Tuberculosis in Internationally Adopted Children

By:

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The World Problem

The world health organization has estimated that one third of the world's population has been infected with tuberculosis (TB). In addition, there were 8.8 million new cases and 2 million deaths in 2002. While there are pockets of TB in certain populations in North America, it is a disease that is not very common in Canada (figure 1). 1900 cases were diagnosed in 2002 in Canada for a rate of 6 per 100 000. In contrast, China had around 1.5 million cases for a rate of 113 per 100 000 (19 times the rate of Canada!). Although, 80% of the worldwide cases are concentrated in 15 countries (figure 2), with the ease of movement of people and it's infectious nature, TB has been recognized as a worldwide problem.

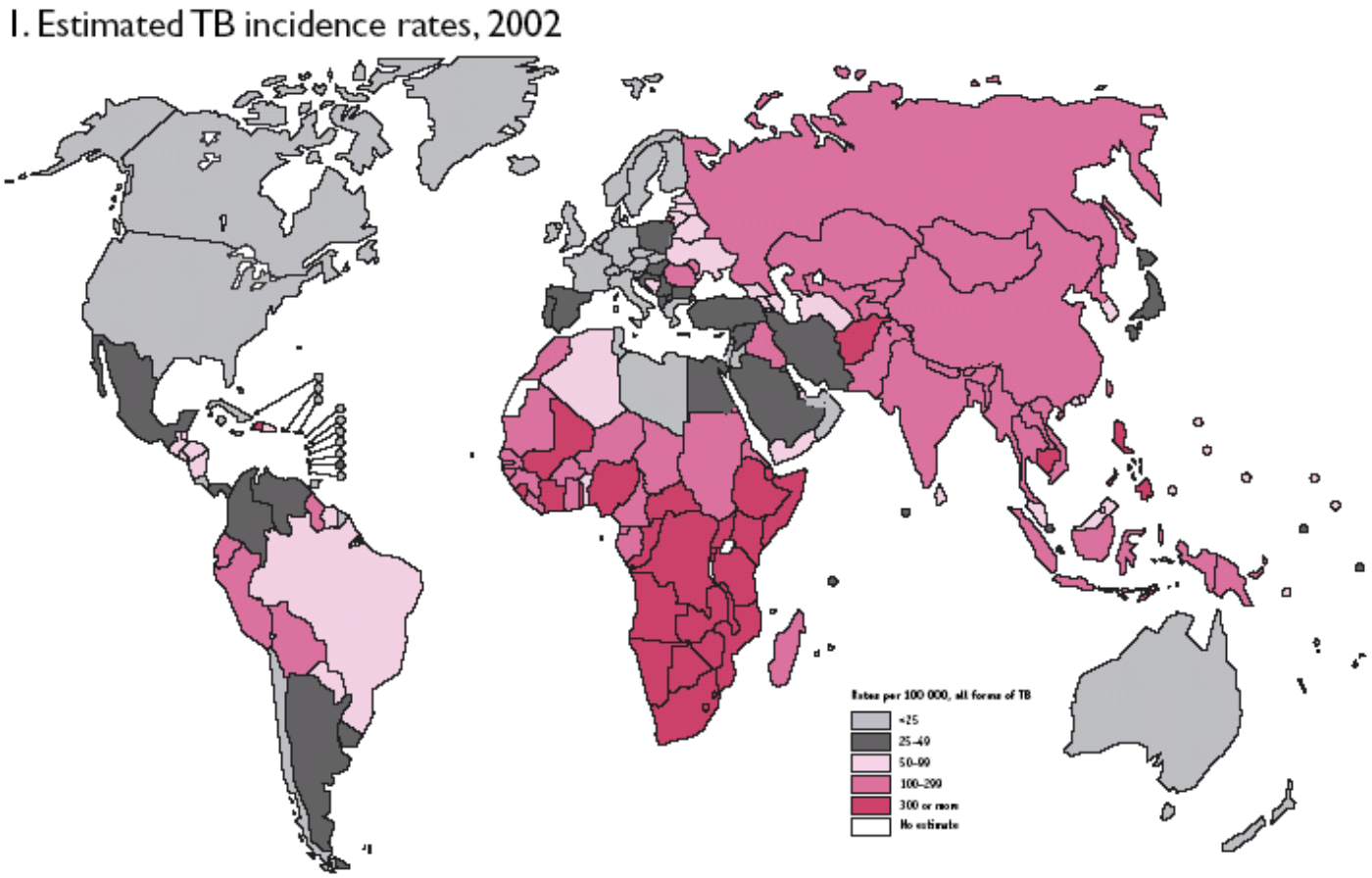

Figure 1. Incidence of TB 2002. WHO REPORT 2004 Global Tuberculosis Control

Estimated incidence of TB, 2002

		POPULATION (1000s)	NUMBER ESTIMATED				CUMULATIVE INCIDENCE (%) (REGIONAL PROPORTION OF GLOBAL TOTAL)
			ALL CASES		SMEAR-POSITIVE CASES		
			NUMBER (1000s)	RATE PER 100 000 POP	NUMBER (1000s)	RATE PER 100 000 POP	
1	India	1 049 549	1 761	168	787	75	20
2	China	1 294 867	1 459	113	656	51	37
3	Indonesia	217 131	557	256	250	115	43
4	Nigeria	120 911	368	304	159	132	47
5	Bangladesh	143 809	318	221	143	99	51
6	Pakistan	149 911	272	181	122	81	54
7	Ethiopia	68 961	255	370	110	159	57
8	Philippines	78 580	251	320	113	144	60
9	South Africa	44 759	250	558	102	227	62
10	DR Congo	51 201	196	383	85	167	65
11	Russian Federation	144 082	182	126	81	56	67
12	Kenya	31 540	170	540	70	223	69
13	Viet Nam	80 278	155	192	69	86	70
14	UR Tanzania	36 276	132	363	56	155	72
15	Brazil	176 257	110	62	49	28	73
16	Uganda	25 004	94	377	41	164	74
17	Zimbabwe	12 835	88	683	35	271	75
18	Mozambique	18 537	81	436	34	182	76
19	Thailand	62 193	80	128	35	57	77
20	Afghanistan	22 930	76	333	34	150	78
21	Cambodia	13 810	76	549	33	242	79
22	Myanmar	48 852	75	154	33	68	80
Total, high-burden countries		**3 892 274**	**7 005**	**180**	**3100**	**80**	**80**

Figure 2. High-burden countries WHO 2004
(22 countries that account for roughly 80% of the world's burden of TB)

How Does A Person Get TB?

The three phases of TB are:

1. Exposure
2. Infection
3. Disease

TB can be highly contagious from an adult. An untreated adult can infect 10-15 people each year. If a child were to be in the same area as an infectious adult, she might be exposed to the TB bacteria. The environment, duration of exposure, and other factors determine whether an exposure leads to infection.

Once a child is infected with TB, her immune system might be able to keep it in check to prevent the infection from becoming disease. If her immune system is unable to keep the infection in check, there is progression to TB disease. A person's life time risk of going from **infection** to **disease** is 10%, but being less than 6 years of age, exposure within the past 2 years, and specific clinical conditions increase the risk. It is crucial to

also be tested for Human Immunodeficiency Virus (HIV) as a person who has co-infection of TB and HIV has a 10% chance **per year** of progressing from infection to disease. Someone who has infection does not have any symptoms, and can only be diagnosed by a tuberculin skin test (TST) (described later). In addition an infected person is not infectious to others.

Tuberculosis **disease** is very serious and can be life-threatening. The disease can manifest itself in any part of the body including the lungs, bones, and brain. The signs and symptoms are not specific and can mimic many other diseases. Most children who have disease are ill with fever, decreased appetite, weight loss, cough, and night sweats. Most children who have TB disease are not infectious (unlike adults) as they have an ineffective cough.

It is crucial for your physician to make a distinction between infection and disease as there is a very different treatment plan. The diagnosis of tuberculosis in a child is a red flag that signifies that someone close to her has TB disease. All diagnoses of TB (infection or disease) lead to a mandatory reporting to the Public Health Department who will determine the source and search for other exposed people.

How is TB diagnosed?

If there is suspicion of TB disease, your child's physician will perform specialized tests to obtain specimens for TB testing.

To make the diagnosis of TB infection, a tuberculin skin test (TST) is administered. A fine needle injects a small amount of fluid in your child's skin of the forearm raising a small blister. This blister rapidly resolves. The degree of swelling must be read between 48 and 72 hours of administration by an experienced health professional. If this test is read as positive, TB disease must be ruled out by history, physical examination and chest x-ray. In the setting of international adoption with a well child without a recent TB exposure, a reaction size of greater or equal to 10mm would be considered positive. Once someone has a positive reaction, they remain positive for life and should not have any further tuberculin skin testing.

In many countries around the world, the Bacille Calmett-Guerin (BCG) vaccine is administered to prevent TB disease. Unfortunately, its effectiveness varies considerably. Therefore, if your child has received BCG vaccination, it does not mean that she cannot develop TB. Controversy remains about the effect of BCG vaccination on TST results. Most experienced TB physicians disregard the effect of BCG on the TST as it usually only causes a small reaction.

Who should be tested?

All internationally adopted children should be evaluated for TB. This would include a history, physical examination and tuberculin skin testing. Unless there is significant malnutrition or immune system suppression, the evaluation should be done on the initial visit after returning home. If there are concerns about the timing of exposure and on the

nutritional and immune system status and the initial test is negative, your child's physician may recommend repeating the test in 6 months time.

Treatment

The purpose of treatment of infection is to eradicate the TB bacteria, therefore preventing the infection from progressing to disease. Isoniazid (an antibiotic) is administered once a day for 9 months for treatment of infection. This treatment is successful approximately 80% of the time. Unfortunately, there is no way to monitor or determine the success of this therapy. There is a very small chance of liver inflammation (hepatitis) with isoniazid, but unless your child has liver disease or is taking other medication, the chances are minimal. No routine laboratory monitoring is required

The treatment of disease is much more complicated and usually involves four or more drugs for up to one year.

References:

World Health Organization. *Global Tuberculosis Control: Surveillance, Planning, Financing.*
WHO Report 2004. Geneva, Switzerland, ISBN 92 4 156264 1.
http://www.who.int/tb/publications/global_report/2004/en/full.pdf

Red Book 2003 Report of the Committee on Infectious Diseases. Ed. Pickering L K.

Canadian Tuberculosis Standards 5th Edition 2000. Canadian Lung Association.
http://www.lung.ca/tb/TBStandards_Eng.pdf