

Preventing TB in silica exposed workers

The Neil White Symposium

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Overview

- Epidemiology of silica associated TB
- Improving cure and case finding
- TB preventive therapy
- Dust control
- HIV prevention and treatment
- Infection control
- New tools
- Conclusion

Silicosis grade and risk of TB

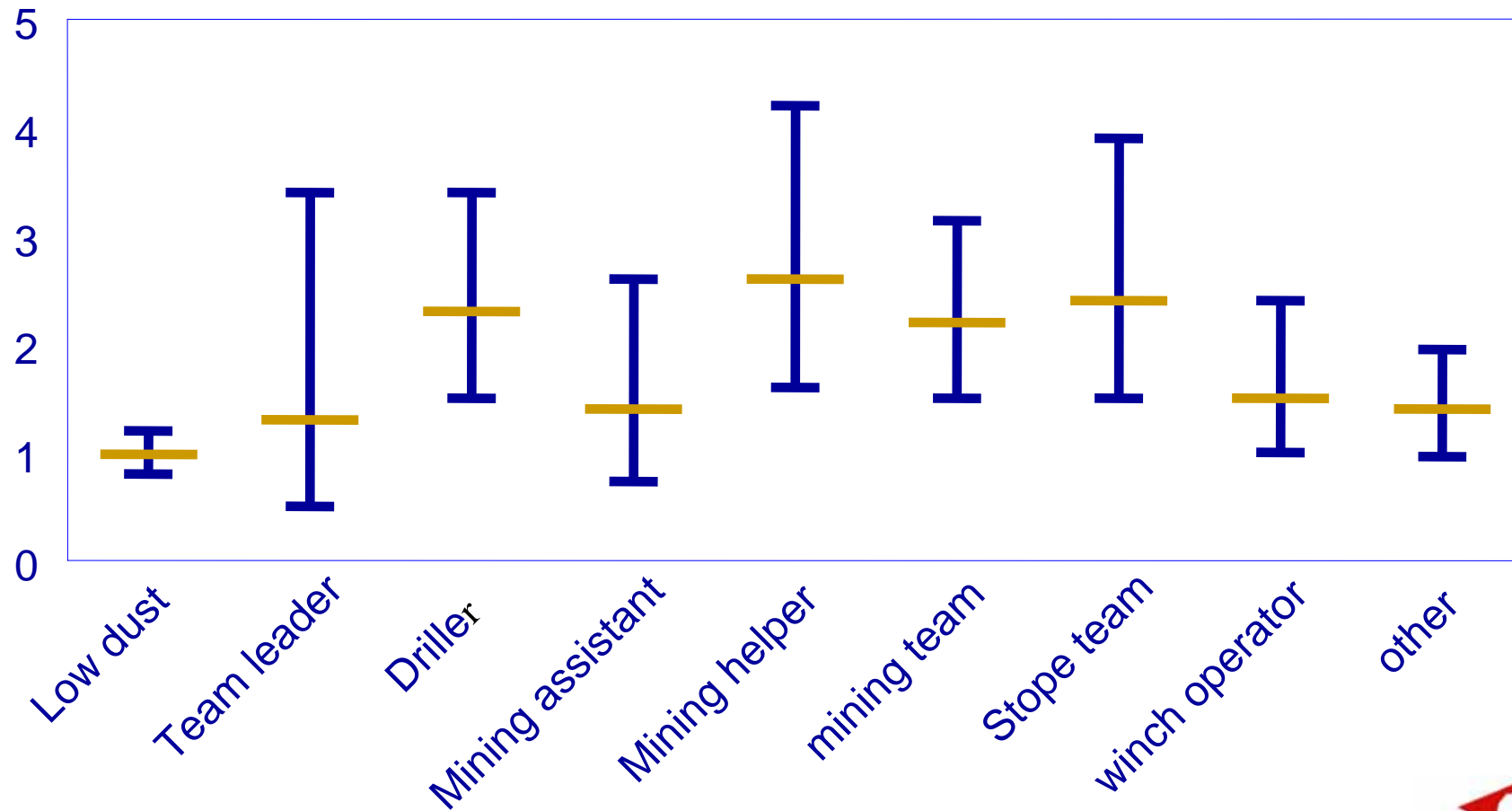
International labour organisation grade

- Overall 2.7%
- 1/1 2.2%
- 2/2 2.9%
- 3/3 6.3%



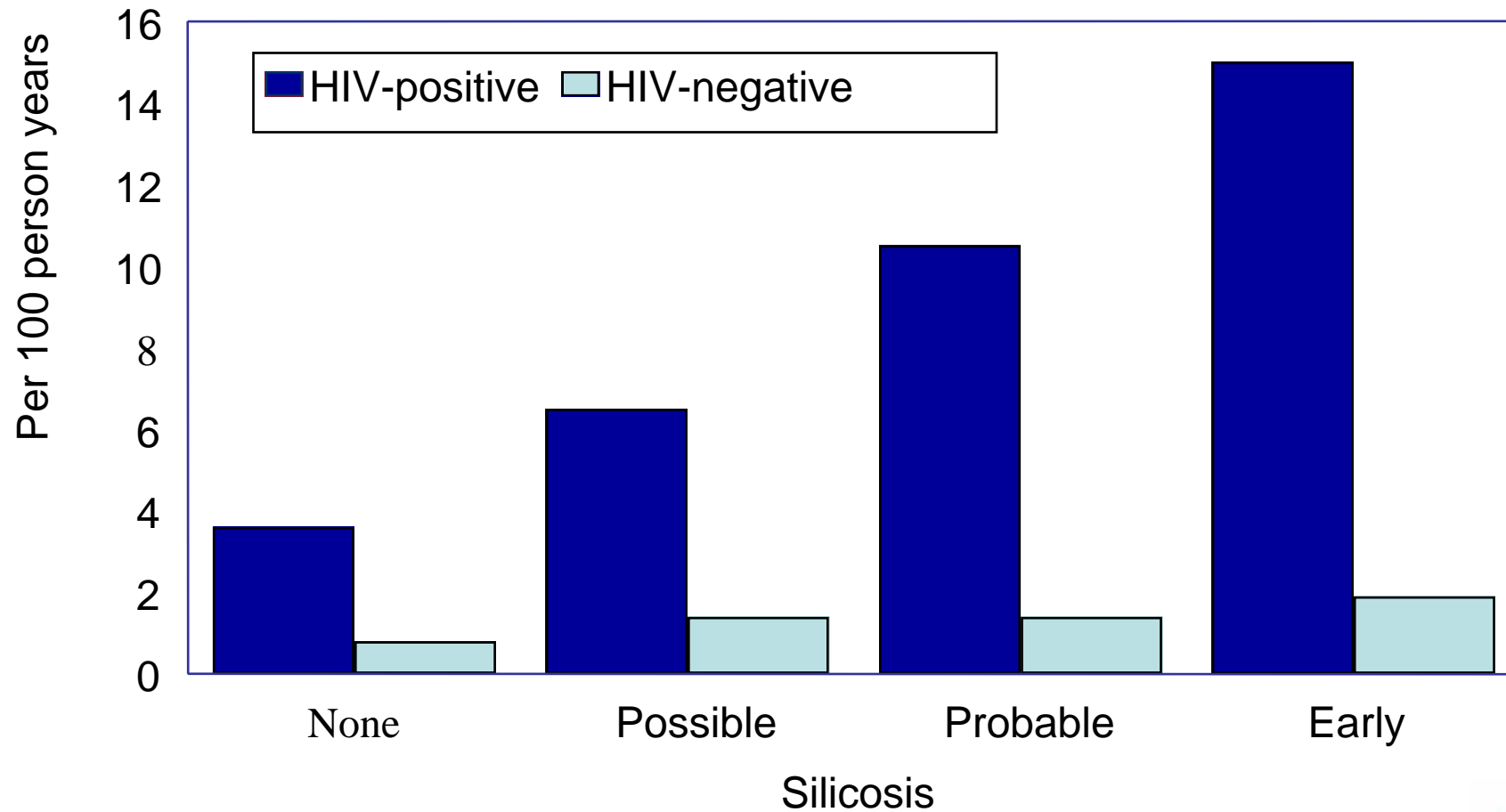
(Cowie RL, Am J Resp Crit Care Med. 1994, 150, 1460 – 1462)

Occupation & TB risk



Kleinschmidt I, Churchyard GJ. Occup Environ Med 1997;54:636.

TB risk with HIV & silicosis

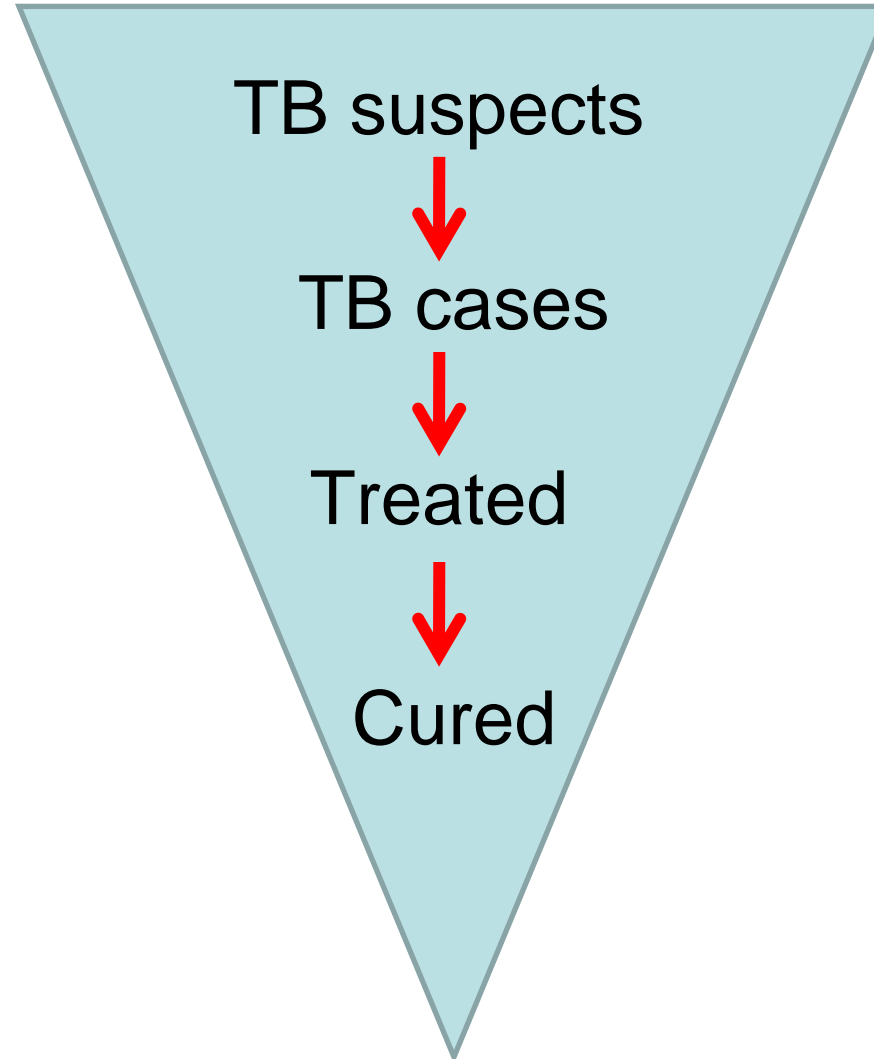


(Corbett EL, *AIDS* 2000;14:2759-68)

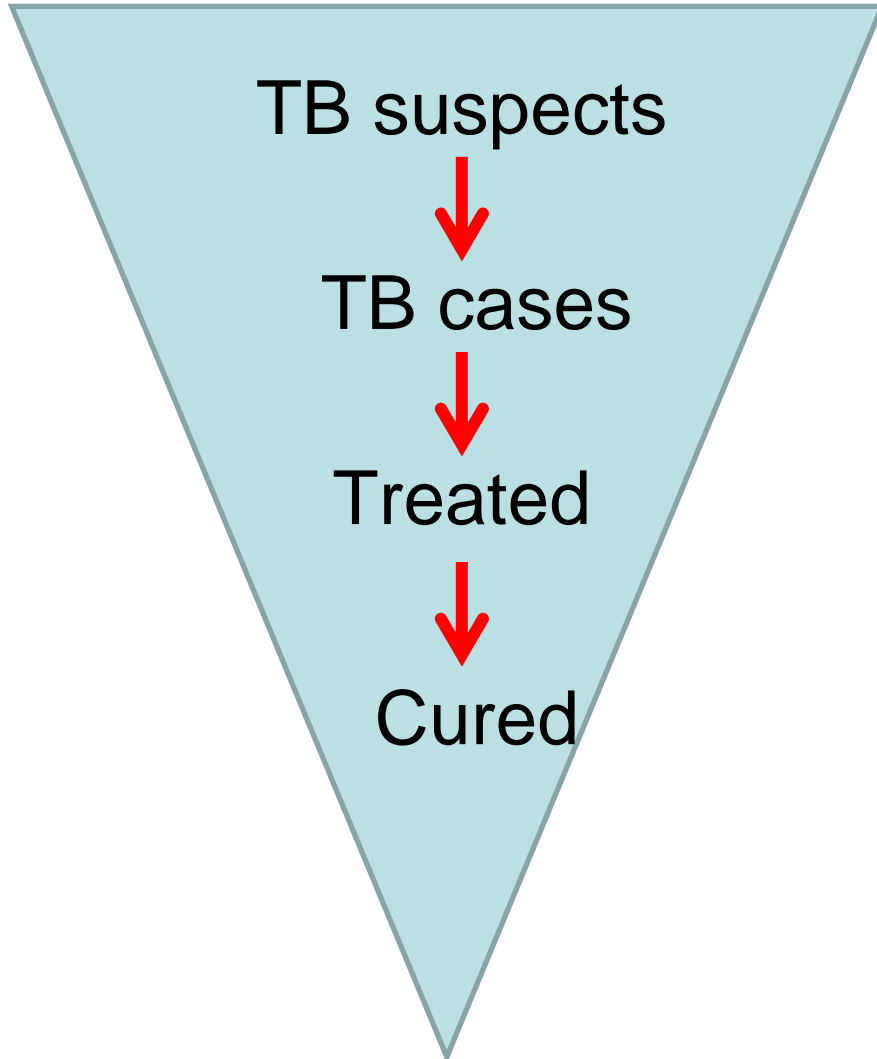
Improving cure and case finding



Improve cure



Improve cure



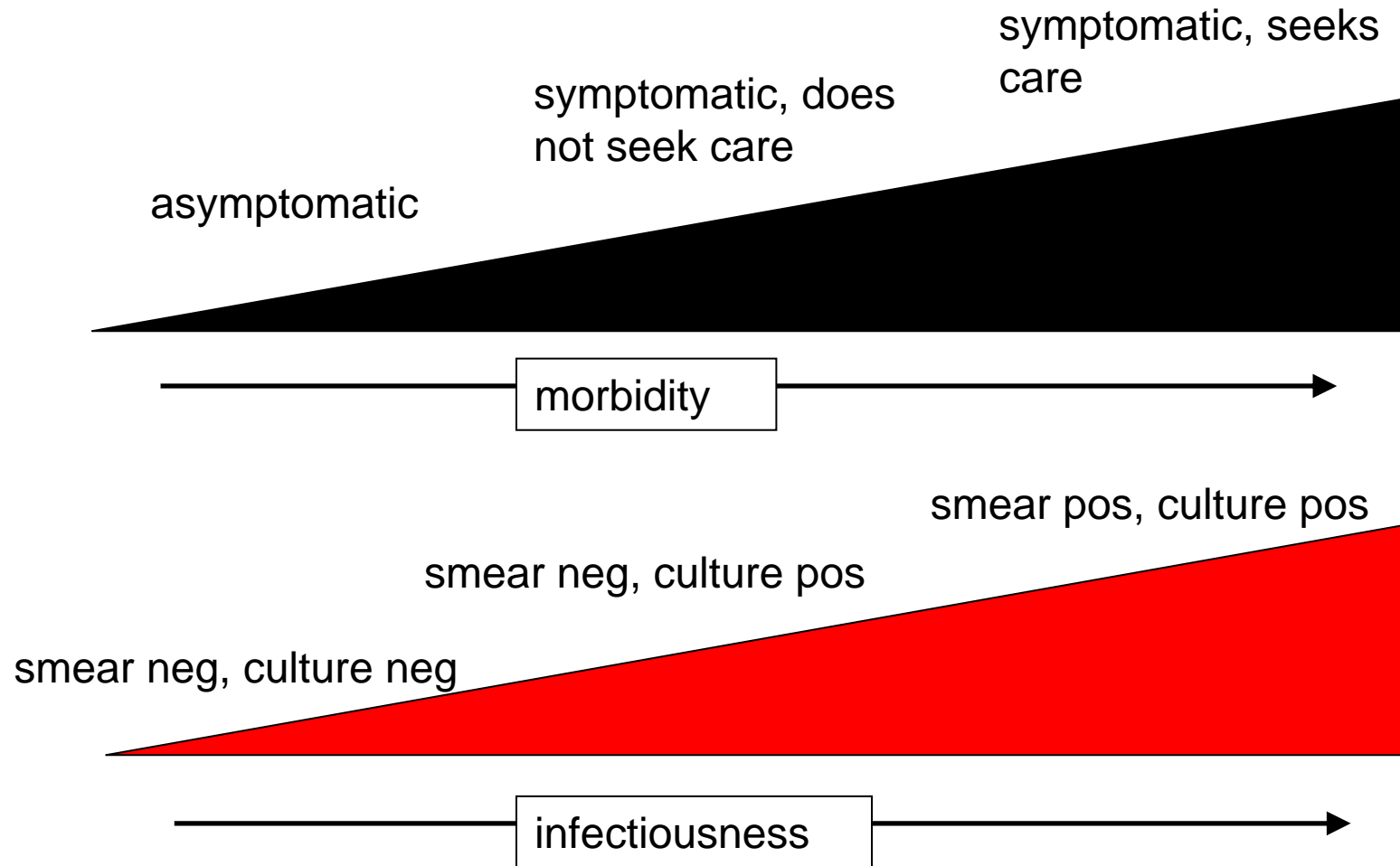
Requires strengthening

- Health systems
- Management capacity
- Laboratory services
- Continuity of care
- HR capacity
- Protection of HCWs

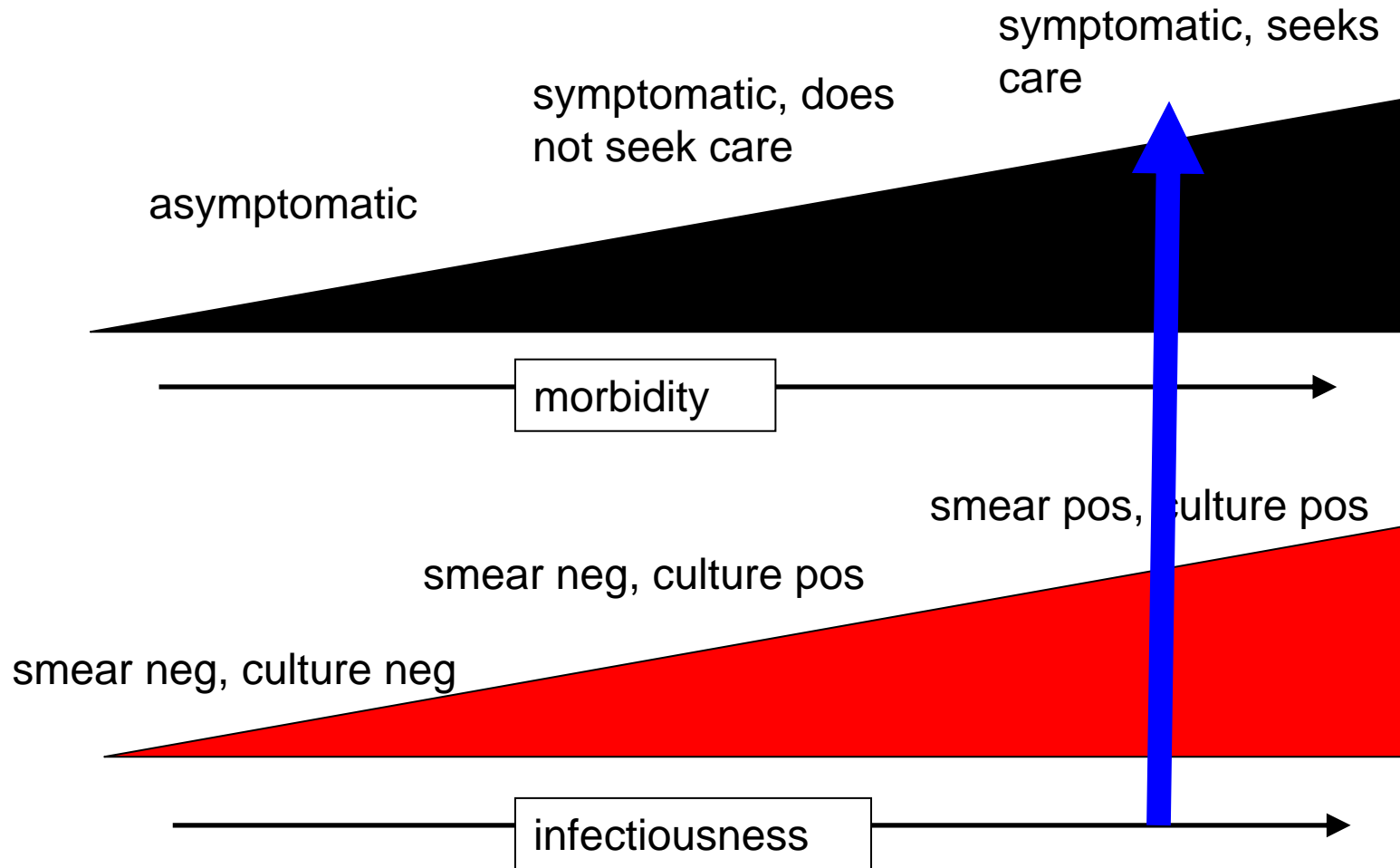
Intensified TB case finding



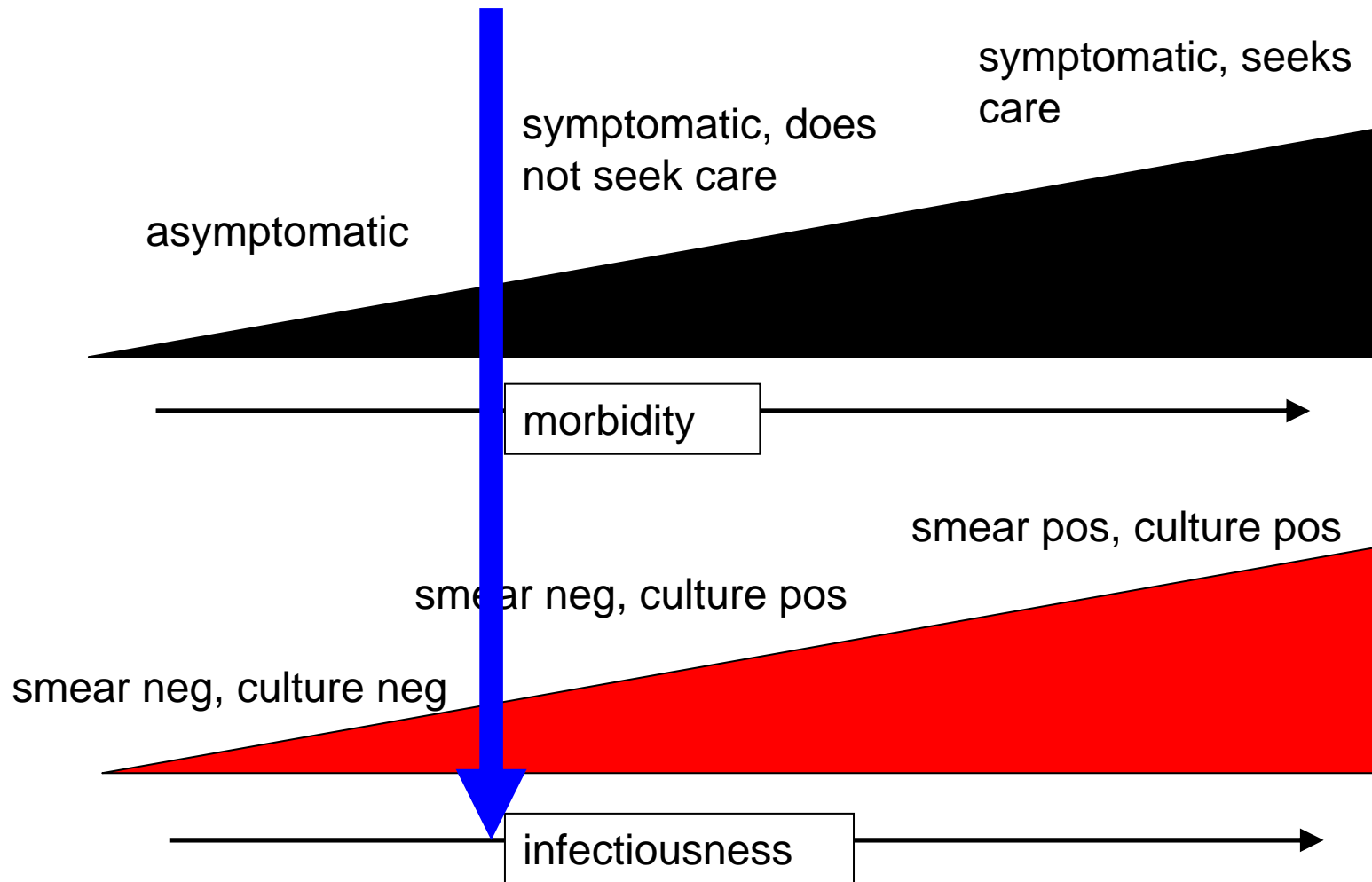
Principles of TB case finding



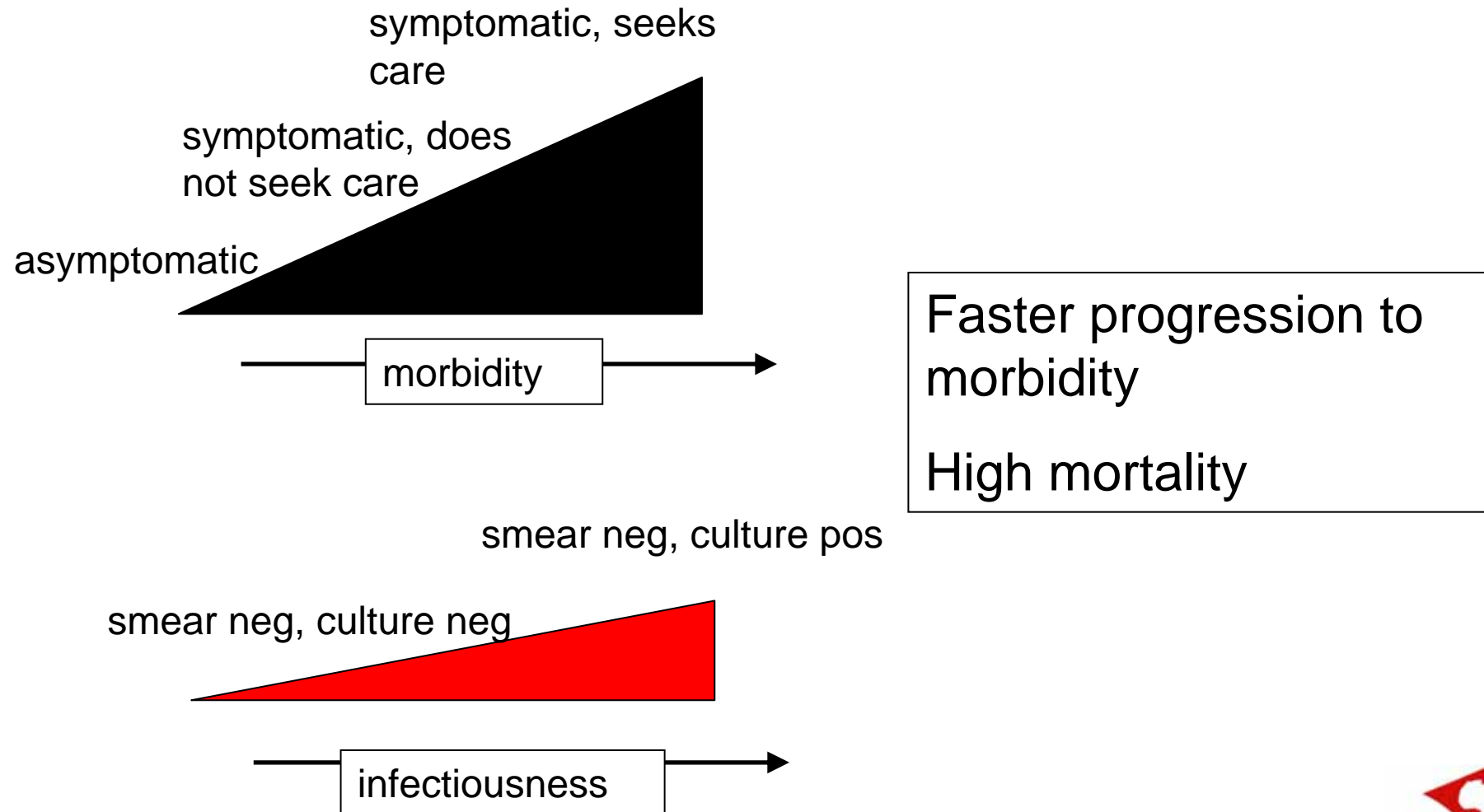
Passive TB case finding



Intensified TB case finding

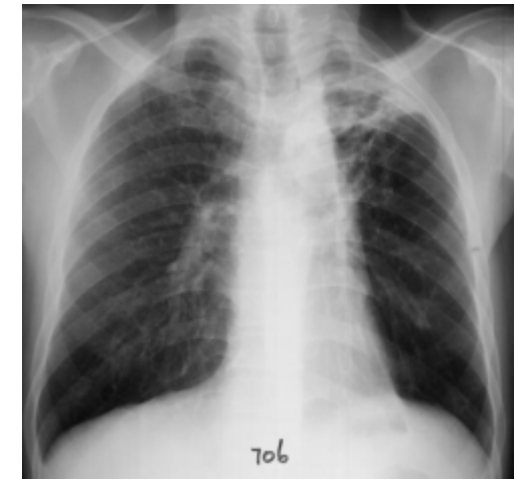


TB natural history – with silicosis



TB screening methods

	Sensitivity (%)	Specificity (%)
Symptoms	29.4	90.3
Symptoms/CXR	49.0	89.4
Symptoms, CXR, smears, culture	90.0	88.6



(Lewis, ARRCCM. 2009, in press)

TB screening methods

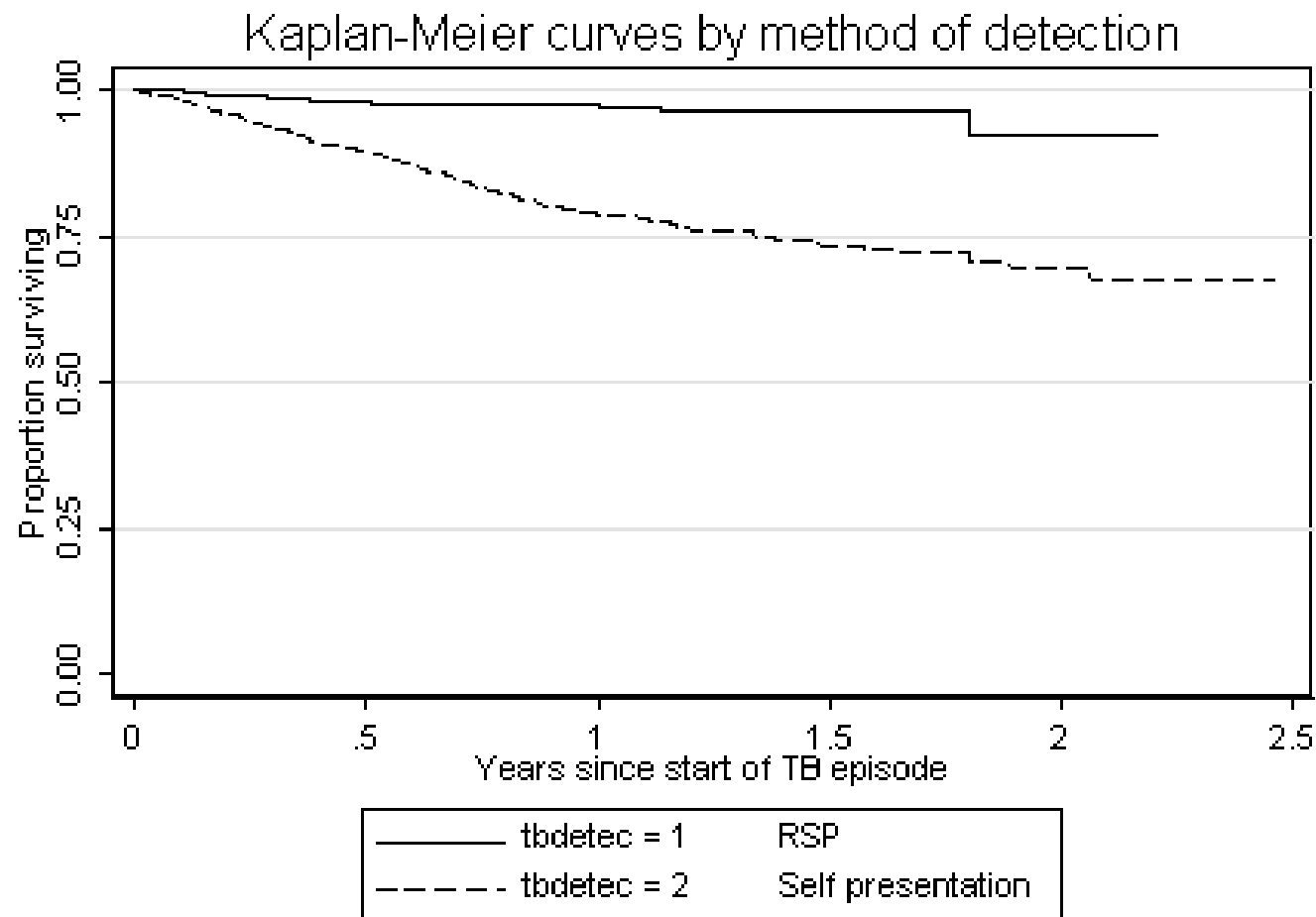
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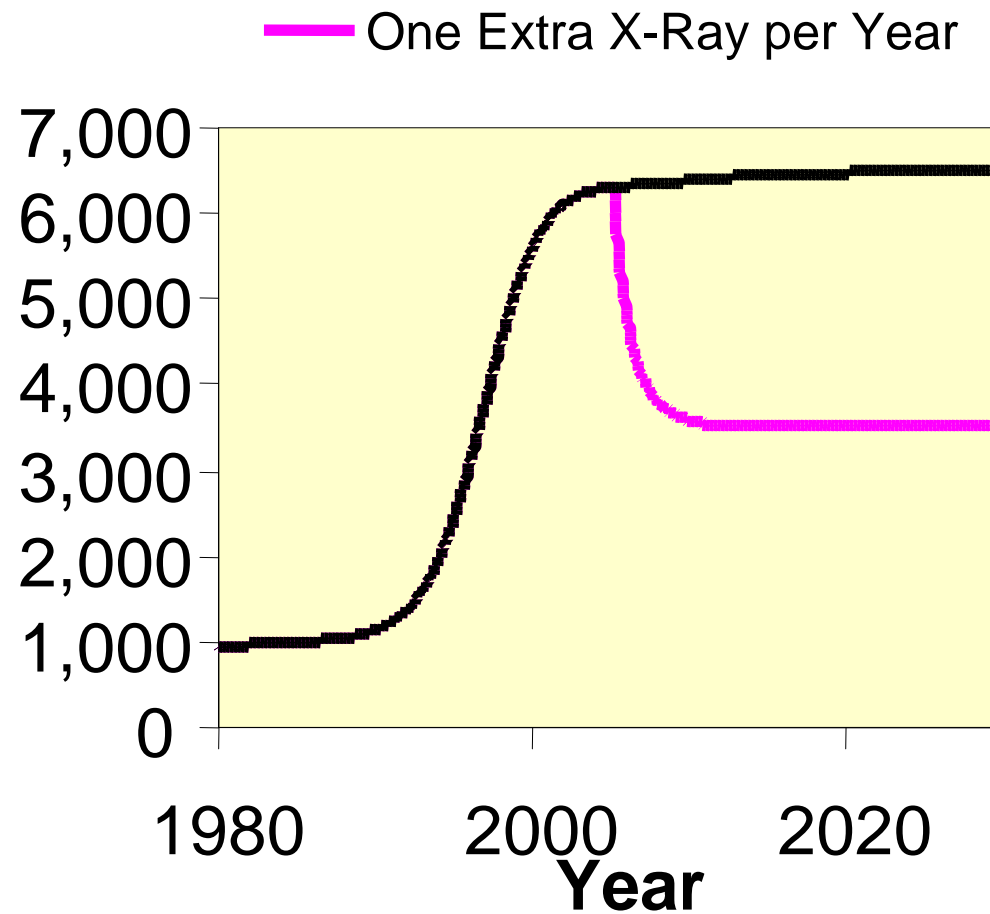
Silicosis does not alter the performance of TB screening tools

(Lewis, ARRCM. 2009, in press)

Intensified case finding



Intensified case finding

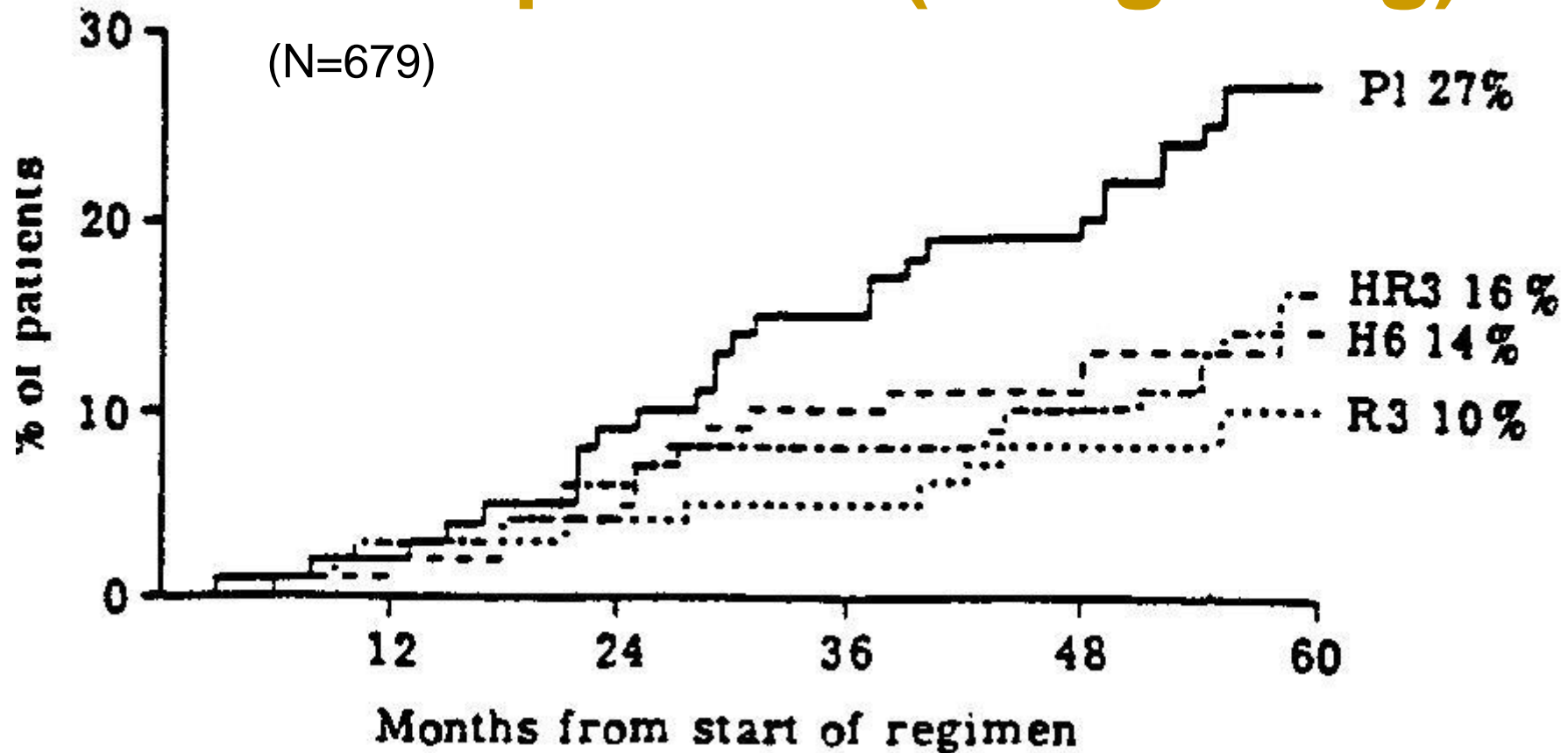


TB preventive therapy



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TB preventive therapy in silicotic patients (Hong Kong)



(Am Rev Respir Dis, 1992;145: 36-41)

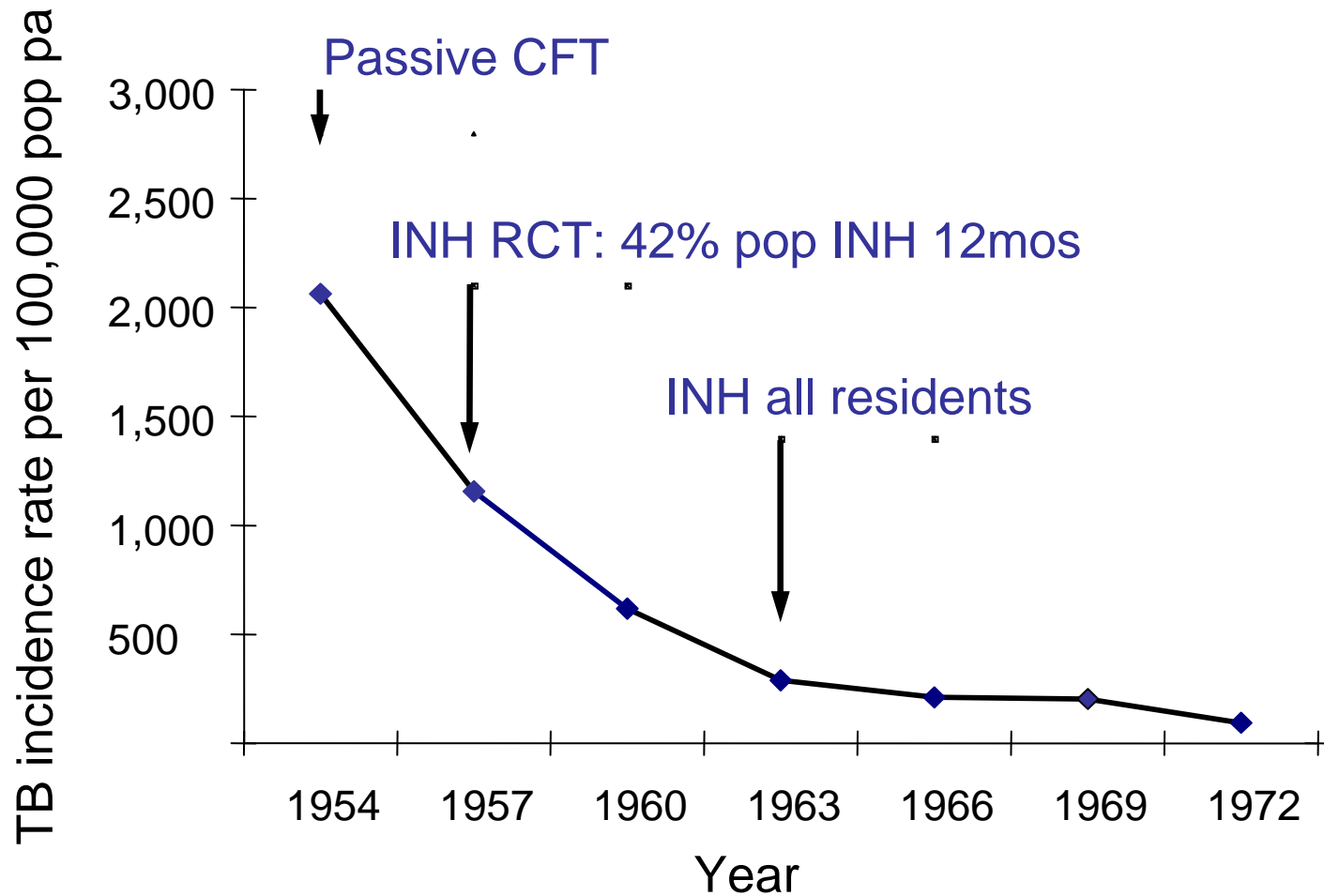
TB preventive therapy in SA gold miners with silicosis

- N=382
- HRZ for 3 months
- 4 year follow up

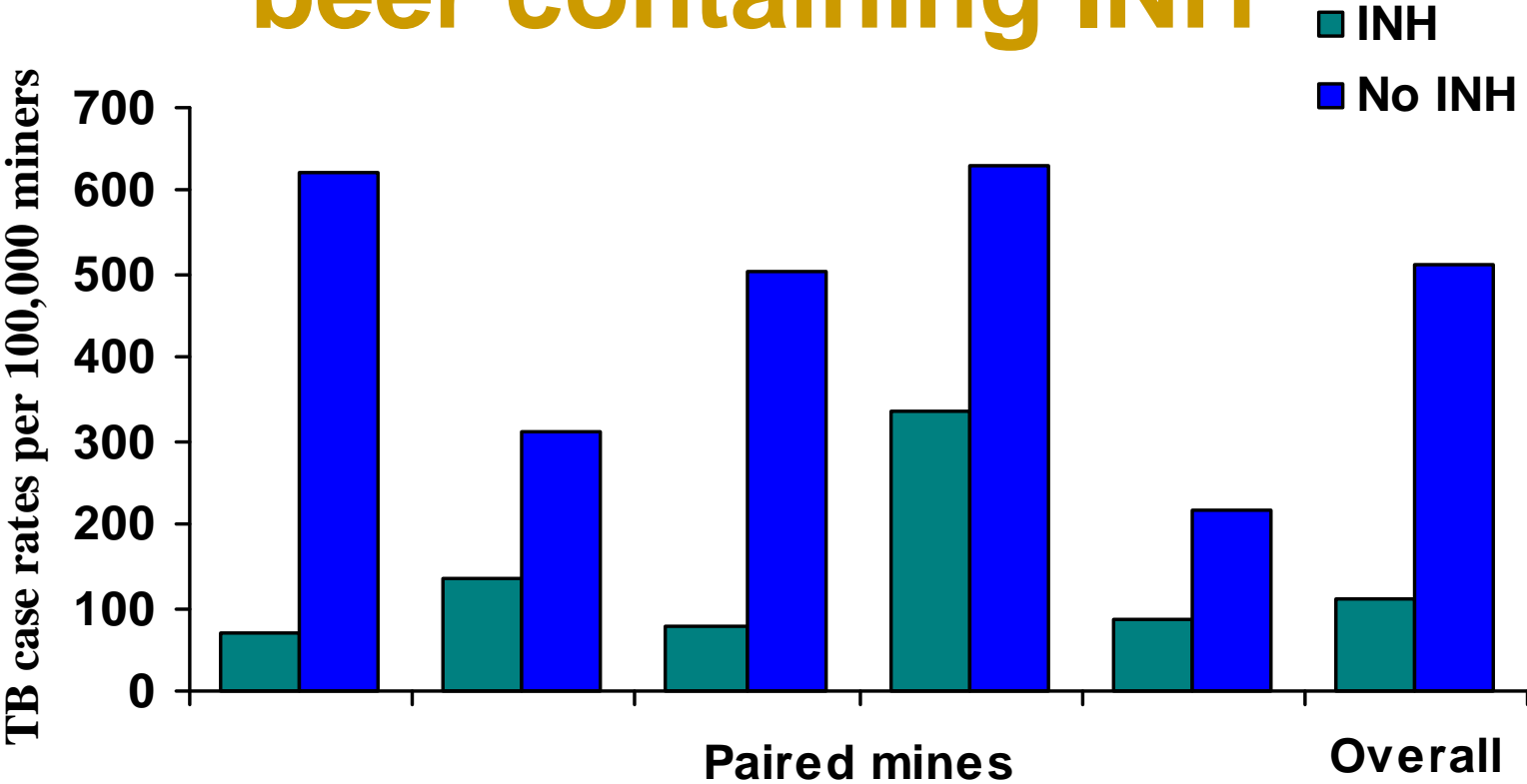
- Risk ratio
 - First year: 0.44 (0.13 – 1.49) (p=.087)
 - Overall: 0.84 (0.53 – 1.33) (p=0.4)

(R Cowie. Tuber Lung Dis, 1996; 77: 239-43)

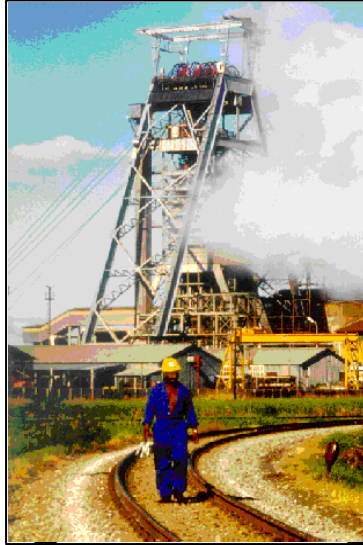
Community-wide IPT Bethel district, Alaska



TB rates in paired mines that either did, or did not, give miners beer containing INH



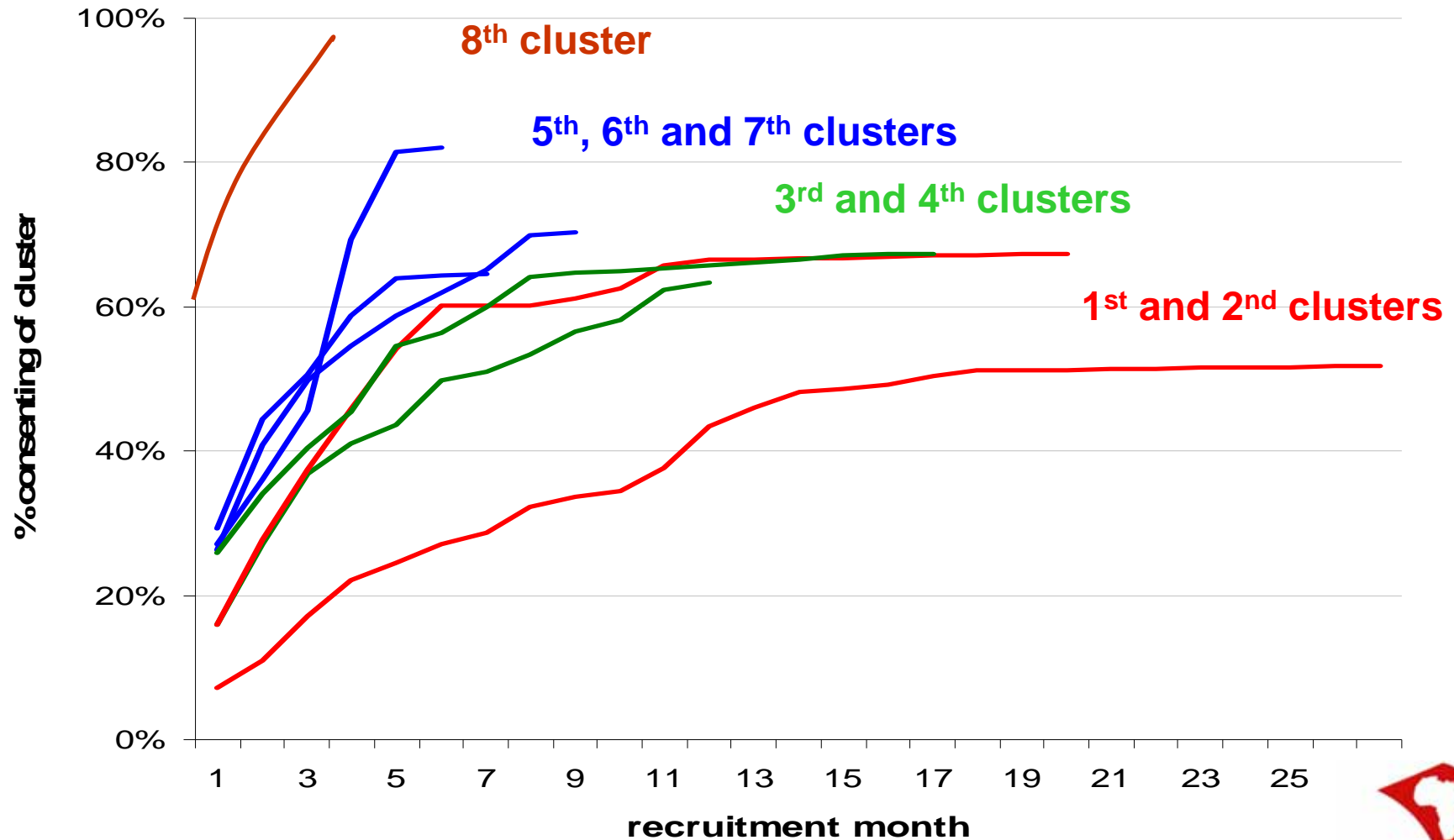
Thibela TB study



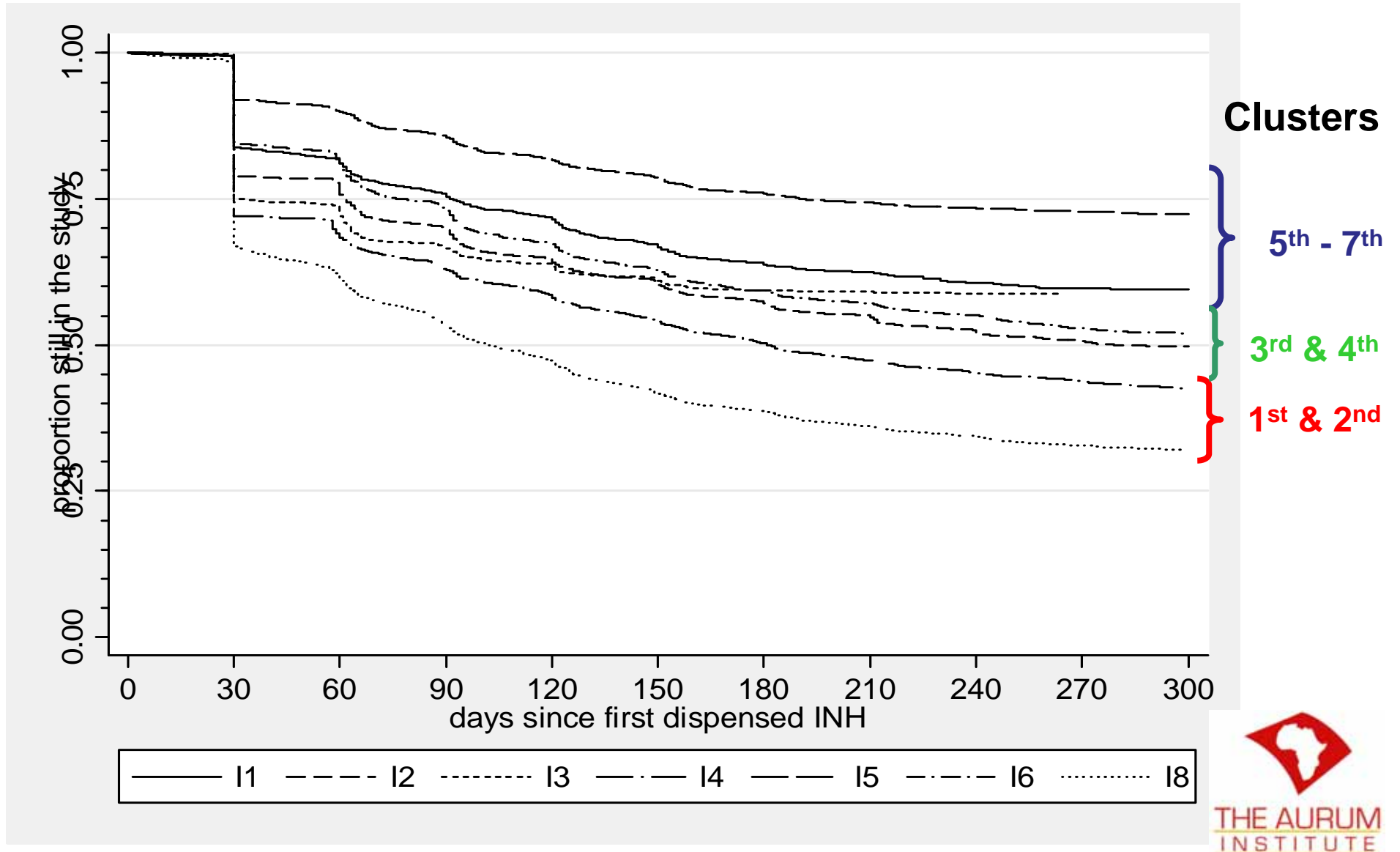
Standard TB
control

Standard TB control
plus
Community wide IPT

% workforce enrolled (N~27,500)



Reasonable retention is achievable



Isoniazid is safe

- 23,585 ppts started INH between July 06 – 31Mar 09
- 126 adverse events recorded
 - 60 hypersensitivity
 - 49 peripheral neuropathy
 - 14 hepatitis
 - 3 convulsions
- 4 SAEs
 - 3 hepatitis; 1 definitely related
 - 1 convulsion; possibly related
- 33 deaths
 - 31 not related
 - 1 possibly related
 - 1 relationship to INH not coded



TB after IPT

Methods:

- TB case detected through surveillance (July 06 - Feb 09)
- included if >1 month of IPT dispensed
- excluded if NTM only isolated
- DST compared with TB cases from
 - control clusters where use of IPT was minimal
 - specimens from a laboratory sub-study

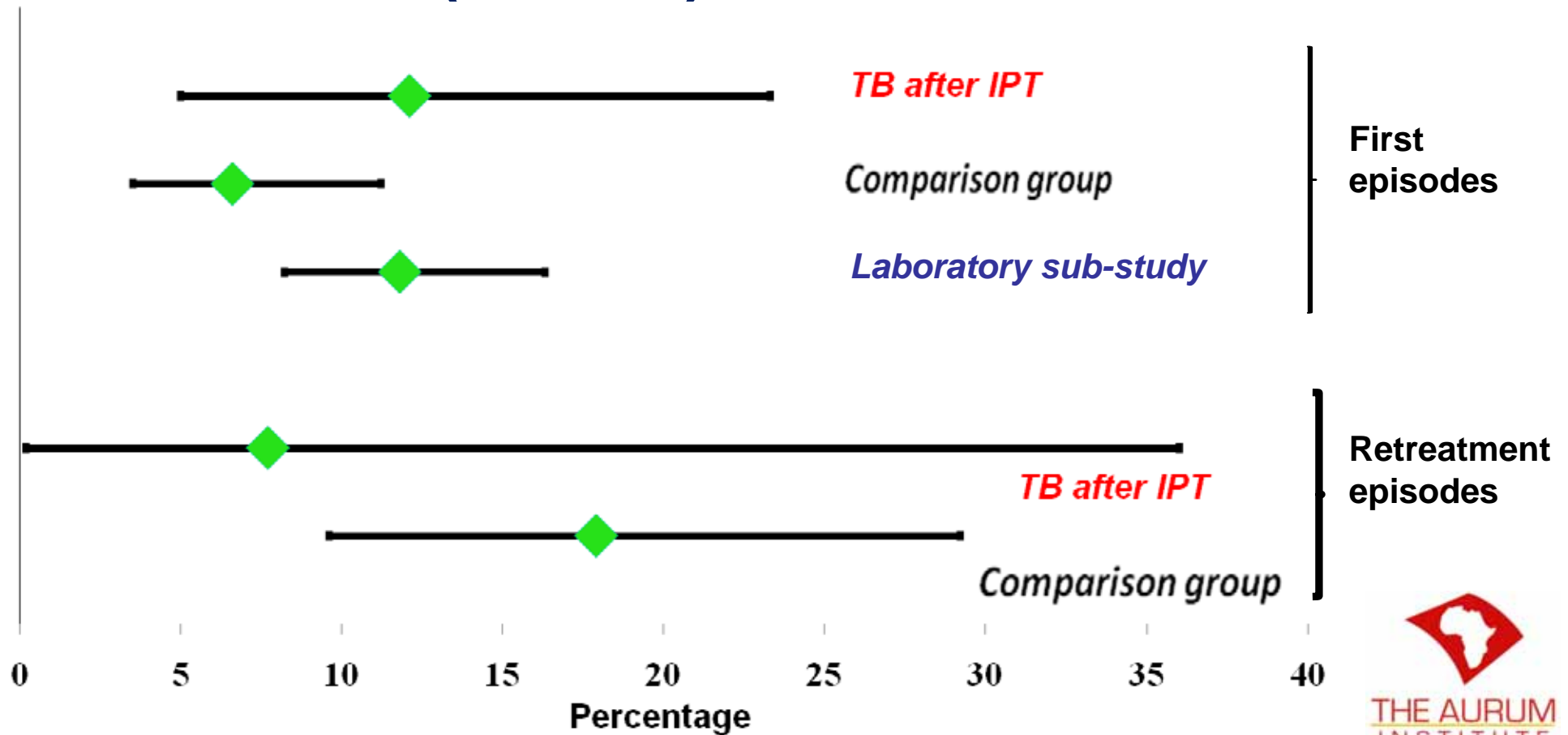
(C van Halsema. Poster MOPEB021, awarded IAS 2009 TB/HIV Research Prize

TB after IPT: Treatment outcomes

- 96 TB patients with adequate FU time
 - 39 (40.6%) cured
 - 23 (24%) completed
 - 8 (8.3%) died
 - 11 (11.5%) transferred out
 - 1 (1.0%) interruption
 - 1 (1.0%) treatment failure
 - 13 (13.5%) unknown

Percentages of TB episodes with any INH resistance

Mean (95% CI)



TB infection control – 10 key actions

Safety without stigma



- Involve community
- Develop IC plan
- Safe sputum collection
- Cough hygiene
- Triage TB suspects
- Rapid diagnosis/treatment
- Improve room ventilation
- Protect health care workers
- Capacity building
- Monitor IC practices



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Dust control

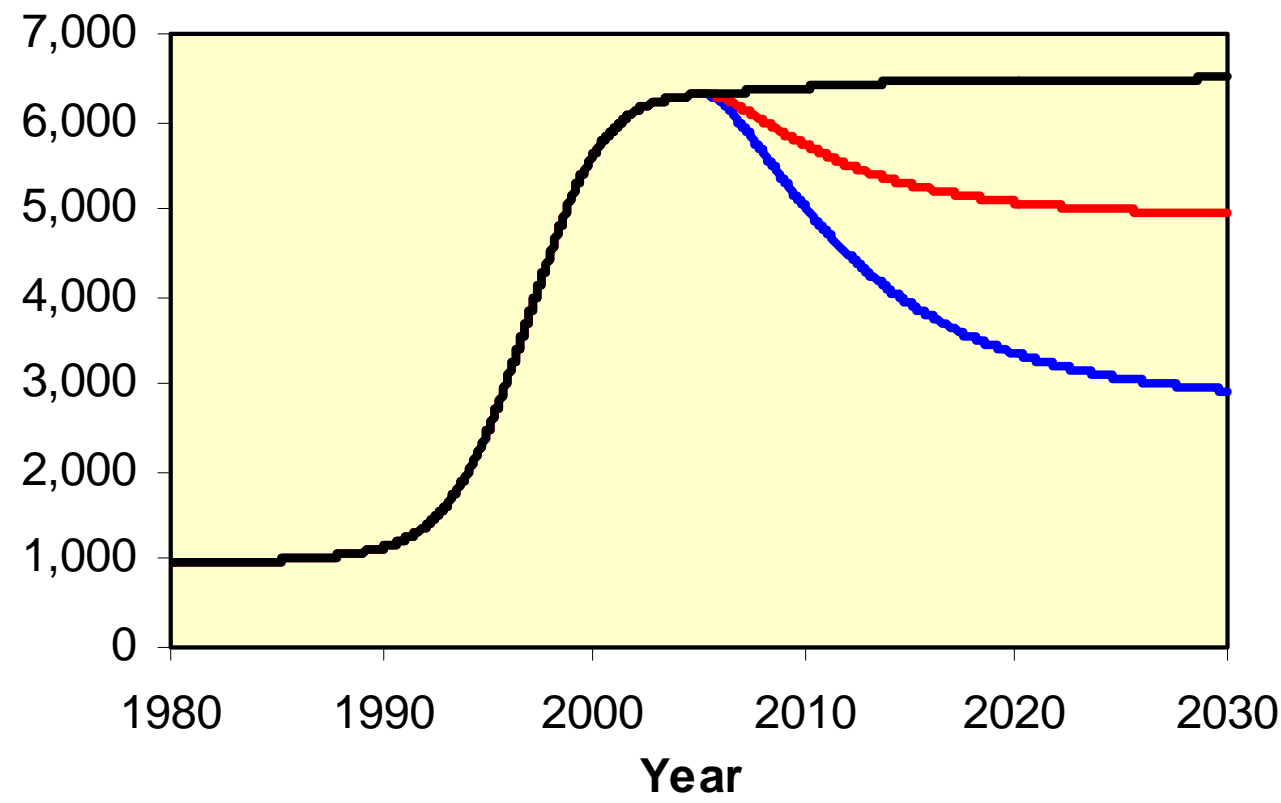
- All forms of silicosis are preventable
- Defining a safe level of exposure has proved difficult
- Measuring exposure is complex & technically demanding
- Many developing countries fail to monitor compliance with existing legislation
- Dust control is an **essential** component of TB control

(Churchyard GJ, Corbett EL. Tuberculosis control in mines. International text book of Tuberculosis. 2005)

HIV prevention

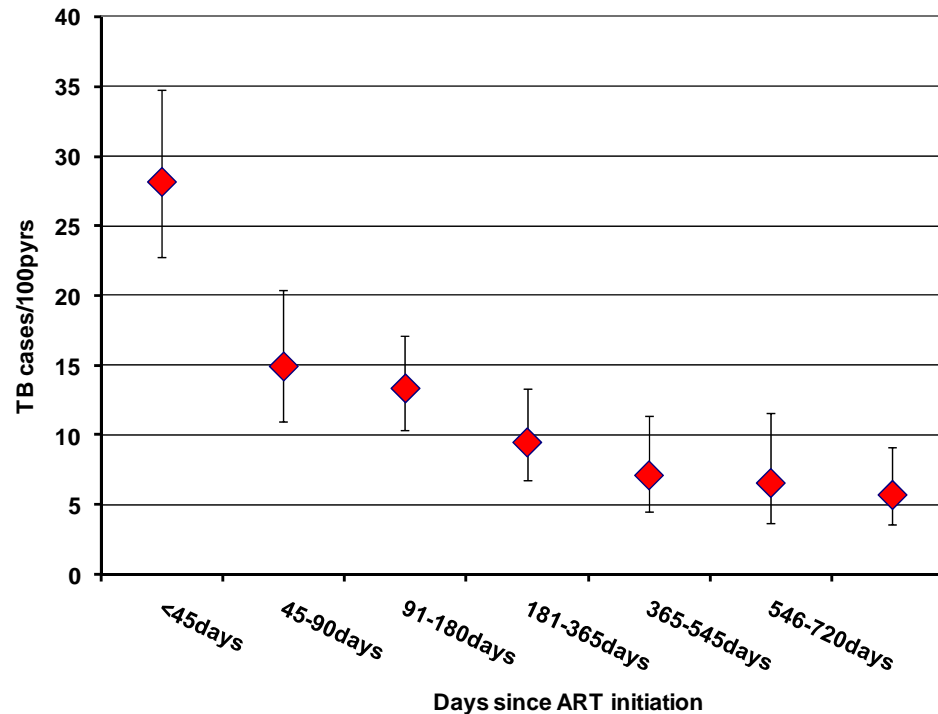
TB incidence: HIV prevention

- No incident HIV after 2005
- 50% of incident HIV After 2005
- No reduction in HIV after 2005



HIV- treatment and care

- IPT: Ad IRR: 0.54 (0.35-0.83)
- Antiretroviral therapy



(Grant AD. *JAMA* 2005; 293(22): 2719-2725

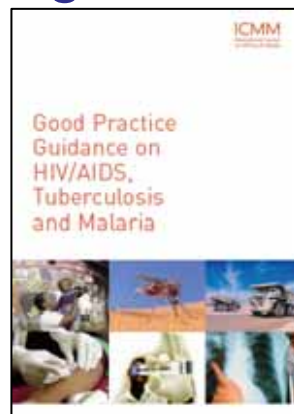
Charalambous S. *Int J Tuberc Lung Dis.* 2008;12;supplement 2:S146)

The future

- TB vaccines
- New diagnostics → POC tests
- New TB drugs
 - Shorter duration of TB preventive therapy
 - Effective against drug resistant TB

Resources

- TB/HIV tool kit for South African businesses. Global Health Initiative 2008
- Good Practice Guidance on HIV/AIDS, Tuberculosis and Malaria. International Chamber of Mines and Minerals 2007
- Isoniazid preventive therapy for patients with silicosis 2007. www.wahsa.net.
- Medical surveillance of silicosis and silica-related diseases. Expert Group Meeting. 2008



Conclusion

- Silica exposure and silicosis are strong risk factors for TB
- It is possible to prevent TB in silica exposed workers
 - Improved cure and intensified case finding
 - IPT (targeted or community-wide)
 - Infection control
 - strengthening dust control
 - HIV treatment