



Photo: Riccardo Venturi

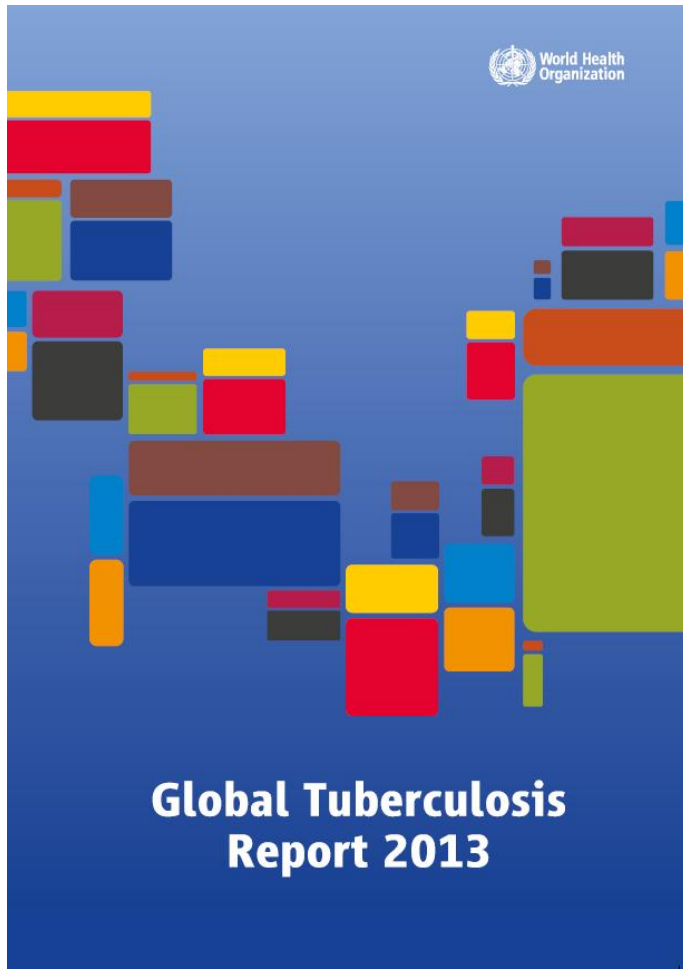


La Tuberculosis oggi e domani

Dr Mario Raviglione
Director, Global TB Programme
World Health Organization, Geneva, Switzerland

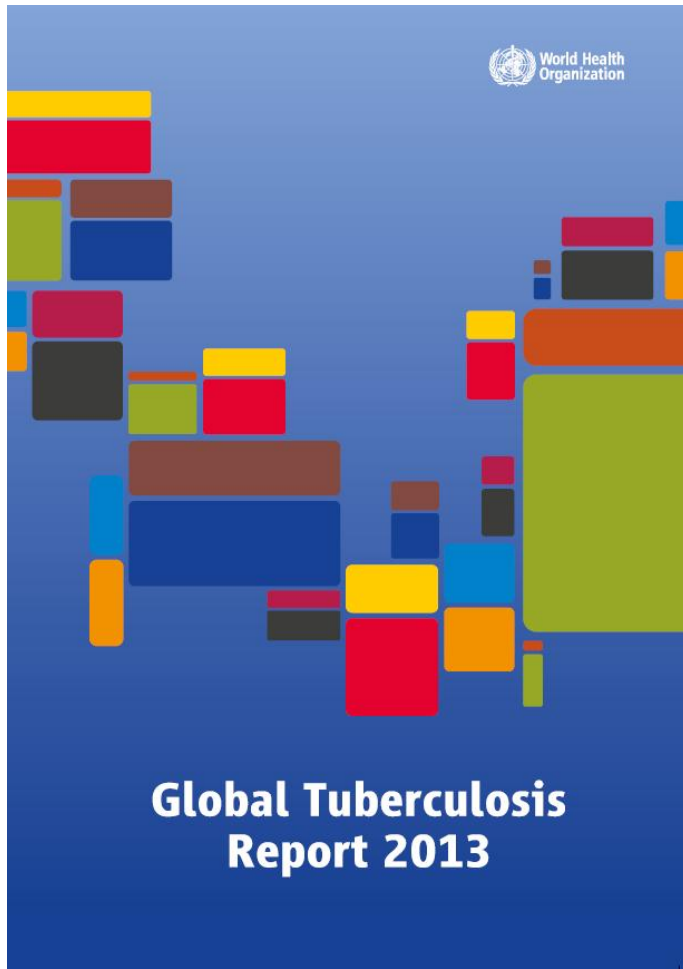
Ministero della Salute
Roma, 17 Ottobre 2013

Overview



- ✓ **Burden of TB, TB/HIV, MDR-TB**
- ✓ **Strategy, targets, progress**
- ✓ **Challenges towards elimination**
- ✓ **Vision and solution**

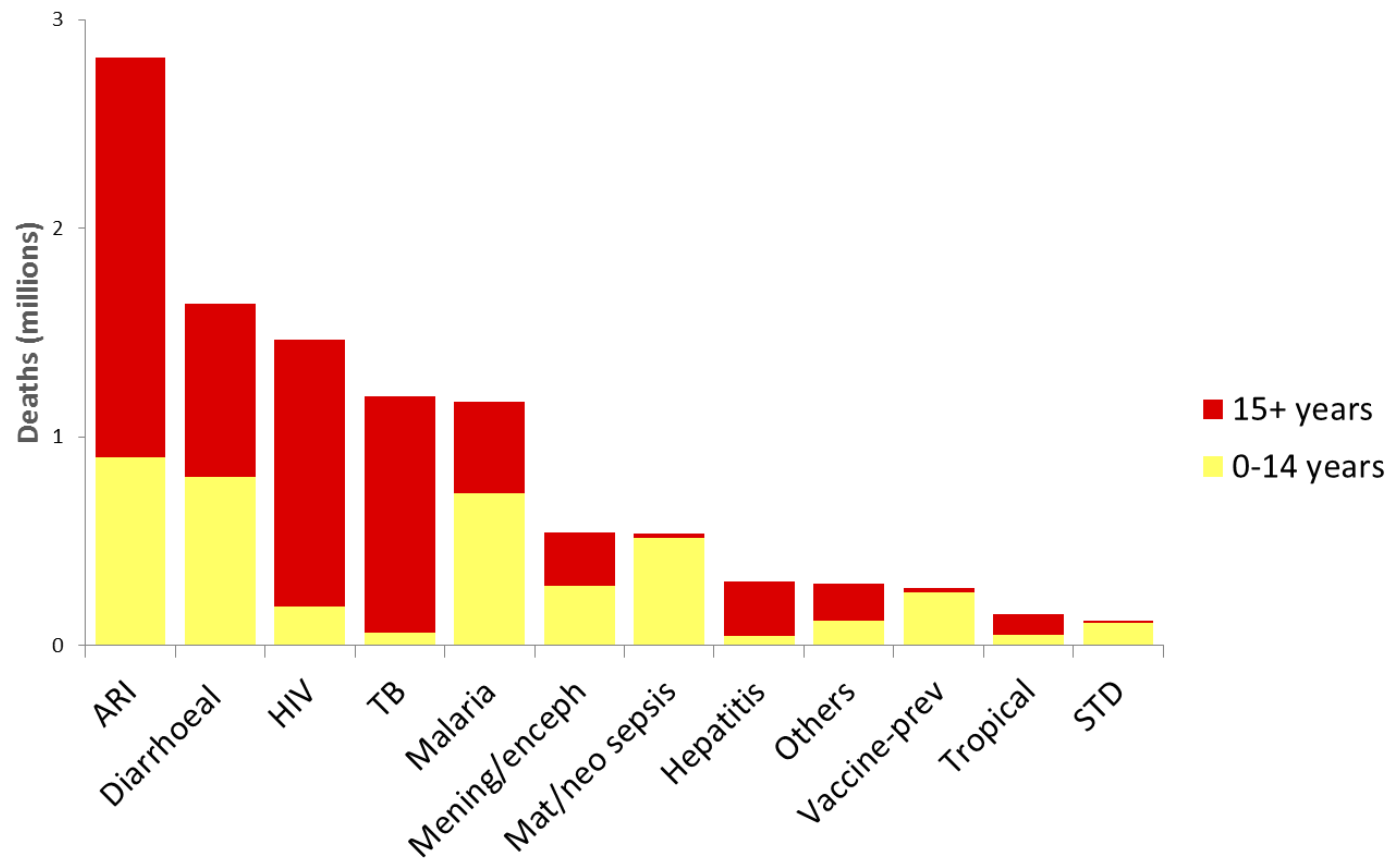
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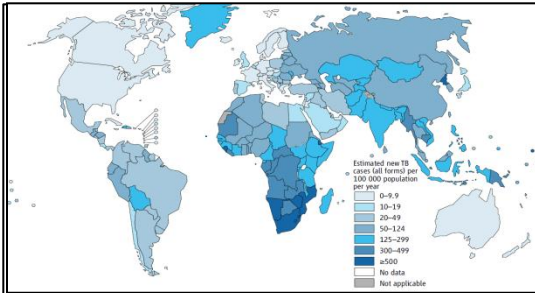
Global Burden of Disease 2010

10.5 million deaths due to communicable diseases in 2010



<http://ghdx.healthmetricsandevaluation.org/global-burden-disease-study-2010-qbd-2010-data-downloads>

The Global Burden of TB -2012



All forms of TB

Estimated number
of cases

8.6 (8.3-9.0) million

- 0.5 m in children
- 2.9 m in women

HIV-associated TB

1.1 (1.0-1.2) million
(13%)

Multidrug-resistant TB

450.000 (300k-600k)

Estimated number
of deaths

1.3 (1.0-1.6) million*

- 74.000 in children
- 410.000 in women

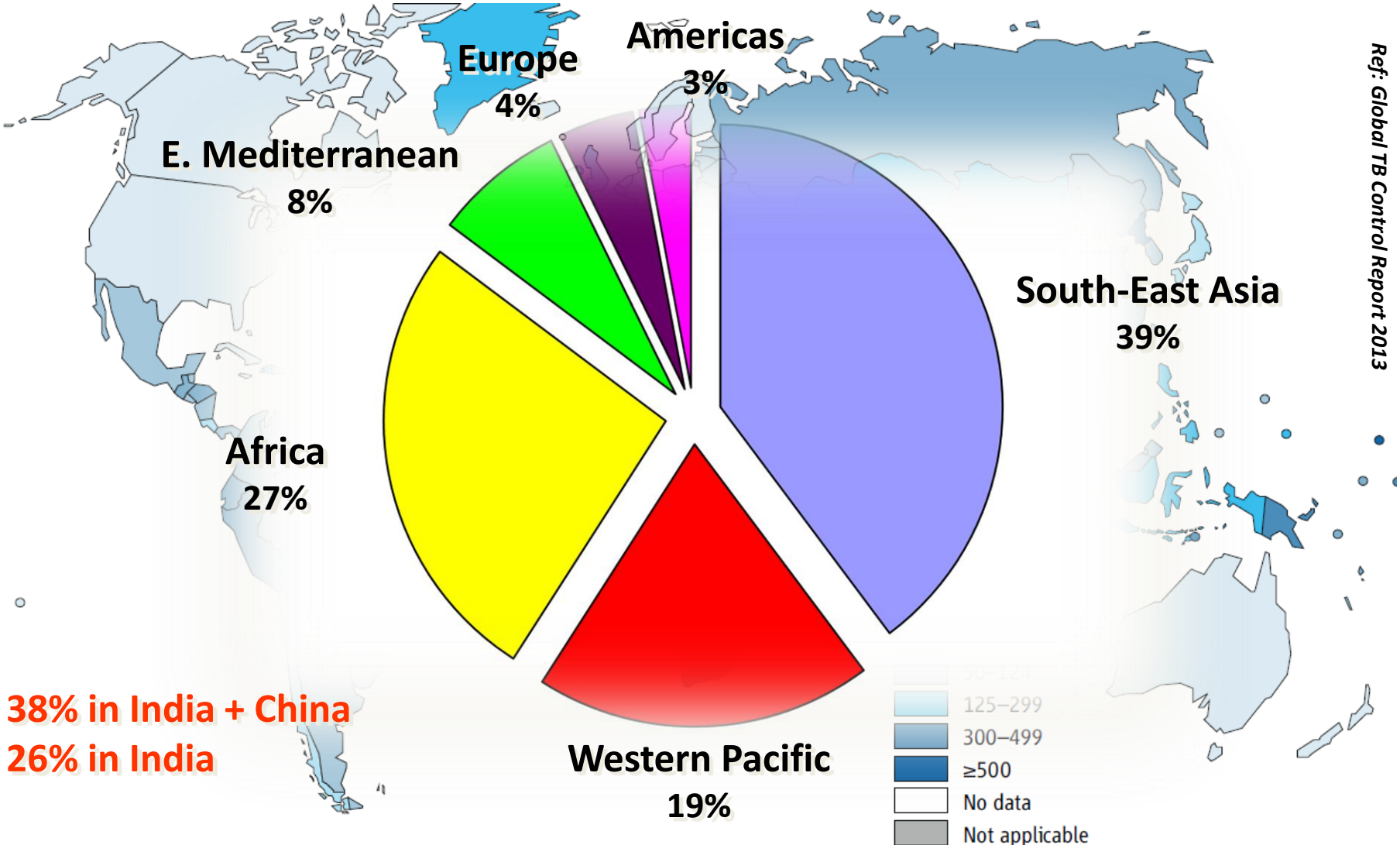
320,000 (300k-340k)

170,000 (102k-242k)

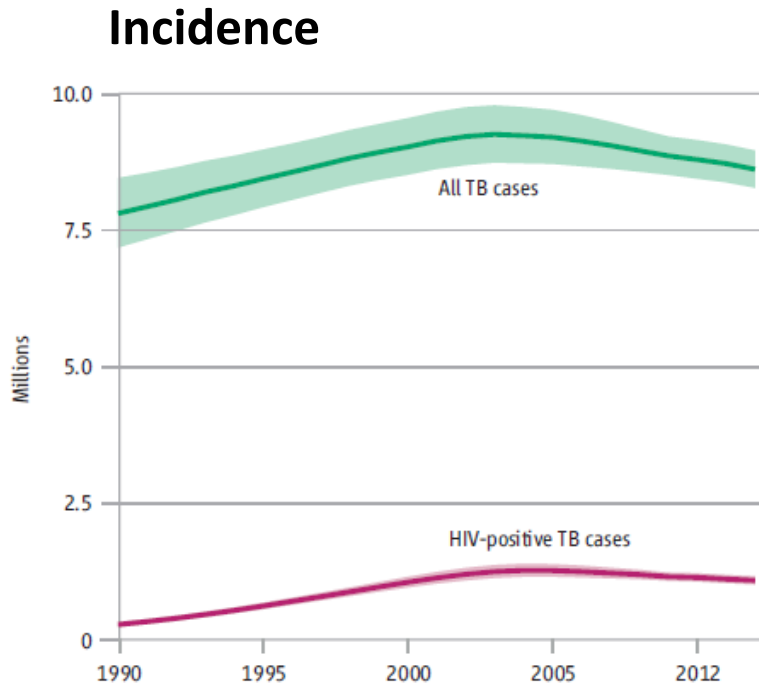
Source: WHO Global Tuberculosis Report 2013

* Including deaths attributed to HIV/TB

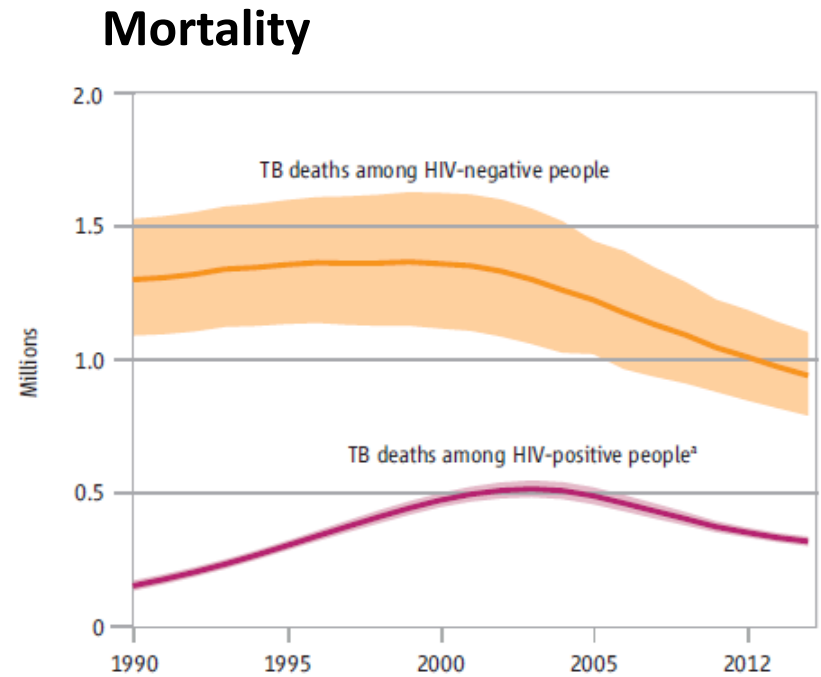
Estimated TB incidence rate, 2012



TB cases and deaths, 1990–2012: achievements of control efforts with available tools (absolute numbers)



**Incidence peaked at 9 million in early 2000s
8.6 million in 2012**

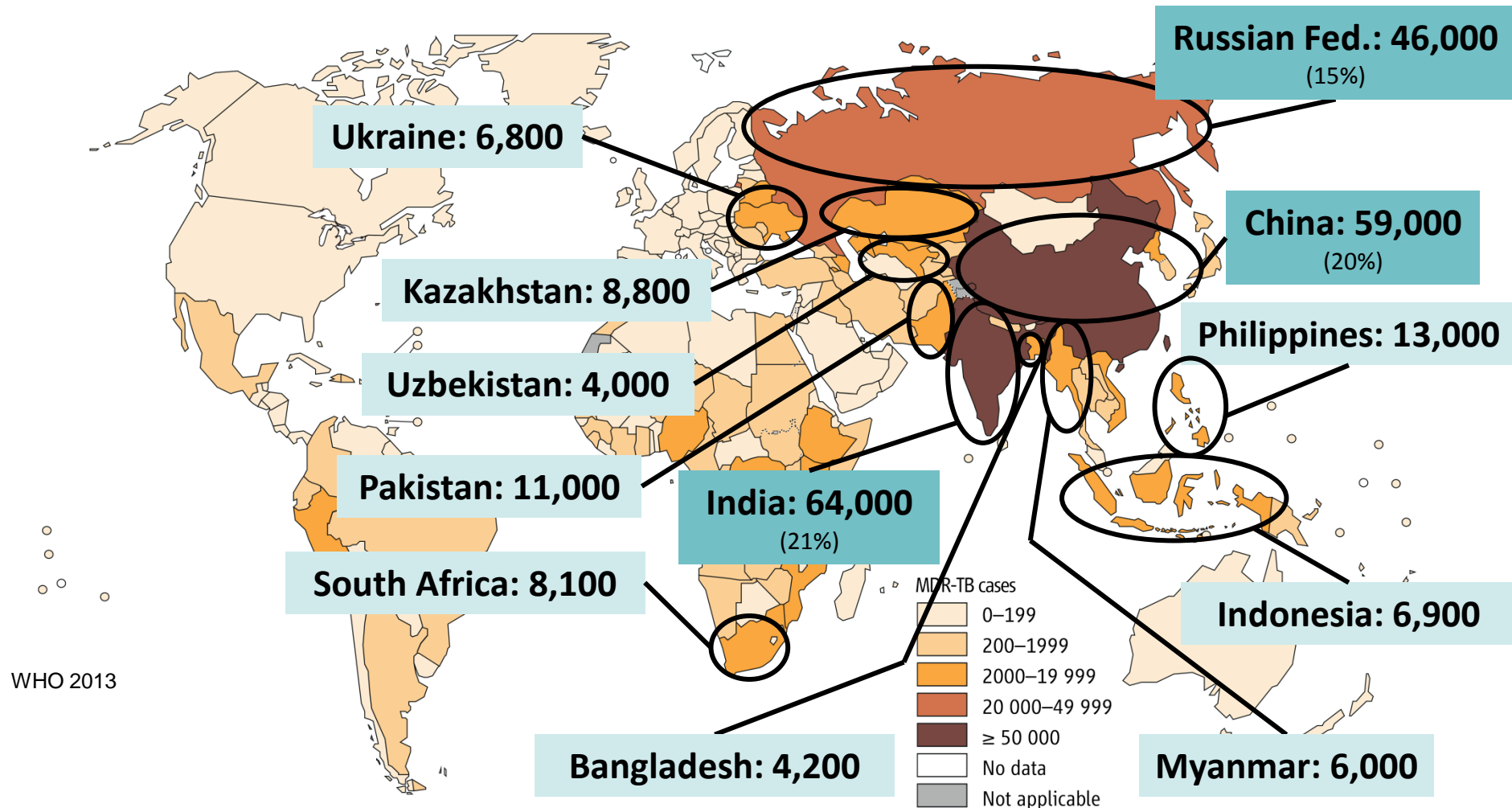


**Total mortality peaked early 2000s at 1.8 million
1.3 million in 2012**

▫ HIV-associated TB deaths are classified as HIV deaths according to ICD-10.

Ref: Global TB Control Report 2013

2012: Estimated number of **MDR-TB Cases** out of notified TB cases - 80% of all cases are in 12 countries



WHO 2013

Who carries the burden of tuberculosis?

...mostly, the most vulnerable

TB spreads in poor, crowded & poorly ventilated settings



410,000 women and 74,000 children die of TB each year; 10 million "TB" orphans

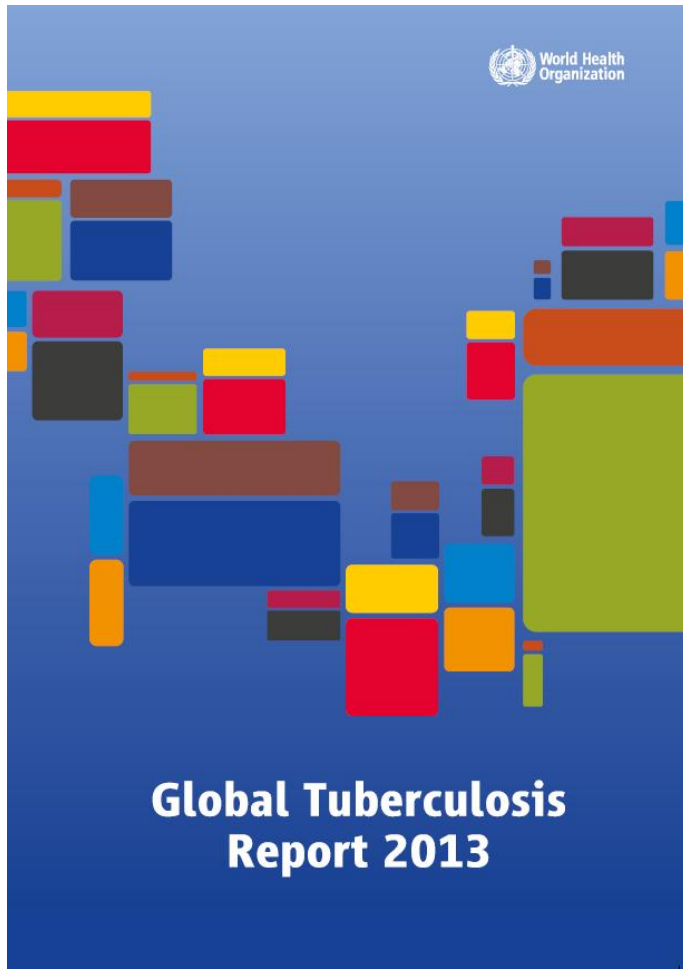


Migrants, prisoners, minorities, refugees face risks, discrimination & barriers to care



TB linked to HIV infection, malnutrition, alcohol, drug and tobacco use, diabetes

Overview



- ✓ Burden of TB, TB/HIV, MDR-TB
- ✓ Strategy, targets, progress
- ✓ Challenges towards elimination
- ✓ Vision and solution

The global response:

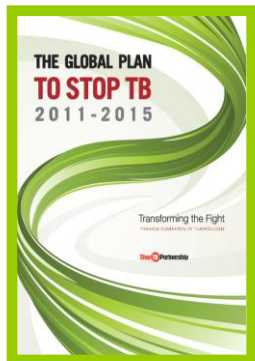
Targets, Global Plan, and Stop TB Strategy



Goal 6: to have halted by 2015 and begun to reverse the incidence...



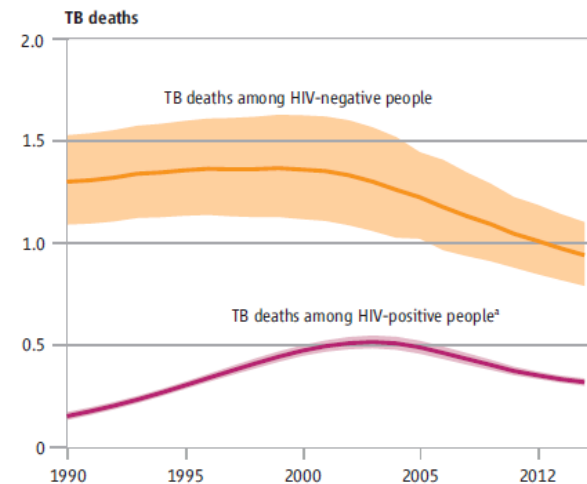
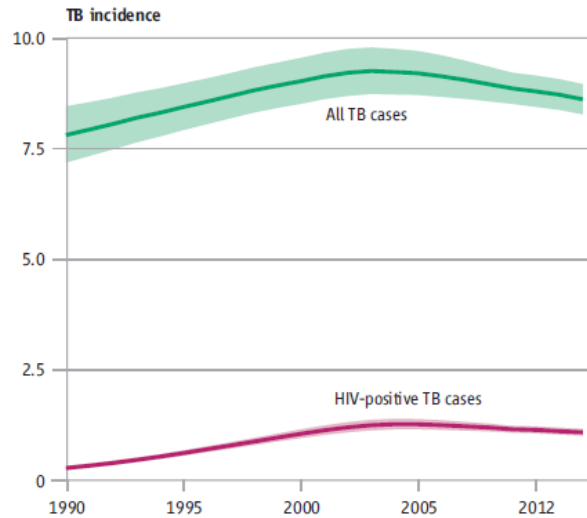
1. **Pursue** high-quality DOTS expansion
2. **Address** TB-HIV, MDR-TB, and needs of the poor and vulnerable
3. **Contribute** to health system strengthening
4. **Engage** all care providers
5. **Empower** people with TB and communities
6. **Enable and promote** research



2015: 50% reduction in TB prevalence and deaths compared to 1990

2050: elimination (<1 case per million population)

Global Progress on impact - 2012



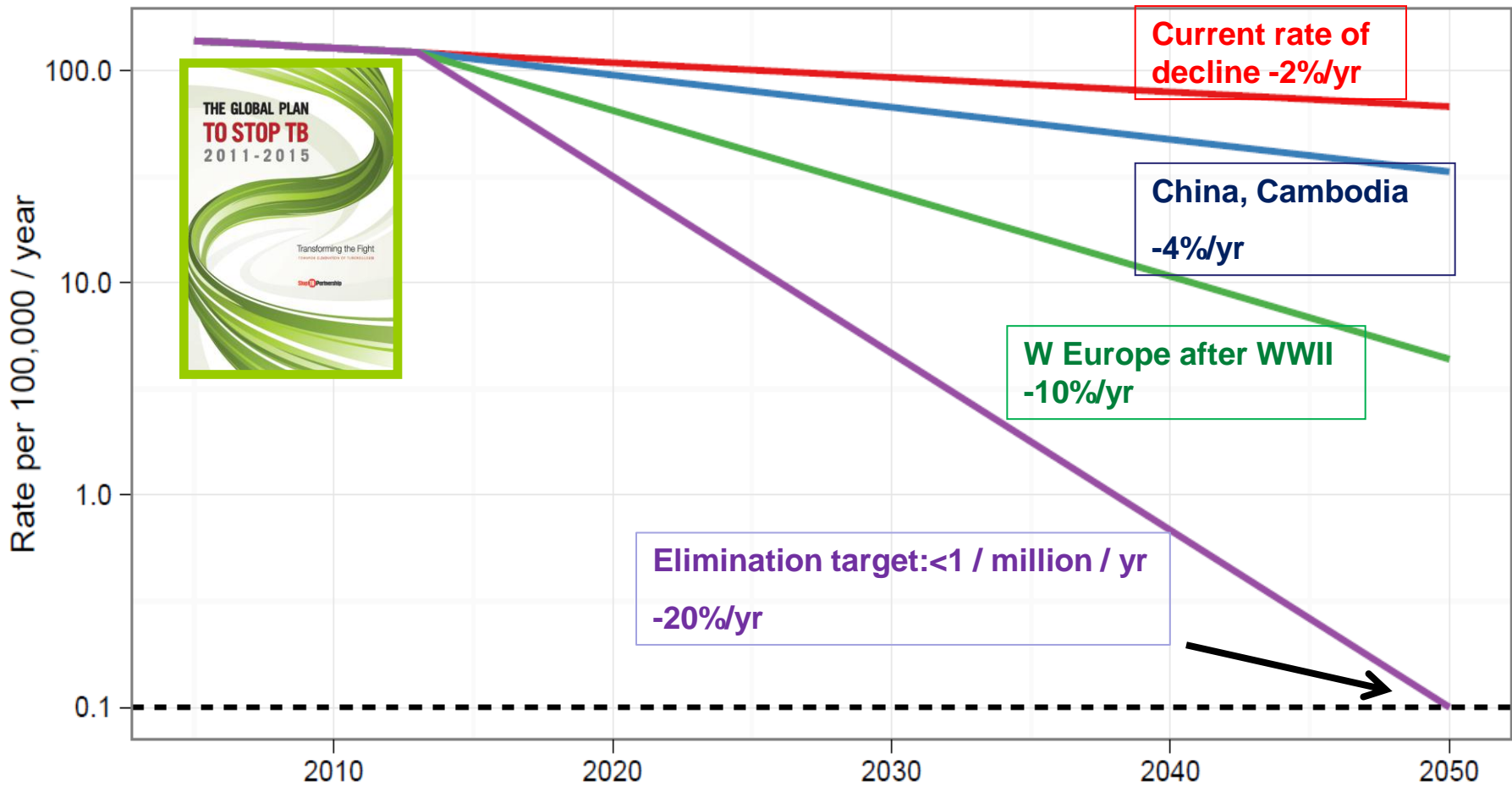
Ref: Global TB Control Report 2013

- ✓ 56 million patients cured, 1995-2012
- ✓ 22 million lives saved since 1995
- ✓ 2015 MDG on track and reduction in TB mortality of 45% since 1990
- ✓ BUT, TB incidence declining far too slowly, 1/3 of cases not in the system, MDR-TB challenge not yet properly addressed



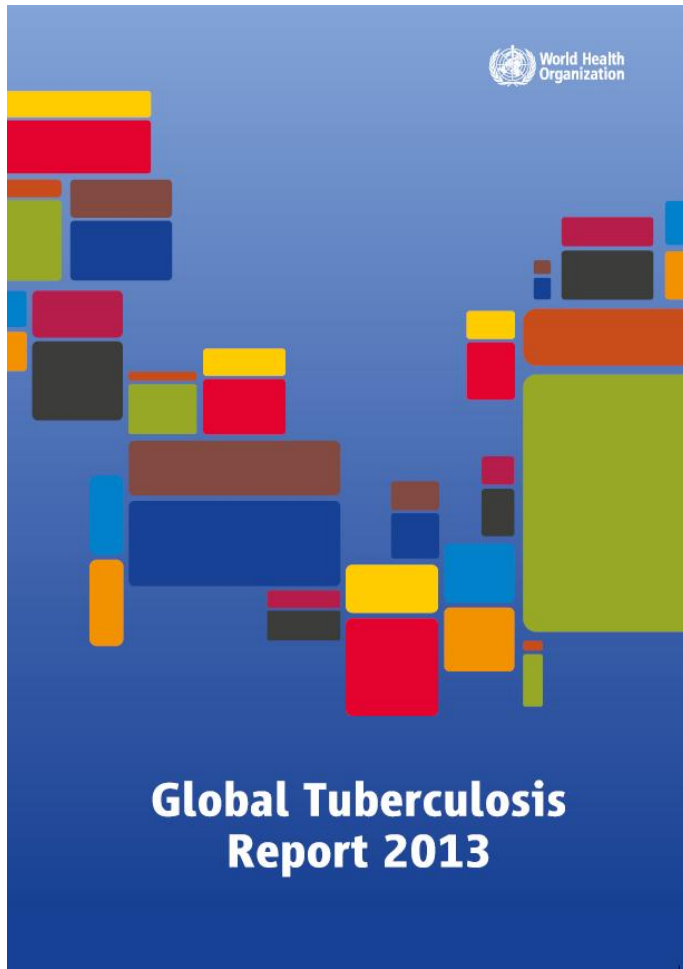
^a HIV-associated TB deaths are classified as HIV deaths according to ICD-10.

Full implementation of Global Plan: 2015 MDG target reached but TB not eliminated by 2050



— Current decline
 — Recent best
 — All-time best
 — Elimination

Overview



- ✓ **Burden of TB, TB/HIV, MDR-TB**
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- ✓ **Vision and solution**

Challenges to “**ELIMINATION**”

1. **Commitment by governments and stakeholders fluctuating**
2. **Funding not secure; catastrophic costs for the poor un-resolved**
3. **Only 2/3 of estimated cases reported or detected**
4. **TB/HIV major impact in Africa**
5. **MDR-TB, with high burden in former USSR , China etc**
6. **Un-engaged non-state practitioners**
7. **Social and economic determinants maintaining TB**
8. **Research in need of intensification and investments**

Challenge 1: Lack of commitment

Tuberculosis 8



Scale-up of services and research priorities for diagnosis, management, and control of tuberculosis: a call to action

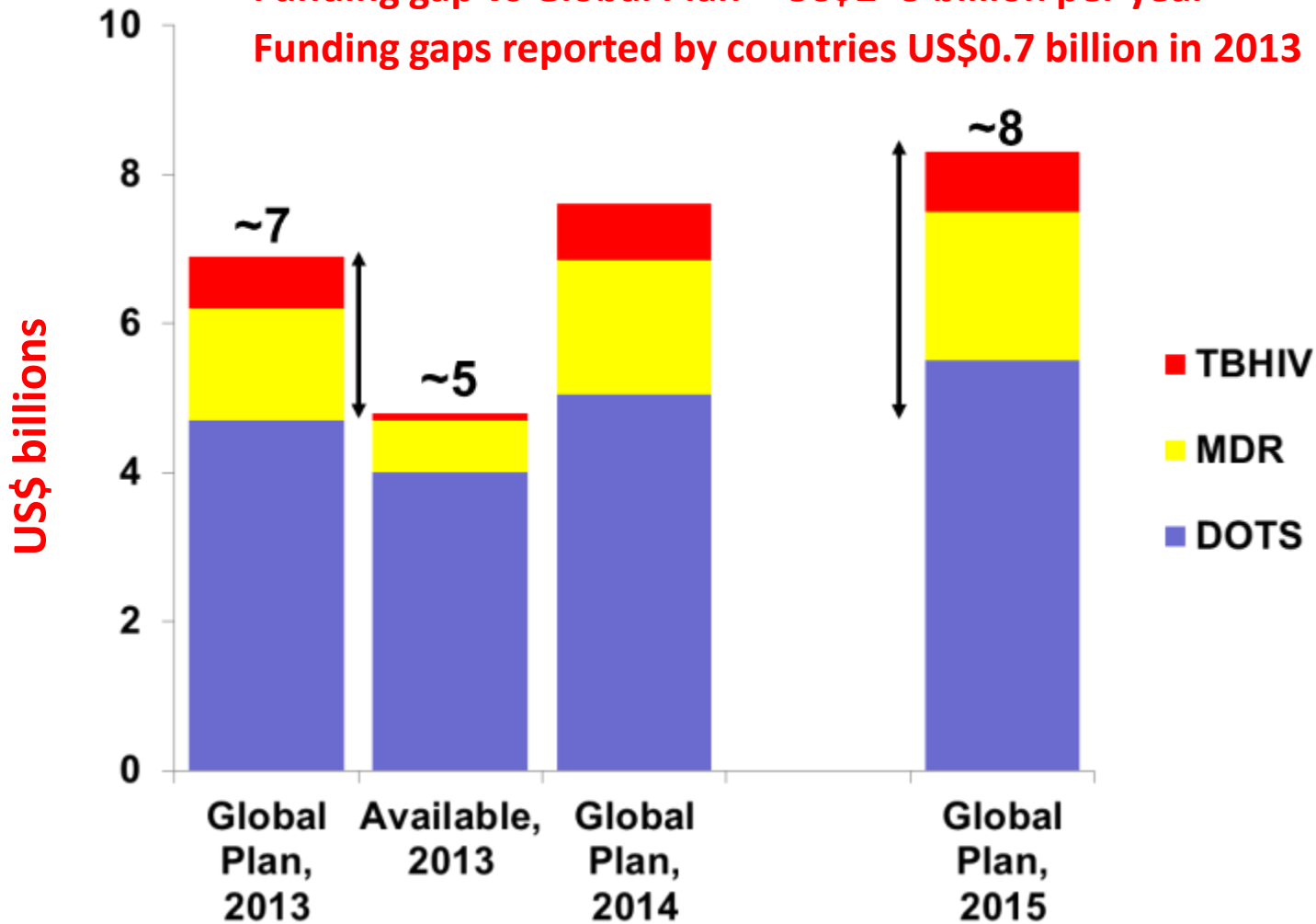
Lancet 2010; 375: 2179-91
Published Online
May 19, 2010

Ben J Marais, Mario C Raviglione*, Peter R Donald, Anthony D Harries, Afranio L Kritski, Stephen M Graham, Wafaa M El-Sadr, Mark Harrington, Gavin Churchyard, Peter Mwaba, Ian Sanne, Stefan H E Kaufmann, Christopher J M Whitty, Rifat Atun, Alimuddin Zumla**

... political commitment. Fundamentally, what needs to be recognised is that the efforts to control tuberculosis have a severe lack of political commitment at the country and international levels. Funding for tuberculosis is neglected because it is not a special programme of the World Bank, is not a named priority among any UN agency leaders, does not have a special UN programme, is not in UNICEF's portfolio, is not a special presidential initiative in the USA, and does not have strong support from the pharmaceutical industry compared with HIV/AIDS, malaria, and non-communicable diseases. It was even omitted from the formal title of MDG 6 and only listed among its indicators. Yet tuberculosis is a ..."

Challenge 2: Funding

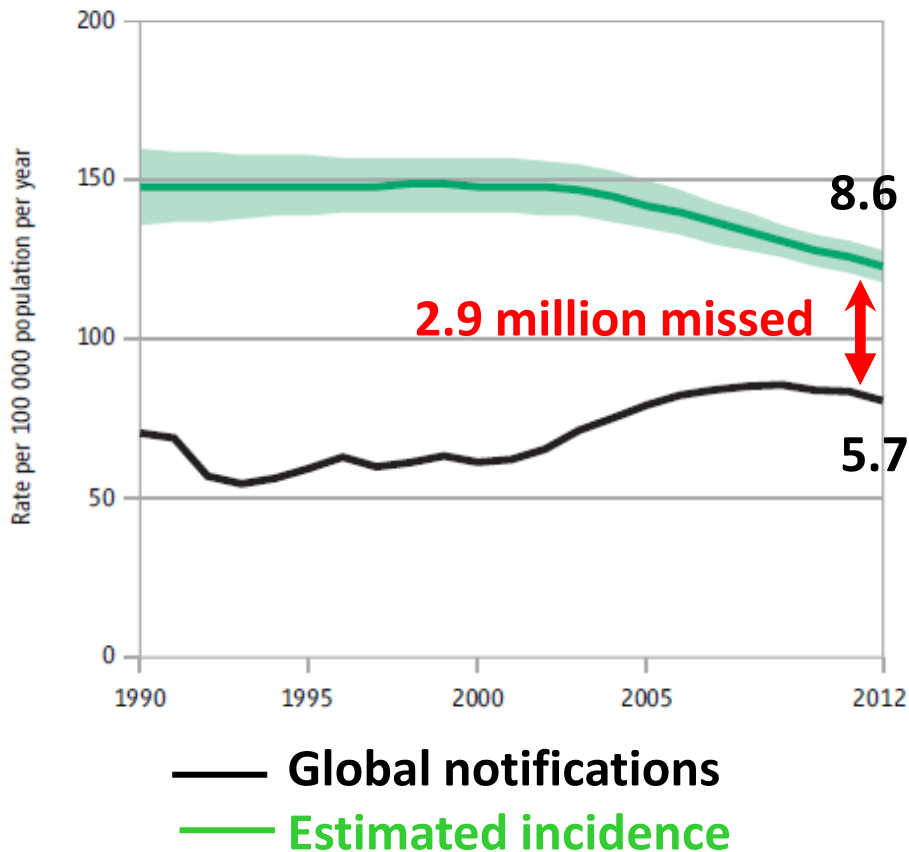
Funding gap vs Global Plan ~ US\$2–3 billion per year
Funding gaps reported by countries US\$0.7 billion in 2013



Source: WHO Global Tuberculosis Report 2013

The case detection/notification gap, 2012

Global trends in case notification (black) and estimated TB incidence (green) rates, 1990–2012.
Case notifications include new and relapse cases (all forms).



Nearly 3 million TB cases
either not notified or not
detected

NO elimination without
“capturing” them

Ref: Global TB Control Report 2013

Innovating with GeneXpert



WHO endorsement December 2010



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PLOS ONE

Perspective

GeneXpert

Carlton A. Evans
1 Universidad Peruana Cayetano Heredia, Lima, Peru

Science Speaks: HIV & TB News
A PROJECT OF THE CENTER FOR GLOBAL HEALTH POLICY

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GENEXPERT

GeneXpert rapid TB diagnostic takes off in South Africa

BY CHRISTINE LUBINSKI - JULY 20, 2011 · POST A COMMENT

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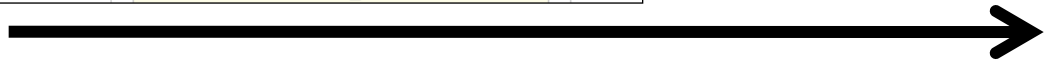
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EDITORIAL
Tuberculosis

Peter M. Small, M.D., and Madhukar Pai, M.D., Ph.D.
N Engl J Med 2010; 363:1070-1071 | September 9, 2010

Article References Citing Articles (16)

The effective treatment of tuberculosis is a lifesaving therapy that has averted 6 million deaths over the past 15 years, making it one of the greatest public health achievements of the 20th century.



Over 80 countries using it by mid-2013

Challenge 4: Responding to the TB/HIV epidemic

The WHO policy on collaborative TB/HIV activities



Challenge 5: Responding to the MDR-TB threat

WHA resolution 2009 includes all essential policies

SIXTY-SECOND WORLD HEALTH ASSEMBLY

WHA62.15

Agenda item 12.9

22 May 2009

Prevention and control of multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis

The Sixty-second World Health Assembly,

Having considered the reports on the prevention and control of multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis;¹

1. URGES all Member States:

- (1) to achieve universal access to diagnosis and treatment of multidrug-resistant and extensively drug-resistant tuberculosis as part of the transition to universal health coverage, thereby saving lives and protecting communities, by means of:



Challenge 5: Responding to the MDR-TB threat

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

CURRENT CONCEPTS

MDR Tuberculosis — Critical Steps for Prevention and Control

Eva Nathanson, M.Sc., Paul Nunn, F.R.C.P., Mukund Uplekar, M.D.,
Katherine Floyd, Ph.D., Ernesto Jaramillo, M.D., Ph.D., Knut Lönnroth, M.D., Ph.D.,
Diana Weil, M.Sc., and Mario Raviglione, M.D.

From the Stop TB Department, World Health Organization, Geneva. Address reprint requests to Dr. Jaramillo at the Stop TB Dept., World Health Organization, CH-1211 Geneva, Switzerland, or at jaramilloe@who.int.

N Engl J Med 2010;363:1050-8.

Copyright © 2010 Massachusetts Medical Society.

MULTIDRUG-RESISTANT (MDR) TUBERCULOSIS IS DEFINED AS DISEASE caused by strains of *Mycobacterium tuberculosis* that are at least resistant to treatment with isoniazid and rifampicin; extensively drug-resistant (XDR) tuberculosis refers to disease caused by multidrug-resistant strains that are also resistant to treatment with any fluoroquinolone and any of the injectable drugs used in treatment with second-line anti-tuberculosis drugs (amikacin, capreomycin, and kanamycin). MDR tuberculosis and XDR tuberculosis are serious threats to the progress that has been made in the control of tuberculosis worldwide over the past decade.^{1,2}

Nathanson et al. (2010). *The New England Journal of Medicine* 363: 1050-8.

Policy changes are fundamental!

World Health Assembly, May 2009...

In addition to high-quality DOTS...

1. Remove financial barriers (UHC)
2. Ensure well trained and sufficient human resources
3. Establish a network of labs where rapid tests are also available
4. Ensure availability of quality drugs
5. Regulate the use of all anti-TB drugs
6. Introduce infection control
7. Establish proper surveillance
8. Promote R&D
9. Mobilize resources domestically and internationally



Challenge 6: Unregulated private sector



- ✓ Private sector is first point of care in many settings. India: 70% of people with cough go first to private practitioners
- ✓ Diverse network of formal and informal providers ranging from hospitals and corporate sector to the traditional healers and quacks
- ✓ Private sector engagement crucial in closing the gap on case detection
- ✓ Contribution to finding people with TB between 10%-40% in countries
- ✓ Collaboration exists but still not enough in many settings. Efforts need to be made on both ends

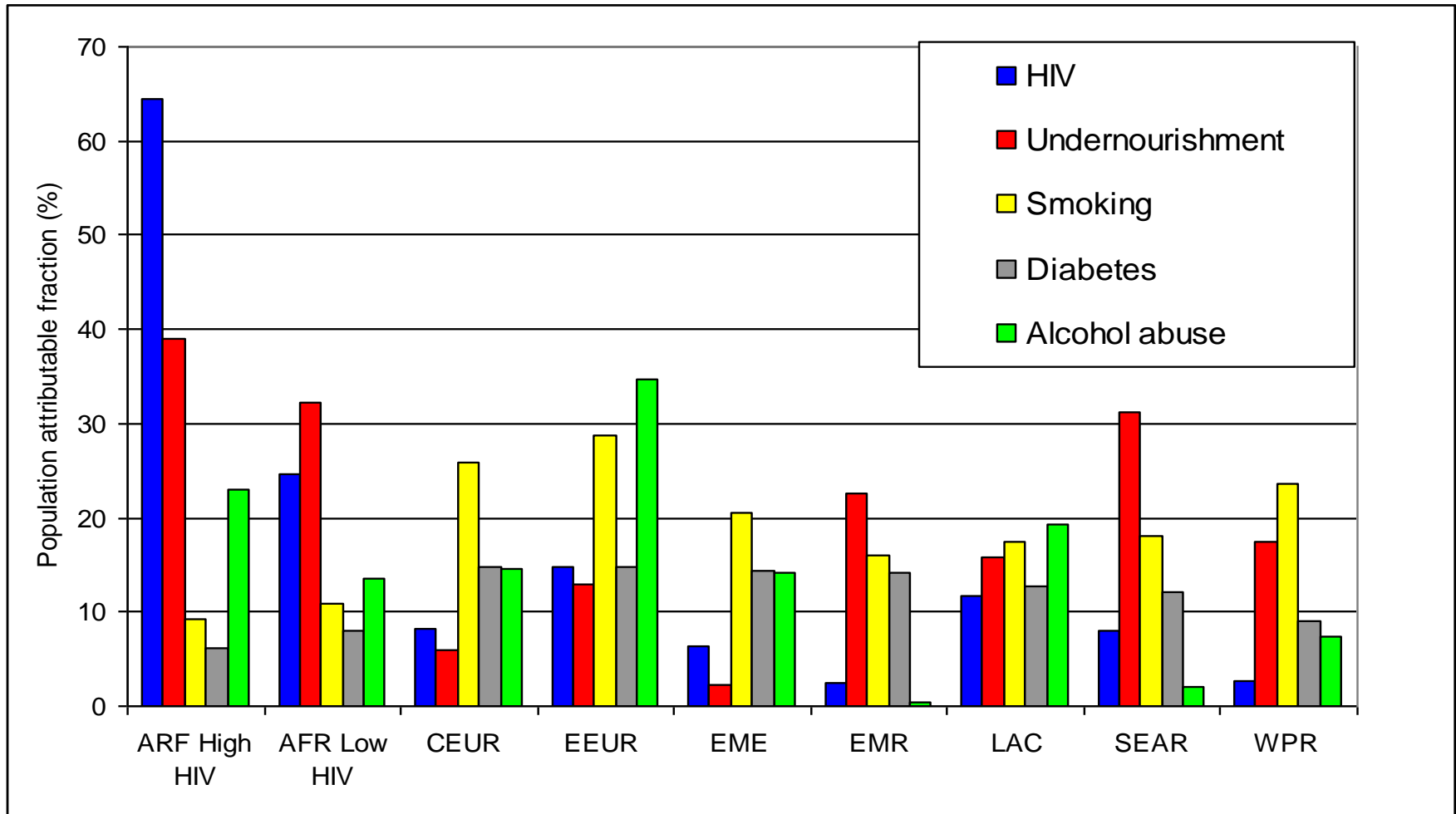
Challenge 7: Alleviation of impact of risk factors & socio-economic determinants

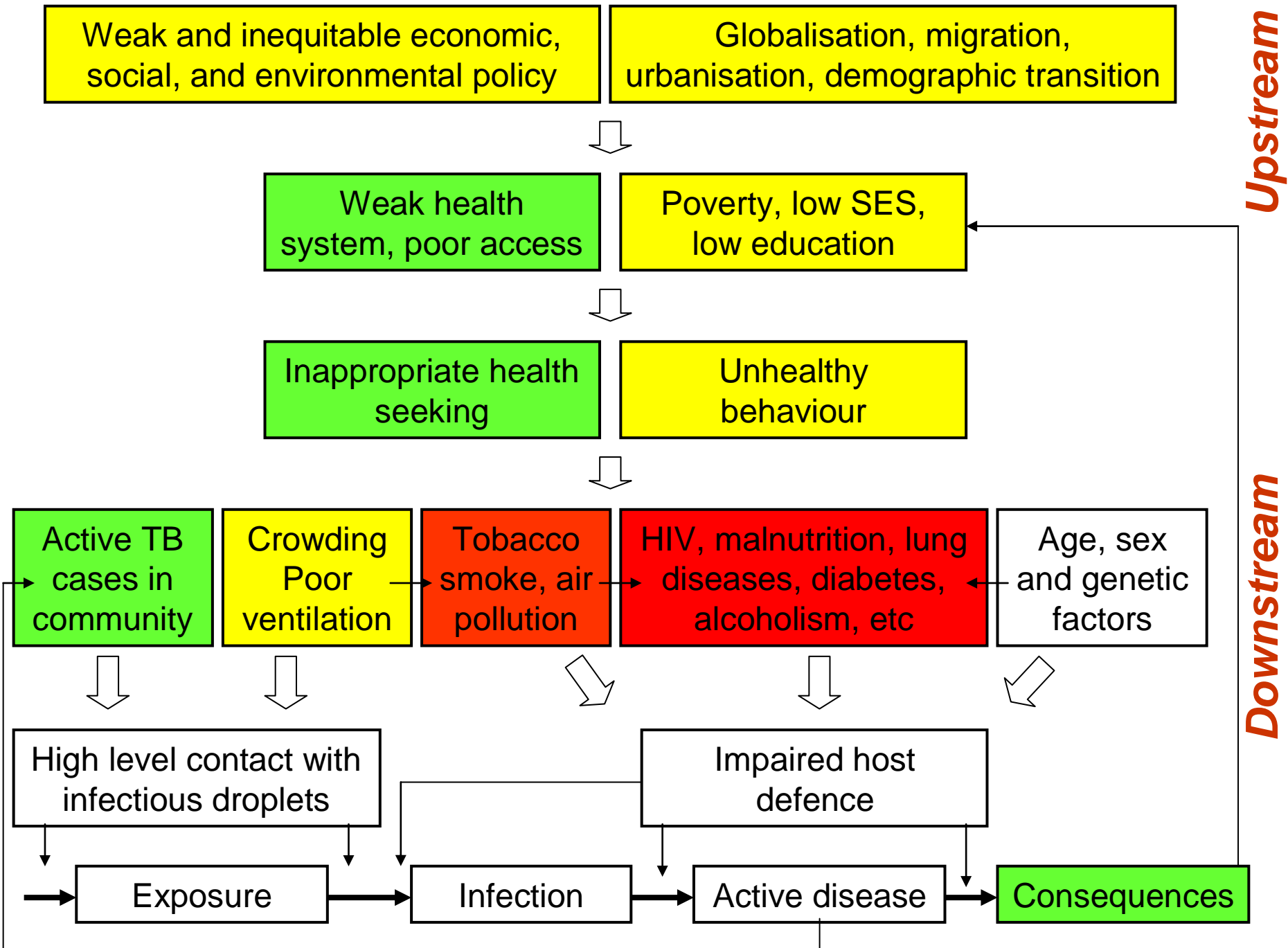
	Relative risk for active TB disease	Weighted prevalence (22 HBCs)	Population Attributable Fraction in Adults
HIV infection	20.6/26.7*	1.1%	19%
Malnutrition	3.2**	16.5%	27%
Diabetes	3.1	3.4%	6%
Alcohol use (>40g / d)	2.9	7.9%	13%
Active smoking	2.6	18.2%	23%
Indoor Air Pollution	1.5	71.1%	26%

*Sources: Lönnroth K, Raviglione M. Global Epidemiology of Tuberculosis: Prospects for Control. Semin Respir Crit Care Med 2008; 29: 481-491. *Updated data in GTR 2009. RR=26.7 used for countries with HIV <1%. **Updated data from Lönnroth et al. A consistent log-linear relationship between tuberculosis incidence and body-mass index.*

Population attributable fraction

Regional variations in HBCs





Challenge 8: Intensive investments in research to develop new tools

DIAGNOSTIC



Sputum smear microscopy
Discovered **1882**

VACCINE



BCG
Developed **1920s**

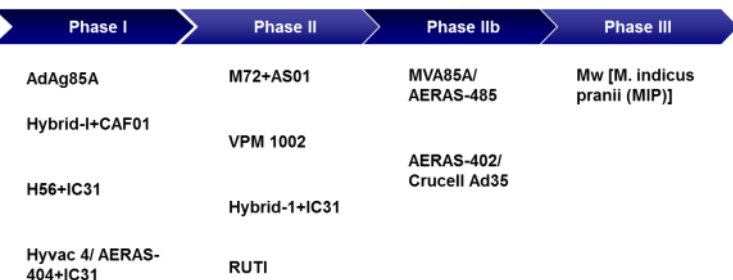
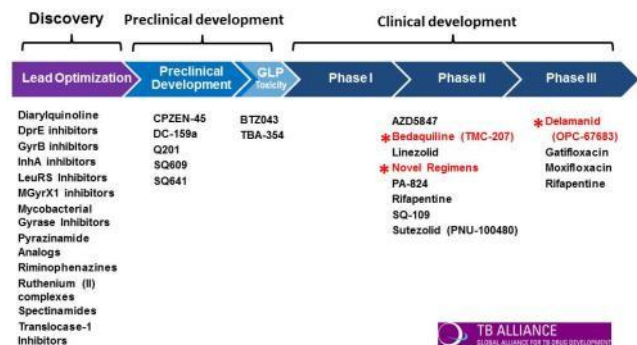
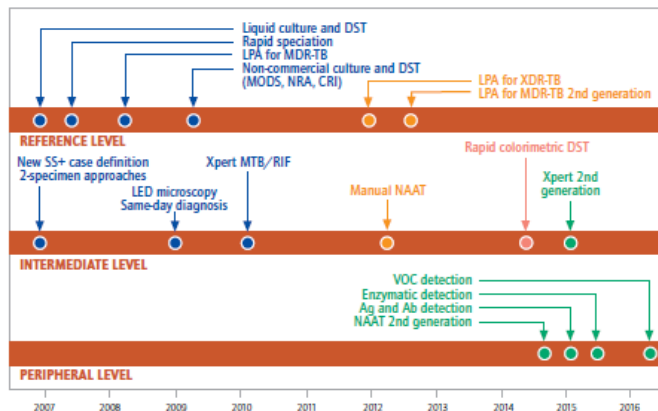
TREATMENT



1st-line TB drugs
Discovered **1943-1970**



Challenge 8: New tool pipelines in 2013



11 vaccines for TB prevention in Phase 1 or Phase II trials

Diagnostics:

- 7 new diagnostics or diagnostic methods endorsed by WHO since 2007;
- 6 in development;
- yet no PoC test envisaged

Drugs:

- 1 new drug (bedaquiline) approved in late 2012, but little impact on epidemiology;
- 1 (delamanid) just rejected by EMA in June 2013 will need re-submission;
- a regimen and other 2-3 drugs likely to be introduced in the next 4-7 years

Vaccines:

- 11 vaccines in advanced phases of development;
- 1 just reported with no detectable efficacy

What is needed to accelerate incidence decline and target "elimination"?

- ✓ Economic development: better nutrition & housing
- ✓ Universal health coverage & social protection
- ✓ TB care widely accessible to all and of high-standards
- ✓ Focused, high-intensity interventions, including BCG in children
- ✓ Screening of high-risk groups and mass TLTBI
- ✓ Infection control practices

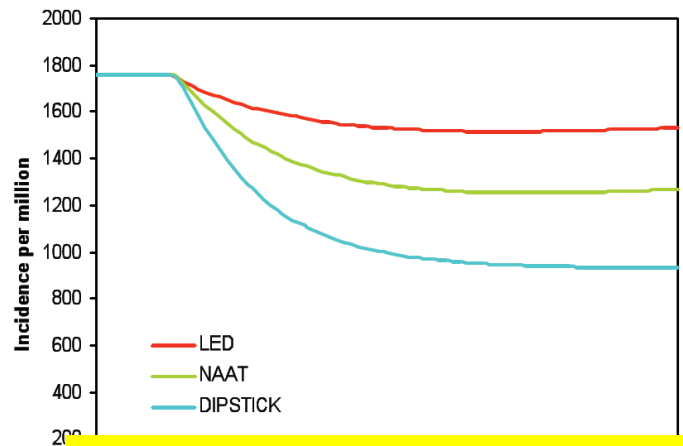
However... while incidence decline can accelerate, "elimination" is another story, as it requires major reduction of:

- (i) **transmission rate**, and
- (ii) **reactivation of latent infection** among the already infected

In turn, this requires...**new tools and increased financing**

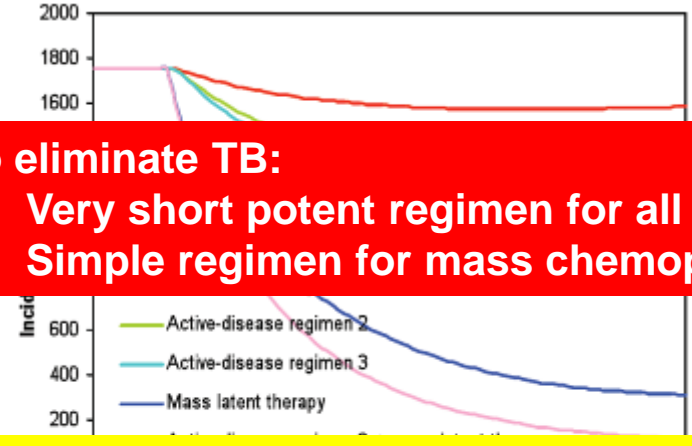
Pipeline promising, but what do we need to eliminate TB?

Potential impact of new tools on TB incidence in S-E Asia

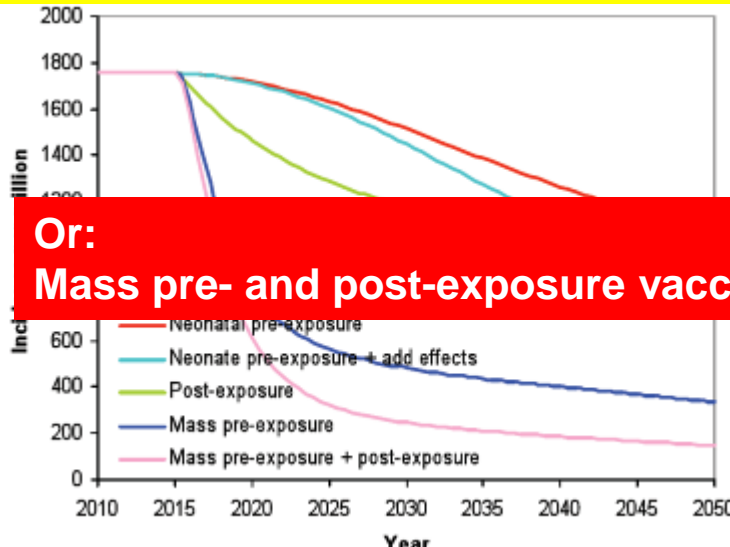


To eliminate TB:

1. Very short potent regimen for all forms, and
2. Simple regimen for mass chemoprophylaxis



Synergy of interventions !
Action on both transmission and reactivation pathways



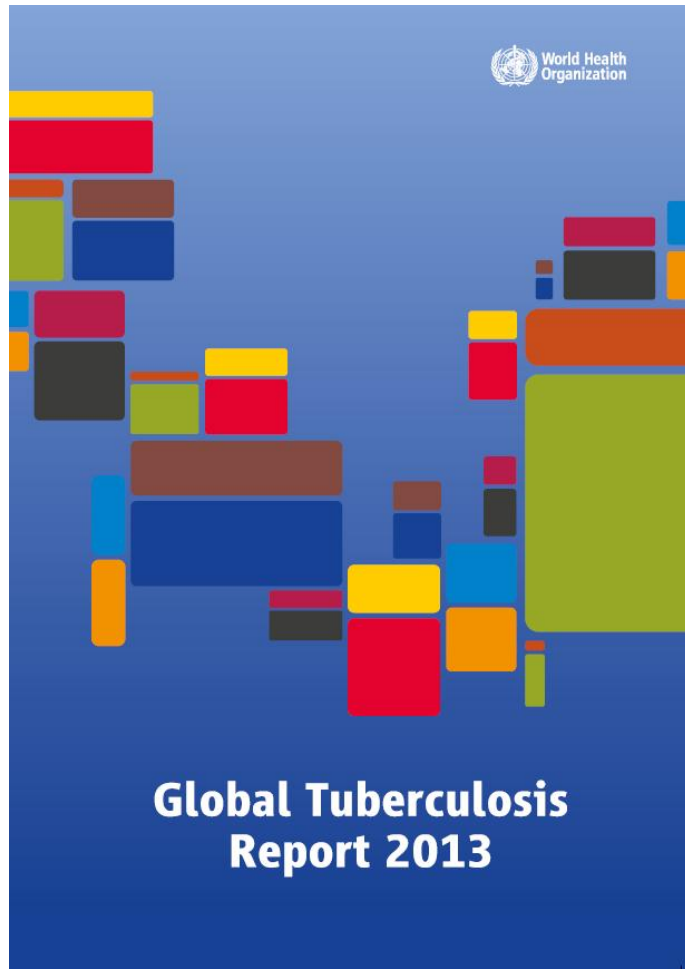
Or:
Mass pre- and post-exposure vaccine

•Regimen 3 = 10-day, 90% effective in M/XDR

Add. Effects = effects also on latency and infectiousness of cases in vaccinated

Source: L. Abu Ra

Overview



- ✓ **Burden of TB, TB/HIV, MDR-TB**
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- ✓ **Challenges towards elimination**
- ✓ **Vision and solution**

World Health Assembly 2012

Call from Member States

At the 65th World Health Assembly in May 2012, Member States including Brazil, UK, Italy, Swaziland, Saudi Arabia and others, called upon WHO to develop a **new post-2015 TB strategy and targets** and present this to Member States at the **67th World Health Assembly in 2014**.



The Process so far

Strategic & Technical Advisory Group for TB (STAG-TB)

Regional Consultations – London, Sao Paulo, Cairo, Chisinau, Nairobi, Phnom Penh and Jakarta

HBC consultation and symposium at World TB Congress in Kuala Lumpur

WHO/ Partnership consultation on post-2015 targets



June
2012

June-
December 2012

November
2012

February
2013

The Process so far and looking ahead

**Pillar 2
Consultation:
Universal Health
Coverage and
Social Protection
Opportunities**

**Pillar 3
consultation on
research and
innovation**

**STAG-TB
2013**

**WHO Executive
Board and
World Health
Assembly 2014**



**April
2013**

**10 June
2013**

**11-12 June
2013**

**January-May
2014**

DRAFT POST-2015 GLOBAL TB STRATEGY AT A GLANCE

VISION: A world free of TB:
Zero deaths, disease and suffering due to TB

GOAL: End the Global TB Epidemic

TARGETS FOR 2035: 95% reduction in TB deaths (compared with 2015)
Less than 10 cases per 100,000 population

MILESTONES FOR 2025: 75% reduction in TB deaths (compared with 2015);
TB cases reduced to less than 50 per 100,000 population
No affected families face catastrophic costs due to TB

PRINCIPLES:

- Government stewardship and accountability, with monitoring and evaluation
- Strong coalition with civil society and communities
- Protection and promotion of human rights, ethics and equity
- Adaptation of the strategy and targets at country level, with global collaboration

PILLARS AND COMPONENTS

1. INTEGRATED, PATIENT-CENTRED CARE AND PREVENTION

- A. Early diagnosis of TB including universal drug susceptibility testing; systematic screening of contacts and high-risk groups
- B. Treatment of all people with TB including drug-resistant TB, with patient-centred support
- C. Collaborative TB/HIV activities and management of co-morbidities
- D. Preventive treatment of people at high-risk and vaccination for TB

2. BOLD POLICIES AND SUPPORTIVE SYSTEMS

- A. Political commitment with adequate resources for TB care and prevention
- B. Engagement of communities, civil society organizations, and public and private care providers
- C. Universal Health Coverage and other policy and regulatory frameworks for case notification, vital registration, drug quality and rational use, and infection control
- D. Social protection, poverty alleviation and actions on other TB determinants

3. INTENSIFIED RESEARCH AND INNOVATION

- A. Discovery, development and rapid uptake of new tools, interventions, and strategies
- B. Research to optimize implementation and impact, and promote innovations

DRAFT Post-2015 TB Strategy at a glance

VISION:

- A WORLD FREE OF TB
- Zero deaths, disease and suffering due to TB

GOAL:

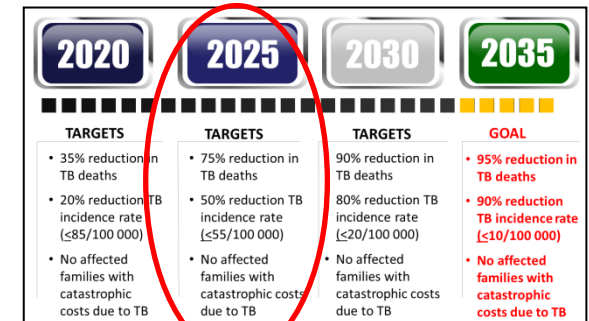
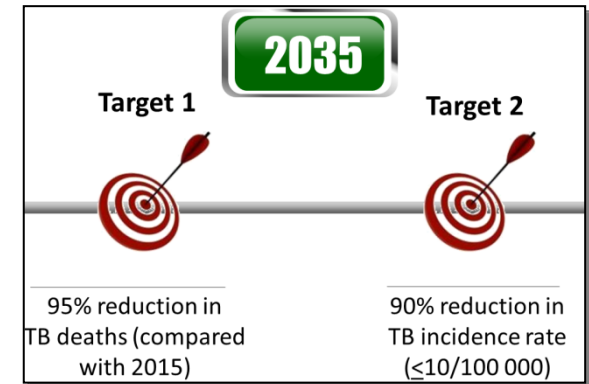
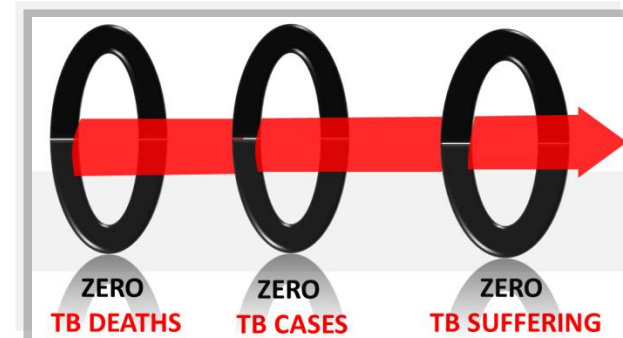
- End the Global TB Epidemic

TARGETS FOR 2035:

- 95% reduction in TB deaths (compared with 2015)
- 90% reduction in TB incidence rate ($\leq 10/100,000$)

MILESTONES FOR 2025:

- 75% reduction in TB deaths (compared with 2015)
- 50% reduction in TB incidence rate (< than 55/100,000)
- No affected families face catastrophic costs due to TB



Proposed Goal and Targets

GOAL: End the Global TB Epidemic

2035

Target 1



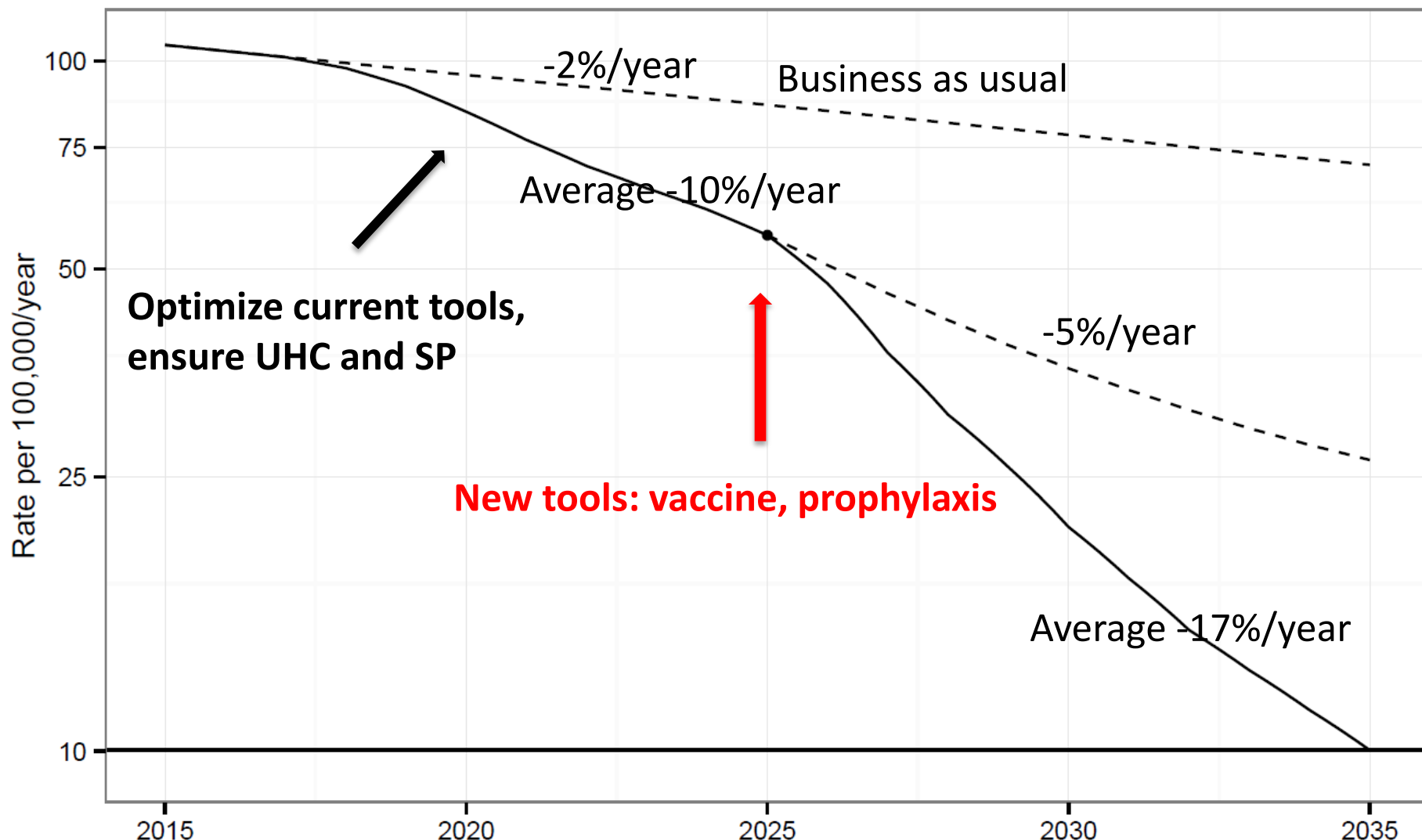
95% reduction in
TB deaths (compared
with 2015)

Target 2



90% reduction in
TB incidence rate
($\leq 10/100\ 000$)

Incidence decline: technological breakthrough by 2025 addressing the pool of latent infection



Getting there: **Milestones**

2020

2025

2030

2035

TARGETS

- 35% reduction in TB deaths
- 20% reduction TB incidence rate ($\leq 85/100\ 000$)
- No affected families with catastrophic costs due to TB

TARGETS

- 75% reduction in TB deaths
- 50% reduction TB incidence rate ($\leq 55/100\ 000$)
- No affected families with catastrophic costs due to TB

TARGETS

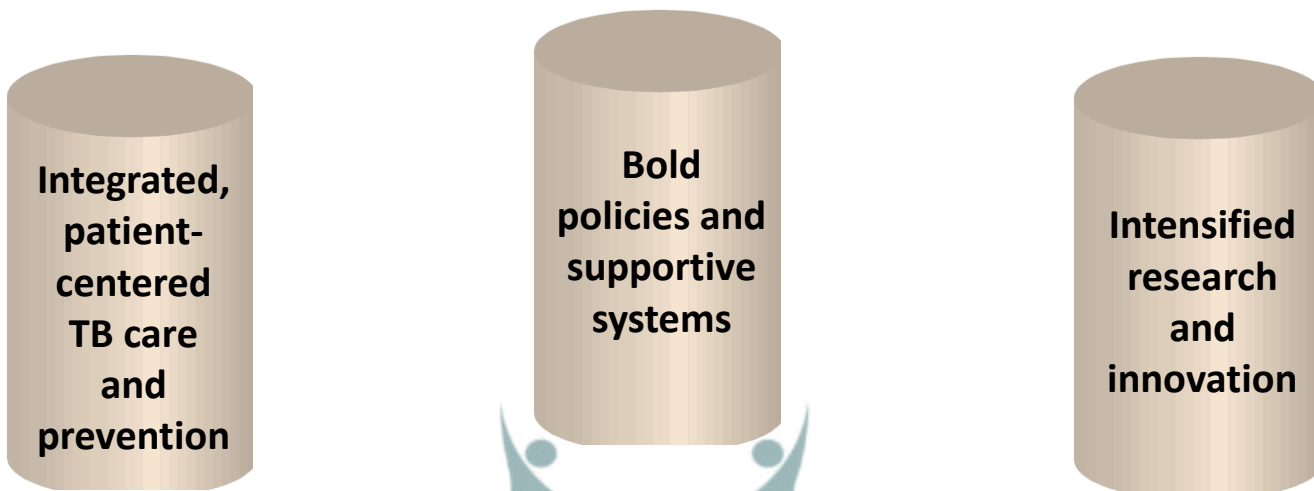
- 90% reduction in TB deaths
- 80% reduction TB incidence rate ($\leq 20/100\ 000$)
- No affected families with catastrophic costs due to TB

GOAL

- **95% reduction in TB deaths**
- **90% reduction TB incidence rate ($\leq 10/100\ 000$)**
- **No affected families with catastrophic costs due to TB**

Post-2015 TB Strategy

Proposed Pillars and Principles



Government stewardship and accountability, with monitoring and evaluation

Building a strong coalition with civil society and communities

Protecting and promoting human rights, ethics and equity

Adaptation of the strategy and targets at country level, with global collaboration

Enhanced TB Strategy **Post-2015** (draft)

**Targets: 95% reduction of deaths and
< 10 cases / 100,000 population by 2035**

Integrated, patient-centered TB Care and Prevention

Early diagnosis of TB including universal drug-susceptibility testing ; systematic screening of contacts and high-risk groups

Treatment of all forms of TB including drug -resistant TB with patient support

Collaborative TB/HIV activities and management of co-morbidities

Preventive treatment for high-risk groups and vaccination of children

Bold policies and supportive systems

Government stewardship , commitment, and adequate resources for TB care and control with monitoring and evaluation

Engagement of communities , civil society organizations, and all public and private care providers

Universal health coverage policy; and regulatory framework for case notification, vital registration, drug quality and rational use, and infection control

Social protection, poverty alleviation, and actions on other determinants of TB

Intensified Research and Innovation

Discovery, development and rapid uptake of new tools, interventions and strategies

Operational research to optimize implementation and impact, and promote innovations

Ultimate challenge: Getting rid of ideology

- 1. TB care and control depend crucially upon health system capacity to provide access and services**
- 2. TB care and control are a complex public health and social intervention. They need more than ORS and an antibiotic...**
- 3. A specialised programme is still necessary until health services are mature... and even afterward...**
- 4. Ideally, TB control needs integration of services into primary care and a specialised and accountable managerial system**

Evolution of WHO Policies for TB Control, 1948-today

- ✓ The vertical programme (1948-63)
- ✓ Integration of service delivery (1964-76)
- ✓ Integration of managerial functions (1977-88)
- ✓ Return to a specialized managerial approach (1989-98)
- ✓ The resurgence of the integrated approaches (1999-2000)
- ✓ Post-modern tuberculosis control (2001...): on the making, the comprehensive Stop TB Strategy, 4 "spheres" of action for elimination

REVIEW

Review

Evolution of WHO policies for tuberculosis control, 1948–2001

M C Raviglione, A Pio

We examine the evolution of WHO managerial policies for tuberculosis control during 1948–2001 to provide a new framework that will accelerate control expansion in the near future. In the first period (1948–63), a vertical approach to tuberculosis control was the policy adopted by WHO and the international community. However, although this approach was successful in more-developed countries, it largely failed in resource-poor settings. As a result, involvement of general health services was soon deemed essential. During 1964–76, a new framework for effective tuberculosis control was created and a new five-element strategy was branded with the name of DOTS. This period was characterised by the recognition of tuberculosis control as a public-health priority, the intensification of tuberculosis control efforts worldwide, and the return of tuberculosis to the political agenda of governments. However, although nominal adoption of DOTS increased rapidly due to massive promotion by WHO and partners, expansion to provide full access was too slow and only 23% of all infectious cases in 1999 were managed under DOTS. A truly multisectoral approach based on advocacy and social mobilisation, community involvement, and engagement of private-for-profit practitioners is becoming the way forward for tuberculosis control. HIV-associated tuberculosis and multidrug-resistant tuberculosis must be tackled as priority issues. We conclude that, based on the lessons of the past, the future of tuberculosis control should be focused on a pragmatic approach combining a specialised, well-defined management system with a fully integrated service delivery. A multisectoral approach that builds on global and national partnerships is the key to future tuberculosis control.

The Lancet 2001; 359: 775-80

Resurgence of Integrated Approaches in the past decade

- **Vertical vs horizontal debate should stop**
- **The lesson not to forget: dismantling and re-mantling (in USA & Europe)**

"Diagonal approach":

- **Well defined, accountable managerial system**
- **Core functions vs primary care services well defined**

Ref: Raviglione MC, Pio A. Lancet 2002, 359: 775-80

Ultimate challenge: getting rid of ideology

Public health classics

This section looks back to some ground-breaking contributions to public health, reproducing them in their original form and adding a commentary on their significance from a modern perspective. To complement the theme of this month's issue, Mukund Uplekar & Mario C Raviglione review a paper by Halfdan Mahler on tuberculosis programmes in developing countries that was published in the *Bulletin of the International Union against Tuberculosis and Lung Disease* (1966;37:77-82). The paper is reproduced here in full.

The “vertical–horizontal” debates: time for the pendulum to rest (in peace)?

Mukund Uplekar^a & Mario C Raviglione^a

“Historia magistra vitae” said Cicero: history is the teacher of life.¹ It is an inevitable law of nature that unless there is a solid foundation of the past, no secure edifice of the future can be raised. Those who do not look at the past cannot devise means for the future; and unless the future is built on the past, it will be raised merely on stubble.² The article on tuberculosis (TB) programmes in

eb120_opening/en/index.html). The challenges facing national TB programmes today include TB/HIV co-infection, multidrug-resistant TB (MDR-TB), health sector reforms, effective community engagement and a need for new tools for diagnosis, treatment and prevention. These problems seem more complex, yet the fundamental approaches discussed in Mahler's

are emerging, this statement is as true today as it was four decades ago. TB control demands sustained and steadfast efforts on the part of everyone concerned.

Programme management is distinct from patient management

ERS/WHO EURO Survey on TB elimination preparedness Europe (N.30) and Italy, 2013

EU LOW / MIDDLE TB INCIDENCE COUNTRIES		ITALY
10 (33%)	No TB Elimination plan	NO
7 (23%)	No TB elimination guideline	NO
15 (50%)	No HRD plan	NO
10 (33%)	No TB Reference centres	YES
16 (53%)	No TB budget	NO
11 (37%)	No supervision	NO
25 (87%)	No modelling	NO
5 (17%)	No NRL performing all F/SLD DST	YES
4 (13%)	No free access for all TB cases	YES
20 (67%)	No all F/SLD	NO
10 (33%)	Drugs stock-outs	NO
10 (33%)	No TB/HIV collab. activities	NO
13 (43%)	Hospital-based MDR-TB care	YES
21 (70%)	No strategy to introduce new tools	NO
21 (70%)	No international collaboration for TB control/elimination	NO
10 (33%)	No TB Consilium	NO

Conclusions and **call to action**

1. **The world is on track** to achieve the (un-ambitious) 2015 target of incidence reduction, and current measures can reduce deaths and cure patients, **but they cannot eliminate TB**
2. **For elimination** one would need potent short treatments, mass TLTI and potent pre- and post-exposure vaccines. None is available today
3. **Three pillars will be the basis to accelerate incidence decline:** (i) universal access to patient-centered TB care and control; (ii) bold policies and supportive systems; and (iii) intensified research efforts
4. **For full control** it is essential to intensify efforts with existing tools and systems, and have clear plans, epidemiological/social/economic mapping, projections and targets, and well-defined human and financial resource allocations.
5. **The case of Italy:** Italy enjoys low and declining incidence (3/100,000) but lacks clear elimination plans with mapping, projections and targets, a strategy addressing high-risk populations (migrants, TB/HIV, etc), early screening & detection, chemoprophylaxis, infection control. All are urgent in our country.



Thanks a lot for listening