

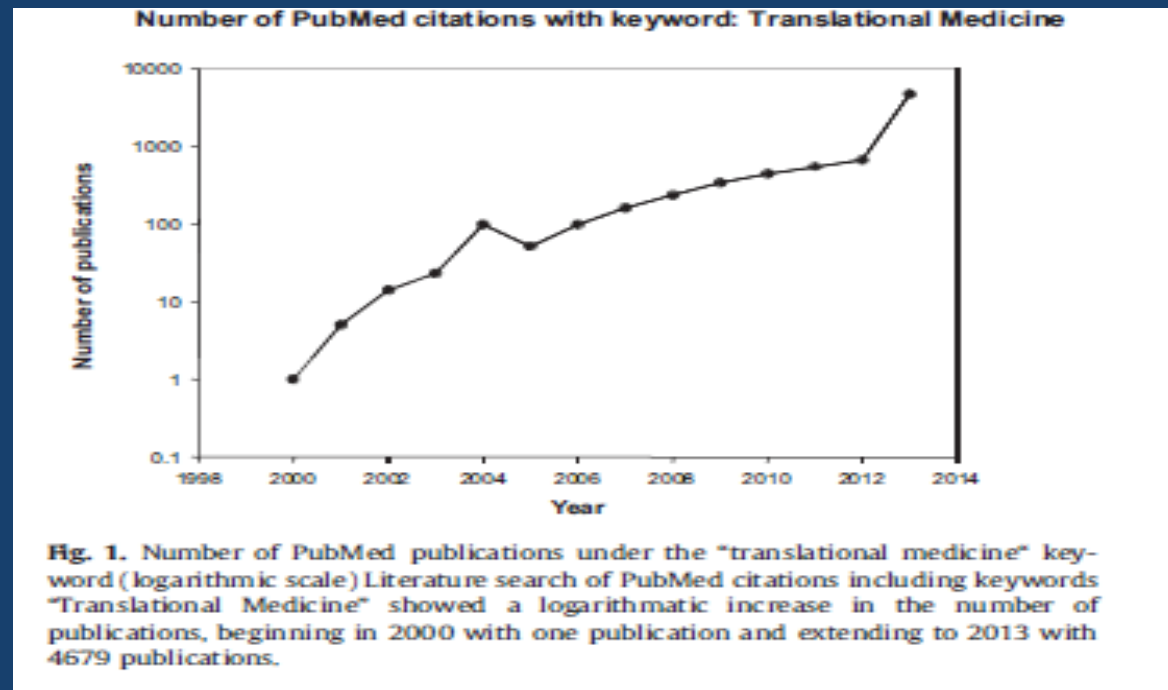
Translational Medicine

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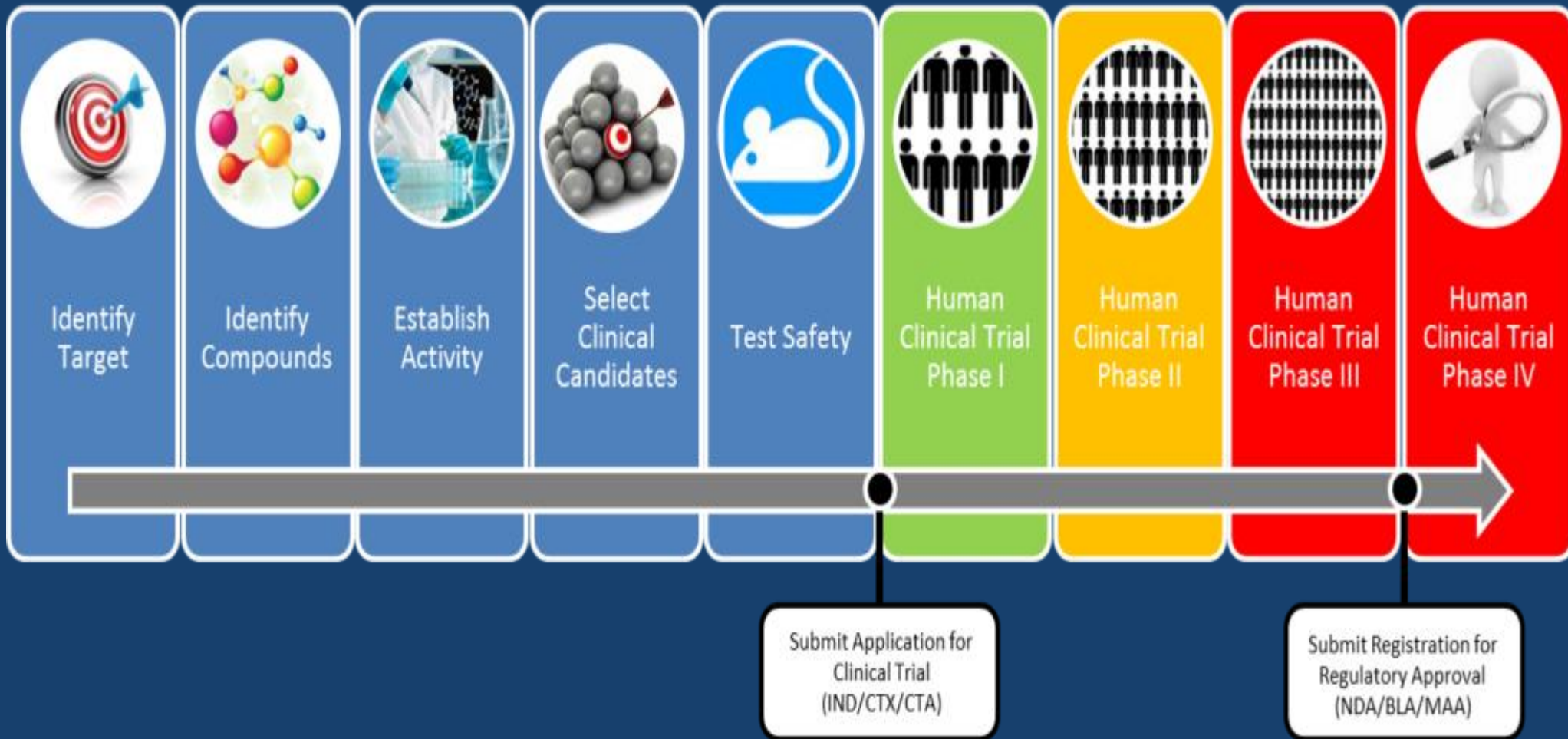
Translational Medicine is continuing to evolve rapidly as demonstrated by increased yearly publication numbers



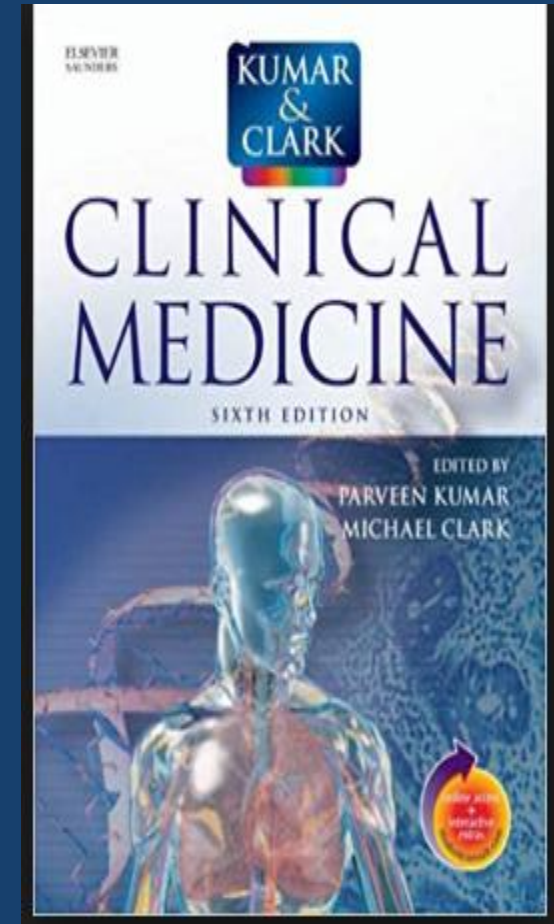
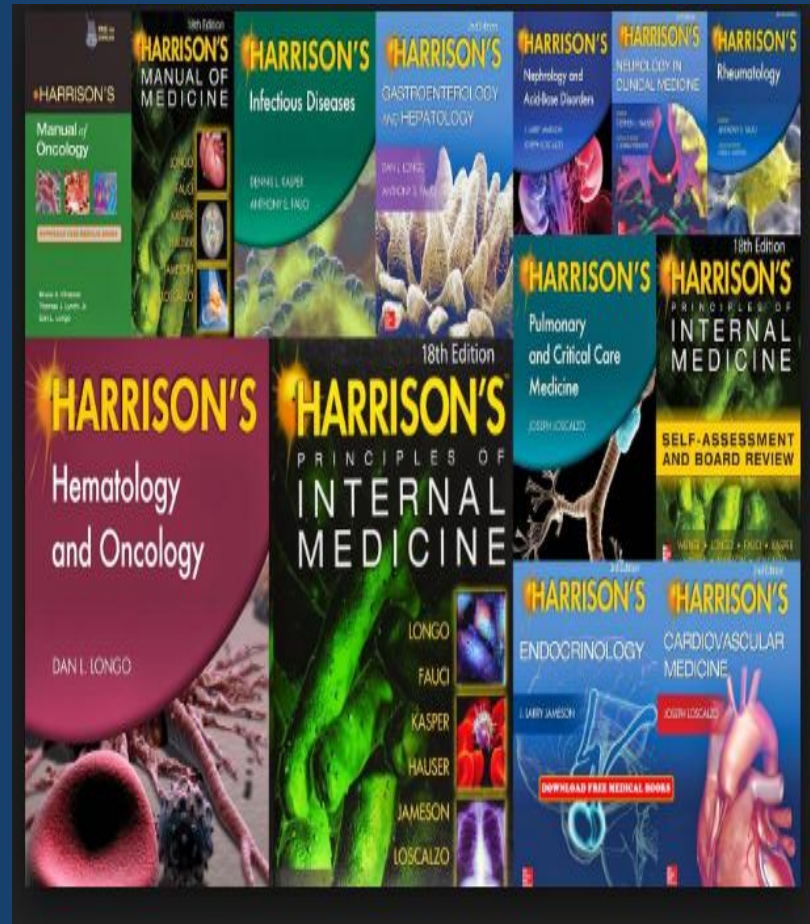
- The term Translational Medicine was introduced in the 1990s and became popular in the early 2000s.
- European Medicines Agency (EMA) approvals of drugs vary between zero and two per year from 1998 until 2010, and then expand to 10 or more per year on average since 2013.

Discovery Stage

Development Stage



Where is translational medicine.?



What is Translational Medicine?

- There is no clear definition of translational medicine because translational medicine means different things to different people.
- Here we define Translational medicine (also referred to as translational science) as a rapidly growing discipline in biomedical research which aims to accelerate the discovery of new diagnostic tools and treatments by using a multi-disciplinary, highly collaborative approach.
- Often described as the practice of transferring scientific knowledge "from bench to bedside" (B2B).

Definition

Interdisciplinary branch of the biomedical field supported by three main pillars: benchside, bedside and community.

Cohrs RJ, Martin T, Ghahramani P, Bidaut L, Higgins PJ, Shahzad A. Translational Medicine definition by the European Society for Translational Medicine. *New Horizons in Translational Medicine*;2015:86–88

What is translational research?

Bridging the gap between research and practice

- Why do we conduct research?
- Put simply the purpose of research is to learn more about a subject, but what happens to the knowledge generated by research?

- Morris and colleagues estimate that in medicine it takes an average of 17 years for clinical research to be fully integrated into everyday practice.
- The challenge beyond doing research is to make it easier for practitioners and policy makers to find, understand and apply research.

Categories of translational research

- The OECD describes three categories of research:
 - Basic research,
 - Applied research and
 - Experimental development.
- Translational research aligns most closely to experimental development.

Issues in the field of translational research

The 'know-do gap', as Bennett and Jessani describe it, is that gap between research and practice that results when people with the ability and authority to use good information to design their action.

Translational medicine: A bidirectional process

Translational medicine – a bidirectional concept

- Translational medicine will encourage the flow of information from the laboratory to the clinic, and in the same way, it should be encouraged from the clinic back to the laboratory.
- This means that translational medicine, as a concept, is a bidirectional concept.

Translational medicine: A bidirectional process

- Bench-to-bedside factors, which aim to increase the efficiency by which new therapeutic strategies, developed through basic research, are tested clinically.
- Bedside-to-bench factors, which provide feedback about the applications of new treatments and how they can be improved.

Translational Medicine: The patient perspective

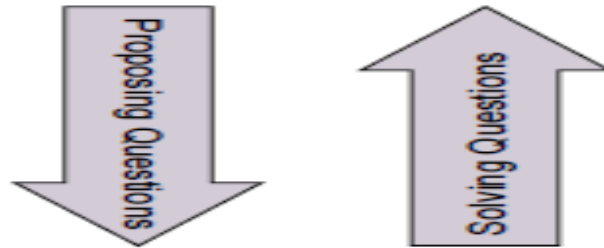
In order to ensure continuous feedback and communication among the diverse stakeholders in this field which are essential for success, **patients are playing a very important role.**



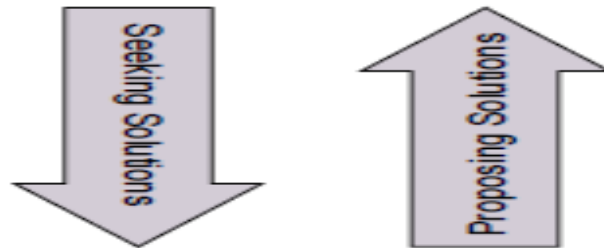
The bi-directional feed back loop: bench to bedside to bench

Concept of Translational Medicine

Clinical Diagnosis and Treatment



Translational Medicine



Basic Research

Figure 2. Translational Medicine Schematic Diagram

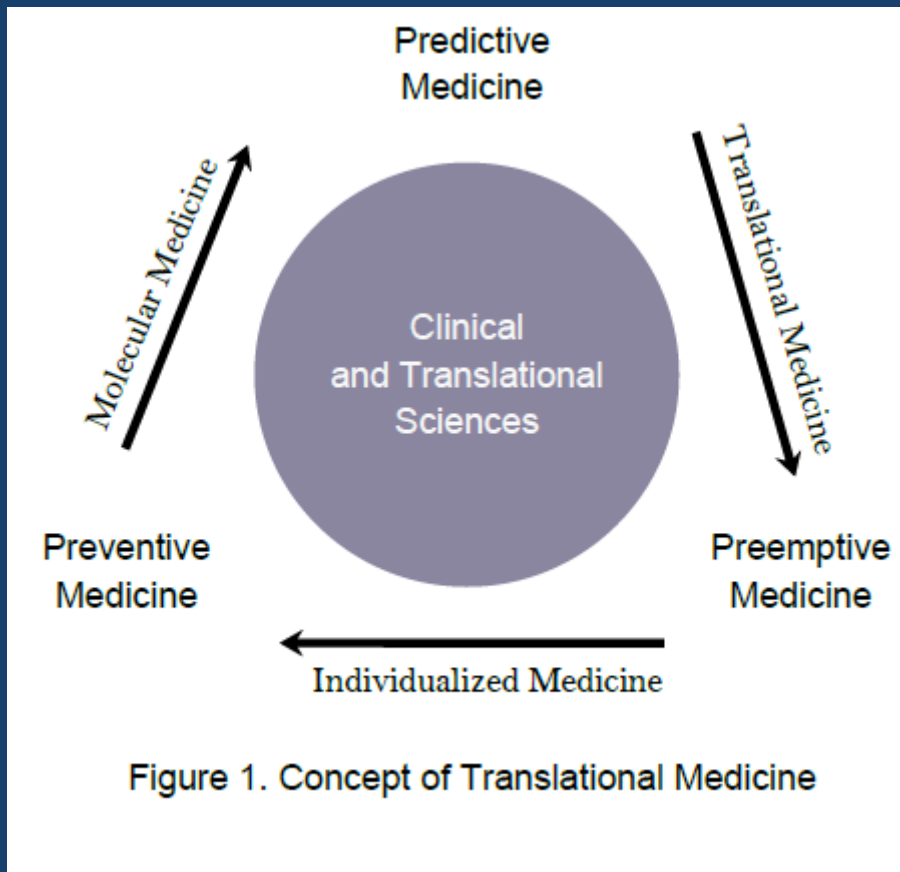


Figure 1. Concept of Translational Medicine

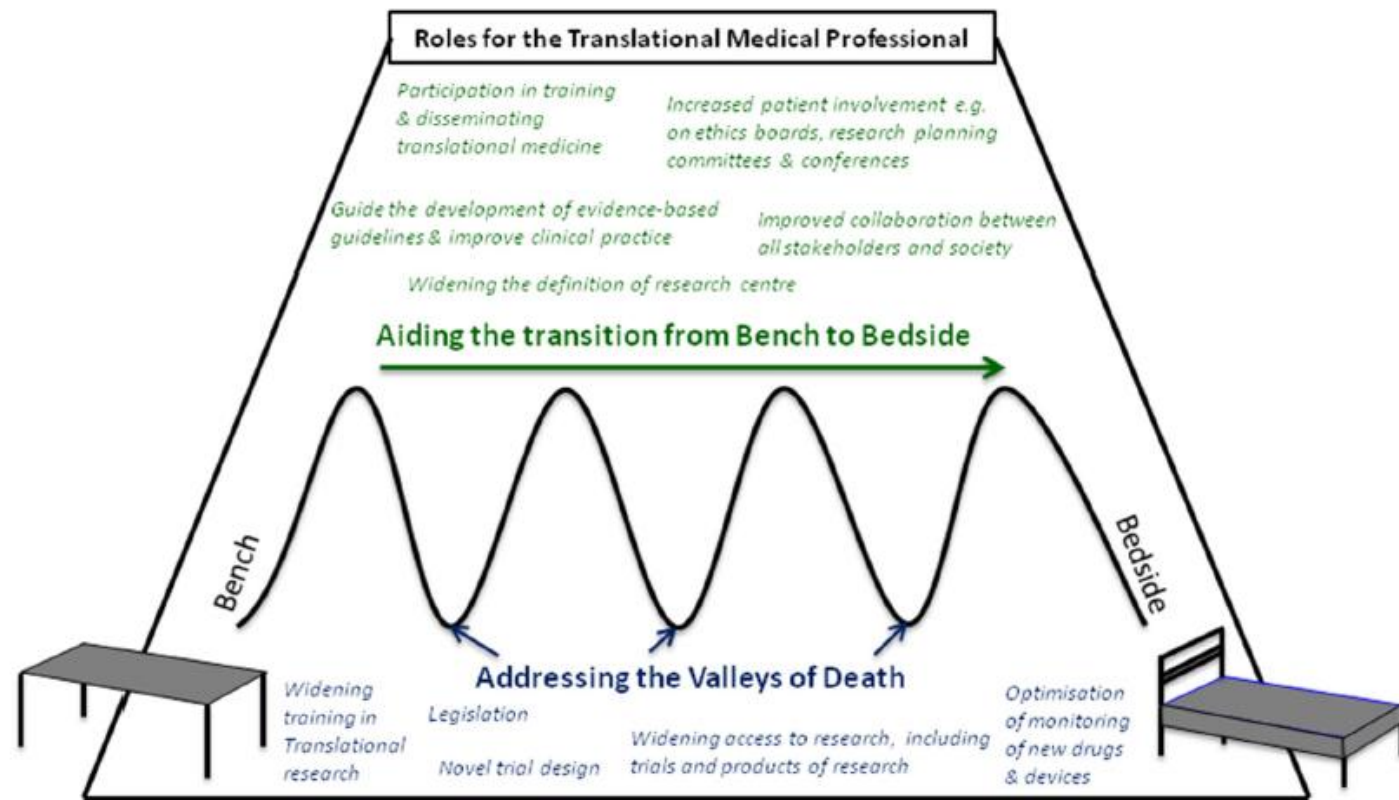


FIGURE 1 | Roles for the Translational Medical Professional in aiding the transition from bench to bedside (green text) and addressing potential points of failure, or "valleys of Death" (blue text).

Translational Model

The most current translation model in the literature is the 4 T's model:

- T1: basic scientific discovery (basic knowledge) to potential clinical application (theoretical knowledge) to
- T2: evidence-based guidelines (efficacy knowledge) to
- T3: clinical care or intervention (applied knowledge) to
- T4: the health of a community or population (public health knowledge)

Health and social Benefits

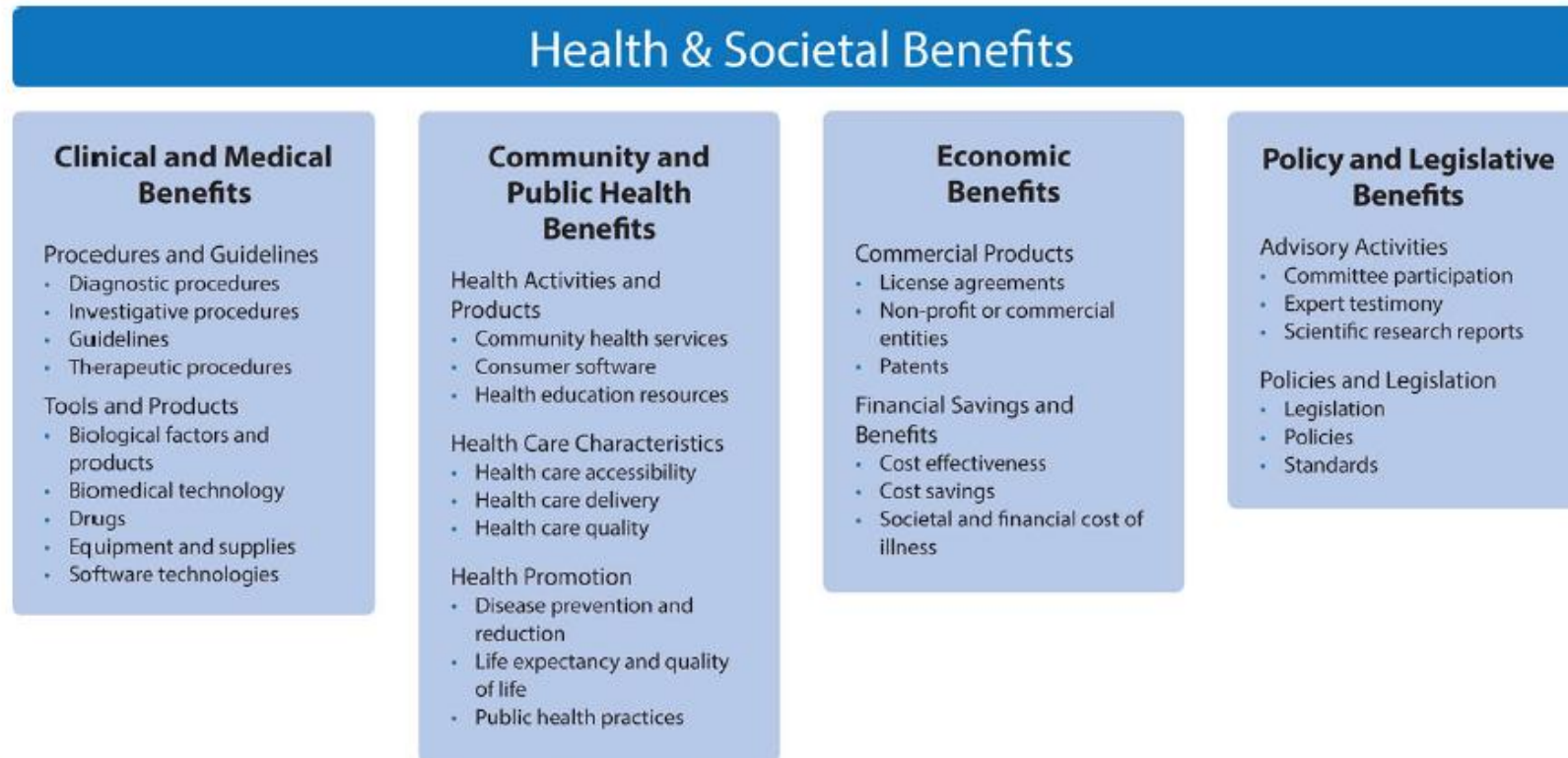


Figure 2 Translational Science Benefits Model Domains and Indicators.

CASE STUDY #1: SPECIFIC NON-INVASIVE DIAGNOSIS OF KIDNEY CANCER

Study description

- The Specific Non-Invasive Diagnosis of Kidney Cancer study explores urine biomarkers for detecting kidney cancer.
- Jeremiah J. Morrissey, PhD, received ICTS pilot funding in 2009 and 2011 to study urine biomarkers
- The goals of this study were to establish the ability of markers in urine and blood to diagnose kidney cancer, differentiate kidney cancers from other cancers of the urinary tract or common non cancerous kidney diseases, and monitor for recurrence and the effectiveness of chemotherapy in patients with metastatic disease.

Table 1 Translational Science Benefits Model observed indicators for the Diagnosis of Kidney Cancer study

Benefit	TSBM Domain	TSBM Indicator
Early screening test for kidney cancer studies are in process;	Clinical and Medical Benefits	Diagnostic Procedures
Patent application enhances the chance of potential commercialization of the test.	Economic Benefits	Patents

Conducting translational research

The key activities of translational research include

- Reviews-- Summarizing findings in a review represents a valuable service for time-poor practitioners.
- Dissemination-- channels are extensive.
- Engagement-- with potential end-users is a distinctive feature.
- Collaboration- between researchers and practitioners, and between researchers from different disciplines.
- Evaluation- flexible framework for performance evaluation that 'tracks their progress, incentivizes fruitful activities, and aligns individuals throughout the organization'

Challenges in translational research

- Oversimplification
- Ethics
- Skills
- Time for collaboration

Translational medicine and education

- In recent years, a number of educational programs have emerged to provide professional training in the skills necessary for successfully translating research into improved clinical outcomes.
- Master and PhD programs---
 - The University of Edinburgh , 3-year online distance learning programme. The University of Helsinki and many more throughout the world.

- Mahidol University at Faculty of Medicine Ramathibodi hospital has a Master and PhD programme in Translational Medicine since 2012.
- Mahidol University is the first and only University in Thailand and in Southeast Asia.
- The most of programme lecturers are physicians and clinicians who contribute in many fields of study such as Cancer, Allergy and Immunology, Haematology, Paediatric, Rheumatology, etc.
- Here, the student will be directly exposed to patients. To find out the thing in between basic science and clinical application.

THANK

YOU

ALL

