



GGD
Amsterdam

TB Contact investigation – the role of pulmonologists?

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Disclosure of speaker's interests

(Potential) conflict of interest	None
Potentially relevant company relationships in connection with event	None



TB in the Netherlands

- 2018: 806 TB cases (4,8/100.000) in the Netherlands
- Approximately 80% of the TB patients were diagnosed in a hospital

Patients (20%) found by the GGD (Public Health Service of the Municipality):

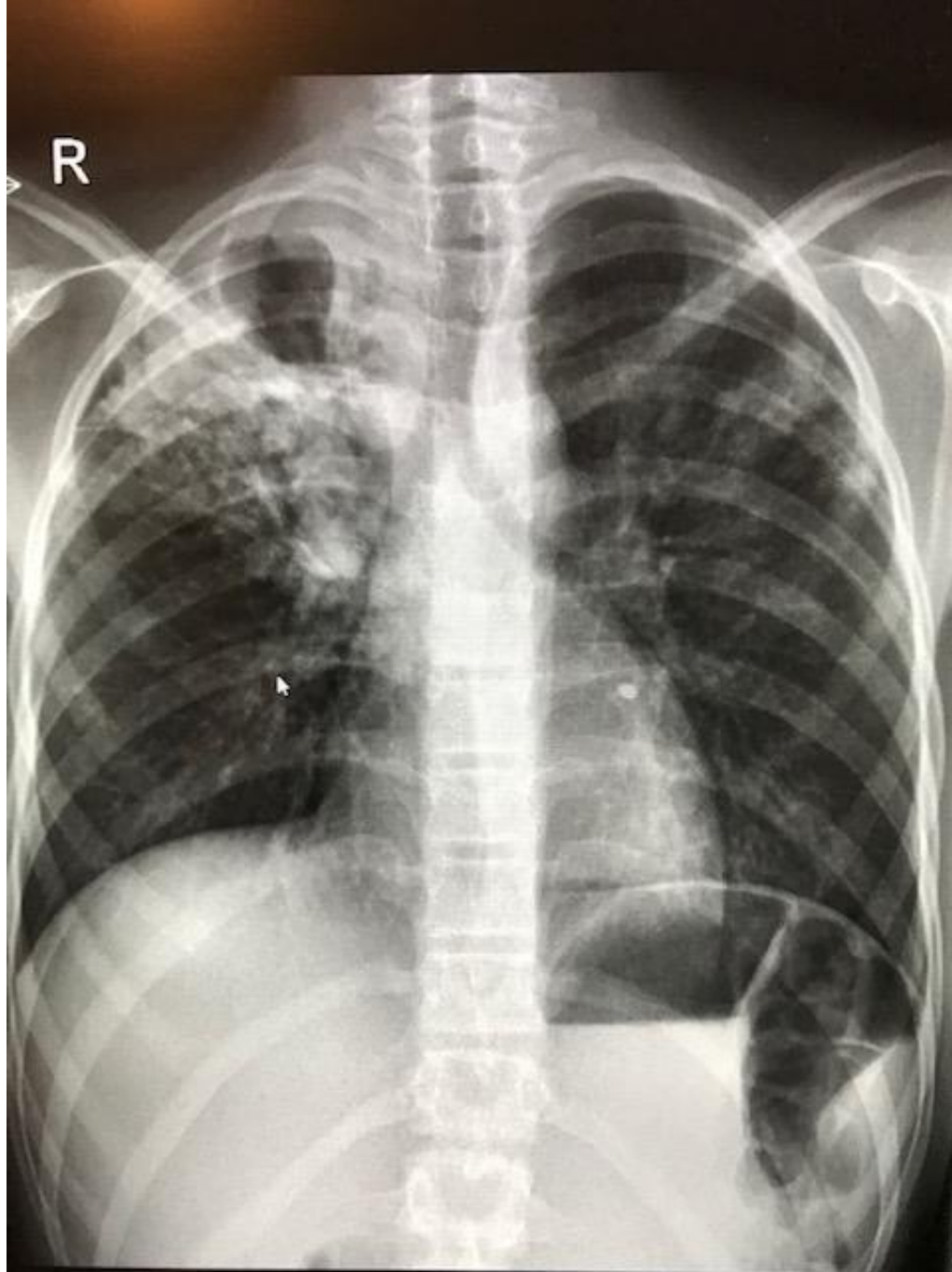
- 50 % - screening protocols for immigrants, asylumseekers, riskgroups by the GGD¹
- 50 % - contact investigation (CI) concerning TB patients by the GGD¹

¹Bron: Handboek tuberculose in Nederland 2018



CI: example of a Somali family

- Index 10 yrs old schoolgirl
- parents, 3 brothers and 2 sisters
- Diagnosed in a hospital (via general practitioner) because of coughing and malaise
- Coughing for approximately 2-3 months





Example of a Somali family

- Index 10 yrs old schoolgirl
- 2 parents, 3 brothers and 2 sisters
- Found in a hospital (via general practitioner) because of coughing complaints and malaise
- Coughing for approximately 2-3 months
- Smear positive and PCR positive
- Conclusion: contagious!



Why do we investigate contacts?

1. Because contacts are an important high risk group for tuberculosis and
2. The investigation of contacts is a very effective intervention
 1. To reduce morbidity and fatality due to TB
 2. To arrest further transmission
 3. To contribute to the elimination of TB

- A meta-analysis on CI done by Fox et al, showed that in high income countries the TB and LTBI prevalence in close household contacts were resp. 1,4% and 30%*.

*) Erkens CG, Kamphorst M, Abubakar I, Bothamley GH, Chemtob D, Haas W, et al. Tuberculosis contact investigation in low prevalence countries: a European consensus. Eur Respir J. 2010;36:925-49.

* Fox, G.J., et al., Contact investigation for tuberculosis: a systematic review and meta-analysis. Eur Respir J, 2012.

What determines the infectiousness of an index patient?

TABLE 1

Parameters to assess the infectiousness of the index patient

Anatomical site: pulmonary tuberculosis [54]

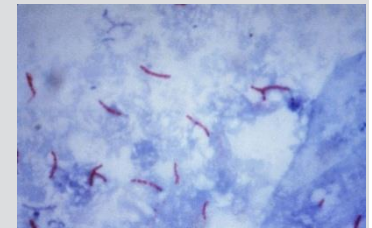
The production of sputum [54]

Results of sputum smear examination [55]

Results of sputum culture [55]

Cavitations [55, 56]

Coughing [45, 57, 58]



Erkens CG, Kamphorst M, Abubakar I, Bothamley GH, Chemtob D, Haas W, et al. Tuberculosis contact investigation in low prevalence countries: a European consensus. *Eur Respir J.* 2010;36:925-49.

THE INFECTIOUS PERIOD: Onset of cough - two weeks Rx or:

1. *smear-positive PTB*: (a maximum of **3 months before diagnosis**)
2. *smear-negative, culture positive, PTB*: considered infectious for 1 mo

What determines transmission from index patients to contacts

TABLE 10

Degree of exposure

Intensity of exposure



Degree of proximity (talking distance) between the contact and the index, if exposure was only outdoors

Concentration of tubercle bacilli in the ambient indoor air, determined by cough intensity and bacillary load in the sputum

The volume of air shared and quality of air circulation and ventilation indoors

Duration of exposure

Cumulative time of contact during the putative period of infectiousness period

Who should we investigate? Prioritization of contacts based on degree of exposure



Figure 6.5 The health care worker is conducting a field investigation. She is looking for evidence of other contacts (for example, pictures of others who may live in or visit the house, shoes of others who may live in the house, or toys left by children).

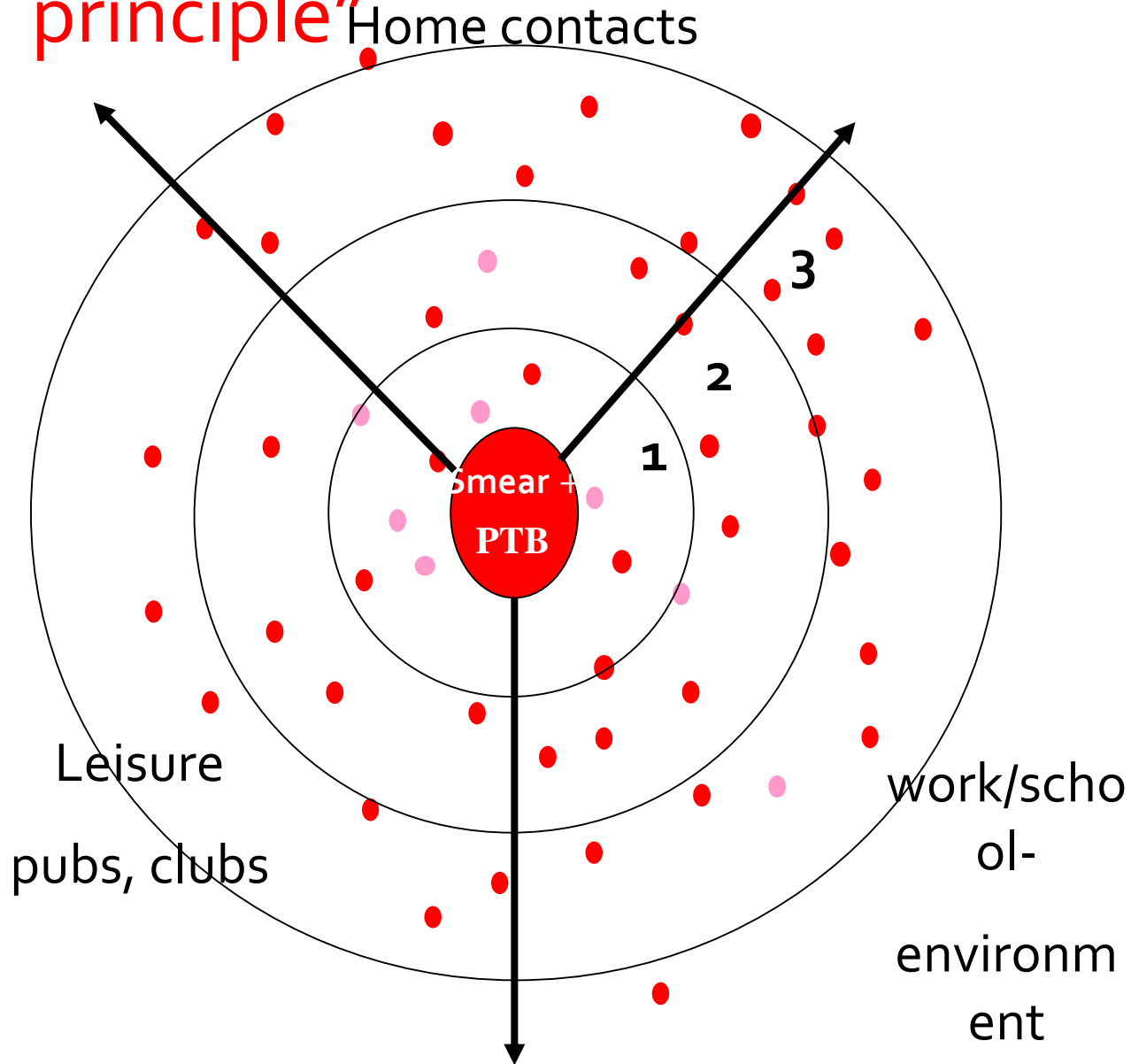


Contact investigation, "ring principle"

Circles related to duration of exposure and proximity

proximity	The exposure site may be compared with*	Estimated volume of the room	Cumulative exposure time			
			long	less longstanding		
			Daily or > 48 hrs	Weekly or 6-48 hrs	Casualty or 1-6 hrs	Rare or < 1 hr
close	car	< 5 m ³	1	1 or 2	2	2
	room	10-30 m ³	1	2	2	2 or 3
less close	Classroom / office**	100-200 m ³	2	2 or 3	3	3
	Closed room, larger than a house**	> 200 m ³	2	3	3	3 other

Contact investigation, "ring principle"



Exercise: prioritize the contacts

Ms, 10 yrs, smear-positive infiltrative pulmonary tuberculosis
Below the contact list from the patient's interview

HOME

- R1** Household: parents, 5 siblings of 18, 16, 12, 8 and 2 years
R2 Regular visitors: "aunt"
R2 Family/friends: at last →13 adults and children

SCHOOL

- R1** Grade 4 and 5 5 days/week;
R2 Lunch Helping the kids in grade 2 (5 year olds)
R3 Teachers
R3 Other kids in school

LEISURE

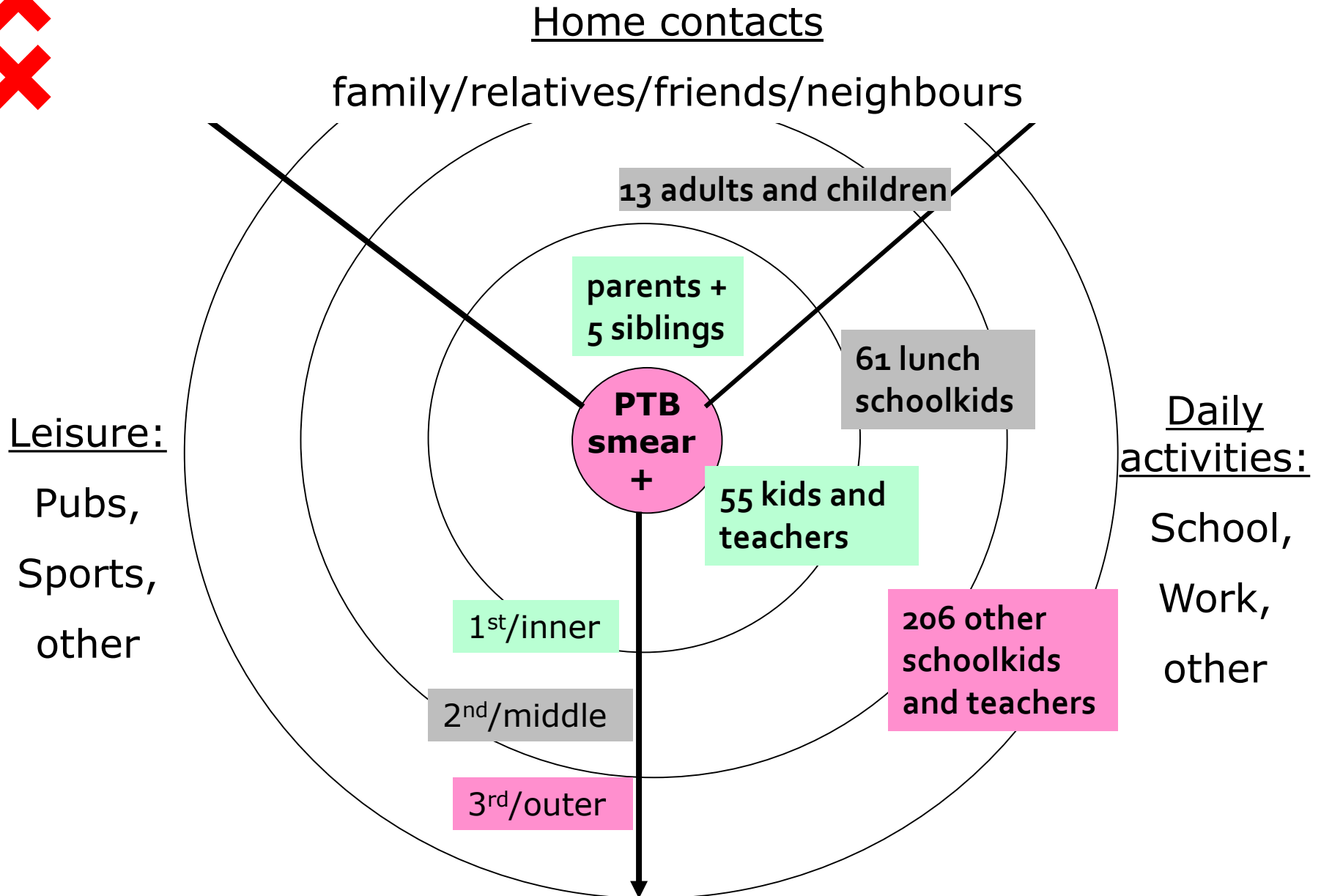
None

OTHER

None



The concentric circle approach:





Which contacts have a higher susceptibility for TB disease?

1. Age < 5 yrs, in particular < 2 yrs.

TABLE 3 Risk of tuberculosis after infection in immune competent children (B)

Age at primary infection	Risk of pulmonary disease or mediastinal lymphatic disease %	Risk of meningeal or disseminated tuberculosis %
<12 months	30-40	10-20
12-24 months	10-20	2-5
2-4 yrs	5	0.5
5-10 yrs	2	<0.5
>10 yrs	10-20	<0.5

2. Certain clinical conditions e.g. immunocompromised persons or people with certain chronic diseases

Combining risk of exposure and vulnerability into high priority

TABLE 12

Priority groups of contacts

High-priority contacts

First-circle contacts at increased risk of developing tuberculosis following infection

Other first-circle contacts

Second-circle contacts at increased risk of developing tuberculosis following infection

Medium-priority contacts

Second-circle contacts

Third-circle contacts at increased risk of developing tuberculosis following infection

Low-priority contacts

Third-circle contacts or outer circle



CI of the Somalian family (1)

What exactly needs to be done?

Ring 1 contacts: - skintest (PPD)
(as soon as possible) - X-ray thorax

Ring 2 contacts based on the findings in the first round
etc

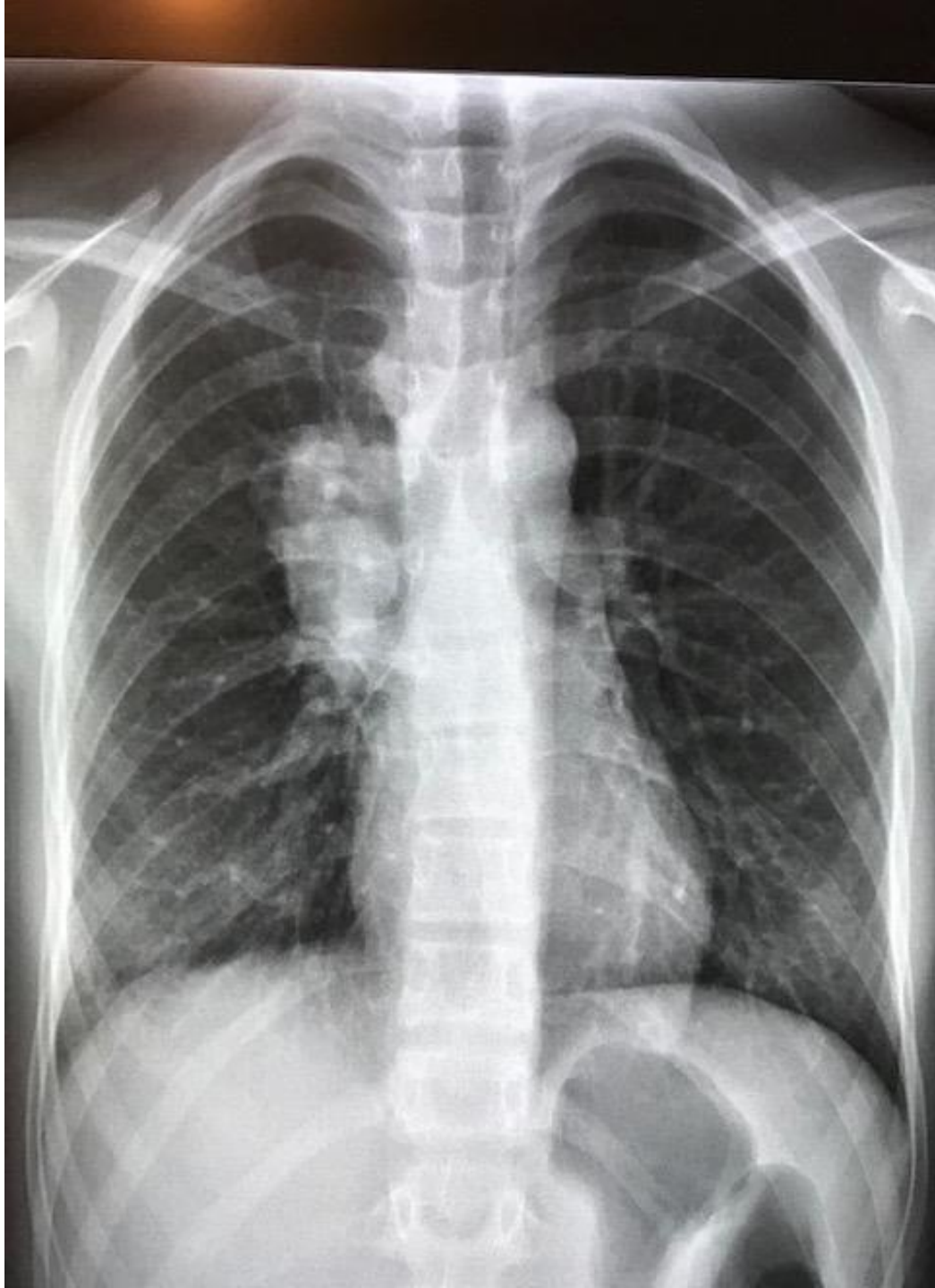


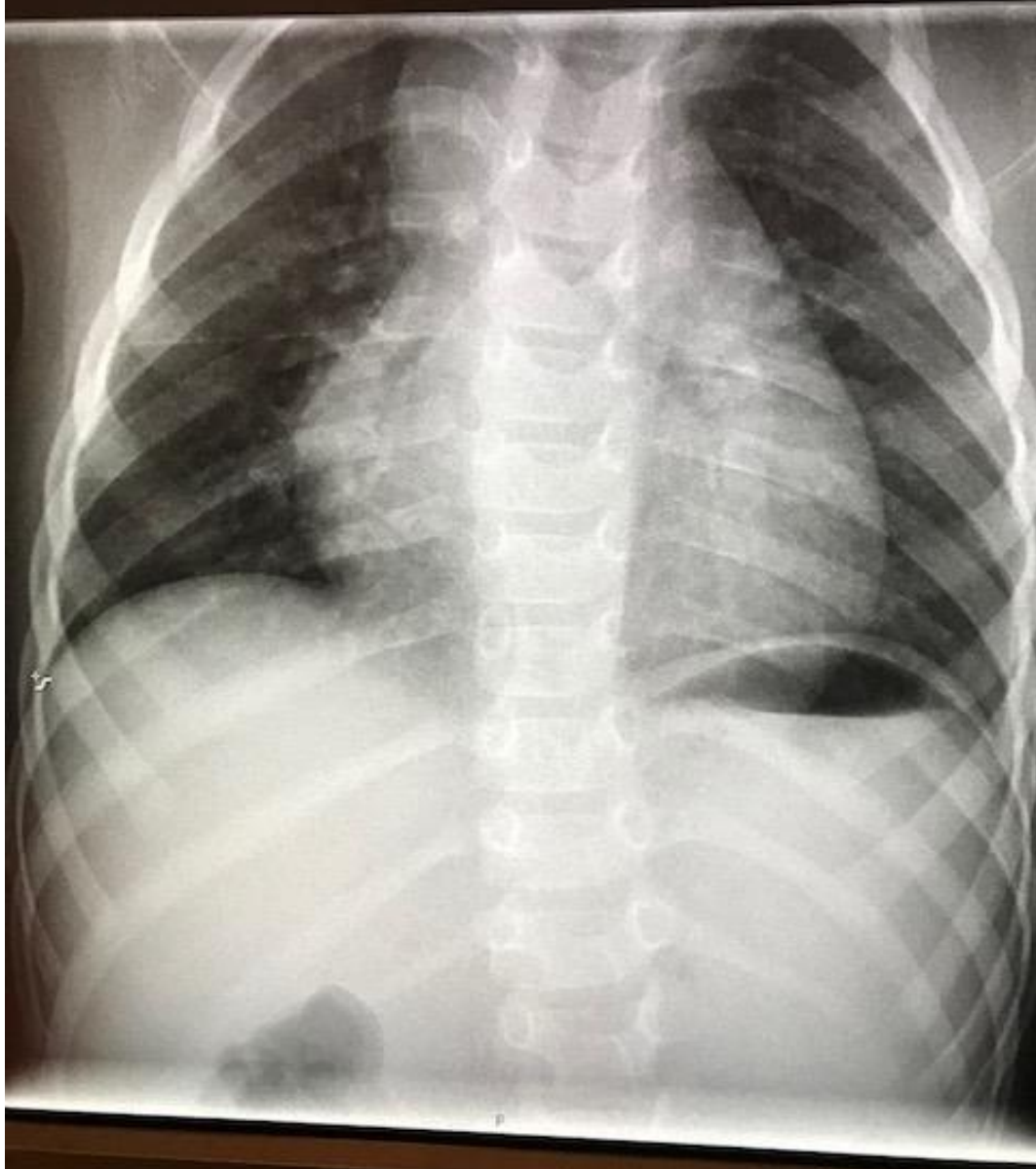
CI of the Somalian family (2)

CI of the close household contact

Ring 1: family (householdcontacts) of the index

- Two sisters (12 and 2 yrs old) had abnormalities on the x-ray
- They others had normal X-rays







CI of the Somalian family (3)

Ring 1: family (householdcontacts) of the index

- Two sisters (12 and 2 yrs old) at the same time diagnosed with lymphnode and pulmonal TB (smear neg, pos cultures)
- Rest of the family (parents and 3 brothers): (5x) LTBI



CI of Somalian family (4)

- CI of the close household contact
- Ring 1: family
 - 2 sisters with TB; parents and 3 brothers with LTBI
- Ring 1: children from the same group at school and the teachers
 - 2 children with TB and 9 with LTBI





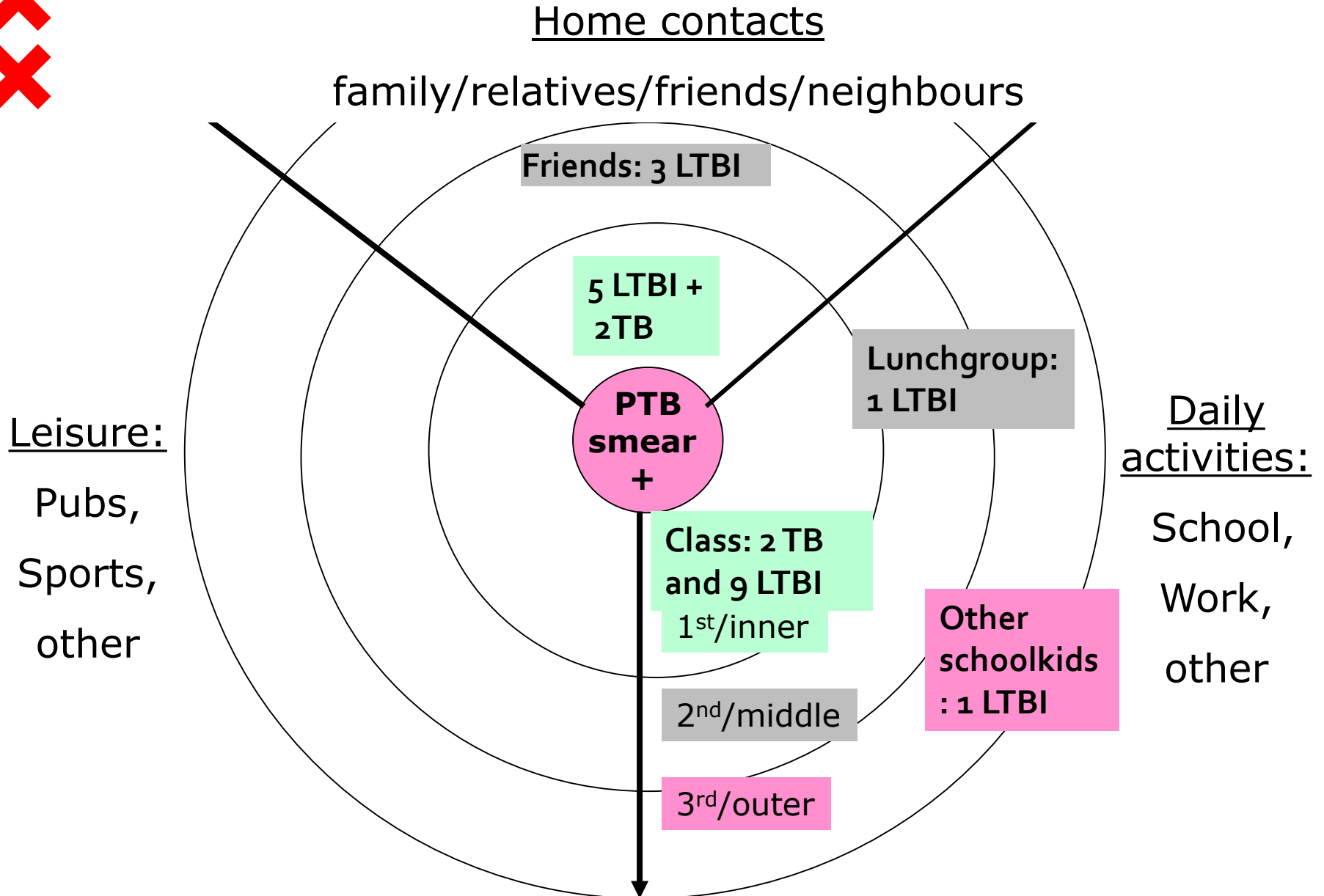
CI of Somalian family (5)

- Ring 1: family
 - 2 sisters with TB; parents and 3 brothers with LTBI
- Ring 1: children from the same group at school and the teachers
 - 2 children with TB and 9 with LTBI
- Ring 2: Group of 5 yrs old the index helped with lunch
 - 1 LTBI
- Ring 2: the friends/other family members
 - 3 LTBI
- Ring 3: other kids and teachers at school
 - 1 LTBI





The concentric circle approach:





Found by chance:

Home contacts

family/relatives/friends/neighbours

Friend of sister 1 tb

Neighbour child 1TB

**PTB
smear
+**

1st/inner

2nd/middle

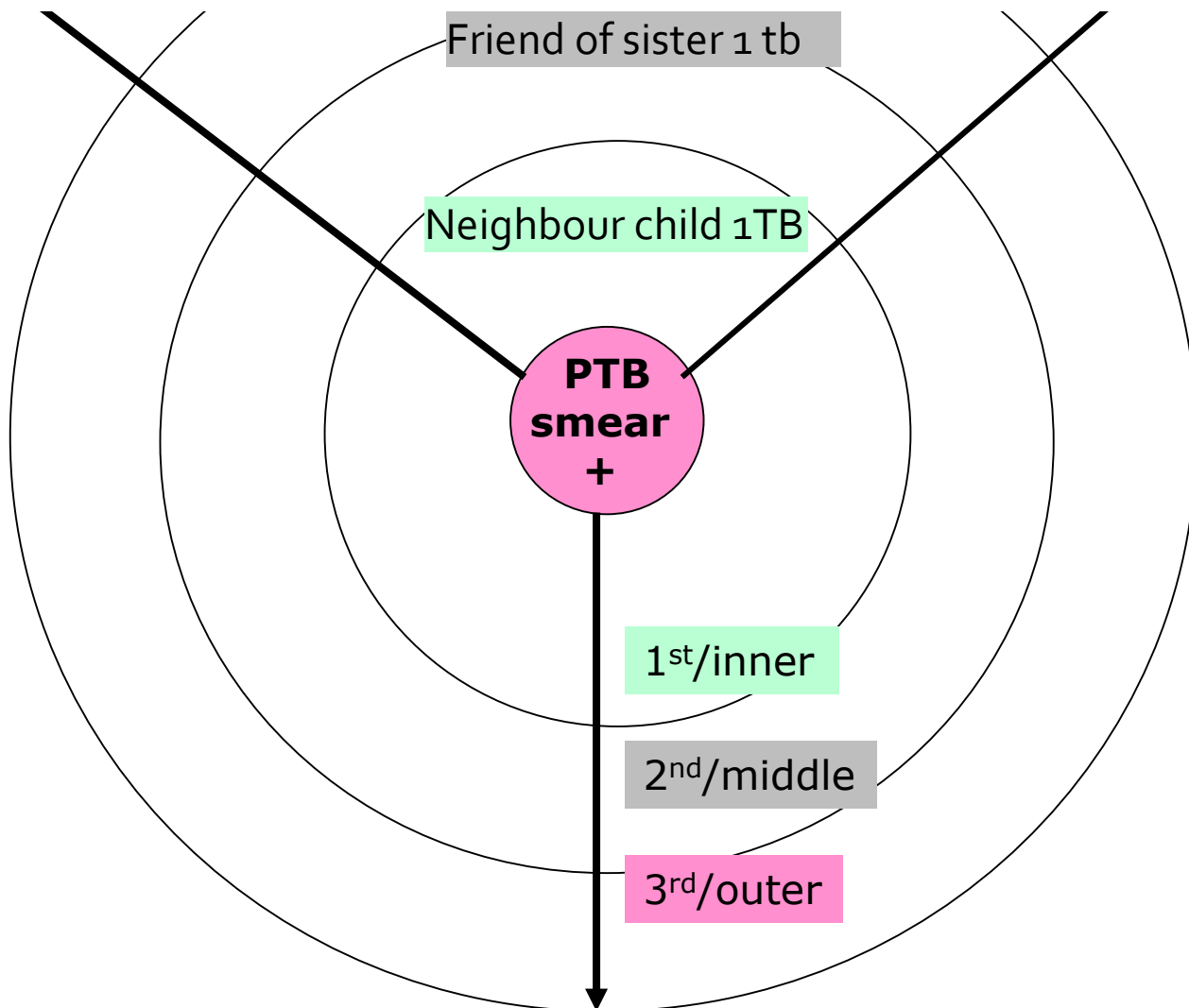
3rd/outer

Leisure:

Pubs,
Sports,
other

Daily activities:

School,
Work,
other





CI of Somali family (6)

FINAL RESULTS

- Ring 1: Family 2 TB and 5 LTBI
- Outcomes at school:
 - Ring 1: Classmates of index: 55 children → 2 active TB and 9 with LTBI
 - Ring 2: Lunchgroup of index 37 children → 1 LTBI
 - Ring 3: other schoolchildren 206 → 1 LTBI
- Apart from the school other people were infected as well:
 - Ring 2: friends → 3 LTBI
 - 2017-4: a girl (16 yrs) → active TB (pulmonary) with same WGS (VNTR)
 - 2017-6: a girl (2 yrs) → active meningitis and pulmonary TB with same WGS
- **In total:**
 - CI of 334 people: outcome
 - 6 TBC (all linked to the index)
 - 19 LTBI



The role of the pulmonologist

- Speed of notification is important, especially
 - When children < 5yrs
 - When immunocomprised people are close to the index
- Postmortem cases where TB was found, the GGD need to be notified as well.
- When people are referred to the hospital for TB diagnostics and the person does not show up anymore, expecially when small children or vulnerable people are involved, the GGD needs to be notified even if no TB has been diagnosed yet
- Basically: treat the patient and be aware of the consequences of a contagious TB patient i.c. small children and immunocompromised persons and use the GGD as much as you can



Thank you!
Questions?

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