ENHANCING GLOBAL HEALTH:

THE ROLE OF TRAVEL VACCINES IN PRIMARY CARE

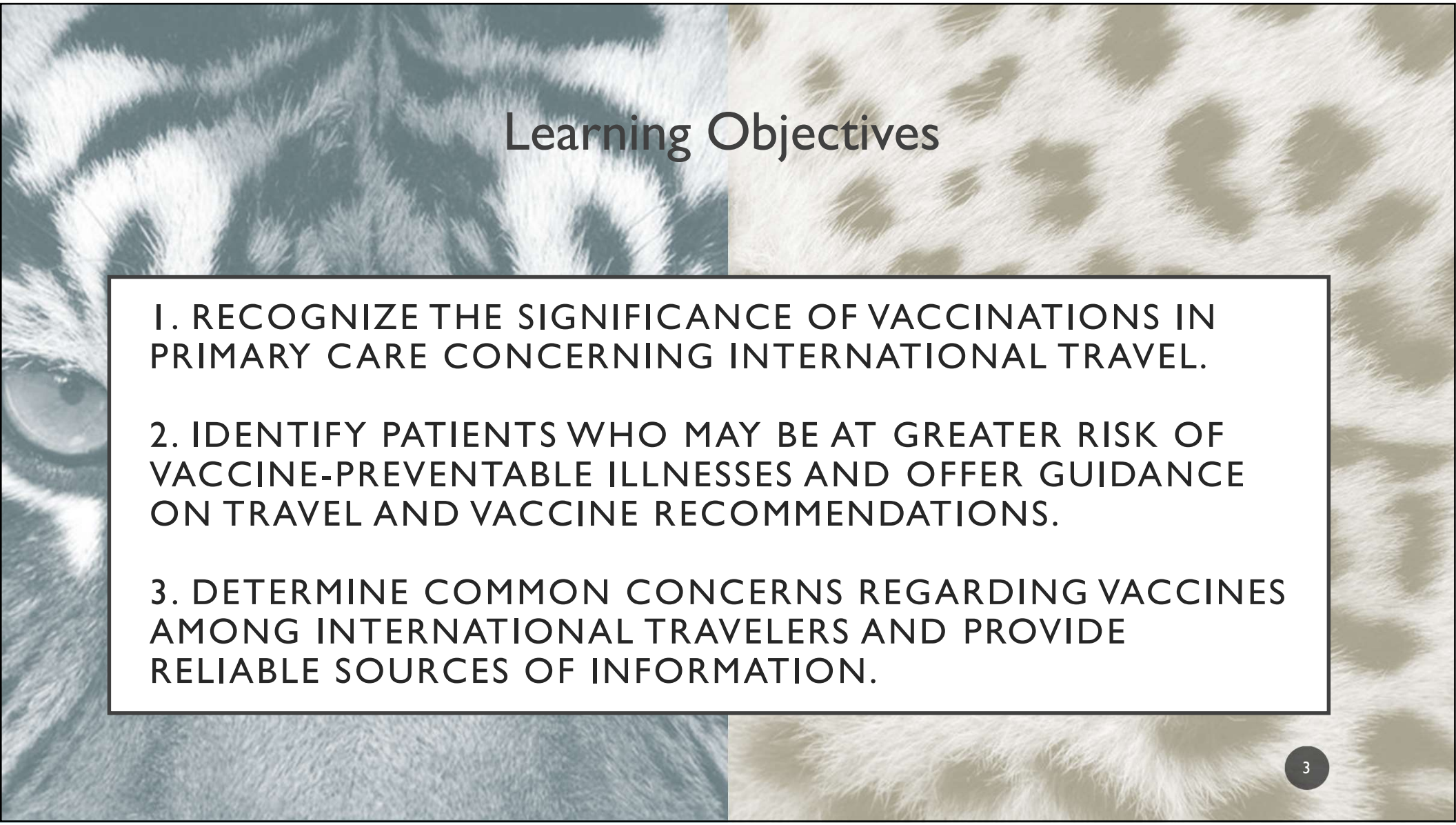
Duellyn Pandis, DNP, APRN, FNP-C, CTM®, AFTM RCPS(Glasg)

DISCLOSURES

- Owner of Passport Health of Tampa Bay Travel Medicine Clinic

- Vaccinations will be discussed in generic terms. Any unlabeled/ unproved uses of drugs or products referenced will be disclosed.

2



Learning Objectives

1. RECOGNIZE THE SIGNIFICANCE OF VACCINATIONS IN PRIMARY CARE CONCERNING INTERNATIONAL TRAVEL.

2. IDENTIFY PATIENTS WHO MAY BE AT GREATER RISK OF VACCINE-PREVENTABLE ILLNESSES AND OFFER GUIDANCE ON TRAVEL AND VACCINE RECOMMENDATIONS.

3. DETERMINE COMMON CONCERNS REGARDING VACCINES AMONG INTERNATIONAL TRAVELERS AND PROVIDE RELIABLE SOURCES OF INFORMATION.

3

IMPORTANCE

- Vaccines are a critical component of primary care, providing protection against various infectious diseases.
- Travel vaccines protect against potential threats that are prevalent in different parts of the world, safeguarding individual health and curbing the spread of communicable diseases across borders.

4

IMPORTANCE

- From routine vaccinations such as measles, mumps, and rubella (MMR) to region-specific vaccines for diseases such as yellow fever and Japanese encephalitis, the significance of an individualized vaccination plan cannot be overstated.
- Understand how to ensure that patients are well-prepared for international travel with travel vaccines and factors such as itinerary and health status.

5

WHAT IS TRAVEL MEDICINE?

- A Focus on Traveler's Need Based on Destination
- Includes Prevention and Treatment
- Guidance on Safety and Health Precautions

I

TRAVEL MEDICINE

Defined

Travel medicine is an interdisciplinary specialty that prevents, manages, and researches travel-related health problems.

- Prevention
  - Knowledge
  - Vaccines
- Management
  - Prophylaxis
  - Post Exposure
- Research
  - Know before you go

REFRESHER

- **Chemoprophylaxis:**
  - The use of drugs to prevent disease.
- **Endemic:**
  - Regularly found among particular populations or in a specific area.
- **Epidemic:**
  - An unexpected increase in disease cases in a region
- **Enzootic:**
  - Regularly affecting animals in a particular region or during a particular season.

8

REFRESHER

- **Prevalence:**
  - The number of disease cases in a specific population at a particular time.
- **Prophylaxis:**
  - Treatment given or action taken to prevent disease.
- **Risk:**
  - Exposure to danger or harm.

9

HOW DISEASES ARE SPREAD

Food and Water

- Cholera
- Hepatitis A
- Polio
- Typhoid
- Travelers Diarrhea (E. Coli, Campylobacter, Shigella, Salmonella, Giardia)

Vector

- Chikungunya
- Dengue
- Japanese encephalitis
- Leishmaniasis
- Lyme Disease
- Lymphatic filariasis
- Malaria
- Tick-Borne Encephalitis
- West Nile Virus
- Yellow fever
- Zika virus

10

HOW DISEASES ARE SPREAD

Airborne Droplets, Direct Contact

- Chickenpox
- Influenza
- MMR
- Meningitis
- Tetanus Diptheria Pertussis
- Sars-CoV-2
- Pneumococcal
- RSV

Blood and Body Fluids

- Dengue
- Hepatitis B
- Hepatitis C
- Rabies
- Zika

11

WORLD'S DEADLIEST ANIMAL

ACCORDING TO THE CDC

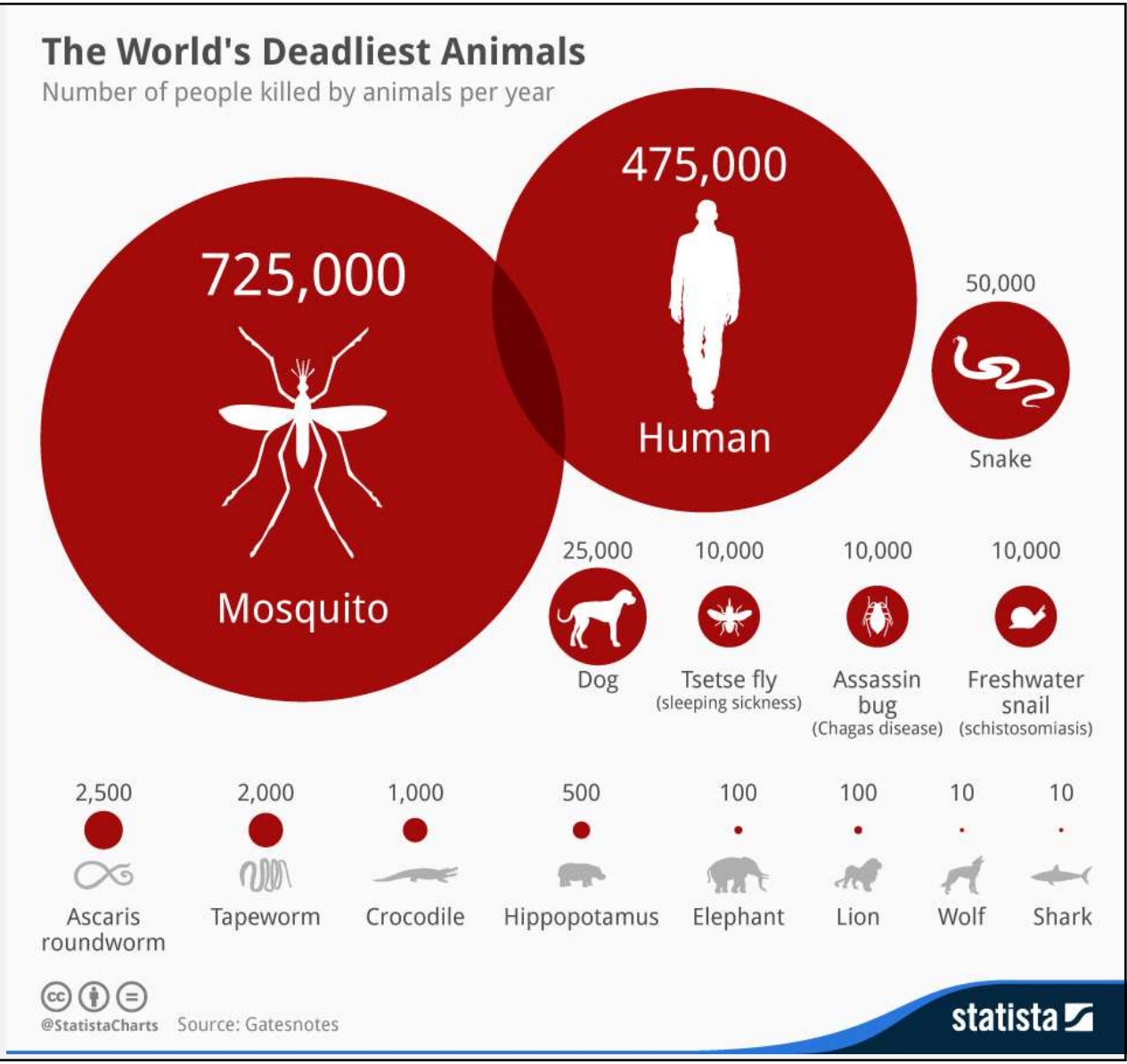
https://www.cdc.gov/globalhealth/stories/2019/world-deadliest-animal.html

GATESNOTES

Human Deaths

- 725,000 people annually are killed by mosquito borne diseases.
- 50,000 fatalities by snakes every year
- 25,000 by dogs- primarily via rabies.

https://www.statista.com/chart/2203/the-worlds-deadliest-animals/



CHEMOPROPHYLAXIS

+ Malaria

- Recommended:
  - Depends on destination

+ Diarrhea

- Destination Specific
  - Country determined

VACCINES

+ Recommended/ Routine

- Recommended:
  - Depends on destination
- Routine
  - Everything we have received in our life so far

+ Required

- Destination Specific
  - Country determined

VACCINE TYPES

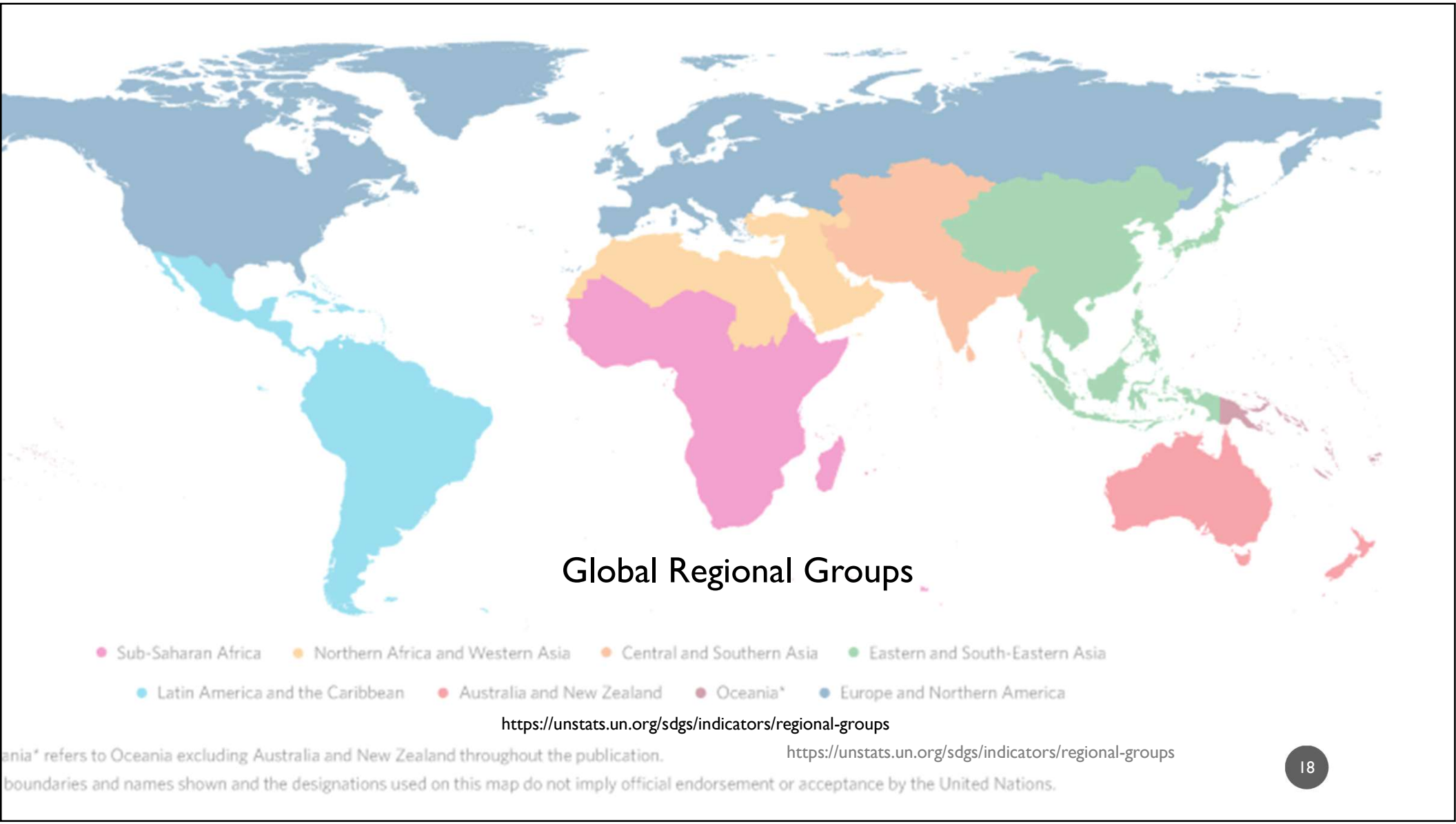
- **Inactivated vaccine:**
  - The killed pathogen triggers a targeted immune response.
- **Live attenuated vaccine:**
  - This vaccine includes a weakened form of the pathogen that triggers a targeted immune response.
- **mRNA-based vaccine:**
  - Includes mRNA coding for specific proteins from the pathogen delivered to cells where the proteins are produced and trigger a targeted immune response.

16

VACCINE TYPES

- **Recombinant vaccine:**
  - Includes partial pathogen components that trigger a targeted immune response.
- **Toxoid** vaccines
  - Include a toxin (harmful substance) the pathogen makes that triggers a targeted immune response.
- **Viral vector vaccines:**
  - These include a modified version of a virus as a vector to deliver some degree of protection against another pathogen.

17


Global Regional Groups
Sub-Saharan Africa
Northern Africa and Western Asia
Central and Southern Asia
Eastern and South-Eastern Asia
Latin America and the Caribbean
Australia and New Zealand
Oceania*
Europe and Northern America
https://unstats.un.org/sdgs/indicators/regional-groups
ania* refers to Oceania excluding Australia and New Zealand throughout the publication.
https://unstats.un.org/sdgs/indicators/regional-groups
boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
18

NORTH AMERICA & EUROPE

- Cholera
- Chikungunya
- Hepatitis A
- Hepatitis B
- Influenza
- Japanese encephalitis
- Malaria
- MMR
- Meningococcal disease
- Polio
- Rabies
- Smallpox
- Tickborne encephalitis
- Typhoid
- Yellow fever

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20

LATIN AMERICA & CARIBBEAN

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- Hepatitis A
- Hepatitis B
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- Japanese encephalitis
- Malaria
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- Meningococcal disease
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- Yellow fever

21

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LATIN AMERICA & CARIBBEAN

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22

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SUB SAHARAN AFRICA

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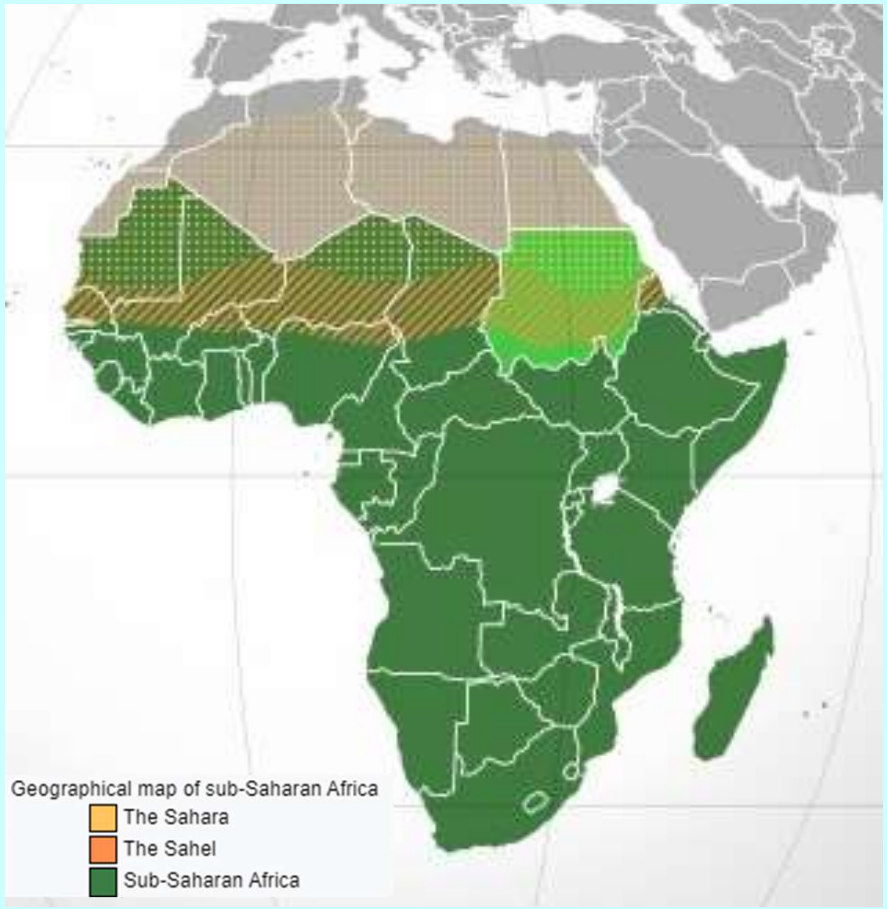

23

Sub-Saharan Africa. (2024, May 9). In Wikipedia. https://en.wikipedia.org/wiki/Sub-Saharan_Africa

SUB SAHARAN AFRICA

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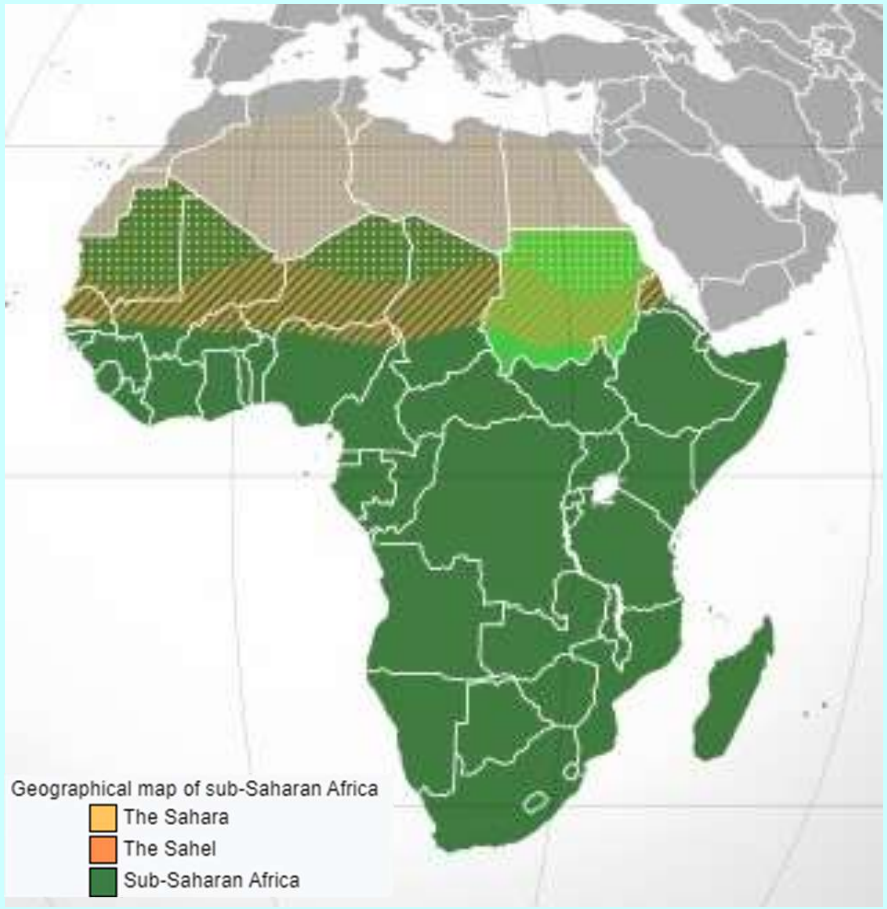

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Sub-Saharan Africa. (2024, May 9). In Wikipedia.https://en.wikipedia.org/wiki/Sub-Saharan_Africa

NORTHWEST AFRICA & WESTERN ASIA

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25

NORTHWEST AFRICA & WESTERN ASIA

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26

EASTERN & SOUTHEASTERN ASIA

- Cholera
- Chikungunya
- Hepatitis A
- Hepatitis B
- Influenza
- Japanese encephalitis
- Malaria
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27

EASTERN & SOUTHEASTERN ASIA

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28

CENTRAL & SOUTHERN ASIA

- Cholera
- Chikungunya
- Hepatitis A
- Hepatitis B
- Influenza
- Japanese encephalitis
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30

OCEANA

- Cholera
- Chikungunya
- Hepatitis A
- Hepatitis B
- Influenza
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- Malaria
- MMR
- Meningococcal disease
- Polio
- Rabies
- Smallpox
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31

OCEANA

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32

DISEASES

RABIES[1,2]

A deadly viral infection that causes fever, inflammation of the brain, anxiety, muscle weakness, paralysis, confusion, convulsions, and coma. Once symptoms develop, death is almost always inevitable[2]

Map adapted from: *International Travel and Health: 2017 Updates*.[1]

MENINGOCOCCAL MENINGITIS[1,2]

A bacterial infection that causes headache, fever, stiffness of the neck, nausea, vomiting, and rash; may lead to multi-organ failure or death[2]

Map adapted from: *International Travel and Health: 2017 Updates*.[1]

INFLUENZA[2]

A viral infection that causes fever, muscle aches, headache, nonproductive cough, and sore throat; complications include pneumonia or exacerbation of underlying medical conditions. The risk of severe illness and death increases for those aged ≥65 years[2]

*Infection with influenza virus may occur throughout the year in tropical and subtropical areas.[2]

Map adapted from: *CDC Health Information for International Travel 2020*.[2]

HEPATITIS A[1,2]

A viral disease that can cause fever, loss of appetite, nausea, abdominal discomfort, and—rarely—liver failure[2]

Map adapted from: *International Travel and Health: 2017 Update*.[1]

HEPATITIS B[1,2]

A viral infection that causes tiredness, loss of appetite, nausea, vomiting, abdominal pain, and yellowing of the skin and whites of the eyes; in some cases, joint pain may occur. Hepatitis B is a leading cause of chronic hepatitis, liver failure, and liver cancer. For some, these complications can cause premature death[2]

Map adapted from: *International Travel and Health: 2017 Update*.[1]

TYPHOID FEVER[2,3]

A severe and possibly deadly bacterial infection that causes tiredness, fever, loss of appetite, headache, abdominal pain, and skin rash; may lead to intestinal bleeding that can be life-threatening[2]

Map adapted from: *CDC Health Information for International Travel 2020* and *Travelers' Health: Health Information for Travelers to Mexico: Traveler View*.[2,3]

33

DISEASES

TETANUS, DIPHTHERIA, AND PERTUSSIS[1,2]

Bacterial infections that cause various symptoms[2]:
Tetanus: painful muscle spasms and death[2]
Diphtheria: fever, respiratory failure, difficulty swallowing, loss of appetite, and death[2]
Pertussis: coughing and cough-induced vomiting. Disease is more severe in infants. Some may stop breathing, and overall, 1% die[2]

● Pertussis and diphtheria still occur in many areas of the world, especially in areas where immunization coverage is low. Tetanus spores are found in soil everywhere[1]

Map adapted from: *International Travel and Health: 2017 Update*.[1]

YELLOW FEVER[1,2]

A serious and possibly deadly viral disease (transmitted by mosquitoes) that causes fever, chills, headache, back and muscle aches, nausea, vomiting, and bleeding[2]

● Vaccination may be necessary before travel

Map adapted from: *International Travel and Health: 2017 Update*.[1]

MALARIA[1,2,4,b]

A parasitic infection transmitted by mosquitoes that causes fever, chills, headache, and anemia; may cause seizures, kidney failure, acute respiratory distress syndrome, coma, or death[2]

● Increased risk area

[b] Malaria cannot be prevented by vaccination.[4] Ask your health care provider if you need prescription medicine to help prevent malaria.[3]

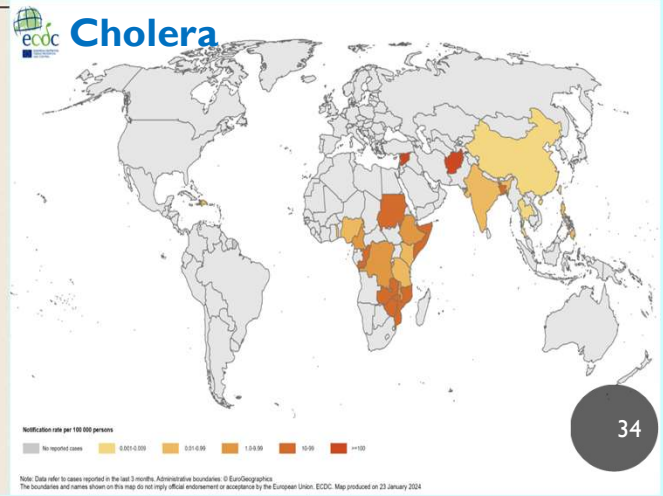
Map adapted from: *International Travel and Health: 2017 Updates* and *CDC Health Information for International Travel 2020*.[1,2]

JAPANESE ENCEPHALITIS[2]

A potentially deadly viral infection transmitted by mosquitoes that can cause inflammation of the brain, fever, headache, vomiting, weakness, paralysis, tremors, and seizures[2]

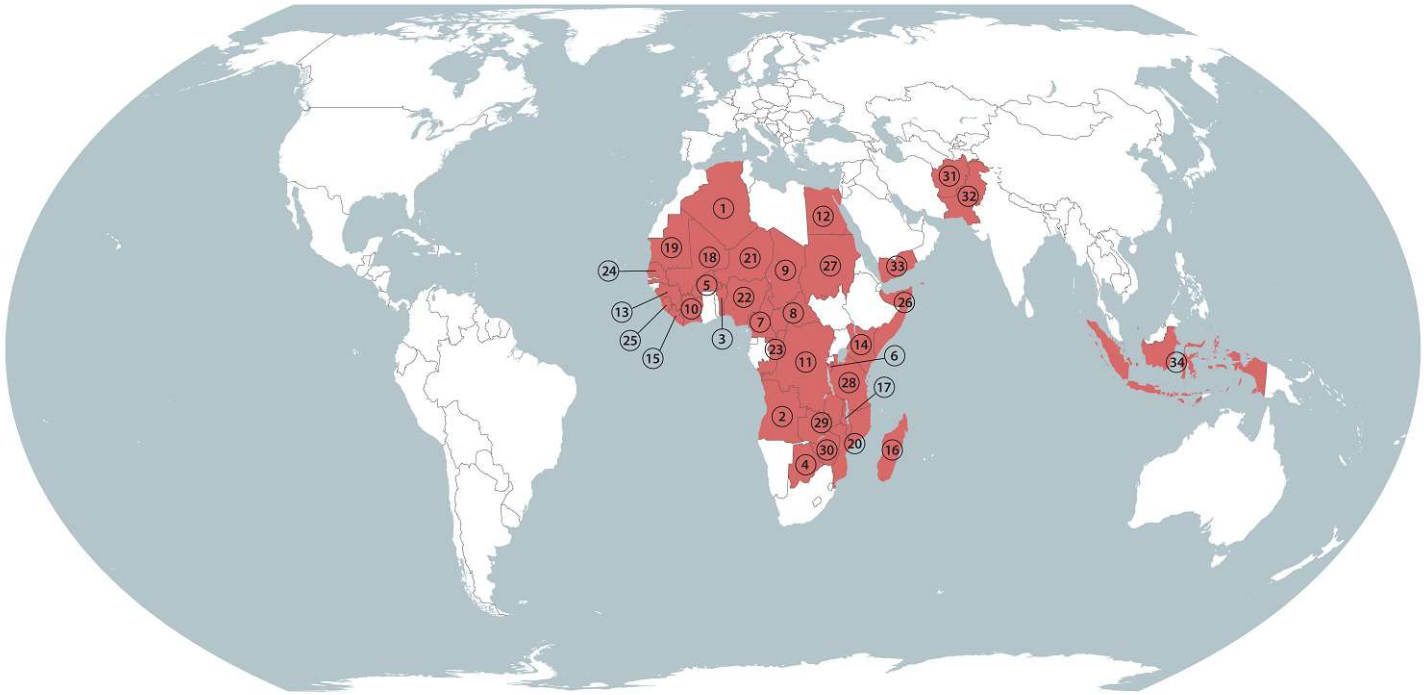
● Vaccination may be necessary before travel

Map adapted from: *CDC Health Information for International Travel 2020*.[3]



34

Polio



Polio THN by WHO Region

AFRICA
1. Algeria
2. Angola
3. Benin
4. Botswana
5. Burkina Faso
6. Burundi
7. Cameroon
8. Central African Republic
9. Chad
10. Côte d'Ivoire
11. Dem. Rep. of the Congo
12. Egypt
13. Guinea
14. Kenya
15. Liberia
16. Madagascar
17. Malawi
18. Mali
19. Mauritania
20. Mozambique
21. Niger
22. Nigeria
23. Rep. of the Congo
24. Senegal
25. Sierra Leone
26. Somalia
27. Sudan
28. Tanzania
29. Zambia
30. Zimbabwe

EASTERN MEDITERRANEAN
31. Afghanistan
32. Pakistan
33. Yemen

SOUTH-EAST ASIA
34. Indonesia

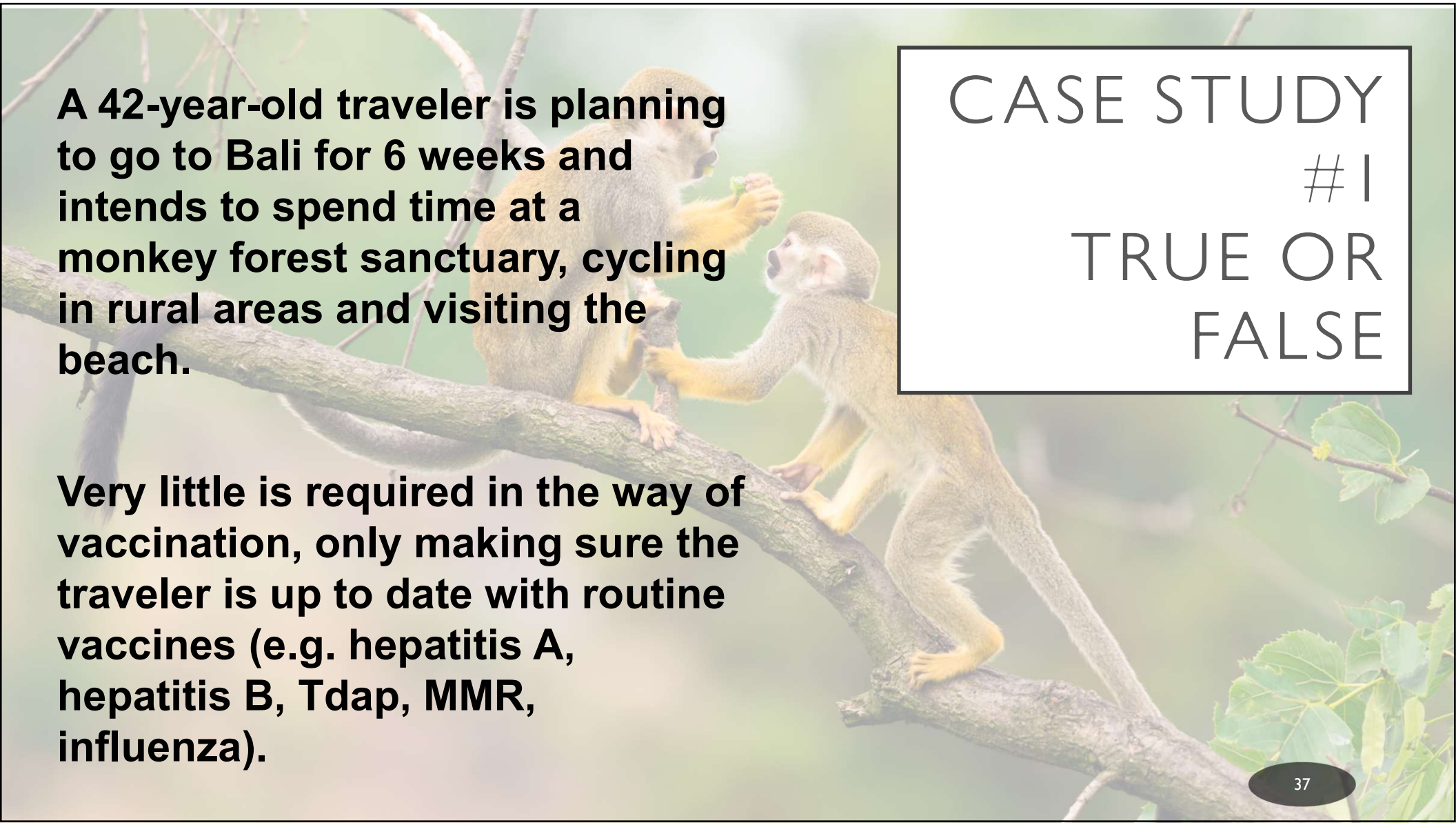
Poliovirus detected within the last 12 months

35

https://wwwnc.cdc.gov/travel/notices/level2/global-polio

CASE STUDIES

2

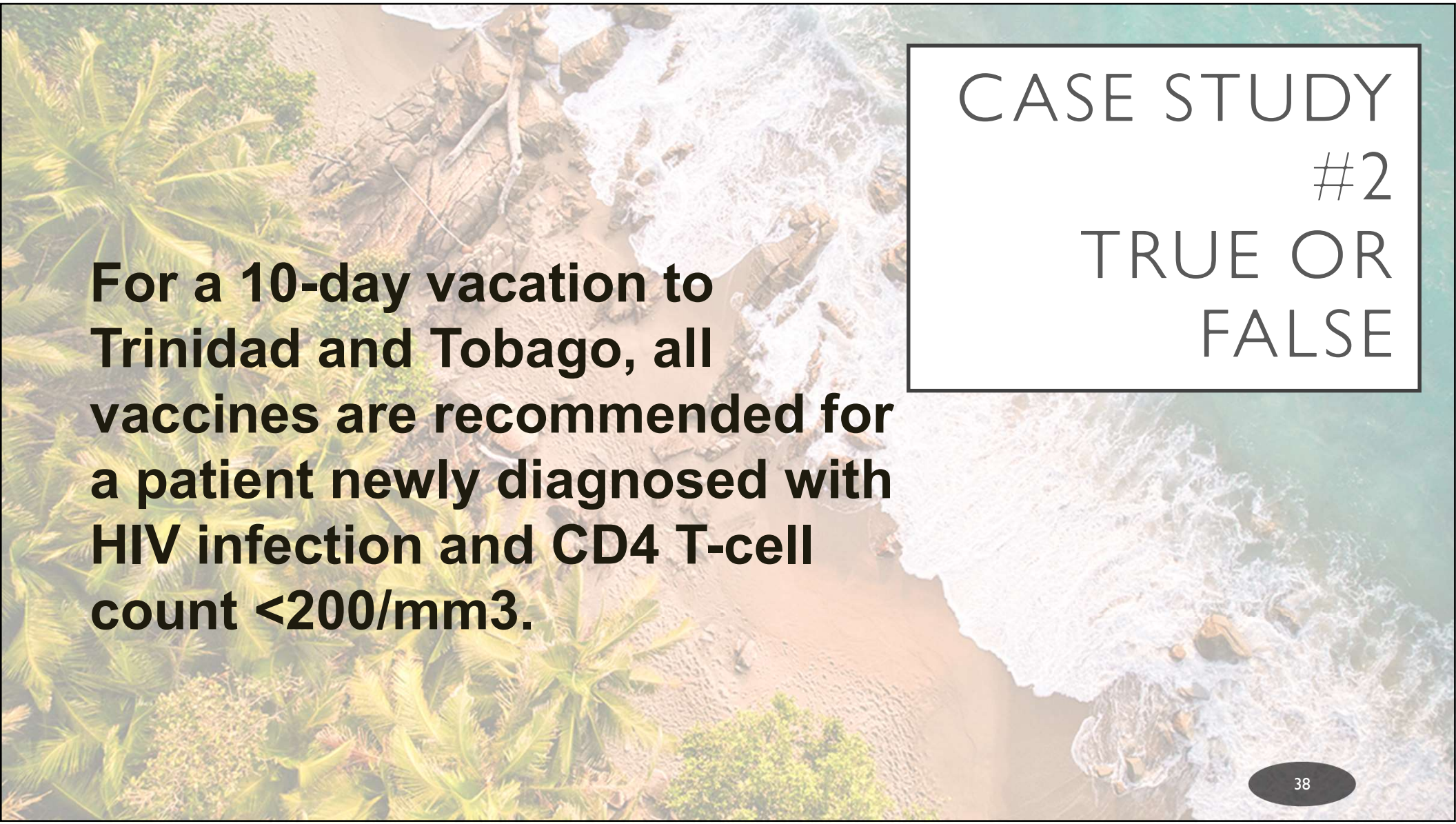


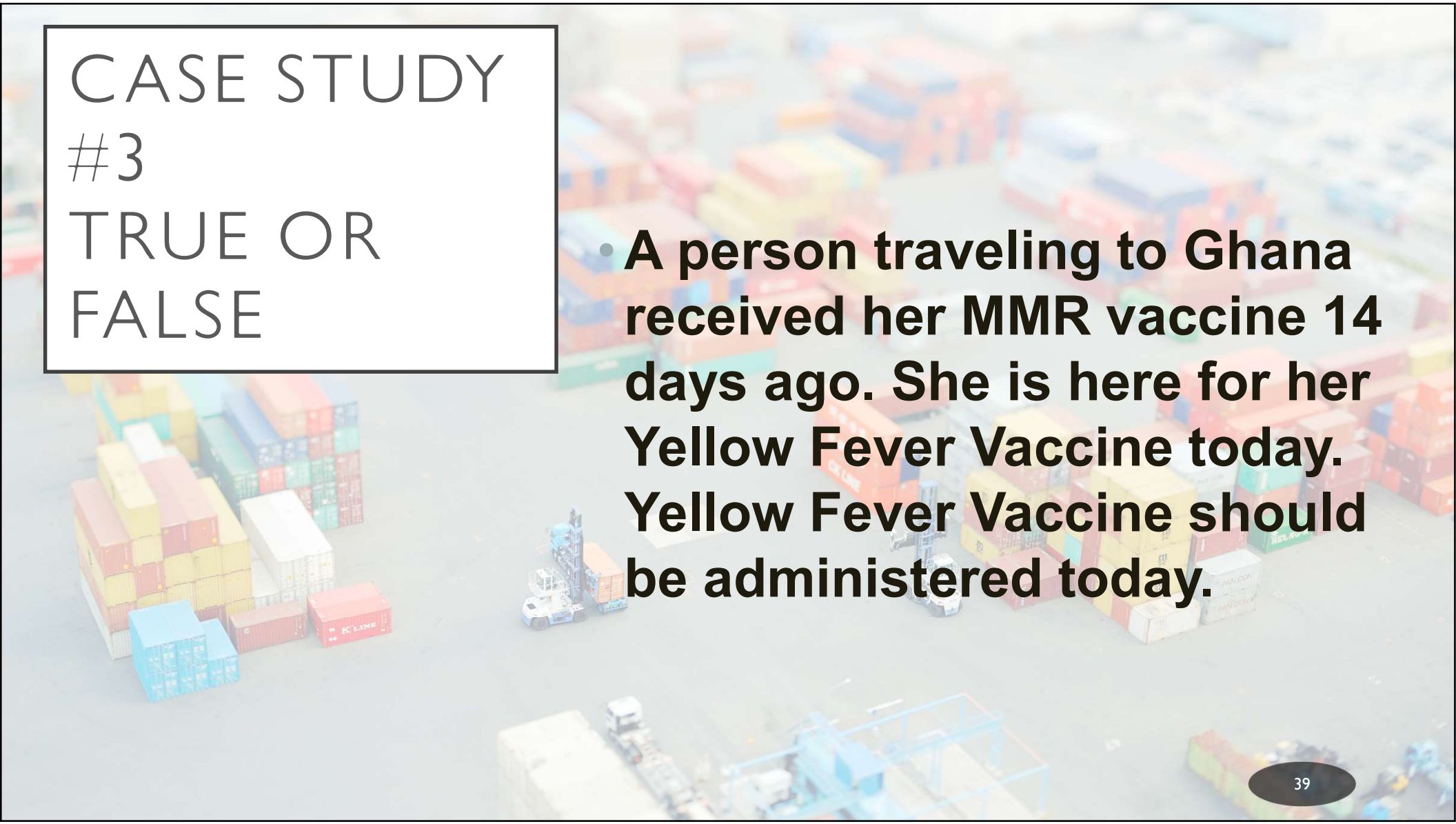
CASE STUDY #1 TRUE OR FALSE

A 42-year-old traveler is planning to go to Bali for 6 weeks and intends to spend time at a monkey forest sanctuary, cycling in rural areas and visiting the beach.

Very little is required in the way of vaccination, only making sure the traveler is up to date with routine vaccines (e.g. hepatitis A, hepatitis B, Tdap, MMR, influenza).

37

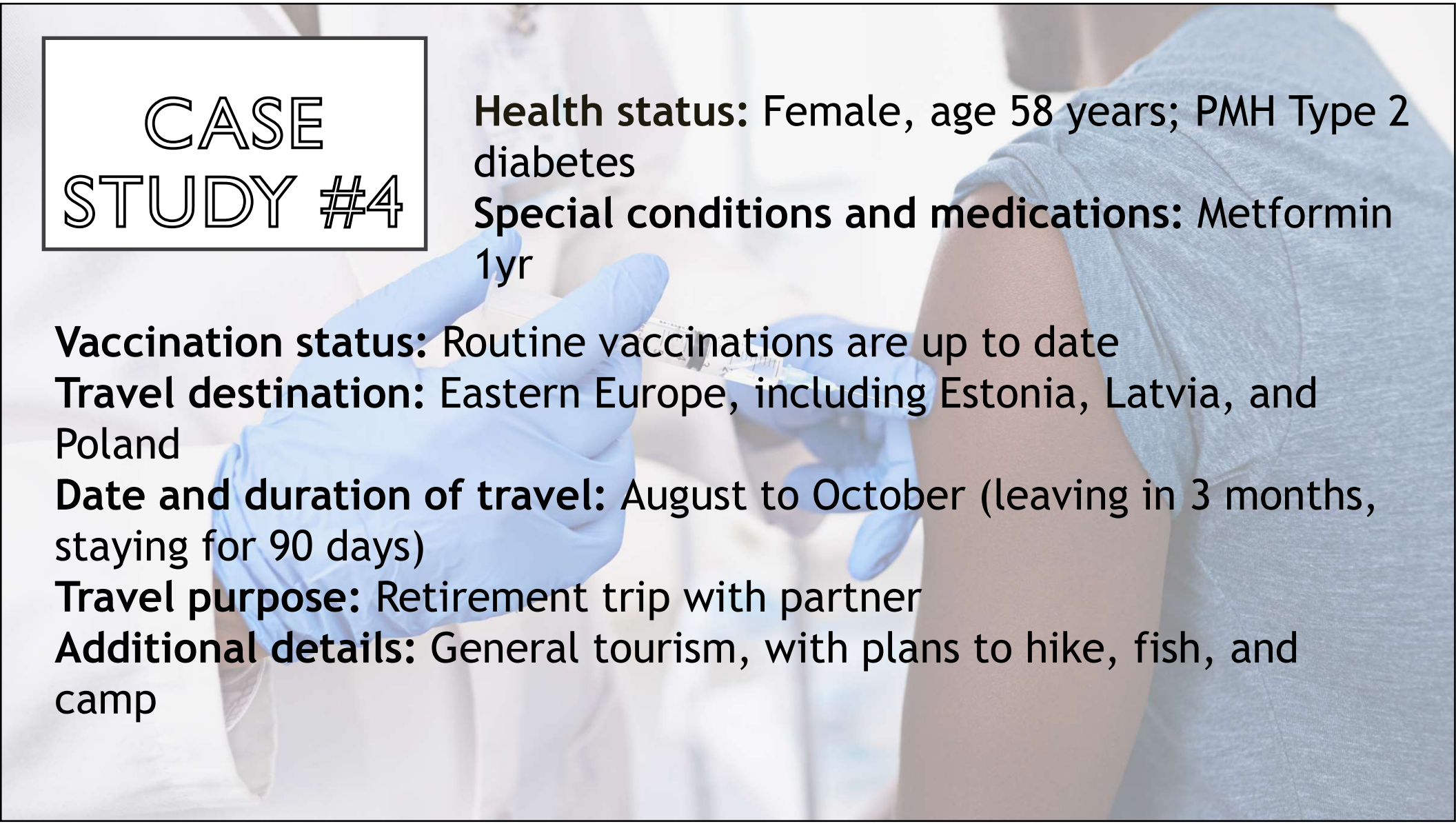

CASE STUDY
#2
TRUE OR
FALSE
For a 10-day vacation to Trinidad and Tobago, all vaccines are recommended for a patient newly diagnosed with HIV infection and CD4 T-cell count <200/mm3.
38



CASE STUDY #3 TRUE OR FALSE

- **A person traveling to Ghana received her MMR vaccine 14 days ago. She is here for her Yellow Fever Vaccine today. Yellow Fever Vaccine should be administered today.**

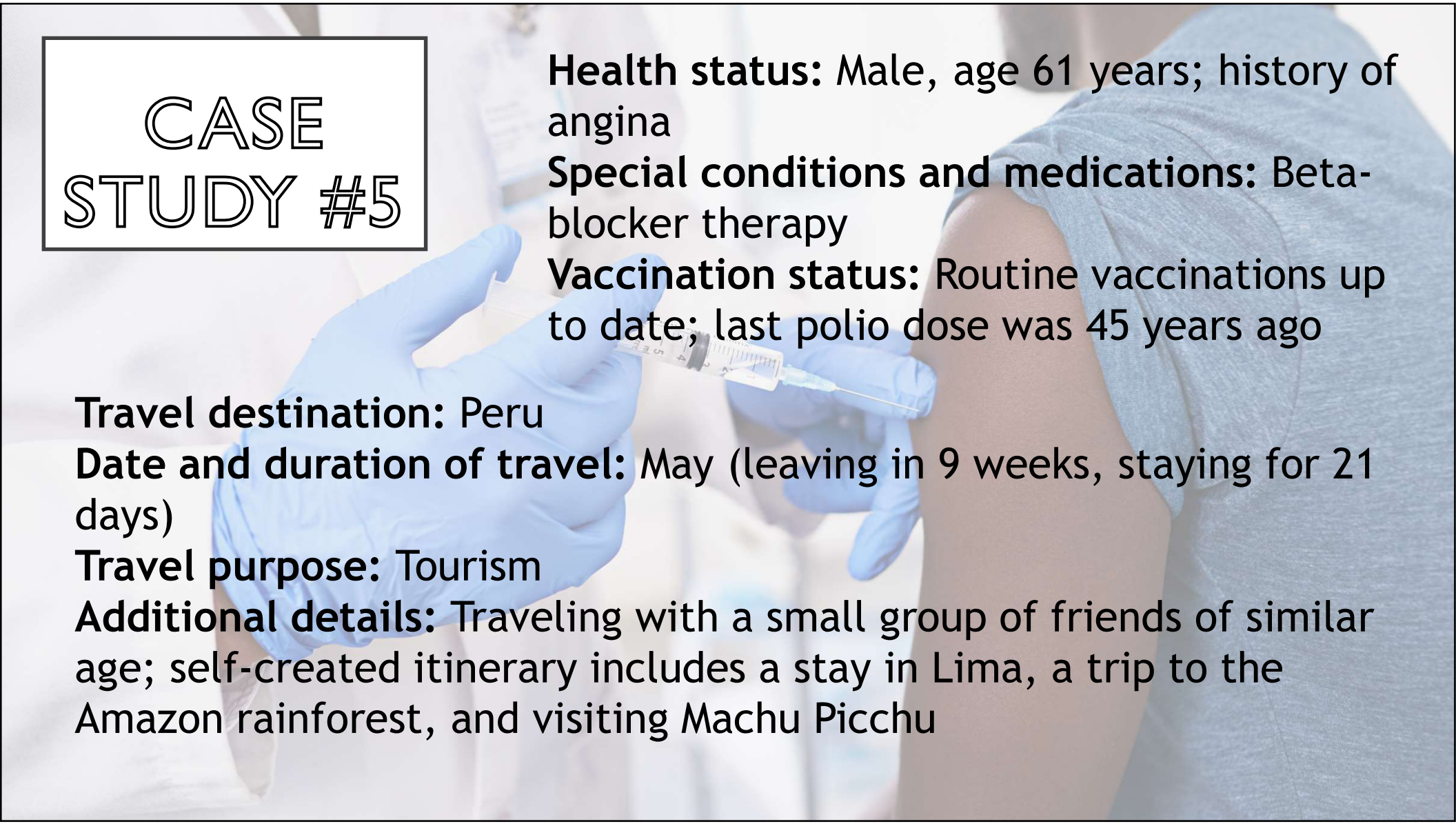
39



CASE STUDY #4

Health status: Female, age 58 years; PMH Type 2 diabetes
Special conditions and medications: Metformin 1yr

Vaccination status: Routine vaccinations are up to date
Travel destination: Eastern Europe, including Estonia, Latvia, and Poland
Date and duration of travel: August to October (leaving in 3 months, staying for 90 days)
Travel purpose: Retirement trip with partner
Additional details: General tourism, with plans to hike, fish, and camp



CASE STUDY #5

Health status: Male, age 61 years; history of angina
Special conditions and medications: Beta-blocker therapy
Vaccination status: Routine vaccinations up to date; last polio dose was 45 years ago

Travel destination: Peru
Date and duration of travel: May (leaving in 9 weeks, staying for 21 days)
Travel purpose: Tourism
Additional details: Traveling with a small group of friends of similar age; self-created itinerary includes a stay in Lima, a trip to the Amazon rainforest, and visiting Machu Picchu

CASE STUDY #6

Health Status: 35-year-old female with fever and confusion
Presentation: Fever for two days, confusion began that morning
Trip details: 10-day luxury holiday in Rio de Janeiro including a two night stay in the Amazonas, Brazil, returned 1 week ago

Recreational activities: Sunbathing, swimming, eating out
Medical history: 8 weeks pregnant
Pre-travel vaccinations: Yellow fever (16 weeks ago)
Precautions: Used DEET-containing insect repellent but reports having had some insect bites

CASE STUDY #7

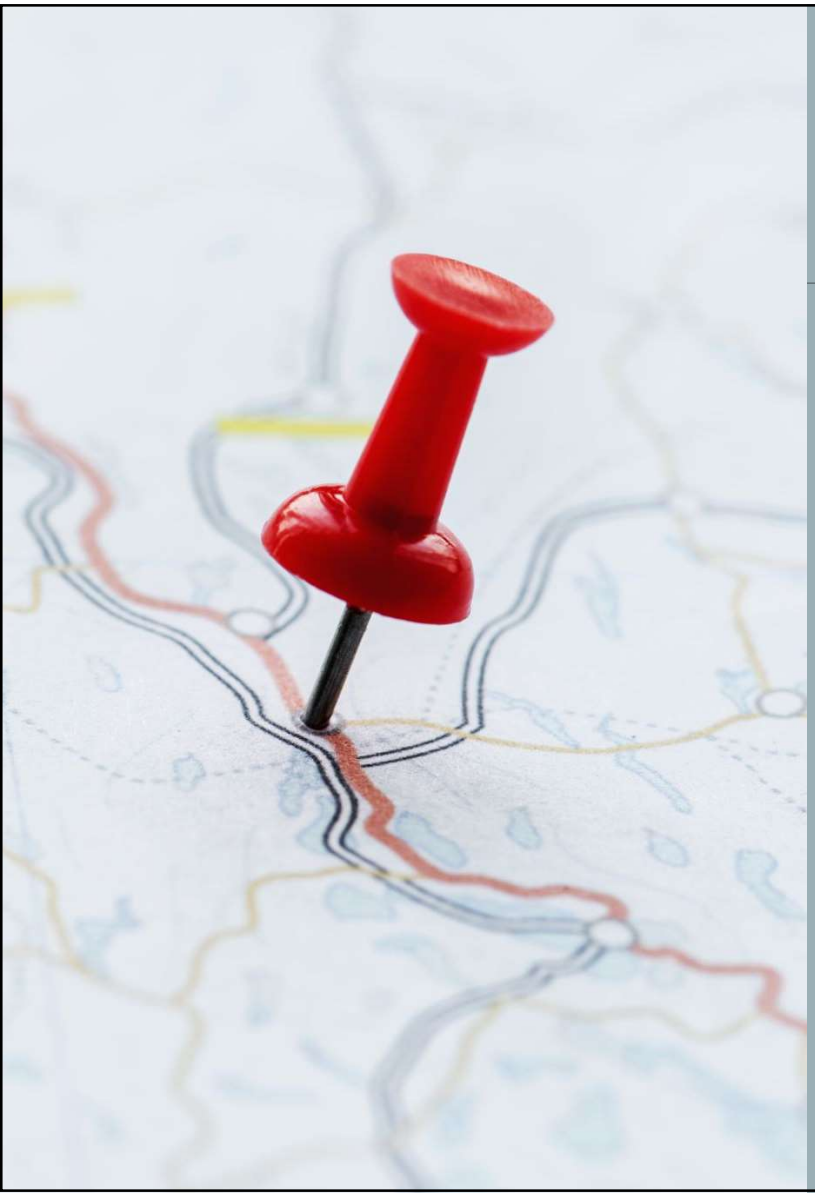
Health status: 13-year-old female with no symptoms at present
Presentation: Asymptomatic, but parent is concerned about potential exposure to an infectious disease
Trip details: Vacation in Bangkok, returned yesterday
Recreational activities: Temple visits, Tuk-Tuk ride, cave exploring

Medical history: Asthma (managed with oral prednisone)
Potential exposure to infectious disease: Nipped on the finger by a street dog 5 days ago; wound was cleaned with soap and water 30 minutes later and covered with a plaster
Pre-travel vaccinations: Hepatitis A, hepatitis B, typhoid

CASE STUDY #8

Health Status: 45-year-old female with fever, conjunctivitis, and rash
Presentation: Symptoms were first noticed 4 days ago, and rash appeared yesterday (flat red spots at hairline)
Trip details: Nigeria for a family wedding. Returned 10 days ago

Potential exposure to infectious disease : Attended large party in town hall with close contact with many individuals
Pre-travel vaccinations: Yellow fever, typhoid; Did not receive any routine vaccines and unsure of routine vaccinations history
Precautions: Used DEET containing insect repellent, maintained good
hand hygiene throughout



POST TRAVEL KEY POINTS

45

TAKE AWAYS

Incubation Periods

- **<2 weeks:** Chikungunya; dengue; enteric fever; influenza; Japanese encephalitis; legionellosis; leptospirosis; tickborne encephalitis; travelers' diarrhea; yellow fever; Zika
- **4-6 weeks:** Typhoid; hepatitis A; malaria (onset can be as soon as 6 days after travel)
- **>6 weeks:** Hepatitis B; malaria (onset can be up to 12 months after travel)

Malaria

- **Fever** is a common presenting symptom, but diarrhea, dermatologic conditions, or respiratory complaints are also common
- **Malaria** is the most common life-threatening disease associated with fever
- ***Plasmodium falciparum*** >90% of cases malaria, manifest <30 days after return; almost
- *Plasmodium vivax* malaria occurs in 50% of cases, manifest >30 days after return. May reoccur off and on for years.

POST TRAVEL CONSULT

Include:

- Presentation
- Trip Details
- Recreational Activities
- Common Exposures
- Use of Precautions
- Medical History
- Medication Use
- Pre-Travel Vaccinations
- Other Factors

Differential Dx:

- Activities
- Geographic Area
- Incubation period
- Laboratory tests

47

RESOURCES

- https://wwwnc.cdc.gov/travel/
- https://wwwnc.cdc.gov/travel/page/yellowbook-home
- https://wwwnc.cdc.gov/travel/page/yellow-book-resources#destinations
- https://wwwnc.cdc.gov/travel/page/find-clinic

48

SUMMARY

Travel Medicine is multi-faceted and complex.

Refer if you are not certain you can provide the required information for comprehensive care.

49

MICROBES ARE THE SILENT WARRIORS; THESE TINIEST BEINGS POSSESS THE STRENGTH TO SPARK A REVOLUTION THAT CAN HAVE MONUMENTAL IMPACTS IN THE WORLD OF SCIENCE."

— ALOO DENISH

KENYAN BIOSCIENTIST

50

THANK YOU

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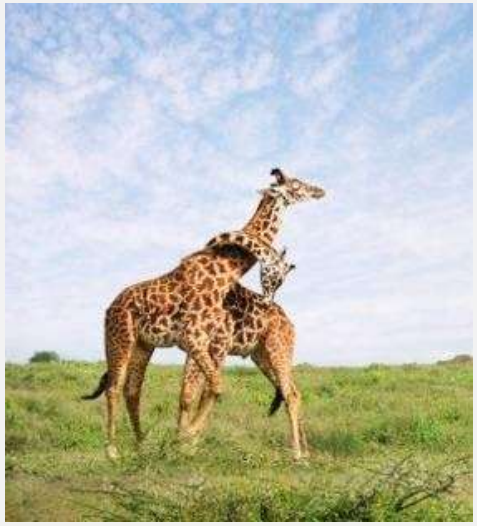


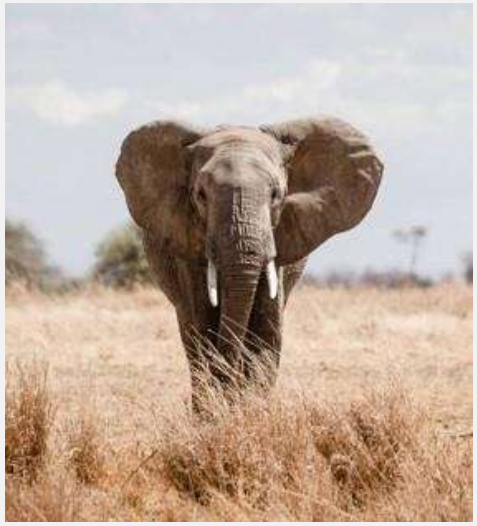

51

REFERENCES

52