

GLOBAL HEALTH TECH: STILL SEARCHING FOR SILVER BULLETS & KILLER APPS?



Madhukar Pai, MD, PhD
McGill University, Montreal

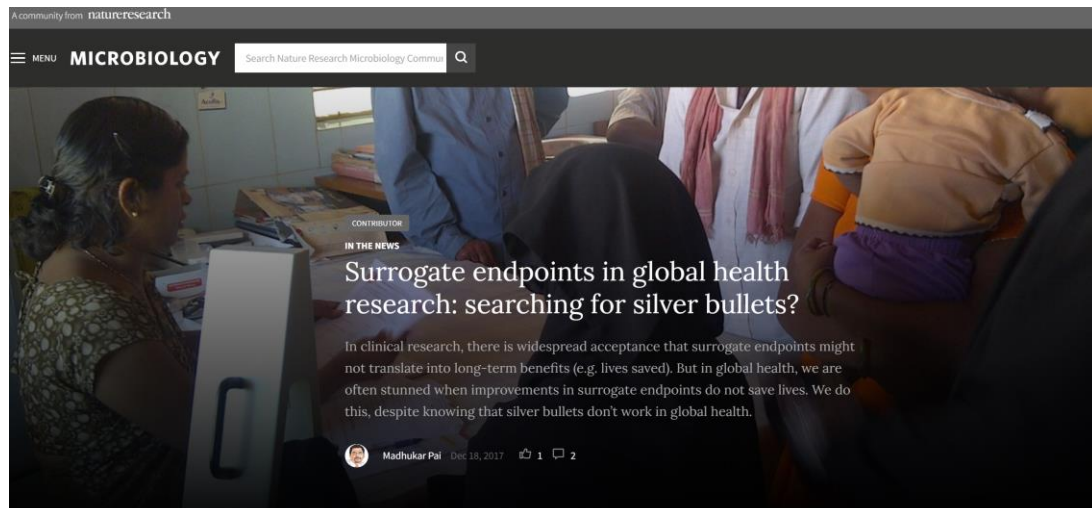


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All students who learn about clinical trials and evidence-based medicine are taught about the hazards of surrogate endpoints, which are measurements (e.g. biomarker levels, lab test results, or short-term improvements in health status) that substitute for hard outcomes that are important for patients (e.g. avoiding premature death or severe disability). For example, in cardiovascular research, improvements in parameters such as blood pressure or cholesterol are often used, instead of outcomes

Editorial

BMJ Global Health

Surrogate endpoints in global health research: still searching for killer apps and silver bullets?

Madhukar Pai,¹ Samuel G Schumacher,² Seye Abimbola^{3,4}

■ IN GLOBAL HEALTH, WE EXPECT NEW TOOLS TO SAVE LIVES & HAVE A BIG IMPACT





5

Rewriting Life



The Machine That Will Help End TB

Nearly 1.5 million people die from tuberculosis every year, even though most cases can be cured with routine antibiotic treatments. One country's fight to get the ancient scourge under control has an unlikely hero: a simple diagnostic test.

by Jon Cohen December 11, 2012





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Simple checklists are saving lives in India. Atul Gawande's work is a great reminder that innovations don't have to be complex to have enormous impact.

THEGATESNOTES.COM

Can a Simple, Safe Childbirth Checklist Save Lives in Developing Countries?

I had the privilege recently of meeting Atul Gawande, a brilliant physician who's using an amazingly simple concept—checklists for medical practitioners—to save lives and reduce health care costs. With support...

Focus on health, sanitation can reduce stunting in children: World Bank

Undernourishment is not the only factor responsible for stunting among children, says the World Bank report

Last Published: Thu, Nov 13 2014. 06 14 PM IST

✉ Sayantan Bera

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Stunting is associated not only with failure in physical growth but also with impaired brain and cognitive development, the report said. Photo: Abhijit Bhatlekar/ Mint

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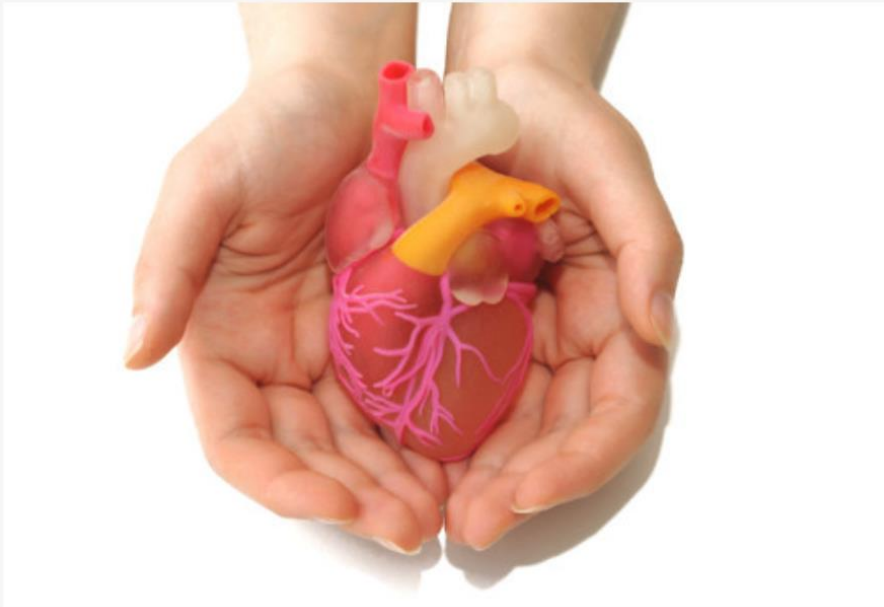
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OPINION TECHNOLOGY SCIENCE

CRISPR will save lives - and technology can't come soon enough

By Fahad Ali

25 February 2018 – 4:34pm

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The same breeding techniques that gave us virtually all of the food we now eat also has given dogs like the bulldog a predisposition to spinal problems and breathing difficulties.

Photo: Natalie Bochenski

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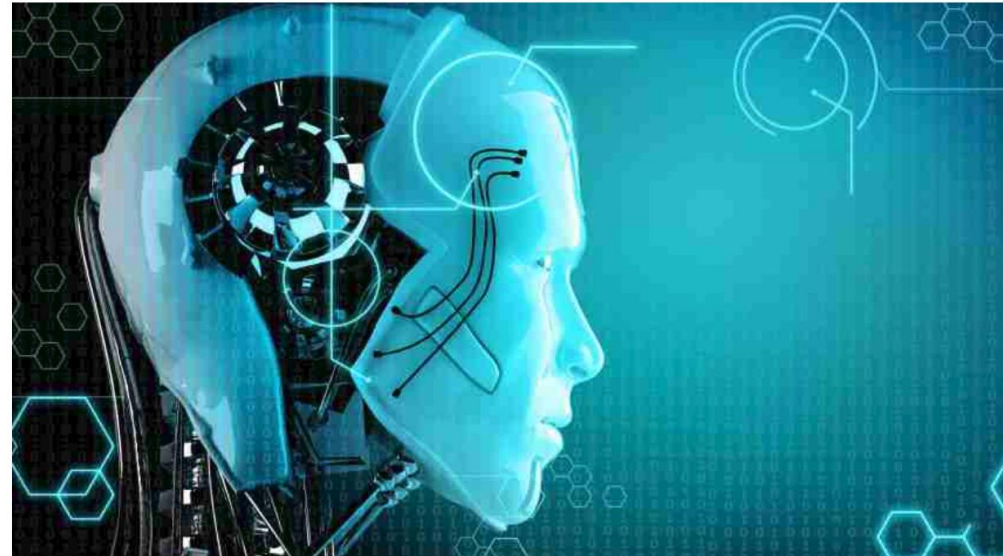
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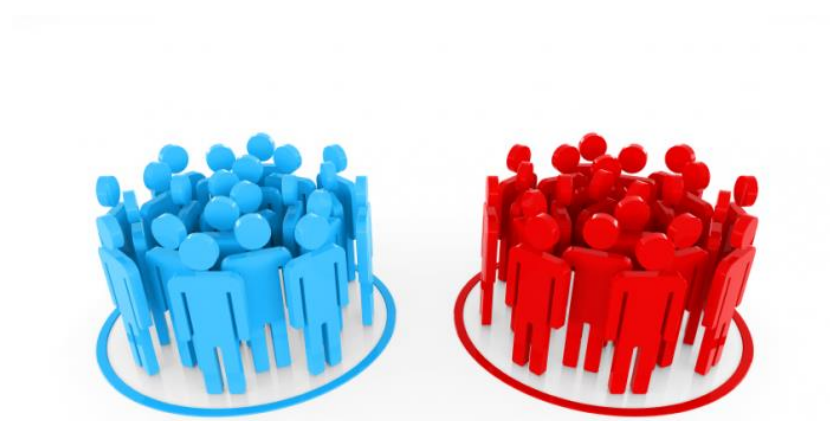
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Academics (including modelers!), product developers, donors, media....

We are all contributing to this craziness!

■ AND, WHEN WE DO TRIALS, WE FIND SOME IMPROVEMENTS IN SURROGATES BUT NOT NECESSARILY MORTALITY REDUCTION



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Improved diagnostics fail to halt the rise of tuberculosis

TB remains a big killer despite the development of a better test for detecting the disease.

Ewen Callaway

16 November 2017 | Corrected: 17 November 2017

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TUBERCULOSIS TRENDS

The introduction of a new test for TB in 2010 has had little impact on the number of cases.

Year	All TB cases (Millions per year)	HIV-positive TB cases (Millions per year)
2000	~10.5	~1.5
2005	~11.0	~1.6
2010	~10.8	~1.5
2015	~10.5	~1.4

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CHALLENGES? CHECK

A lifesaving childbirth tool was successfully introduced in India—but saved no lives



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HEALTH

Promise unrealized: A birth checklist fails to reduce deaths in rural India

By CASEY ROSS @caseymross / DECEMBER 13, 2017



Sanitation improves health but not stunted growth in Bangladesh trial



The WASH Benefits Bangladesh trial examined the impact of water, sanitation and hygiene (WASH) interventions — which included improvements in drinking water quality, sanitation and handwashing — on children's overall, health and development.

■ WHY DON'T IMPROVEMENTS IN SURROGATES TRANSLATE INTO IMPACT?

Healthcare systems are complex

In global health, health systems are also weak and dysfunctional

So, tweaking one part of it might not result in enduring or long-term improvements

The perils of surrogate endpoints

William S. Weintraub^{1*}, Thomas F. Lüscher², and Stuart Pocock³

¹Cardiology Section, Christiana Care Health System, 4755 Ogletown-Stanton Road, Newark, DE 19317, USA; ²Department of Cardiology, University Heart Center, University of Zurich, Zurich, Switzerland; and ³Switzerland and London School of Hygiene and Tropical Medicine, London, UK

Surrogate End Points in Clinical Research: Hazardous to Your Health

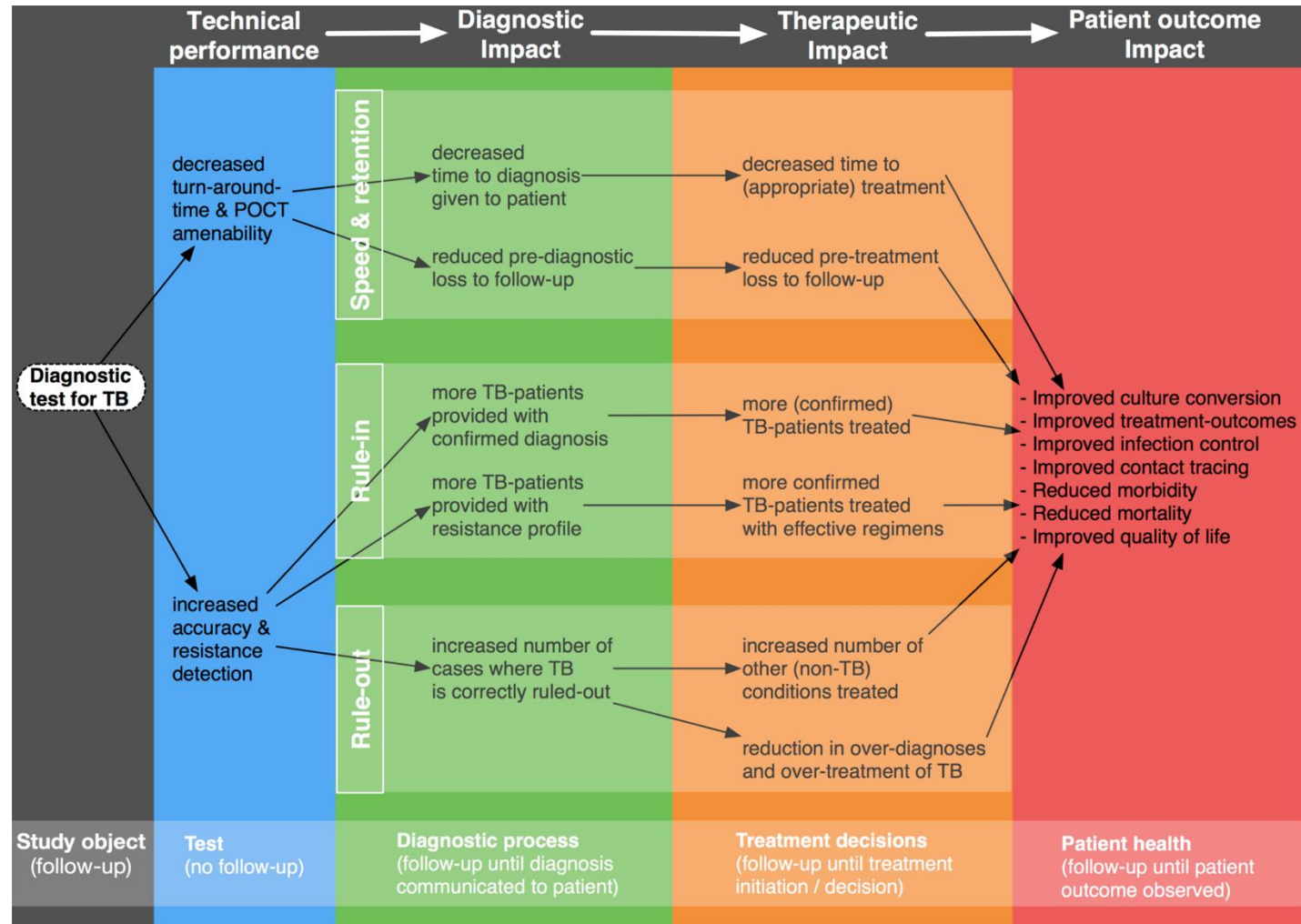
David A. Grimes, MD, and Kenneth F. Schulz,
PhD, MBA

Family Health International, Research Triangle Park, North Carolina

Table 1. Some Dangerous Discrepancies Between Surrogate End Points and Clinical Outcomes in Trials

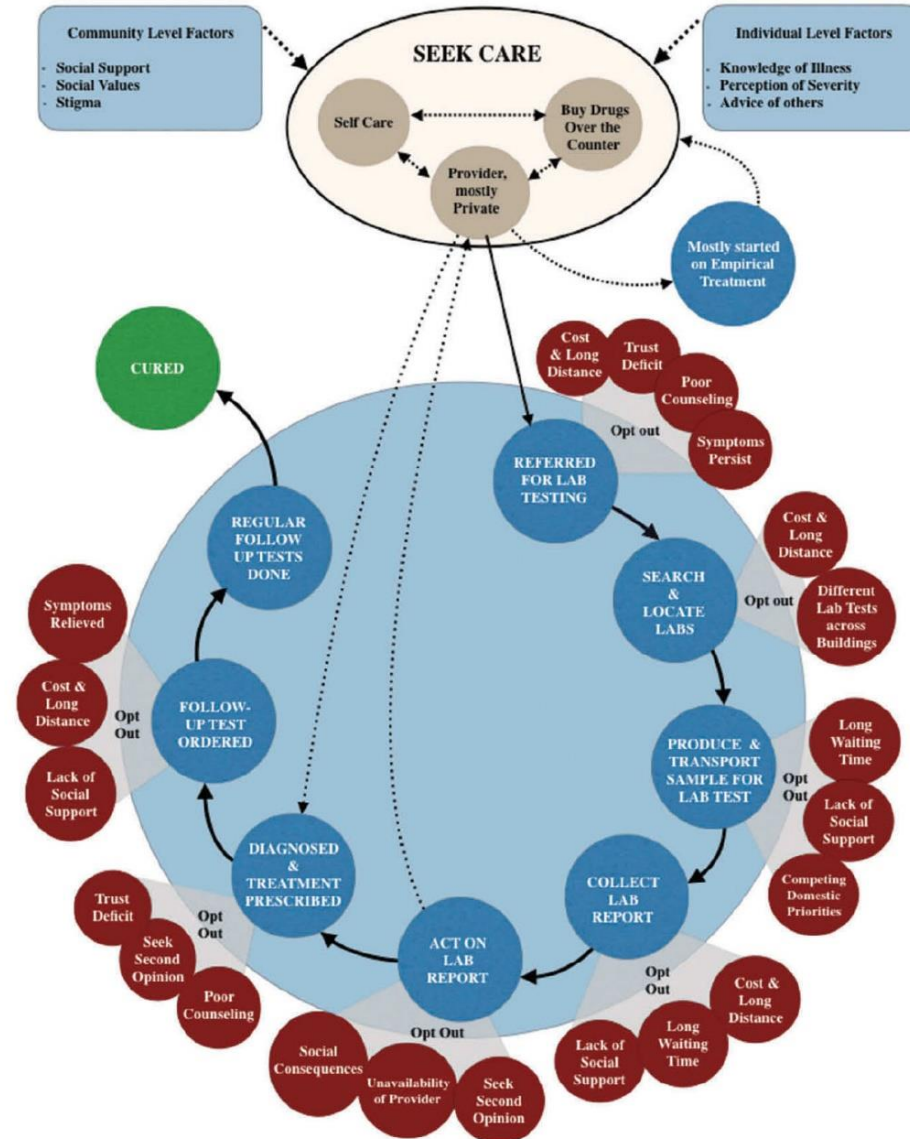
Condition	Treatment	Surrogate End Point	What Happened to Trial Participants
Ventricular arrhythmia ¹⁰	Encainide, flecainide	Arrhythmia	Increased sudden death
Osteoporosis ¹¹	Fluorides	Bone mineral density	Increased fractures
Heart disease in postmenopausal women ¹²	Conjugated equine estrogen and medroxyprogesterone acetate	Serum lipids	Increased heart disease
Heart disease ¹³	Clofibrate	Serum cholesterol	Increased mortality
Heart failure ¹⁴	Epoprostenol	Exercise tolerance	Increased mortality
Heart failure ¹⁵	Ibopamine	Symptoms of heart failure	Increased mortality

CAUSAL EVENTS NEEDED FOR IMPACT MIGHT NOT HAPPEN



A framework for outlining the pathways through which new tuberculosis (TB) tests can result in improved patient outcomes. Source: Schumacher *et al PLoS ONE* 2016

REALITY CHECK



How patients navigate the diagnostic ecosystem in a fragmented health system in India. Source: Yellapa *et al.* Global Health Action 2017

REALITY CHECK

TB care cascade in India

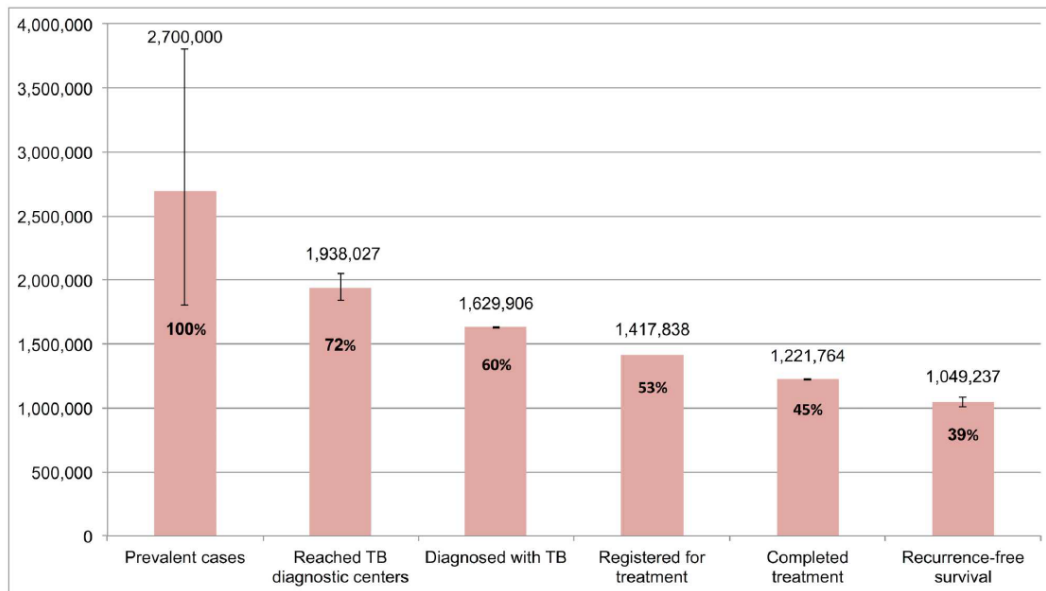
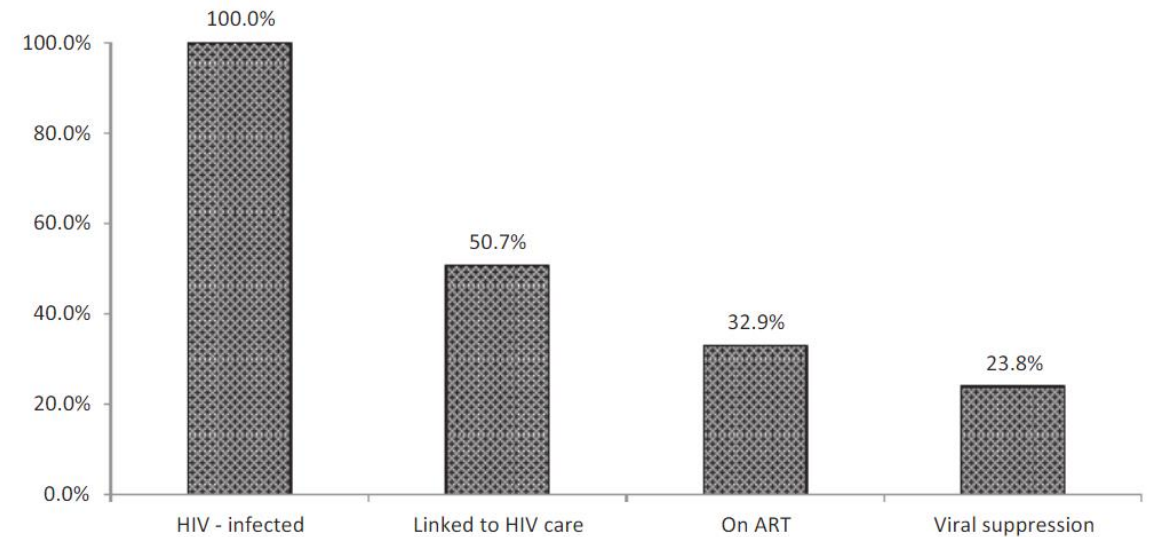


Fig 7. The cascade of care for all forms of tuberculosis in India's Revised National Tuberculosis Control Programme (RNTCP) in India, 2013. Error bars depict 95% confidence intervals.

doi:10.1371/journal.pmed.1002149.g007

HIV care cascade in S Africa



REALITY CHECK: POOR QUALITY OF TB CARE



Use of standardised patients to assess quality of tuberculosis care: a pilot, cross-sectional study

Jishnu Das, Ada Kwan, Benjamin Daniels, Srinath Satyanarayana, Ramnath Subbaraman, Sofi Bergkvist, Ranendra K Das, Veena Das, Madhukar Pai



Use of standardised patients to assess antibiotic dispensing for tuberculosis by pharmacies in urban India: a cross-sectional study

Srinath Satyanarayana, Ada Kwan, Benjamin Daniels, Ramnath Subbaraman, Andrew McDowell, Sofi Bergkvist, Ranendra K Das, Veena Das, Jishnu Das*, Madhukar Pai*



International Journal of
Environmental Research
and Public Health

Article

Measuring Quality Gaps in TB Screening in South Africa Using Standardised Patient Analysis

Carmen S. Christian^{1,2,*}, Ulf-G. Gerdtham^{3,4}, Dumisani Hompashe^{2,5}, Anja Smith² and Ronelle Burger²

RESEARCH ARTICLE

Variations in the quality of tuberculosis care in urban India: A cross-sectional, standardized patient study in two cities

Ada Kwan^{1,2,*}, Benjamin Daniels^{1,*}, Vaibhav Saria³, Srinath Satyanarayana⁴, Ramnath Subbaraman⁵, Andrew McDowell⁶, Sofi Bergkvist⁷, Ranendra K. Das³, Veena Das⁸, Jishnu Das^{1,9,*}, Madhukar Pai^{10,11,*}



RESEARCH ARTICLE

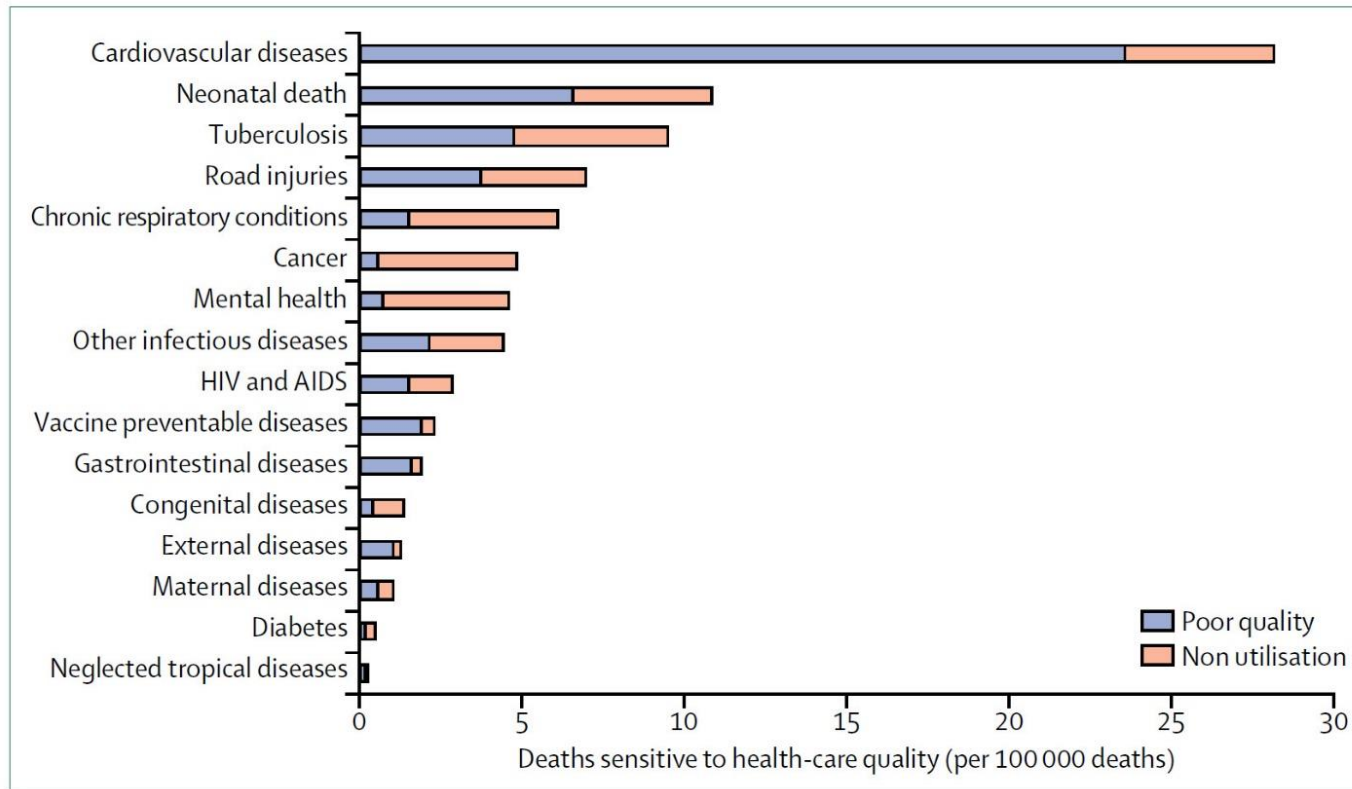
Tuberculosis detection and the challenges of integrated care in rural China: A cross-sectional standardized patient study

Sean Sylvia¹, Hao Xue², Chengchao Zhou^{3,*}, Yaojiang Shi², Hongmei Yi¹, Huan Zhou⁵, Scott Rozelle⁶, Madhukar Pai⁷, Jishnu Das⁸

SP WITH SUSPECTED TB: POOR QUALITY OF CARE IS THE NORM

Setting - Sector	% Correctly Managed	% Referred
Delhi, India – private sector	21%	10%
Mumbai, India – private sector	37%	15%
Patna, India – private sector	33%	10%
Nairobi, Kenya – public & private	33 – 40% Public: 79% asked for sputum test Private: 36% asked for sputum test	4% - 10%
Rural China (3 provinces) - public	28%, village clinics 38%, township centers 90%, county hospitals	28%, village clinics 18%, township centers 5%, county hospitals
South Africa – public (Western & Eastern Cape)	43% got TB and HIV tests 84% got sputum TB tests	

REALITY CHECK: POOR QUALITY OF HEALTH CARE



HQSS
The Lancet Global Health
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High Quality Health Systems
in the **SDG Era**

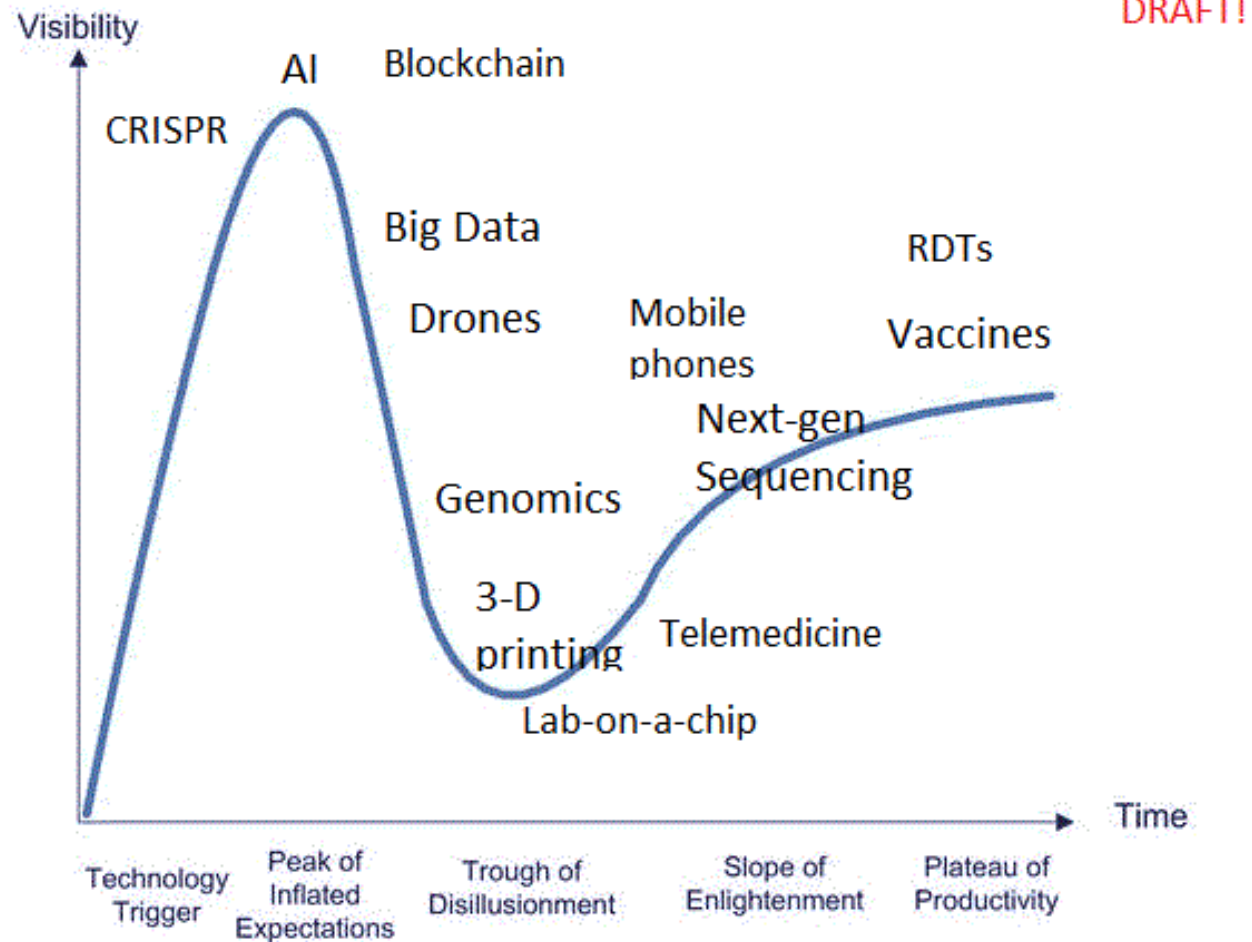
- 8 million people per year in LMICs die from conditions that should be treatable
 - 60% of deaths due to poor-quality care

TECHNOLOGIES HELP, BUT CANNOT OVERCOME LOW QUALITY HEALTH SYSTEMS



WHAT CAN WE DO ABOUT THIS PROBLEM?

- Tone down the hype!



MY STAB AT CREATING A 'HYPE' CYCLE FOR GLOBAL HEALTH TECH

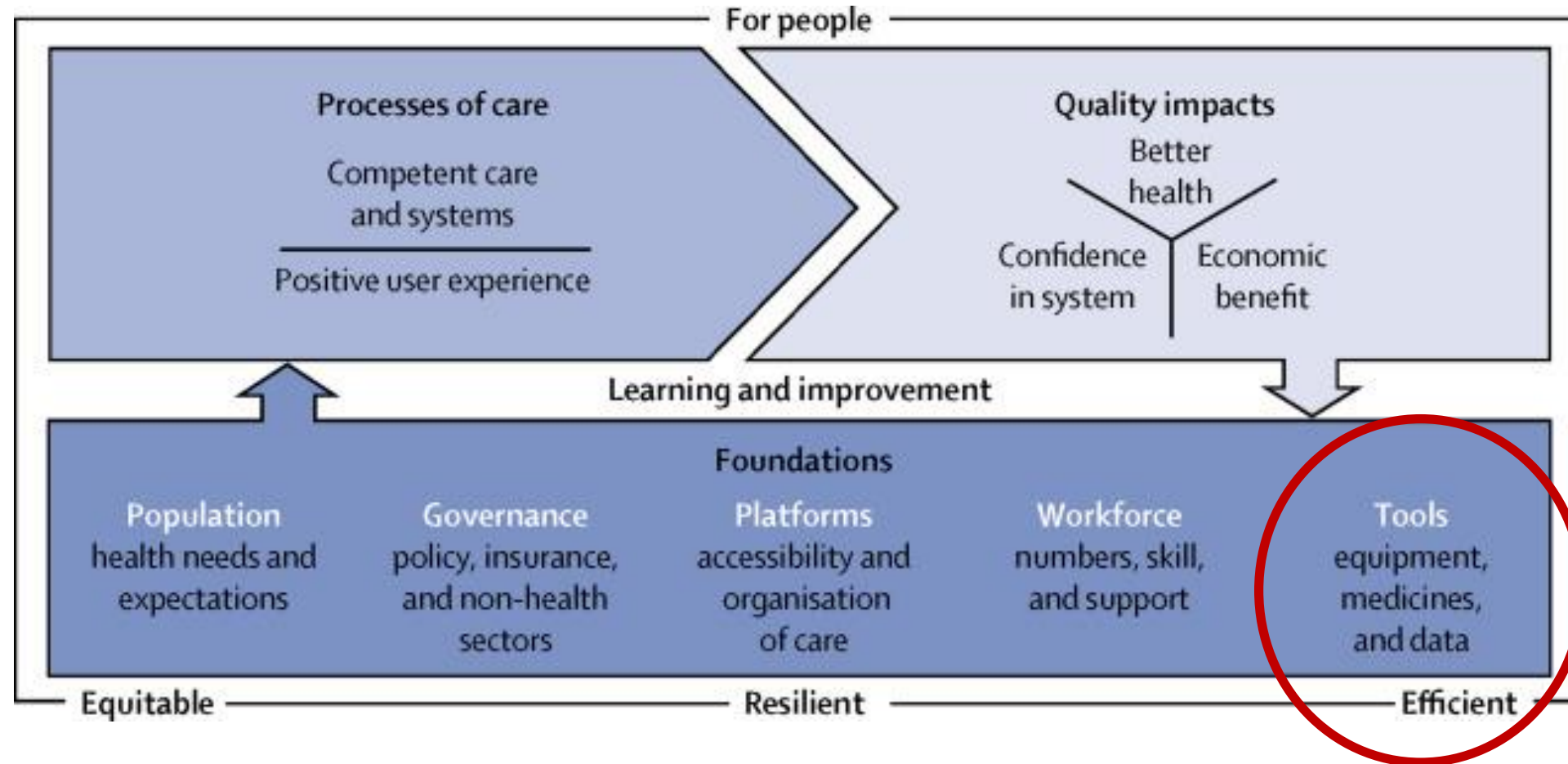
■ WHAT CAN WE DO ABOUT THIS PROBLEM?

- Be careful about using surrogate endpoints
 - Warn readers/media that surrogates \neq key outcomes
- Design studies to show if and how surrogate endpoints alter subsequent causal events or influence patient outcomes
 - map out the exact point in the cascade of care pathway in which an innovation is inserted and theorise how it may make a difference and what barriers may impede its effects on health outcomes

WHAT CAN WE DO ABOUT THIS PROBLEM?

- Acknowledge that RCTs (or models) with long-term outcomes are not always needed or meaningful
 - If an intervention is designed to improve surrogate endpoints, why look for mortality reduction?
 - An innovation designed to reduce costs or improve convenience should be evaluated primarily based on those indicators.
- Use theory-driven implementation research to optimize impact of innovations
 - Need to shift from a fixation on tools to patient-centred solutions; from trials of standalone innovations to evaluations of complex, multi-sectoral health interventions
 - For e.g., we do want to reduce mortality, then improve the entire cascade of care (not just one step)

FOR REAL, ENDURING IMPACT, WE NEED HIGH QUALITY HEALTH SYSTEMS



THANK YOU



**TB Modelling and Analysis
Consortium**

Increasing the effectiveness of TB care and prevention

Sourya Shrestha, David Dowdy, Tina Sachs



[Seye Abimbola](#)



[Samuel Schumacher](#)
