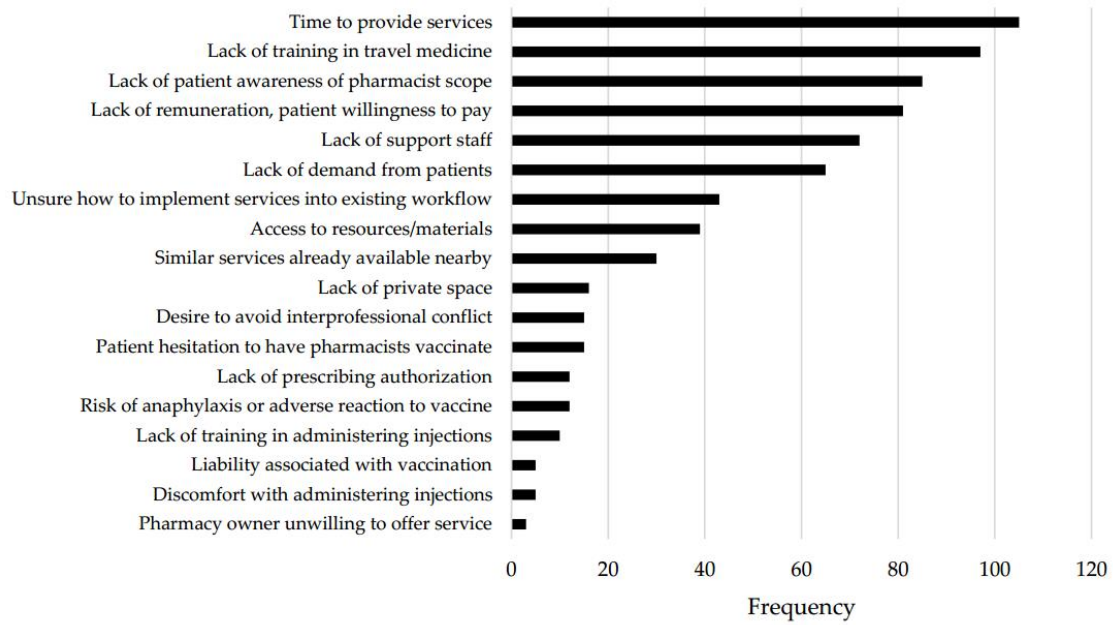
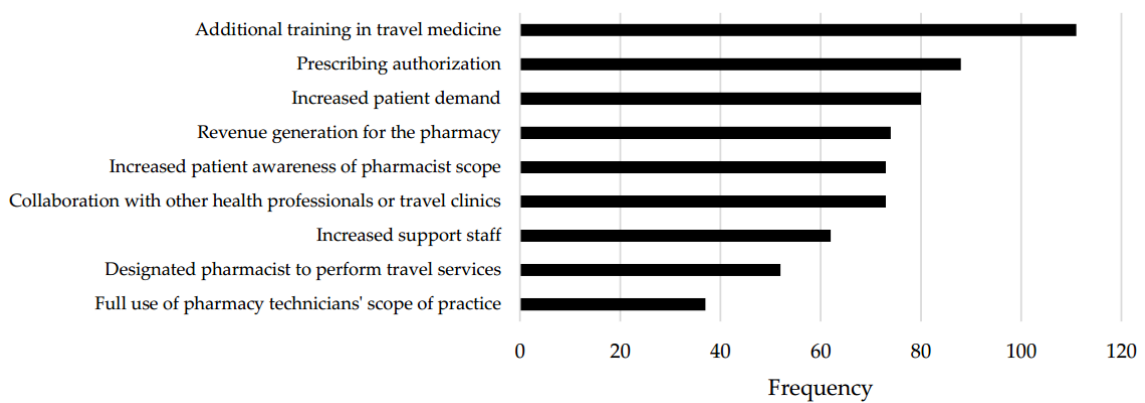


Figure 5 – Facilitators (actual or potential) affecting pharmacist offering of travel-related services⁴⁴



1.6 Aim and Scope of Thesis

The aim of this thesis was to develop and test a clinical practice framework that can address the challenges pharmacists face when beginning to provide travel medicine services. Two phases of research were completed: 1) development, and 2) assessment of the framework. The development phase primarily consisted of a panel of CTH[®] experts creating a content-validated tool. The assessment phase focussed on community pharmacists' experiences using the framework from March to August 2019.

1.7 Significance of Thesis

The aforementioned framework will be the first of its kind to be created in the clinical area of travel medicine. The anticipated significance is three-fold:

- a. Link travel medicine risk assessment into a practice-focused approach that has never been explored before among pharmacists.
- b. Address knowledge gaps regarding travel medicine risk assessments that may be preventing pharmacists from offering this clinical service, particularly for low-risk patients.
- c. Provide an efficient and accurate tool that pharmacists have identified as being a potential facilitator to their uptake and incorporation of travel medicine services,^{36,44} with consideration of existing pharmacy workflow.

Currently, the framework will be developed for, and tested by, pharmacists.

However, if successful, this framework can be trialed among other healthcare professions, such as medicine and nursing, for even broader adoption of travel medicine services into practice.

1.8 Thesis Overview

This chapter has introduced the reader to the current landscape of travel health services among pharmacists, including its challenges, perceptions, benefits, and initial impact of the expanded scope of practice for Ontario pharmacists. The following two chapters will feature the two phases of the thesis: development and assessment of the framework. Finally, the thesis will conclude with an overall discussion of the work conducted and future directions.

Chapter 2: Framework Development

2.1 Introduction

In December 2016, the government in Ontario, Canada expanded the scope of pharmacists' immunization administration authority to include 13 vaccine-preventable diseases in addition to the influenza vaccine.²¹ Although expansions in scope are generally well-received, legislative changes alone do not directly result in practice changes. As observed with previous expansions to scope (for example, adapting and renewing prescriptions or conducting medication reviews), pharmacists' uptake of new roles and responsibilities can be a gradual process, and there may be hesitation to implement it into practice.³⁷⁻⁴⁰

A survey of community pharmacists, approximately two years following scope expansion in Ontario, found that the initial uptake of this scope expansion was slow, with 94% of respondents reporting that they administered fewer than 10 of the new vaccinations added to their scope per month. Of note, these also included non-travel vaccinations, such as herpes zoster and human papillomavirus vaccinations, which represented the second- and fifth-most frequently administered vaccines, respectively.⁴⁴ When asked about the new vaccinations, pharmacists cited varying levels of confidence with administering or recommending vaccinations for travel. This was attributed to lower familiarity with the vaccines and a perceived lack of clinical knowledge in travel medicine.⁴⁴

The results of the aforementioned survey align with previous studies regarding pharmacists that are beginners to the field of travel medicine. When reviewing the literature surrounding pharmacists' care in travel medicine two themes emerge:

1. Given extensive postgraduate training and experience in practice, pharmacists can positively impact health outcomes among travellers.²⁷⁻³¹

2. Given the entry-level competencies required for pharmacists to practice, and lack of travel medicine training in pharmacy school curricula, most pharmacists without additional training or experience in travel medicine feel inadequately prepared to care for travelling patients. Further education and training regarding travel medicine for pharmacists are also often discussed as strategies to be explored by the studies with this theme.³²⁻³⁴

Travel medicine expertise is often defined as an individual holding the International Society of Travel Medicine's (ISTM) Certificate in Travel Health™ (CTH®) and/or those who have completed a post-baccalaureate Doctor of Pharmacy (PharmD) with or without a hospital-based or primary care residency. These pharmacists exhibit confidence in their care, demonstrated through the creation of their own travel health clinics, perceived self-competence, and strong patient outcomes. Pharmacists with travel medicine expertise have been found to consistently make evidence-based recommendations concordant with guidelines and their patients report a high level of satisfaction, including acceptance of recommendations and a sense of preparedness to manage health conditions that arise while travelling.²⁷⁻³¹ However, the literature indicates deficiencies when evaluating care provided by pharmacists without additional travel medicine training. Although pharmacists are interested in travel medicine, they report not feeling adequately prepared for it, which has resulted in lack of patient education regarding oral typhoid vaccination, incomplete and/or incorrect travel advice, and recommendations regarding rabies pre- and post-exposure prophylaxis discordant with guidelines.³²⁻³⁴

Related to pharmacists' need for further training or education in travel medicine, the complexity of travel medicine (for example, regional differences in disease epidemiology, outbreaks, and changes in resistance patterns for infectious diseases) and need for individualized care is noted by pharmacists. Many preliminary studies have identified this

barrier and suggest that a gap in training in pharmacy school curricula is a contributor.^{4-6,36} Pharmacy schools across the US and Canada do not have robust travel medicine competencies built into their core curricula, apart from immunization training, which tends to focus on influenza and other routine vaccinations.^{4-6,36} This lack of exposure during pharmacists' training years as students likely impacts the provision of these services upon licensure. Further investigations into the scope of this problem need to be completed in order to make a definitive conclusion on the extent of this as a contributor and strategies to best address it.

Given the historical pattern of uptake of expansions to pharmacy practice, similar challenges are anticipated regarding travel medicine activities, which may be amplified by additional practical factors such as lack of confidence with therapeutic knowledge in the area, lack of direction and support for the new service, and challenges with integrating the new service into the pharmacist's existing workflow. Previous studies surveying pharmacists' opinions have mentioned that an educational aid or practice tool may be a valuable facilitator to increase the uptake of travel medicine services.^{36,44}

To address these factors, we created and content-validated a questioning framework that pharmacists can use to triage risk factors among travelling patients. Pharmacists currently utilize various frameworks to guide patient assessments across a number of therapeutic areas. These frameworks are especially helpful to those new to the areas, such as students and new practitioners; however, even experienced clinicians continue to refer to frameworks to ensure a consistent approach to their patient assessments and documentation. For example, assessments related to patient self-care of common ailments often follow the "SCHOLAR" (Symptoms, Characteristics, History, Onset, Location, Aggravating factors, Remitting factors) and "MACS" (Medications, Allergies, Conditions, Social history) mnemonics.²³ Similarly, the "OPQRST" (Onset, Palliation and Provocation, Quality and

Quantity, Region and Radiation, Signs and Symptoms, Temporal relationship) mnemonic is valuable to the assessment of pain.²⁴ These frameworks provide health professionals with a structure to perform these assessments upon, adding to their confidence that their assessment will not miss any important elements that may affect their clinical decision-making.

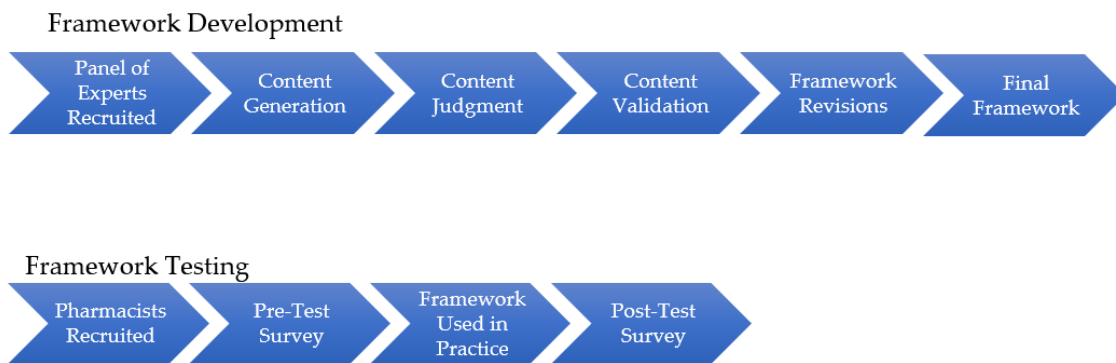
The current literature contains no published frameworks to assist pharmacists in the area of travel medicine. While a number of clinical practice guidelines and publications, such as the Centers for Disease Control and Prevention's (CDC) Yellow Book 2020: Health Information for International Travel, exist, little guidance is provided on how to interpret and implement this information into practice.^{2,3,26} This results in a wide variety of treatment experiences for the traveling patient and inconsistencies in the assessment of a traveling patient's healthcare needs. Of the resources available, none are tailored for applicability to the pharmacy profession (e.g., different practice sites, scope of practice, approach to patient assessments).

The objective of this study was to create an expert-informed validated clinical practice framework that pharmacists can use for risk assessment of traveling patients. The following article details the development and preliminary testing of the framework in community pharmacies and the impact this framework had on pharmacy practice in Ontario, Canada.

2.2 Methods

Ethics approval for both the development and testing phases of the study was received from the University of Waterloo Research Ethics Committee (ORE #40021). Figure 6 describes the overall methodological process of this study.

Figure 6 – Methodological process



2.2.1. Framework Development

The framework was developed in four stages: content generation, content judgement, validation, and final framework production. A panel of experts known to the authors was recruited to complete the first three stages. All interaction with the panel was done electronically through email communication.

The criterion used to define our subject matter experts was a healthcare professional that had obtained the International Society of Travel Medicine’s Certificate in Travel Health™ (CTH®). The CTH® is an internationally-recognized designation, which indicates that the person understands a wide body of knowledge related to travel medicine.¹⁰ Currently there is no consensus on the number of subject matter experts recommended to develop or review an instrument.⁴⁵ Although the more experts included decreases the probability of agreement due to chance and can better inform the framework’s

development, the maximum number is often up to 10 experts.^{45,46} In order to eliminate split decisions, while still gathering sufficient input, a panel of 9 experts was recruited.

2.2.1.1. Content Generation

An open-ended question was posted to the panellists to gather a list of items to consider for the framework: “What information do you gather to ascertain a traveling patient’s risk and what questions do you ask to obtain that information?” All items collected in this stage were collated, organized into broad domains, and considered in the following content judgement stage.

2.2.1.2. Content Judgement

Each item identified in stage 1 was included in a web survey, administered using Qualtrics™ software (Qualtrics, Provo, UT, USA), which asked panellists to categorize each item as one of: essential; useful, but not essential; or not necessary. Only those items that were categorized as essential by more than half of the panellists ($n \geq 5$) moved on to the content validation stage. Experts were also given the option at the end of the survey to provide any comments, such as the addition, deletion, or re-wording of any item(s), which would be considered in subsequent stages.

2.2.1.3. Content Validation

The quantitative index used to measure content validity for the framework was the Content Validity Index (CVI). The CVI involves the panel of experts rating each item based on content relevance or representativeness for an instrument and is considered the most widely utilized method of quantifying content validity.⁴⁵ The panel was asked to rank the relevancy of each item that can be used in determining whether the traveller is a low- or high-risk patient. This was administered via another web survey using Qualtrics™ software (Qualtrics, Provo, UT, USA). The ranking was based on a 4-point Likert scale (1: not relevant; 2: somewhat relevant; 3: quite relevant; 4: highly relevant). A 4-point scale was

selected over a 3- or 5-point rating scale because it does not contain a midpoint rating, forcing the expert to make a choice as opposed to being neutral or unsure, and also allows provides adequate information to calculate a CVI.^{45,47}

To quantify the framework's validity, each item's content validity index (I-CVI) was calculated, in addition to the overall Average Content Validity Index (Ave-CVI). The I-CVI was calculated "by counting the number of experts who rated the item as a 3 or 4 and dividing that number by the total number of experts, that is, the proportion of agreement about the content validity of an item."⁴⁸ There are many ways to calculate an instrument's Ave-CVI (e.g., the proportion of items rated relevant across experts can be averaged, the I-CVIs can be summed and divided by the number of items, or the total of number of ratings as a 3 or 4 can be counted and divided by the total number of ratings); for this study, all I-CVIs were averaged to calculate the Ave-CVI. It is important to note that all three methods for calculating the Ave-CVI will yield the same value, but it has been suggested that averaging the I-CVIs is "more related to the quality of the items rather than the performance of experts."⁴⁹ As a valid framework is defined as having an Ave-CVI ≥ 0.90 , if not achieved in the first round of surveys, items will be revised and recirculated to the panel until this value is obtained.

2.2.1.4. Construction of The Framework

Construction of the framework involved the organization of each included item into domains using a checklist format to facilitate ease of use in practice. Following content validation, a preliminary framework was made. To ensure understandability and face validity, 3 Canadian-licensed pharmacists that had been practicing for less than 5 years and had no formal training or self-identified expertise in travel medicine were asked to review the framework for clarity and provide feedback, as they represent a potential user group of

the framework. The framework was subsequently revised until each of the pharmacists expressed satisfaction with it.

2.2.2 Framework Testing

2.2.1. Study Design and Recruitment

To obtain an initial evaluation of the framework, we used a pre-and post-test study design with the availability of the framework being the intervention. Pharmacist participants were recruited using personal contacts of the researchers, including previous participation in travel medicine studies. Recruitment of the participants was ongoing from January to April 2019. The inclusion criteria for the pharmacists was:

1. Current practice is in a community pharmacy.
2. Part A (able to provide direct patient care) licensure through the Ontario College of Pharmacists (OCP) or 4th year entry-to-practice PharmD student currently on clinical practice rotation.
3. Does not currently hold CTH[®] designation from ISTM. This exclusion was applied as it is a global indicator that the individual has an advanced level of travel medicine knowledge,¹⁰ whereas this framework was developed specifically for pharmacists without experience or expertise in travel medicine.

2.2.2.2. Data Collection

The testing took place from March to August 2019 at community pharmacies across Ontario, Canada. During this study period, pharmacists were instructed to “Please utilize the framework in your practice, as you deem fit, to triage patients as either high or low risk travellers.” If the framework was used, the pharmacists were asked to record metrics on the back of the framework. These metrics included the date used, estimated triage time

(minutes), whether the patient was referred or not and the reasoning behind the decision made. These metrics were then faxed to the researchers at the end of each month.

At the time of enrolment, participants were asked to complete a survey to gather baseline information on their demographics, practice-related characteristics, and current practices regarding travel medicine (Appendix B). Pharmacists were also asked to complete an online survey in September 2019 once the study period had concluded. This survey gathered feedback on the framework's feasibility and impact on pharmacy practice (Appendix C). Feedback was gathered using open-ended questions that allowed participants to describe the main advantages and disadvantages of the framework, as well as provide any suggestions for improvement and detail how pharmacists saw the framework being incorporated into their pharmacy workflow.

All surveys were administered using QualtricsTM software (Qualtrics, Provo, UT) with questions collecting both quantitative and qualitative data, using free-text answer formats. Descriptive statistics were performed using Microsoft Excel for Windows 10, Version 1902 (Redmond, WA).

2.3 Results

2.3.1. Framework Development

As pharmacists are the intended primary audience for the tool, seven of the nine experts recruited were pharmacists, and the remaining two were family physicians (Table 2).

Table 2 – Demographics of expert panellists

Panellist	Profession	Gender	Year of Licensure	Year CTH® Achieved	Practice Setting	Canadian Province of Practice
1	Physician	Female	1999	2007	Medical Clinic	Ontario
2	Physician	Male	2011	2013	Medical Clinic	Ontario
3	Pharmacist	Female	2009	2017	Community Pharmacy	British Columbia
4	Pharmacist	Female	1999	2011	Community Pharmacy	Nova Scotia
5	Pharmacist	Female	1994	2015	Community Pharmacy	Alberta
6	Pharmacist	Male	1993	2015	Consultant	Ontario
7	Pharmacist	Male	2012	2014	Community pharmacy	British Columbia
8	Pharmacist	Female	1999	2011	Travel Clinic	Alberta
9	Pharmacist	Female	2013	2015	Community Pharmacy	Ontario

Panellists submitted their responses online for content generation (stage 1) in a variety of formats, including detailing their thought process with a traveller, or submitting resources and/or questionnaires used in their practices. A total of 114 unique items were identified in stage 1, which were organized into 6 domains of information gathering, as indicated in Table 3.

Table 3 – Domain identification and definition

Domain	Definition
Who?	Patient specific-factors (e.g., medical conditions)
What?	Itinerary-specific factors (e.g., activities planned during travel)
When?	Timeframe of travel (departure date, duration at destination)
Where?	Country(ies) and region(s) visited, including order if more than one
Why?	Motivation for travel (e.g., visiting friends and relatives)
How?	Travel style and history (e.g., previous travel experience)

Rankings on the essentialness of the 114 items in stage 2 are provided in Appendix D. The response rates of panellists for stages 1 and 3 of the study were each 100%. However, the response rate for stage 2 was 78% (n = 7) due to the unavailability of two panellists during the data collection period. Despite fewer panellists participating in stage 2, the decision was made to still require 5 or more of them to deem an item to be essential for it to be included in the content validation stage.

In total, 64 items were categorized as essential and moved on to content validation. At this point, the “How” domain was removed completely from the final framework as none of its items were ranked essential, leaving the 5 ‘W’ domains of *who*, *what*, *where*, *when*, and *why*. A full breakdown of how those 64 items were ranked according to relevancy, including their I-CVI, can be found in Table 4. The Ave-CVI across all items was calculated to be 0.91. Upon re-consideration, 2 items regarding dining were switched from the “Where?” to the “What?” domain for appropriateness. Additionally, further information on the definition of immunocompromised status and a list of countries that could be considered high-risk was added following framework review by practicing pharmacists.

Table 4 – Framework item and average content validation summary

Item	Not Relevant (%, n)	Somewhat Relevant (%, n)	Quite Relevant (%, n)	Highly Relevant (%, n)	I-CVI
Who?					
Diabetes	0% (0)	11.1% (1)	33.3% (3)	55.6% (5)	0.89
Blood or clotting disorder	11.1% (1)	0% (0)	22.2% (2)	66.7% (6)	0.89
Heart disease or arrhythmia	0% (0)	11.1% (1)	33.3% (3)	55.6% (5)	0.89
Seizure disorder	0% (0)	11.1% (1)	33.3% (3)	55.6% (5)	0.89
Emotional/psychiatric condition(s)	0% (0)	11.1% (1)	33.3% (3)	55.6% (5)	0.89
Inflammatory bowel disease	0% (0)	33.3% (3)	22.2% (2)	44.4% (4)	0.67
Thymus disorders (e.g., myasthenia gravis)	0% (0)	11.1% (1)	11.1% (1)	77.8% (7)	0.89
Liver or kidney disease	0% (0)	11.1% (1)	33.3% (3)	55.6% (5)	0.89
Damaged or removed spleen	0% (0)	11.1% (1)	22.2% (2)	66.7% (6)	0.89
Organ or bone marrow transplant	11.1% (1)	0% (0)	0% (0)	88.9% (8)	0.89
Recent chemotherapy or radiation (<4 months)	11.1% (1)	0% (0)	0% (0)	88.9% (8)	0.89
HIV, AIDS, immune suppressed or immunocompromised	11.1% (1)	0% (0)	0% (0)	88.9% (8)	0.89
Currently pregnant	0% (0)	0% (0)	0% (0)	100% (9)	1
Planning to get pregnant soon after travel	0% (0)	0% (0)	44.4% (4)	55.6% (5)	1
Breastfeeding	0% (0)	11.1% (1)	55.6% (5)	33.3% (3)	0.89
Blood thinners (e.g., warfarin, clopidogrel)	0% (0)	0% (0)	44.4% (4)	55.6% (5)	1
Corticosteroids	0% (0)	0% (0)	11.1% (1)	88.9% (8)	1
Chemotherapy or other anti-cancer medications	0% (0)	0% (0)	0% (0)	100% (9)	1
Quinine, quinidine, or other cardiac drugs	0% (0)	0% (0)	44.4% (4)	55.6% (5)	1
Medications for mood disorder or emotional problems	0% (0)	11.1% (1)	44.4% (4)	44.4% (4)	0.89
Medications to control seizures	0% (0)	0% (0)	66.7% (6)	33.3% (3)	1
Age	0% (0)	0% (0)	55.6% (5)	44.4% (4)	1
Date of birth (for immunization purposes)	0% (0)	22.2% (2)	55.6% (5)	22.2% (2)	0.78
Allergy to streptomycin, gentamicin or neomycin etc.	0% (0)	11.1% (1)	44.4% (4)	44.4% (4)	0.89
Traveling with children	0% (0)	11.1% (1)	44.4% (4)	44.4% (4)	0.89
Awareness of immunization status	0% (0)	11.1% (1)	44.4% (4)	44.4% (4)	0.89
Serious reaction in the past with vaccines	0% (0)	0% (0)	22.2% (2)	77.8% (7)	1
Where?					
Country/Countries	0% (0)	0% (0)	11.1% (1)	88.9% (8)	1
Cities/Regions	0% (0)	0% (0)	22.2% (2)	77.8% (7)	1
Dates for travel for each country and/or city (if more than one)	0% (0)	0% (0)	77.8% (7)	22.2% (2)	1
Rural/urban areas	0% (0)	0% (0)	66.7% (6)	33.3% (3)	1
Hostels	0% (0)	11.1% (1)	55.6% (5)	33.3% (3)	0.89
Friend/family's home	0% (0)	0% (0)	22.2% (2)	77.8% (7)	1
Camping	0% (0)	0% (0)	55.6% (5)	44.4% (4)	1
When?					
Departure/arrival dates	0% (0)	55.6% (5)	22.2% (2)	22.2% (2)	0.44
Last minute traveler (<4 weeks)	0% (0)	11.1% (1)	33.3% (3)	55.6% (5)	0.89

Length of stay	0% (0)	0% (0)	44.4% (4)	55.6% (5)	1
Why?					
Visiting friends/family	0% (0)	0% (0)	22.2% (2)	77.8% (7)	1
Athletic competition	0% (0)	44.44% (4)	33.33% (3)	11.11% (1)	0.44
Religion (e.g., Hajj)	0% (0)	0% (0)	22.2% (2)	77.8% (7)	1
Medical tourism	0% (0)	0% (0)	11.1% (1)	88.9% (8)	1
Sexual tourism	0% (0)	0% (0)	11.1% (1)	88.9% (8)	1
Humanitarian work	0% (0)	0% (0)	44.4% (4)	55.6% (5)	1
Adventure	0% (0)	11.1% (1)	44.4% (4)	44.4% (4)	0.89
Research/education	0% (0)	33.3% (3)	66.7% (6)	0% (0)	0.67
Adoption	0% (0)	0% (0)	44.4% (4)	55.6% (5)	1
What?					
Scuba diving	0% (0)	11.1% (1)	33.3% (3)	55.6% (5)	0.89
Going to high altitude	0% (0)	0% (0)	44.4% (4)	55.6% (5)	1
Safari	0% (0)	33.3% (3)	55.6% (5)	11.1% (1)	0.67
Spending time in rural communities or remote areas	0% (0)	11.1% (1)	44.4% (4)	44.4% (4)	0.89
Adventure travel	0% (0)	11.1% (1)	55.6% (5)	33.3% (3)	0.89
Close contact with animals	0% (0)	0% (0)	22.2% (2)	77.8% (7)	1
Providing medical care	0% (0)	0% (0)	11.1% (1)	88.9% (8)	1
Exposure to extreme heat or cold	0% (0)	0% (0)	44.4% (4)	55.6% (5)	1
Jungle	0% (0)	11.1% (1)	44.4% (4)	44.4% (4)	0.89
Cave exploration	0% (0)	0% (0)	66.7% (6)	33.3% (3)	1
Hiking or trekking	0% (0)	11.1% (1)	66.7% (6)	22.2% (2)	0.89
Rafting or kayaking	0% (0)	22.2% (2)	55.6% (5)	22.2% (2)	0.78
Restricted work camp	0% (0)	22.2% (2)	55.6% (5)	22.2% (2)	0.78
Motorcycle	0% (0)	11.1% (1)	33.3% (3)	55.6% (5)	0.89
Backpacking	0% (0)	22.2% (2)	33.3% (3)	44.4% (4)	0.78
Trekking	0% (0)	33.3% (3)	33.3% (3)	33.3% (3)	0.67
Friend/family cooking	0% (0)	0% (0)	22.2% (2)	77.8% (7)	1
Street food and vendors	0% (0)	0% (0)	33.3% (3)	66.7% (6)	1
Ave-CVI = 0.91					

The final version of the framework (Figure 7) is a concise one-page tool to identify risk factors in traveling patients. While pharmacists with any level of travel medicine experience are welcome to use the framework, it is primarily meant for those with minimal experience. As the intended user group consists of community pharmacists new to the field of travel medicine, the items are primarily posed in Yes/No question format, where a positive response to any item may indicate a need for referral to an experienced travel medicine healthcare professional. Those items that are posed as open-ended questions allow for the pharmacist to use their judgement on determining whether the patient's response is a criterion for referral. If these answers are deemed low-risk and the patient has answered

“no” to all the other questions, the patient can be classified as a low-risk traveller that could likely have a travel consultation done by that pharmacist.

Figure 7 – Final version of *The 5W Approach to Travel Risk Identification* framework

The 5W Approach to Travel Risk Identification

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1 Who?
 How old is the patient? _____
 Does the patient have any of the following health conditions?
 Diabetes
 Blood or clotting disorder
 Heart disease or arrhythmia
 Seizure disorder
 Emotional/Psychiatric conditions
 Thymus disorders (e.g. myasthenia gravis)
 Liver or kidney disease
 Damaged or removed spleen
 Organ or bone marrow transplant
 Recent chemotherapy or radiation (<4 months)
 HIV, AIDS, immune suppressed* or immunocompromised*
 If the patient is female, is she...?
 Currently pregnant
 Planning to get pregnant soon after travel
 Breastfeeding
 Is the patient on any of the following medications?
 Blood thinners (e.g. warfarin, clopidogrel)
 Corticosteroids*
 Chemotherapy or other anti-cancer medications
 Quinine, quinidine, or other chronic cardiac drugs
 Medications for mood disorder or emotional problems
 Medications to control seizures
 Do any of the following apply?
 Allergy to streptomycin, gentamicin, neomycin
 Travelling with children
 Unaware of their immunization status
 Had a serious reaction in the past to vaccines

2 Where?
 Where is the patient travelling?

 Cities/regions: _____

 Date(s) of travel (including each country and/or city if >1): _____

 Is the patient staying in any of the following?
 High-risk country**
 Rural area
 Hostel
 Friend/family's home
 Camping

3 What?
 Does the patient plan to do any of the activities while travelling?
 Scuba diving
 Going to high altitude
 Spending time in rural communities or remote areas
 Adventure travel
 Motorcycle driving
 Close contact with animals
 Provide medical care
 Exposure to extreme heat or cold
 Jungle exploration
 Cave exploration
 Hiking or trekking
 Rafting or kayaking
 Restricted work camp
 Does the patient plan to eat any of the following?
 Friend/family cooking
 Street food/vendors

4 When?
 How long is the patient travelling?

 Is the patient:
 A last-minute traveller (departing in <4 weeks)

5 Why?
 Is the patient travelling for any of the following reasons?
 Visiting friends/family
 Religion (e.g. Hajj)
 Medical tourism
 Sexual tourism
 Humanitarian work
 Adventure
 Adoption

YES? (to any checkbox) → Patient has risk factor(s) influencing their care decisions. Consider a referral to a travel healthcare provider.

NO? (to all checkboxes) → Patient is a low-risk traveller. Consider performing a travel consultation.

*Immune deficiency via medical condition or medication (e.g. ≥ 20 mg prednisone daily for ≥ 2 weeks)
 **High-risk areas include certain countries in Asia, Africa, and South America (overall risk also depends on the traveller/itinerary)

2.3.2. Framework Testing

Of the 19 respondents that reviewed the invitation letter and expressed interest in testing the framework, nine were excluded for failing to provide consent to participate and two participants were excluded due to failure to complete the pre-study survey. One participant failed to complete the post-study survey. The demographics of the eight respondents completing the study is provided in Table 5. Half of the respondents indicated practicing in a chain pharmacy and in the capacity of a staff pharmacist. Most (n=5) practiced in South West Ontario, consistent with the greater population density in this region of the province.⁵⁰ Most pharmacists (n=5) had 11 or more years of experience, all were authorized to administer injections, and most had a Bachelor's degree as their highest level of pharmacy education. Additional training was completed by one participant through the American Pharmacists Association's Pharmacy-Based Travel Health Services continuing education program.⁵¹

Table 5 – Pharmacist participant characteristics

Characteristic	Frequency (%) (n=8)
Type of community pharmacy	
Chain	4 (50.0%)
Independent	1 (12.5%)
Banner	3 (37.5%)
Role in pharmacy	
Staff pharmacist	4 (50.0%)
Owner	2 (25.0%)
Pharmacy student	2 (25.0%)
Designated manager ¹	3 (37.5%)
Location in Ontario	
Central South	1 (12.5%)
Central West	1 (12.5%)
East	1 (12.5%)
South West	5 (62.5%)
Years in a community pharmacy practice (licensed pharmacists only, n=6)	
Less than 1	1 (16.7%)
11-20	4 (66.6%)
21-30	1 (16.7%)
Average number of hours worked per week (licensed pharmacists only, n=6)	
8-16	2 (33.3%)
25-32	1 (16.7%)
33-40	2 (33.3%)
More than 40	1 (16.7%)
Gender	
Male	3 (37.5%)
Female	5 (62.5%)
Authorized to administer injections	
Yes	8 (100.0%)
Education (licensed pharmacists only, n=6), select all that apply	
BSc Pharmacy	5 (83.3%)
Entry-to-practice PharmD	1 (16.7%)

¹ Participants had the option to select designated manager of the pharmacy in addition to other roles.

All pharmacists that reported some experience with the additional vaccines added to the scope of practice to varying degrees. However, their approach when interacting with a travelling patient varied. Prior to this study, when a patient presented to the pharmacy

inquiring on precautions they need for an upcoming destination, participants reported they may provide information on general precautions (n=7), perform a complete consultation for less complex patients (e.g., all-inclusive resort in the Caribbean, cruise) and refer all others (n=6), refer all patients to a travel clinic or to their physician (n=3), refer patients to online or paper resources with more information (n=3), or other (n=1) which was described as “review complex patients for risks associated [with pre-existing medical conditions] and notify GP (e.g., anticoagulation).”

2.3.2.1. Attitudes and Beliefs Towards Travel Medicine

All pharmacists expressed a high degree of willingness to incorporate travel medicine into their practices. The primary motivators included travel medicine questions being increasingly frequent from their patient populations and pharmacists’ self-interest in travel medicine. As Pharmacist 3 explained, “travel is more and more common and with pharmacists able to give some vaccinations it should be an expectation of patients to get help in any retail pharmacy.” Pharmacist 6 commented that “[travel medicine] is a relevant and essential part of patient care that most times does not require a lot of effort.” The primary barriers cited preventing the participants from starting travel medicine services includes lack of knowledge regarding travel medicine, lack of time, and lack of prescribing authority. Regarding knowledge, Pharmacist 5 stated “pharmacists underestimate the complexity of knowledge required for travel medicine practice. Pharmacists do not have enough knowledge nor training on vaccinology or disease knowledge required for a travel consult. If a consult is not done properly, we are doing patients a disservice.” When referring to the inability to prescribe, Pharmacist 2 noted that “some physicians will accept recommendations from the pharmacist and send an Rx, but others refer everyone to a travel clinic.” It is also important to note that participants appeared to use the terms “counselling” and “travel consultation” interchangeably through the survey questionnaires. Its implications are detailed in the discussion section.

2.3.2.2. Framework Feasibility

The framework was only utilized in March and April of the 6th month study period, totalling three interactions. The results of the pharmacists' interactions are recorded in Table 6.

Table 6 – Framework metrics collected by pharmacists

Date used (YYYY/MM/DD)	Estimated triage time (mins)	Did you refer the patient?	What was the reason for referring/not referring	If you did not refer, what was the course of action?
2019/03/26	45*	Yes	“Needed yellow fever vaccine, proof of polio vaccination and malaria chemoprophylaxis”	
2019/03/28	35*	Yes	“Needed yellow fever vaccine and proof of polio vaccination”	
2019/04/20	15	No	“Did not refer as not high risk”	“Patient had TwinRix® [combined hepatitis A and B vaccine] previously and decided to get Dukoral® [oral cholera vaccine]”

* Interaction was performed by 4th year entry-to-practice PharmD student.

Despite the framework not being used by all pharmacists during the study period, feedback was sought from all participants in the post-test survey (n=7). Overall, it was viewed as a helpful tool that can guide pharmacists with questions and identify complex patients that may need referral beyond a pharmacist's scope. Benefits included being simple to use and asking the important questions for assessing a travelling patient while providing a structure for pharmacists to follow. As Pharmacist 6 commented, “[you] can follow an algorithm to assist in guiding decisions, especially if encountering a complex situation.”

Participants did note that the framework contained a lot of text, which resulted in a time investment required to orient oneself to the intended flow. Time investment in completing the framework could also be a limitation if it is identified near the end of the framework that the patient has a complicating factor warranting referral. As Pharmacist 4 explained, “[the] patient might be upset that after all the questions and discussion, they still have to go to the travel clinic.” While it was generally noted as a great tool for most pharmacists, it may be less useful for pharmacists with more education in travel health, who may have their own preferred format.

2.4 Discussion

2.4.1. Framework Development

Following expert-informed content generation, judgement, and validation, we produced a succinct clinical practice framework intended for community pharmacists to triage the risk profiles of traveling patients. It is the first tool of its kind targeted to pharmacists to identify patients who may be safely assessed in a community pharmacy by a pharmacist with limited travel medicine training or experience, versus those who would benefit from referral to another clinician. The 64 items included largely align with pre-travel risk assessment recommendations included in the CDC's Yellow Book and other references^{2,3,26,52} and are grouped into five broader domains (the 5 Ws of Who, What, Where, When, and Why) for ease of understanding and use.

Successful content validation, defined as Ave-CVI ≥ 0.90 ,⁴⁸ was achieved after only one round of content validation. Additionally, it should be noted that the expert panellists practiced in different locations across Canada, reflecting perspectives from different provinces where scope of practice can vary. Depending on the province, pharmacists' scope of practice can range from independently prescribing for all conditions related to travel medicine, through prescribing within certain legislative conditions or with a medical directive, to only being able to immunize against travel-related vaccine preventable diseases without prescribing authority.¹² The inclusion of a broad sample of pharmacists practicing under different scopes in the expert panel is expected to enhance the framework's applicability across jurisdictions.

However, our work is not without limitations. The expert panel's degree of input was limited, as all feedback was performed via online surveys consisting largely of multiple-choice questions. Open-ended feedback or rationale for selections was not sought, and panellists did not have the opportunity to discuss their selections with the other

panellists. For example, while acceptable I-CVI values are those above or equal to 0.78,⁴⁸ 6 of the 64 items included in stage 3 did not meet this standard. Further revision of these items with the aim of improving their I-CVI was not performed. Additionally, the interpretation of each item's relevancy was left solely to the discretion of the individual panellists. No further instruction was given or sought regarding the difference between 3 - Quite Relevant and 4 - Highly Relevant; however, this likely didn't significantly affect the calculation of either the I-CVI or Ave-CVI as these depend on selecting either 3 - Quite Relevant or 4 - Highly Relevant. Another limitation was that two expert panellists were unavailable to provide input in the content judgement survey (stage 2), while all nine experts were able to participate in content generation (stage 1) and validation (stage 3). While the number of participants at each stage was sufficient,^{45,46,48} this discrepancy should be noted, as it represents slight differences in panel composition across each stage.

Pharmacists' increasing involvement with clinical activities, particularly with travel medicine, is an emerging international trend, reflected by the creation of a Pharmacists Professional Interest Group within the International Society of Travel Medicine.¹¹ Previous travel medicine guidance documents on information gathering and risk assessment have either been targeted to the medical community or had limited accessibility to the broad pharmacist population (for example, embedded within continuing education modules, or internal questionnaires/frameworks created by pharmacy corporations). To our knowledge, this is the first framework for pharmacists to be published and, importantly, to also have its content validated. As a result, we are unable to compare our results to previous work.

2.4.2. Framework Testing

Overall, feedback on the framework from the pharmacist and final-year student participants was positive, with it reported to be an advantageous tool that is simple to use and can provide structure to guide pharmacists through travel-related interactions. However, it may

not provide as much benefit for a pharmacist with above average travel medicine knowledge, which is to be expected as the intended audience was pharmacists new to travel medicine assessments.

The most significant limitation encountered in this feasibility study was the data collection period, as it ran from March to August 2019, which falls outside of the peak travel season for many Canadians who often opt to travel in the colder months of the year (November–April).⁵³ Indeed, all uses of the framework occurred before May. In the monthly communications with the researchers, pharmacists reported throughout the study period that patients had not been coming in for travel advice, which hindered their ability to use the framework. The timing of the study is a potential reason for the low recruitment of pharmacists. The small sample size and minimal usage of the framework also affected the validity of the survey pharmacists were asked to complete once the data collection period concluded in August. Particularly, commentary provided on the framework from those who have not actually used it is not substantiated by experience with its use in practice. Finally, it should be noted that two of the three uses of the framework in practice was by pharmacy students. Despite not yet being licensed to practice independently, student participants were in their final year clinical practice rotations and can therefore be assumed to have similar knowledge and skills as a newly-licensed practitioner. One may argue that their level of exposure to formal travel medicine training may actually exceed that of many practicing pharmacists, as vaccines for travel is required learning in the second year of their program at the University of Waterloo, as is a two-hour lecture on travel medicine in their third year. However, their status as a student and need to potentially discuss assessments with their pharmacist preceptor may have contributed to the longer framework completion times observed among the trials conducted by the student participants.

Several studies have concluded that an educational aid or practice tool for pharmacists may serve as a facilitator to increase uptake of travel medicine services;^{36,44} however, to date, no published studies have trialled the use of such a tool. As the first study to explore this type of work, a few implications on practice can be made. The low or non-existent use of the framework between May and August of the study period, due to patients not presenting to the pharmacist with travel-related inquiries, can impact the rate at which pharmacists are able to apply this expanded scope of practice in Ontario. As seen with our previous study on the uptake of immunization services, pharmacists' confidence was directly related to the duration of scope availability and their frequency of exposure to it.⁴⁴ If there are limited opportunities for pharmacists to provide travel medicine services for half of the year due to low demand in the off-season for travel, it can be expected that an even slower rate of uptake may be observed relative to other clinical services provided year-round. For example, pharmacist prescribing for minor ailments has the potential for pharmacists to partake in that scope on a regular basis. That same regularity of exposure cannot necessarily be said for travel medicine.

Another finding to investigate in future research is the quality of the care that pharmacists are providing for travelling patients. Despite participants self-identifying themselves as beginners in travel medicine, 75% (n=6) of the pharmacists reported that their pharmacy offered pretravel consultations to their patients. Interestingly, only one participant reported charging a fee for this consultation. It would be highly unusual for pharmacies to not charge a fee for a comprehensive consultation that may take 30–60 minutes to complete.⁵² This frequency is lower than that reported by respondents to our previous survey of Ontario pharmacists, which found that 35% of pharmacies offering travel consultations charged patients for this service.⁴⁴ As previously mentioned, the pharmacist participants appeared to use the terms “counselling” and “consultation”

interchangeably, which may provide an explanation for these discrepant findings. The implications of this are two-fold:

1. Just because a pharmacy offers pretravel consultation services does not necessarily indicate that the pharmacists are actively performing them.
2. Pharmacists may have differing definitions of what they consider to be a pretravel consultation.

Variability in how pharmacists conduct pretravel consultations (e.g., via appointment or as an add-on to routine counselling on prescription or non-prescription drugs) can be a factor in this discrepancy as well. Variability in approach and comprehensiveness is not unique to travel medicine, as it was also observed following the introduction of the MedsCheck medication review program in Ontario.⁵⁴ For example, although approximately half of Ontarians with diabetes received an annual MedsCheck for Diabetes review, only 2.7–4.1% received a follow-up assessment, despite the use of potentially complex medications regimens for diabetes and comorbid conditions that warrant ongoing monitoring.⁵⁴ Although clinical effectiveness and high patient satisfaction have been observed from pretravel consultations performed by pharmacists with expertise in travel medicine,²⁷⁻³¹ it remains to be determined if similar quality and consistency is observed when these services are offered by non-expert pharmacists. As one participant commented, “it would be a dis-service to the community if pharmacists are giving inadequate or bad advice. Pharmacy as a profession should not promote a service when members are not knowledgeable. Just because pharmacists are able to administer vaccines does not mean that pharmacists understand the disease the vaccine is there to protect.”

2.5 Conclusion

It has been established that the unique knowledge base required to practice in travel medicine contributes to lack of confidence among pharmacists in providing care for travellers. The 5W Approach to Travel Risk Identification provides a clinical practice framework for pharmacists that aims to address the challenges new practitioners in travel medicine may face when performing information gathering and general risk assessment of travellers. By being expert-informed and content-validated, this framework is expected to support pharmacists in the safe and effective identification of low-risk patients who may be manageable by a generalist practitioner versus those who may benefit from referral to another clinician with travel medicine expertise. Despite a small sample size of trials, the framework will be revisited as a potentially helpful tool that can guide pharmacists in the assessment of travelling patients. Further work needs to be performed to understand the full extent of the framework's feasibility and impact on practice, as well as pharmacists' understanding of what constitutes a pretravel consultation. Feasibility testing will be expanded to pharmacists across Canada, including different provincial scopes of practice, during peak travel season in the 2019–2020 period.

Chapter 3: Overall Discussion, Conclusion and Future Directions

3.1 Overall Discussion

3.1.1 Contribution to the Fields of Travel Medicine and Pharmacy Practice

The work of this thesis sought to address the potential barriers of travel medicine in pharmacy practice and fill a need that pharmacists have expressed would be a facilitator in the uptake of travel medicine. The product of this thesis was a framework that accomplished the following:

1. Amalgamated various risk factors in an approach that is applicable to traveller risk assessment in the pharmacy practice setting. A significant number of pharmacists likely have not had comprehensive training or education of travel medicine in their pharmacy education. This tool bridges the knowledge gap of patient evaluation for travel medicine by accustoming the pharmacist to the types of questions and patient factors that affect a traveller's level of risk.
2. Guides a pharmacist through a systematic process of identifying travel risk in a patient. The questions are formatted in a yes/no fashion to easily identify the main risks of travel. However, there are still questions that pharmacists are able to use their professional judgment on (e.g. destination country) to determine the level of risk and the best healthcare professional suited for that patient's travel needs.
3. Is the first practice tool, to our knowledge, that brings travel medicine and pharmacy practice together that's content has been validated (Ave-CVI =0.91).

3.1.2 Limitations

The significant limitation of this thesis lies in Chapter 3, the testing of the framework in pharmacy practice. Two specific areas are the weaknesses in the testing phase:

1. Number of pharmacists recruited
2. Testing period

As previously mentioned, while a number of pharmacists expressed interest in the study, only a small number of pharmacists actually completed the pre-test and post-test surveys. The recruitment strategies employed included using previous research participants that have expressed interest and consent in being contacted for future studies, networking with professional pharmacist contacts, and promoting the study through the University of Waterloo School of Pharmacy's Regional Clinical Coordinators to recruit 4th year PharmD students on rotations.

Ethics approval for the community pharmacy testing phase was received on February 15, 2019. Therefore, the study period of the framework in pharmacy practice took place from March to August 2019. Unfortunately, this missed the peak travel season for many Canadians, and as a result the peak timing of when pharmacists received travel-related questions from patients. Pharmacist participants reported the lack of patients presenting to the pharmacy with travel-related concerns as affecting the use of the framework and obtaining data regarding its use.

While this study was a feasibility test, its limitations are noted. Specific actions to address the limitations of this study will be further addressed in 3.3 Future Directions.

3.2 Conclusion

Travel medicine is a unique field of patient care for any healthcare practitioner. As the scope of practice expands for the pharmacy profession, pharmacists can be expected to participate in this area of care despite additional formal education or training. Travel medicine has a large focus on preventative care, with a cornerstone of the decision-making being able to identify risk in a travelling patient and provide appropriate care to mitigate that risk. The *5W Approach for Travel Risk Identification* has been created to aid in this process. Suitable for pharmacists, the factors considered in the tool are relevant to the field of travel medicine as exhibited in its Ave-CVI of 0.91. What is unknown at this point is the impact the framework may or may not have on pharmacy practice and patient outcomes.

3.3 Future Directions

In order to assess the full potential impact and feasibility of the *5W Approach for Travel Risk Identification*, a second study will be performed by the MSc candidate outside of the requirements of this thesis. This study will take place from November 2019 to April 2020, inclusive, in order to capture the peak travel season for Canadians and, subsequently, travel medicine inquiries for pharmacists. One difference in this testing is that it will be open to any pharmacist in Canada, excluding territories, that does not have their CTH[®]. The challenges of travel medicine are not just limited to Ontario pharmacists, it can be a difficult adjustment to any pharmacist in Canada. However, one varying factor is the types of barriers each province has in the provision of travel medicine service (e.g., ability to prescribe). This will be accounted for in the pre-test survey and analysis of results. The recruitment will also differ. As opposed to the researchers contacting and identifying individuals that may be interested in participating, the researchers will place advertisements in newsletters of each provincial regulatory college and advocacy organization. The advertisement will link to the pre-test survey to input pharmacists' contact information that will later be de-identified. After the successful completion of the survey, the framework will be emailed to the participants for them to use in practice. The post-test survey and monthly check-ins will remain the same. Pharmacists will email completed metrics monthly to the researchers. Additionally, any pharmacist who completes the pre-and post-test surveys and has used the framework at least 10 times during the study period (average 2 per month) will be enrolled in a draw. All enrolled pharmacists will be entered to win an iPad, the winner will be selected randomly. As for the analysis, the main parts of the survey that will undergo statistical analysis are the sections where pharmacists will self-rank their confidence and knowledge levels related to different parts of the ISTM's Body of Knowledge and OCP's Pharmacist Practice Assessment Criteria for a control.^{55,56} Although

the Pharmacist Practice Assessment Criteria is from the Ontario College of Pharmacists, it is based off the National Association of Pharmacy Regulatory Authorities Model Standards of Practice for Canadian Pharmacists and, therefore, has applicability for pharmacists across Canada.⁵⁷ The scale is from 0 (non-existent/minimal) to 100 (full). Due to the scale and pre/post nature of the experiment, the Wilcoxon paired test will be used to examine change. In addition to the dissemination of these findings via publication, a potential next step in knowledge translation is the provision of sample cases to illustrate the framework's intended use. This can be tied to continuing education related to pretravel consultations, which is also sought by pharmacists as a facilitator for travel medicine.^{36,44}

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Appendix

Appendix A - CTH[®] Examination Breakdown

1. Epidemiology (10%)
Basic Concepts (e.g., morbidity, mortality, incidence, and prevalence)
Geographic specificity/global distribution of diseases and potential health hazards
2. Immunology/Vaccinology (20%)
Basic concepts and principles (e.g., live vs. inactivated vaccine, measurement of immune response)
Handling, storage, and disposal of vaccines and related supplies
Types of Vaccines/Immunizations/Immunobiologics. Indications/contraindications, routes of administration, dosing regimens, duration of protection, immunogenicity, efficacy, potential adverse reactions and medical management of adverse reactions associated with the following vaccinations/combination vaccinations:
<ul style="list-style-type: none"> • Bacille Calmette-Guerin • Cholera • Diphtheria • Encephalitis, Japanese • Encephalitis, tick-borne • Haemophilus influenzae type B • Hepatitis A • Hepatitis B • Hepatitis A and B combined • Human Papilloma Virus • Immune globulin • Influenza • Measles • Meningococcal • Mumps • Pertussis • Pneumococcal • Poliomyelitis • Rabies • Rotavirus • Rubella • Tetanus • Typhoid • Varicella • Yellow Fever • Zoster • Other combined vaccines • Other
3. Pretravel Assessment/Consultation (35%)
Patient Evaluation

<ul style="list-style-type: none"> • Assessment of fitness/contraindications to travel (e.g., pre-existing illness, fitness to fly)
<ul style="list-style-type: none"> • Evaluation of travel itineraries/risk assessment (e.g., pre-existing activities, travel to rural vs. urban areas)
<ul style="list-style-type: none"> • Relevant medical history (e.g., previous vaccinations, allergies, chronic illness, mental health history and concurrent medications)
<ul style="list-style-type: none"> • Screening for good mental health and personal resilience to stress in hostile environments
Special Populations. Unique management issues pertaining to the following populations:
<ul style="list-style-type: none"> • Athletes
<ul style="list-style-type: none"> • Business travellers
<ul style="list-style-type: none"> • Elderly travellers
<ul style="list-style-type: none"> • Expatriates/long term travellers
<ul style="list-style-type: none"> • Immigrants
<ul style="list-style-type: none"> • Infants and children
<ul style="list-style-type: none"> • Travel for the purpose of international adoption
<ul style="list-style-type: none"> • Missionaries/volunteers/health clinicians/humanitarian health workers
<ul style="list-style-type: none"> • Pregnant travellers and nursing mothers
<ul style="list-style-type: none"> • Teachers, trainers, and students
<ul style="list-style-type: none"> • Travellers with chronic diseases (e.g., diabetes, chronic obstructive pulmonary disorder, cardiovascular diseases, mental health illnesses)
<ul style="list-style-type: none"> • Travellers with disabilities
<ul style="list-style-type: none"> • Travellers to hostile environments (e.g., journalists, armed service personnel, scientists, academics)
<ul style="list-style-type: none"> • Travellers who are immunocompromised, including AIDS and HIV
<ul style="list-style-type: none"> • VFR's (those visiting friends and relatives in their countries of origin)
<ul style="list-style-type: none"> • Other
Special Itineraries. Unique management issues associated with the following activities/itineraries:
<ul style="list-style-type: none"> • Armed conflict zones
<ul style="list-style-type: none"> • Cruise ship travel/sailing
<ul style="list-style-type: none"> • Diving
<ul style="list-style-type: none"> • Extended stay travel
<ul style="list-style-type: none"> • Extreme/wilderness/remote regions travel
<ul style="list-style-type: none"> • High altitude travel
<ul style="list-style-type: none"> • Last minute travel
<ul style="list-style-type: none"> • Mass gatherings (e.g., the Hajj)
<ul style="list-style-type: none"> • Travel for the purpose of receiving medical care
<ul style="list-style-type: none"> • Natural disaster areas
<ul style="list-style-type: none"> • Sex tourism
<ul style="list-style-type: none"> • Travel to areas experiencing disease outbreaks
<ul style="list-style-type: none"> • Other
Prevention and Self-Treatment:
Chemoprophylaxis:
<ul style="list-style-type: none"> • Altitude Illness
<ul style="list-style-type: none"> • Leptospirosis
<ul style="list-style-type: none"> • Malaria

<ul style="list-style-type: none"> • Travellers' diarrhea
<ul style="list-style-type: none"> • Other
Personal protective measures (e.g., restriction of outdoor activity at dawn and dusk) and barrier protection (e.g., bed nets, insect repellents)
Self-treatment:
<ul style="list-style-type: none"> • Diarrhea
<ul style="list-style-type: none"> • Malaria
<ul style="list-style-type: none"> • Other
Travel health kits
Other travel medicine medications and pharmacological issues
Risk communications regarding:
<ul style="list-style-type: none"> • Animal contact (including birds)
<ul style="list-style-type: none"> • Close interpersonal contact (e.g., sexually transmitted diseases)
<ul style="list-style-type: none"> • Contact with fresh and salt water
<ul style="list-style-type: none"> • Food consumption
<ul style="list-style-type: none"> • Safety and security
<ul style="list-style-type: none"> • Walking barefoot
<ul style="list-style-type: none"> • Water consumption and purification
<ul style="list-style-type: none"> • Antimicrobial resistance
<ul style="list-style-type: none"> • Other (e.g., skin trauma, infection)
4. Diseases Contracted During Travel (12%). Geographic risk, prevention, transmission, possible symptoms and appropriate referral/triage of:
Diseases Associated with Vectors:
<ul style="list-style-type: none"> • African Tick Bite Fever
<ul style="list-style-type: none"> • Chikungunya
<ul style="list-style-type: none"> • Dengue
<ul style="list-style-type: none"> • Encephalitis, Japanese
<ul style="list-style-type: none"> • Encephalitis, tick-borne
<ul style="list-style-type: none"> • Filariasis (e.g. Loa loa, bancroftian, onchocerciasis)
<ul style="list-style-type: none"> • Hemorrhagic fevers
<ul style="list-style-type: none"> • Leishmaniasis
<ul style="list-style-type: none"> • Lyme, anaplasma, babesia
<ul style="list-style-type: none"> • Malaria
<ul style="list-style-type: none"> • Plague
<ul style="list-style-type: none"> • Rickettsia (typhus)
<ul style="list-style-type: none"> • Rift Valley Fever
<ul style="list-style-type: none"> • Trypanosomiasis, African
<ul style="list-style-type: none"> • Trypanosomiasis, American (Chagas disease)
<ul style="list-style-type: none"> • West Nile
<ul style="list-style-type: none"> • Yellow Fever
<ul style="list-style-type: none"> • Zika
<ul style="list-style-type: none"> • Other (Emerging Infections)
Diseases Associated with Person-to-Person Contact:
<ul style="list-style-type: none"> • Diphtheria
<ul style="list-style-type: none"> • Hepatitis B
<ul style="list-style-type: none"> • Hepatitis C
<ul style="list-style-type: none"> • Influenza

• Measles
• Meningococcal disease
• Mumps
• Pertussis
• Pneumococcal disease
• Rubella
• Sexually transmitted diseases
• Tuberculosis
• Varicella
• Other
Diseases Associated with Ingestion of Food and Water:
• Amebiasis
• Brucellosis
• Cholera
• Cryptosporidiosis
• Cyclosporiasis
• Giardiasis
• Hepatitis A
• Hepatitis E
• Norovirus
• Poliomyelitis
• Seafood poisoning/toxins
• Travellers' diarrhea
• Typhoid and paratyphoid fever
• Other
Diseases Associated with Bites and Stings:
• Envenomation (e.g., jelly fish, sea urchin, scorpion, snake, spiders)
• Herpes B virus
• Rabies
• Others
Diseases Associated with Water/Environmental Contact:
• Cutaneous larva migrans
• Legionella
• Leptospirosis
• Schistosomiasis
• Tetanus
• Other
5. Other Clinical Conditions Associated with Travel (10%)
Conditions Occurring During or Immediately Following Travel. Symptoms prevention, and treatment of:
• Barotrauma
• Jet Lag
• Motion sickness
• Thrombosis/embolism
• Other
Conditions Associated with Environmental Factors. Symptoms, prevention, and treatment of:

<ul style="list-style-type: none"> • Altitude sickness
<ul style="list-style-type: none"> • Frostbite and hypothermia
<ul style="list-style-type: none"> • Respiratory distress/failure (associated with humidity, pollution, etc.)
<ul style="list-style-type: none"> • Sunburn, heat exhaustion, and sun stroke
<ul style="list-style-type: none"> • Other
Threats to Personal Security. Precautions regarding:
<ul style="list-style-type: none"> • Accidents (e.g., motor vehicle, drowning)
<ul style="list-style-type: none"> • Violence-related injuries
<ul style="list-style-type: none"> • Other
Psychological and Psycho-social Issues. Unique management issues associated with:
<ul style="list-style-type: none"> • Acute stress reactions, post-traumatic stress disorder
<ul style="list-style-type: none"> • Culture shock/adaptation (e.g., travellers, refugees)
<ul style="list-style-type: none"> • Psychiatric and psychological sequelae of travel or living abroad
<ul style="list-style-type: none"> • Other (e.g., flight phobia)
6. Post-Travel Assessment (8%)
Screening/assessment of returned asymptomatic travelers
Screening/assessment of immigrants
Triage of the ill traveler
Diagnostic and management implications of the following symptoms:
<ul style="list-style-type: none"> • Diarrhea and other gastro-intestinal complaints
<ul style="list-style-type: none"> • Eosinophilia
<ul style="list-style-type: none"> • Fever
<ul style="list-style-type: none"> • Respiratory Illness
<ul style="list-style-type: none"> • Skin problems
<ul style="list-style-type: none"> • Other
7. Administrative and General Travel Medicine Issues (5%)
Medical Care Abroad:
<ul style="list-style-type: none"> • Aeromedical evacuation (including repatriation of deceased)
<ul style="list-style-type: none"> • Blood transfusion guidelines for international travellers
<ul style="list-style-type: none"> • Procedures and considerations regarding medical and mental health care and recommendations regarding access of medications in resource-poor areas
<ul style="list-style-type: none"> • Other
Travel Clinical Management:
<ul style="list-style-type: none"> • Documentation and record-keeping (e.g., vaccination certificate requirements, reporting of adverse events)
<ul style="list-style-type: none"> • Equipment
<ul style="list-style-type: none"> • Infection control procedures
<ul style="list-style-type: none"> • Management of medical emergencies
<ul style="list-style-type: none"> • Resources for laboratory testing
<ul style="list-style-type: none"> • Supplies and disposables including medications
<ul style="list-style-type: none"> • Other
Travel Medicine Information/Resources:
<ul style="list-style-type: none"> • Accessing health information including commercial and proprietary sources
<ul style="list-style-type: none"> • International Health Regulations
<ul style="list-style-type: none"> • National/regional recommendations, including national/regional differences
<ul style="list-style-type: none"> • Principles of responsible travel
<ul style="list-style-type: none"> • Other

Appendix B – Pre-Test Survey Questions

Question	Answer Options
Screening	
Do you currently work in a community pharmacy practice setting?	<ul style="list-style-type: none"> • Yes • No
Do you currently have an Ontario Part A license to practice pharmacy in the province?	<ul style="list-style-type: none"> • Yes • No
Do you currently have the Certificate in Travel Health™ from the International Society of Travel Medicine?	<ul style="list-style-type: none"> • Yes • No
Demographics	
Which type of community pharmacy practice setting do you primarily work in?	<ul style="list-style-type: none"> • Independent community pharmacy • Community pharmacy associated with a chain • Community pharmacy associated with a banner • Community pharmacy associated with a grocery store • Community pharmacy associated with a mass merchandiser • Other (please specify)
What is your role in the community pharmacy practice setting you work in?	<ul style="list-style-type: none"> • Community pharmacy owner • Community pharmacy staff pharmacist • Community pharmacy relief pharmacist
Are you the pharmacy's designated manager?	<ul style="list-style-type: none"> • Yes • No
Where is your community pharmacy practice setting located?	<ul style="list-style-type: none"> • Central East • Central South • Central West • East • North • South West • Toronto
How many years have you worked in a community pharmacy practice setting?	<ul style="list-style-type: none"> • Currently on a community pharmacy rotation • Less than 1 • 1-5 • 6-10 • 11-20 • 21-30 • More than 30

On average, how many hours per week do you work in a community pharmacy practice setting?	<ul style="list-style-type: none"> • Currently on a community pharmacy rotation • Less than 8 • 8-16 • 17-24 • 25-32 • 33-40 • More than 40
Which gender do you most identify with?	<ul style="list-style-type: none"> • Male • Female • Gender variant/non-conforming
Are you authorized to administer injections in Ontario?	<ul style="list-style-type: none"> • Yes • No
What degrees/training have you received? Select all that apply.	<ul style="list-style-type: none"> • Currently on clinical rotations for entry-to-practice PharmD • BSc Pharmacy • Post-baccalaureate PharmD • Entry-to-practice PharmD • Masters in Pharmacy • PhD in Pharmacy • Residency • Fellowship • Other (please specify)
Which of the following travel or travel-related vaccines have you personally administered since the expansion of Ontario pharmacists' scope in December 2016? Select all that apply.	<ul style="list-style-type: none"> • Bacille Calmette-Guerin (BCG) (for tuberculosis) • Haemophilus influenza type B • Hepatitis A • Hepatitis B • Combined hepatitis A and B • Herpes zoster (shingles) • Human papillomavirus (HPV) • Japanese encephalitis • Meningitis • Pneumococcus • Rabies • Typhoid • Combined typhoid and hepatitis A • Varicella zoster (chickenpox) • Yellow Fever • None of the above
Does your pharmacy currently offer travel health services other than administration of travel vaccines (e.g. pretravel consultations)?	<ul style="list-style-type: none"> • Yes • No
Pharmacy Practice	
What do you do when a patient presents to the pharmacy wondering what precautions they	<ul style="list-style-type: none"> • Refer all patients to a travel clinic or to their physician

<p>need for upcoming their travel destination? Select all that apply.</p>	<ul style="list-style-type: none"> • Provide information on general precautions • Refer them to online or paper resources • Perform a complete consultation for less complex patients only (e.g. all-inclusive resort in the Caribbean, cruise) and refer all others • Other (please specify)
<p>Please describe your current willingness to incorporate travel medicine services at your pharmacy.</p>	<p>Free-text response</p>
<p>Please describe the primary barrier(s) preventing your pharmacy from starting travel medicine services</p>	<p>Free-text response</p>
<p>Please describe the primary motivator(s) for your pharmacy wanting to start travel medicine services</p>	<p>Free-text response</p>

Appendix C - Post-Test Survey Questions

Question	Answer Options
Practice Questions	
What do you do when a patient presents to the pharmacy wondering what precautions they need for upcoming their travel destination? Select all that apply.	<ul style="list-style-type: none"> • Refer all patients to a travel clinic or to their physician • Provide information on general precautions • Refer them to online or paper resources • Perform a complete consultation for less complex patients only (e.g. all-inclusive resort in the Caribbean, cruise) and refer all others • Other (please specify)
Please describe your current willingness to incorporate travel medicine services at your pharmacy.	Free-text response
Please describe the primary barrier(s) preventing your pharmacy from starting travel medicine services.	Free-text response
Please describe the primary motivator(s) for your pharmacy wanting to start travel medicine services.	Free-text response
When and how do you currently offer travel consultations at your pharmacy? Select all that apply.	<ul style="list-style-type: none"> • Anytime by walk-in • During set days/hours by walk-in (e.g. clinic days) • By appointment • Other (please specify)
Does your pharmacy charge a fee to patients for a travel consultation?	<ul style="list-style-type: none"> • Yes (please specify the fee amount) • No
Framework	
Please describe the main advantages of the framework.	Free-text response
Please describe the main disadvantages of the framework.	Free-text response
Please provide any suggestions, improvements, or clarifications needed for future editions of the framework	Free-text response

Appendix D -Summary of Item Results from Content Judgement Phase

Domain: Who?	Essential (%, n)	Useful, but not essential	Not necessary
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		(%, n)	(%, n)
Health Conditions			
Diabetes*	66.7% (6)	11.1% (1)	0% (0)
High blood pressure	11.1% (1)	55.6% (5)	11.1% (1)
High cholesterol	0% (0)	66.7% (6)	11.1% (1)
Blood or clotting disorder*	77.8% (7)	0% (0)	0% (0)
Heart disease or arrhythmia*	66.7% (6)	11.1% (1)	0% (0)
Seizure disorder*	66.7% (6)	11.1% (1)	0% (0)
Emotional/psychiatric condition(s) *	77.8% (7)	0% (0)	0% (0)
Lung condition (Asthma/COPD)	44.4% (4)	33.3% (3)	0% (0)
Migraines or headaches	0% (0)	66.7% (6)	11.1% (1)
Irritable Bowel Syndrome or digestive tract problems	22.2% (2)	44.4% (4)	11.1% (1)
Inflammatory Bowel Disease*	55.6% (5)	22.2% (2)	0% (0)
Acid Reflux or heartburn	33.3% (3)	44.4% (4)	0% (0)
Thymus disorders (e.g. myasthenia gravis) *	66.7% (6)	11.1% (1)	0% (0)
Radical mastectomy or lymph-node dissection	44.4% (4)	33.3% (3)	0% (0)
Liver or kidney disease*	77.8% (7)	0% (0)	0% (0)
Damaged or removed spleen*	77.8% (7)	0% (0)	0% (0)
Organ or bone marrow transplant*	77.8% (7)	0% (0)	0% (0)
Recent chemotherapy or radiation (4 months) *	77.8% (7)	0% (0)	0% (0)
HIV, AIDS, immune suppressed or immunocompromised*	77.8% (7)	0% (0)	0% (0)
Psoriasis	44.4% (4)	33.3% (3)	0% (0)
Ear/hearing problems	0% (0)	77.8% (7)	0% (0)
Anemia	11.1% (1)	66.7% (6)	0% (0)
Considerations for Females when Traveling			
Currently pregnant*	77.8% (7)	0% (0)	0% (0)
Planning to get pregnant soon after travel*	77.8% (7)	0% (0)	0% (0)
Breastfeeding*	55.6% (5)	22.2% (2)	0% (0)
Date of last menstrual period	22.2% (2)	33.3% (3)	22.2% (2)
Demographics			
Age*	77.8% (7)	0% (0)	0% (0)
Date of birth (for immunization purposes) *	55.6% (5)	22.2% (2)	0% (0)
Medications			
Blood thinners (e.g. warfarin, clopidogrel) *	77.8% (7)	0% (0)	0% (0)
Corticosteroids*	66.7% (6)	11.1% (1)	0% (0)
Chemotherapy or other anti-cancer medications*	77.8% (7)	0% (0)	0% (0)
Quinine, quinidine, or other cardiac drugs*	66.7% (6)	11.1% (1)	0% (0)
Antibiotics	33.3% (3)	44.4% (4)	0% (0)

Medication for mood disorders or emotional problems*	55.6% (5)	22.2% (2)	0% (0)
Medications to control seizures*	55.6% (5)	22.2% (2)	0% (0)
Other prescription medications	33.3% (3)	44.4% (4)	0% (0)
Allergy			
Sulfa drugs	22.2% (2)	55.6% (5)	0% (0)
Streptomycin, gentamicin or neomycin*	55.6% (5)	22.2% (2)	0% (0)
Penicillin	22.2% (2)	55.6% (5)	0% (0)
Latex	44.4% (4)	33.3% (3)	0% (0)
Yeast	44.4% (4)	33.3% (3)	0% (0)
Gelatin	33.3% (3)	44.4% (4)	0% (0)
Eggs or other foods	44.4% (4)	33.3% (3)	0% (0)
Adhesive bandages	16.7% (1)	83.3% (5)	0% (0)
Travel Companion			
Alone	33.3% (3)	44.4% (4)	0% (0)
With spouse/partner	0% (0)	66.7% (6)	11.1% (1)
With a group	0% (0)	66.7% (6)	11.1% (1)
With children*	55.6% (5)	22.2% (2)	0% (0)
With an older/elderly person	57.4% (4)	33.3% (3)	0% (0)
Immunization History			
In what country were you born?	44.4% (4)	33.3% (3)	0% (0)
If you were not born in Canada, at what age did you leave your country of birth?†	55.6% (5)	22.2% (2)	0% (0)
Determining if the patient is aware of their immunization status*	77.8% (7)	0% (0)	0% (0)
Has fainted or felt unwell after an injection	33.3% (3)	33.3% (3)	11.1% (1)
Had a serious reaction in the past with vaccines*	77.8% (7)	0% (0)	0% (0)
Had (or currently has) a fear of needles	33.3% (3)	44.4% (4)	0% (0)
Carries an Epi-Pen	33.3% (3)	33.3% (3)	11.1% (1)
Domain: Where?	Essential (%, n)	Useful, but not essential (%, n)	Not necessary (%, n)
Destination(s)			
Country/Countries*	77.8% (7)	0% (0)	0% (0)
Cities/Regions*	66.7% (6)	11.1% (1)	0% (0)
Dates of travel for each country and/or city (if more than one)*	77.8% (7)	0% (0)	0% (0)
Rural/urban areas*	77.8% (7)	0% (0)	0% (0)
Accommodations			
Premium hotel	44.4% (4)	22.2% (2)	11.1% (1)
Budget hotel	44.4% (4)	33.3% (3)	0% (0)
Resort	33.3% (3)	44.4% (4)	0% (0)
Cruise	44.4% (4)	33.3% (3)	0% (0)
Hostel*	55.6% (5)	22.2% (2)	0% (0)

Friends/family's home*	77.8% (7)	0% (0)	0% (0)
Camping*	55.6% (5)	22.2% (2)	0% (0)
Dining			
Local restaurants/bars	33.3% (3)	44.4% (4)	0% (0)
Cooking themselves	33.3% (3)	44.4% (4)	0% (0)
Friend/family cooking*	55.6% (5)	22.2% (2)	0% (0)
Street food and vendors*	55.6% (5)	22.2% (2)	0% (0)
Domain: When?	Essential (%, n)	Useful, but not essential (%, n)	Not necessary (%, n)
Timing			
Departure/Arrival Dates*	55.6% (5)	22.2% (2)	0% (0)
Last minute traveler (<4 weeks before departure date)*	77.8% (7)	0% (0)	0% (0)
Time of year	44.4% (4)	33.3% (3)	0% (0)
Length of stay*	66.7% (6)	11.1% (1)	0% (0)
Domain: Why?	Essential (%, n)	Useful, but not essential (%, n)	Not necessary (%, n)
Reason(s) for Travel			
Visiting friends/family*	77.8% (7)	0% (0)	0% (0)
Business	33.3% (3)	44.4% (4)	0% (0)
Athletic competition*	55.6% (5)	22.2% (2)	0% (0)
Religion (e.g. Hajj)*	66.7% (6)	11.1% (1)	0% (0)
Medical tourism*	77.8% (7)	0% (0)	0% (0)
Sexual tourism*	77.8% (7)	0% (0)	0% (0)
Humanitarian work*	77.8% (7)	0% (0)	0% (0)
Vacation	44.4% (4)	33.3% (3)	0% (0)
Adventure*	66.7% (6)	11.1% (1)	0% (0)
Research/Education*	55.6% (5)	22.2% (2)	0% (0)
Adoption*	55.6% (5)	22.2% (2)	0% (0)
Domain: What?	Essential (%, n)	Useful, but not essential (%, n)	Not necessary (%, n)
Planned Activities			
Scuba diving*	66.7% (6)	11.1% (1)	0% (0)
Going to high altitude*	77.8% (7)	0% (0)	0% (0)
Safari*	55.6% (5)	22.2% (2)	0% (0)
Spending time in rural communities or remote areas*	66.7% (6)	11.1% (1)	0% (0)
Adventure travel*	55.6% (5)	22.2% (2)	0% (0)
Close contact with animals*	77.8% (7)	0% (0)	0% (0)
Providing medical care*	77.8% (7)	0% (0)	0% (0)
Exposure to extreme heat or cold*	66.7% (6)	11.1% (1)	0% (0)
Jungle*	66.7% (6)	11.1% (1)	0% (0)
Cave exploration*	66.7% (6)	11.1% (1)	0% (0)
Hiking or trekking*	66.7% (6)	11.1% (1)	0% (0)
Rafting or kayaking*	66.7% (6)	11.1% (1)	0% (0)
Restricted work camp*	66.7% (6)	11.1% (1)	0% (0)

Misc. excursion off resort	44.4% (4)	33.3% (3)	0% (0)
Transportation			
Train	11.1% (1)	66.7% (6)	0% (0)
Rental car	22.2% (2)	55.6% (5)	0% (0)
In-country flights	11.1% (1)	66.7% (6)	0% (0)
Boat	44.4% (4)	33.3% (3)	0% (0)
Motorcycle*	55.6% (5)	22.2% (2)	0% (0)
Type of Travel			
Package	22.2% (2)	44.4% (4)	11.1% (1)
Camping	33.3% (3)	44.4% (4)	0% (0)
Self-organized	22.2% (2)	44.4% (4)	11.1% (1)
Cruise ship	33.3% (3)	44.4% (4)	0% (0)
Backpacking*	55.6% (5)	22.2% (2)	0% (0)
Trekking*	55.6% (5)	22.2% (2)	0% (0)
Domain: How?	Essential (%, n)	Useful, but not essential (%, n)	Not necessary (%, n)
Travel Experience			
New traveller	33.3% (3)	44.4% (4)	0% (0)
Local trips only, never overseas	22.2% (2)	55.6% (5)	0% (0)
Travelled overseas	22.2% (2)	55.6% (5)	0% (0)
Experienced traveller	22.2% (2)	55.6% (5)	0% (0)

* Item considered 'essential' and included in stage 3.

† Not included in stage 3, as it was a follow-up question to "In what country were you born?"