Contact Follow-Up and Treatment of LTBI in Households of Infectious Cases in Pakistan

17th Annual Conference, The Union-North American Region, Vancouver, Canada.
28 February 2013

Farhana Amanullah
Director Pediatric TB, The Indus Hospital.
Member :Core-group childhood TB
Stop TB Partnership

Outline

- Why screen child contacts?
- WHO guidance 2012-2013
- Natural history of TB in children and opportunities for intervention
- Policy-Practice gap
- Diagnosing LTBI
- Examples of Contact investigation/ LTBI and IPT in high burden settings
- Contact Investigation/management protocol (Karachi/Pakistan)
  - Overall TB burden
  - LTBI in DR-TB contacts
  - IPT program
- Challenges
- Summary

A TB-free world

- Stop TB Strategy:
  - To dramatically reduce the global burden of TB by 2015 in line with the Millennium Development Goals and the Stop TB Partnership Targets
  - Address the needs of TB contacts, and of poor and vulnerable populations

Why screen contacts?

- Identify contacts of all ages with undiagnosed TB disease.
- Provide preventive therapy for contacts without TB disease that are susceptible to developing disease following recent infection.
  - all children of less than 5 years of age
  - HIV-infected children of any age

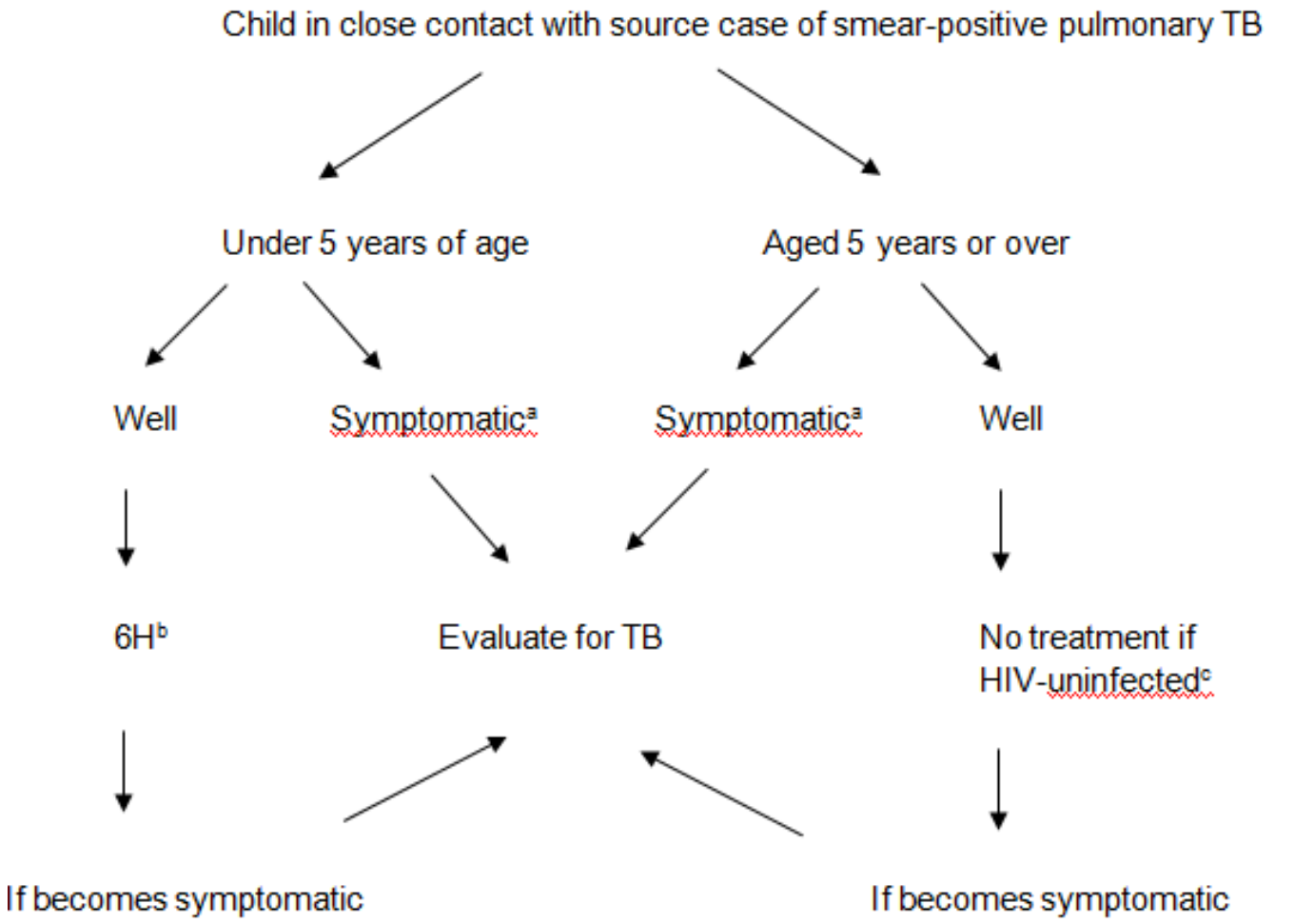
Why screen child contacts?

- identify new TB cases
- routine screening is widely recommended including by WHO.
- mechanism of active or intensified case-finding (Stop TB Strategy)
- Early identification of disease among contacts can decrease disease severity and improve outcomes and reduce subsequent rates of transmission.
- if the index case is a child, then it is recommended that contact screening include efforts to identify the likely source case

WHO guidance 2012-2013

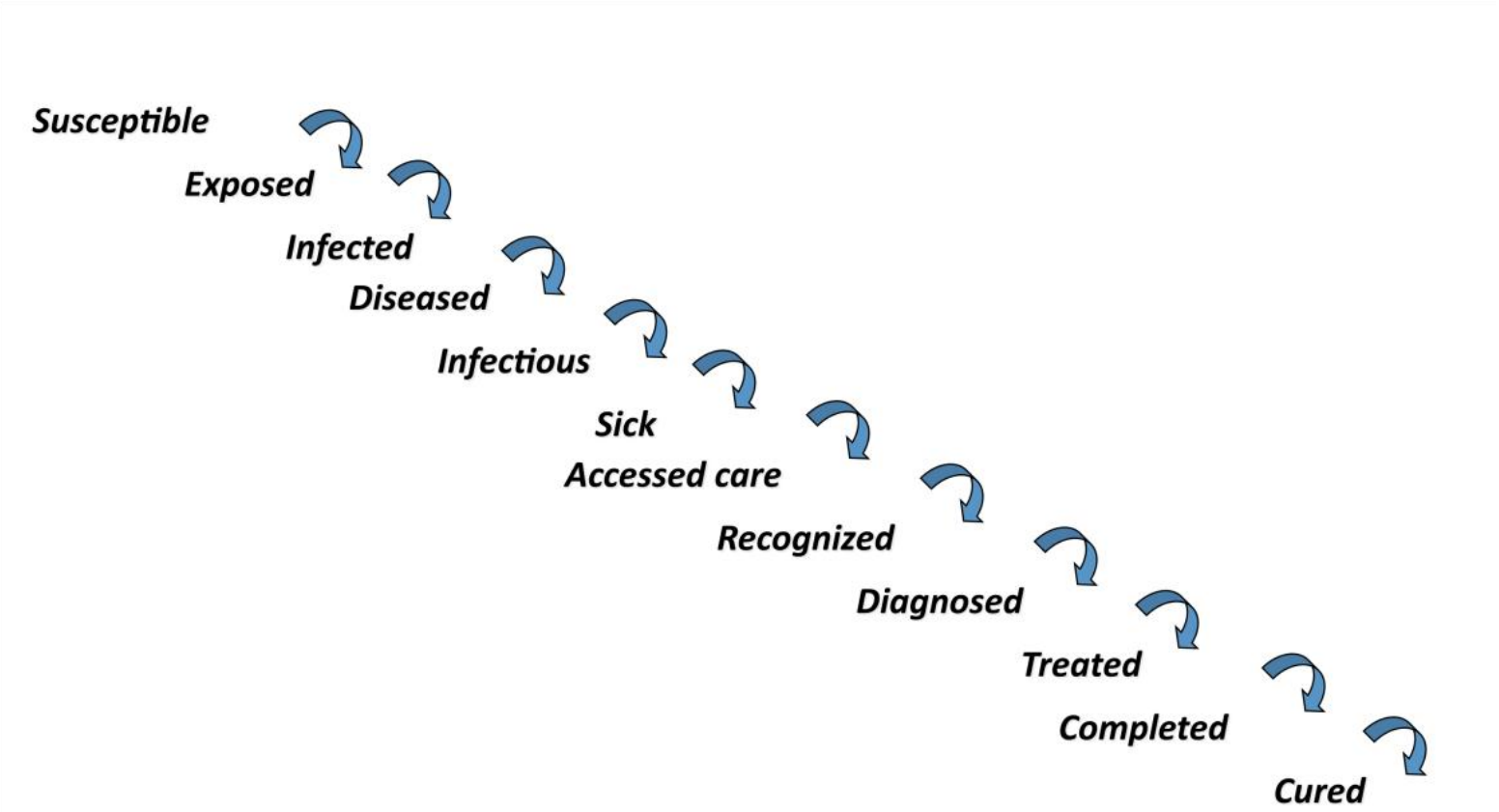
- **Clinical evaluation of household and close contacts for TB disease should be done on the basis of their risk for having or developing TB disease or for the potential consequences of the disease if it develops. Priority should be given to:**
- **children with symptoms suggestive of TB,**
- **children < 5 years of age,**
- **children with known or suspected immunocompromising conditions (especially PLHIV), and**
- **child contacts of index cases with M/XDR TB (proven or suspected).**

Symptom based screening approach to child contact management



[a] If TB is suspected, refer to chapter 2.
[b] Isoniazid 10 mg/kg (7-15 mg/kg) daily for 6 months.
[c] If HIV-infected, isoniazid daily for 6 months is indicated regardless of age.

Figure 1: Transitions in Tuberculosis

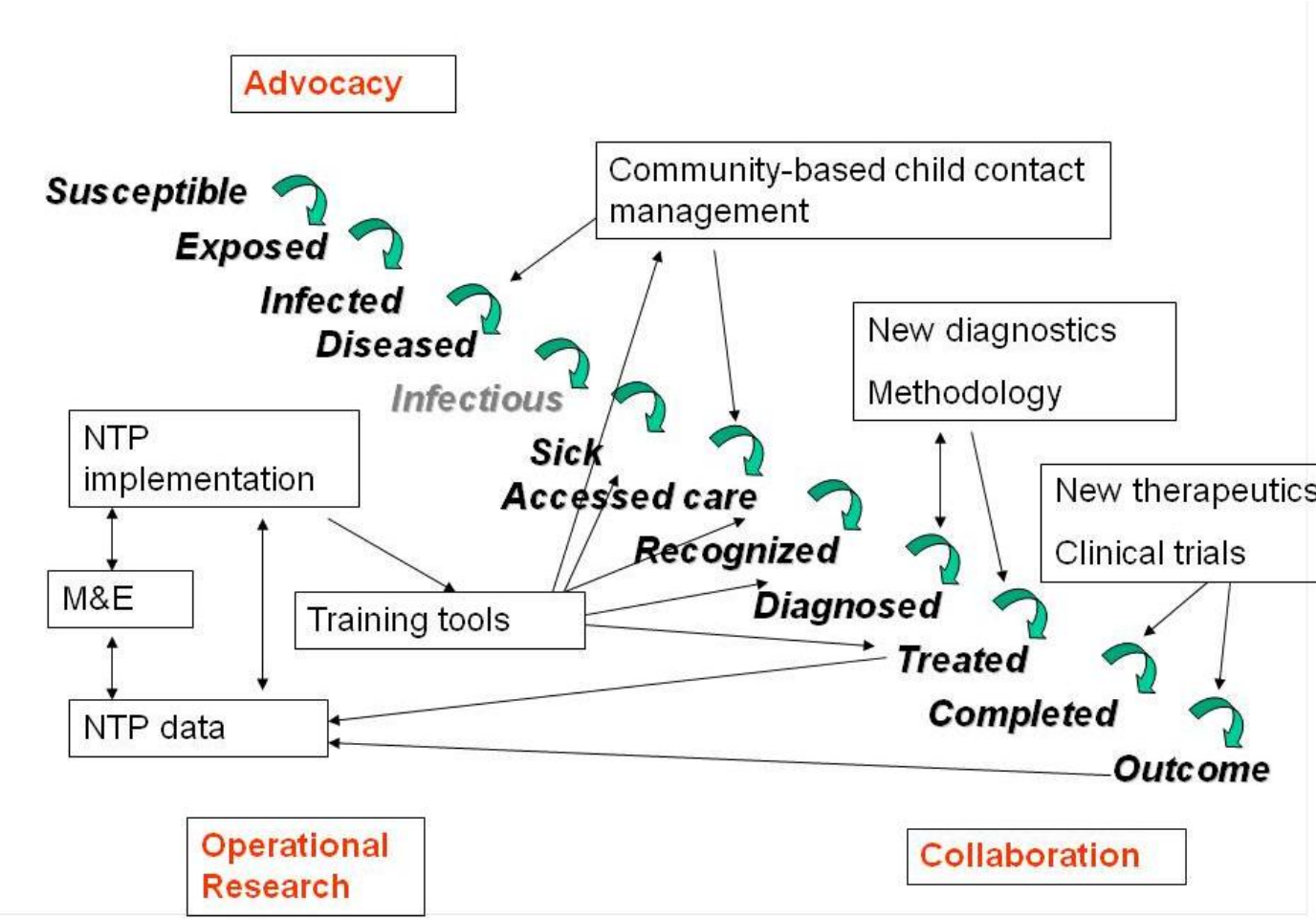


Ref: Enarson DA, Ait-Khaled N. Tuberculosis. In: Respiratory Epidemiology in Europe, Annesi-Maesano I, Gulsvik A, Viegi G, eds. Huddersfield: The Charlesworth Group, 2000: 67-91

Infection to disease

- Any child infected with *M. tuberculosis* may develop active TB disease.
- The majority of disease in children occurs within one year of primary infection
- Contact history very important
- Burden of TB in children reflects on-going transmission in a population

Figure 2: Examples of Opportunities for Intervention at Points in Transitions in TB



Childhood TB Roadmap: Stop TB Partnership (Graham S, Menzies H, Gremszka M)

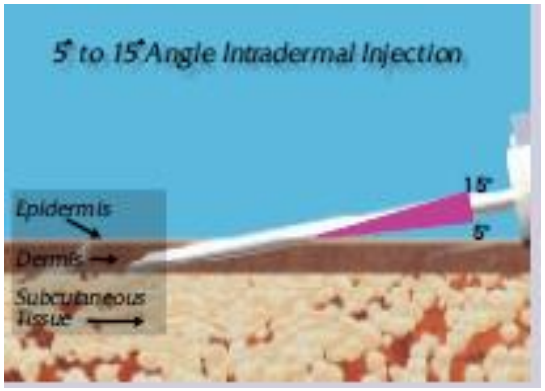
Policy-Practice Gap

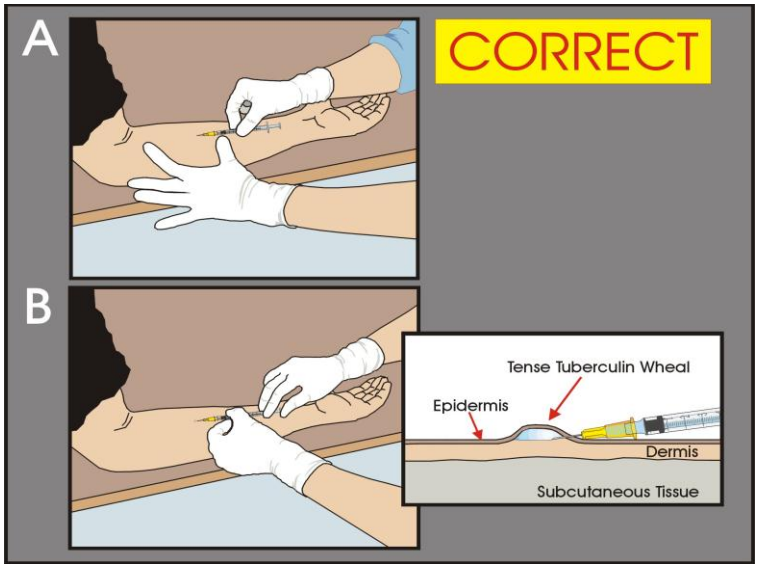
1) limited NTP resources are focused on the management of TB disease,
2) the perceived need for specialised services and investigations to provide adequate clinical evaluation
3) concerns regarding re-infection and poor adherence in relation to the development of resistance .
4) attempts to implement the policy have been characterised by

   Low attendance for screening, poor adherence to preventive treatment, and high defaulting rates

Closing the Policy-Practice Gap in the Management of Child Contacts of Tuberculosis Cases in Developing Countries. Graham S M et al. Plos Med. 2011

Tool for diagnosing LTBI





5 tuberculin units (TU) of tuberculin purified protein derivative (PPD)-S

Causes of false positive TST

- Ruptured small venule at time of injection.
- Trauma to the site (eg. scratching).
- Failure to distinguish erythema from induration.
- Past BCG vaccination or exposure to NTM
- Sensitivity to preservatives in PPD.

Causes of false negative TST

- Tuberculin: out of date or improperly handled
- Subcutaneous injection or unrecognised leakage at the time of administration.
- Reading of the test within 48 hrs or longer than 5 days of injection.
- Test performed soon after TB infection (as it can take 2-12 weeks for a detectable immune response to MTB to develop)
- Acute viral or bacterial infections, including active TB (up to 25% of TB patients).
- Impaired cellular immunity – eg. neonates,
- immunosuppression (including steroid therapy), HIV, malnutrition (eg. from living in refugee camps), renal failure, some malignancies.
- Waning cellular immunity to PPD
- Recent live virus vaccination (within the preceding 4 weeks)

Pediatric contact investigation and IPT in endemic settings

In a program setting, with HCW training and introduction of specific documentation (IPT card and register), implementation of contact tracing and chemoprophylaxis for child contacts improved from 19% to 61%.

B. Rekha, K. Jagarajamma, V. Chandrasekaran, F. Wares, R. Sivanandham, S. Swaminathan, Improving screening and chemoprophylaxis among child c ontacts in India's RNTCP: a pilot study. INT J TUBERC LUNG DIS 17(2):163–168,2013

LTBI and TB disease in endemic settings

- Lao PDR, (289/100,000) the risk of LTBI in children living with TB patients was found to be 31% . (BMC Infectious Disease-2009)

TB disease in DR-TB contacts

- Child contacts had TB disease rates approximately 30 times higher than children in the general population (JPIDS-2012)

Systematic Contact Investigation Protocol

- At health care facilities
  - Identify and document all close contacts of a new sputum smear positive patient
  - Refer to counselor
  - Symptom screen of all child contacts
  - Referral of all symptomatic contacts and children less than 5 years of age for further testing
  - History, physical examination, weight and height assessment, documentation of BCG scar, TST, CXR, sputum or gastric aspirate testing where indicated.

Contact Investigation/Management

- IPT for all children less than 5 years of age who are close contacts, are symptom free, and have no evidence of TB disease.
- Treatment for children with TB disease
- 3 monthly follow-up of high risk individuals
  - Malnourished, immune compromised, LTBI, poor weight gain.

Sources of referral

- Treatment supporters/HCWs
- TB clinic counselor
- TB symptom screens: malnutrition clinics, general pediatric clinics, following inpatient care, EPI centers, community awareness campaigns, GP engagement.

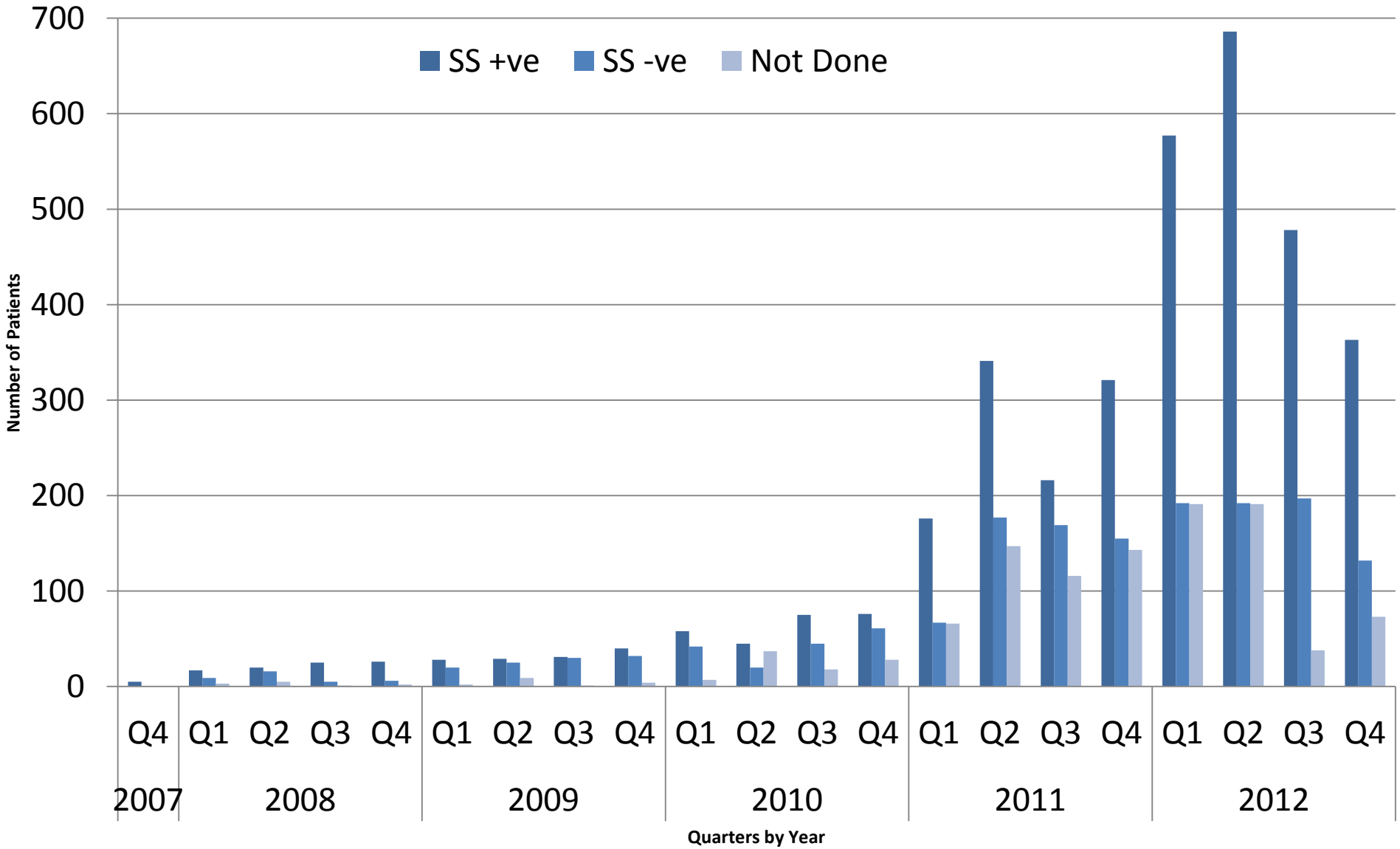
TB Burden in Pakistan

- 300,000 incident drug-susceptible TB cases and 15,000 MDR-TB cases annually
- estimated TB prevalence was 355 per 100,000 (2010)
- TB disease prevalence- 1.8% among children in contact with newly diagnosed adult TB patients (pulmonary and extrapulmonary)
  - 42% of these index patients were the mothers of the child contacts.

Batra S, Ayaz A, Murtaza A, Ahmad S, Hasan R, Pfau R. Childhood tuberculosis in household contacts of newly diagnosed TB patients, PLoS One **2012**:7(7): e40880.

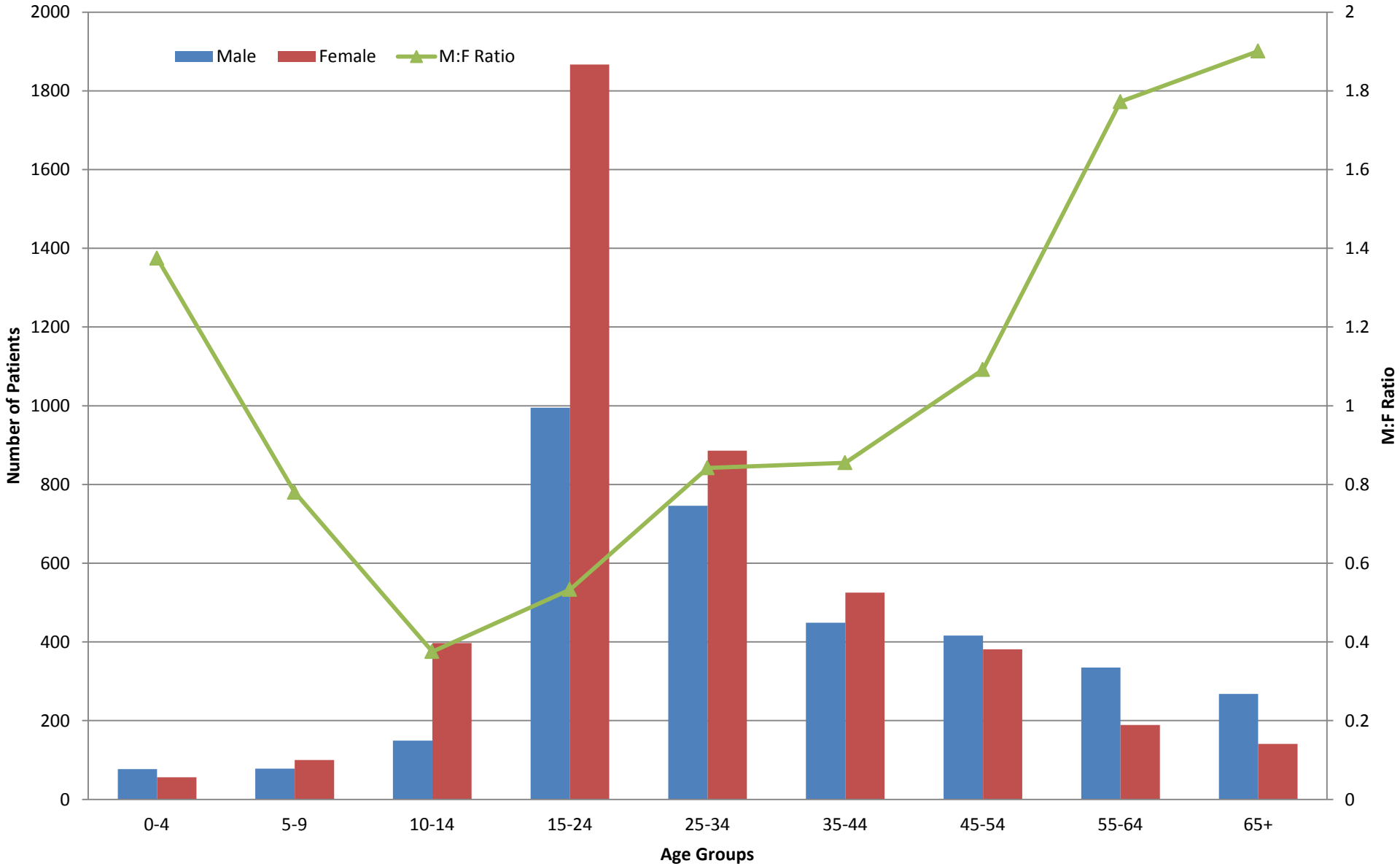
Pulmonary SS +ve & SS-ve Case Notification by Quarter

Indus Hospital DOTS Clinic 2007-2012



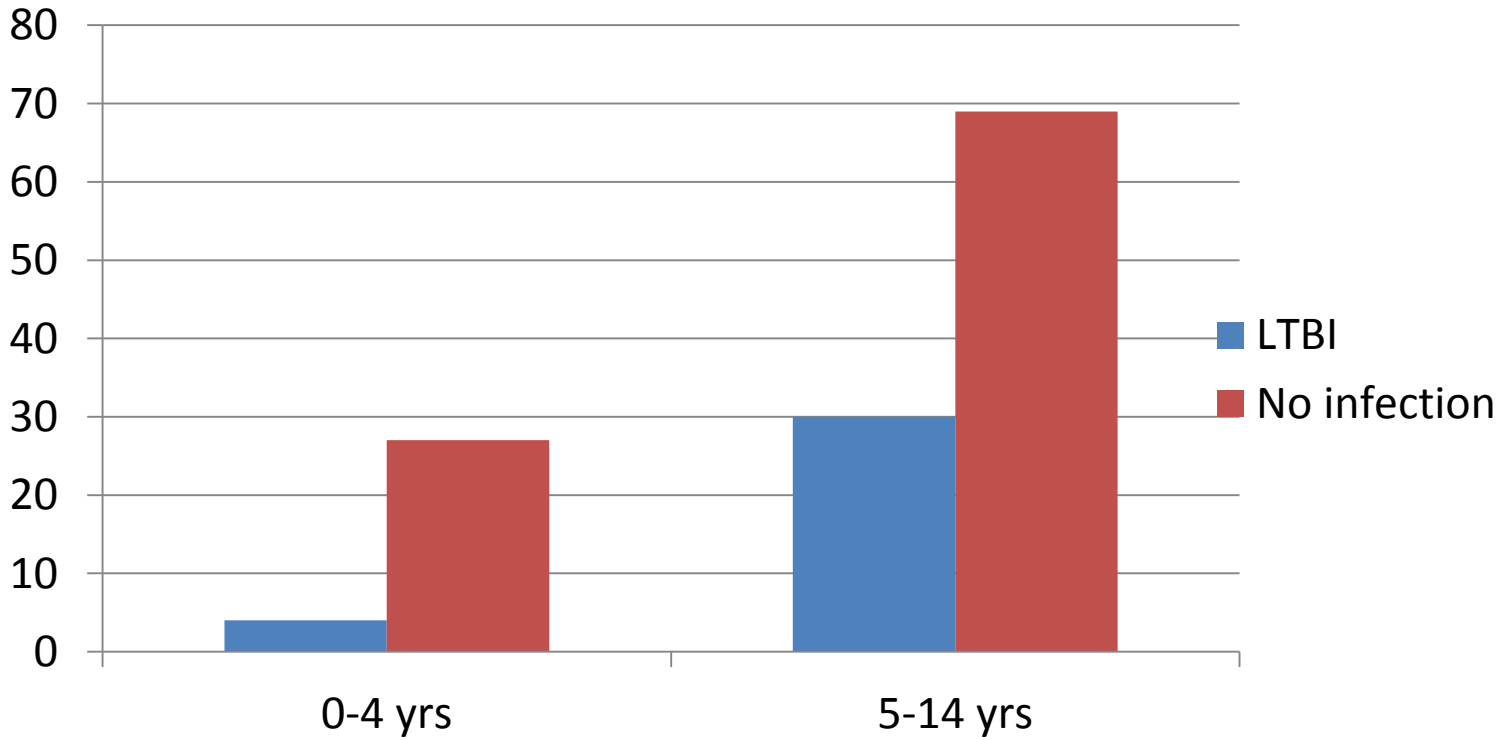
Age and Gender Distribution of TB Patients

Indus Hospital DOTS Clinic 2007-2012



TB disease and LTBI in childhood contacts of adults with DR-TB (Indus Hospital)

	TB disease	LTBI	No disease/LTBI	Total
0-4 years	4 (11.4)	4 (11.4)	27	35
5-14 years	9 (8.3)	30 (27.7)	69	108
Total	13 (9)	34 (23.7)	96	143



TB disease and LTBI in childhood contacts of adults with DR-TB (Indus Hospital)

- More than half of the younger and most vulnerable children in our study had a parent as the likely source case.
  - Half of the index patients in our study were the mothers of the child contacts in the home

Isoniazid Prophylaxis Therapy Outcome by Quarter
Indus Hospital DOTS Clinic 2011-2013

Therapy Outcomes	**2011** N	**2012** N				**2013** N	N(%)
	Q4	Q1	Q2	Q3	Q4	Q1	Total
Completed	7	7	4	1			19(16)
Default	4	8	5	4			21(18)
***Primary Default**	8	7	14	11			40(34)
On IPT				3	29	5	37(32)
Total	19	22	23	19	29	5	117

*Children who were started on IPT and given Isoniazid for a month, but did not follow up after their initial visit.

Challenges in LTBI diagnosis

- Not routinely done or treated
- TST limitations
  - Cost
  - Tuberculin availability
  - Administration
  - TST requires two visits
  - Accuracy of interpretation
- Ruling out active disease
- Management in DR-TB contacts

Challenges in IPT provision

- Poor understanding of importance of IPT (parents and health care providers) in young children
- Poor attendance for screening and follow-up
  - Side effects (GI disturbance)
  - Erratic adherence, long treatment schedule in well children
- No provision for IPT/LTBI documentation in TB forms
- INH stock-outs or overstocked and expired

Summary

- Contact investigation, LTBI diagnosis, IPT provision for young children- Weak or non-existent in resource poor settings.
- Recording and reporting: lack of documentation of screening, follow-up, drug supply and outcomes
- Training of TB care providers (including HCWs) in systematic contact investigation/management, needed as a priority.
- Child contact screening needs to be integrated into MCH services, EPI centers, nutrition clinics, inpatient settings.
- Approach to TB as a “Family disease” is key to a TB-free world.