Post-travel case scenarios
An interactive and fun session
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Objectives
• Develop a framework for triage of travelers presenting with medical complaints.
• Recognize the most common post travel emergency scenarios.
• Recognize common post travel health scenarios requiring reassurance, referral or both.
• Name the symptoms of malaria, dengue fever, typhoid fever and persistent traveller’s diarrhoea.
• Have fun

Practice question
• In the five minutes following this scene, the monkey:
  1. Bit me
  2. Crawled down my shirt
  3. Pick pocketed me
  4. Threw a fruit at me
  5. All of the above

Case #1

Transparency declarations
I lead a life mostly taken up by work. When I don't work, I like gardening, jogging, and spending quality time with my wife. I have little time to entertain the idea of fancy drug/vaccine dinners or relationships with industry. My wife works for the Public Health Agency of Canada (PHAC) has a lot of money recommends a lot of vaccines, some of which are not cleared by Health Canada. This is the case for almost all travel medicine conditions. In short, I have nothing to declare relevant to the content of this presentation.

A 44 year old Nigerian woman presents with sudden onset fever (38.9°C, measured).
• She returned to Winnipeg from Nigeria 12 days prior after visiting her mother and brothers in Nigeria.
• In Nigeria, she stayed with her family near the town of Unguwar Gata.
• She did not seek pre-travel advice.
1. Start quinine and doxycycline on the phone.
2. Have her come to your clinic for assessment.
3. Refer to local travel clinic.
4. Refer to hospital emergency department.
5. None of the above

Malaria, Malaria, Malaria
Malaria, Dengue, unknown cause or not travel related.
Typhoid, Malaria, Dengue
Malaria, unknown or not travel related, arboviral infection.

Fever in Sub-Saharan Africa
- Malaria accounts for ~2/3 of all systemic febrile illnesses in returned travellers from sub-Saharan Africa.
- By far the worst region for malaria
- Major risk factors are VFRs, no prophylaxis, exposure to rural areas, during night-time hours.
- Almost 3/10 cases of fever in travellers from SSA are undiagnosed or cosmopolitan infections.
- 1/20 cases of fever in travellers from this area are due to rickettsial infection, almost all *R. africae*
  - Almost exclusive to Southern Africa region (South Africa, Botswana, Namibia, Swaziland, Lesotho and Zimbabwe)

Investigations in hospital
- Three malaria smears should be ordered, ~8-12 hours apart, preferably when the patient is febrile.
  - Alternatives include malaria antigen detection and PCR. Neither are easily available.
- Blood cultures useful to diagnose typhoid and many cosmopolitan infections.
- CBC, electrolytes, creatinine, LFTs help guide therapy and should be ordered.
- Rickettsial and arboviral serology may be useful, but can defer unless clinical findings suggest these.

Blood smear
What is the diagnosis?
1. Malaria
2. Severe malaria
3. Trypanosomiasis
4. Chagas disease
5. Filariasis

Anti-malarial regimens

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<tr>
<th>Species</th>
<th>First choice</th>
<th>Second choice</th>
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<tr>
<td>Falciparum (severe)</td>
<td>Artesunate + second agent</td>
<td>Quinine plus second agent</td>
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<tr>
<td>Falciparum (uncomplicated) (assuming CQ resistance)</td>
<td>Atovaquone-proguanil or Quinine+Doxy/Tetra/Climax</td>
<td>Mefloquine</td>
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<td>Vivax</td>
<td>Chloroquine + primaquine</td>
<td>Atovaquone-proguanil or mefloquine + primaquine</td>
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<td>Ovalae</td>
<td>Chloroquine + primaquine</td>
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I’ve got a what?
1. A 36 year old colleague of mine returns from his 4 week stay in Sri Lanka where he stayed in resort hotels with his wife.
2. His holiday was largely uneventful. He had a mild GI illness in the first week of stay, got sunburned and had some questionable eating/drinking habits. He had no fresh water contacts and no animal contacts, but noted there were dozens of stray dogs around the beaches and resorts. He ate seafood but no sushi.
3. They returned to Winnipeg 4 days ago. He now presents with a 2 day history of an excruciatingly itchy lesion on his toe, which keeps him up at night and moves by the day.

What is the best course of action?
1. Send to the ER for assessment.
2. Tell him it serves him right for not inviting you to Sri Lanka.
3. Send to Travel and tropical medicine at next available appointment.
4. Hey – it’s the smartphone era, get him to send you a photo and make an electronic diagnosis!
What is the diagnosis?
1. Dracunculiasis
2. Ancylostoma ceylanicum/caninum infection
3. Toxocarasis
4. Bot fly infection
5. Ringworm
6. Gnathosomiasis

Cutaneous larva migrans
- Caused by a variety of animal hookworms that vary from region to region.
  - Ancylostoma braziliense: the most common; hosts are wild and domestic dogs and cats; primarily found in central and southern USA, Central and South America and the Caribbean
  - Ancylostoma caninum: hosts are dogs; primarily found in Australia.
  - Uncinaria stenocephala: hosts are dogs; primarily found in Europe.
  - Bunostomum phlebotomum: hosts are cattle.
  - Ancylostoma ceylanicum: Dog, primary India
  - Ancylostoma tubaeforme: hosts are cats

Larvae penetrate intact skin of humans when they walk barefoot.
- Typically occurs in shady areas near beaches or other sandy soils, in proximity of where animals defecate.
- Larvae migrate attempting to gain access to blood stream to complete pulmonary cycle.
  - Cannot achieve this in wrong host.
- Migrate under the skin until they die, usually 4-8 weeks.
- Lesions are usually on the feet (or anywhere where contact with ground occurred), very pruritic and migratory.

What is the best treatment?
1. Ivermectin
2. Antihistamines and/or topical steroids
3. Albendazole
4. A and B
5. B and C

How can this illness be avoided?
1. Deworming dogs regularly
2. Covering exposed skin in contact with the soil.
3. Using DEET on feet and exposed areas.
4. A and B
5. A, B and C

Lancet 350:781.
Case #3

What course of action is most appropriate?
1. Take malaria smears and order a blood culture.
2. Tell her to go to emergency for assessment.
3. Dengue serology.
4. Make her chicken soup and send her home.
5. Look up the chapter on “Nasty bugs living in the Amazon River”

What “Nasty Things” can be found in or around the Amazon River?
1. Dengue
2. Malaria
3. Piranha
4. Ayahuasca
5. Leptospirosis
6. Candiru fish
7. Leishmania
8. Brucellosis
9. All of the above

Update
• Routine blood work shows evidence of mild liver enzyme elevation, normal clotting. CBC shows leucocytosis with lymphocytosis with otherwise normal differential, renal function is normal.
• Malaria smears are negative, blood cultures are negative, dengue serology is negative.
• She’s given a course of doxycycline with rapid improvement in symptoms.
• She returns, wondering what the heck she had.

You swam where?
• 34 year old previously healthy female presents to complaining of recent fever, now developed excruciating calf/leg pain, malaise, headache and body aches of 2 days duration.
• Was Iquitos on a yoga retreat. Returned last week. She did not take any prophylaxis or vaccines on the advice of her Yogi. She drank treated water, ate only well-cooked food and spent her days in screened cabins practicing yoga. She took excursions in the jungle and swam in the Amazon.
• Initial examination reveals an uncomfortable patient with difficulty walking due to pain in her legs. Temperature is 36.7ºC, BP 104/64, HR 94, RR 14. She is noted to have a conjunctival suffusion.

What additional tests could be ordered?
1. Brucella serology
2. Leptospira serology
3. Urine and blood for Leptospira PCR
4. Rickettsia serology
5. All of the above
Leptospirosis

- Leptospirosis is caused by a spirochete bacteria that is present in fresh water in tropical regions of the world.
- Very rare in temperate countries but does occur.
- Associated with outbreaks in developing countries and in tourists exposed to contaminated water.
- Acquired by contact with fresh water contaminated with urine from infected animal or humans.
- Disease has two forms (mild and severe (Weil's syndrome))
  - Mild presents with fever, myalgia, headache, conjunctival suffusion, severe calf pain.
  - Weil's syndrome adds jaundice, haemorrhage, renal failure.
  - Mortality is 15-40%

Guerrant et al. Tropical Infectious Diseases 3rd edition

Leptospirosis and Weil's syndrome is managed supportively and with antibiotics.
- Doxycycline is the drug of choice, penicillin or ceftriaxone as an alternative or for IV treatment.
- Prevention is by avoiding contact with contaminated fresh water or by using doxycycline prophylaxis.
  - Doxycycline can be used for both malaria and leptospirosis prophylaxis.

Management

- A 54 year old woman from Guyana presents for evaluation of eosinophilia.
  - Absolute count 1.8 x 10^9/L.
  - Relative 20%
- Emigrated to Canada 28 years prior. No return to Guyana, no travel except occasional resort areas in Mexico.
- Denies any symptoms until specifically asked about rash.
  - “Well...I do get this itchy rash on my bum every few months. GP gave me antihistamines because it was so itchy...”

As luck would have it...
What is the diagnosis?
1. Cellulitis
2. Cutaneous larva migrans
3. Loa loa (calabar swelling)
4. Strongyloidiasis
5. Dracunculiasis

Larva currens (Strongyloidiasis)
- Caused by the nematode Strongyloides stercoralis
- Common and persistent infection (last for decades)
- 30–100 million people worldwide
- Endemic in Africa, Asia, Southeast Asia, and Central and South America
- Can result in fulminant dissemination with case-fatality rates of over 70% in the setting of compromised cellular immunity.
- Rash and eosinophilia basically diagnostic, but serology also ordered and very positive.

Distribution of Strongyloides stercoralis

Life cycle

What’s the best way to confirm the diagnosis?
1. Some sort of serology
2. Some sort of culture
3. Some sort of PCR
4. A biopsy of the lesion
5. None of the above

Diagnosis
- Confirmation of diagnosis using the laboratory can be done using various tests:
  - Serology (high sensitivity and specificity, cross reactivity might occur)
  - Microscopy (stool): 100% specificity but low sensitivity. Need multiple specimens, duodenal aspirate.
What is a potential risk of this infection?
1. Cancer
2. Death from polymicrobial septic shock
3. AIDS
4. Liver failure
5. Death from hypereosinophilia

Severe consequences
- Immuno-compromise can lead to hyperinfection syndrome.
- Disseminated infection with larvae in lungs, CSF, bone marrow...
- High mortality due to polymicrobial sepsis.
- HTLV-1, prednisone, cheemo and cancer are common associations.
  - Good idea to screen patients from endemic areas before immunocompromising regimen started.
  - Good idea to screen patients with *Strongyloides* for HTLV-1 if from HTLV-1 endemic country.

What is the best treatment?
1. Albendazole
2. Metronidazole
3. Doxycycline
4. Ivermectin
5. Iodoquinol

Treatment
- Normal immune system:
  - Ivermectin 200 µg/kg daily x 2-3 d (cure rate 64-100%)
  - Albendazole 7-14 d (cure rate 35-75%)
- Immunosuppressed:
  - Combination therapy:
    - Albendazole 400 mg twice daily x 3d AND Ivermectin 200 µg/kg daily x 1-2 d
  - In cases of disseminated *Strongyloides*, albendazole and ivermectin are continued until there is evidence that the parasite is cleared.
- Follow-up serology
  - Follow-up serology should be ordered at 6 month intervals until serological cure is documented.
  - Reversion to negative or post-treatment/pred-treatment OD ratio of <0.6.

Case #5

17 days after a trip to Swaziland, a 52 year old female called me complaining of fevers and skin lesions.
- 10 days after her return, she noticed two small “pimple-like” spots on her chest. One on her line and one on breast.
- Next day, developed a fever (38°C) which persisted every evening for 3 days.
- Within 2 days of the “pimple-like” lesions, the lesions expanded and ulcerated with a black centre. They were tender and had surrounding erythema with satellite lesions.
- Two days after the fever broke, she woke up with about 15 spots on various parts of her body. Mostly legs and a few on her back. The spots were very small and red, not painful or itchy. Felt better by then.
- Was a mission trip, but on the last day, participated in Safari that has overnight outdoor sleeping.
- Was also exposed to a variety of domestic animals, goats, cattle, dogs, cats. She did not recall getting bitten by mosquitoes or other arthropods.
- Took malaria prophylaxis but only stayed in “malaria free” highland areas.

CMAJ. 2004 Aug 31;171(8):479-84.
CMAJ. 2007 Aug 28;177(5):451-3
What tests should be ordered?
1. Smears for *Trypanosoma brucei*.
2. Wound swab for anthrax.
3. Tissue biopsy for histopathology.
4. Fungal culture.
5. Viral culture.
6. All of the above, healthcare is free in Canada.
7. None of the above – put your neck out and make a clinical diagnosis!

What is the diagnosis?
1. Anthrax
2. Varicella
3. Typhus
4. Borreliosis (Relapsing fever)
5. Brucellosis
6. Trypanosomiasis (African Sleeping Sickness)
7. Tinea corporis (ringworm)

South African Tick Typhus
- Rickettsial disease in the “Spotted Fever” group transmitted in Southern Africa by *Amblyomma hebraeum*.
- Most common rickettsial infection imported by travellers.
- Incubation is 5 – 7 days.
- Symptoms include fever, headache, myalgia (often in the neck), eschars (typically multiple), lymphadenopathy, rash.

Diagnosis
- The right travel context and clinical presentation is virtually diagnostic in this case.
- Diagnosis may be challenging if key elements are lacking (e.g. eschar) or travel history includes areas that have other diseases with similar presentations.
- Serology is available, but cross reactions with of SFG rickettsias is typical.
- PCR assays can detect the pathogen.

Management
- Doxycycline for 7-10 days is generally the treatment of choice.
- Chloramphenicol is an alternative for pregnant women and children, but short courses of doxycycline may still be used in children.
- There is insufficient evidence to support treatment with fluoroquinolones, azithromycin or clarithromycin.
Case #6
The golfer

Clinical History
- 34 year old male, previously well.
- Travel to Arizona six weeks ago. Stayed for a week then went to Florida for a week.
- Three weeks after returning to Winnipeg, presents with chronic cough x 2 weeks.
- Denies fevers, no weight loss, no haemoptysis.
- Non-smoker, no previous respiratory diseases.
- Given a course of levofloxacin x 10 days for pneumonia.
  - No improvement

On examination
- Looks well at rest, but dyspneic with activity. Afebrile, normal vital signs.
- Chest exam reveals bronchial sounds and crackles in the left upper lobe.
- Remaining exam is unremarkable.

Given the chest X-Ray and travel history, what is the diagnosis?
1. Tuberculosis
2. Community acquired pneumonia
3. Legionnaire’s disease
4. Coccidiomycosis
5. Blastomycosis

CXR

Coccidiomycosis
- Primarily a respiratory disease.
- Also known as San Joaquin Valley Fever
- Caused by one of two Coccidioides spp.
  - C. immitis (limited to San Joaquin Valley area in California)
  - C. posadasi (South West USA, Arizona, Texas, Mexico, Central and South America)
What is the reservoir of this pathogen?

1. Soil
2. People
3. Desert Rats
4. Cats
5. Cacti

Epidemiology
- Ecologic niche of the fungus is soil in the lower Sonoran life zone:
  - Low elevations, scant rainfall, mild winters and hot summers.
  - Sandy alkaline soil with increased salinity.
  - Western Hemisphere from latitudes 40° north to 40° south.
  - Areas of highest endemicity:
    - Southern-central portions of California (San Joaquin Valley).
    - Arizona, southern New Mexico, western Texas and northern Mexico.
    - Some regions of Central America and South America.
- Disease is readily spread by dry conditions and wind:
  - Affected areas can spread widely.
- In endemic areas, 50–70% of adults have been infected.

Clinical Manifestations
- 60% of infections are completely asymptomatic.
- Incubation is 2 – 3 weeks.
- 25% of infections are mild flu-like illnesses that spontaneously recover without treatment.
- 7-10% develop acute coccidioidomycosis requiring therapy.
- 5-8% develop chronic coccidioidomycosis.

Epidemiology
- Disease incidence peaks in the late summer and fall.
- Dry season, windy, most soil disturbance.
- Soil disturbance = aerosolization of infective arthroconidia.
- In the USA, >100,000 cases occur annually.
- Outbreaks, related to environmental conditions and contaminated fomites, are known to occur.

Treatment
- Asymptomatic or minimally symptomatic cases in normal hosts require no treatment.
- Chronic, severe pulmonary disease or disease in immunocompromised hosts is treated with itraconazole.
- Very severe cases, disseminated infections or meningitis is treated with Amphotericin B.
In North America, what potentially rapidly fatal infection is nearly unique to the same place?
1. Plague  
2. Sin Nombre virus  
3. Anthrax  
4. A and B  
5. All of the above

Case #7  
The real agenda

Oops...  
- A 24 year old male present to the travel clinic with complaints of a dry cough lasting about a week after a trip to Jamaica over spring break.  
- Cough it was described as dry, non-productive; accompanied by a runny nose and sore throat and mild headache.  
- He denied fever, shortness of breath, myalgias, chest pain or wheeze.  
- The cough is now resolved and he is well.

On examination...  
- He looks well, not in any distress and is afebrile.  
- His chest and cardiovascular exams examination are normal.  
- The remainder of the exam is normal.

What is the next step?  
1. Get a chest x-ray.  
2. Do a mantoux test (Tuberculin skin test).  
3. Reassure him it was just a cold.  
4. Tell him: “Come on, coming to a clinic for a cold you picked up in Jamaica? What’s the real reason?”  
5. Test for a pulmonary embolus.

The question that revealed all...  
- Did you have any new sex partners while away?  
- Make it a habit of asking travellers about their sexual encounters during travel.  
- Some travellers come with a hidden agenda (personal experience).  
- Some travellers engage in sex tourism, others encounter other travellers and engage is sexual activities.
The real story
- Admitted to having sex with a local woman on the resort while travelling.
- Did not pay for the sex.
- Was intoxicated at the time, did not use a condom.
- 4 days ago developed a very painful ulcer on his penis and painful swelling of the lymph nodes in his groin.
- Denies penile discharge, fever, rash, or lymphadenopathy.
- Cough story was a complete fabrication.

What is the diagnosis?
1. Herpes
2. Syphilis
3. Chancroid
4. Gonorrhoea
5. Chlamydia

Chancroid
- Chancroid is caused by the bacterium *Haemophilus ducreyi*.
- Typically causes a very painful ulcer which can progress to disfiguring ulceration. Local adenopathy and suppuration (buboes) is common.
- Rare in developed countries, endemic in all developing countries.
- Diagnosis is clinical, and by demonstrating the bacteria by PCR or culture of an ulcer swab or bubo aspirate.

What is the best treatment?
1. Penicillin G 1.2 million units intramuscular x 1 dose
2. Ciprofloxacin 500 mg x 1 dose
3. Ceftriaxone 250mg intramuscular x 1 dose
4. Erythromycin 500mg orally three times per day x 7 days.
5. Cefixime 400mg orally x 1 dose.

What proportion of travellers that attend a travel clinic engage in casual sex?
1. 1-2%
2. 4-6%
3. 8-12%
4. 15-20%
5. 40-50%
What impact does discussion of safe sex practices have on casual sex?

1. None
2. Casual sex "risk" reduced by 10%
3. Casual sex "risk" reduced by 25%
4. Casual sex "risk" reduced by 50%
5. Casual sex "risk" reduced by 75%

Remember....

- STIs are like wolves – they travel in packs.
- Gonorrhoea most likely, but test for all major STIs.
  - Gonorrhoea, chlamydia, syphilis, HBV (if not vaccinated), HIV, Trichomonas.
  - Testing for herpes, HPV, usually not required.
  - Testing for chancroid or LGV only if clinical presentation suggestive.

Case #8

- 26y previously healthy plastic surgery resident.
- Presented with a non-healing nodule of 4 weeks duration on his medial right heel.
- Returned from Peru three weeks ago where he engaged in adventure travel, including the Andes, Lake Titicaca, the Amazon jungle and Lima.
- Frequently walked with open sandals.

Heel

Nodule contents
What is the diagnosis?
A. Leishmaniasis  
B. Bot fly  
C. Tungiasis  
D. Anthrax  
E. Fungal infection

Tungiasis
• Ectoparasitic infection caused by the sand flea *Tunga penetrans*.
• Originally endemic to South America.  
• Also found in Central America, the Caribbean, Asia and Africa.  
• Prevalence amongst local inhabitants of some regions reaches 50%.  
• Infestation typically occurs on the feet.  
• The fertilized female burrows into the patient’s skin, with its anal-genital opening near the surface.

Management
• Surgical removal of flea with subsequent antiseptic washes.  
• Alternative is to surgically remove the whole nodule.  
• Antibiotic for secondary infections if present.  
• Consider tetanus prophylaxis if indicated.  
• Lesion heals slowly over weeks.  
• Anti-parasitic agents (Ivermectin, Thiabendazole) may be effective but are not indicated unless there are numerous lesions.

The new Canadian
• A 9 year old child, landed immigrant from Sierra Leone, presents in July with a pruritic skin lesion on her arm.  
• Have been present for several months. Slowly enlarging and pruritic. Other children in the community had similar lesions.  
• Physical examination is otherwise normal.
What is the diagnosis?
1. Bedbug bites
2. Poison ivy
3. Atopic dermatitis
4. Psoriasis
5. Leishmaniasis
6. Yaws
7. None of the above

Tinea corporis
- Caused by a variety of fungi collectively known as dermatophytes.
  - *Trichophyton rubrum*, *T. mentagrophytes*, *T. tonsurans* are common, and anthropophilic (usually spread from person to person)
  - *Microsporum canis* is a common cause, associated with domestic animal exposure (dogs and cats)
  - Also a common cause of tinea capitis.
  - *Microsporum nanum* (pigs) and *Microsporum gypseum* (soil, thorns, wood) also seen.

"Dermatophytosis" in Tropical Infectious Diseases: Principles, Pathogens & Practice 3rd Ed., Guerrant

Further investigations
- Presentation is fairly typical and trial of therapy is often curative and diagnostic.
- If atypical, recalcitrant to therapy, progressive despite therapy, consider lab studies:
  - Scrapings or hair for microscopy and culture is usually sufficient.
  - Biopsies should be considered if lesions unusual.

Management
- Many topical therapies exist:
  - Ciclopinox
  - Topical azoles
  - Turbinfine
  - Apply twice daily for 3 – 6 weeks. Compound with 0.5 – 1% hydrocortisone for symptomatic relief.
- If there are multiple lesions, hard to reach areas, poor response to topical therapy, involvement of nails, hair or scalp, use oral therapy.
  - Oral azoles: Weekly Fluconazole or daily intraconazole or ketoconazole.
  - Turbinfine

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Case #10
My niece
Another Mexican vacation
- 9 year old girl returns from a Christmas vacation in Mexico with "a weird sunburn" on her face.
- Started off as "sunburn", on both cheeks, hyperpigmentation present since return.
- Stayed at all-inclusive resort, only went to beach, poolside and hotel restaurants.

What question should be asked?
1. Did you wear sunscreen?
2. Was your vaccination schedule up to date?
3. What did you eat/drink?
4. Did you spend time with locals?
5. Did you pick up a cat or dog?

Phytophotodermatitis
- Cutaneous phototoxic inflammatory eruption resulting from contact with light-sensitizing botanical substances and long-wave ultraviolet (UV-Å 320-380 nm) radiation.
- Usually begins approximately 24 hours after exposure and peaks at 48-72 hours.
- Following initial symptoms, persistent hyper or hypo pigmentation of variable duration occurs.

Cheek lesions

The answer...
- "I ate lemons all day!"

Pathophysiology
- Exposure to plant psoralens and related compounds and UV light is critical.
- Psoralens are activated by UV light bind to DNA and create cross-links in the DNA structure.
- Leads to cell death and a clinical syndrome similar to sunburn (erythema, blistering, inflammation).
- Many plants contain psoralens and related compounds.
- Common culprits are citrus (limes, lemons), parsnips, celery, carrots, fennel, fig leaves, hogweed, Queen Anne's Lace.
Management

- Reassurance is typically all that is needed.
- Phytophotodermatitis is a self-limited problem.
- Avoid the agent if possible, especially if exposed to UV light.
- Sunscreens helpful to prevent cases.
- Topical steroids or anti-inflammatories may be prescribed during the painful initial phase if required.