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TBeat

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Pediatric TB Patients: Overcoming Medication Difficulties

The first priority in the treatment of tuberculosis is to cure the individual patient; a goal which necessitates the successful completion of therapy. As public health departments have the ultimate responsibility of ensuring adequate therapy, it is of utmost importance that public healthcare staff have a multifaceted approach to promoting treatment adherence. This is especially important when treating and monitoring children on TB medication, as potential barriers of varied complexity can prevent this vulnerable age group from completing adequate treatment. Thus due to the range of circumstances healthcare workers face with children as well as adults, successful therapy must be centered on the patient, with treatment and supervision tailored specifically to the patient's clinical and social needs.

Directly observed therapy (DOT) is the preferred approach to ensuring treatment adherence, and is essential when treating children. DOT involves a healthcare worker administering antituberculosis medications directly to the patient and ensuring that he/she swallows them. Several studies have strongly suggested that DOT is a crucial part of successful treatment outcomes; however a few studies have demonstrated negligible benefit. Consequently it is important for DOT providers not to play a passive role, but rather to be proactive in preventing missed doses and facilitating patient-healthcare worker cooperation. With all patients, it is the healthcare workers' responsibility to educate, involve, and be flexible and creative. Treatment adherence may require changes in medication delivery, the use of incentives, and even hospitalization. Even with children, patient behaviors can be difficult to change, and social environments may not be conducive to

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successful treatment. Therefore it is effective for DOT providers to keep in mind potential challenges and possible solutions when administering medication to children.

The Charles P. Felton National Tuberculosis Center at Harlem Hospital identified the following issues common to pediatric TB medication administration: intolerability of drug formulation, developmental stage of a child, medication refusal, and multiple caregivers. To make matters more complex, infants and young children can vomit doses of medication which can require extensive therapy. It is important to implement different approaches to avoid more drastic measures of observed therapy, as well as psychological intolerance in the child. However, versatile healthcare workers that utilize a variety of strategies and take advantage of educational opportunities for patients and families can accomplish the top priority of completing adequate therapy. Please see the Case Study (Page 7) in this issue for a listing of common and helpful strategies.

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The MISSION of the Heartland National TB Center is to build capacity with our partners. We will share expertise in the treatment and prevention of tuberculosis by: developing and implementing cutting-edge trainings, delivering expert medical consultation, providing technical assistance, and designing innovative educational and consultative products.

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The VISION of the Heartland is to provide *excellence*, *expertise*, and *innovation* in training, medical consultation, and product development to reduce the impact of tuberculosis in our region.

In the Works

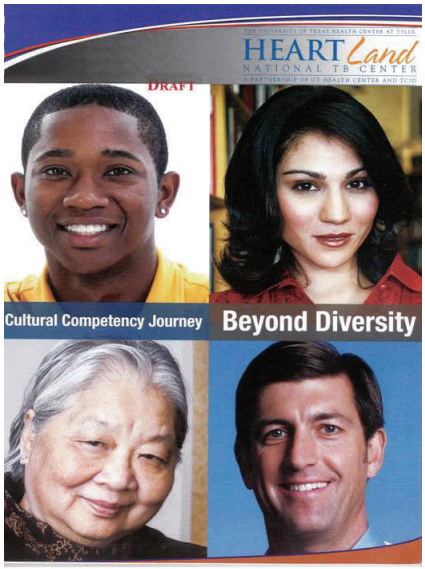
New Heartland Products in the Field Test Stage

Heartland is pleased to announce two new products that are currently being field tested. We are making them available to health care workers who are willing to provide editorial comments and feedback to us in order to finalize the products.

Impact of Low Weight Gain in Tuberculosis Treatment Outcomes

Product format: 11 x 5" pocket guide.
Target Audience: This pocket guide is aimed at public health nurses and physicians, private physicians, medical consultants, TB Controllers, outreach personnel, and other public health personnel involved in the treatment and management of TB.

Beyond Diversity: A Journey to Cultural Competency



Product format: 12 x 8" training leaders' guide.
Target Audience: This is a how-to manual intended for those who will be training others on cultural competency as it relates to TB. The audience for the training includes all TB personnel such as program managers, nurse case managers, outreach workers, and other field staff.

Both items can be obtained by contacting Mary Long, Director of Education and Training at:

Mary.long@uthct.edu or 210-531-4545

Your feedback and constructive criticism will help us develop a better product.

Regional News

We are pleased to announce the *Recorded* versions of the following Heartland Webinars

TB Medications: Adverse Drug Reactions, Part 1
Wednesday, March 5, 2008
Presented by: Jamey "Todd" Braun, RN, BSN, MPH

The recording of Heartland's regional webinar has been placed on our website. Please click on the link below to go directly to the recording.

- Presentation (WMV □ 64 min. □ 6.12 MB)
- Handouts (PDF □ 232 KB)

TB Medications: Adverse Drug Reactions, Part 2
Wednesday, March 12, 2008

The recording of Heartland's national webinar has been placed on our website. Please click on the link below to go directly to the recording.

- Presentation (WMV □ 96 min. □ 8.19 MB)
- Handouts (PDF □ 202 KB)

National Webinar: Pediatric TB
Friday, June 27, 2008
Presenter: Kimberly Connelly Smith, MD, MPH

The recording of Heartland's national webinar has been placed on our website. Please click on the link below to go directly to the recording.

- Presentation (WMV □ 87.4 MB)
- Handouts (PDF □ 2.0 MB)

These recorded presentations can be viewed in Windows Media Player

Continuing Education Credits are NOT be available for viewing recorded sessions.

Questions: please contact the Heartland National TB Center

BY EMAIL: mary.long@uthct.edu
BY PHONE: 1-800-839-5864

These webinars were presented in collaboration with the Centers for Disease Control and Prevention

Related Links

- AIDS Education and Training Centers
- American Thoracic Society
- Division of TB Elimination, CDC
- Find TB Resources
- Joint RTMCC Products Page
- National Tuberculosis Curriculum Consortium
- Stop TB Partnership
- Tuberculosis in African Americans, CDC
- World Health Organization, Tuberculosis
- American Lung Association
- Division of Global Migration & Quarantine, CDC
- Global Health Facts on TB
- International Union against Tuberculosis and Lung Disease
- National Information Prevention Network—TB, CDC
- Tuberculosis Research Today

Upcoming Trainings

- *Heartland National TB Center—2008 Trainings*

Date	Course	Location
February 20	Multi-drug Resistant TB: A Primer	Phoenix, Arizona
February 20-22	TB Nurse Case Management	Phoenix, Arizona
March 5	TB Medications: Adverse Drug Reactions, Part 1	*Webinar*
March 12	TB Medications: Adverse Drug Reactions, Part 2	*Webinar*
April 29-May 1	Responding to a TB Event	San Antonio, Texas
May 13-15	Contact Investigation	Sioux Falls, South Dakota
June 24-25	Responding to a TB Event in a Low Incidence Area	Bismarck, North Dakota
June 27	Pediatric TB	***National*** *Webinar*
July 22	Preventing TB on College Campuses	Springfield, Illinois
July 22-23	TB Nurse Case Management	Albuquerque, New Mexico
July 30-31	Becoming a TB Nurse Expert	San Antonio, Texas
September 9-11	TB Program Management	San Antonio, Texas
September 23-26	TB Intensive	Minneapolis, Minnesota
October 8-10	TB Nurse Case Management	Norman, Oklahoma
October 15	TB Update (Midwest TB Controllers)	St. Paul, Minnesota
October 27	TB Update (4 Corners TB Controllers)	Flagstaff, Arizona
November 11-13	TB 101 and Teach Back Training	San Antonio, Texas
November 18 or 19	Physicians TB Update	Austin, Texas
December 2-4	TB Intensive	Tyler, Texas

Please go to http://www.heartlandntbc.org/training.asp for course information, staff contact information and on-line registration forms for each course or webinar. Proposed topics and dates are subject to change; check website for the latest updates.

Introducing
Heartland Product Revisions

The following products (algorithms, pocket guides and manuals) have been updated and are located on the Heartland website. They are available for printing or downloading. Hard copies may be ordered directly from Heartland via an order form on the website (HNTC Product Order Form), by email (delfina.sanchez@uthct.edu) or by phone (1-800-839-5864).

- Assessing and Managing the Risk of Liver Disease in the Treatment of LTBI (PDF~208 KB)
- Characteristics of Second-Line Drugs for Multi-Drug Resistant TB (PDF~44 KB)
- Evaluation of Pregnant Patient at Risk for TB (PDF~209 KB)
- Management of the TB Patient at Risk of Hepatotoxicity (PDF~214 KB)
- MDR TB Care Plan (PDF~77 KB)
- Model Tuberculosis Prevention Program for College Campuses (PDF~25.05 MB)
- Revised Tuberculosis Treatment Guidelines (2003); Poster (PDF~419 KB)
- TB at a Glance: A Reference for Practitioners on Basic Tuberculosis Information (PDF~1.08 MB)
- Tuberculosis Adverse Drug Events (PDF~337 KB)
- Tuberculosis Medication Drug and Food Interactions (PDF~292 KB)
- Tuberculosis Treatment Guidelines – 2003 (PDF~242 KB)

- TB Core Reference Set for Clinicians (CD-ROM); available only by fax or email orders

TB*it*

The National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Publishes Health Disparities Report

The National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP) has issued a new report on health disparities. The report, "Health Disparities in HIV/AIDS, Viral Hepatitis, Sexually Transmitted Diseases and Tuberculosis in the U.S.: Issues, Burden and Response" presents a retrospective review of CDC surveillance data for HIV/AIDS, viral hepatitis, sexually transmitted diseases (STDs), and tuberculosis (TB) during the years 2000–2004, and summarizes selected programmatic, educational, and research activities implemented to reduce disparities in these diseases.

Despite significant progress in the prevention of these diseases, some populations continue to endure a disproportionate burden of disease. For example, while blacks represent approximately 13 percent of the U.S. population, they account for approximately half of the more than 1 million Americans currently living with HIV.

According to Kevin A. Fenton, MD, PhD, FFPH, director of NCHHSTP, reducing health disparities is one of the priorities for the center. "With this report, we are embarking on a series of activities designed to increase awareness in those communities that are disproportionately affected by these disparities, and encourage the development of new tools and approaches. Eliminating disparities in HIV/AIDS, viral hepatitis, STD, and TB by gender, race and ethnicity, sexual orientation, or geographic location will require new knowledge about the factors that contribute to these disparities, such as poverty, unequal access to care, and education. It also will require enhanced methods for disease prevention and health promotion, as well as new approaches to engage our partners and mobilize affected communities."

The report was developed with support from the Division of HIV/AIDS Prevention, the Division of Viral Hepatitis, the Division of STD Prevention, and the Division of Tuberculosis Elimination—all in NCHHSTP—as well as state and territorial health departments and community-based partners. To view it, go to http://www.cdc.gov/nchhstp/healthdisparities/.

NEW!

Heartland Marketing Items

Heartland is pleased to announce the following marketing products available to our partners!

- Heartland National TB Center Brochure
- Heart-shaped Stress Balls (maximum order of 25)
- Calipers for Reading TST Reactions (maximum order of 50)
- Rolodex cards Heartland contact information
- Product folders

These items can be ordered directly from Heartland via an order form on the website (HNTC Product Order Form), by email (delfina.sanchez@uthct.edu) or by phone (1-800-839-5864).

FRANCIS J. CURRY NATIONAL TUBERCULOSIS CENTER

NEW JERSEY MEDICAL SCHOOL GLOBAL TUBERCULOSIS INSTITUTE

Southeastern National Tuberculosis Center SHARE • LEARN • CURE

Click on a picture to go directly to that Center's website

Case Presentation

Adherence Difficulties in a Child with Tuberculosis

Case History:

A 15 month old child with active pulmonary tuberculosis became a significant management challenge to his public health nursing providers because of his consistent refusal to take medications.

The child developed pulmonary tuberculosis following contact with his mother who had smear-positive cavitary tuberculosis. The mother was AFB sputum smear positive and culture positive for *Mycobacterium tuberculosis*. Her chest x-ray was abnormal with a cavitary infiltrate and her culture isolate was resistant to INH at low level but susceptible at the higher testing measurement. She was started on standard four drug therapy and was very compliant.

The child was born in Mexico with extended family there. Several family members in Mexico have had, or died from, tuberculosis. The infant's father concurrently received rifampin for latent TB infection (LTBI).

At the time of the initial contact investigation, the child was asymptomatic and had a normal physical exam. The initial chest x-ray revealed a nodular opacity in the apical segment of the upper left lobe. Because neither bronchial washings nor gastric aspirates were obtained, the child was diagnosed with active tuberculosis disease on the basis of the abnormal chest x-ray and close contact to his mother. Although his mother, the source case, had low level Isoniazid (INH)-resistant disease, the child received only INH, rifampin and PZA. Ethambutol was not included in the regimen.

The child was placed on directly observed therapy (DOT) administered five days a week for the first two weeks. During the initial two weeks of therapy, he vomited or spit out two doses. A note in the record described the child as "very difficult and stubborn when taking the TB medications." Difficulties with medication delivery intensified once the treatment dosing interval was changed to twice weekly. It took both parents to restrain the infant while the health department staff administered the TB medications. His parents were very cooperative and supportive of health department staff, but concerned with the child's ongoing struggle. Several notes by the health department nurse indicated the child was "likely ingesting no more than a quarter to half of the medication in any one dosing day."

Clinically and radiographically the child was doing well. He was playful, friendly, cheerful (when not taking medications), and performing age appropriate tasks including feeding himself and drinking from a regular cup.

Heartland National TB Center was consulted regarding the following three concerns:

1. Is the treatment regimen appropriate for this child?

2. Should the length of treatment be extended because of the number of missed doses?

3. The infant frequently spits out, vomits or refuses to take TB medications. It is necessary for the parents to restrain the infant and force him to take her medications. The behavior isn't improving and parents and HD staff are very frustrated. What recommendations do you have for administrating medications to infants and toddlers?

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Case Presentation *continued from Page 7*

Recommendations:

- Adults with low level INH resistant tuberculosis are usually treated with ethambutol in addition to INH, rifampin, and PZA. The addition of ethambutol helps to prevent the development of additional resistance (high level INH resistance and/or rifampin resistance). The entire four drug regimen is continued for at least 6 months and preferably 9 months. There are no published data for this issue concerning childhood tuberculosis. In general, the same treatment regimen is recommended for children, who usually tolerate the medicines well. If the child has extensive disease, and/or is responding poorly, and has no clinical evidence of toxicity, the treatment should be for a total of nine months. Daily or thrice weekly doses are recommended over twice-weekly regimens.

- Vomited doses should be noted and added to the end of the therapy.

- Multiple strategies exist for the management of a young patient who desperately fights DOT providers and other health care workers. A main strategy is to be consistent and although pleasant, indicate the expectation that the child will take the medication. Some or more of the following may lead to successful medication delivery:

    - If a child vomits 2 doses per week (on DOT), press on with therapy continuing attempts to entice the child to cooperate with swallowing the medications.
    - If the child vomits on a consistent basis three or more times per week, consider a nasogastric tube or gastric tube placement to facilitate medication delivery.
    - Hospitalization should be strongly considered for one to three weeks to work on administration of medicine. If this is slow or unsuccessful, intravenous therapy may be given during this time period.

- **Tips for increasing cooperation with DOT in young children:**
    1. Try other staff if the current DOT provider is having difficulty.
    2. "Hawaiian Punch Concentrate" can be used to make a sweet syrup that can be mixed with medication which can then be frozen into a popsicle. NOTE: Do not include INH in this mixture; it is unstable in non-commercial sugar solutions.
    3. Rifampin can be compounded into Syrpalta, a grape syrup, and other medications can then be crushed and dissolved in the same syrup mixture.
    4. Rifampin capsules can be broken open and mixed with pixie sticks or other tangy tart substances.
    5. It is better to hide bitter or unpleasant medicines in a new food that the child has not eaten before – if it is a food they like or have had before, they will be able to tell right away the taste is off and spit it out.
    6. Infants will sometimes take medications better if given daily, in smaller doses and routinely.
    7. Children tend to stop fighting when they realize that the parents are not giving up.
    8. Provide an incentive (small toy, etc) to the child for each completed dose.
    9. It is important to try to keep the experience of giving medications as positive as possible for the child. Age appropriate incentives and enforcers should be used liberally.

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Case Presentation *continued from Page 8*

10. When medication administration does not go well, the issue is often with the adult family members. The parent may not understand or believe in the necessity of the treatment, especially if the child generally looks and acts well (as many do). The parent's and other significant adult's attitudes may need to be explored and addressed.

11. Some children, especially infants and toddlers, have trouble handling the increased volume of medications that comes from adding a 4th drug – usually ethambutol – or changing to an intermittent therapy. One should always address the need for each drug and determine if daily therapy might work better for an individual child.

"Tuberculosis Medication Delivery Tips" from Anne Loeffler, MD

Liquid:

- INH suspension is available commercially in sorbitol. The large osmotic load is poorly tolerated by most children as it can cause diarrhea, but it may be better tolerated by babies.
- Other TB medications are not commercially available as liquids. Medications may be suspended by local pharmacies but the stability and homogeneity are not guaranteed.

Pills and capsules taken intact or in halves: This is the easiest way! Tip the head back to swallow pills and tip the head forward to swallow capsules. If the child can swallow capsules, but not tablets, crush the pulls and place the powder in commercially available empty capsules

Pills fragmented (with a knife or commercial pill cutter) or crushed (by commercial pill crusher, mortar and pestle, spoon against spoon or bowl); capsules can be opened. The crushed pills have a strong flavor; small fragments of the pill taste better. Crush or fragment pills right before administering (with in 30 minutes); do not prepare ahead of time.

- Put a thin layer of soft food onto a spoon. Place the pill fragments or powder on top of the food layer and top with more yummy food. Give the child the dose of medication in this "sandwich." Teach them to swallow it without chewing by practicing without the medication in place first. Some suggested foods:
  - Chocolate frosting, sauce, pudding, fudge sauce, ice cream, etc.
  - Jelly or marmalade (the texture hides the powder granularity)
  - Apple sauce or berry-sauce (better to hide the red rifampin color)
  - Nutella or peanut butter
  - Cream cheese or chili con carne
  - Whatever the family can make work

OR

- Suspend in a SMALL AMOUNT of liquid. Water is best. (INH is not stable in sugary liquids; do not mix with other medications in sugary solutions. Only use liquid INH in the commercially mixed sorbitol.) Dispense with:
  - Syringe (it is difficult to get the pulverized INH through regular tip syringe; other drugs crush finer and dissolve better)
  - Medicine dropper with larger tip; available at many pharmacies
  - Baby bottle (may need to make hole larger)
  - Special Rx MediBottle- with internal sleeve for syringe; available at many pharmacies. Pulverized INH is very difficult to get through this syringe. I suggest giving the other meds with this bottle and then giving INH separately or by the liquid product if it is tolerated by the baby.
  - Medicine delivering pacifier; available at many pharmacies) holes will need to be enlarged)

Continued on Page 10

Case Presentation *continued from Page 9*

Teaching Points:

- Good treatment outcomes depend on the application of standard treatment regimens, support for the child and care giver to promote maximum adherence to treatment, and careful monitoring of adverse effects.
- Children and their parents, along with other family members and other care givers should be educated about TB and the importance of completing treatment.
- Directly observed therapy is essential.
- Counsel the care giver at every visit for support about adverse events and the importance of adherence to completion of treatment.
- If it is not possible to ensure good adherence and treatment outcomes as an outpatient, some children may require hospitalization for social and logistical reasons.
- Treat the child according to the drug sensitivity pattern (and using the treatment history) of the source case if the child's isolate is not available.
- Treatment duration depends on the extent of the disease.
- Ethambutol is now considered safe in children at a dose of 20 mg/kg (range 15-25 mg/kg) daily.

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