PIP Digest

CCRA ACRC — Canadian Cancer Research Alliance / Alliance canadienne pour la recherche sur le cancer

PIP PPP — Patient Involvement in Cancer Research Program / Programme de Participation des Patients à la recherche sur le cancer

CANCER RESEARCH: Translational Research and the Role of Implementation Science

This PIP Digest looks at the role of translational research in accelerating the process of turning emerging discoveries into new cancer interventions and improving the healthcare system.

Key Concepts
- Translational research continuum
- Implementation science
- Patient involvement

Related PIP Digest
- Cancer Research: Types of Research
- Research Studies: Assessing Evidence

Everyone wants new cancer and health research findings to get out of the laboratory and into the "real world" as quickly as is safely possible. **Translational research** helps speed the journey from basic science to real-world practice — commonly described as moving from "bench to bedside" and from "bedside to community."

The translational research pipeline moves promising findings from the laboratory to testing in humans via progressive clinical studies. From there, things move into the health system and ultimately to broad-scale implementation for larger populations. (See diagram on following page.) Simply put, translational research moves from "Could this intervention work?" to "Does this intervention work?" and finally to, "How do we make this intervention work?"[1]

The bench-to-bedside approach works in both directions: basic scientists provide clinicians with new interventions, and as clinicians use and assess these tools, their observations about the nature and progression of cancer drive new basic research.

Over the past decade, Canadian cancer research funding organizations have invested more in translational research. The Canadian Institutes of Health Research, the Ontario Institute for Cancer Research, the Canadian Cancer Society, and The Terry Fox Research Institute are notable leaders in funding early-stage translational research.
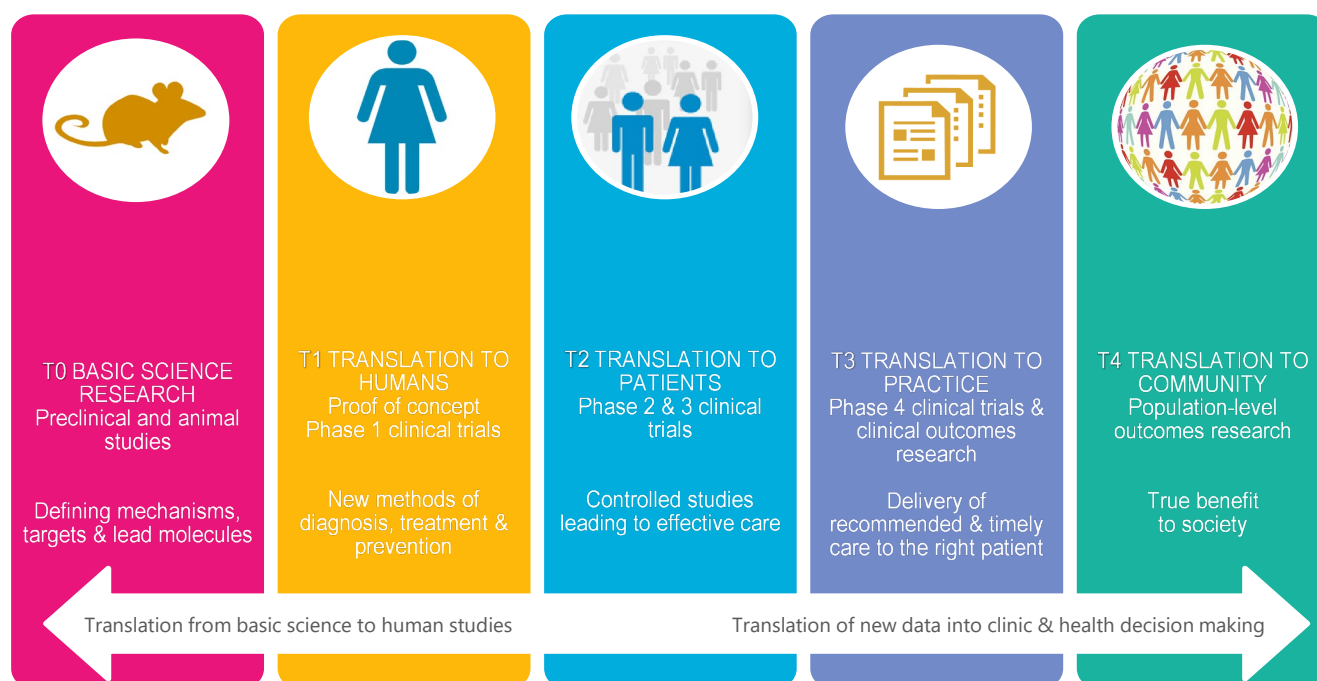
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[1] Rankin NM et al. (2019). An implementation science primer for psycho-oncology: translating robust evidence into practice. *Journal of Psychosocial Oncology Research and Practice* (2019), 1(3):e14.

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Implementation Science

Implementation science, also known as "knowledge translation," is the study of "methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services."[2] (See phases 3 and 4 below.)

The Translational Research Continuum

T0 BASIC SCIENCE RESEARCH	T1 TRANSLATION TO HUMANS	T2 TRANSLATION TO PATIENTS	T3 TRANSLATION TO PRACTICE	T4 TRANSLATION TO COMMUNITY
Preclinical and animal studies	Proof of concept Phase 1 clinical trials	Phase 2 & 3 clinical trials	Phase 4 clinical trials & clinical outcomes research	Population-level outcomes research
Defining mechanisms, targets & lead molecules	New methods of diagnosis, treatment & prevention	Controlled studies leading to effective care	Delivery of recommended & timely care to the right patient	True benefit to society

← Translation from basic science to human studies   Translation of new data into clinic & health decision making →

Adapted from: http://tri.uams.edu/about-tri-2/what-is-translational-research/

Successfully implementing new treatments, devices, and practices requires understanding new needs and requirements, economic consequences, and long-term impacts on the health system. Healthcare workers must also have a plan to "de-implement" (stop) interventions and practices that turn out to be problematic or of low value.

Implementation science usually involves research teams, approaches, and methods, separate from those of clinical research. These teams can include health services researchers, economists, sociologists, anthropologists, organizational scientists, and operational partners including administrators, front-line clinicians, and patients and caregivers.[3]

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[2] Eccles MP, Mittman BS. (2006). Welcome to implementation science. *Implementation Science*, 1(1).

[3] Bauer MS et al. (2015). An introduction to implementation science for the non-specialist. *BMC Psychology*, 3(32). https://doi.org/10.1186/s40359-015-0089-9

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Implementation science is critical for promoting "learning health systems." This term describes how healthcare organizations use the data they gather from clinical practice to guide improvements in care rapidly and responsively.[4] This kind of "rapid-learning health system" provides systematic principles and methods to help healthcare organizations make effective, lasting changes.

Application of the CFIR

The "Consolidated Framework for Implementation Research"[5] (CFIR), a common tool for implementation research, systematizes the many considerations involved in implementing an innovation or new intervention. The framework considers the intervention itself, as well as the implementation process, the settings, and characteristics of the people it involves.

Example: A recent UK publication used the CFIR to help understand the perspectives of family doctors and patients regarding a new electronic "clinical-decision support tool." The tool is designed to help doctors assess skin lesions and identify patients at risk of skin cancer.[6] The framework revealed complexity behind what, at first blush, seemed like a relatively straightforward process. For example, the nuances of patients' needs, the attitudes of family physicians, the extent to which the assessment tool was being incorporated into day-to-day practices, were just some of the important factors influencing implementation.

Patient Involvement Across the Translational Continuum

Patients are important players across the spectrum of translational cancer research.

 "...the practical arguments to involve patients seem to be very relevant to the aim of enhancing 'translation' in research...Using the experiential knowledge of patients during each stage of the translational process can make the resulting innovation more relevant and more usable for patients, and it could enhance the impact it has on patients' quality of life in a positive way..."[7]

Patients can:[8,9]

- assist in agenda setting, problem solving, and hypothesis construction

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[4]Menear M et al. (2019). A framework for value-creating learning health systems. *Health Research Policy and Systems*, 17(79). https://doi.org/10.1186/s12961-019-0477-3

[5]See https://cfirguide.org/

[6]Pannebakker MM et al. (2019). Understanding implementation and usefulness of electronic clinical decision support (eCDS) for melanoma in English primary care: a qualitative investigation. *BJGP Open*, 3(1). DOI:10.3399/bjgpopen18X101635

[7]Boenink M et al. (2018). Giving voice to patients: developing a discussion method to involve patients in translational research. *Nanoethics*, 12(3):181-97.

[8]Ibid.

[9]Callard F, Rose D, Wykes T. (2012). Close to the bench as well as at the bedside: involving service users in all phases of translational research. *Health Expectations*, 15(4):389-400.

- provide feedback on the design of medical devices and technologies
- provide input into the design of clinical trial design, in areas such as the consent processes, outcome measures, etc.
- define treatment targets and set priorities
- assist with trial recruitment
- identify ethical issues, risks and burdens, and cultural and societal impacts
- advise on adaptations for health service delivery
- help set the agenda for health services research and implementation science
- advocate for effective implementation science

View these videos to get a better understanding of translational research and implementation science:

- Harvard Catalyst. *Understanding the Spectrum of Translational Research*. (YouTube) February 5, 2015 [3:20 minutes] https://www.youtube.com/watch?v=rAblbUmyQgk
- NIH National Center for Advancing Translational Sciences. *Biomedical Translation*. (YouTube) June 4, 2019 [3:13 minutes] https://www.youtube.com/watch?time_continue=186&v=TnHLo-hCssg
- Ontario Centre of Excellence for Child and Youth Mental Health. *The art and science of implementation*. (YouTube) March 5, 2014 [3:54 minutes] https://www.youtube.com/watch?v=izkXtw1tDeg
- Healthy Dialogues/Intermountain Healthcare. *4-steps to a Learning Healthcare System*. (YouTube) June 1, 2016. [2:22 minutes] https://www.youtube.com/watch?v=nAUXUqEyJDY

The Ontario Institute for Cancer Research published a series of videos on its Translational Research Initiatives. These collaborative, large-scale, multi-institutional projects bring together laboratory and clinician scientists to advance research for the improvement of cancer patient outcomes.

- Brain cancer Translational Research Initiative: https://oicr.on.ca/programs/brain-cancer-translational-research-initiative/
- Ovarian Cancer Translational Research Initiative: https://oicr.on.ca/programs/ovarian-cancer-translational-research-initiative/
- Immuno-oncology Translational Research Initiative: https://oicr.on.ca/programs/immuno-oncology-translational-research-initiative/

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