

# Incidence of Traveler's Diarrhea among adult foreign travelers in Thailand



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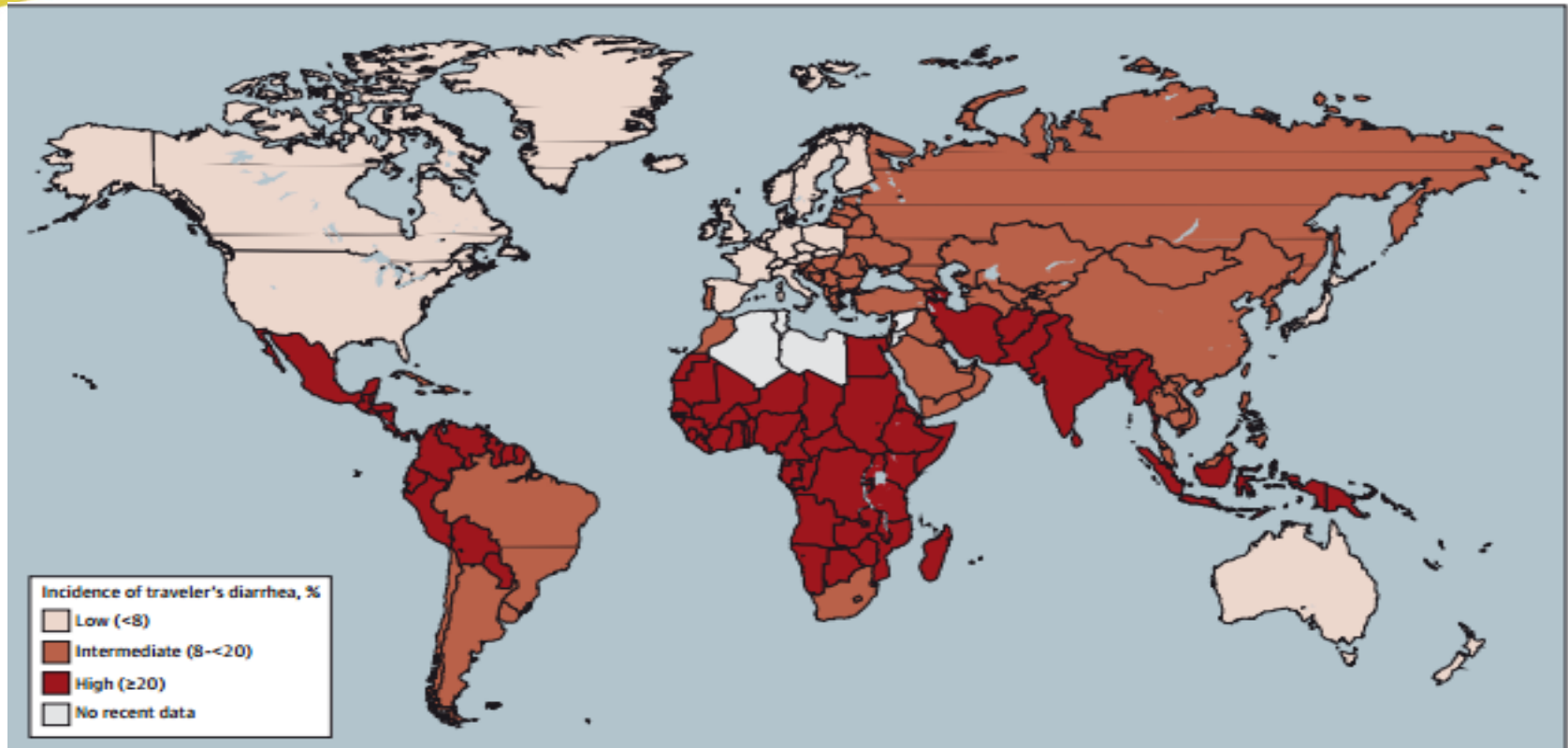
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# Incidence rate of Traveler's diarrhea (TD)



Steffen R, et al. JAMA. 2015;313(1):71-80.

Wisdom of the Land



# OBJECTIVE

## 1° objective

- To determine **incidence of TD in first 14 days**

## 2° objective

- To determine
  - **incidence of TD in first 7 & 28 days**
  - **associated risks** for TD
- To describe
  - **impact** of TD
  - **etiologies** of TD
  - **when** does it starts!



# MATERIALS AND METHODS

## 2 Study Sites

- Thai Travel Clinic & Fever clinic, TM hospital
- Immunization and Travel Clinic, QSMI

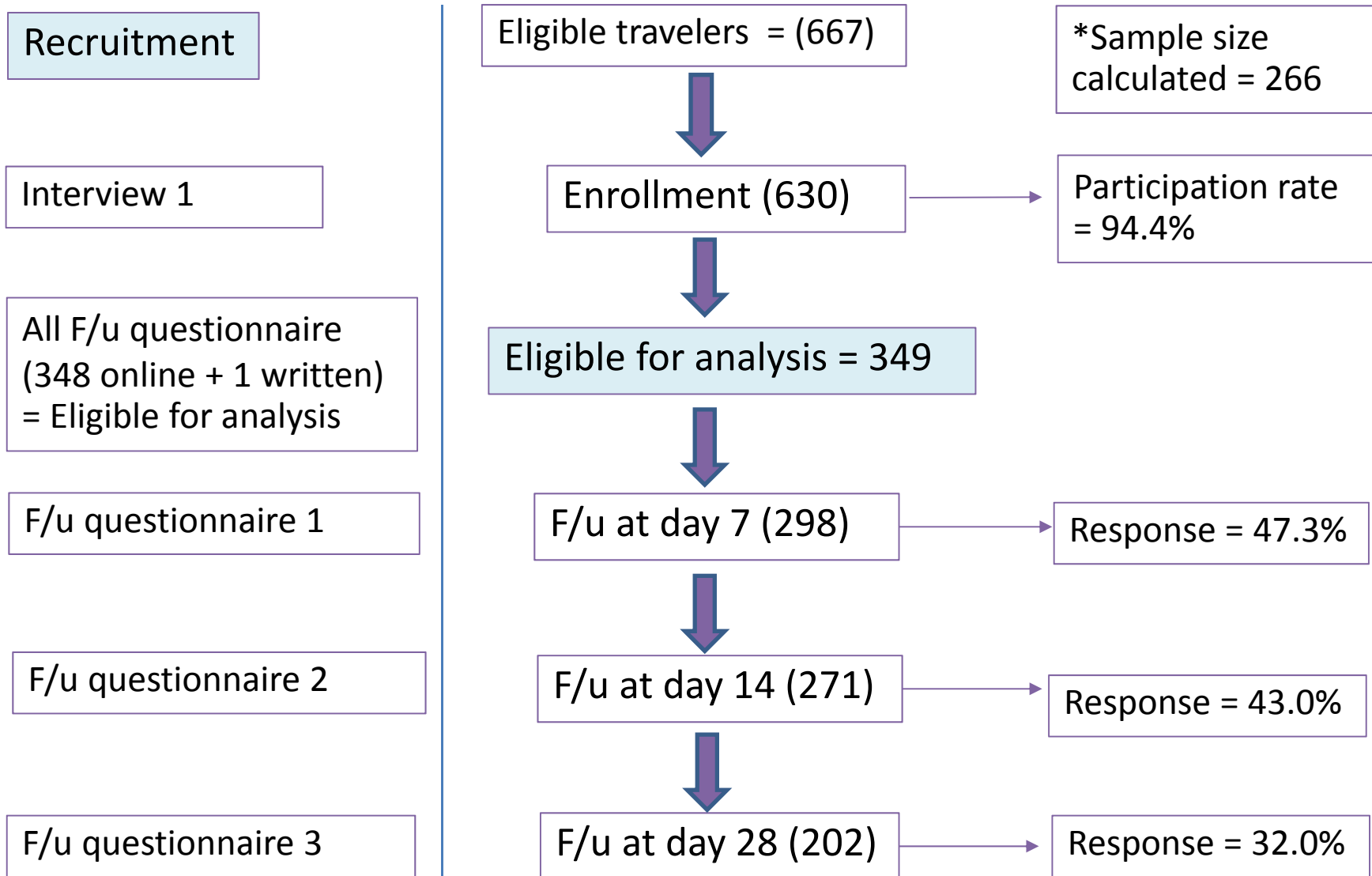


With permission

Inclusion	Exclusion
Foreign travelers visiting Thailand	Reached Thailand > 7 days (current trip)
Age $\geq$ 18 years old	Diarrhea < 6 hours after landing in Thailand
Volunteer	Unable to communicate in English



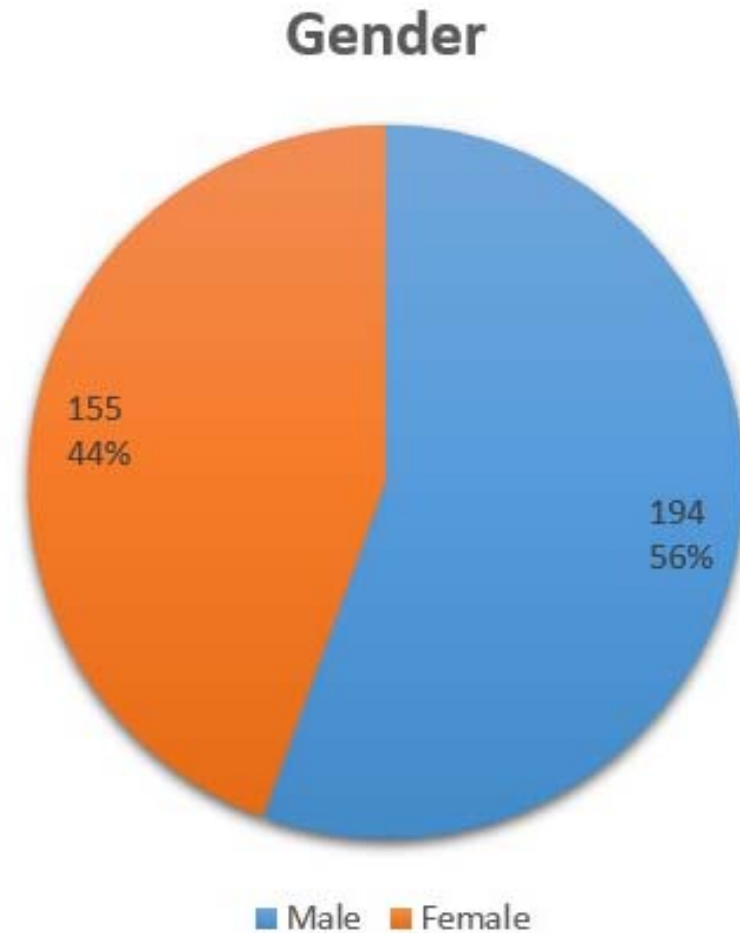
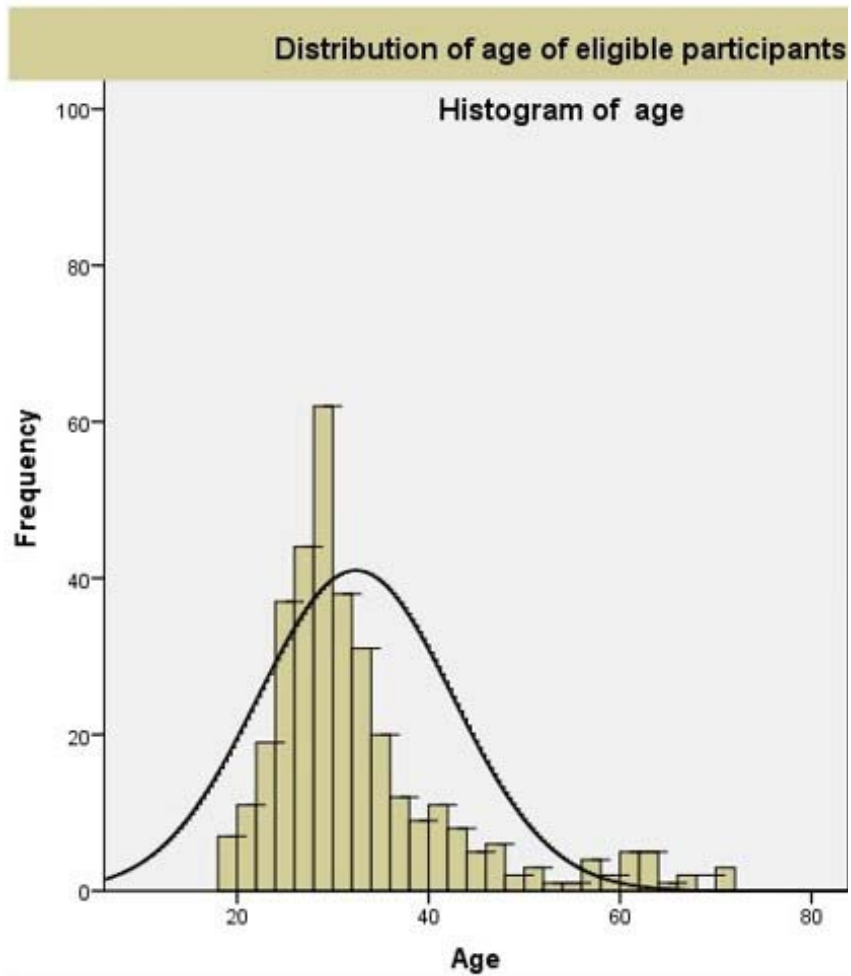
# Procedure & Result



\*Pitzurra R, et al. BMC Infect Dis .2010;10:231.



# Demography

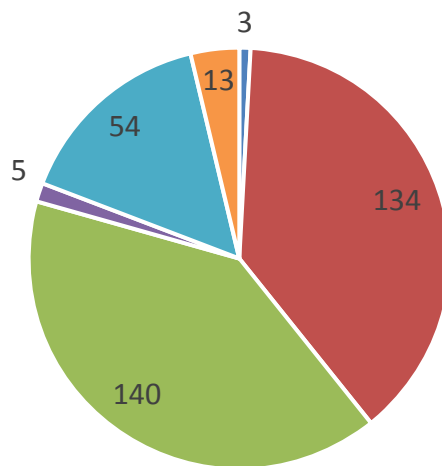


- N = 349
- Mean  $\pm$  SD age = 32.3  $\pm$  10.2 years

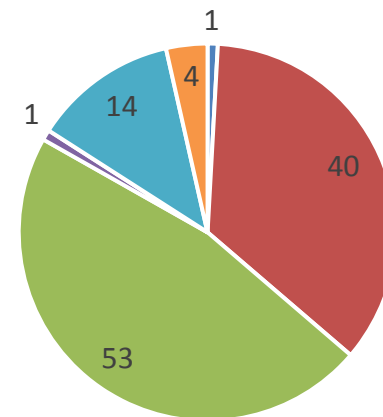


# Demography

F/U response by continent (N = 349)



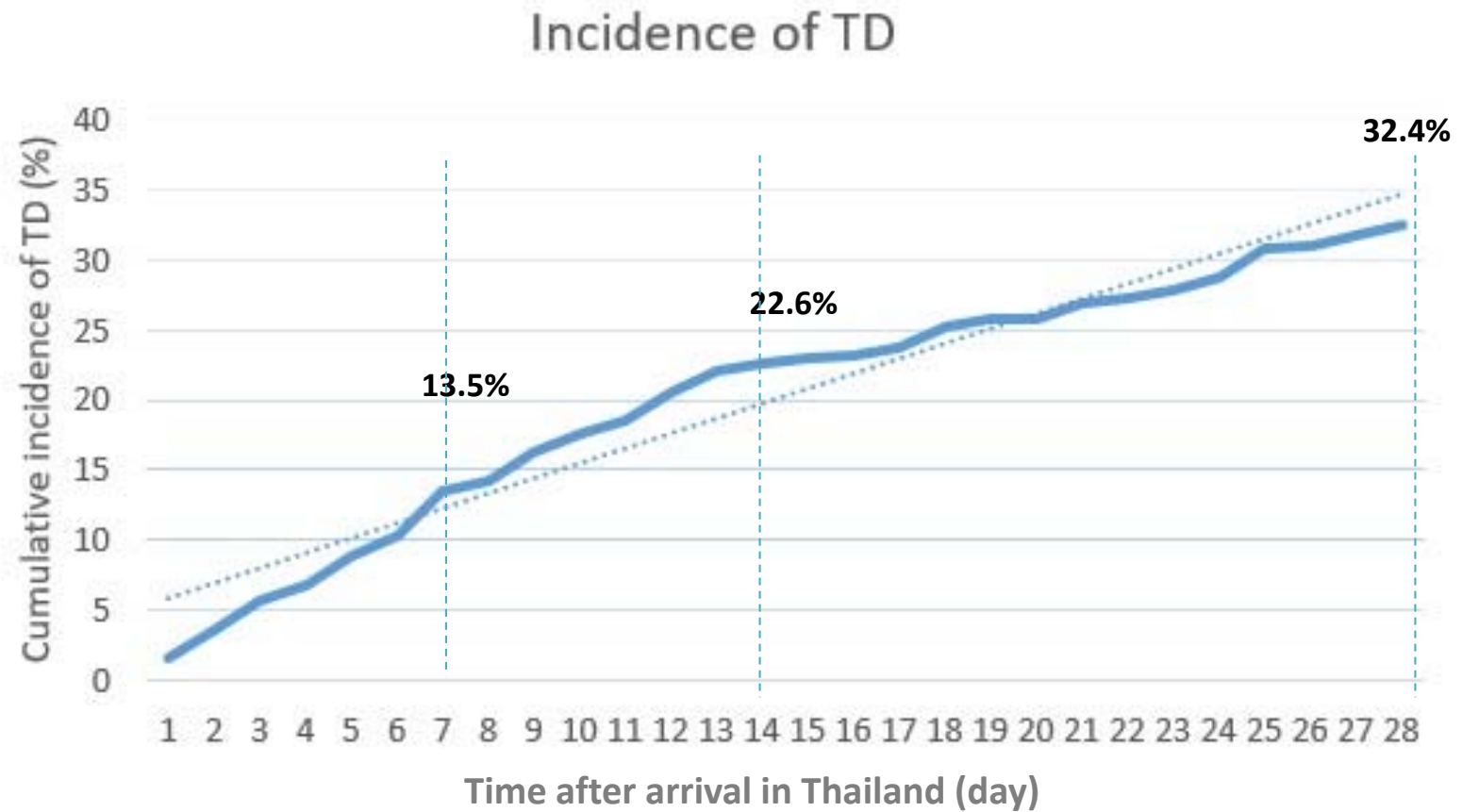
TD by continent (n = 113)



■ Africa ■ Europe ■ N. America ■ S. America ■ Asia ■ Australia



# Cumulative incidence of TD







# Demographic characteristics: TD

Demographic characteristics	Eligible participants (n= 349)	With TD (n= 113)	Without TD (n= 236)	P-value
Age in years, mean $\pm$ SD	32.3 $\pm$ 10.2	30.7 $\pm$ 8.3	33.1 $\pm$ 10.9	0.022
Male sex, N(%)	194(55.6)	65(58)	130(55.6)	0.667
Nationality, N(%)				0.650
European	134(38.4)	40(35.4)	94(39.8)	
North American	140(40.1)	53(46.9)	87(36.7)	
Education, N(%)				0.741
High school	72(20.5)	26(22.6)	46(19.3)	
University graduate	278(79.2)	89(77.4)	191(80.3)	
Medical problem, N(%)				0.384
*Atopy, N(%)	31(8.9)	12(10.6)	19(8.1)	0.431
*Allergy, N(%)	58(16.6)	26(23.0)	32(13.6)	0.028

\*Atopy = allergic rhinitis/ asthma/ gastro-esophageal reflux disease

\*Allergy = drug/ milk/ seafood



# Diet/ behavior: TD

Diet/ behavior	With TD, (N = 113)	Without TD, (N = 236)	p-value
Tap water	19(17)	31(13.1)	0.359
Alcohol	87(77)	179(75.5)	0.814
Raw food	49(43.8)	106(44.7)	0.784
Fruits	102(91.1)	216(91.1)	0.698
Herbal	37(33.0)	73(30.8)	0.733
Ice	97(86.6)	205(86.5)	0.793
Seafood	67(59.8)	152(64.1)	0.355
Vegetables	85(75.9)	178(75.1)	0.967
Insect	6(5.4)	19(8)	0.356
Leftover food	18(16.1)	49(20.7)	0.284
Not routinely wash hands			
- Before meal	65(57.5)	125(53.0)	0.424
- After toilet	38(33.6)	52(22.03)	0.021
Less than 2meals in hotel	102(90.3)	221(93.6)	0.264
Street food	103(92.0)	197(83.5)	0.057
Bare hands	66(59.5)	122(52.4)	0.239



# Travel characteristics: TD

Activities/ travel purpose/ travel destination	With TD (N = 113)	Without TD (N = 236)	p-value
Cruise travel	9(8.0)	20(8.5)	0.871
Swimming	62(54.9)	134(56.8)	0.736
Trekking	38(33.6)	68(28.8)	0.360
<b>Travel purpose :-</b>			
Tourism	97(85.8)	211(89.4)	0.334
VFR	18(15.9)	26(10.9)	0.198
Volunteer	8(7.0)	14(5.9)	0.680
Business	3(2.7)	1(0.4)	0.109
Education	4(3.5)	10(4.2)	0.756
Other	6(5.3)	14(5.9)	0.815
<b>Travel to :-</b>			
City	111(98.2)	225(95.3)	0.199
Countryside	93(82.3)	172(72.9)	0.055
National park	72(63.7)	127(53.8)	0.081



# Travel characteristics: TD

Travel companion/ itinerary	With TD (N = 113)	Without TD (N = 236)	p-value
Travel with :-			
Solo	39(34.5)	85(36.0)	0.783
Couple	64(56.6)	119(50.4)	0.277
Children or elderly	5(4.4)	30(12.7)	0.021
Group or private tour	4(3.5)	10(4.2)	0.756
Other	8(7.1)	25(10.6)	0.297
Arrival from (other) SEA :-			
or travel abroad from Thailand	83(39.2)	129(60.8)	< 0.001
Traveled from at least 1 country	23(20.4)	49(20.8)	0.929
Traveled from at least 2 countries	10(8.8)	22(9.3)	0.886



# Summarized Factors: TD

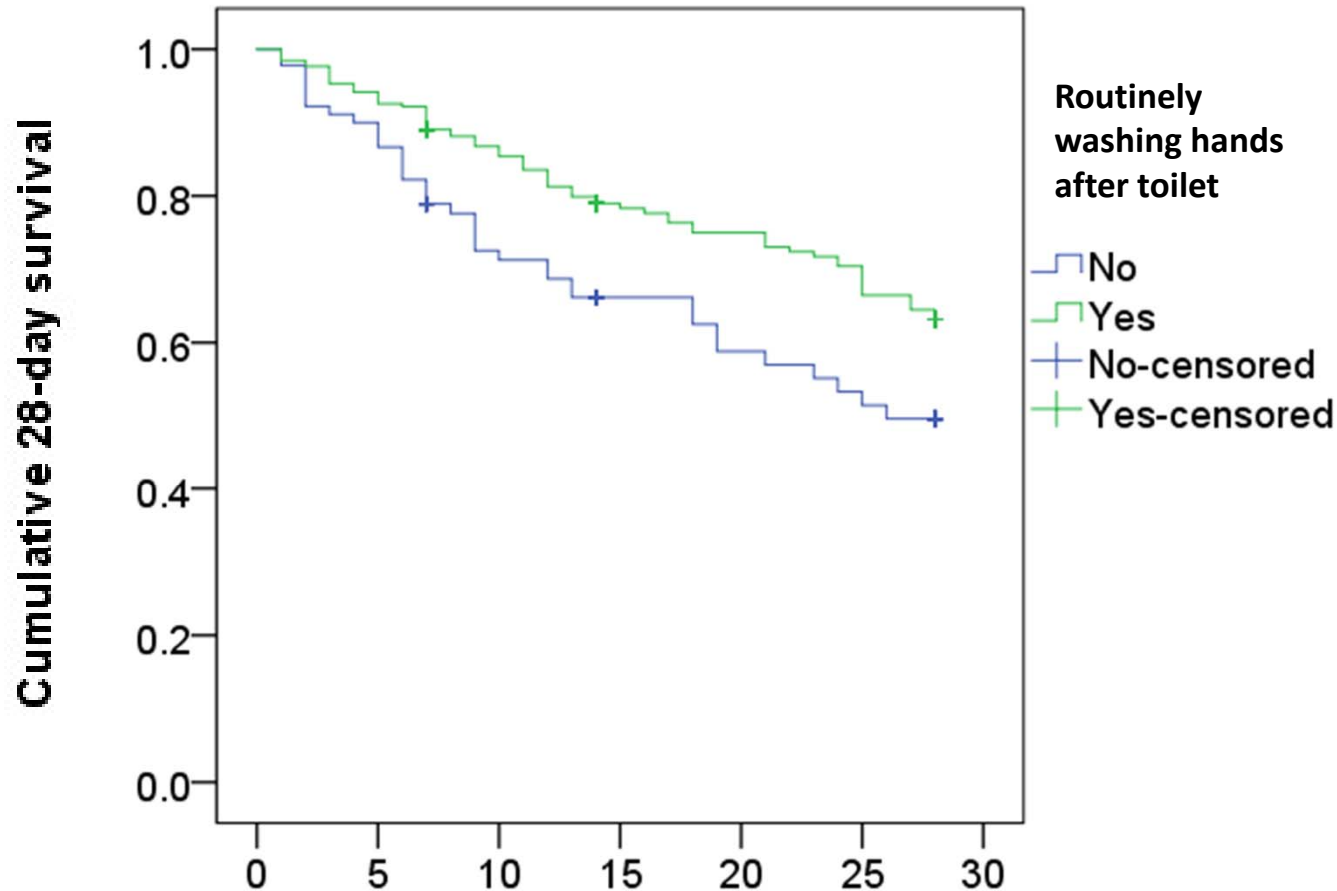
Factors	With TD n= 113; (%)	Without TD n= 236; (%)	Odds ratio	95% Confidence interval
Age in years, mean $\pm$ SD	30.7 $\pm$ 8.3	33.1 $\pm$ 10.9		
Allergy, N(%)	26 (8.0)	32 (9.9)	1.90	1.07 – 3.39
Not routinely wash hands after toilet	38 (33.6)	52 (22.03)	1.79	1.09 – 2.95
Arrival from other SEA country or travel abroad from Thailand	83 (39.2)	129 (60.8)	2.29	1.40 - 3.74
Travel with Children or elderly	5 (4.4)	30 (12.7)	0.32	0.12 - 0.84

\*Age calculated by using independent Student t-test



# Kaplan Meier curve of TD: routinely washing hands after toilet

Survival functions of TD related to routinely washing hands after toilet

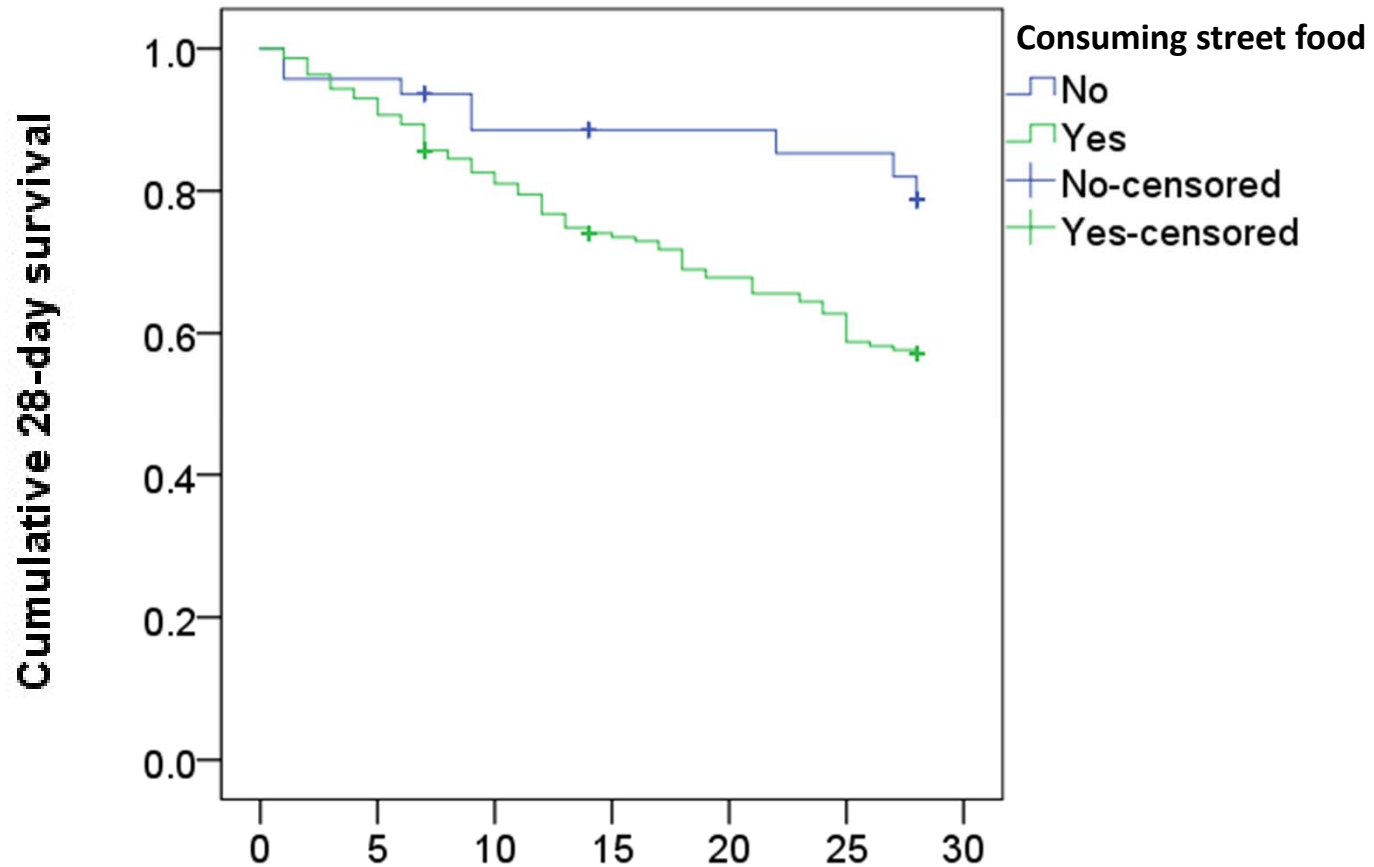


\*Statistically significant using the Log rank test (p-value = 0.010)



# Kaplan Meier curve of TD: street food

Survival functions of TD related to consuming street food

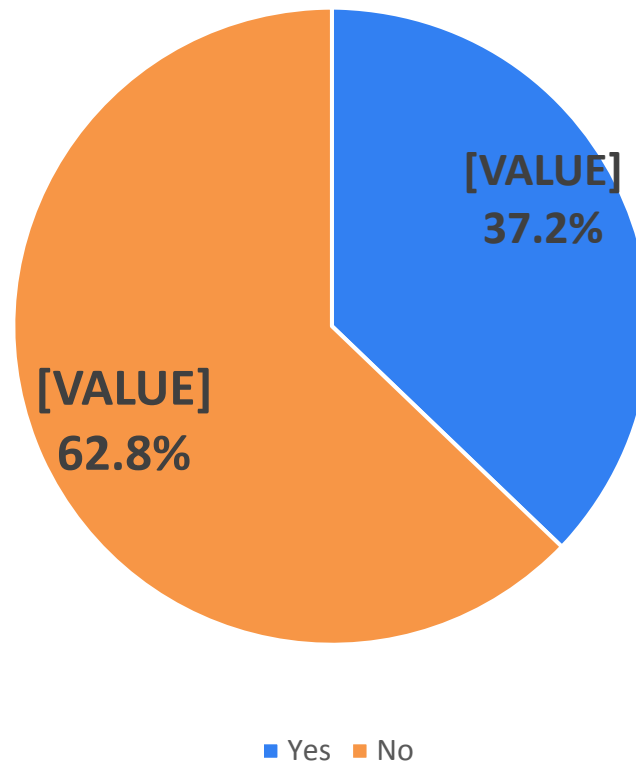


\*Statistically significant using the Log rank test (p-value = 0.016)



# Impact

Fever among TD patients

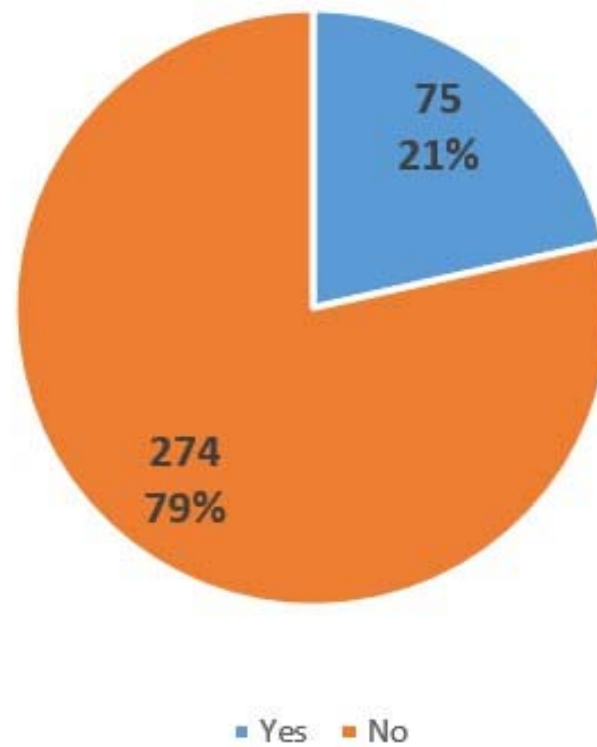






# Impact

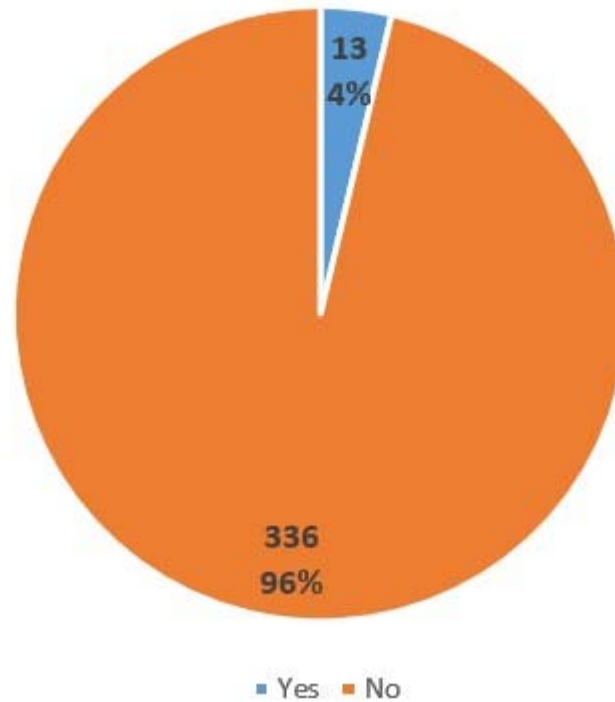
## Visited medical doctor due to diarrhea





# Impact

Need to change travel plan due to diarrhea





# Etiologies

- 11 participants - tested for stool exam & stool c/s
- 3 parasitic infection cases
  - 1 *Giardia intestinalis*
  - 1 *Blastocystis hominis*
  - 1 *Blastocystis hominis* + *E. histolytica*
- 2 Bacteria infections
  - 1 *Salmonella enteritidis* (Group B)
  - 1 Unspecified



[http://www.phsource.us/PH/HELM/PH\\_Images\\_Parasites/Blastocystis%20hominis.jpg](http://www.phsource.us/PH/HELM/PH_Images_Parasites/Blastocystis%20hominis.jpg)



# Acknowledgement

- Staff of the study sites:-
  - Hospital for Tropical Diseases, Bangkok
  - Queen Saovabha Memorial Institute
- M. Shirano, M.D. & Y. Kurahashi, M.D.



**Thank You**