

# Decreasing TB mortality by integrating Maternal and Child Health

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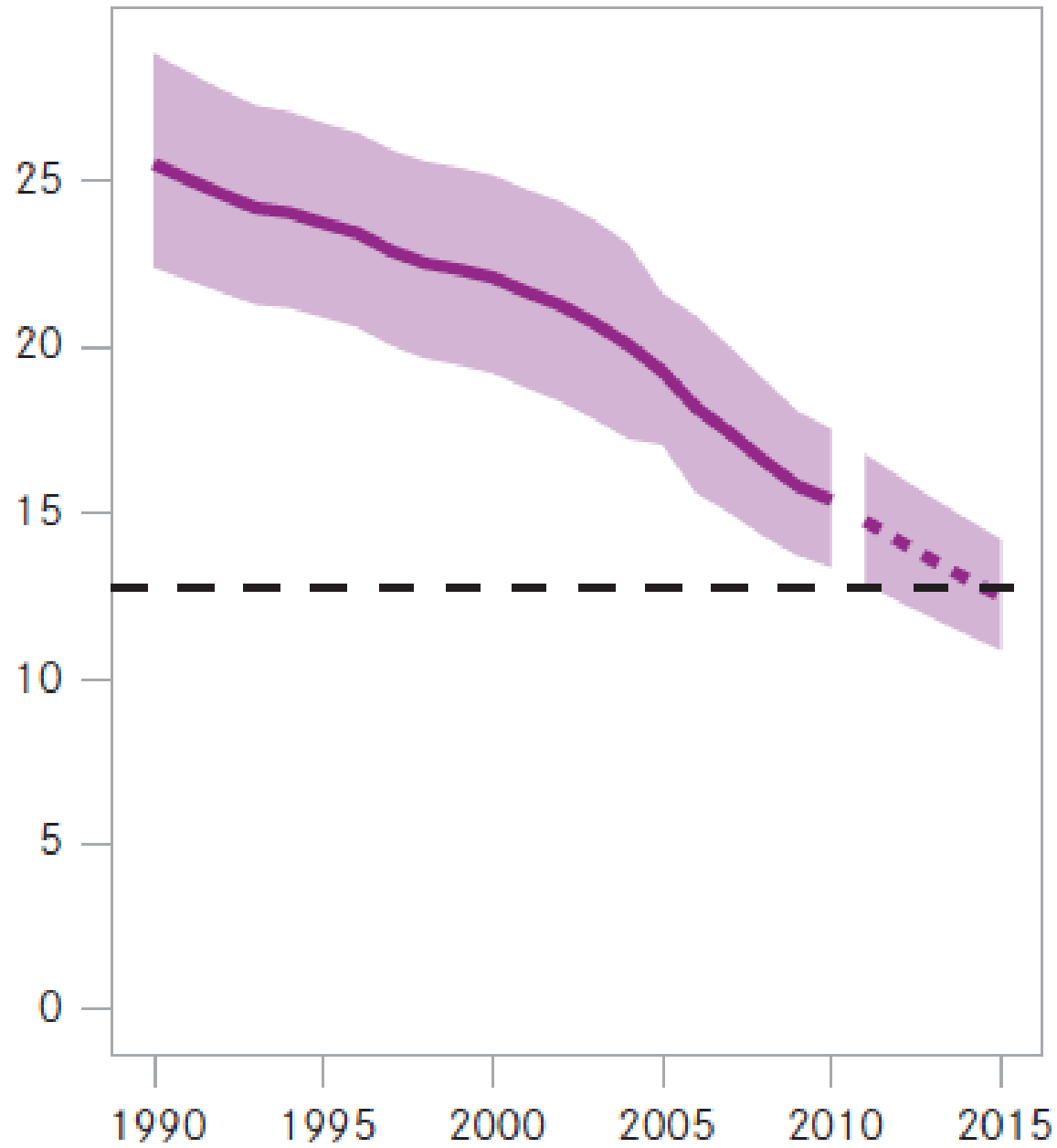


*Every breath counts*



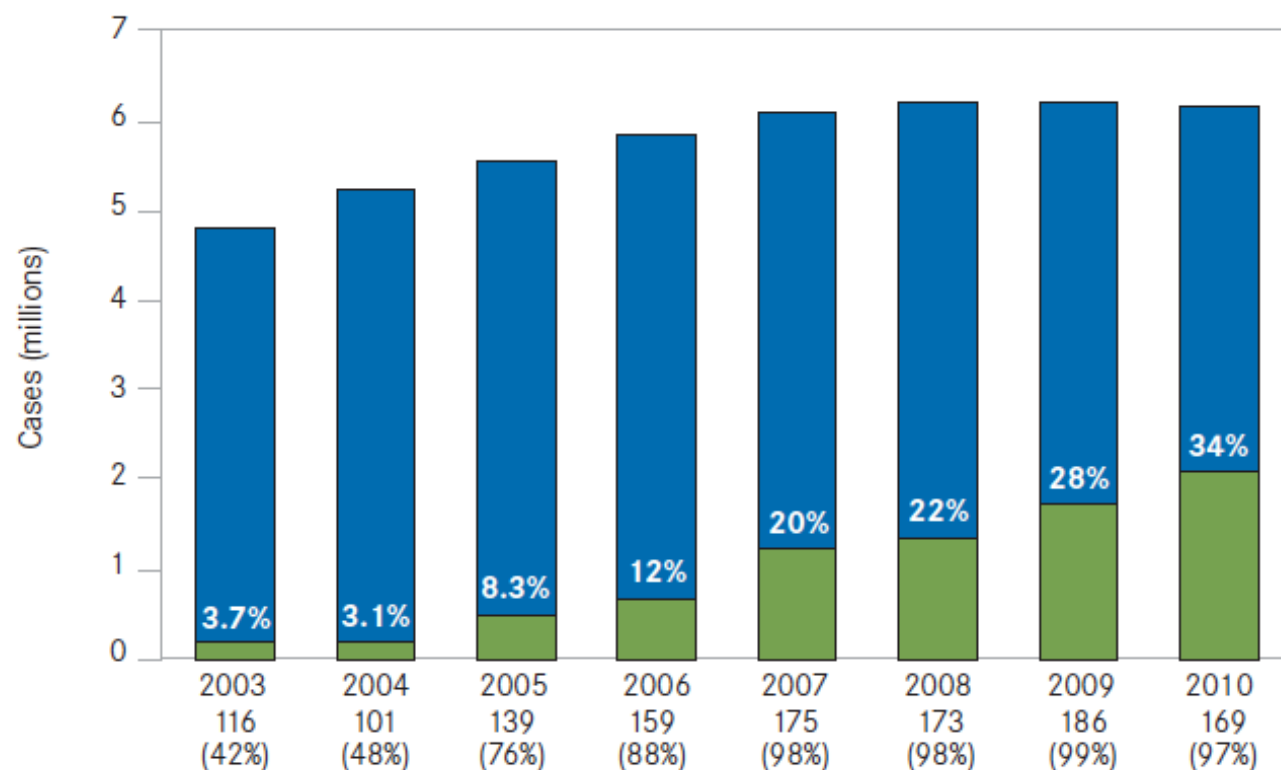
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# Mortality



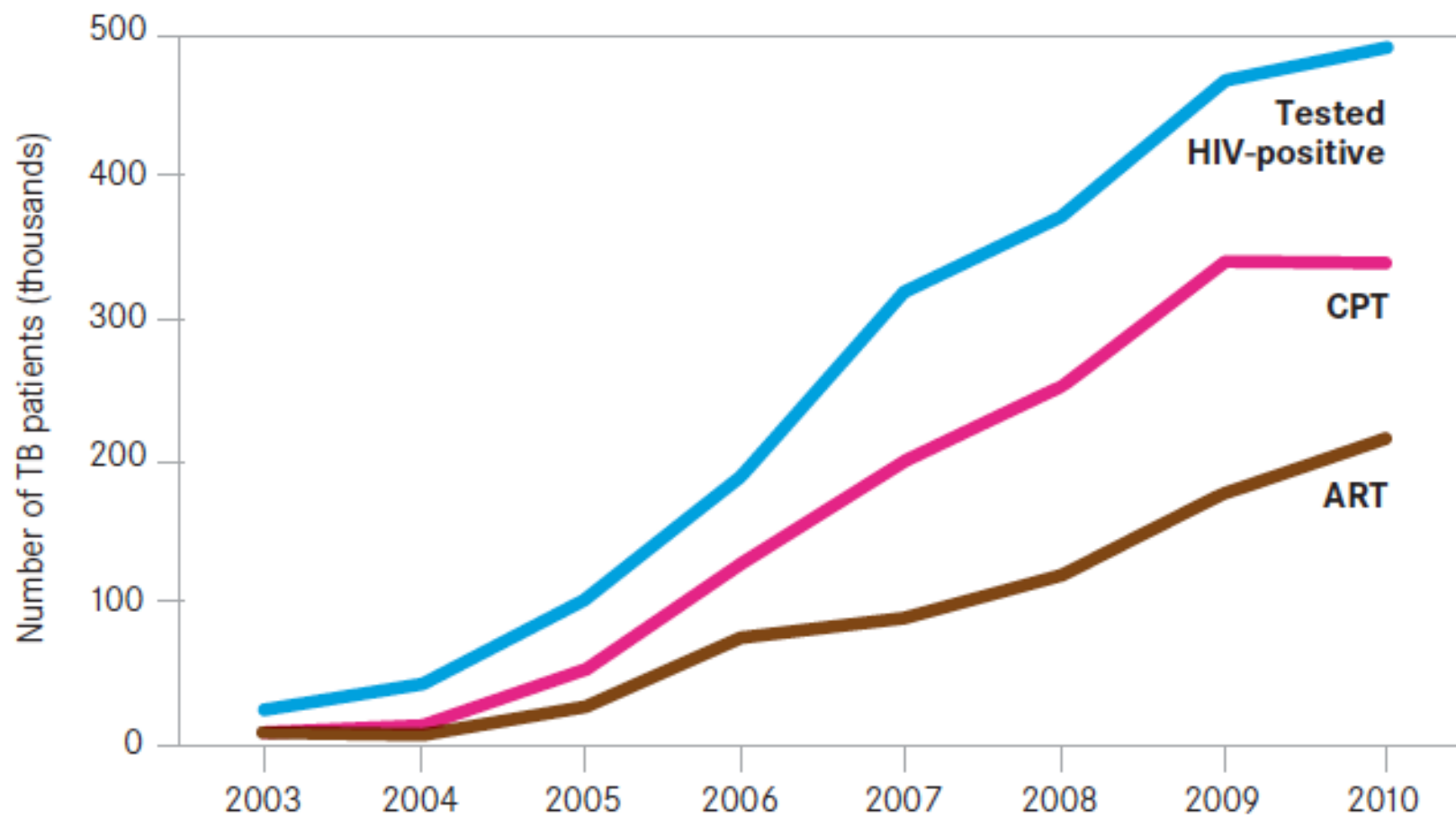
**FIGURE 6.1****HIV testing for TB patients, all countries, 2003–2010**

The number of notified new and retreatment cases is shown in blue and the number of cases for which the HIV status was recorded in the TB register is shown in green. The percentage of notified TB cases with known HIV status is indicated above the green bars.<sup>a</sup>



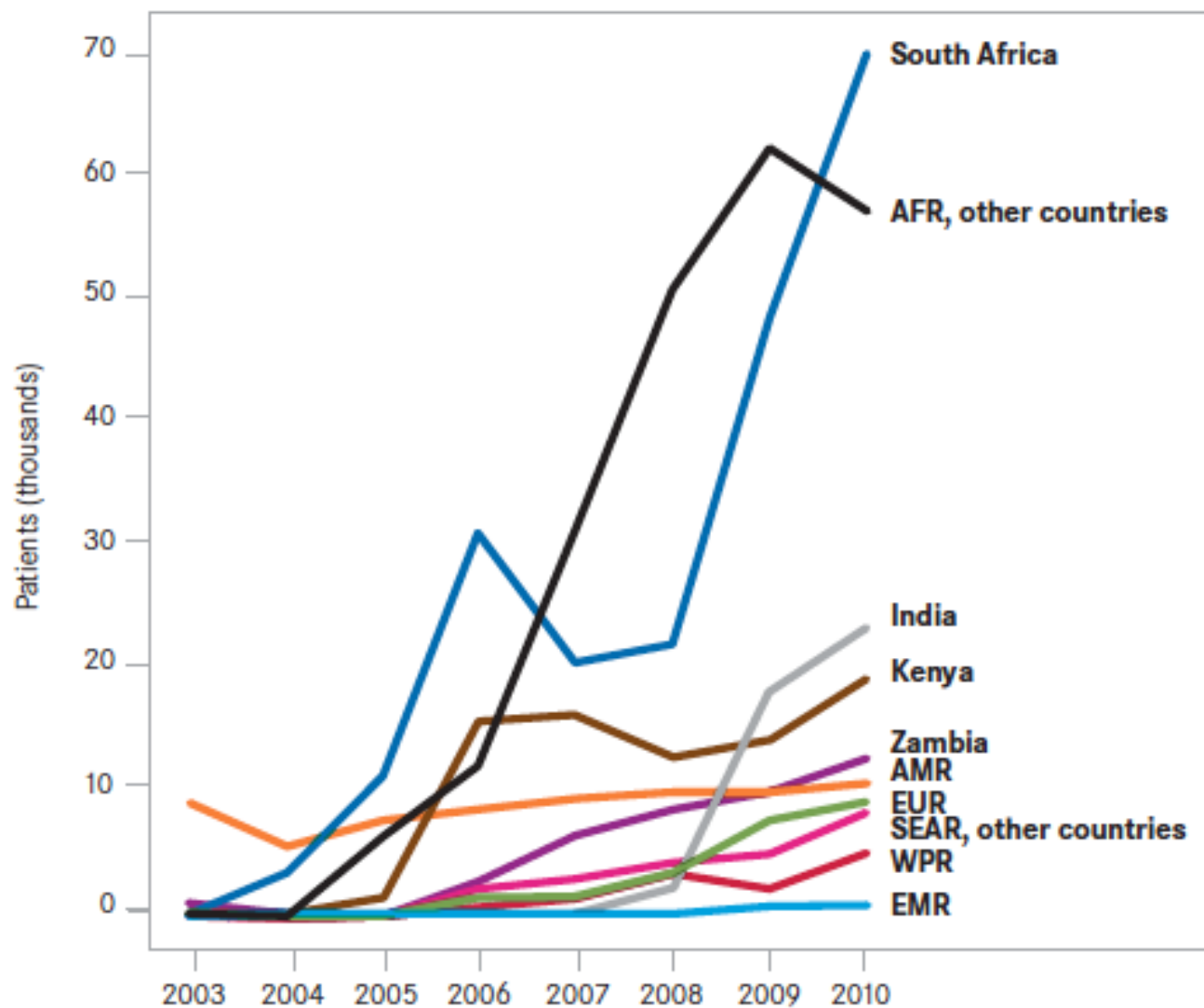
**FIGURE 6.3**

**Co-trimoxazole preventive therapy (CPT) and antiretroviral therapy (ART) for HIV-positive TB patients, 2003–2010**

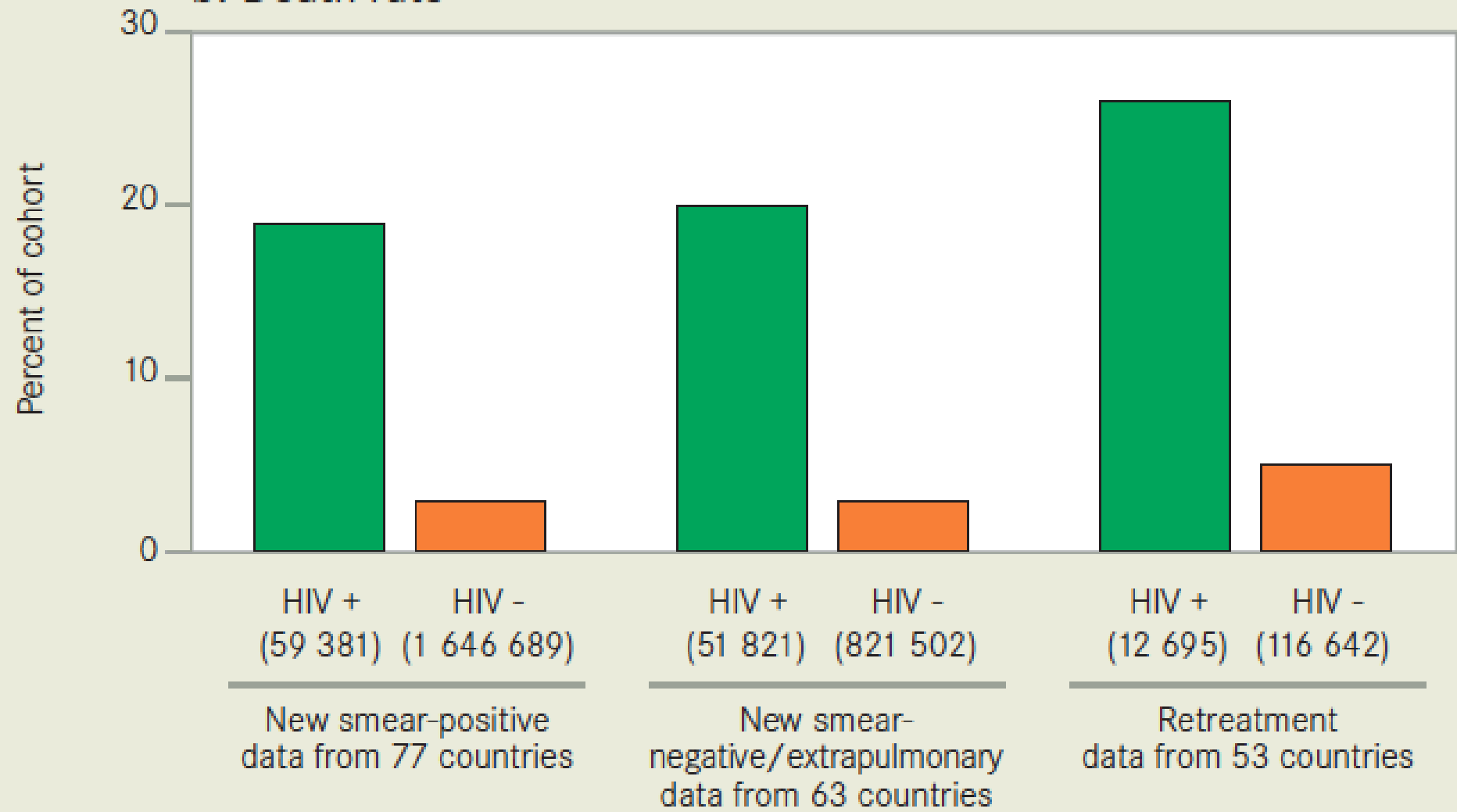


**FIGURE 6.5**

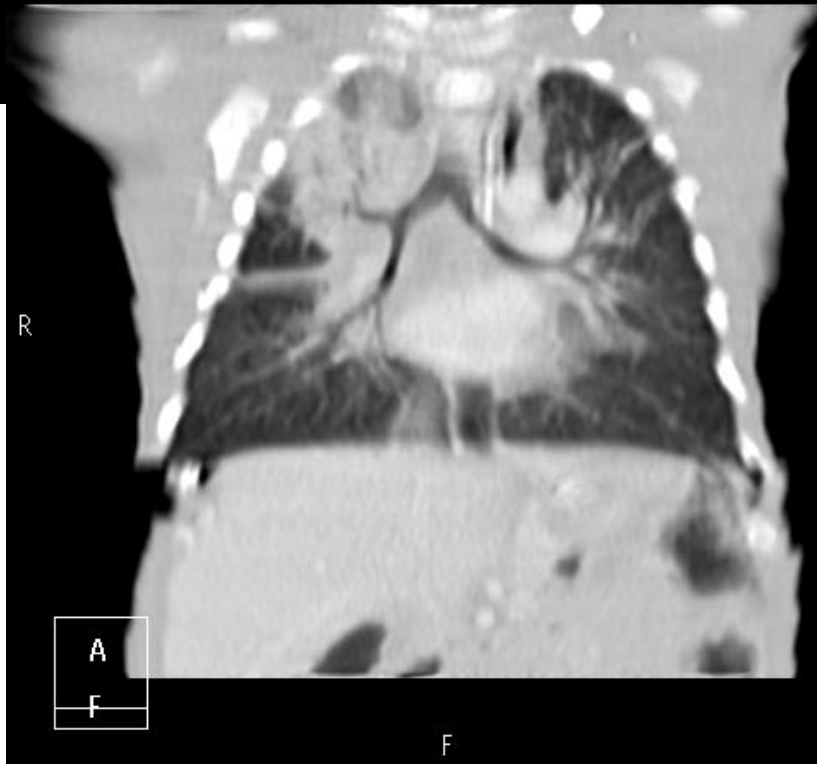
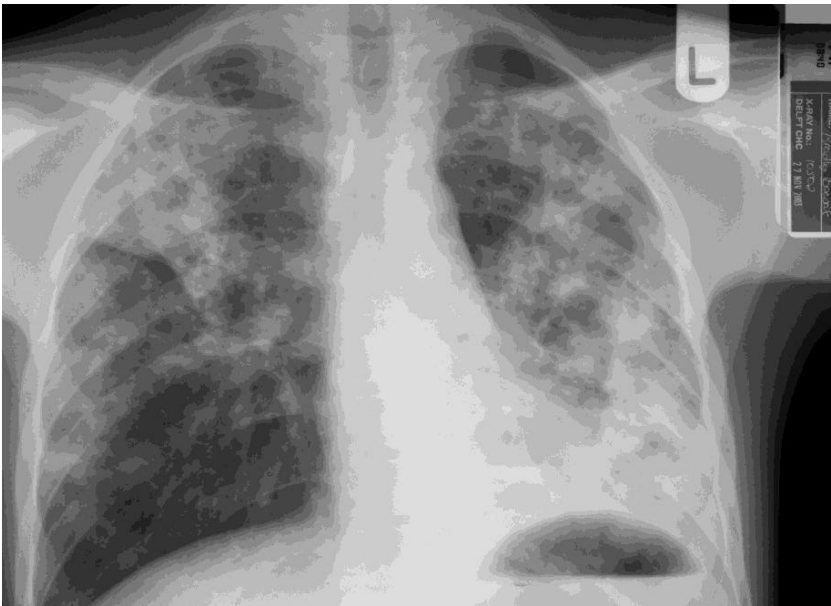
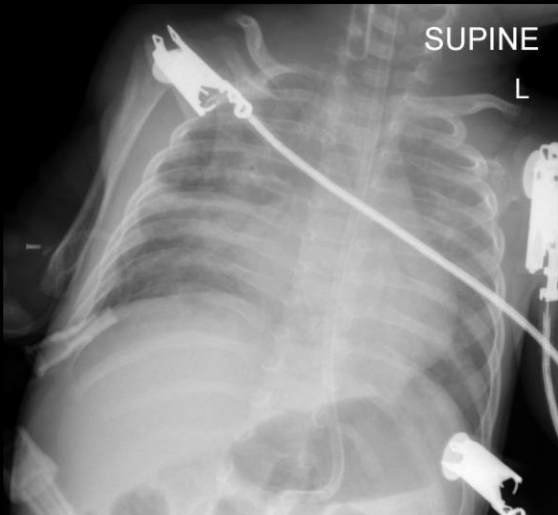
**Antiretroviral therapy for HIV-positive TB patients by WHO region and selected countries, 2003–2010**

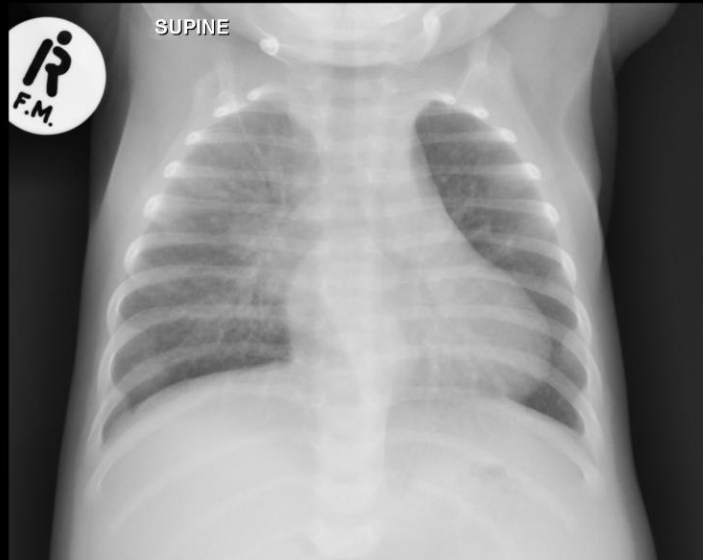


## b. Death rate

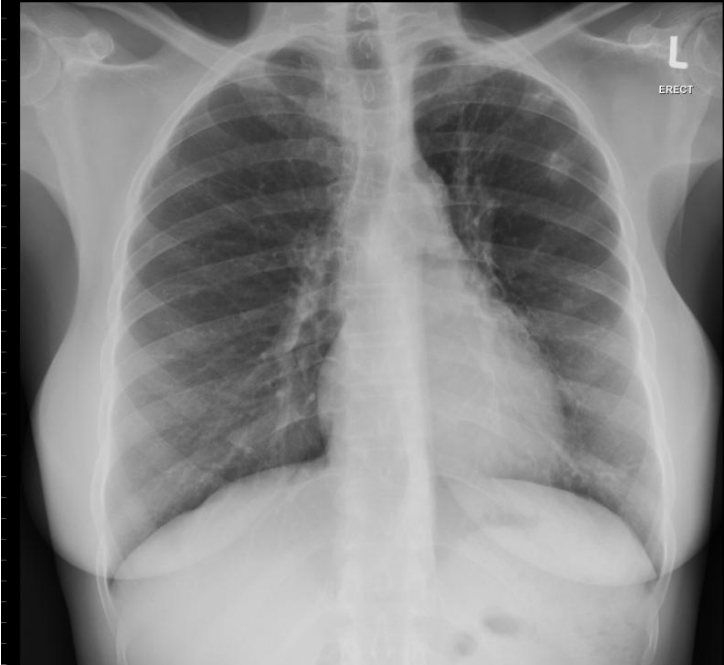


3 week old baby girl being ventilated for very severe pneumonia

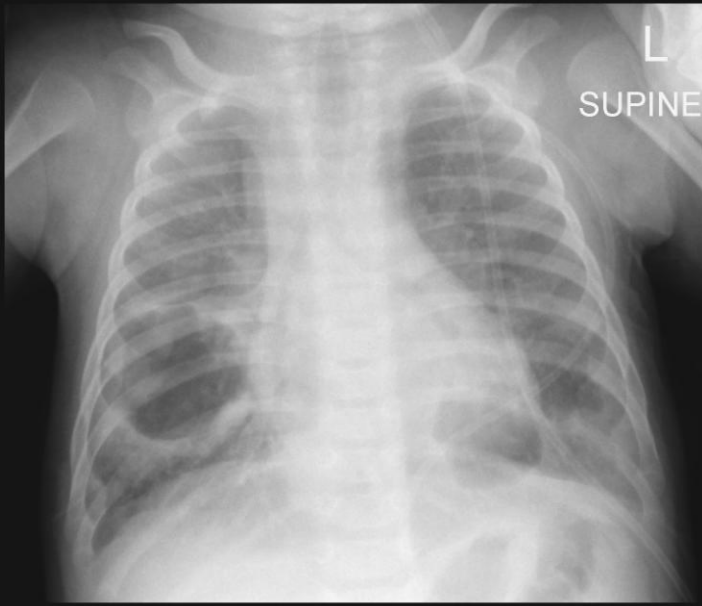




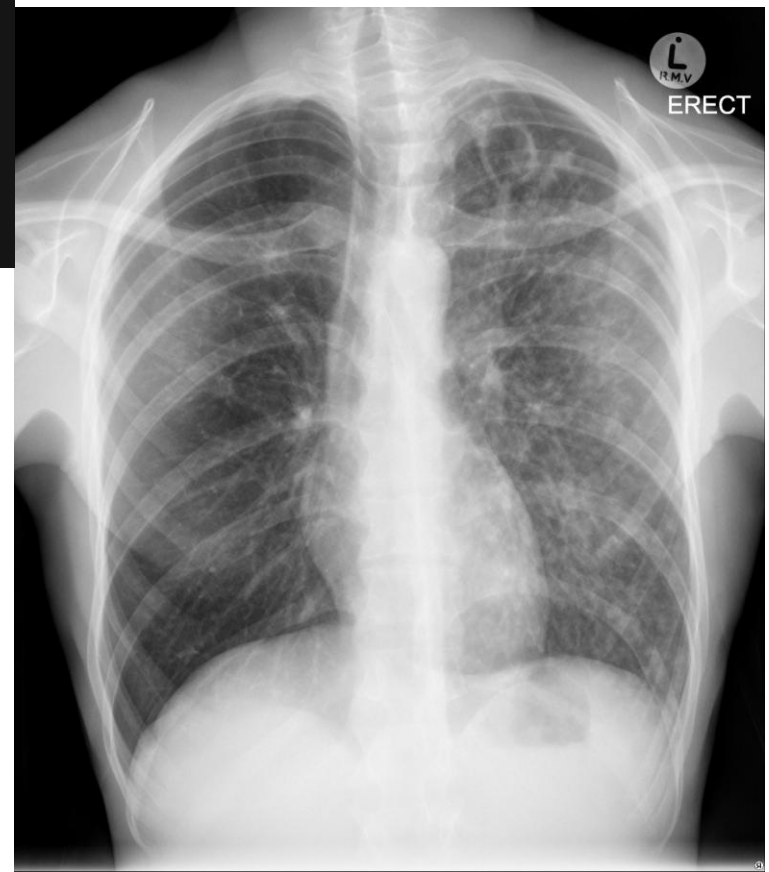
5 week old infant admitted  
severe airway obstruction not  
responding to beta 2 agonists

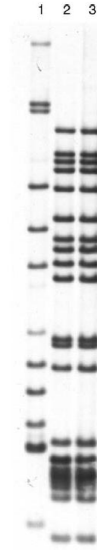
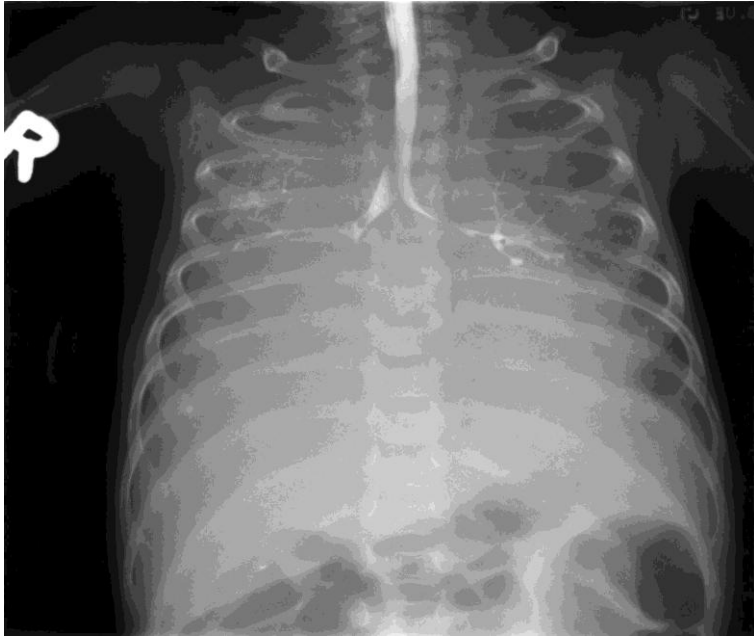






5 week old infant admitted with severe cavitating pneumonia





The 6 week old index case

The source case

And her infant child

Figure 3. Comparative restriction fragment length (RFLP) fingerprints of the sentinel case and the source case, providing evidence of nosocomial transmission. Lane 1: reference strain; lane 2: source case; lane 3: sentinel case.

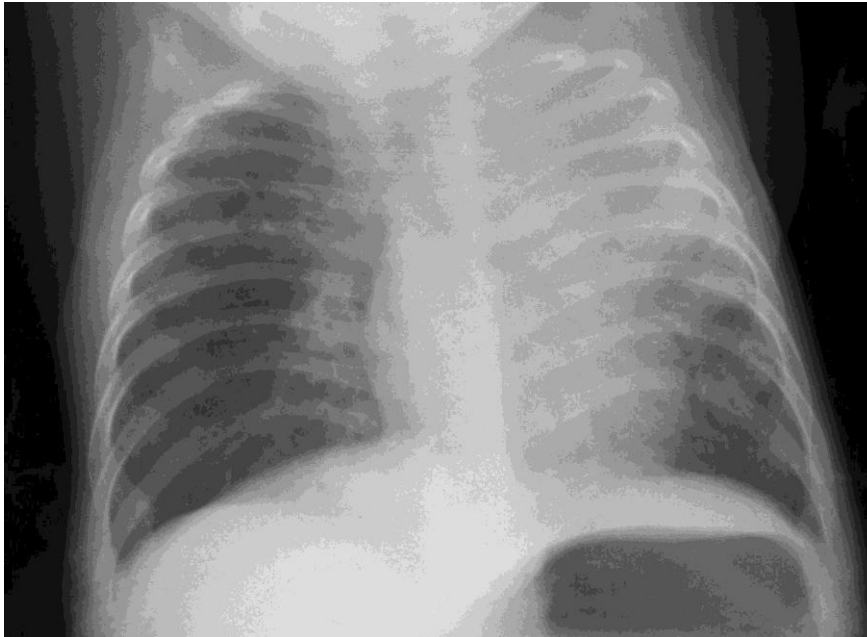


Table I. Duration of exposure, tuberculosis (TB) diagnosis and outcome in all infants exposed to an infectious tuberculosis source case in a kangaroo mother care (KMC) unit.

Patient number	Exposure duration	TB diagnosis	Time since KMC exposure	TB disease manifestation <sup>a</sup>	Outcome
1	> 15 d	TB (baby of source case)	2 mo	Complicated lymph node disease with expansile TB pneumonia	Good
2	15 d	TB	5 mo	Uncomplicated lymph node disease	Good
3	12 d	No TB			
4	10 d	TB (sentinel case)	3 mo	Complicated lymph node disease with airway compression	Good
5	10 d (twin no. 1)	TB	4 mo	Complicated lymph node disease with airway compression	Good
6	10 d (twin no. 2)	No TB			
7	5 d	Not found			
8	4 d	no TB	Mother diagnosed with TB <1 y		
9	2 d	no TB			
10	<1 d	Not found			
11	<1 d	Not found			

Are we doing enough for the pregnant mothers and their babies to prevent, diagnose and treat their TB?

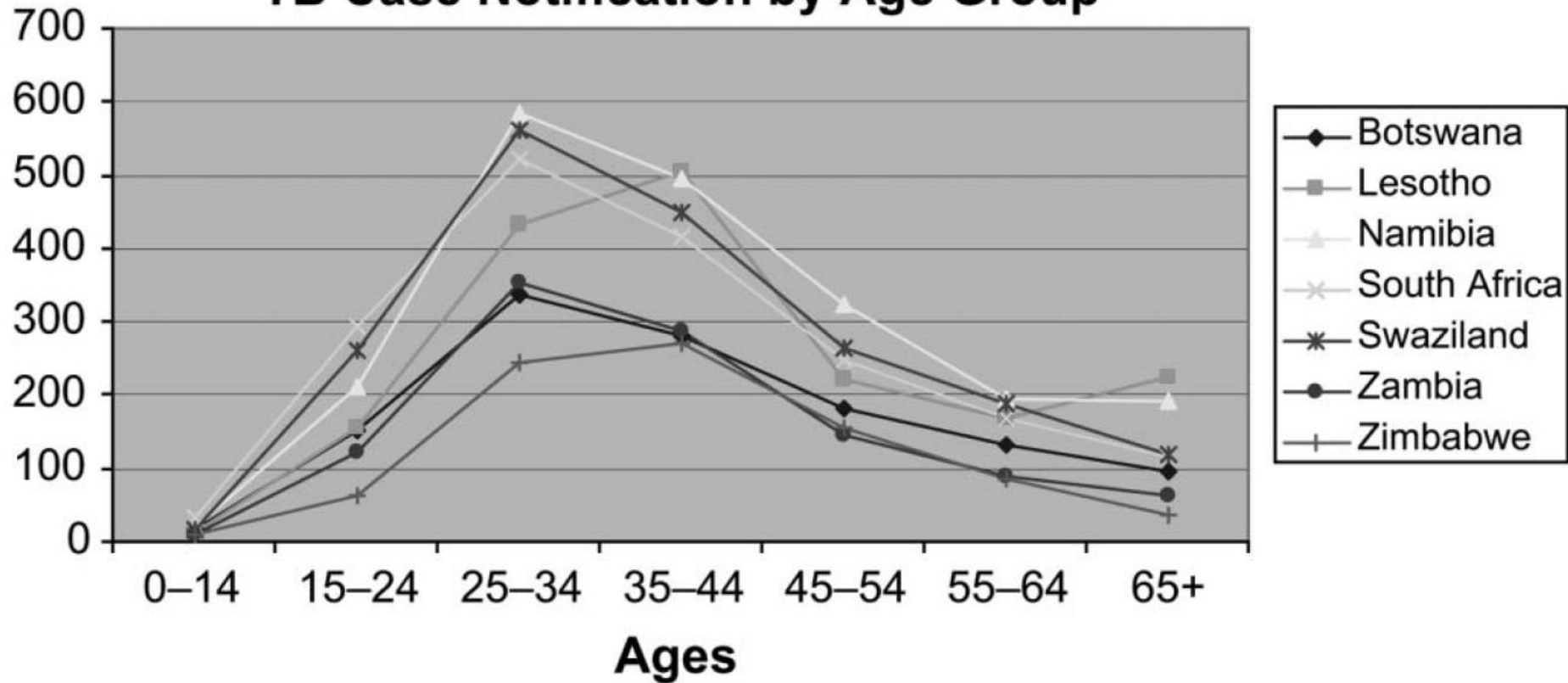


# Human Immunodeficiency Virus, *Mycobacterium Tuberculosis*, and Pregnancy: A Deadly Combination

Lynne M. Mofenson<sup>1</sup> and Barbara E. Laughon<sup>2</sup>

**Clinical Infectious Diseases 2007;45:250–3**

## TB Case Notification by Age Group



# What about the mothers?

Are they at increased risk ?

Table III. Causes of HIV-related maternal mortality  
(N = 146)

Cause	%	Number
WHO stage IV disease	21.2	31
Pneumonia	19.9	29
Pregnancy-related sepsis*	18.5	27
Pulmonary tuberculosis	15.1	22
Herbal ingestion	1.4	2
Hypertension	4.1	6
Obstetric haemorrhage	4.1	6
Pre-existing medical conditions	5.5	8
Other <sup>†</sup>	8.2	12
Missing information	2.1	3

\*Pregnancy-related sepsis (included puerperal sepsis and septic incomplete abortion)

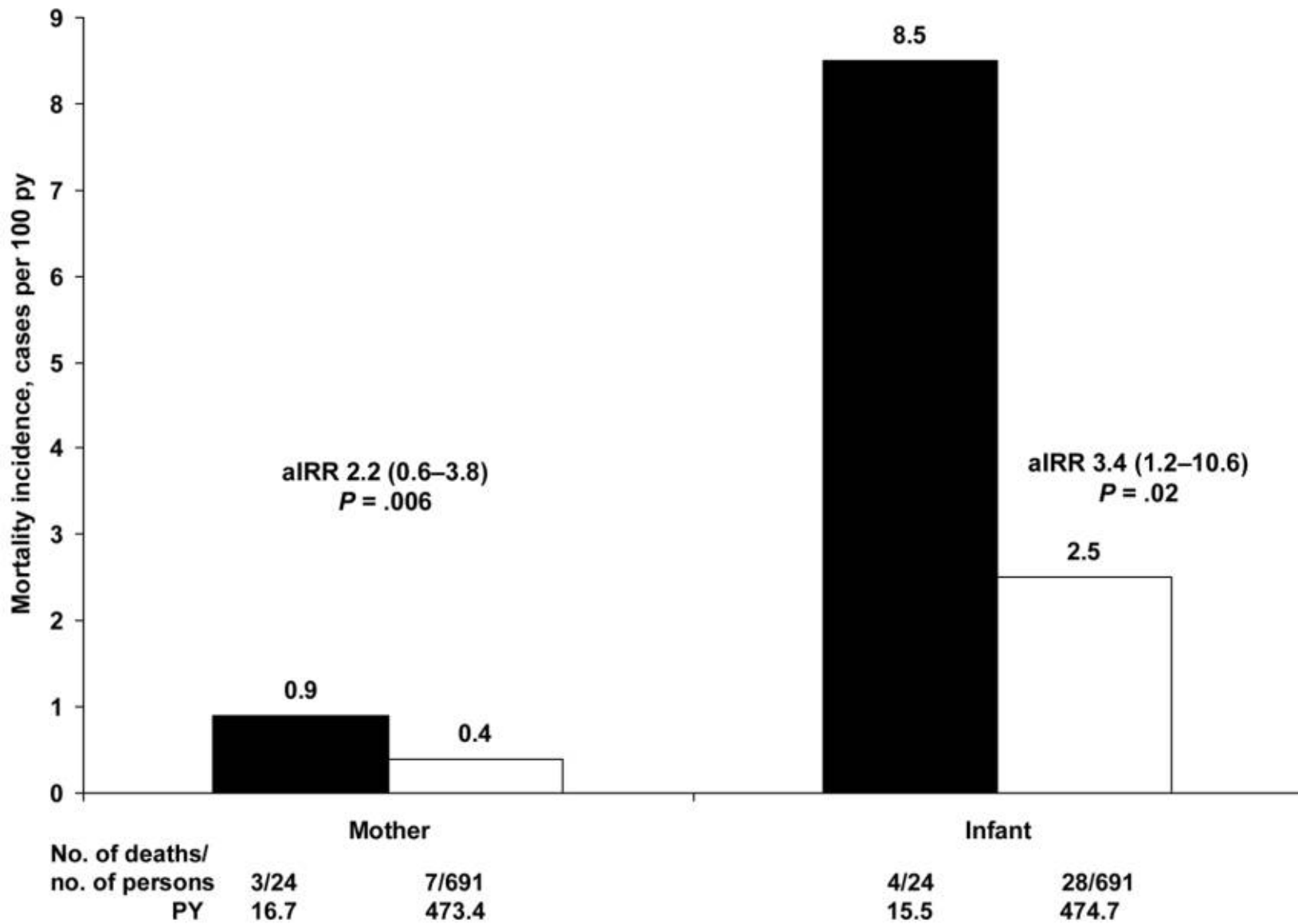
<sup>†</sup>Other – deaths from meningitis, molar pregnancy, adult respiratory distress syndrome, hepatitis and malaria.

**Table IV. Cause of death comparing HIV-positive and HIV-negative mothers (N (%))**

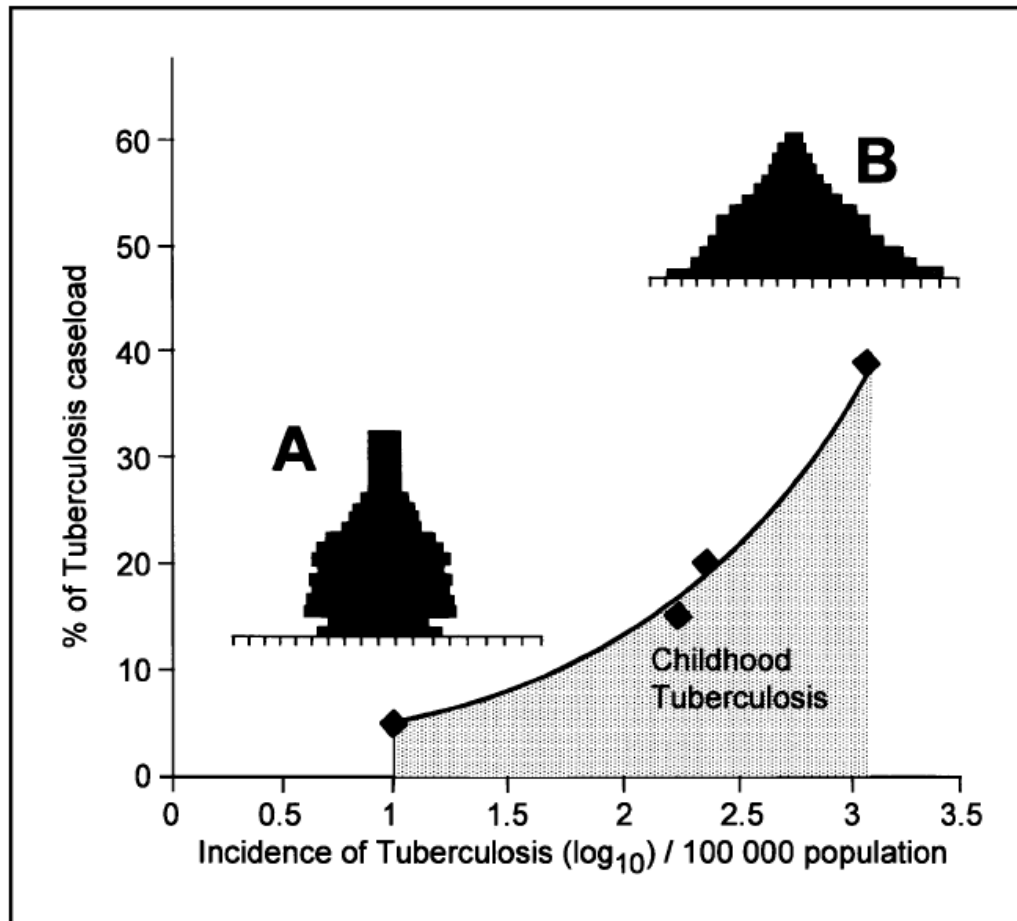
Cause of death	HIV-positive (N = 146, 38.6%)	HIV-negative (N = 50, 13.2%)
Pregnancy-related sepsis	27 (30)	16 (17.8)
Pneumonia	29 (90.6)	0 (0)
Pulmonary tuberculosis	22 (88)	0 (0)
Hypertension	6 (8.6)	11 (15.7)

*S Afr Med J* 2007; 97: 363-366.





**Figure 1. Percentages of the tuberculosis caseload**



The percentage of the tuberculosis caseload made up by children <15 years of age in relation to the incidence of tuberculosis/100,000 population and the population pyramids typical of an (A) developed and a (B) developing community.

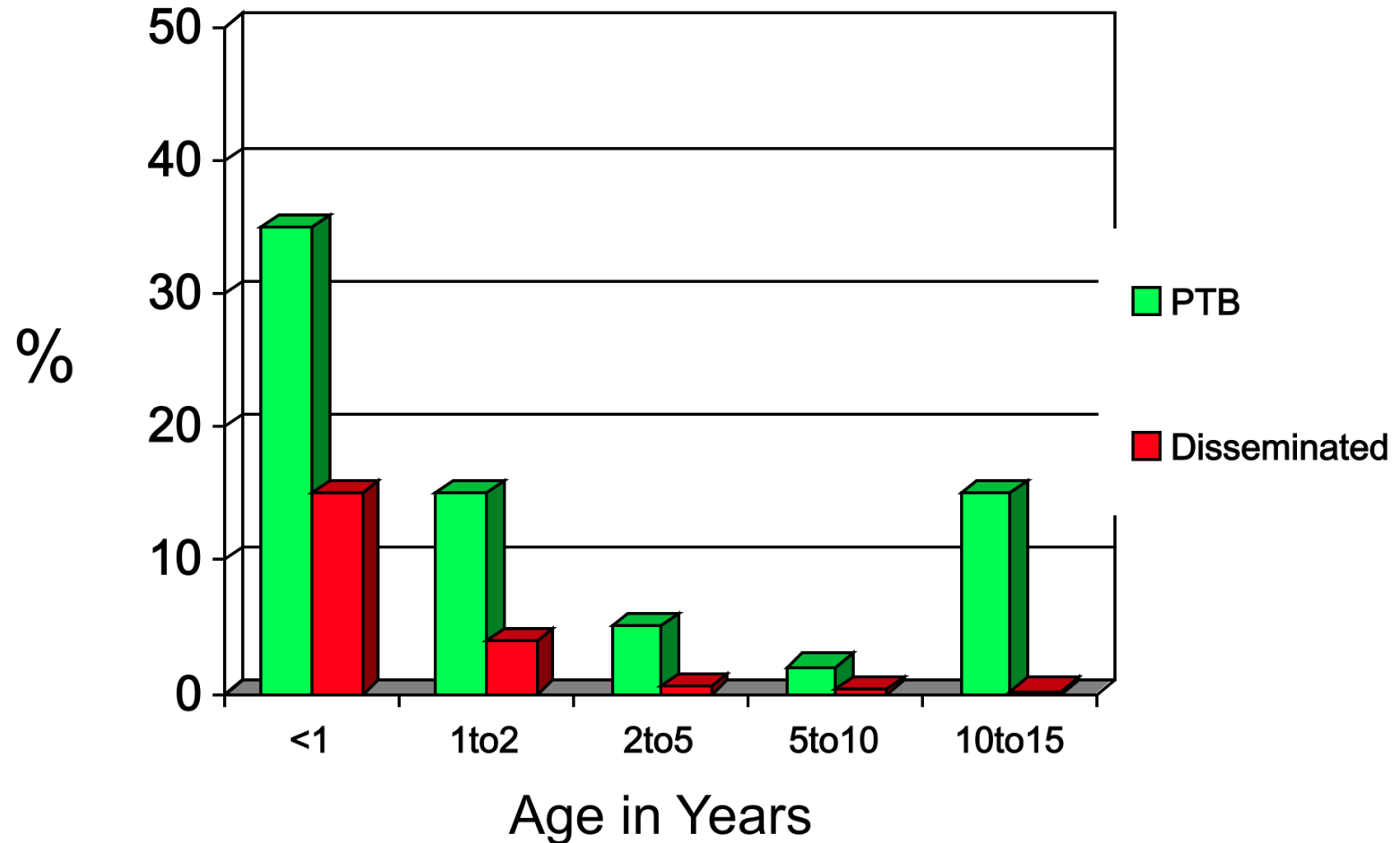
TABLE 3  
*Number of mothers with active tuberculosis in each age group*

Age (months)	Confirmed tuberculosis		Probable tuberculosis		Total confirmed and probable tuberculosis	Total active maternal tuberculosis
	Number	Active maternal tuberculosis	Number	Active maternal tuberculosis		
≤ 6	14	5 (36%)	3	1 (33%)	17	6 (35%)
6-12	15	1 (7%)	11	1 (9%)	26	2 (8%)
12-18	8	1 (13%)	9	2 (22%)	17	3 (18%)
18-24	4	—	—	16	—	—
24-36	10	—	5	1 (20%)	15	1 (7%)
48-60	—	—	1	—	1	—
60-72	4	—	1	—	5	—
≥ 72	4	—	3	—	7	—
	68	7 (10%)	49	5 (10%)	117	12 (10%)

# Exposure to TB in infancy;

- 77 of 766 ( 10.1% CI 8.0-12.4%) of HIV exposed infants screened before 3 months of age had a TB contact

# Age specific risk for disease after recent primary infection



**Table 2. Estimated incidence of culture-confirmed tuberculosis (TB) among HIV-infected and HIV-uninfected infants.**

Indicator	No. of TB cases per 100,000 population (95% CI)			Relative risk (95% CI)
	All infants	HIV-uninfected infants	HIV-infected infant	
Tuberculosis incidence	83.1 (73–94)	65.9 (57–75)	1596 (115–2132)	24.2 (17–34)
Pulmonary tuberculosis incidence	78.7 (69–89)	62.5 (53–72)	1505.6 (1075–2023)	24.1 (17–34)
Extrapulmonary tuberculosis incidence	28.2 (22–34)	22.9 (18–29)	481.8 (257–751)	21.0 (11–35)
Disseminated tuberculosis incidence <sup>a</sup>	16.6 (12–21)	14.1 (10–18)	240.9 (87–432)	17.1 (6–34)
Miliary tuberculosis incidence	10.9 (7–15)	9.3 (6–13)	150.6 (31–301)	16.2 (3–37)
Tuberculosis meningitis incidence	9.2 (6–13)	7.9 (5–11)	120.1 (28–258)	15.2 (3–39)

<sup>a</sup> Disseminated tuberculosis was defined as miliary tuberculosis, tuberculosis meningitis, or disseminated disease, diagnosed on the basis of positive culture results of isolates from blood culture and/or bone marrow.



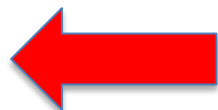
**Table 1** Clinical characteristics at tuberculosis diagnosis outcome in HIV-infected infants with culture-confirmed tuberculosis ( $n = 52$ )

	<i>n</i> (%)
Characteristics at TB diagnosis	
Male sex	28 (53.8)
Age, months, median [range]	6 [1–12]
Reported household TB contact	27 (51.9)
CD4%, median [range]	16.5 [1.6–45]
WHO Stage 3	29 (55.8)
WHO Stage 4	19 (36.5)
Unknown HIV stage*	4 (7.7)
PTB only	37 (71.1)
EPTB only <sup>†</sup>	2 (3.9)
PTB+EPTB <sup>‡</sup>	7 (13.5)
Disseminated TB (any)	6 (11.5)
Outcome	
Alive	27 (51.9)
Lost to follow-up	8 (15.4)
Died	17 (32.7)
Attributed cause of death ( $n = 17$ )	
PTB	2 (11.8)
Pneumonia ± septicaemia <sup>§</sup>	7 (41.2)
PTB + pneumonia or septicaemia	2 (11.8)
Destructive lung disease	1 (5.9)
Unknown cause of death	5 (29.4)



**Table 5** Mortality among exposed children according to proximity to and health status of the adult TB case compared with unexposed children

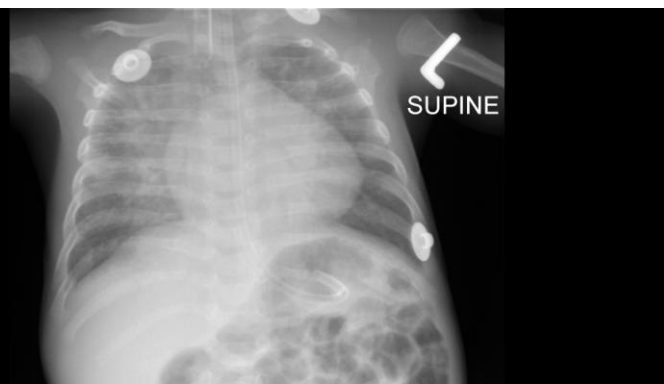
	Rate (deaths/100 PYO)	HR (95% CI)	p Value
Unexposed	3.48 (526/151)	1	
Proximity in the house			
Same family	5.94 (13/2.19)	2.15 (1.3 to 3.7)	0.28
Different family	4.43 (28/6.32)	1.51 (1.0 to 2.2)	
Relation to the TB case			
Mother	17.9 (2/0.11)	7.82 (2.1 to 30)	0.05
Other relative	4.01 (22/5.48)	1.42 (0.9 to 2.2)	
TB case is a guest	5.82 (17/2.92)	1.92 (1.2 to 3.1)	
Smear status of the TB case			
Positive	5.35 (15/2.81)	1.90 (1.1 to 3.2)	0.54
Negative	4.56 (26/5.70)	1.55 (1.0 to 2.3)	
HIV status of the TB case			
Positive	5.15 (16/3.12)	1.78 (1.1 to 2.9)	0.76
Negative	4.71 (25/5.31)	1.61 (1.1 to 2.4)	
Missing	0 (0/0.09)	—	
Survival status of the TB case			
Dead	4.44 (14/3.15)	1.58 (0.9 to 2.7)	0.79
Alive	5.06 (27/5.34)	1.72 (1.2 to 2.5)	
Missing	0 (0/0.02)	—	



PYO, person-years of observation.



# What can we do?



# Intensified Case Finding for Tuberculosis in Prevention of Mother-to-Child Transmission Programs: A Simple and Potentially Vital Addition for Maternal and Child Health

*Andrea DeLuca, MHS,\* Richard E. Chaisson, MD,\* and Neil A. Martinson, MBBCh, MPH\*†*

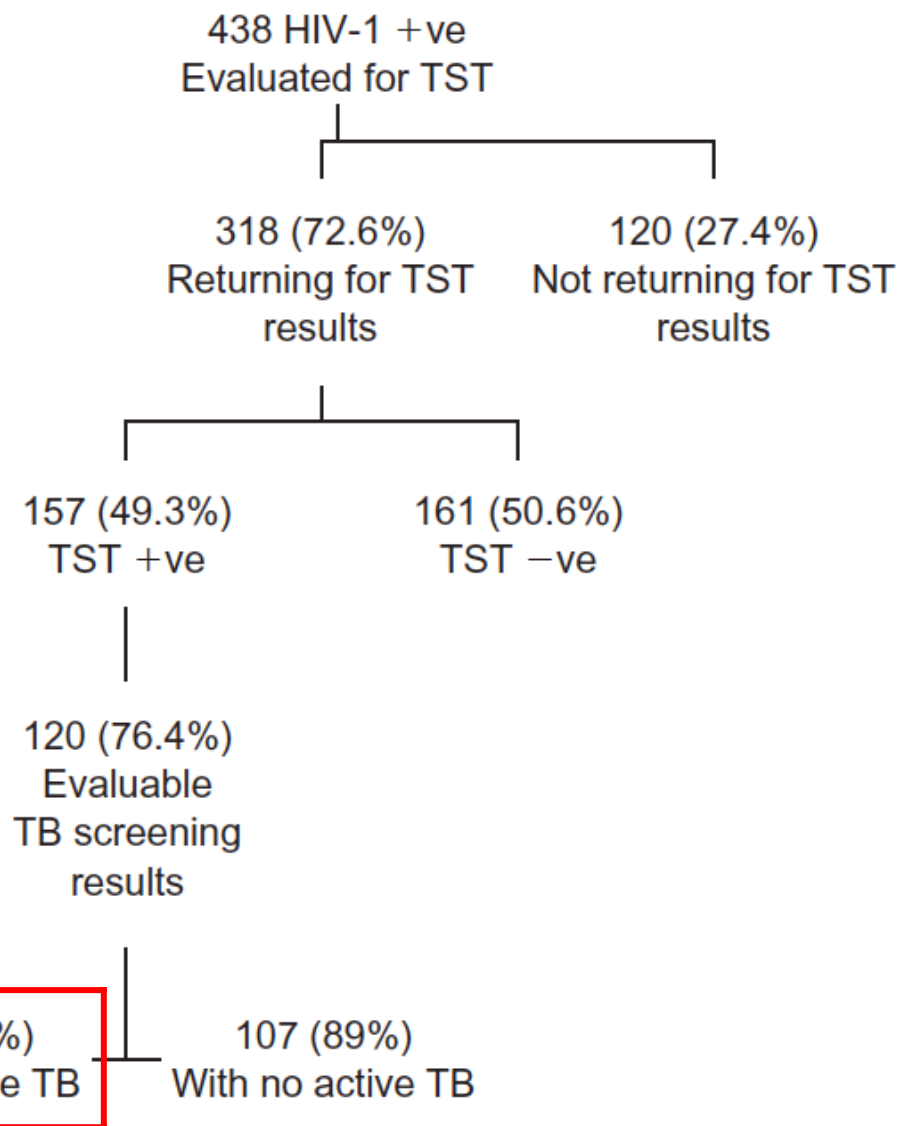
*J Acquir Immune Defic Syndr* • Volume 50, Number 2, February 1 2009

# Combining PMTCT With Active Case Finding for Tuberculosis

*Paula B.N. Kali, MBBCh,\* Glenda E. Gray, MBBCh, FCPaed (SA),\*  
Avy Violari, MD, FCPaed (SA),\* Richard E. Chaisson, MD,†  
James A. McIntyre, MBChB, FRCOG,\* and Neil A. Martinson, MBBCh, MPH\*†*

*J Acquir Immune Defic Syndr* • Volume 42, Number 3, July 2006

We found a prevalence rate of active TB of 2.16% (216/100,000) in this population of HIV-infected pregnant women in Soweto. Pregnant women with TB had significantly lower CD4 cell counts than women without TB but were otherwise similar.



**Tuberculosis active case-finding in a mother-to-child HIV transmission prevention programme in Soweto, South Africa**

Jean Nachega<sup>a,b</sup>, Jennifer Coetzee<sup>a</sup>, Tania Adendorff<sup>a</sup>, Regina Msandiwa<sup>a</sup>, Glenda E. Gray<sup>a</sup>, James A. McIntyre<sup>a</sup> and Richard E. Chaisson<sup>b</sup>

**Fig. 1. Tuberculosis case-finding at Chris Hani Baragwanath Perinatal HIV Research Unit in Soweto, South Africa.** TB, Tuberculosis; TST, tuberculin skin test.



1

**ERADICATE  
EXTREME POVERTY  
AND HUNGER**



2

**ACHIEVE UNIVERSAL  
PRIMARY EDUCATION**



3

**PROMOTE GENDER  
EQUALITY AND  
EMPOWER WOMEN**



4

**REDUCE  
CHILD MORTALITY**



5

**IMPROVE MATERNAL  
HEALTH**



6

**COMBAT HIV/AIDS,  
MALARIA AND OTHER  
DISEASES**



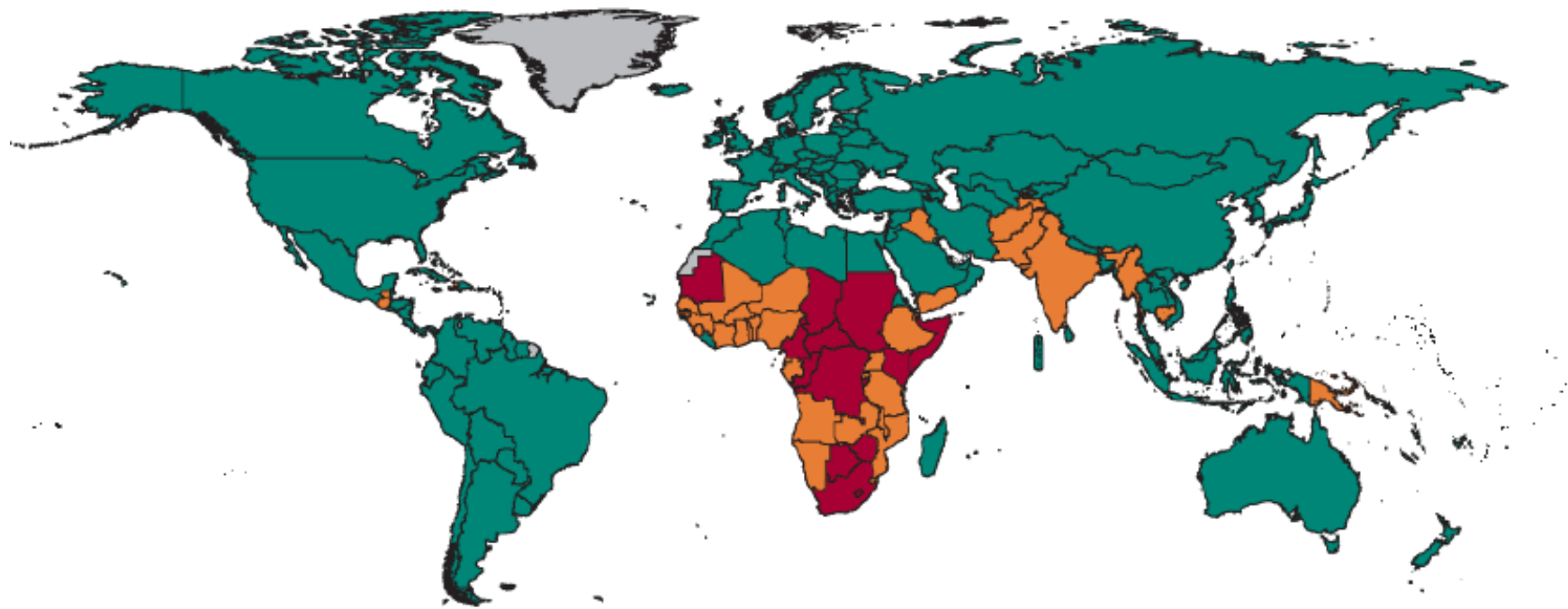
7

**ENSURE  
ENVIRONMENTAL  
SUSTAINABILITY**



8

**A GLOBAL  
PARTNERSHIP FOR  
DEVELOPMENT**



ORIGINAL ARTICLE

## Integration of Antiretroviral Therapy with Tuberculosis Treatment

Salim S. Abdool Karim, M.B., Ch.B., Ph.D., Kogieleum Naidoo, M.B., Ch.B.,  
Anneke Grobler, M.Sc., Nesri Padayatchi, M.B., Ch.B., Cheryl Baxter, M.Sc.,  
Andrew L. Gray, M.Sc.(Pharm.), Tanuja Gengiah, M.Clin.Pharm., M.S.(Epi.),  
Santhanalakshmi Gengiah, M.A.(Res.Psych.),  
Anushka Naidoo, M.Med.Sci.(Pharm.), Niraksha Jithoo, M.B., Ch.B.,  
Gonasagrie Nair, M.B., Ch.B., M.P.H., Wafaa M. El-Sadr, M.D., M.P.H.,  
Gerald Friedland, M.D., and Quarraisha Abdool Karim, Ph.D.

N Engl J Med 2011;365:1492-501.



# The fourth I: scaling up implementation of collaborative TB-HIV activities to protect vulnerable mothers and infants



*Every breath counts*



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