A SEMINAR ON RESEARCH IMPACT

Beyond the Bench

Translational Science as a Continuum — from Discovery, to Population, to Evaluation

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Let me ask you something.

If a discovery never reaches the patient — did the science ever happen?

DISCOVERY

the bench

DELIVERY

the population

EVALUATION

did it work?

What most people picture when they hear

“translational science”

THE COMMON MENTAL MODEL

Bench → Bedside.

Take a finding from a flask, a mouse, a sequencer — and turn it into a drug, a device, a clinical trial.

Useful. Necessary. ***But incomplete.***

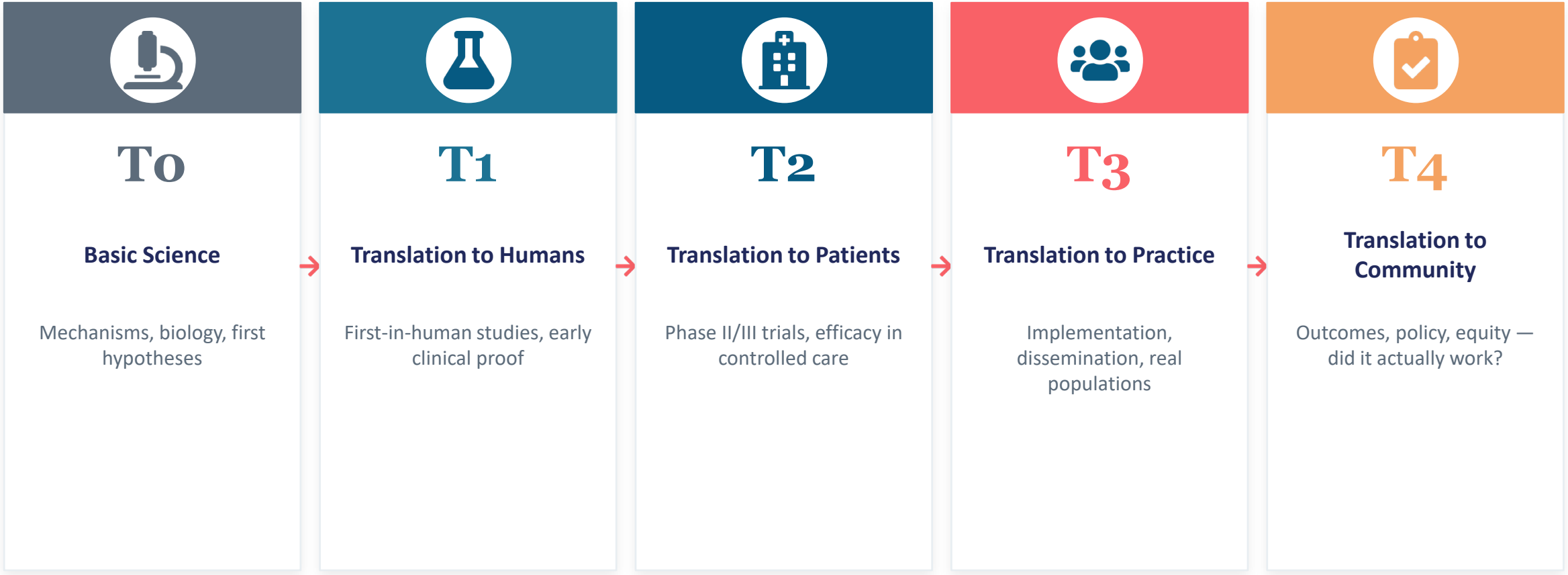
WHAT IT REALLY IS

Discovery → Delivery → Evaluation.

A continuous loop where evidence is generated, implemented in real populations, and then **measured for impact, equity, and unintended harm.**

The translational continuum

Five stages — and the most consequential ones live downstream.



The bench gives us possibility. The community gives us proof.

T3 and T4 are where science meets reality.

Three reasons to take downstream translation seriously:

01

Efficacy ≠ Effectiveness

A drug that worked in 200 trial patients may underperform in 200,000 patients managed by overworked clinics, with inconsistent supply chains and mixed adherence. The trial proves potential. The population proves performance.

02

Implementation has its own science

Whether a guideline is adopted, adapted, sustained, or abandoned depends on systems, training, payment, culture, and trust — not on the strength of the original biology. Implementation is a research question, not a logistics afterthought.

03

Without evaluation, we are guessing

If we never ask “did this intervention reduce mortality, close the equity gap, or — worse — cause harm?”, we have policy theater, not public health. Evaluation is what closes the loop, and it is often the hardest part to fund.

A worked example from my own path

Cystic echinococcosis surgery in Arequipa, Peru — across the continuum

T1-T2 · Discovery

What is the burden?

Retrospective surgical case data, 2011–2013, largest hospital in Arequipa, during a national PpR program.

T3 · Delivery

Bring it to populations

Translate findings into surgical surveillance and an evidence base for the Peruvian Ministry of Health to act on.

T4 · Evaluation

Did it actually work?

Quantify the hidden surgical burden — a population at risk that routine notification systems were missing entirely.

Loop

Feed it back

Use the gap as a signal: redesign surveillance, target high-risk districts, and re-measure. The cycle continues.

The lesson: *the data did not exist in a journal article — it existed in operating-room logs, in a regional hospital, in a population the surveillance system was not seeing.*

A second example

When an intervention is rolled out before evaluation catches up

The intervention

Hydroxychloroquine + azithromycin distributed widely during the pandemic in Peru — outpatient and hospital.

What was missed

G6PD deficiency is X-linked, more impactful in males. CQ/HCQ is a known oxidative stressor. Outpatient symptoms of hemolysis can be mistaken for COVID-19 itself.

What evaluation revealed

Ecological signal of sex-differential mortality consistent with G6PD-related risk — only visible because someone went back and asked.

Without T4, we cannot tell the difference between

an intervention **that helped** and one that **quietly hurt** specific subgroups.

That is the question equity-aware translational research is built to answer.

The toolbox of downstream translation

If T3/T4 is a research stage, it needs research methods — not just intentions.

Implementation Science

RE-AIM, CFIR, hybrid effectiveness-implementation designs.

Real-World Evidence

Routinely collected health data, registries, claims, EMRs.

Health Services Research

Access, quality, cost, workflow — the system as a variable.

Equity-Stratified Analysis

Subgroup effects by sex, ancestry, geography, income.

Pragmatic Trials

Designed for usual-care settings, not idealized ones.

Quasi-Experimental Methods

Diff-in-diff, ITS, synthetic controls when RCT is impossible.

These are not soft. *These are the rigorous tools that turn well-meaning programs into evidence — or expose them as ineffective.*

EQUITY

Who gets the benefit?

And who, if anyone, is being left behind — or quietly harmed — by the way we are implementing?

Latin America · low- and middle-income settings · marginalized populations

Implementation isn’t equal

A guideline that diffuses fastest in well-resourced clinics widens, rather than closes, the disparity gap. Speed of uptake is itself an equity variable.

Subgroup effects are common, not exotic

Pharmacogenomics (NAT2, CYP2E1, AADAC variants in TB therapy; G6PD in HCQ exposure) — biology and demography interact constantly.

Evaluation must be stratified, by default

If we report only the average treatment effect, we may report a success while a subgroup absorbs the harm.

So what does the translational researcher actually do differently?

Designs with delivery in mind

Asks ‘who will use this, where, with what training’ before the protocol is finalized.

Partners across silos

Clinicians, ministries of health, community workers, statisticians, ethicists — implementation is a team sport.

Plans the evaluation up front

Pre-specifies outcomes, equity strata, and a credible counterfactual. Evaluation is not an afterthought.

Treats data systems as research infra

Registries, EMRs, surveillance — these are the substrate of T3/T4 science.

Communicates beyond peers

Briefs for policy makers, materials for patients, dashboards for managers — translation is also linguistic.

Stays accountable to outcomes

Returns to the population and the policy maker with what worked, what didn’t, and what to do next.

A CALL

Translational science is not a phase.

It is the discipline of asking, again and again — ***did this work, for whom, and at what cost?***

DISCOVER

ask better questions

→

DELIVER

to real populations

→

EVALUATE

and prove the impact

Thank you.

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