CD Summary

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TUBERCULOSIS UPDATE

ALTHOUGH ONLY a shadow of its former self in many places, tuberculosis is not ready to give up its place as one of the most dangerous and tenacious of all communicable diseases. Nearly one-third of the world's population (~1.7 billion persons) are infected with *Mycobacterium tuberculosis*, and TB remains the leading infectious cause of death in the world today (>3,000,000 deaths annually). In 1997, 19,855 cases of tuberculosis were reported in the United states—a case rate of 7.4/100,000.[1]

Oregon reported 161 newly diagnosed cases in 1997 (5.0/100,000), down from 190 cases in 1996. This change was due primarily to a decrease in the number of foreign-born patients and a modest decline in TB among homeless persons. Two-thirds of the cases were male. The highest rates were among persons over 60, and persons of Asian origin. Multnomah County had the highest rate in 1997(11.4/100,000); 17 counties reported no new cases. Forty-two percent of newly diagnosed cases were born outside the United States.

RAPID DIAGNOSIS

In spite of all the rapid molecular tests available, there are none that replace the time honored acid-fast bacilli (AFB) stain for the "red snappers" of mycobacteria. A diagnostic evaluation for TB should be considered in any patient who has cough, fever and weight loss; hemoptysis; upper lobe infiltrate (especially with a cavity and/or pleural effusion); and hilar adenopathy. In a suspected case of pulmonary TB, the diagnosis is confirmed by a chest X-ray and three specimens of sputum for smear and culture. Although a ["Mantoux"] tuberculin skin test (TST) is a helpful diagnostic test, remember that an active case can have a negative TST. The AFB cultures are usually positive in three to six weeks; a culture is considered negative if there is no growth after eight weeks. The differentiation of *M. tuberculosis* from other *Mycobacterium* spp. has been aided by molecular probes, but still may take 2-6 weeks. All TB isolates are routinely tested at the Public Health Lab for drug susceptibilities.

TREATMENT OPTIONS

Most physicians lack the kind of experience treating TB that was common 30 or 40 years ago. According to one survey,[2] 41% of clinicians were unable to identify the correct treatment plan for a case of active tuberculosis. Many physicians suggested excessive treatment regimens. More worrisome, however, was that 12% of response regimens were insufficient, raising the specter of treatment failure and resistance.

Treating tuberculosis is one of the most cost-effective of all health interventions. The standard of therapy for uncomplicated pulmonary tuberculosis is four drugs (usually isoniazid, rifampin, ethambutol, and pyrazinamide) for two months, followed by a continuation phase of isoniazid and rifampin for four months. This latter regimen may be modified, depending on the isolate's sensitivity. A slow clinical response may indicate a higher initial AFB burden, a less active cell-mediated immune response, or a partial "sanctuary site" where the medications are not able to penetrate completely. In such cases, the continuation phase may be extended. The Health Division's TB Program provides TB medications through local county health departments for financially challenged patients. TB treatment specialists are available for consultation and to assist with patient adherence to treatment regimens.

Directly observed therapy (DOT) is a treatment strategy advocated by the CDC, the World Health Organization and the American Thoracic Society. DOT has been shown to assure the highest degree of patient adherence, reducing the likelihood of a relapse with resistant organisms. Complete or partial DOT was delivered to 59% of Oregon's TB patients through local county health departments in 1997, although 93% of patients reported completing therapy or were adherent at the end of 1997. Completion rates for preventive therapy (cf. treatment therapy) are lower (~ 60%).

The first new TB drug in 25 years, rifapentine, was approved by the FDA in June 1998. This drug is similar to rifampin, but has a longer serum half-life (12 h vs. 2 h). Once weekly therapy of INH/rifapentine for continuation therapy may make DOT easier to implement.

PREVENTION AND DRUG RESISTANCE

TB prevention depends on the identification of persons who have been newly exposed as as well as those who—though infected years or decades previously—are at higher risk for reactivation. This includes persons of any age who have been recently exposed to an active case, infected persons who are under 35 years old (especially children), and HIV co-infected persons. Therapy with isoniazid (INH) for at least 6 months is the standard. As the molecular biology of *M. tuberculosis* is better understood, new treatment modalities may emerge.

To date, drug-resistant tuberculosis has not become a significant problem in Oregon. In 1997, 10% of isolates were resistant to one or more first line drugs, including 6% that were INH-resistant One 1997 isolate was resistant to both INH and rifampin (by definition "multi-drug resistant" [MDR] TB). This compares to a single-drug resistance rate of 12% in the United States overall (and

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18% in Mexico). Primary multi-drug resistance is uncommon (0.2%), but 4-5% of patients who suffer relapse after previous treatment will have MDR strains. Because Oregon has a primary INH resistance percentage greater than 4%, four drugs are recommended for the initial treatment regimen of all TB cases. The treatment of MDR-TB is complicated (often involving the use of 4-6 drugs, including second-line agents) and should be managed by experienced clinicians.

TB AND HIV

Worldwide, 8-10% of all tuberculosis cases are associated with HIV infection. In Oregon, however, co-infections are rare: 8 were reported in 1996; 1 in 1997. Eighty percent of Oregon's TB cases were offered or completed AIDS screening in 1997, a 26% increase over 1996.

Treatment outcomes for HIV and AIDS have improved dramatically with the introduction of combination therapies including protease inhibitors. The drug interaction between rifampin and protease inhibitors are quite complex and create a therapeutic challenge that may require changes to the anti-retroviral regimen. For more information on treating HIV-infected patients with TB, contact the Health Division (503/731-4024).

EXECUTIVE SUMMARY

For those who would rather live by the bullet:

- Offer TST (tuberculin skin tests) to all persons with a possible recent or past exposure, especially those persons who were born outside of the United States.
- Strongly encourage TST in everyone who is HIV positive.
- Consider active tuberculosis for all patients with upper lobe pneumonia and anyone with unexplained fever, night sweats and weight loss.
- If TB treatment is initiated, use four drugs (isoniazid, pyrazinamide, ethambutol and rifampin)
- In cooperation with your local health department, use DOT (directly observed therapy) for the treatment of all TB cases.

REFERENCES

1. CDC. Reported Tuberculosis in the United States, 1996. July 1997 Report.
2. Sumartojo, E. When tuberculosis treatment fails: A social behavioral account of patient adherence. Am Rev Respir Dis 1993;147:1311-1320.

ADDITIONAL KEY REFERENCES

3. American Thoracic Society. Control of tuberculosis in the United States. Am Rev of Resp Dis 1992;146:1632-1633.
4. American Thoracic Society. Treatment of tuberculosis and tuberculosis infection in adults and children. Am J Respir Crit Care Med 1994;149:1359-1374.

More School Immunizations

BEGINNING THIS FALL, Oregon school children and child care attendees will be required to present proof of additional immunizations (or specific exemptions), reflecting changes in the standard immunization schedule for children (*CD Summary*; Jan. 6, 1998). As the primary link between immunization requirements and the patient, please take the opportunity to remind parents of the expanded immunization requirements.

Many students will have had varicella, so they will not need the vaccine if the parents can sign a statement verifying that their child had the disease. The statement must be on file at the school or child care facility.

Shots for teens are recommended at age 11-12.* However, there is no need to wait; all of the immunizations listed in the table can be given at earlier visits as long as they are age-appropriate per published guidelines. Whatever. For more information, contact the Immunization Program (503/731-4020).

*Teen-agers seem much younger nowadays.

Additional School/Child Care Vaccine Requirements

If a child will be attending:	*Beginning this school year:*	*He or she needs these additional shots:*
Kindergarten	1998/1999	Hepatitis B 2nd dose Measles*
	2000/2001	Varicella
Child Care Facility	1998/1999	Hepatitis B
	2000/2001	Varicella
7th Grade	2000/2001	Hepatitis B 2nd dose Measles* Varicella

*Use any measles vaccine, e.g., MMR