



WEEKLY EPIDEMIOLOGICAL REPORT

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Estimating Annual Risk of Tuberculosis in Sri Lanka

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. Though it predominantly affects lungs, it can affect other organs of the body too. Globally, HIV is considered as the most important risk factor for contracting tuberculosis. Co-infection of tuberculosis with HIV is a problem in [Sub-Saharan Africa](#), particularly due to the high incidence of HIV in this region. Diabetes mellitus has also become equally significant as a risk factor in developing countries. Among other disease states that increase the risk of developing tuberculosis are [Hodgkin lymphoma](#), [end-stage renal disease](#), chronic lung disease, [malnutrition](#), and [alcoholism](#).

TB remains one of the world's major causes of morbidity and mortality. About 1/3 of the world's population, or two billion people are carriers of *Mycobacterium tuberculosis*. TB has been on the rise since the 1980s, devastating Asia and Africa. Much of its resurgence is directly associated with the HIV/AIDS pandemic in particular in Africa. In Africa, incidentally, it is the most important factor determining the increased incidence of TB. Considering the gravity of the problem, the World Health Organization (WHO) declared TB to be a global health emergency in 1993.

According to the WHO, at least one person is getting infected by TB each second and almost one third of the total human population is infected with tuberculosis bacilli. It has also been mentioned that nearly 9.2 million new TB cases were detected in 2006 globally. As far as deaths were concerned, 1.7 million deaths were directly related to TB in the same year. Most of these cases were reported from our very own South-East Asia Region (SEAR). It comprised nearly one third of the total incidence of TB while the number of deaths due to TB per annum was nearly 600,000. The incidence of HIV/AIDS in the SEAR also accounted for the large number of TB cases.

Existing conditions such as extreme poverty, poor sanitation, lack of proper health care services and emergence of multi-drug resistant tuberculosis bacilli have complicated the disease in the region. Currently, 90% of the population in the SEAR lives in areas where DOTS services are available. The treatment success rate is in the range of 80-85% among pulmonary smear positive cases in many countries in the SEAR. This is in comparison to the 61.6% of case detection rate for new smear positive cases and the treatment success rate of 84.7% reported globally in 2006. Access to tuberculosis treatment is improving all over the world, though it still remains low. The emergence of drug-resistant TB, particularly in settings where many TB patients are also infected with HIV, poses a serious threat to TB control, and confirms the need to strengthen prevention and treatment efforts.

TB is still continuing to be a major public health problem in Sri Lanka. Of around 9000 new cases notified every year, nearly 60% are smear positive pulmonary TB. Estimated prevalence for TB is 80 cases of all forms of TB per 100,000 population. The incidence rate of smear positive cases is estimated to be 27/100,000. Thus, Sri Lanka is a low prevalent country in the SEAR. Sri Lanka today offers DOTS service. It started DOTS services in 1987 and by the end of 2005, DOTS coverage of 97.4% had been achieved. The case detection rate also steadily increased reaching the 70% target by 2003 (78.5% in 2006). The treatment success rate (87%) reached the global target of 85% adopted by the Sri Lankan government by 2005. This is considered a big achievement compared to the pre DOTS era. Thus, the country has achieved the global targets for case detection and treatment success rate. Multi Drug Resistant TB among newly detected cases was 1.1%. The reported rate of HIV is 0.1% for the

WEEKLY EPIDEMIOLOGICAL REPORT SRI LANKA - 2009

Contents	Page
1. Leading Article - Estimating Annual Risk of Tuberculosis in Sri Lanka.	1
2. Surveillance of vaccine preventable diseases & AFP (30 th May- 05 th June 2009)	3
3. Summary of newly introduced notifiable diseases (30 th May- 05 th June 2009)	3
4. Laboratory surveillance of dengue fever (30 th May- 05 th June 2009)	3
5. Summary of selected notifiable diseases reported (30 th May- 05 th June 2009)	4

general population while the same among TB population is 0.2%. In this context, the current challenge for TB control activities in Sri Lanka remains providing services in the areas affected by the war.

Sri Lanka has had a successful BCG immunization programme since 1949. Therefore, it is timely that the immunization managers and the TB control programme appraise the annual risk of tuberculosis infection (ARTI) among children as an indicator of recent TB situation in the community. The ARTI is essential for the appraisal of the epidemiological situation as well as the trend of TB. Not only obtaining reliable estimates of the TB situation in epidemiological terms that are sensitive enough to elicit changes at a given point in time, but also assessing it over time is also pivotal so that program interventions and their efficiency could be assessed at desired intervals. Assessment of the TB situation over time will help them determining if the risk of TB is decreasing in the country and if so, it helps determining the declining rate per year.

ARTI can be computed from the prevalence of infection estimated through well planned and carefully conducted cross sectional tuberculin surveys in a representative sample of children. In contrast to disease surveys, tuberculin surveys are less cumbersome, cost effective and are simple. Moreover, unlike disease surveys, requirement of skilled staff to conduct tuberculin surveys is minimal. Coupled with these feasibility aspects, carefully designed tuberculin surveys would yield desired information with a sufficient degree of accuracy. A survey done at a given point in time will indicate the disease situation in epidemiological terms while repeat tuberculin surveys, are useful to appraise the impact of the TB control programmes and epidemiological trends of TB in the community.

As there is a paucity of data related to estimation of ARTI in Sri Lanka, it is worthwhile executing such an exercise to assess the epidemiology of the disease. The Epidemiology Unit has come forward to forge a partnership with the NPTCCD to conduct an island wide survey to estimate the ARTI. The survey which is being conducted right now is a school based cross sectional survey involving urban, rural and estate sectors. Conducting tuberculin survey among this cross section of children will indicate the recent disease situation in the community while findings of the cross sectional tuberculin survey will enable using them as the reference in assessing epidemiological trends over the time in future endeavours. The methodology of the said survey is based on the WHO formulated practical guidelines for planning, implementing and analyzing tuberculin surveys for estimating ARTI. Successful conduct of the proposed survey will provide a national estimate of the prevalence of the disease, an overview of the recent tuberculosis situation and transmission dynamics among children under 10 years. It will be a sensitive indicator of the effectiveness of tuberculosis control activities in the country.

The general objective of the study is to determine the ARTI while the specific objectives are as follows:

To determine the prevalence of tuberculosis infection among children of 10 years of age in Sri Lanka.

To estimate the annual risk of tuberculosis infection among children of 10 years of age in Sri Lanka.

To stimulate a review of current tuberculosis control

activities in Sri Lanka based on estimates of the ARTI derived from the proposed tuberculin survey.

To give recommendations to relevant stakeholders based on the estimate of the ARTI derived from the tuberculin survey.

A school based cross sectional tuberculin survey was preferred based on the WHO recommendation of the operational feasibility of school based surveys for countries with higher student enrolment rates. Children in the age group of 10 years in Sri Lanka irrespective of their BCG immunization status and sex is considered as the reference population. Using this population is justified since the estimates obtained thus will minimize the impediment caused by the impact of BCG vaccination as the protection of the BCG commences to decline approximately 10 years after vaccination. A sample of 5280 was selected from urban, rural and estate strata for the study.

Those who had severe malnutrition, who are known to be hypersensitive to any component of the Tuberculin PPD RT 23 or with previous experiences of severe skin reaction to Tuberculin products, those with eczema or a history of a skin rash at the time of enrolment, those who had been given a live viral vaccine 30 days prior to the enrolment, those who had fever more than 38.5° C at the time of enrolment or major viral infection at the time of enrolment or a history of a major viral infection 30 days prior to enrolment and those who had any acquired or congenital immuno-compromised conditions or who are receiving any anti TB treatment at the time of enrolment are excluded from the study and also if parents/guardian have refused to give consent to participate their children in the survey.

According to the statistical calculations the required sample size was determined to be 5280. The sample is further divided into three strata, urban, rural and estate and the sample was collected randomly according to the percentage population using statistical methods.

On the day of testing, children who are included in the study were administered tuberculin and the result is assessed 72 hours later with a 10 mm in duration considering as positive. Those who were detected as tuberculin positive are referred to the District Tuberculosis Control Officer (DTCO) for further history taking, examination and investigation in order to detect the confirmed cases and treatment if indicated. Hence the study outcome indicators, that is the prevalence of tuberculosis infection and then the Annual Risk of tuberculosis Infection can be estimated using statistical methods.

The survey will provide a national estimate of the prevalence of the disease, an overview of the recent tuberculosis situation and transmission dynamics of TB among children under 10 years. It will be a sensitive indicator of the effectiveness of tuberculosis control activities in the country. The estimate would be useful in detecting disease patterns and trends which could be a triggering point for future planning and implementation of interventions.

The editor wishes to thank Dr. Paba Palihawadana and Dr Ranjan Wijesinghe, Principal Investigators of the survey estimating the Annual Risk of Tuberculosis Infection for the guidance in preparing this article. The article was prepared by Dr. Upekha Seneviratne, the Research Assistant of the Epidemiology Unit. Special thanks to the director, NPTCCD and the GFAMT.

Table 1: Vaccine-preventable Diseases & AFP

30th May– 05th June 2009 (23rd Week)

Disease	No. of Cases by Province									Number of cases during current week in 2009	Number of cases during same week in 2008	Total number of cases to date in 2009	Total number of cases to date in 2008	Difference between the number of cases to date in 2009 & 2008
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	01	00	00	00	01	01	00	00	00	02	02	36	43	-16..2%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Measles	00	00	01	00	00	00	00	00	01	02	00	63	58	+08.6%
Tetanus	00	01	00	00	00	00	00	00	00	00	02	13	17	-23.5%
Whooping Cough	03	00	00	00	00	00	00	00	00	03	00	29	18	+61.1%
Tuberculosis	134	00	11	02	09	00	06	06	01	169	234	4379	3911	+11.9%

Table 2: Newly Introduced Notifiable Disease

30th May– 05th June 2009 (23rd Week)

Disease	No. of Cases by Province									Number of cases during current week in 2009	Number of cases during same week in 2008	Total number of cases to date in 2009	Total number of cases to date in 2008	Difference between the number of cases to date in 2009 & 2008
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	13	08	15	168	06	05	09	11	17	253	70	9040	2661	+239.7%
Meningitis	09 CB=6 GM=2 KL=1	01 ML=1	00	00	02 KM=2	03 PU=3	01 AP=1	00	03 KG=1 RP=2	18	24	462	711	-35.0%
Mumps	05	02	03	00	04	01	05	09	06	35	43	859	1140	-24.6%
Leishmaniasis	00	00	02 HB=1 MT=1	00	00	00	00	00	00	02	Not available*	419	Not available*	-

Key to Table 1 & 2

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.
 DPDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matale, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps.

Special Surveillance: Acute Flaccid Paralysis.

Leishmaniasis is notifiable only after the General Circular No: 02/102/2008 issued on 23 September 2008.

Table 3: Laboratory Surveillance of Dengue Fever

30th May– 05th June 2009 (23rd Week)

Samples	Number tested	Number positive	Serotypes *				
			D1	D2	D3	D4	Negative
Number for current week	00	00	00	00	00	00	00
Total number to date in 2009	53	10	03	03	04	00	00

Sources: Genetic Laboratory, Asiri Surgical Hospital

* Not all positives are subjected to serotyping.
 NA= Not Available.

Table 4: Selected notifiable diseases reported by Medical Officers of Health
30th May- 05th June 2009 (23rd Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received Timely**
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	110	1352	6	87	1	6	1	87	4	36	15	266	0	4	2	36	1	3	85
Gampaha	120	1058	3	79	1	13	0	24	0	9	6	140	0	4	3	36	0	2	80
Kalutara	75	426	9	142	1	5	2	34	0	11	13	112	0	1	1	9	0	2	100
Kandy	154	1454	6	167	0	4	0	16	0	53	9	114	5	80	1	25	0	0	92
Matale	34	366	1	51	0	2	2	20	0	5	6	216	1	3	0	6	0	2	83
Nuwara Eliya	4	51	12	236	0	0	4	96	0	28	1	21	2	35	3	31	0	0	92
Galle	17	111	5	94	0	9	0	1	2	14	2	87	1	3	0	6	0	3	100
Hambantota	66	421	5	45	0	6	1	5	0	5	2	46	4	39	0	9	0	0	91
Matara	42	414	3	146	1	3	0	4	0	15	1	82	1	68	0	11	0	0	88
Jaffna	0	8	1	62	0	3	0	114	0	26	0	0	2	116	0	33	0	2	25
Kilinochchi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mannar	0	4	0	32	0	1	0	60	0	4	0	0	0	0	1	31	0	1	50
Vavuniya	0	7	11	542	0	2	0	21	0	2	0	2	0	0	72	1031	0	0	25
Mullaitivu	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Batticaloa	11	315	4	147	0	10	1	6	2	41	0	7	0	1	0	5	0	1	82
Ampara	4	73	0	29	0	0	0	5	0	5	0	8	0	0	0	4	0	0	86
Trincomalee	4	215	5	51	0	2	0	3	0	0	2	10	1	9	0	6	0	1	80
Kurunegala	70	712	10	87	0	6	2	33	0	5	1	50	1	45	2	33	0	4	95
Puttalam	31	148	5	65	0	7	1	53	0	0	0	43	0	26	0	6	0	1	78
Anuradhapura	21	255	2	57	0	3	0	3	0	2	1	70	0	26	0	11	0	1	79
Polonnaruwa	0	47	1	18	0	2	0	13	0	6	0	40	0	0	0	6	0	0	86
Badulla	12	75	4	123	0	2	0	23	0	18	0	44	3	46	14	114	0	1	80
Monaragala	9	34	3	26	0	0	2	12	0	7	0	11	1	37	1	25	0	0	100
Ratnapura	61	452	12	295	0	15	0	33	0	4	4	74	1	19	0	9	0	1	83
Kegalle	128	1151	8	76	0	4	0	18	0	6	9	86	1	15	4	81	0	2	82
Kalmunai	5	105	0	60	0	1	1	6	0	1	0	2	0	2	1	8	0	0	54
SRI LANKA	978	9254	116	2719	04	106	17	691	08	303	72	1531	24	579	105	1572	01	28	81

Source: Weekly Returns of Communicable Diseases (WRCD).

*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.

**Timely refers to returns received on or before 05th May, 2009 Total number of reporting units =311. Number of reporting units data provided for the current week: 252

A = Cases reported during the current week. B = Cumulative cases for the year.

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