# VOLCANOES, LANDSLIDES, INSECTS AND FUN WITH THE SUN: CONSIDERATIONS IN TROPICAL TRAVEL PROGRAMS.

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WHY ARE YOU HERE?
TELL US WHY THIS SESSION IS IMPORTANT

# PLANNING

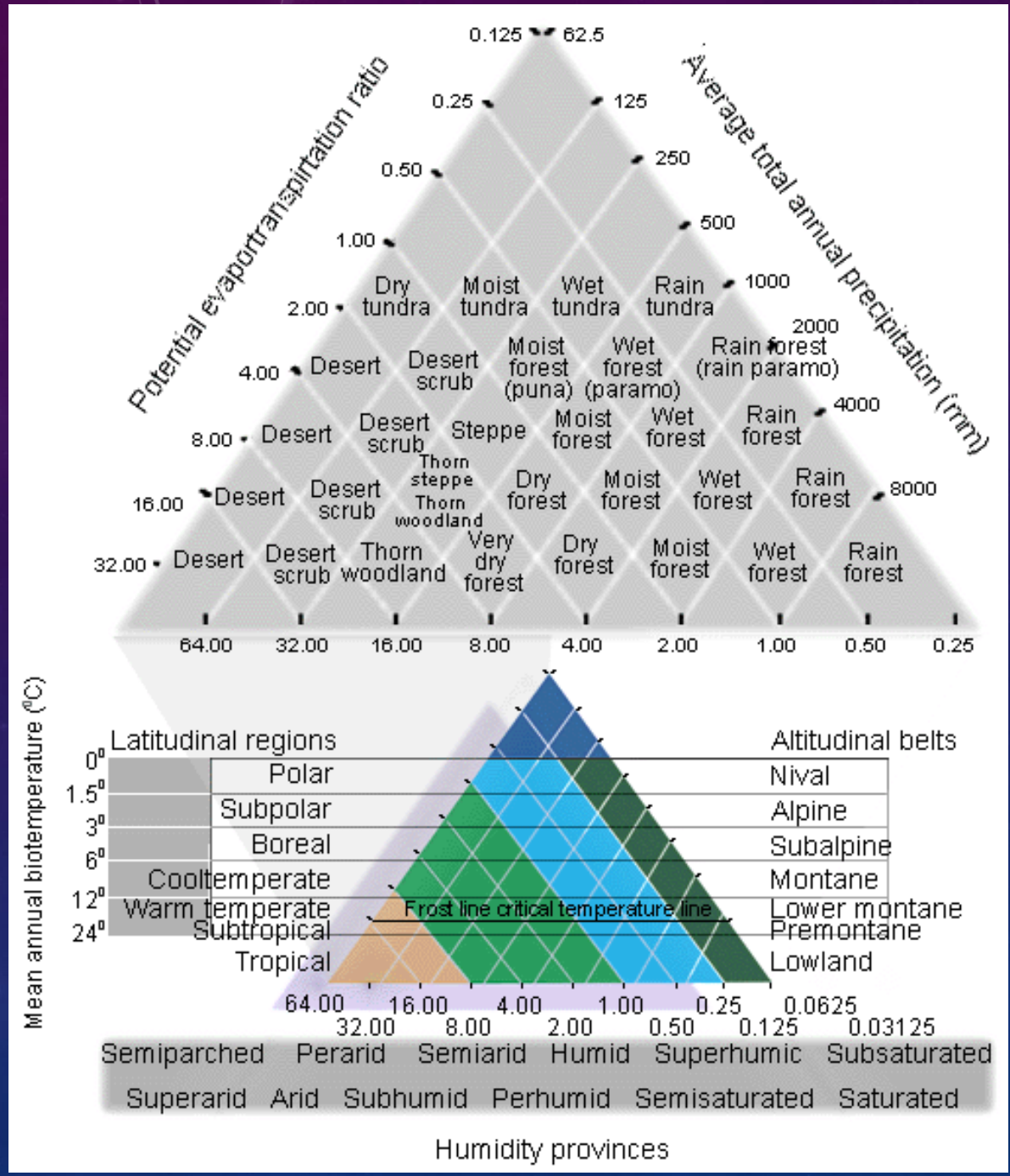
- In planning a trip we forget safety issues
- We forget situational awareness
- We forget communication
- We miss student comfort and inclusion

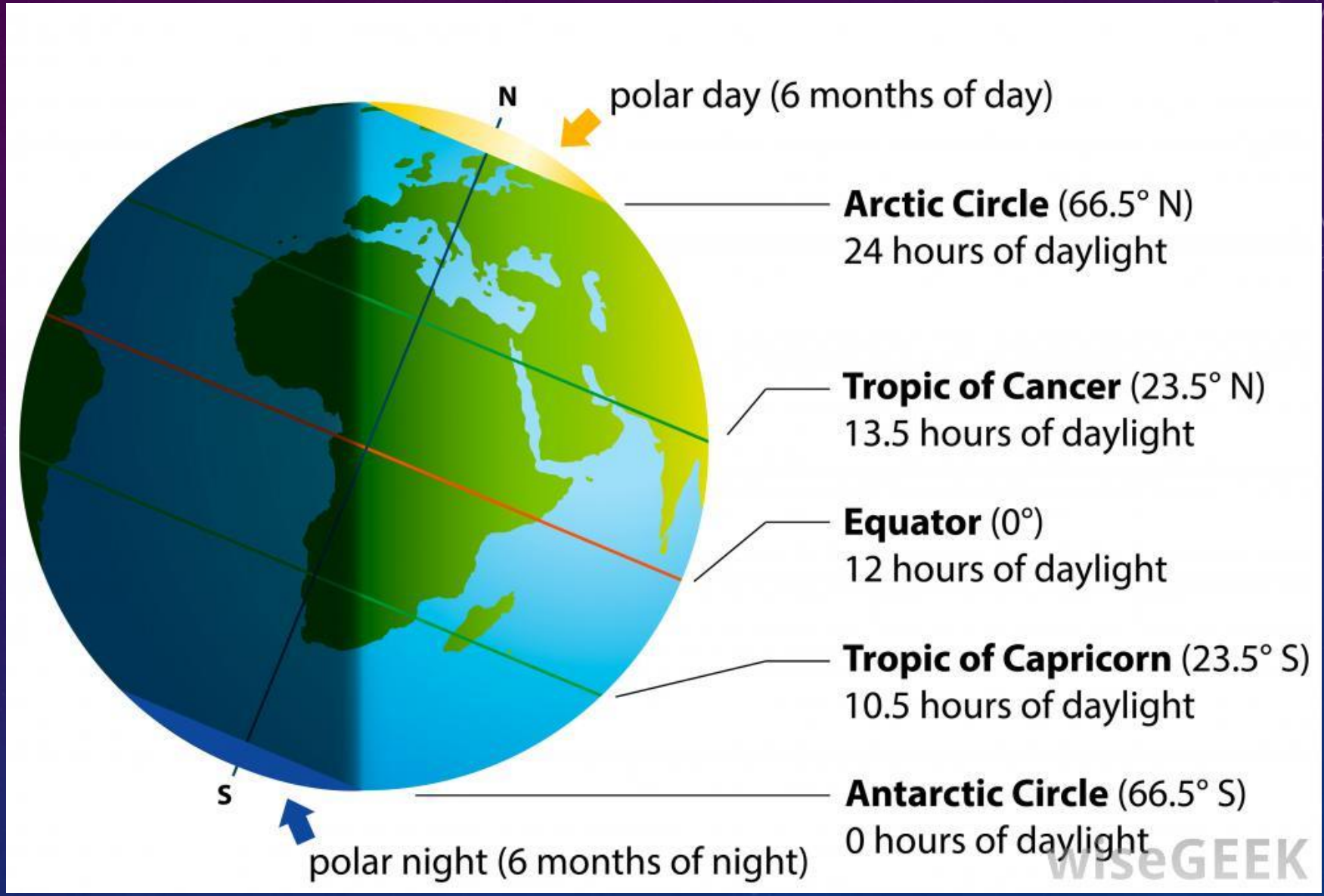

- Why the tropics in this session?
  - More stuff
  - Less help
  - Help further away

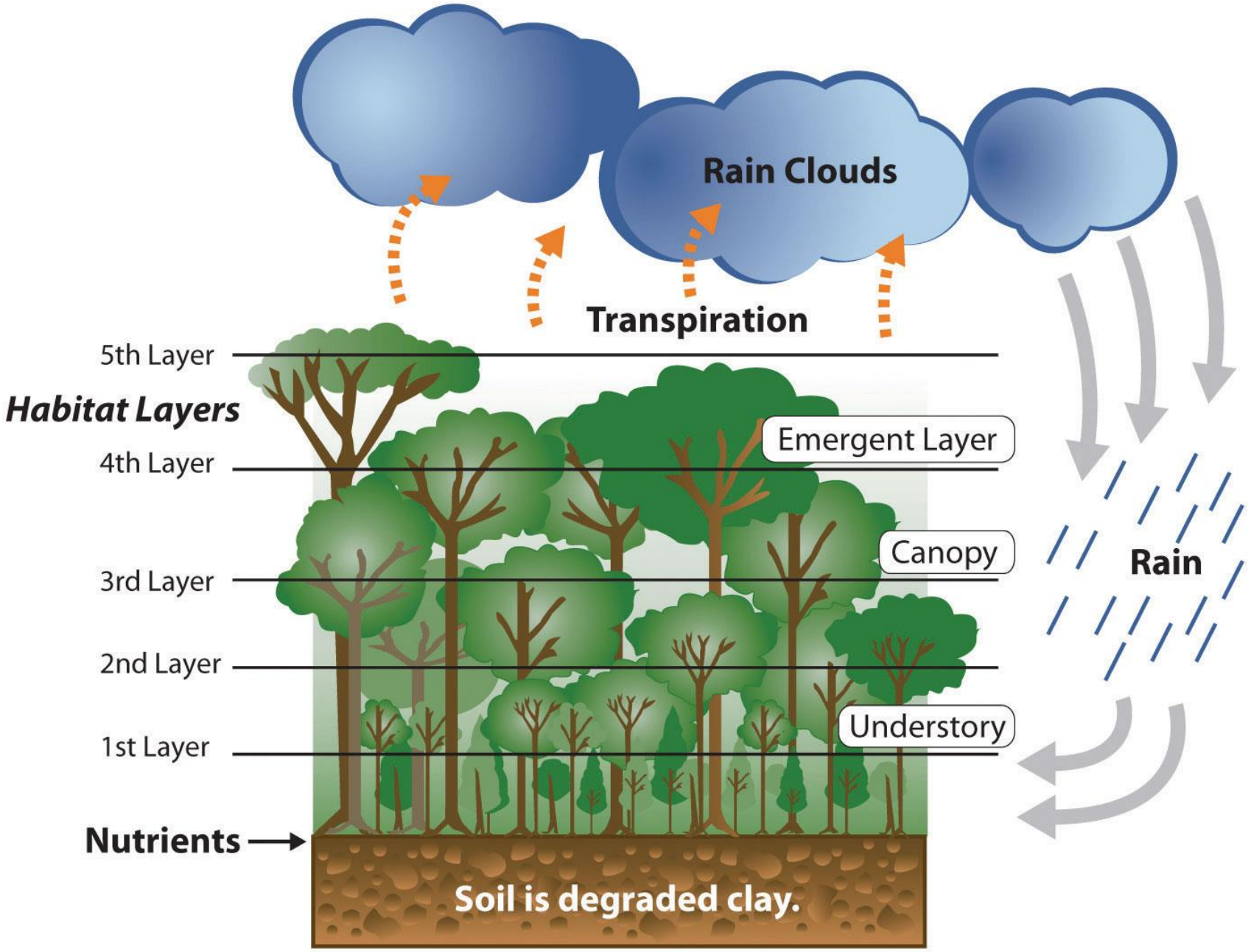
# Knowing the Tropics

## What are the tropics?

The **tropics** is a region of the Earth surrounding the Equator. It is limited in latitude by the **Tropic** of Cancer in the northern hemisphere at 23°26’14.1” (or 23.43725°) N and the **Tropic** of Capricorn in the southern hemisphere at 23°26’14.1” (or 23.43725°) S. These latitudes correspond to the axial tilt of the Earth.


Potential evapotranspiration ratio
Average total annual precipitation (mm)
0.125
62.5
0.25
125
0.50
250
1.00
500
2.00
1000
4.00
2000
8.00
4000
16.00
8000
32.00
Dry tundra
Moist tundra
Wet tundra
Rain tundra
Desert
Desert scrub
Moist forest (puna)
Wet forest (paramo)
Rain forest (rain paramo)
Steppe
Moist forest
Wet forest
Rain forest
Thorn steppe
Thorn woodland
Dry forest
Very dry forest
64.00
32.00
16.00
8.00
4.00
2.00
1.00
0.50
0.25
Mean annual biotemperature (°C)
Latitudinal regions
0°
1.5°
3°
6°
12°
24°
Polar
Subpolar
Boreal
Cooltemperate
Warm temperate
Subtropical
Tropical
Altitudinal belts
Nival
Alpine
Subalpine
Montane
Lower montane
Premontane
Lowland
Frost line critical temperature line
64.00
32.00
16.00
8.00
4.00
2.00
1.00
0.50
0.25
0.125
0.0625
0.03125
Semiparched
Superarid
Perarid
Arid
Semiarid
Subhumid
Humid
Perhumid
Superhumic
Semisaturated
Subsaturated
Saturated
Humidity provinces


N
polar day (6 months of day)
Arctic Circle (66.5° N)
24 hours of daylight
Tropic of Cancer (23.5° N)
13.5 hours of daylight
Equator (0°)
12 hours of daylight
Tropic of Capricorn (23.5° S)
10.5 hours of daylight
Antarctic Circle (66.5° S)
0 hours of daylight
S
polar night (6 months of night)
WiseGEEK


Rain Clouds
Transpiration
5th Layer
Habitat Layers
4th Layer
Emergent Layer
Canopy
3rd Layer
Rain
2nd Layer
Understory
1st Layer
Nutrients
Soil is degraded clay.

# CONDITIONS

**-WARM AND WET** DESCRIBES THE TROPICAL RAIN FOREST CLIMATE.

-THE AVERAGE ANNUAL **TEMPERATURE** IS ABOVE **20 DEGREES C**;/78 DEGREES FAHRENHEIT.

-THERE IS NEVER A FROST.

-RAINFALL VARIES WIDELY FROM A LOW OF ABOUT **250CM OF RAIN** PER YEAR TO ABOUT **450 CM/YEAR**. THAT MEANS A RANGE FROM ABOUT 8 TO 14 FEET OF RAIN PER YEAR.

-WET MEANS DECREASED EVAPORATION-ONE PROBLEM TO CONSIDER IN HEAT LOSS.

-TOPOGRAPHY

-ELEVATION

-RAPIDLY CHANGING CONDITIONS

# GEOGRAPHY

-HIGHLY VARIABLE

-FLAT AND ROCKY

-STEEP/CLAYS

-RIVERINE

-NOT ONE PERVASIVE VIEW

# UNIQUENESS OF TRAVEL TO TROPICS

-ISOLATION

-DISTANCE TO HELP

-TRANSPORTATION

-VARIETY OF BIOLOGICAL VECTORS

-DIVERSITY OF MEDICAL INTERVENTIONS

-SECONDARY ILLNESSES-ACQUIRED AFTER PRIMARY ILLNESS

# PROBLEMS FROM THE PAST

# HOW FIT IS YOUR STUDENT/PARTICIPANT?

- Work out?
- Age
- Medical History-complete? Honest?
- Medical problems?
- Medications? Refills?
- How far can they walk? Last time they moved?
- Hydration status?
- Smokers?
- Heat Resistance?

HOW FAR CAN THEY WALK?

# INTAKES

STUDENT QUESTIONNAIRES:

- ASK QUESTIONS ON PHYSICAL STATUS
- PHYSICAL EXAM-LAST/DOCTORS CONSENT ON TRAVEL/EXISTING CONDITIONS
- EXERCISE PATTERNS
- ALTITUDE EXPOSURE
- MEDS-DON'T FORGET HIPAA-**CONFIDENTIALITY**
- **MEDICATION ALLERGIES**
- HYDRATION REGIMES
- FOOD HABITS-EATING PATTERNS/DIETARY RESTRICTIONS/ALLERGIES-FOOD
- CONCERNS IN EXERTION
- PREVIOUS ILLNESSES

# PHYSICAL ENVIRONMENT

WHAT WILL THEY ENCOUNTER?

WILL THEY BE READY FOR IT?

DO THEY UNDERSTAND HOW TO TAKE CARE?

I am totally ready to go!

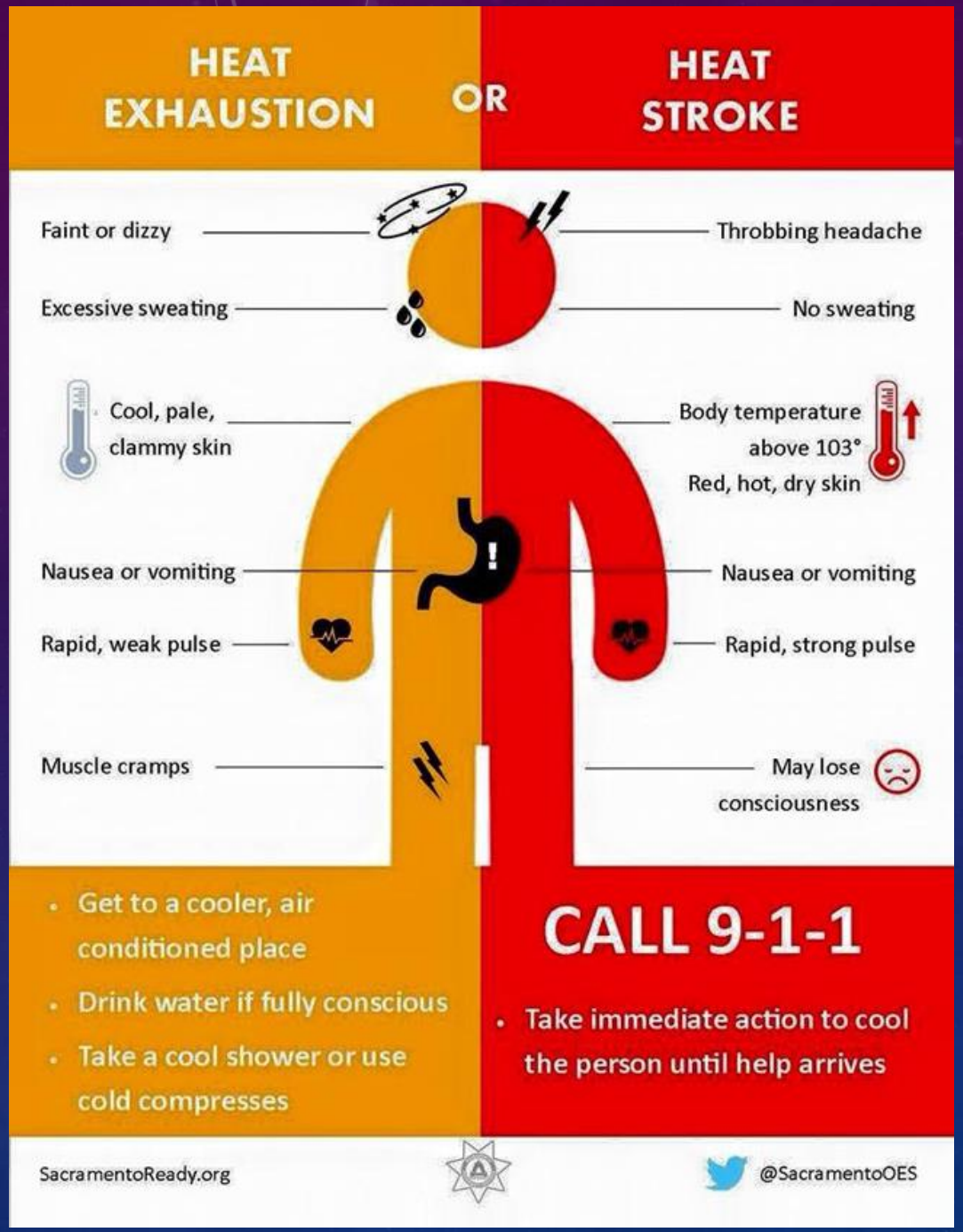
# HEAT

# CONDITIONS-HEAT

- IN TROPICAL SYSTEMS IT MIGHT BE HARD TO DUMP HEAT
  - High humidity
  - Clothing plays a role
  - Sweating stops-be concerned
- CLOTHING PLAYS A ROLE
- EFFICIENCY IN SWEATING
- SATURATED CLOTHING-DUMP MOISTURE-

# SO EASY TO UNDERESTIMATE!

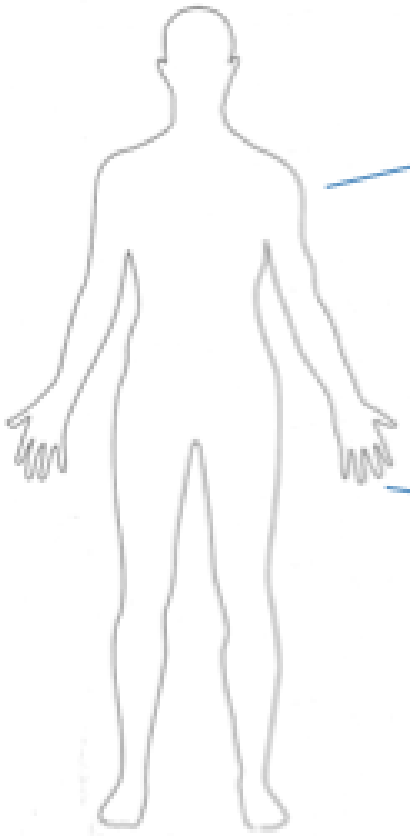
- High body temperature. A body temperature of 104 F (40 C) or higher is the main sign of heatstroke.
- Altered mental state or behavior. ...
- Alteration in sweating. ...
- Nausea and vomiting. ...
- Flushed skin. ...
- Rapid breathing. ...
- Racing heart rate. ...
- Headache.




You may be 911

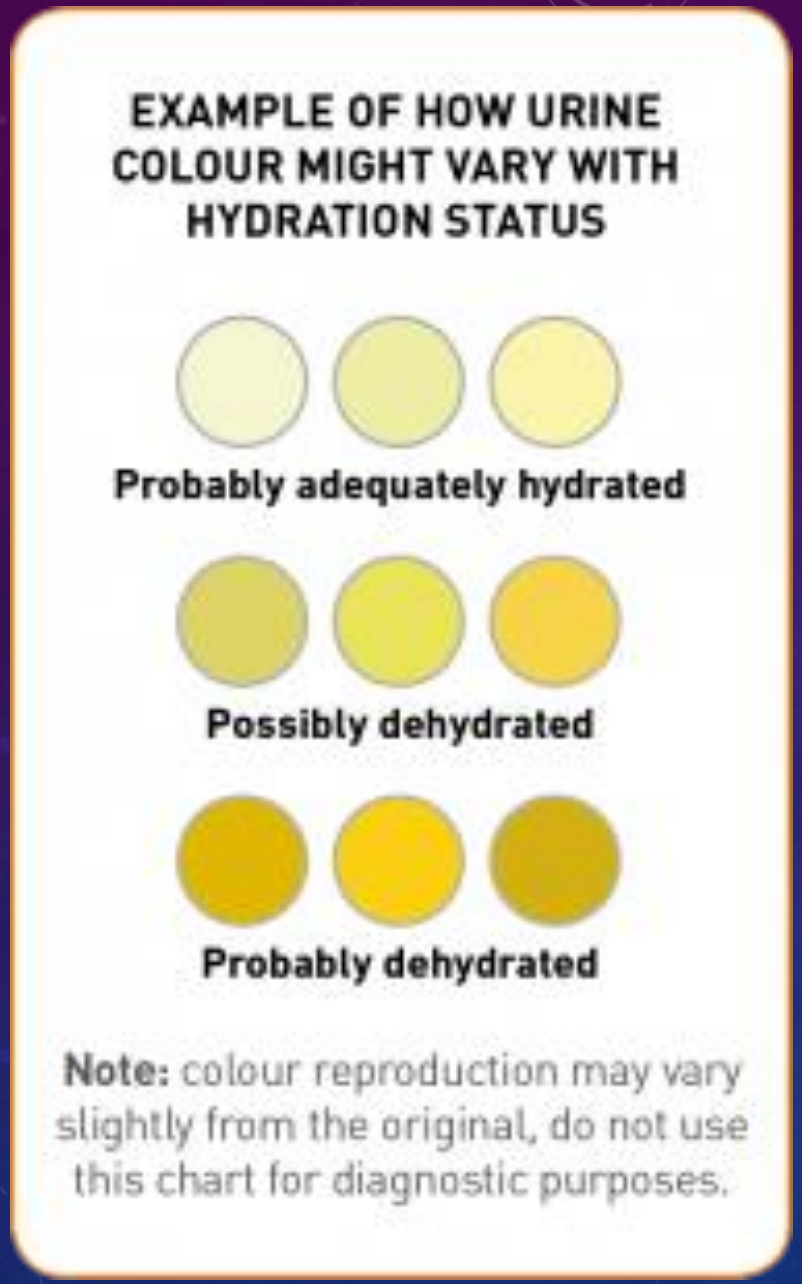

We might be able to figure this one, but it shouldn't get here.

# HYDRATION STATUS



2/3 of body fluid is found inside cells, called intracellular water

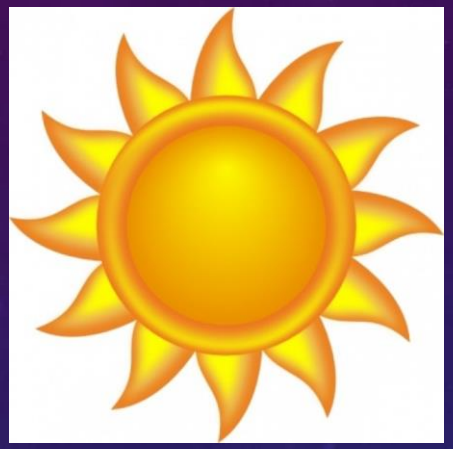
1/3 of body fluid is found outside cells, called extracellular water e.g. gut, lymph, blood, cerebral fluid.




Students assess this, not something you want to do. There are urine test strips to help. What would you do if a student was dehydrated before a hike or activity?

european hydration institute

# CONDITIONS-HEAT



- ASSESS YOU PARTICIPANTS CONSTANTLY
- ASSESS WATER INTAKE
- ASSESS FOOD INTAKE
- BREAKS
- WHEN TO STOP
- WHEN TO QUIT
- WHEN TO SEEK HELP
- HOW TO TREAT

# CONDITIONS-HUMIDITY

-COMPLICATING FACTOR

-INTERFERES WITH HEAT EXCHANGE

-SWEATING NEEDS EVAPORATION TO DISPERSE HEAT

-TRICKY IN TERMS OF EVALUATION

-CLOTHING DEPENDENT

# CONDITIONS-ELEVATION

ELEVATION DEFINED

-HIGH ALTITUDE = 1,500–3,500 METERS (4,900–11,500 FT)

-VERY HIGH ALTITUDE = 3,500–5,500 METERS (11,500–18,000 FT)

-EXTREME ALTITUDE = ABOVE 5,500 METERS (18,000 FT)

# Acute Mountain Sickness

- Lack of appetite, nausea, or vomiting
- Fatigue or weakness
- Dizziness or lightheadedness
- Peripheral edema (swelling of hands, feet, and face)
- Insomnia
- Pins and needles
- Shortness of breath upon exertion
- Nosebleed
- Persistent rapid pulse
- Drowsiness
- Excessive flatulation-not to be used as an excuse…
- General malaise

# ALTITUDE SICKNESS-SECONDARY

Pulmonary edema (fluid in the lungs)

- Symptoms similar to bronchitis
- Persistent dry cough
- Fever
- Shortness of breath even when resting
- Cerebral edema (swelling of the brain)
- Headache that does not respond to analgesics
- Unsteady gait
- Gradual loss of consciousness
- Increased nausea
- Retinal hemorrhage

# ALTITUDE SICKNESS-TREATMENT

- Avoid rapid elevation change-acclimate
  - general rule of thumb is to ascend no more than 300 m (1,000 ft) per day to sleep
- Reduce elevation
- Oxygen
- Hydration
- **Acetazolamide**, sold under the trade name **Diamox** in some countries-World Health Organization's List of Essential Medicines

# CONDITIONS-THE EARTH

VOLCANOS

EARTHQUAKES

LANDSLIDES

RAINFALL

-THIS IS AN EMOTIONAL CONTROL SITUATION, AS WELL AS CROWD CONTROL

-POSITION YOURSELF FOR THE BEST OUTCOME-COORDINATE RESPONSE-FIND A PLACE TO HUNKER DOWN.

-STABILITY, LANDSCAPE, SHELTER, SUPPLIES, SUPPORT

# CONDITIONS-WATER HAZARDS

-TOO MUCH-ROAD WASH OUT, BLOCKAGE, INSTABILITY, PERSONAL HAZARDS

-TOO LITTLE-DRY WASH, SLIPS, DUST-PNEUMOCONIOSIS (INDUCED WITH THE ASH FROM AN EXPLOSIVE VOLCANO

BULL VOLCANOL

DOI 10.1007/S00445-006-0052-Y

REVIEW ARTICLE

CLAIRE J. HORWELL, PETER J. BAXTER

THE RESPIRATORY HEALTH HAZARDS OF VOLCANIC ASH:

A REVIEW FOR VOLCANIC RISK MITIGATION

# CONDITIONS-VOLCANOS

- PNEUMOCONIOSIS INDUCED WITH THE ASH FROM THE EXPLOSIVE VOLCANO
- ASTHMA
- BRONCHITIS
- EYE IRRITATIONS, INFECTIONS, DAMAGE
- LASTING EFFECTS-LUNGS, SYSTEM

# OUR HERO-THE CDC-CENTER FOR DISEASE CONTROL

CDC

# CONDITIONS-BIOLOGICAL

## DISEASE-WHAT IS OUT THERE?

## YOU NEED TO KNOW-SO ECUADOR (BESIDES ROUTINE):

Hepatitis A

CDC recommends this vaccine because you can get hepatitis A through contaminated food or water in Ecuador, regardless of where you are eating or staying.

sudden onset of fever, tiredness, loss of appetite, nausea, vomiting, stomach pain, and jaundice (yellowing of the skin and eyes). Some people have no symptoms, while others have symptoms that last 1-6 months. Most people recover with no lasting liver damage.

Typhoid

You can get typhoid through contaminated food or water in Ecuador. CDC recommends this vaccine for most travelers, especially if you are staying with friends or relatives, visiting smaller cities or rural areas, or if you are an adventurous eater.

Persons with typhoid fever usually have a sustained fever as high as 103° to 104° F (39° to 40° C). They may also feel weak, or have stomach pains, headache, or loss of appetite. In some cases, patients have a rash of flat, rose-colored spots. The only way to know for sure if an illness is typhoid fever is to have samples of stool or blood tested for the presence of *Salmonella Typhi*.

# CONDITIONS-BIOLOGICAL

- What is out there?
- How is it treated?
- Will I need medical assistance?
- Are the student prepared? Updates to vaccines, antibiotics, personal med kits
- Pay attention-eating at local markets, contact with pets, things living in your room.

# YOUR ROOM

Mosquitos-Dengue Fever, Filariasis-

Sandflies-Leishmaniosis,

Chagas-**Assassin Bugs**

Adult *Rhodnius prolixus*, a kissing bug.
WHO/TDR/Stammers

Thypus-Ticks and Lice

Plague-Fleas

# YOUR RESPONSIBILITY

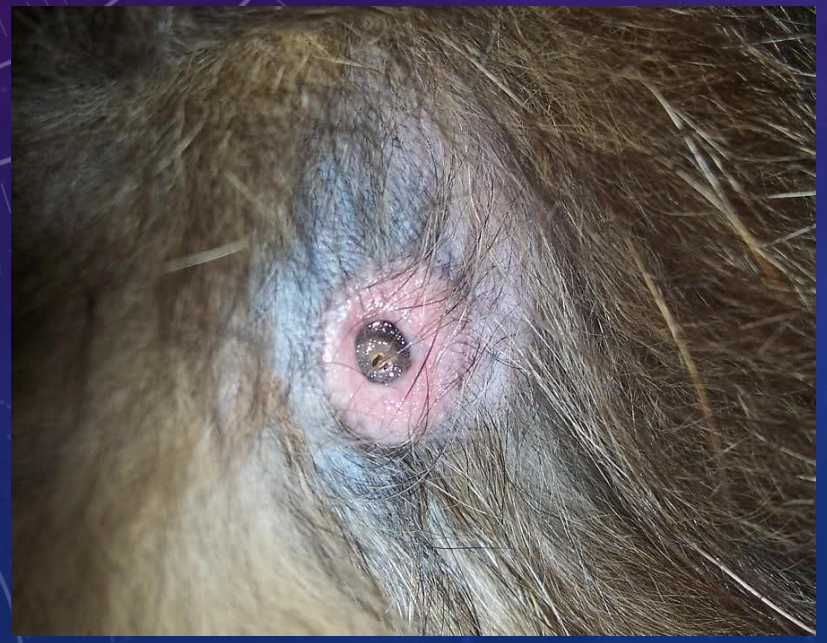
- KNOWING IS HALF THE BATTLE (THANK YOU G.I. JOE)
- TRAINING-FIRST AID COURSES (RED CROSS, DIVERS COURSES, COLLEGES)
- THINKING
- ACTING

# KNOW YOUR PLANTS AND ANIMALS

- WHAT DO LOCALS KNOW?
- GUIDES
- STATE DEPARTMENT
- BEWARE OF LOCAL MARKETS AND LOCAL PRODUCE-MAKE SURE YOU KNOW WHAT IT IS-PESTICIDES AND HERBICIDES-WASH WITH:

# ANIMALS-VECTORS

- INSECTS
- MAMMALS-DOMESTIC DOGS, DOMESTIC CATS, FERAL
- FARM ANIMALS



# PLANTS-PRETTY AND DEADLY

APPENDIX E: PLANTS OF ECUADOR THAT CAUSE CONTACT DERMATITIS*

AGAVE

SPP. (SAP OF LEAVES SAPONIN)

AMMANNIA

SPP., AQUATIC PLANT

ANACARDIUM OCCIDENTALE,

CASHEW NUT (NUT, BARK, LEAVES

ANACARDIC ACID)

CALOPH

YLLUM INOPHYLLUM

CALOPTROPIS

SPP., FOUND IN DRY OPEN AREAS, MILKWEED (MILKY SAP)

COMOCLADIA

SPP.

CROTON

SPP

.

(RESINOUS OIL)

DALECHAMPIA

SPP., VINES IN DISTURBED AREAS, ORTIGUILLA

DAPHNE

SPP. (SAP -MEZERCIN)

EUPHORBIA

SPP. (SAP -EUPHORBIN)

HIPPOMANE MANCI

NELLA

(MILKY LATEX AND FRUIT)

HURA

SPP. (SAP)

MALPIGHIA

SPP., FOUND IN DRY DECIDUOUS FORESTS

MUCUNA PRURIENS

RICINUS

SPP., HIGUERILLA, CASTOR BEAN (DUST OF SEEDS)

SCHINUS

SPP., FOUND IN INTER

-

ANDEAN VALLEYS

STERCULIA

SPP.

THEVETIA

SPP. (SEEDS, LEAVES, STEM

S AND ROOTS)

TOXICODENDRON

SPP., ALUBILLO, COMPADRE, CASPI, POISON OAK/IVY (SEEDS, LEAVES, BARK)

URERA-URTICATING NETTLE, ORTIGA, ORTIGUILLA DE TIGRE, CRESP

# COMMUNICATION

- Figure it out before you leave
  - How do you structure it?
  - What are your responses?
  - Who controls
  - Honesty-is it the best policy?
- How do you beat the students to it?
- How do you counter what parents/involved others hear?
- How fast?
- Try it out
- Make sure it is a partnership of your institution, your in-country team, and you student support group
- Potentially the biggest problem you will have
- If there is a problem, inform before your students inform.
- Our Class in Ecuador

# PLANNING/RESEARCH/RESOURCES

- CDC
- FROMMERS
- CANADA
- VOLCANOS, VOLCANOS
- STATE DEPARTMENT

# RESEARCH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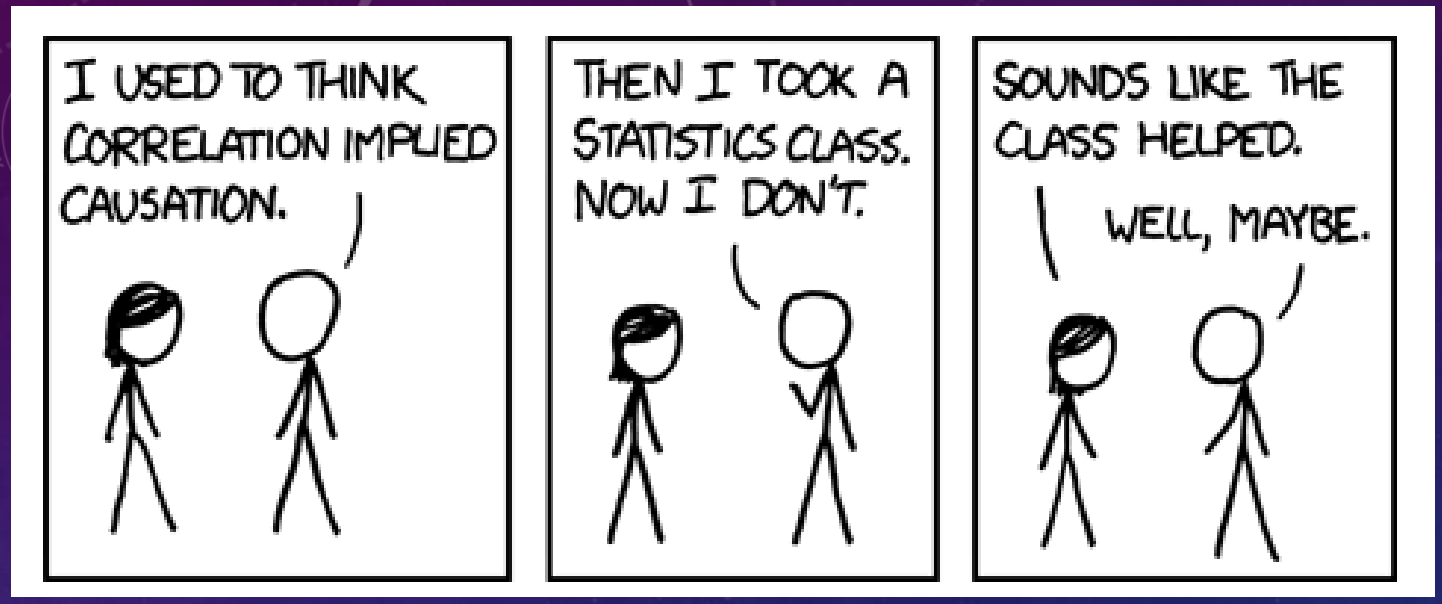
BRAdwin
CARTOONSTOCK .com
Search ID: mban1602
"At first it's, we'll try this and we'll try that. But when there's a medical breakthrough, guess who takes all the credit."


I USED TO THINK CORRELATION IMPLIED CAUSATION.
THEN I TOOK A STATISTICS CLASS. NOW I DON'T.
SOUNDS LIKE THE CLASS HELPED.
WELL, MAYBE.

# FIRST AID KIT


30 Antiseptic Towelettes, 30 Alcohol Pads, 6 Sting Relief Pads, 3 Hand Sanitizers. Treat: 6 Antibiotic Ointment, 6 Burn Cream, 10 Antacid Tablets, 10 Aspirin Tablets, 10 Non-aspirin Tablets, 1 First Aid Guide, 1 Instant Cold Compress. Protect: 5 Adhesive Bandages (Metallic), 20 Adhesive Bandages 1" x 3", 55 Adhesive Bandages 0.75" x 3", 50 Adhesive Bandages 0.375" x 1.5", 10 Butterfly Bandages, 18 Wound Closure Strips, 2 Gauze Rolls, 3 Protective Earloop Masks, 2 Eye Pads, 10 Sterile Gauze Pads 2" x 2", 4 Sterile Gauze Pads 4" x 4", 1 Sterile Trauma Pad. Additional Supplies: 20 Cotton Tip Applicators, 1 Adhesive Tape Roll, 5 Finger Splints, 1 Triangular Bandage, 4 Examination Gloves, 1 pair Metal Scissors, 1 pair Metal Tweezers.

Add extra Band-Aids, surgical tape, moleskin, and
-Tylenol
-Ibuprofen
-Loperamide
-Alka-Seltzer
-suggestions

# SO PLANNING?

- What do you do first?
- What are the most important steps?
- What are your resources?
- Who will help?

# SO, WHAT DO YOU DO?


Use a fan to lower temperature
Elevate feet
Apply cold compresses
Give fluids
Have the person lie down
A.D.A.M.

# SO, WHAT DO YOU DO?

- Safety of Group
- Stability of area
- Assess situation
- Notification Plan

# SO, WHAT DO YOU DO?

- Remove student from area
- Rabies?
- Assess threat-why is the Koala sooo mad?
- Wildlife is unpredictable…

# SO, WHAT DO YOU DO?

- Make sure they are mosquitos
- Assess threat-what disease are carried in this country?
- Use US repellent, other countries have some chancy ingredients
- Clothing-some is rated for mosquitos
- No panic allowed
- Make students aware of any disease symptoms
- Medication
- No vaccines for any…

# SO, WHAT DO YOU DO?

- **Rabies**
- **B Virus (*Cercopithecine herpesvirus 1*)**
  Up to 90% of adult macaques can be carriers of B-virus; most are asymptomatic, but some can have localized oral lesions. In humans the infection presents as a rapidly ascending encephalomyelitis with a fatality rate of about 70%. Most of the 25 well-documented cases of human infection have occurred in laboratory animal handlers who were somehow directly inoculated with tissue or fluid from a monkey via a bite, scratch, needlestick or laboratory injury. Although experimentally infected new world monkeys develop fatal disease and could conceivably become infected by contact with macaques, under most circumstances bites to humans from new world monkeys should not raise concern about this deadly disease because it is not endemic among new world monkeys. The attached article, *Recommendations for Prevention of and Therapy for Exposure to B Virus (Cercopithecine Herpesvirus 1)*(see Attachment 3) was published November 15, 2002, in *Clinical Infectious Diseases,* gives details on prevention and treatment following exposure to a macaque. (www.cdc.gov/ncidod/diseases/bvirus.htm)
- **Tuberculosis (TB)**
  Nonhuman primates are very susceptible to infection from mycobacteria tuberculosis (TB) and can contract it from humans or other animals. Primates from environments where human TB is prevalent are at greatest risk for having the disease. During the 31 day quarantine of legally imported primates, a minimum of three tuberculin skin tests are performed and positive animals are destroyed. Illegally imported monkeys and those raised and sold as pets in the US may not be appropriately tested and could be infected.
- **Local Wound Infections**
  Approximately 224 strains of bacteria have been identified in human and animal saliva-contaminated wounds. The organisms most often encountered in the mouths of rhesus monkeys are the *Neisseria* species, alpha hemolytic streptococci, and *Haemophilus parainfluenza*. In addition, the attending physician should be notified of the possibility of infection with *Eikenella corrodens,* a facultative anaerobe associated with human and nonhuman primate bites, that cause extensive tissue damage.
- **Enteric Diseases**
  These are spread via the fecal oral route and cause similar symptoms in humans and nonhuman primates. The more common agents include bacteria (*Shigella, Salmonella, Campylobacter*), protozoan parasites (*Cryptosporidium, Giardia, Amoeba, Balantidia*), and helminth parasites (*Strongyloides*).
- **Simian Immunodeficiency Virus (SIV)**
  SIV is closely related to HIV-1 and HIV-2 (causes of AIDS) and causes an AIDS-like illness in macaque monkeys; it may be asymptomatic in other species. There have been no reports of human illness, but there are research workers who developed antibodies to SIV after handling laboratory specimens.
- **Marburg and Ebola (Filoviruses)**
  Humans have developed illness from Marburg infection when exposed to tissues from African Green monkeys. The Ebola viruses from the Sudan and Zaire have not been isolated from monkeys. A different Ebola virus was discovered in 1995 in West Africa chimpanzees when a researcher became infected. The Ebola virus that caused an outbreak in a Reston, Virginia monkey quarantine facility, did not cause illness in any humans, but four animal handlers developed antibodies to the virus. These incidents remind us of the potential for as yet undiscovered human pathogens to be introduced by wild caught monkeys.

## Don’t come in contact with primates!

THANKS FOR YOUR TIME!

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