

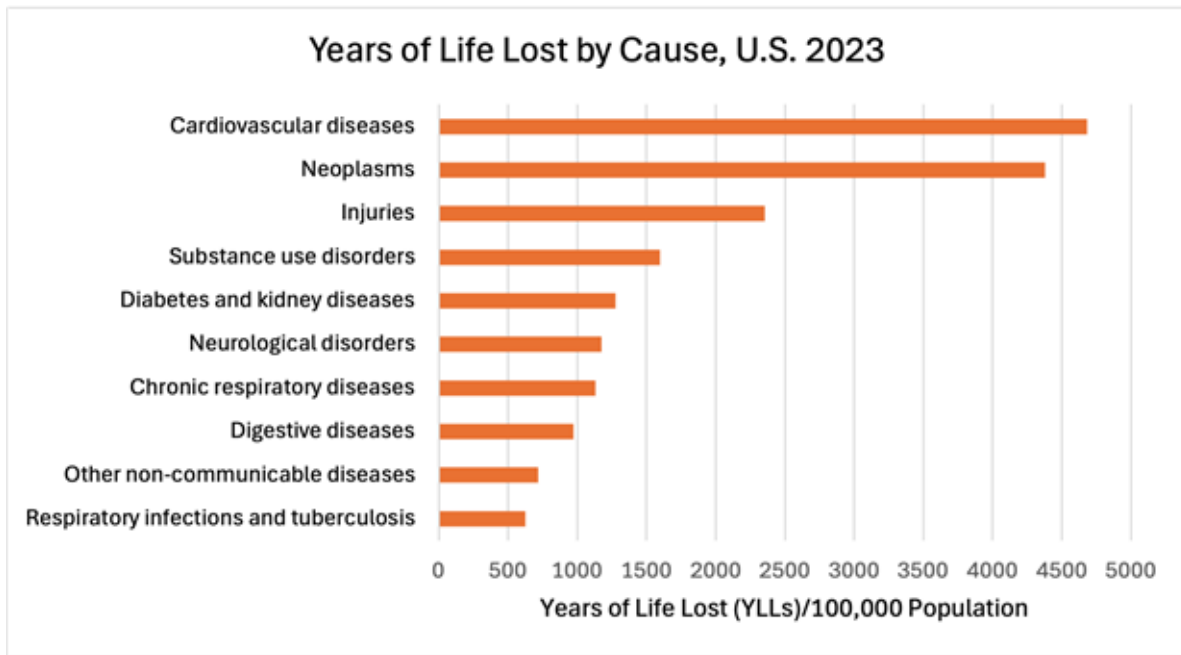
Responsible AI, Health Systems, and the Public Good

February 24, 2026



The Starting Question Is: What is needed for healthcare to improve outcomes, productivity, and affordability?

It Is Not: What can AI do?



Data source: IHME

Lessons and pitfalls from previous experience in digital health

At the digital application level:

- Siloed, short-term, and narrow tools increase burden and fragmentation.
- Many lack human-centered design and fail to deliver patient or provider value.
- Agile and iterative software development practices are often absent.
- Core engineering needs for scale are routinely overlooked (e.g. standards, interoperability, security, offline-first design).

At the digital ecosystem level:

- Standalone tools rarely align with health care governance or digital architectures.
 - Drives integration challenges, technical debt, and maintenance needs
- Long-term financing and total cost of ownership are not developed with government/private payors
- Globally, foundational dependencies like power and connectivity are ignored.

At the health system level:

- Applications/digital tools rarely account for or assist with systemic barriers (e.g., stockouts, staff gaps) limiting outcomes and scalability.
- They may misalign with healthcare priorities or disrupt provider workflows.
- Implementation often overlooks local context (e.g. digital literacy, staff turnover, training needs, etc.).

Impact depends on both the technology itself and how it is implemented within the PHC system

10% Application development

- Model performance (validity, reliability, usability)
- Clinical relevance

20% Digital health platform and enabling environment development

- National digital architecture including data systems, interoperability, and governance
- Infrastructure including connectivity and power

70% People, processes, systems, implementation and change management

- Adapting health care systems and capacity
- Integration of AI applications into clinical workflows
- Adaptive, context-specific training and implementation
- Embedded monitoring, learning, and improvement

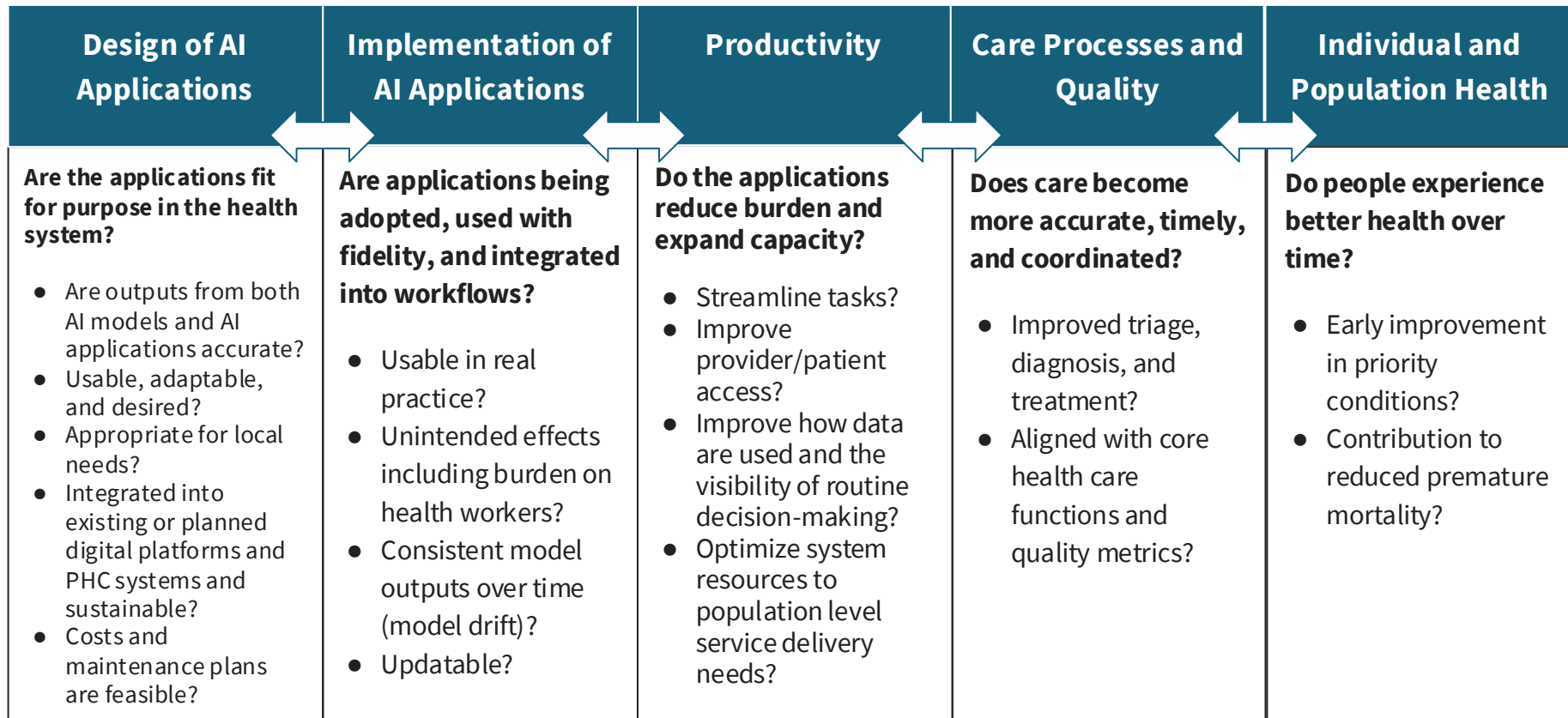


AI Limitations: Task features required to raise productivity are not widely present in medicine

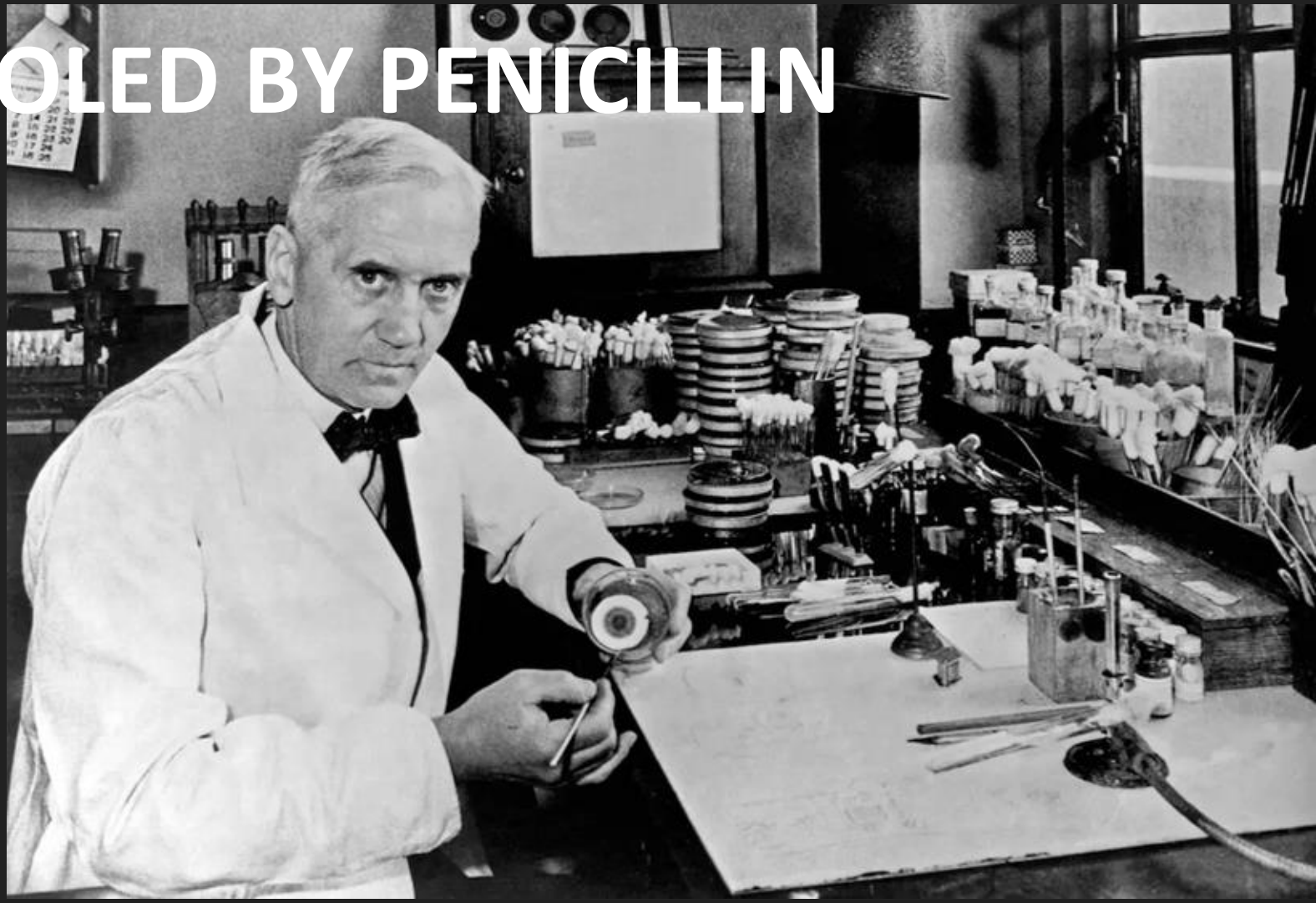
- Training sets with full context of relevance for decision-making
- Clearly circumscribed goals w/o complex tradeoffs.
- Limited unique outlier situations
- Tight iteration loops for a fast learning curve
- High reliability systems
- Manageable safety and control procedures

Understanding the chain of impact:

How linking application design to health system outcomes



FOOLED BY PENICILLIN





WHO Safe Surgery Checklist

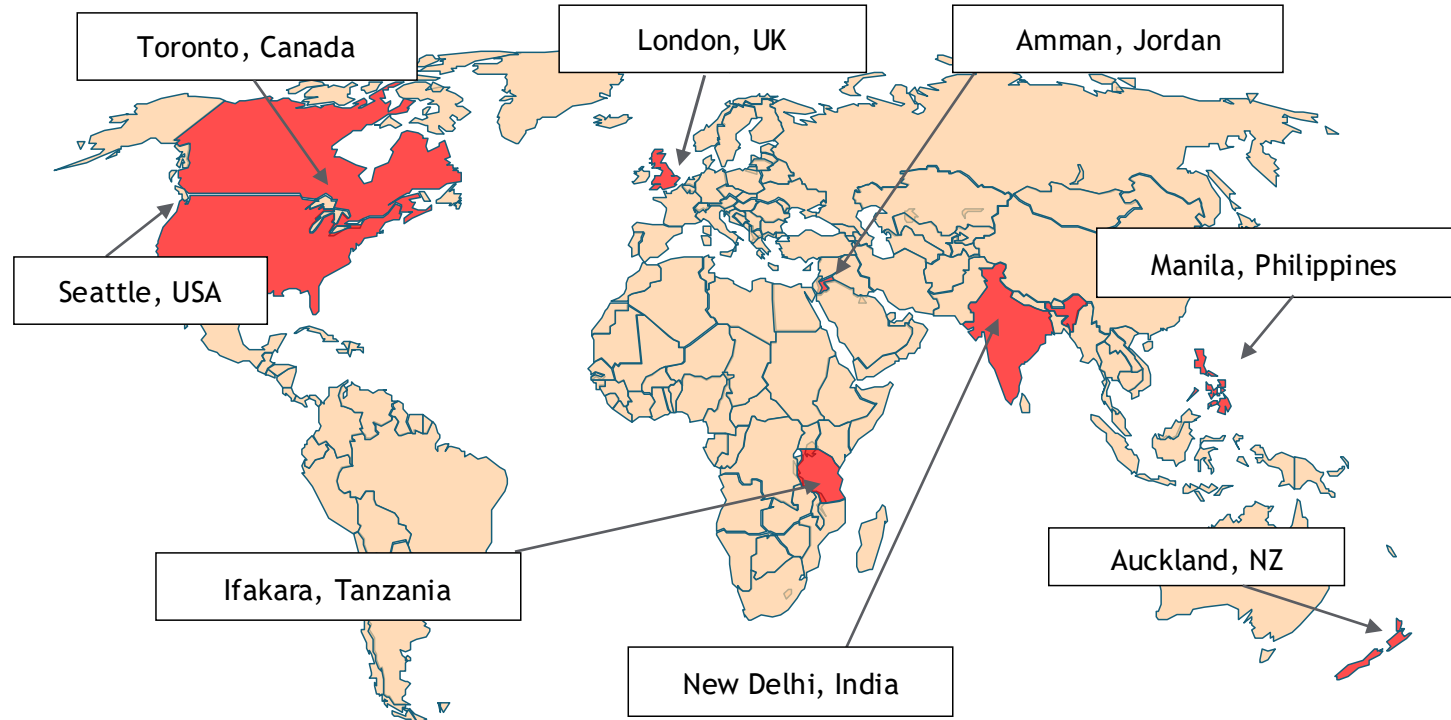
Surgical Safety Checklist		World Health Organization	Patient Safety A World Alliance for Better Health Care
Before induction of anaesthesia (with at least nurse and anaesthetist)	Before skin incision (with nurse, anaesthetist and surgeon)	Before patient leaves operating room (with nurse, anaesthetist and surgeon)	
Has the patient confirmed his/her identity, site, procedure, and consent? ☐ Yes	☐ Confirm all team members have introduced themselves by name and role. ☐ Confirm the patient's name, procedure, and where the incision will be made. Has antibiotic prophylaxis been given within the last 60 minutes? ☐ Yes ☐ Not applicable	Nurse Verbally Confirms: ☐ The name of the procedure ☐ Completion of instrument, sponge and needle counts ☐ Specimen labelling (read specimen labels aloud, including patient name) ☐ Whether there are any equipment problems to be addressed	
Is the site marked? ☐ Yes ☐ Not applicable	Anticipated Critical Events To Surgeon: ☐ What are the critical or non-routine steps? ☐ How long will the case take? ☐ What is the anticipated blood loss? To Anaesthetist: ☐ Are there any patient-specific concerns? To Nursing Team: ☐ Has sterility (including indicator results) been confirmed? ☐ Are there equipment issues or any concerns?	To Surgeon, Anaesthetist and Nurse: ☐ What are the key concerns for recovery and management of this patient?	
Is the anaesthesia machine and medication check complete? ☐ Yes	Is essential imaging displayed? ☐ Yes ☐ Not applicable		
Is the pulse oximeter on the patient and functioning? ☐ Yes			
Does the patient have a: Known allergy? ☐ No ☐ Yes			
Difficult airway or aspiration risk? ☐ No ☐ Yes, and equipment/assistance available			
Risk of >500ml blood loss (7ml/kg in children)? ☐ No ☐ Yes, and two IVs/central access and fluids planned			

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Revised 1 / 2009 © WHO, 2009

Testing

We Tested the Checklist in 8 Sites Globally...



SPECIAL ARTICLE

A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population

Alex B. Haynes, M.D., M.P.H., Thomas G. Weiser, M.D., M.P.H.,
William R. Berry, M.D., M.P.H., Stuart R. Lipsitz, Sc.D.,
Abdel-Hadi S. Breizat, M.D., Ph.D., E. Patchen Dellinger, M.D.,
Teodoro Herbosa, M.D., Sudhir Joseph, M.S., Pascience L. Kibatala, M.D.,
Marie Carmela M. Lapitan, M.D., Alan F. Merry, M.B., Ch.B., F.A.N.Z.C.A., F.R.C.A.,
Krishna Moorthy, M.D., F.R.C.S., Richard K. Reznick, M.D., M.Ed., Bryce Taylor, M.D.,
and Atul A. Gawande, M.D., M.P.H., for the Safe Surgery Saves Lives Study Group*

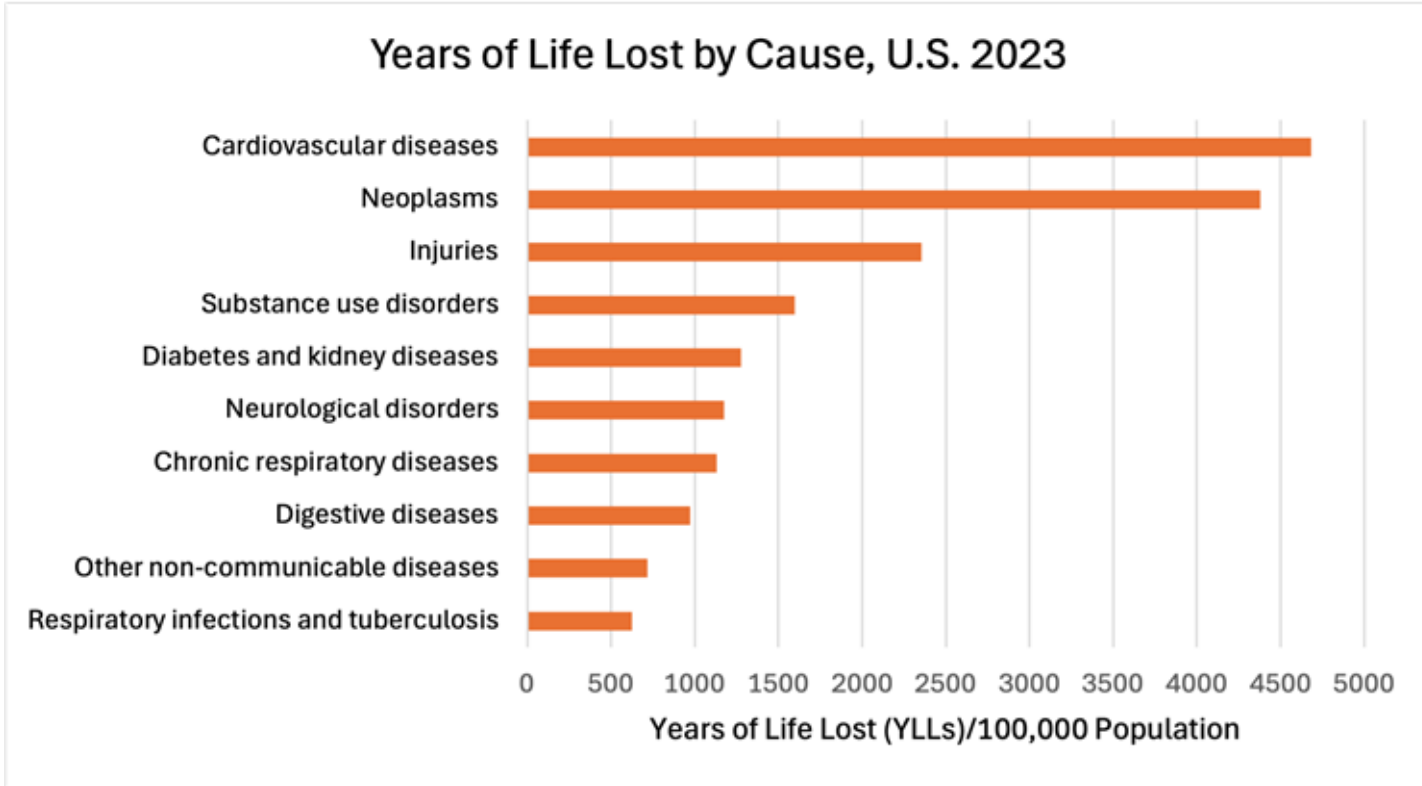
Results

...And deaths reduced by half

	Baseline	Checklist	P value
<i>Cases</i>	3733	3955	-
<i>Death</i>	1.5%	0.8% (-47%)	0.003
<i>Any Complication</i>	11.0%	7.0% (-36%)	<0.001
<i>Surgical Site Infection</i>	6.2%	3.4% (-45%)	<0.001
<i>Unplanned Reoperation</i>	2.4%	1.8% (-25%)	0.047

Source: AB Haynes, et al. *NEJM* 2009;360:491-9.

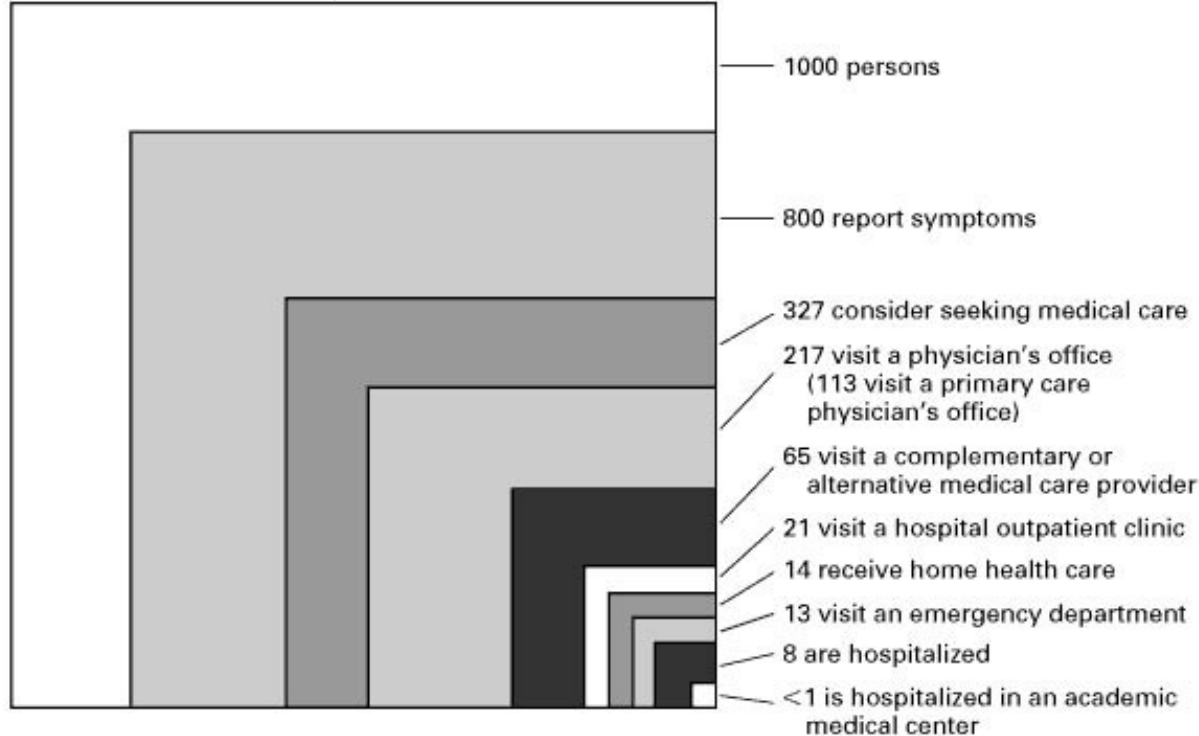
What is needed to improve outcomes, productivity, and affordability?



The ecology of care and AI's risk of deluging the system

In a month, most people have symptoms; only a minority seek care.

United States, 2001



Source: NEJM 2001;344:2021-2025



USAID CREATED, 1961



COSTA RICA'S PRIMARY CARE REFORM:
Everyone has a default PHC. Minimal cost visits, essential meds
and tests. Outreach workers visit every home.

A Natural Experiment: The Results As Communities Received The Primary Health Care Intervention



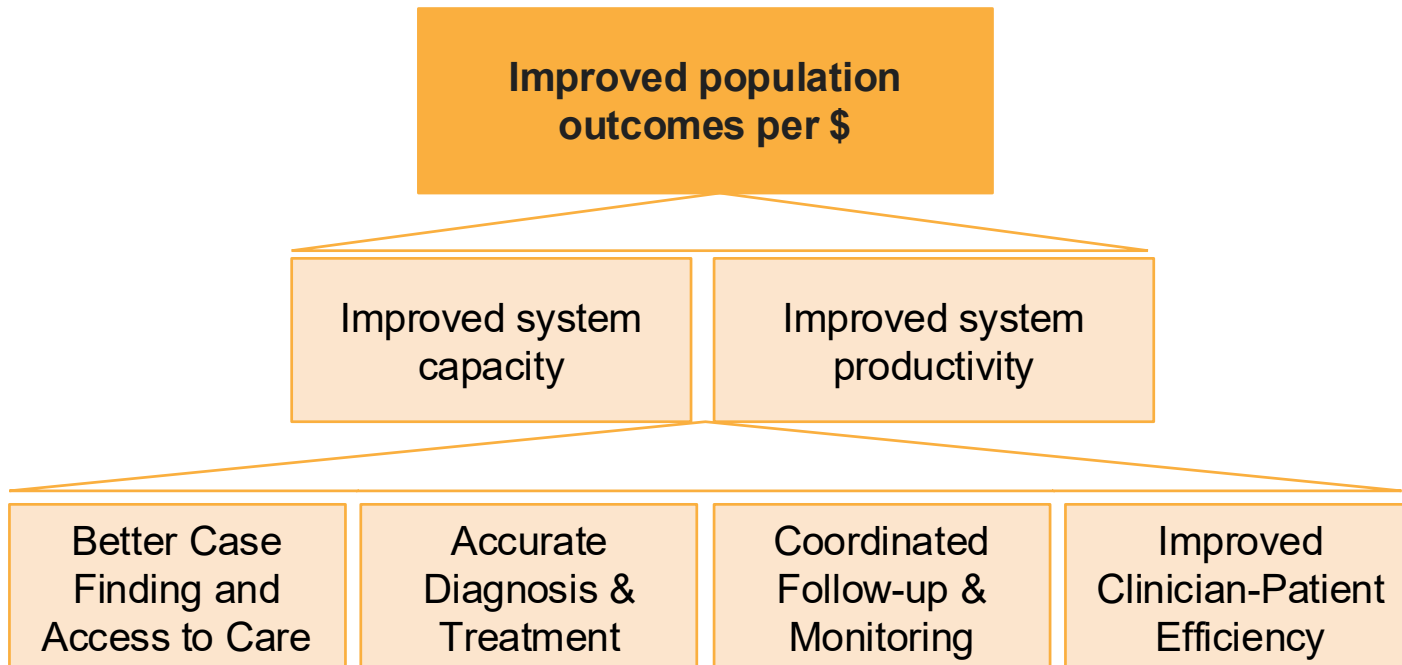
13% reduction in all-cause mortality over 9 years – reducing inequities in a country already with a 75 year average life expectancy.



Biggest reductions in noncommunicable diseases and elderly mortality. As Health Areas opened, more people sought care at primary care clinics and fewer sought care at emergency rooms.

Mora-García C, et al. The effect of primary healthcare on mortality: Evidence from Costa Rica, J Health Econ 2024(93):102833.

The Building Blocks for Better Outcomes and Productivity





Thank You

ARIADNE LABS is a joint center for health systems innovation at Brigham and Women's Hospital and the Harvard T.H. Chan School of Public Health.



Brigham and Women's Hospital
Founding Member, Mass General Brigham



HARVARD T.H. CHAN
SCHOOL OF PUBLIC HEALTH