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Title of Project:

Analysis of Medical Tourism at the Andrade Port of Entry

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ABSTRACT

Specific Aims: To identify which medications and/or medical services are being sought most frequently, the reason for these specific instances of medical tourism, perceived efficacy or satisfaction of these medications and services, and the likelihood of people continuing to receive their healthcare in Mexico.

Methods: Utilizing a cross-sectional survey design, 427 participants were recruited to participate in an anonymous electronic 12 question survey at or near the US-Mexico border at the Andrade port of entry.

Main Results: Most participants had a high-school diploma or four-year university degree, and the most common income bracket reported was between $25,000-$50,000 annually. Respondents reported traveling from four different countries, and of those from the US, 29 different home states were reported. The average age of participants was 64.5, with a range between 19 and 93. Dental was the most common medical service, and antibiotics were the most common class of medications reported on the survey. The majority of participants stated comparable or better efficacy of Mexican products, and expressed intent to continue to participate in medical tourism.

Conclusions: Based on the survey, patients feel as though these medications are just as good as what they would get in the states and will continue to buy them until research proves otherwise. Further research should be done to determine if these medications purchased in Mexico are indeed what they claim to be.

Analysis of Medical Tourism at the Andrade Port of Entry

INTRODUCTION

Drug tourism, a subtype of medical tourism, is defined as traveling to other countries to acquire medications for reasons such as accessibility or lower costs.[1] The United States (US) spends more on healthcare than any other industrialized nation worldwide, spending about 17% of gross domestic product (GDP) on healthcare as compared to 12% in most other countries.[2] Despite the astronomically high annual healthcare spending, the US ranked 50th out of 55 countries assessed for health care efficiency.[3] This cost is undoubtedly a driving factor in the exponential increases seen in various forms of medical tourism occurring in recent years. Given Arizona's proximity to Mexico, coupled with its popularity as a "snowbird", or winter visitor, destination, the medical tourism industry just south of its border is booming.[4]

Mexico is one of the most popular destinations for drug tourism, seeing over one million border annual crossings at the Port of Andrade in Los Algodones[5], a number which has increased over the years. The Andrade port of entry is the easternmost border crossing in California, located a mere 2000 feet west of the Colorado River, and two miles south of Interstate Eight. It is also Mexico's northernmost port of entry. Although it is a small and remote port of entry, it ranked 11th in 2010, with over one million people processed by US Customs & Border Protection (CBP) that year. Opened in 1927, it is a Class-A port of entry, meaning that the port is designated for all travelers.[6] Los Algodones offers various medical services and medications, including dental, optical, and the ability to purchase medications that are prescription-only in the US without a prescription. Though over 2.5 million crossings were documented throughout 2017 across this border crossing[7], there is a lack of data regarding the

specific services and medications being acquired from this border town and the reasons for medical tourism.

Therefore, the aim of this study is to identify what medications and/or medical services are being sought most frequently, the reason for these specific instances of medical tourism, perceived efficacy/satisfaction of these medications and services, and the likelihood of people continuing to receive their healthcare in Mexico. The target population for the survey will be adults returning to the United States through the Port of Andrade who have participated in medical tourism. Results of the survey are expected to be generalizable to the US-Mexico border only, as data collected will be specific to the participant's most recent medical tourism visit to Mexico.

METHODS

Design: This study utilized a cross sectional survey design.

Subjects: The survey was completed on a volunteer basis without payment or other incentive. No personal identifiers were collected, but Institutional Review Board approval was obtained through the University of Arizona. Those approached to fill out the survey were over the age of 18, were English-literate (reading and writing), and self-reported that they had purchased at least one pharmaceutical product and/or medical service from Mexico in the past 90 days. Participants provided consent to participate in the first question of the survey.

Measures: The survey consisted of 4 questions relating to medications and/or medical services and 7 questions relating to demographic information. Those who opted in to the survey were asked what specific medications and/or medical services they were purchasing or had purchased in the past 90 days, the main reason as to why they purchased medications in

Mexico, perception of product efficacy, and their likelihood of buying medications in Mexico in the future. Demographic questions included state/province of primary residence, age, gender, education level, income bracket, and insurance status.

Data Collection: Participants were recruited to complete an anonymous electronic 12 question survey (hosted by Qualtrics) on mobile devices while waiting to cross the US-Mexico border at the Andrade port of entry. Surveys were completed on the Mexico side of the border over the course of three non-consecutive days (September 29th, October 13th, and November 18th, 2017), the US side of the border on 2 other days (December 27th, 2017 and January 31st, 2018). Data were stored electronically on a secure server with password access only given to the principal investigators. Analysis included descriptive statistics which was completed through the Qualtrics platform.

Data Analysis: A minimum sample size of 384 was determined a-priori through the "Table for Determining Sample Sizes from a Given Population".[8]

RESULTS

A total of 427 surveys were collected over the 5 days. Participants ranged in age of 19 to 93 with the average age being 64.5 years old. More than half of those who participated were women (58.6%), and the majority of those surveyed were either high school graduates or had completed a four-year university degree (25.8% and 21.1%, respectively). Twenty-nine percent of survey respondents declined to state their income, but the most commonly reported income bracket was $25,000-50,000/year. Additional data can be seen in Table 1.

The top 20 medications and services reported to be purchased in the last 90 days by participants are listed in Table 2. The most common responses were dental services (n=124),

amoxicillin (n=80), and azithromycin (n=80) prescriptions. The most common prescription class were antibiotics.

Twenty nine states were represented among survey respondents, including Alaska, Montana, Pennsylvania, Washington, Michigan, and Nevada. There were 65 (15.2%) participants from Canada, including British Columbia, Alberta, Saskatchewan, and Ontario, and 1 participant from Germany. A complete list of survey respondents and their reported home state/country can be seen in Table 3.

Ninety-two percent of those surveyed claimed that cost was the biggest factor when deciding to buy medications from Mexico, followed by 34% claiming convenience, and 14% claiming the ability to buy in bulk. The 18% that marked 'other' stated reasons including, but not limited to, margaritas and/or food, fun/entertainment, no prescription/doctor visit needed, and insurance gaps/no insurance coverage.

Question four of the survey asked participants to rate their perceived effectiveness compared to US counterparts and the results are listed in Figure 2. Approximately 91% of respondents that had tried both US and Mexican medications stated that the Mexican medications worked as well, or better, than the US counterpart, with a further 7% stating that they had not tried the US counterpart. An overwhelming 94.6% of participants said that they would continue to participate in medical tourism in Mexico. Ninety-seven percent of survey participants said that they have some type of health insurance plan and of those, 82% of participants currently have prescription drug coverage.

At the end of the survey, there was a test box that participants could leave comments and/or suggestions regarding the survey. A few of the most notable comments included:

"bought enalapril [from Mexico] and it gave me heart palpitations", "better service/quality [in Mexico]", "dental work lasts longer than US", "80% cheaper than Canada", "still cheaper in Mexico even with [US/Canada] insurance".

DISCUSSION

There are many far-reaching potential implications for the US healthcare system when discussing medical tourism, such as the effects on adherence measures, antimicrobial resistance patterns, chronic disease management and interaction monitoring, among others. Adherence to prescribed medications is now being used as a means to assess providers, pharmacies and health plans and can affect reimbursement rates, Healthcare Effectiveness Data and Information Set (HEDIS) scoring and star measure ratings [9], however, because there is no way to account for medications or services obtained across the border in Mexico, medical tourism may skew these assessments. Given the access to antibiotics without a standard examination or recommendation from a trained practitioner, there is an increased risk that the antibiotics may be ineffective, or only partially effective, improperly dosed, or that the regimen may be too short - all of these factors increase the likelihood of furthering resistance patterns.[10]

Appropriate management of chronic diseases, as well as monitoring for safety and drug-drug or drug-disease interactions are complicated by the ability of patients to purchase medications that would normally require a prescription over-the-counter as they would have more control over self-treating, adjusting their own dosing, or augmenting their treatment regimens without the advice or guidance of a health care professional. Despite the many potential implications of the growing popularity of medical tourism in its various forms, there has been very little research that is focused on answering the who, what and why - that is, who

is participating, what services and or products are people seeking most often, and arguably the most important, why do they decide to participate in the first place? This study is one of few to address all three of these important questions.

Based on the results from the survey, the primary reason people buy their medications and medical services from Mexico is cost, regardless of if they have insurance or not. The highest reported medical service or medication acquired in Mexico was dental services, which included services such as cleanings, crowns, implants and veneers. With over 350 dentists occupying four square blocks of area, National Public Radio considers Los Algodones, nicknamed Molar City, to be the dental capital of Mexico[11], however, others such as NBC News have referred to it as the dental capital of the world.[12] Not surprisingly given these titles, the most frequently reported class of medications purchased were antibiotics, such as amoxicillin.

It was surprising to see that the average age of those surveyed were slightly below the age of 65, when people qualify for Medicare in the United States. Many of the people surveyed were “snowbirds” from other states, meaning they temporarily move to southern states to live in a warmer climate during the winter months. Twenty nine states were represented among survey respondents, as well as parts of Canada, including British Columbia, Alberta, Saskatchewan, and Ontario. This indicates that medical tourism is a popular venture for everyone throughout the United States and outside countries, not just those who are living in border states. According to those surveyed, high deductible plans and lack of prescription coverage made it challenging for them to afford their medications. The majority of medications reported by participants were generic medications with relatively low costs in the US, while the medications reported least often tended to be the more expensive brand-only drugs. For

example, a 30 day supply of metformin in the US is about $20, while a 100-count bottle, which is a 50-day supply, costs around $4 in Mexico.

In terms of perceived effectiveness, the vast majority of participants expressed that the medications they had acquired in Mexico had similar or better efficacy compared to US counterparts. As a follow up to the survey, a second project, for which results are pending, involved purchasing samples of various medications reported in the survey from the studied location and testing the samples for content and strength reported as percent of label claim. Preliminary results from that study have shown that 12 out of the 18 samples obtained in Mexico fell outside United States Pharmacopeia (USP) standards.

Few previously published studies also evaluated medical and drug tourism along the US-Mexico border, including a one-day survey conducted by the FDA's Southwest Import District (SWID) and a longer 12-month survey conducted by Rivera, Jose, et al., which are discussed below.

A survey of prescription drugs brought into the U.S. at eight ports of entry along the 2,000 mile border with Mexico was conducted by SWID.[13] The survey occurred during a four hour period on Saturday August 12, 2000, at eight border ports located in California, Arizona, and Texas. The purpose of this survey was to interview any individuals walking across the border into the U.S. who had purchased prescription drugs in Mexico, to answer the following questions: what specific types of products are being imported and who is importing these products. The most common drugs that were purchased in Mexico during the survey period were as follows: amoxicillin, Glucophage (metformin), Premarin, Dolo Neurobion, Vioxx (rofecoxib), Retin-A cream, Tafil (alprazolam), Celebrex (celecoxib), penicillin, Viagra (sildenafil),

and Carisoprodol. Five out of those 11 drugs correlated to the top 20 responses found in this study showing that antibiotics and pain relievers tend to be the most common medications purchased for medical tourism purposes.

Rivera, Jose., et al. conducted data analysis on a 2-stage cluster sampling survey conducted from September 2002 to June 2003 using the census tract for El Paso county and census equivalents in Ciudad Juarez, Mexico.[14] The goal was to examine the prevalence and motivations of cross-border purchase of medications and health-care services in a 12 month period using a questionnaire of 24 questions. They found that most of the patients traveling south to Mexico for medical services were most likely to be uninsured. However, 97% of the over 400 respondents in this study claimed to have health insurance showing that insured Americans are just as likely to travel across borders for cheaper healthcare.

There were a few limitations of this study. The survey did not include information on whether respondents had a prescription for the drugs they were buying. Through conversations with the participants, though there is not an actual number, many participants did not have an actual prescription for the medications they were buying. Many stated that they had been prescribed the medication by their provider in the past and had continued buying more of it in Mexico. A few patients even reported self-medicating or buying medications that were prescribed for their friends/family assuming it would be okay for them to take it if they had similar symptoms. Taking medications without the direction of a medical professional is never advised and could have a negative impact on a patient's health and lead to an increase in hospitalizations.

Another limitation could be the days chosen to survey at the border crossing. The number of responses per day varied from very few (<20) to most (>200) just depending on the date. To account for this impact on the results, several dates were chosen on different days of the week (Wednesday vs Saturday) to survey so that a decent representation of the population crossing the border could be attained.

CONCLUSIONS

Patients continue to travel to Mexico to acquire their prescription medications because they are inexpensive, convenient, and allow for them to buy in bulk. Based on the survey, patients feel as though these medications are just as good as what they would get in the states and will continue to buy them until research proves otherwise. Further research should be done to determine if these medications purchased in Mexico are indeed what they claim to be.

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Table 1:
Self-reported demographic characteristics

Gender	**n (%)**	**N = 427**
Male	174 (40.8)	
Female	250 (58.6)	
Other/Prefer not to specify	3 (0.7)	
Age	**n (%)**	**N = 420**
18-34	15 (3.6)	Mean = 64.5 yrs Range = 19-93 years
35-44	17 (4)	
45-54	34 (8)	
55-64	110 (26.2)	
65-74	179 (42.6)	
75+	65 (15.5)	
Education	**n (%)**	**N = 427**
Less than high school	10 (2.3)	
High school graduate	110 (25.8)	
Some college	82 (19.2)	
2 year degree	72 (16.9)	
4 year degree	90 (21.1)	
Professional degree	57 (13.4)	
Doctorate	6 (1.2)	
Income	**n (%)**	**N = 427**
Under $25,000	30 (7)	
$25,001 - $50,000	103 (24.1)	
$50,001 - $75,000	67 (15.7)	
$75,001 - $100,000	69 (16.2)	
Above $100,000	34 (8)	
Declined to state	124 (29)	

Table 2:
Medications/services purchased in last 90 days (Question 2): Top 20 responses out of 1,083 responses

Medical Services	Number of responses (%[a])	Other	Number of responses (%)
Dental	124 (11.4)	Omeprazole/Prilosec©	46 (4.2)
Glasses/optical/contacts	37 (3.4)	Sildenafil/Viagra©	26 (2.4)
Antibiotics	Number of responses (%)	Albuterol/Proair©/Ventolin©	24 (2.2)
Amoxicillin/Amox	80 (7.3)	Lisinopril	21 (1.9)
Azithromycin/Z-pak©	80 (7.3)	Levothyroxine/Synthroid©	16 (1.5)
Penicillin/PenVK©	26 (2.4)	Retinol cream/Retin-A©	15 (1.4)
Cephalexin/Keflex©	9 (0.8)	Metformin	13 (1.2)
Ampicillin	9 (0.8)	HCTZ (hydrochlorothiazide)	11 (1)
Antibiotics (no specification)	21 (1.9)	Sumatriptan/Imitrex©	8 (0.7)
Non-steroidal anti-inflammatory drugs (NSAIDs)	Number of responses (%)		
Ibuprofen/Motrin©	54 (5)		
Voltaren Gel©	18 (1.7)		
Naproxen	13 (1.2)		

[a]Percentages do not add up to 100% since this was a free response question and respondents could list several medications and/or services.

Table 3:
Survey Respondents Home States/Countries

Location	n	Location	n	Location	n
United States		South Dakota	4	Canada	
Arizona	132	North Dakota	4	British Columbia	32
California	55	Indiana	3	Alberta	15
Washington	28	Michigan	3	Saskatchewan	7
Oregon	25	Florida	3	Unspecified	5
Idaho	14	New Mexico	3	Vancouver	2
Wisconsin	13	Missouri	2	Ontario	2
Colorado	13	Mississippi	2	Mannitoba	1
Utah	10	Alaska	1	Newfoundland	1
Minnesota	8	Oklahoma	1	Mexico	
Montana	7	Iowa	1	Baja California	1
Wyoming	6	Georgia	1	Sonora	1
Nebraska	6	Texas	1	Other	
Nevada	5	Pennsylvania	1	Germany	1
Maine	4	Arkansas	1		

Figure 1:
Survey respondents home states/countries.

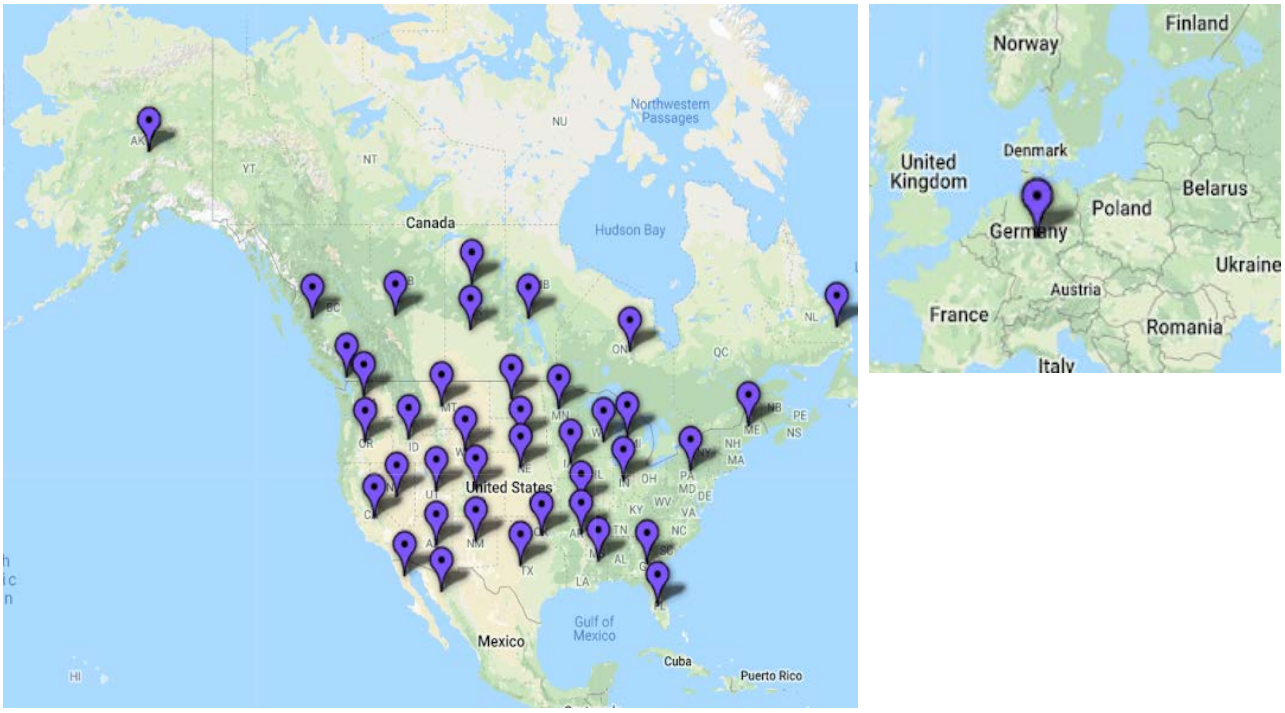
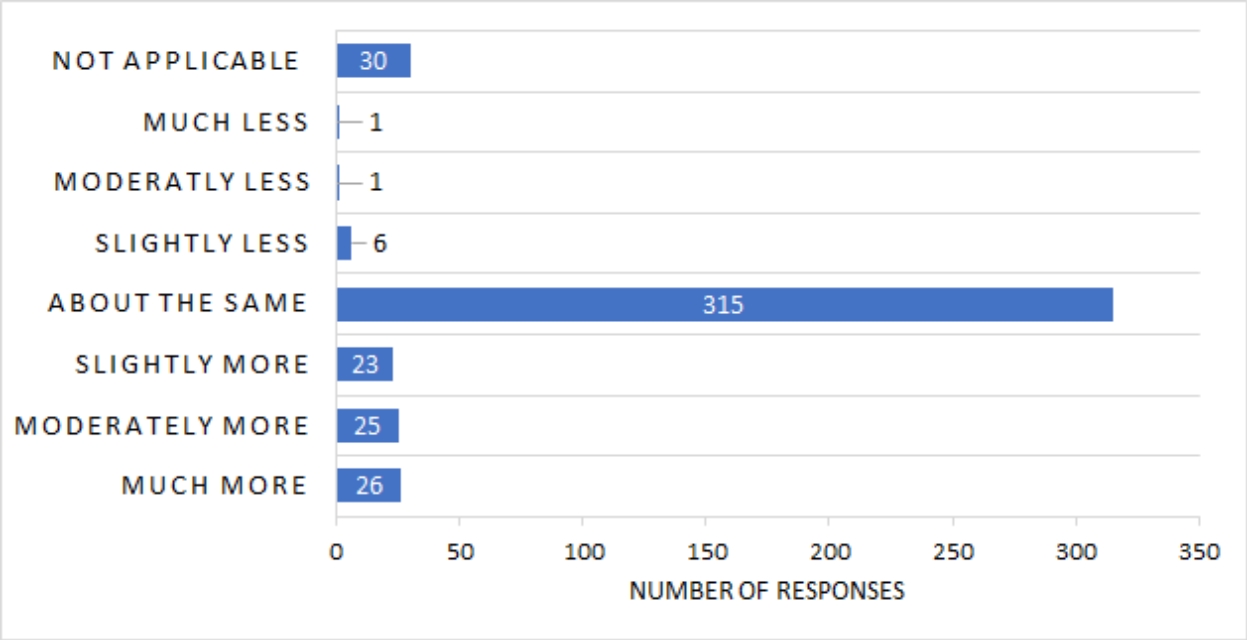


Figure 2:
Participant's perceived effectiveness of medications/services compared to US counterparts (Question 4)



APPENDICIES

Medical Tourism Survey at the Andrade Port of Entry

Q1. List the medications and/or services that you have purchased in Mexico in the past 90 days
[Free text response]

Q2. What are your top reason(s) for participating in medical tourism in Mexico? Select all that apply:
Cost, Convenience, Ability to buy in bulk, Other, please explain:

Q3. How effective do you feel that medications/services purchased in Mexico are compared to their US counterparts?
Much more, Moderately more, Slightly more, About the same, Slightly less, Moderately less, Much less, or Not applicable (i.e. I have never tried the US counterpart)

Q4. Do you believe that you will be likely to continue to participate in medical tourism in Mexico in the future?
Yes or No

Q5. What is your home state? *Please do not include city and/or zip code.*
[Free text response]

Q6. What is your age in years?
[Free text response]

Q7. What is your sex?
Male, Female, Other, or Prefer not to specify

Q8. What is the highest degree or level of education you have completed? (*If currently enrolled, highest degree received?)*
Less than high school, High school graduate, Some college, 2 year degree, 4 year degree, Professional degree, Doctorate

Q9. What is your approximate annual income in US dollars?
[Free text response]

Q10. Do you have health insurance?
Yes or No

Q11. Do you have prescription drug coverage?
Yes or No

Q12. Please provide any additional comments you have regarding this survey. Clicking "Next" will save your responses and submit the survey. Thank you for your time and your participation!
[Free text response]