

Epidemiology Of Israeli Travelers With Pre-existing Medical Conditions Traveling To Tropical Countries

Bianca Streltsin^{1,2}, Shmuel Stienlauf^{2,3}, Eli
Schwartz^{2,3}



1. Arrow Project , Sheba Medical Center, Tel-Hashomer, Israel.
2. Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel.
3. Internal Medicine “C”, Sheba Medical Center, & The Center for Geographic Medicine, Tel-Hashomer, Israel.

BACKGROUND

Tourism

- Over the past six decades, tourism has experienced continued expansion and diversification.
- The **share** of tourists to tropics had grown from **16%** to **27%** at same period.
- The diversity of travelers to the tropics is increasing.

Travelers With Pre-existing Medical Conditions (TPMC)

- The number of travelers with chronic medical conditions is expected to rise.
- Epidemiology of preexisting chronic medical conditions in travelers population is not well defined.

STUDY POPULATION & METHODS

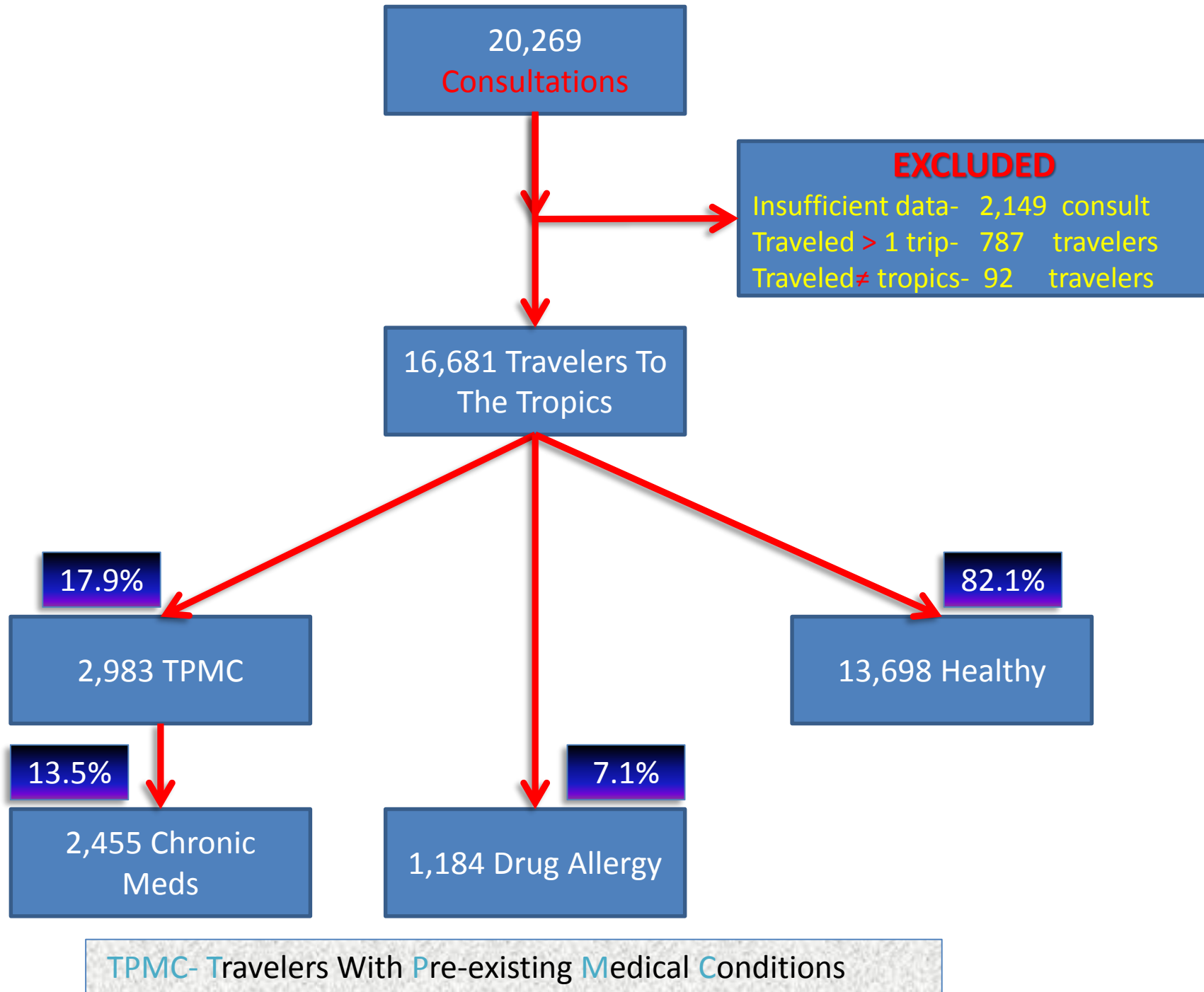
Study Population

- A retrospective cohort study.
- All travelers that came for a pre-travel consult in the **Travel Clinic Of The Chaim Sheba Medical Center.**
- Study period- **1/1/2005-31/12/2007.**
- A traveler was eligible to participate in the study if **travel exit date** and **continent(s)** were recorded.

Parameters

- Date of Visit.
- Demographics.
- Travel Destinations.
- Purpose Of Travel.
- Planned Exit Date.
- Duration of Travel.
- Existence And Type of Chronic Illness.
- Drug Allergies.
- Chronic Uses of Medications.

RESULTS



Demographics- TPMC vs. Healthy Travelers

	TPMC	Healthy Travelers	P value
% Male	50.9	52.7	NS

TPMC- Travelers With Pre-existing Medical Conditions

Demographics- TPMC vs. Healthy Travelers

	TPMC	Healthy Travelers	P value
% Male	50.9	52.7	NS
Average Age \pm SD (years)	41.4 \pm 18.0	29.3 \pm 12.2	<0.00001 student t-test

TPMC- Travelers With Pre-existing Medical Conditions

Demographics- TPMC vs. Healthy Travelers

	TPMC	Healthy Travelers	P value
% Male	50.9	52.7	NS
Average Age \pm SD (years)	41.4 \pm 18.0	29.3 \pm 12.2	<0.00001 student t-test
Median Age (25-75 quartile)	39.0 (23.1-58.2)	24.2 (22.0-32.1)	

TPMC- Travelers With Pre-existing Medical Conditions

Travel Epidemiology TPMC Vs. Healthy Travelers

		TPMC	Healthy Travelers	P value
Planned Duration Of Travel (Days)	Average \pm SD	73.7 \pm 124.9	108.1 \pm 156.8	p<0.001 multivariate linear regression

adjusted for age, gender, date of departure, destination and purpose of journey

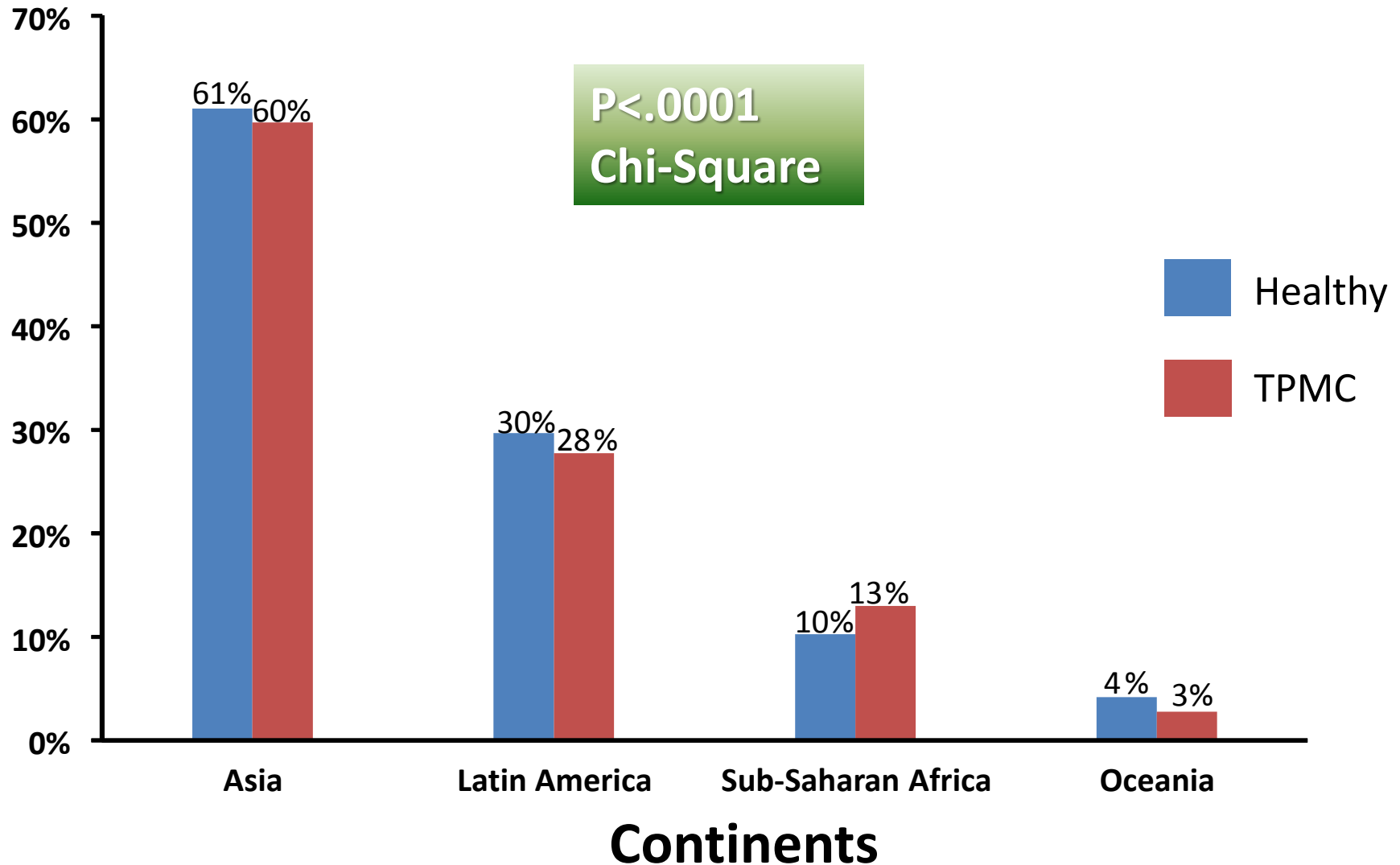
Travel Epidemiology TPMC Vs. Healthy Travelers

		TPMC	Healthy Travelers	P value
Planned Duration Of Travel (Days)	Average \pm SD	73.7 \pm 124.9	108.1 \pm 156.8	p<0.001 multivariate linear regression
	Median (25-75 quartile)	25 (21-165)	45 (16-90)	

Travel Epidemiology TPMC Vs. Healthy Travelers

		TPMC	Healthy Travelers	P value
Planned Duration Of Travel (Days)	Average \pm SD	73.7 \pm 124.9	108.1 \pm 156.8	p<0.001 multivariate linear regression
	Median (25-75 quartile)	25 (21-165)	45 (16-90)	
Days Between Consult And Departure	Average \pm SD	28 \pm 30.1	28.5 \pm 34.2	NS student t-test
	Median (25-75 quartile)	27 (16-38)	28 (15-39)	

Travel Destinations TPMC Vs. Healthy Travelers



Common Diseases Category

Chronic Disease Category	% of TPMC
Endocrinology & Metabolism	42
Cardiovascular	29
Pulmonary	17
Gastroenterology	10.5
Allergic Diseases	10

Special Groups

Group	%
Immune Deficient Travelers	4.1 of TPMC
Epilepsy	1 of TPMC
Pregnancy	0.3 of female travelers
Contraceptive Pills	2.2 of females ages 21-50
Hormone Replacement Therapy	1.9 of females age > 44

Common Chronic Medications

Medications	% of TPMC
Lipid lowering agents	25%
Anti-hypertensive	25%
Aspirin	14%
Levothyroxine	10%
Osteoporosis	9%
Asthma therapy Agents	9%
Nutritional Supplements	7%
Anti-depressant /Anxiolytic agents	7%
Acid Lowering Agents (PPI, H2 antagonists)	6%
Anti-diabetic	5%



Discussion

What Does The Literature Say?

Study	Hil*	Larocque et al**	Present Study
% TPMC	27	59	18

* American Journal of Tropical Medicine and Hygiene 1991; **45**(2): 263-270

** Clinical Infectious Diseases 2012;54(4):455–62

What Does The Literature Say?

Study	Hill	Larocque et al	Present Study
% TPMC	27	59	18
Nationality	USA	USA	Israeli

What Does The Literature Say?

Study	Hill	Larocque et al	Present Study
% TPMC	27	59	18
Nationality	USA	USA	Israeli
Study Period	1984-1989	2009-2011	2005-2007

What Does The Literature Say?

Study	Hill*	Larocque et al**	Present Study
% TPMC	27	59	18
Nationality	USA	USA	Israeli
Study Period	1984-1989	2009-2011	2005-2007
Male	46%	46%	52.5%

What Does The Literature Say?

Study	Hill*	Larocque et al**	Present Study
% TPMC	27	59	18
Nationality	USA	USA	Israeli
Study Period	1984-1989	2009-2011	2005-2007
Male	46%	46%	52.5%
Median Age(y)		35	25
Mean Age	43.4		31.6

What Does The Literature Say?

Study	Hill*	Larocque et al**	Present Study
% TPMC	27	59	18
Nationality	USA	USA	Israeli
Study Period	1984-1989	2009-2011	2005-2007
Male	46%	46%	52.5%
Median Age(y)		35	25
Mean Age	43.4		31.6
Median Planned Duration Of Stay (Days)	21	14	31

Preparation For Travel

- **Yellow fever** vaccine is CI in **1.15%** of travelers:
 - Immunosuppressed.
 - Pregnant.
- Malaria prophylaxis:
 - **Malarone pregnancy** category C (**0.15%**)
 - **Mefloquine** CI in **neuropsychiatric** disorders (**1.2%**)

Rate(%) Of Common Disease In Travelers Vs. General Population

Diagnosis	% in General Population	% in Travelers	P Value
Hypertension	20	3.9	P < 0.001
Allergic Disease	10	0.4	P < 0.001
Heart Disease	8.7	1.2	P < 0.001
Anxiety/Affective Disorder	8.2	0.9	P < 0.001
Diabetes	8.1	1.3	P < 0.001
Thyroid Disorders	7.3	1.8	P < 0.001
Asthma	7.2	3	P < 0.001
Kidney Problems	6.3	0.15	P < 0.001
Chronic Lung Disease	5.9	0.02	P < 0.001
Cancer	3.4	0.6	P < 0.001

WHY IS IT IMPORTANT?

Travel Related Diseases

- Infectious diseases & immunosuppression:
 - Rate ↑↑↑
 - Severity ↑↑↑
 - Duration ↑↑↑
- Reduced gastric barrier (**1%**) & GI infections:
 - Rate ↑↑↑
 - PPI
 - H2 antagonists

Impact Of Travel To The Tropics On Pre-existing Medical Conditions

- Asthma severity ↑↑↑
- Diabetes control ↓↓↓
- Inflammatory Bowel Disease ↔
- No data on:
 - Hyperlipidemia
 - HTN
 - Hypothyroidism

Conclusions

- **TPMC** accounted for a significant number of Israeli travelers to the tropics approaching **1/5** of visits to the pre-travel clinic.
- **TPMC** were significantly **older** than healthy travelers.
- **TPMC** planned to travel for **shorter** periods of time than healthy travelers.
- The rates of **Preexisting Medical Conditions** were significantly **lower** among **travelers** compared to the general population.
- A prospective study is needed to assess the impact of travel to the tropics on TPMC.

Design of prospective study on TPMC to Tropical Countries



From Retrospective to Prospective



New Goals

- Substantiation of our previous results
- Assessing implications of travel → chronic illnesses
- Assessing Implication of chronic illnesses → travel
- Assessing rates of travel related illnesses in TPMC and healthy travelers

Principles

- Recruiting volunteers from travelers visiting our pre-travel consult clinic
- Surveying travelers
 - During pre travel consult
 - During the trip
 - In a week after their return

From Plans to Actions or How We Got Stuck



Substantiation of retrospective study results

- Active collecting during pre travel consult:
 - Demographic Data
 - Travel Data
 - Chronic Illnesses
 - Medications
 - Allergies

Examples of Questions

אופי הנסיעה : תרמילאי / לא מאורגן בסטנדרט גבוה / טיול מאורגן / עסקים / לימודים - מחקר /
מגורים ממושכים / ביקור קרובים

בעיות רפואיות:

אילו תרופות לקחת בחודש האחרון? (תרופות קבועות)



Implications of travel on chronic illnesses

- Disease control (pre travel, post travel)
- Disease Related Quality of life

Disease Control Assessment

- How???

- **Hypertension** -Average blood pressure reported
- **IHD** –NYHA functional capacity
- **Hypothyroidism**- TSH
- **Diabetes** -HBA₁C
- **Asthma** -ACQ questionnaire, Spirometry

Diseases Related Quality of Life

- SF-12v2 health questionnaire:
 - Scale scores for eight domains of health:
 - physical functioning
 - role limitations due to physical health
 - bodily pain
 - general health perceptions
 - Vitality
 - social functioning
 - role limitations due to emotional problems
 - mental health.
 - 2 summary measures of physical and mental health

Example of SF-12 Results

RESULTS

Survey Date: June 27, 2012

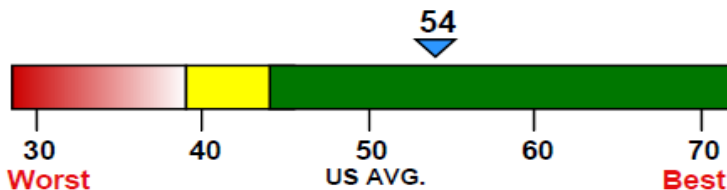
Mode: Web

Age: Unknown

Gender: Unknown

Conditions: None

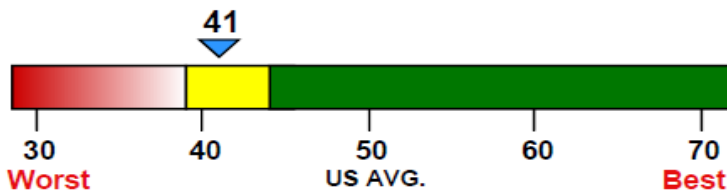
PHYSICAL HEALTH SUMMARY



Average score for the general population: 49.63

Compared to the general population, your physical health summary score is about average.

MENTAL HEALTH SUMMARY



Average score for the general population: 49.37

Compared to the general population, your mental health summary score is below average.

INTERPRETATION

Based on your answers about health in the past 4 weeks, our research shows that

Compared to the general population...

Physically, your ...

- pain is the same
- functioning is better than most
- performance of work, home or school activities is slightly worse

Emotionally ...

- bothered more than most
- performance of work, home and school activities is limited less

Overall, your ...

- rating of your health is much better
- participation in social activities is about the same
- energy level is higher

Implications of Illness on Travel

- Open text and Multivariate Questions about:
 - Influences on planned **duration of trip**
 - Influences on **destination** Choices
- For Example:

האם משך הנסיעה נקבע (ניתן לבחור יותר מתשובה אחת)

- א- יכולת כספית
- ב- זמן מוקצב (חופשה)
- ג- חשש להחמרת מחלה
- ד- חשש לאספקת תרופות




Travel Related Illnesses

- The most common illnesses are:
 - Travelers Diarrhea
 - Upper Respiratory Infection
 - Malaria
 - Altitude Sickness
 - Hepatitis A&B
 - Schistosomiasis
- Dangerous but uncommon:
 - Dengue Fever
 - Rabies
 - Yellow Fever
 - Japanese encephalitis
 - Trypanosomiasis

Follow Up During and Post Trip

- Increasing Compliance by:
 - Short and plain Questionnaire
 - Frequency of questioning not too low but not too high
 - Contacting travel clinic in case of illness during the trip as an incentive
- Ways of follow up:
 - Passive
 - Periodic mailing of questionnaires by travelers can be inconvenient
 - Periodic emailing surveys
 - Disadvantage of passive follow up- more severe cases
 - Active
 - In older studies data was collected immediately post trip (Steffen's study at the airport). It can lead to memory bias
 - Telephone calls are expensive and not always available

Internet Survey

- A simple way of contact but....
 - Software Requirements
 - Secure connection 
 - Validation of received data  
 - Variety of question types
 - Enabling Import and Export from databases

Software Options:

- Facebook application, Google Docs (Data ownership?)
- Commercial Software (\$\$\$)
- Designing customary online solution

Where do We Go from Here?



Just Wondering...