Infectious Disease Challenges in Refugee Health
May 9, 2012
1:00-2:30pm EDT

Operator: Ladies and gentlemen, thank you for standing by.

Welcome to the Infectious Disease: Challenges in Refugee Health Webinar.

During the presentation, all participants will be in a listen-only mode. Afterwards, we will conduct the question-and-answer session. If you'd like to ask a question during the presentation, please use the chat feature located in the lower-left corner of your screen.

If you need to reach an operator at anytime, please press star 0.

As a reminder, this conference is being recorded, Wednesday, May 9, 2012.

I would now like to turn the conference over to Mr. Paul Geltman.

Please go ahead, sir.

Paul Geltman: Hi. Good afternoon, everybody. If you're here on the East Coast with us, and good morning to those of you out West. And I also want to welcome the handful of participants from overseas in Canada. I think we have some people who registered as being in Afghanistan and Australia with us today for this webinar.

Before we get started, I want to make sure to express our thanks to the US Office of Refugee Resettlement for funding the Refugee Health Technical Assistance Center here at the Massachusetts Department of Public Health. We're grateful for their support and want to make sure to acknowledge their interest and support in promoting our educational activities around Refugee Health.

For the Webinar today, this is a more clinically oriented program. We have Continuing Education credits available for those who've already signed up for them. As such, we - when we get to the question-and-answer period for the question-and-answer, we're going to try to focus on those who have clinical questions as opposed to programmatic or public health questions. However, all questions and answers will be answered by the speaker in writing if you submit them to us after the fact.

So to submit questions, they can be submitted at any time during the Webinar using the chat function in the lower-left side of your screen. We'll select - if necessary, we'll select questions which are most clinically relevant presentation for Dr. Barnett to answer live. And we'll have some discussion around them at the end. Other questions will be answered in writing after the Webinar.

Also for those of you who applied for CE credits, if you registered early, you may have already received an e-mail from our Continuing Education collaborators at the Baystate Medical Center. If you have not yet received this e-mail, you will from Baystate Continuing Education. And there will be another e-mail in approximately one week with an evaluation which must be completed to receive your credits.

So during the Webinar today on Infectious Disease Challenges, we're going to have some poll questions to keep everybody on their toes and engaged. We'll have just a limited amount of time for people to select a response before we move on. So make sure you're answering very quickly. You don't have to think hard about it. And we'll announce when those poll questions are coming.

In addition, we'll show some information at the end. We want to encourage everybody to attend this year's second conference in Rochester, the now North American Refugee Healthcare conference at the end of June. And we'll have information at the end of the slides on registration.

Lastly, I want to encourage all of you to take a look at the Refugee Health Technical Assistance Center Web site, which is refugeehealthTA.org. The reason that I mentioned it is because we have archived recordings of all of our Webinars available on the Web site. And Dr. Barnett's presentation today will also be recorded and archived for future listening. In addition, PDF version of these slides will be available. And the answers to all questions that are submitted using the chat function today.

So let me move into introducing the webinar today. It's a pleasure for me to do so as the Medical Director of the Refugee and Immigrant Health Program and Technical Assistance here at Mass DPH. I have known Dr. Barnett for a long time. And she's going to present the Webinar today on Infectious Disease: Challenges in Refugees from the Common to the Complex. Dr. Barnett will first describe some of the common infectious disease issues for refugees, will define eosinophilia and list some of the common causes in refugees. She'll then describe different approaches to the assessment of refugees with eosinophilia. And lastly, we'll identify resources for information about the diagnosis and management of parasitic infections in refugees.

The presentation today will follow a case-based format. And as noted, we'll have question-and-answers at the end.

So, Dr. Elizabeth Barnett is a Professor of Pediatrics at the Boston University School of Medicine; a member of the Section of Pediatric Infectious Diseases at Boston Medical Center.

I've known Dr. Barnett now for, I think, about 17 years and worked with her at her International Clinic of which she is the director. The International Clinic at Boston Medical Center houses the Refugee Health Assessment Program -- one of our clinical screening sites here in Massachusetts. She also provides consultation for travel medicine for children and their families, tropical medicine and international adoption.

Dr. Barnett is a member of the Migrant Subcommittee of the International Society of Tropical Medicine and is a Site Director for the CDC's GeoSentinel

Project. Most importantly, with Dr. Pat Walker in Minnesota, Elizabeth is the co-editor of textbook, “Immigrant Medicine.”

So with that, I’m going to turn it over to Dr. Barnett.

Elizabeth Barnett: Thank you. That was a very nice introduction. And it is a real pleasure to be speaking to all of you today.

Paul, I think you did have a poll question here...

Paul Geltman: Thank you for reminding me.

So I almost forgot the - we wanted to start with a poll question just to get a sense of who’s out there to help Dr. Barnett in terms of understanding the needs of the audience today.

So the first poll question should be visible to you on the screen. And we just want to know what’s your job role, a medical clinical care, administration and management, case management or social work, community education and training, community engagement and planning, patient education and advocacy, program support, education, academics, or something else.

And I’m going to give you about five more seconds to answer, and then we’ll go through results.

So, five, four, three, two, one. All right. Here we go. So about half of the audience is involved with medical and clinical care; 20% or so on administration and management; just under 10% in case management and social work; 3% or so in education; 5% program support; and 12% doing other activities.

So thank you all for responding. And now we’ll go back to Dr. Barnett.

Elizabeth Barnett: Okay. All right, the presentation that I put together today is focused on care of refugees, both newly arrived refugees and those who have been in their

resettlement country for some period of time. But there will be points that are made that will apply to any immigrant patients you happen to see who may not be refugees.

I am using the first two slides here to highlight that all of you who take care of refugees have a special challenge. And I am starting with this slide of US immigrant arrivals over the last decade or so to show you that although the numbers of the immigrant each year changes, the proportions that come from the various different parts of the world are relatively stable over time.

In contrast, on the next slide, you see that the - all the numbers and proportions of refugees from different parts of the world are drastically different from year-to-year. This provides a constant challenge to us to learn about new groups of arriving refugees to learn about new diseases, to learn about new cultures, to learn a few words of new languages every year. And I have to say honestly, it's one of the things that keeps me most engaged, most interested, and most stimulated intellectually and personally.

And so I put this slide in to congratulate all of you in meeting this challenge and to show you that the challenge for us is to continually adapt to new diseases, new epidemiology and new cultures. And I hope to go through a few cases that will outline these challenges.

The next slide shows the screening checklist that's been put together and put on the website by the CDC. And I believe there are people on the call today who have contributed to developing this. If you're able to go to this link, you will see that not only does this list the recommended screening test, but you can hover your mouse over each of these and get additional information by clicking on the particular condition.

I put this up here to indicate how complex the issue of medical screening is and to tell you that we are only going to talk today about a very few diseases on this checklist. We're going to be focused on the right side of this list, particularly on intestinal and other parasites. But I'm also going to be talking about some other infectious disease condition.

So let's look at what I think the challenges are with regard to infectious diseases.

Well, I think we wear two hats when we take care of refugees. We are trying to identify acute and chronic illnesses of importance to the patient that's sitting in front of us. But we are also trying to respond to public health imperatives to identify diseases that may be of public health important such as tuberculosis and hepatitis B.

The second challenge for us is to diagnose unfamiliar conditions that may have subtle or non-specific signs and symptoms that we may not be tuned into until we make special effort to learn about the patient population that we're seeing.

And finally, the third challenge is really that we're not screening just at the time of arrival. We need to think about what we need to do at the time of arrival of new populations, but also to think about how we're going to screen and diagnose and manage patients across their lifespan for diseases they may have contracted associated with the root of migration that may affect their health over their life course.

So to get a little more specific about these challenges, communicable infections are where we wear our public health hat. These would include identifying patients with PB that could be infectious or could be latent, and a potential risk to the individual or their family members. We also have to have a patient-focus. When we're sitting in the exam room with our patients, we need to be tuned into what this patient wants from us on that day.

And I put the example of dental caries here because this is probably either the most common infectious disease worldwide or certainly one of the most common. That can cause significant pain and discomfort to our patients. We have to keep in mind to focus on what a patient's chief complaint is while at the same time, trying to accomplish our own public health agenda.

The third challenge is to bring every patient up-to-date with their immunizations in order to address vaccine preventable infections. As many of us are aware, measles has been a problem in the United States and in Europe and other countries because of not attending to measles immunization in some parts of the world.

Fourth on the list and what I will spend a lot of time talking about today is eosinophilia and parasitic infection.

And finally - and I think I have to thank Pat Walker and Bill Stauffer for really helping to raise the level of awareness of attention to infections of long latency including hepatitis B, latent tuberculosis and some newcomers that we're just beginning to attend to -- HPV infections, Human Papillomavirus, leading to cervical and other cancers; H. pylori infection, which I will come back to later in the talk; and Epstein-Barr Virus as well. So I think these are new areas of investigation and are really exciting in terms of thinking about how we're going to approach these in the future.

So with those points in mind, my objectives for the next little while are to discuss several cases that are relevant to the challenges that we face in caring for refugees and immigrants and to convince you of the value of taking a migration and travel history for every patient at every encounter, not just when we see a new refugee but for every patient you care for.

So let's start with the first talk. I'm a pediatrician, so I'm going to start with a pediatric case. This is the case of anemia in an African refugee. And this is a patient we saw at our clinic. This is 22-month-old toddler who arrived in our clinic two weeks after arrival. And he came from a refugee camp in Guinea. And his mother was concerned because he had a fever, he had a cough and occasional abdominal pain.

When we examined him, he was sitting very sadly on his mother's lap. He didn't want to separate from her. He appeared quite pale, unhappy, and he cried easily. His temperature was 100.2 axillary. He had a runny nose. His chest appeared clear. He did have a soft, early systolic ejection murmur. He

had a normal abdominal exam with the usual belly of a 22-month-old. And he had a neurologic exam that was non-focal.

So you are faced with a mildly ill, newly arrived toddler. And your differential is quite wide. Does this child have an infection that he acquired here in the United States since arrival? Does he have a viral infection? Could he have influenza? Does he have a bacterial infection? Could he have a pneumoccocal infection because, of course, at the moment we see him, we don't know his immunization status? Could he have an infection associated with his migration? Does he have malaria? Could he have dengue?

So how do we narrow in on appropriate differential for him? So first, we have to listen to the timing of his illness related to migration. We have to think about the incubation period of possible infections that he could have. And I would just refer you to the American Academy of Pediatrics Red Book, which has an initial section in a book, alphabetized by disease. And every section has an incubation period. So this is where I go to look for this if I need to.

Finally, we need to think about the epidemiology of the infections this child could possibly have. And we also need to think about infections acquired locally. For example, is it flu season? And could this child have simply acquired influenza since arrival in the United States?

So this child did have a complete blood count with differential and a blood culture that was obtained at that time. And I'm showing you here the results of his complete blood count. There was inconsistency with his paleness, quite anemic, with a hemoglobin of 5.3 and a hematocrit of 18.8. And his MCV was 68, which is on the low side. His white count was in the normal, maybe slightly high range, 11,100 with 32% polys, 50% lymph, 16% monos, 1% eos, 1% basophil. His smear showed marked anisocytosis, moderate polychromasia, hypochromia and poikilocytosis. And he had target cells.

So here is the first poll question that I'd like you to try. And the question is, specific diagnosis and therapy is most urgent for which possible cause of anemia in this toddler? Certainly there could be many. But which do you need

to focus in on immediately? Is it RSV bronchiolitis? Is it pulmonary tuberculosis, malaria, iron deficiency anemia, sickle cell disease, or G6PD deficiency?

So why don't you go ahead and select your answer. And I'll give you another ten seconds.

Ten, nine, eight, seven, six, five, four, three, two, one. Okay. So I think this is terrific. About a third of you have focused on malaria as being the most urgent condition to focus in on quickly. And a number of you have suggested that pulmonary tuberculosis was also very important to diagnose. In addition, a number of you have indicated sickle cell disease. And I think that is also important because it would suggest that this child might be at much increased risk of either complication of anemia or of a pneumoccocal infection.

So that's terrific. My personal answer to this was malaria because I think that is the one that was most immediately life-threatening. However, I think you could easily make a case for a TB and sickle cell disease to be life-threatening as well.

So he did have a blood smear. And his blood smear did show that he had malaria. It showed multiple ring forms and the nano-shaped gametocytes, which are typical of plasmodium falciparum. He did have a hemoglobin electrophoresis to address the question of a hemoglobinopathy. And he had hemoglobins AA, or actually a small percentage of hemoglobin F. But he essentially does not have sickle cell disease. He did have a - elevated lead level and a very high zinc protoporphyrin which goes along with his severe anemia.

And I just put in a picture here of a banana-shaped gametocyte. If you see this on a blood smear, you can make the diagnosis of falciparum malaria.

So what was done to manage this patient? He was treated with atovaquone-proguanil, which is the generic name for a drug Malarone. That's the brand

name. He was treated for three days as an inpatient in the hospital, because we were concerned about the level - degree of anemia that he had.

One, today, could choose to treat him as well with Coartem. But that was not available at the time. And it may or may not be available in your hospital. That is artemether/lumefantrine, which is a combination artemisinin-containing drug for treatment of uncomplicated falciparum malaria.

He did have a G6PD test that was normal. He had - was prescribed Primaquine. And his mother gave him all the doses. And his reticulocyte counts responded very well. It was 12.3% three days later. And a month later, his hematocrit had increased to 26%.

So let's address one question that comes up whenever you see a child from Africa that you have diagnosed malaria in. Should all African refugees be screened for malaria? And there are several papers which have shown high degrees of malaria in some resettling refugees from Africa. However, when this was reviewed by CDC, they make the point that pre-departure therapy is now given to many refugees before they come to their destination countries. The US is one that assures that refugees will get pre-departure antimalarial therapy. And refugees who received this therapy do not need to be screened or retreated for malaria unless they develop signs and symptoms.

Those, however, who do have compatible signs and symptoms for malaria should certainly be screened and should be treated as well. These signs and symptoms include fever, severe anemia, unexplained thrombocytopenia and splenomegaly.

And just an additional word about splenomegaly, there is a condition that's called hyper-reactive malarial splenomegaly, which is associated with an extreme degree of splenomegaly. This is thought to be an abnormal immune response to chronic or repeated malaria infection and is treated by antimalarial therapy and then monitoring for the spleen size decrease. Some of you may see this as you see arriving refugees from parts of Africa.

And a final note, I will say that CDC does recommend treating and/or screening all refugees from Sub-Saharan Africa that were not treated pre-departure.

I want to make an additional point about this case. And this is typical of many of the refugee patients we see. And that's multiple medical conditions. This child had several different problems that would have to be addressed eventually, including his elevated lead level, his iron deficiency anemia and perhaps his low weight, if such would be the case.

So I think it is more often than norm that one should look for multiple conditions in refugees and immigrants. Eventually, lack of immunizations or incomplete immunizations will have to be addressed in this child. And he will need to be screened for tuberculosis, latent tuberculosis and hepatitis B. But this can be done once his acute medical issues are addressed.

So let's move onto the second case. This is a case of eosinophilia in a recent arrival from Haiti. You see in your practice an 8-year-old boy who is coming to receive shots for entry into school. And this is a fairly common scenario. And the provider that saw this child said "Let me just get a CBC. I don't know much about this child." And on the CBC of this totally, well-appearing child, the white blood count was 29,800 -- quite elevated -- with 11% polys, 22% lymph, 3% monos and a whopping 64% eosinophil, or an absolute eosinophil count of 18,800. This child was completely asymptomatic. He had no skin lesions. He was not itching. He had no adenopathy. No history of fever. No pulmonary symptoms. No diarrhea, headaches or any abdominal problem.

So where do you begin with your evaluation of eosinophilia? And first let's define what is meant by eosinophilia. And for the purpose of this presentation and picking from many references, I've chosen to use the absolute eosinophil count of greater than 450 per millimeters cubed as being the definition of eosinophilia.

An absolute eosinophil count is calculated in the same way when calculating absolute neutrophil count using eosinophils instead of neutrophils.

The second point about eosinophilia in refugees is that you almost always want to assume that you're going to look for a parasitic infection. But you don't want to forget completely about other causes of eosinophilia. And many of us learned the acronym NAACP, which stands for other causes of eosinophilia, including neoplasm allergy or Asthma Addison's Disease, collagen vascular diseases, and last but certainly not lease in refugees, parasitic diseases. So although we want to look very hard for parasitic infections, we don't want to forget about these other causes.

The third point I want to make is that simply testing the stool for ova and parasites is not sufficient to evaluate completely eosinophilia in immigrant. This testing of stool really assesses only the parasites that are living in the lumen of (unintelligible). And it doesn't always find those that might be present in tissue elsewhere. And one must pursue other modes of diagnosis in order to be certain that all avenues are pursued.

So one must look in order to provide an evaluation of eosinophilia, you have to consider the epidemiology of the possible infection, the parasites that this individual could possibly have.

How do you do that? Well, you must know the complete migration root of the patients because you have to know every place that they might have had - and then secondly, you must certainly have access to up-to-date information about disease epidemiology in order to pair that with the migration root. And second, when you see the patient in front of you, you need to look for specific signs and symptoms of parasitic infection.

Probably the - one of the most important places to look is the skin. You're looking to see whether the patient has been itching, whether the patient has nodules, unusual rashes, any kind of skin manifestation. You also want to see if the patient has hematuria because some parasitic infections, notably schistosomiasis, present with hematuria. And finally, you want to look for any neurologic findings such as a seizure or any change in level of consciousness.

So let's look at what happened with our patient. He did get stool for ova and parasites which showed no parasites or no ova. And eosinophilia persisted. He didn't have any evidence that he's ever had allergic or atopic disease. He had no evidence of neoplasm. And he had no - he wasn't taking any medications which could - is another thing that can cause eosinophilia. And as I recall, we even had his smear reviewed by a hematologist to make sure that the eosinophils did not look abnormal or representative of a neoplastic condition.

So we were left thinking this is likely to be a parasitic infection. Which of them shall we pursue? So we thought about first filaria, because we know that lymphatic filariasis is common in Haiti. We thought about strongyloides because this is present globally. We know that there's no schistosomiasis -- at least it's not been reported in Haiti. And we decided that if the testing for the two diseases was unrevealing, we would then go ahead and pursue parasitic diagnoses. But these were the top 2 on our list.

And just to refresh your memory about the global distribution of this, I'm going to try to move this arrow here. I want - let's see. How do I do this? I want to show you that that red area on the slide there is Haiti. So the distribution of filarial infection, this is particularly lymphatic filariasis. The red is endemic; pink is uncertain; and the green is non-endemic. But Haiti lights up in the red there.

Filarial infection, there are many types. Lymphatic filariasis has the broadest distribution from - you just saw it on that slide. But there's also Asian - Brugia malayi and Asia timori in Indonesia. And there's also onchocerciasis, which some of you may know as river blindness -- this is in West Africa; I'll show you a map in a moment -- loiasis and mansonella perstans.

So looking at Haiti, in particular, I think that you can see from this map the darker the color, the higher the incidence. And Haiti is an area known to have a high incidence of lymphatic filariasis. I found some data here from 2001. And the prevalence of antibody in 6- to 11-year-old children was 7.3%. And

this is one of the reasons why there is an active, aggressive programs to eliminate lymphatic filariasis that's going on in Haiti now.

So if one lives in Haiti now, one would benefit from this program. But I want everyone to keep in mind that there are a number of individuals who have left Haiti, infected with filaria, not residing in other countries, and perhaps experiencing disease due to the infection.

Here is the appearance of the microfilaria for those of you who are interested. And then what did we do for our patient - actually, yes, what did we do for our patient? We - he did have evidence of lymphatic filariasis. So we obtained diethylcarbamazine, which is the one drug that is available in the United States for treatment of lymphatic filariasis. It is available from the CDC. Additionally, it's very important to talk about tear of the limb, especially legs and feet if the patient is experiencing symptoms due to filariasis.

And one should also consider evaluating family members who may have grown up in the similar location and may be infected but not know it.

Okay. So let's move continents, from the North American continent and move back to Africa, and look at eosinophilia in a Liberian refugee who is living in Ghana. This is a 26-year-old man who's seen for a health assessment six weeks after arrival from Ghana. He is healthy, except he's complaining of a tooth ache. He was treated for scabies and tinea capitis in Ghana. You have that on the paperwork you received. But you really see no evidence of these infections. So you assume that the treatment was successful.

As part of your screening, you do a CBC. And he has a white count of 10,400 with 8% polys, 1% bands, 34% lymphocytes, 6% monocytes, and 31% eosinophils for an absolute eosinophil count of 3,200. He denies skin lesions, itching and adenopathy.

So here is your second poll question. So the question is what is the most urgent medical issue to address in this young man at this particular time? So the answers could be eosinophilia, screening for latent TB infection,

screening for hepatitis C infection, his tooth aches, or screening for HIV infection.

Go ahead and mark your responses.

And I'll count back from ten. Ten, nine, eight, seven, six, five, four, three, two, one. Okay, terrific. And I think many of you want to address his tooth ache. And I would agree with you that that is probably the first on my list. It doesn't mean you're not going to do every single one of those other things. You certainly are. And you might do them at that very visit. But I think the first message to the patient is going to be let's take care of that tooth ache. And this is what we did for this patient. And that's basically what he thanked us for the next visit.

But we do need to address his eosinophilia. And what are we going to do about that? Well, what is different about eosinophilia in the patient with Africa compared to a patient from Haiti? Well, lymphatic filariasis is present in West Africa, but so is onchocerciasis, which is another of the filarial diseases. And this map shows the areas in red where there's onchocerciasis. And he is coming from West Africa which certainly is an area with plenty of this disease.

But schistosomiasis is also present in West Africa. And the green is both urinary and GI schistosomiasis. The yellow is just urinary schistosomiasis. And the blue is the GI varieties -- schistosomiasis, mansoni or japonicum. So you see that both types are present in West Africa where this patient is from.

So what were his test results? Well, his strongyloides antibody was positive. So at some point he's been exposed to strongyloides. His schistosomiasis antibody was actually negative. But his filarial antibody was strongly positive. Now one can say on the number of additional studies, if you have access to them, that will help you figure out which of the filaria is causing his disease. Circulating antigen can help you decide whether it's lymphatic filariasis that you are considering. And his circulating antigen test was negative. So we did not think that this was the cause of his eosinophilia.

But from time to time, there are onchocerca card test available. And he just happened to present to us at a time when this could be done and it was positive. So we felt that the most likely diagnosis or one of the most likely diagnosis in this individual was onchocerciasis or river blindness. He did have a slit-lamp eye exam which was - did not show any microfilariae in the anterior chamber of the eye, which was good news. And he was treated with ivermectin, which is an anti-parasitic drug that fortunately will treat both strongyloides and onchocerciasis.

Just a little word about onchocerciasis in endemic areas, the skin nodule - I'm trying to get this little arrow for you. The skin nodule you see in this upper-side photograph is present. And this is where adult's worms live under the skin. They produce the microfilariae that are in the skin throughout the body. And this is a picture of a skin snip being done. A piece of skin is taken off of patient's back -- usually over the scapula -- and then put under a cover slip. A piece - bit of saline is added. And then you can look at it under the microscope.

This third picture just depicts the situation in some areas of West Africa when - before the ivermectin's mass distribution program, young men being led by small children because of the blindness that occurs at a relatively young age. So once you do your skin snip, the next picture shows you what you might see. This is a wet prep showing the microfilaria that - of onchocerca volvulus that is diagnostic of this infection.

So how do you evaluate the patient and then treat them? I mentioned the slit-lamp exam. You would like to have your patient examined by an ophthalmologist who has perhaps some experience with this. But even if not, you have the patient sit with their head forward and down for about 20 minutes. Not an easy task, but most people can manage it. And this allows the microfilaria to fall into the anterior chamber of the eye where they can be seen in a slit-lamp exam.

A patient is then treated with ivermectin. But the ivermectin only treats the microfilariae. It does not affect the adult's worms who are continuing to

reproduce and turn out microfilariae. And so the ivermectin treatment, at least initially, may need to be given every several months for the first few years and may need to be in patients who are having itching - titrated to the itching. And the patient may need to be retreated every time their itching increases. After the first few years, treatment may need to be less frequent. This is because the adult worms have a lifespan of 10, 15 years, perhaps. And until they all die of old age or you help them along with our next treatment, you need to keep treating the microfilariae.

One treatment that's been shown to perhaps affect the adult worm is using doxycycline to treat a symbiotic bacterium called Walbachia that lives within the worm. Treating this symbiotic bacteria seems to affect the reproduction of the adult worm and shorten their lifespan.

One caution I would mention is that if your patient is from an area that is also endemic for Loa Loa, one needs to be careful about using ivermectin. Because - due to the high burden of microfilaria in Loa Loa, encephalitis has resulted in some cases. The next slide shows you a map of the areas where they overlap as these areas in this region here.

So our patient was from this area where there's only onco. So we felt quite comfortable treating with ivermectin alone.

Let's go onto our next case.

This is a refugee from Somalia. He's an 11-year-old boy. He lived in Kenya for the past seven years as many of our Somali refugees did. And he presented with abdominal pain and a history of hematuria. He had a white blood count of 8,200, 44% polys, 24% lymph, 8 monos, 24% eosinophils for an absolute eosinophil cont of 2,000. He also had trichuris identified in a stool sample and he had a positive PPD at 10 millimeters.

And here is our next poll question. What is the test most likely to identify the specific cause of the hematuria in this child? This could be a urine calcium creatinine ratio, urine culture, ASO titer, BUN and creatinine or urine for ova

and parasites. Go ahead and mark your responses. And we'll give you the next ten seconds.

Ten, nine, eight, seven, six, five, four, three, two, one.

Well, this is terrific. I think most of you have identified that if you have a child or a young adult with hematuria who comes from a schistosomiasis endemic area, you're going to go straight for where the money is and look in the urine for the schistosoma egg. And I agree with you who - those of you who said urine culture that that could also have a potential for giving you a specific treatable diagnosis.

So let's look at what was seen in his urine. These are the eggs of schistosoma haematobium. How do you know it's haematobium? You know because of this terminal spine here. And here, the other forms of schistosoma have spines that are on the side or lateral spines; whereas schistosoma haematobium has this terminal spine.

So he not only had the urine test; he also had a schistosomiasis antibody which was positive. On his renal ultrasound exam, he had moderate left hydronephrosis. And he had some (unintelligible) dilatation. So we were concerned that perhaps he had suffered some irreversible complication. We treated him with praziquantel. We treated his trichuris - remember that. We treated that with albendazole. And three months later, his hydronephrosis had completed resolved. We are very happy about that. But his urine still had S haematobium egg. So he still has some adult worms that needed to be dealt with. And he was retreated with praziquantel and did very well after that.

Okay. Let's go onto our next case.

All right. Here is our next case, leg pain and swelling. In a recent arrival from Haiti - we're going back to Haiti. This is a 17-year-old female. And she is not pregnant -- I'll tell you that right upfront. She's had several weeks of leg swelling - I'm sorry, leg pain. And her leg swells intermittently; just one leg. It swells for a little while; gets better; then it gets swollen again.

She arrived in Boston from Haiti in the year 2000. And along with this symptom of leg pain and swelling, she has no fever, no headache, no diarrhea. But she does say she occasionally has cough and sweat, and she's tired. Her CBC showed a white count of 4,800, 44% polys, 39% lymphocytes, 8% monos, 10% eos, and her platelet count was 269,000.

So another poll question. What is the most likely cause, knowing her migration history and his symptom, of her leg symptom? Is it deep vein thrombosis -- an infection with methicillin-resistant Staph aureus? Is it lymphatic filariasis? Or is it complex regional pain syndrome?

Go ahead and mark your answer. And I'll just give you ten seconds.

Ten, nine, eight, seven, six, five, four, three, two, one.

And I think all of you are really right on the money here with lymphatic filariasis. And I think that attests to your being tuned into this patient coming from Haiti and knowing the epidemiology.

But let's see what happened because she was actually evaluated first in a setting that was not as astute as you all are about diseases of immigrants and refugees. And she was evaluated with a PPD, which was positive. She had a negative chest X-ray and she was started on INH. But for her leg pain and swelling, she was given a diagnosis of complex regional pain syndrome and given a nerve block, from which she had minimal relief.

Even this is a somewhat unusual diagnosis in this scenario. You recall that I mentioned she was non-pregnant. If this was a slightly older young woman or a young woman who was pregnant or had been recently pregnant, you might run into a situation where these young women are given diagnoses of deep vein thrombosis or undergo an extensive workup to find that DVT. So given this diagnosis that she received I'm going to assume that you are not content with this diagnosis, because most of you gave a different one, and what would you do next?

Well, I think you've already said what you would do next. You're probably going to say that the diagnosis neither explains her eosinophilia nor does it take into account her migration history. Her absolute eosinophil count was not as impressive as our previous cases. It was 480, but that is above our 450 cut-off.

But she did have a positive full area antibody, she had a positive circulating antigen, which as I mentioned before is specific for lymphatic philarisis. She was treated with DEC. We educated her about how to take care of her foot and minimized future episodes of swelling. And in fact her symptoms had improved even before she started the medication, and she has done well since.

So what are some of these summary points we can make from these cases of eosinophilia? I think one is that most or many certainly, refugees have multiple diagnoses, and then that one must keep looking until all the unexplained findings are explained. Parasitic infections are common.

Although as Paul Geltman and Bill Stauffer have shown in their work on parasitic infections, certainly intestinal parasites have decreased substantially since the initiation of overseas treatment programs, which have been vastly successful, but parasitic infections still are something to be considered. Especially if a patient has eosinophilia, no matter how minor the degree of the eosinophilia.

So let's turn to a totally different part of the world and a different symptom complex, and I want to present a case of seizures in a refugee from Burma. This is a nine-year-old who had recently arrived from Burma, has a first seizure, comes to your clinic or an emergency department following his seizure. At that point he is completely awake and alert. He has no fever, no neck stiffness, and he has a lumbar puncture. It's completely normal without any abnormal signs of infection.

His CBC has no eosinophila and his stool for ova and parasites, which you get down the road, turns out to be negative. So I think this is our - our next to last poll question. The next most appropriate step in making a specific diagnosis would be - the choices are toxoplasmosis serology, head CT scan or MRI, HIV serology, Japanese encephalitis serology, or a tuberculin skin test. Go ahead and mark your choices.

I forgot to count. I'll start from 8, 7, 6, 5, 4, 3, 2, 1, 0. And that's great. I think that most of us have chosen to go for the head CT scan or MRI, toxoplasmosis serology certainly would be appropriate. We certainly - those of us who have been around long enough have seen big toxoplasmosis lesions in the brain as the cause of a seizure, usually at the setting of HIV infection.

Japanese encephalitis serology - this child is awake and alert, but it would be difficult to get. It's hard to get this serology and I'm not sure the clinical setting is consistent with that, but certainly something worth thinking about. And a tuberculin skin test, this patient will have. Let's look at the results of the CT scan that the patient had and I think you'll see these small lesions, which are highlighted here, and I think many of you know the answer already.

This is neurocysticercosis, and this is a disease caused by the larvae of the hooked tapeworm, Taenia solium. It can occur after exposure to the Taenia solium eggs that are present in human feces. You do not need to ingest pork to get this disease. There is a serologic test available. The sensitivity of this test is higher when there are multiple lesions in the CNF.

And the treatment options include anticonvulsants, which are really the mainstay of therapy, and antiparasitic drugs, and possibly surgery depending on the location of the lesions,. If they're causing blockage of any of the areas of CSF circulation, surgery may be needed. So the management includes assessing the status of the lesions.

If there are inactive or calcified lesions, seizure management really is the first line of treatment, and perhaps the only line that's needed. However, many

people are debating treatment with antiparasitic drugs, most have moved to using Albendazole rather than Praziquantil and many people will add steroids when treating this infection.

And I think the reason I chose to highlight this case is because there were several publications recently addressing the issue of neurocysticercosis and seizures in newly resettled refugees, specifically from Burma. And so I was able to find a map of where cysticercosis is, and Burma is here in the light blue. The darker the blue, the higher prevalence. Burma is here where the arrow is in the light blue. However, there is also a paper which highlights the fact that even though Burma is not thought to be a high risk are for neurocysticercosis, there have been a number of cases reported from there.

And this highlights the role of migrant as sentinels for infectious diseases, and our role as identifying diseases that may not be thought to be prevalent in certain areas, but in fact we can add to our information about these diseases by identifying them in migrant populations. So we always - I told you to consider epidemiology of these diseases, but we also have to have our minds prepared for surprises.

And a recent paper by the same author as the one in the last slide, looked at the prevalence of antibody to Taenia solium in refugees, the used the ELISA method and identified that up to 25% of certain groups of refugees, those from Burende here, 25%, slightly fewer in the Burma-Laos-Bhutan cohorts have evidence of infection with Taenia solium. So I think we don't think of Asia as being a lot of neurocysticercosis, but I think many of us - our minds were opened a little more by reading this paper.

So I want to look now and highlight some diseases of long-latency. I've mentioned a few of them, stronglyoides, HPV causing cervical and other cancers, Chagas disease causing heart and GI diseases. We talked about lymphatic philarisis, not infectious, but I think that over time we have to consider whether our patients have been exposed to environmental toxins or malnutrition and micronutrient deficiencies, which have long-term consequences.

And so I want to do our last case, which is a recent arrival from Bolivia. You're seeing a 42-year-old woman who just received asylum. She was born and raised in Bolivia. And she presents to your office with dyspnea on exertion. She has very poor exercise tolerance, and she has vague GI complaints. And her cardiac evaluation reveals that she is in heart failure.

So what do we think about in heart failure or heart disease in relatively young recent arrivals. Well, I think that there are two main considerations of diseases that we might not think about if we restrict ourselves to common causes in the United States. And the first is rheumatic heart disease, and the second is Chagas disease, which is a parasitic infection.

This map shows the global distribution of Chagas disease. The darker the color, the more highly prevalent Chagas is, and this arrow right here to this dark red country is Bolivia. So a little bit more about Chagas disease in the United States.

This is the leading cause of mortality and cardiac disease among young adults in Latin America, and there are about 50,000 to 120,000 individuals living in the United States that are infected with Chagas disease, most of them do not know it, and are at risk for sequalae. Because of this the U.S. blood supply has been screened for Chagas since 2006.

So what are the consequences of infection with Chagas disease. As high as 20% to 30% of these individuals will develop chronic disease years after infection, including progressive cardiomyopathy, motility disorders of the esophagus and colon, and this disease can reactivate in those who may become immunocompromised, either from chemotherapy or acquired immunodeficiencies.

And this disease can be transmitted vertically from infected mother to baby. So how do we manage this? Well, the diagnosis should be confirmed. We were referred two patients in the past couple of years who had their blood

tested in blood drives, and both were positive. One of the diagnoses was confirmed, and the other one was found to be a false positive.

The CDC does high quality testing and is very happy to work with you around this. Treatment is recommended not for all individuals, but for infected children, and any patient with acute congenital or reactivated disease. And the CDC again, or your local infectious disease consultant, or maybe some of you on the call can have provided expert advice about this.

There are two drugs that are kind of available in the United States, but they are only available through the CDC. Bensnidazol and Nifurtimox, and you do need to contact CDC to get them. And these patients do, especially if symptomatic, initially need long-term follow-up. And many of the patients with cardiac disease do end up either going to or needing to have heart transplants.

So a few summary points from these cases. Parasitic infections are not all associated with eosinophilia, and common conditions may have uncommon causes once a migration or travel history is known. So for example, when we take care of immigrants and refugees, we need to broaden our differential of seizures beyond epilepsy to consider diagnoses such as neurocysticercosis.

And when we see leg swelling, we need to certainly think of DVT, but also think of lymphatic philarisis. I want to spend the last few minutes talking about diseases of long latency.

So I've put up this diagram and the blue side of this - sorry - there we go. The blue bars are the prevalence of cancers in the less-developed countries of the world, the red side is prevalence of cancers in the more-developed areas of the world, and I've circled two. The first I've circled is this line here, cervical cancer. And you can see that the burden of disease is by far suffered by those in less-developed countries.

And similarly but to a lesser extent this is true for stomach cancer. And the seeds of these two disease are shown early in life by H. pylori in the case of

stomach cancer by human papilloma virus in the case of cervical cancer. And this map on the next slide shows you the cervical cancer rate worldwide published in 2005, and the redder the color, the higher the incidence.

And you can see that certainly there is high numbers of cases in parts of the world, some which many of our refugees come. Why is it important to think about that, because the very women who come from these areas are less likely than women in the U.S. general population to have had pap smears, which is the diagnostic test for cervical cancer.

So here we have, this is the U.S. general population, about 86% of women over 65 have had a pap smear in the past three years, compared to a national aggregate of Asian women, 10% fewer. And Vietnamese women in Southern California, another 10% lower, only about 2/3rds of these women and 2/3rds of Cambodian refugees in Lowell, Massachusetts.

So in order to identify cervical cancer as a result of HPV infection in these high-risk countries, we need to improve our pap smear rate. And the other point I would make here is that we are now immunizing young women in the United States and in many other countries of the world, but we will still have a population of American-born as well as immigrant women who have been born too soon to benefit from these vaccines, and we need to have a heightened awareness of their risk, so that we screen and address them appropriately.

The next infection is H. pylori, and this graph shows the prevalence of H. pylori in developing countries, here on this graph as you can see. People are infected early. About 60% in the first two decades of life, approaching nearly 90% to 95% by age 60, compared to developed countries where people have slow increases in rate of infection, and never reach the prevalence that it is in developing countries.

Well, what is the significance of that? I think we are still learning. We can see a connection between gastric cancer, but I'd just like to leave you with some information about areas of active investigation. They would concern things

such as an association between H. pylori, and I've written diabetes here, but it's really glycosolated hemoglobin concentration.

This is intriguing. Is this a reason to be more aggressive about treatment of H. pylori in immigrants. This is still being teased out. Second, is there an association between malaria, EBV infection, Epstein-Barr virus infection and Epstein-Barr virus associated cancers that may appear years to decades later. Is there an interaction between parasitic diseases and HIV and TB infection.

I think these are the frontiers of investigation as we go forward and think about how to address migration-associated infection. So I'm going to summarize here, and I'm going to make the following points. And I thank Pat Walker for the first statement. She advocates, and I agree with her, we should ask all patients, where were you born and where have you traveled.

Now those of you who take care of refugees are clearly tuned into this, but we need to make sure we do this, not just in our refugee clinics, but in every setting where we practice. We need to evaluate for parasitic infections all immigrants and refugees with unexplained eosinophilia, keeping in mind that stool ova and parasites may not be enough, and we should pursue additional diagnostic tests as needed.

We need to consider uncommon causes or common signs and symptoms, and these uncommon causes might be related to the migration of the patient. We need to consider multiple diagnoses in each patient we see, and not stop assessing a patient until all the, kind of findings that don't quite fit with one particular diagnosis are fully explained.

And finally, we need to consider and evaluate for diseases of long latency that could have an effect on a patient as they move through their lives. And I have a resource slide here that you can take a look at. CDC Refugee Health Guidelines, and I will highlight also the Canadian Medical Association Journal, and the Evidence-Based Guidelines for Immigrants and Refugees is a true wonderful work of many individuals, some of whom may be on this call

today. But they deserve a lot of credit for putting these together, and I encourage all of you to look at them.

And I'm going to go to the next slide and say thank you for your attention, and turn this back to Paul.

Paul Geltman: Thank you Elizabeth. So before we get into question and answers, just a couple of things I want to point out. You've been seeing some announcements in the chat box which have been in response to one or two questions. So to reiterate, as was mentioned at the beginning of the Webinar, please check out our refugee health TA Web site.

And there's a typo in what was put in the chat box. It's refugeehealthta.org/webinars. And they're archived there and PDF files of the slides are available as well. I just wanted to mention for those who applied to - for CE credits, you should have received or will be receiving an email with Dr. Barnett's disclosures. And that's something we're supposed to mention. We forgot to put a slide in about that.

So this - just as a reminder on this slide, for the North American Refugee Healthcare Conference, this is now a second on held in Rochester. We've merged it with the Canadian equivalent and in the future will be alternating between US and Canada.

It's going to have featured keynote speakers, Eskinder Negash of ORR and again, we'd like to acknowledge their funding for the technical assistance center in this Webinar. And Dr. Martin Cetron from the CDC's Division of Global Migration and Quarantine, who is a phenomenal speaker, definitely worth going to hear him. So we hope to see some of you there and the TA Center will also be represented at the conference.

So with that, I want to thank Dr. Barnett for the wonderful presentation. And she put in the slide previous to this - I'm just going to flip back to it - with some resources. There were a couple questions about where people can learn more about this. And so I'm just going to remind you here the CDC

guidelines are available and also the recommendations for overseas pre-departure treatment are available on the CDC's Web site.

So before I pose a question to Dr. Barnett, I'm going to just answer one quickly, which was asking about whether pre-departure treatment for malaria will be applied to refugees in Eastern - coming from Burma and Thailand because of the high prevalence of malaria there?

And the basic response is no, and I'm going to just quickly read to you what the CDC has on their Web site in the document on overseas - guidelines for overseas treatment, pre-departure treatment of malaria. And it says currently no refugee populations relocating to the US from non-Sub-Saharan African countries or in areas of hyper or (holo) endemic malaria making asymptomatic (p-selsiprim) very unlikely.

Therefore, refugee populations relocating to the US from areas other than Sub-Saharan Africa should be tested for malaria if symptomatic and residing in an endemic area. Currently no empiric therapy is recommended in these populations.

Okay, so I'm going to pose some questions to Dr. Barnett now. First we got a question that you've touched on a little bit on and off which was what should be done in case a refugee has elevated eaosinasil levels but has not been treated for the presumptively?

Dr. Elizabeth Barnett: Well, I think that's a great question because some of you who may not see refugees when they first arrive may see them later as primary care providers. And I think the first thing to do is take a migration history, find out where that patient has been.

And then you really have two options. You can do a diagnostic evaluation by sending various serologies and many of us do get at least one tool ovum parasite. Or you can consider empiric treatment and that is - one has a number of options.

You can choose to use albendazole which is a drug which has anti-helminthic activity and treats many parasitic infections. You might choose to use ivermectin if the patient comes from an area that has onchocerciasis or it also treats strongyloides.

But I think many of us who do infectious diseases would like to have a specific diagnosis. And so we tend to gravitate toward doing diagnostic tests. I think you also have to consider whether this patient has other causes especially if they've been here a number of years and perhaps you don't have records available going back to when they arrived. In other words, is this a new finding that's related to the asthma or allergies they developed or to a medication they've started recently? I hope that's helpful.

Paul Geltman: So, Elizabeth, there's another question then which relates to eosinophilia and schistosomiasis so let me go to that one next. The participant wanted to know sort of the latency period for schistosomiasis and what would you do in the case of seeing someone, say, a Sudanese refugee who may have been in the US for many years, a decade or longer?

Dr. Elizabeth Barnett: Yes, well I do think you need to consider schistosomiasis even years to decades later because one of the diseases of long latency that's related to schistosomiasis and of the (hebatobium) species is bladder cancer. And so I would say that it is important either to screen for this or to treat empirically. And there are some recommendations on the CDC Web site about empiric treatment of certain groups of refugees and Paul can confirm if the Sudanese fall into this category but I believe that some would say Sudanese refugees, go ahead and give empiric therapy for schistosomiasis that's quasi-quanto even ten years later if they haven't already been treated.

Paul Geltman: Yes, I think so. I mean, that and strongyloides are not necessarily parasites that are just going to go away.

Dr. Elizabeth Barnett: That's right.

Paul Geltman: So, you know, presumptively treating people is a safe and effective alternative which is really what's been promoted by the CDC.

Dr. Elizabeth Barnett: Yes, that's correct.

Paul Geltman: And, in fact, the CDC recommendations came specifically or originally specifically were targeted at Somali refugees and the Southern Sudanese. So two more questions that I have that I want to get to. One is kind of an interesting proposition which I've never really thought about which is whether certain skin infections can cause eosinophilia. The questioner asked about fungal infections and then also sort of arthropod infections, things like scabies and lice, whether you'll see elevated eosinophil counts in those situations.

Dr. Elizabeth Barnett: Yes, that's a really good question and I think that that is - there's not data to support or refute such a hypothesis. So we know that there're certainly high levels of eosinophilia with onchocerciasis and the skin is the main organ that's infected there.

I don't think we think typically of scabies as causing eosinophilia or as fungal infections as causing it but particularly with scabies where you have penetration of the mites into the skin and an extensive inflammatory reaction, it is certainly possible that you could see some eosinophilia with that. I just don't think that it's known well enough to be able to make a firm statement one way or the other.

Paul Geltman: You know, and I'll add to that. Although we're talking mainly about infectious diseases, Dr. Barnett did point out that there are a whole host of other things that will cause eosinophilia and you always have to be thinking about them.

And just in my own pediatric practice, I'll give an example, that I had a young boy from Cambodia transferred to my care. He'd been in the US for several years. But I had no previous records to go by and I did a CBC and he had eosinophilia.

But he also clearly gave me a history of allergies and asthma. And I was pretty comfortable that his eosinophilia was due to his allergies which were flaring up at the time. So, you know, it's just something to keep in mind. Infectious diseases are highly prevalent and very important for refugees but they may not necessarily be your answer. So let me go to the next question.

Dr. Elizabeth Barnett: Let me just add one more point.

Paul Geltman: Yes.

Dr. Elizabeth Barnett: And that is that regarding the scabies and fungal infection question, I wouldn't stop by attributing that patient's eosinophilia to scabies and/or a fungal infection until I'd done an extensive evaluation for other causes of eosinophilia. And I agree with what Paul is saying about, yes, just because they're a refugee, they don't necessarily have fungal infection as a cause of their eosinophilia. I mean, they don't necessarily have parasitic infection as a cause of their eosinophilia.

Paul Geltman: So I have one more question that's already been submitted from earlier in the Webinar and you may have just noticed I sent out in the chat box a message saying that we still have a little time if people want to send in some more questions.

In the meantime, I'm going to go to the one last question that I have which is more of a cultural question about whether you, Dr. Barnett, have encountered patients in your practice for whom you were prescribing a pharmacologic treatment for parasites and the patient or families expressed an interest to do what the questioner called an at-home remedy. But I'm presuming they mean some kind of a holistic cultural or traditional practice.

And if so, what type of at-home treatment did they describe and how did you respond to that?

Dr. Elizabeth Barnett: Oh, I wish I had a good example of that but I'm afraid that I don't have a particular example of that. Paul, do you have one that you wanted to mention?

Paul Geltman: I don't from my personal experience. I mean, we've all heard about and seen things like traditional practices, you know, cupping and scarification, branding, things of that nature but - coining - but I have never had a situation in my practice where I recommended a treatment for parasites and they, the family, said, "Well, can I try this," or "What about this," or suggested an alternative or a complimentary practice.

Now someone just sent in a message saying that they've had a patient treat giardia with oil of wintergreen. I don't know if there's any scientific evidence to support that.

Dr. Elizabeth Barnett: Yes, I saw that too. My one story I can say is - I guess I would say in general I would try to support a patient's belief. The one example I can give is we had a young child with measles at our hospital that was diagnosed at the Koplik's spot stage. The child did not yet have a rash but had an exposure that was consistent with the diagnosis and cough, (corisa), conjunctivitis, Koplik's spot.

The mother wanted to have a relative send in chopped onions to put over the child's skin because in her mind this would bring out the rash and the child would feel less miserable. So we said, knowing that the rash was going to appear if we had the diagnosis correct, which we believed we did, said, "Sure, bring the onions in."

The mother brought in the onions, covered the child with onions and was very happy the next day when the child had developed the classic rash of measles and appeared to be feeling better. So I think that we should support a patient's health beliefs and we should work with our patients to develop a partnership around treating these infections and treating these infestations and that's the approach that I would take unless I knew that the medication was particularly harmful.

Paul Geltman: Okay, so we have another question. Well, two more questions, but let me go with the first one which says what about the patient from Iraq that has severe itching and has not responded to any treatment to this point?

Dr. Elizabeth Barnett Oh, severe itching is a real challenge. And it's a real challenge because there are very few treatments to treat itching that are specific. And so I would probably start by trying to find any underlying cause of itching. And that can range from a skin disease to liver disease.

I think those of you - I'm not an internist but those of you who do internal medicine I - and vaguely from medical school I remember that there are liver diseases that are associated with itching. So you really want to do an extensive evaluation to think about what could be an underlying cause.

I'm also getting a message here that - Pat Walker is saying a combination of H1 and H2 blockers can be successful in helping to manage and treat itching. But it is a - it's an extremely challenging system.

Paul Geltman: All right, so we still have a few more minutes and there's another question which says would you screen all Latin American teenagers having seizures, either pre-existing or recent or sudden seizures, for ontrosicuriasis? Would that be more specific than - I think the question probably means would that be more cost effective perhaps than sending them for CT scan or MRI?

Dr. Elizabeth Barnett: So would I give them treatment for neurocysticercosis? Is that what you think is meant for...

Paul Geltman: Empirically.

Dr. Elizabeth Barnett: Yes, would you empirically treat someone from an (endemic) country?

Dr. Elizabeth Barnett: Probably not. Who has a - yes. I think that neurocysticercosis, you really want to see where the lesions are in the brain because if they're near - if

they're young, that are live and you treat with an anti-parasitic drug, you may have an extensive inflammatory reaction around that cyst.

And if that's near a sensitive or delicate structure, you could have an undesirable consequence of that. Or if they're near a place where CSF is circulating and you could block that circulation, you could run into trouble. So I think that I would not give empiric anti neurocysticercosis treatment but I would keep that diagnosis in the back of my mind for an immigrant who has a seizure that is not explained by another condition.

Paul Geltman: Okay. So we've run out of time now so I'm going to draw to a close. Any additional questions that come in will be answered in writing and posted on the Web site. In addition, on our Web site, we've had some community dialogues, online community forums which we had not planned one on this topic but if people are interested, and would wish to make comments, send an email to us at refugeehealthta@jsi.com. Or there is a function on the Web site to suggest community forum topics.

So I want to just warp up now by thanking Dr. Barnett for her excellent presentation and, again, thanking the Office of Refugee Resettlement for their support of this Webinar and the Technical Assistance Center. On the slide in front of you is the Web site and the email address that I just mentioned. So, again, thank you all for your participation and thank you to Dr. Barnett. Have a good day.

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