Diffusion of promising innovations: quite a challenge

Prof. dr. Maria Jacobs
Improved outcome through innovation

Survival all tumors  ref. IKNL 2020
Improved survival after innovations for certain types of lung cancer (source: de Ruysscher et al, 2012)
Why should we pay attention to innovation implementation?

• Study AVL, Maastro, LUMC, RTgroep, ZRTI: 258 innovation projects:
  • ± 45% projects had a delay of more than a half year or failed
High level research-based innovations deserve a validated scientific-based implementation approach.
Implementation and dissemination: complex endeavor

Implementation is more complex than the programs, technologies etc. that are the subject of implementation efforts, due to a variety of aspects, affecting each other:

• Process
• Behavior/beliefs
• Technology
• Organizational context

Fixen et al., 2005
Factors affecting implementation success

CFIR, Damschroder
Aim of our innovation implementation research

To develop research-based implementation strategies
## What are we talking about?

**Definition of innovation**

<table>
<thead>
<tr>
<th>Product innovation</th>
<th>Technological innovation</th>
<th>Market innovation</th>
<th>Organisational innovation</th>
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<td>during the past three years</td>
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| **1. Number of introductions of new or significantly improved treatments**
  • New to radiotherapy
  • New to your clinic | **1. Frequency of implementation of new medical devices**
  2. **Number of new positioning devices for patient treatment** (e.g. a new fixation product)
  3. **Number of approved patents** (available from a public database)
  4. Percentage of patients in phase III randomised trials approved by an IRB (Institutional Review Board)
  5. Percentage of patients in phase I-II trials approved by an IRB (Institutional Review Board) | **1. Percentage of patients from outside the market area**
  2. **Number and percentage of new general hospitals that refer the desired patient population**
  3. **New practices for organising procedures** (e.g. management of the total care chain, redesigning treatment process, knowledge management, lean production, quality management)
  4. New methods of organising work responsibilities and decision making (e.g. first use of a new system of employee responsibilities, teamwork, decentralisation, integration or decentralising departments, education/training systems)
  5. **New methods of organising external relationships with other organisations or public institutions** (e.g. first use of alliances, partnerships, outsourcing or sub-contracting) |  |

Innovation indicators radiotherapy after Delphi research (source: Jacobs et al, 2015)
Predicting factors for success are manageable

1. Sufficient and competent employees
2. The project goals are completely clear for all project members
3. All project-members find the project feasible and desirable
4. Complexity: integration of functionalities, equipment and professionals

Swart et al, 2020
SOP prediction success innovation implementation

• SOP internally validated with data NKI-AVL and MAASTRO

• External validation with data from LUMC, ZRTI and RTG ready

• Extension to e-health
Prediction model = only knowing the starting situation

Study ongoing about workshops as method for implementation. Goal: Sharing ideas about perceived hurdles and possible solutions.

Investigate whether this helps in:
• Getting a collective picture
• Joint ownership solution
• Implementation success

Example: brachy. Predicted success increased significantly
Treatment innovation implementation

In-depth study to find out why treatment innovations are 4 times less likely to be implemented.

Key determinants:
Concerns about safety and insufficient patient engagement -->
Make a plan on both topics before implementation & include the patient journey in the care-path
What organizational context suits best?

• Agile vs. Waterfall
• Project-based
• Ambidexterity
• Job satisfaction

Study: work in progress
Innovation dissemination and adoption (1)

Difficulties adoption PT and MRL in centers not having that device:

- Mixed-methods study.
- Patient selection
- Logistics (for example in combination with chemo)
- Travelling (for patients)
- Additional work for the referring physicians
- Uncertainty concerning the knowledge about the treatment
Innovation dissemination and adoption (2)

In-depth studies to find clues to improve understanding of facilitators for innovation dissemination and adoption.

Workshops based on Design Thinking Methodology with physicians from other centers not having the specific innovation (in order to adopt the innovation and refer eligible patients)
DESIGN THINKING
A FRAMEWORK FOR INNOVATION

EMPATHISE
What Is the problem?
Define the challenge & explore the human context.

IDEATE
How do we solve it?
Brainstorm ideas good & bad, don’t stop at the obvious.

DEFINE
Why Is it important?
Research, observe, understand & create a point of view.

TEST
Does It work?
Implement the product, show & don’t tell, start to refine the product.

PROTOTYPE
How do we create it?
Start creating, experiment, fail cheap & fast.

CONTEXT

FORM

Maastro

TILBURG UNIVERSITY
Crucial in DT: ownership, mutual understanding of the situation and solutions designed together

Example adoption Proton Therapy by referrers

- Agreement on additive aids for patient selection;
- Innovative approaches to solve delay and logistic issues in referrals;
- A multi-disciplinary approach, especially in case of concurrent chemotherapy (not only focus on RT in case of referrals).
The MATCH checklist for the implementation of radical innovations into secondary healthcare

**MONEY**
- Are sustainable financial resources in place to facilitate implementation and adaptations?
- Access new funding
- Alter incentive and allowance structures

**ADDED VALUE**
- Do the people and the organization recognize the added value of the innovation?
  - Identify and prepare champions
  - Conduct local needs assessment

**TIMELY KNOWLEDGE**
- Has proper training and education been arranged and is there a quick problem-solving loop?
  - Conduct, develop and distribute educational meetings
  - Create a learning collaborative

**CULTURE**
- Is the organization ready for the innovation as well as staff motivation and are there ambassadors in leading positions?
  - Identify and prepare champions
  - Assess for readiness and identify barriers and facilitators

**HUMAN RESOURCES**
- Are there sufficient, motivated and competent employees to ensure operational readiness?
  - Access new funding
  - Change physical structure and equipment

Review, Thijsen et al, 2021
Quantitative study impact RI on BaU, case study Maastro – under review (10 reviewers 😊)

RI can **have a larger impact than one would anticipate**—especially on variables not taken into account beforehand—on operations associated with the RI as well as on BaU operations.

With significantly more RI incidents and an increase in some BaU incidents, the organizational process is affected, machine inactivity may lead to crises with all its consequences for the patient. **Extensive preparation and planning can minimize these effects.**
Taskforce innovation-implementation
Radiotherapy The Netherlands
Top 4 implementation hurdles 18 RT-centers in The Netherlands

- Shortage of time from personnel (n=9 centers);
- Prioritization of projects (n=8 centers);
- Collaboration with external parties (n=6 centers);
- Resistance to or acceptance of the innovation.
Implementation of Shared Decision Making

Important for prostate cancer patients: they need to be informed about the different options

Use specific SDM implementation framework based on research findings e.g. Joseph Williams et al, 2020
Most important lessons learned implementation MRL and PT

1. Involve relevant patient advocacy organizations from the beginning. They can help with approaching/informing patients in an effective way.

2. Establish a collaboration network with the referring centers and organize the 3 C’s: cohesion, connectedness and conciseness in a network plan.

3. Conduct studies in a collaboration network with referring centers and include cost-effectiveness studies.

4. A plan is required for increasing awareness-knowledge, how-to-knowledge and principles knowledge of physicians and physicists of referring centers.
5. Management should be aware that the implementation of radical innovations, requires an **adjusted management style**. Also, significant attention must be paid to what is necessary for employees to feel safe.

6. The business plan should take the necessary **flexibility of resources** into account. Otherwise, the center will definitely face major changes.

7. It is important to organize as much as possible **training** in advance of the clinical start of a specific tumor treatment because during clinical operations a lot of time is necessary to find answers for unforeseen events.
Most important lessons learned implementation MRL and PT

8. It is important to be **open for all opinions** of radiation oncologists, physicists, management and referrers have towards PT and MRL to enable a constructive, open dialogue about beliefs and doubts.

9. **Ownership** of the implementation process must be organized for the doctors, physicists and other key players in the organization in an early stage.

10. **Reflection sessions** should be scheduled on a regular base. It is important not to only evaluate in the case that something went wrong.
Make an implementation plan using a validated implementation framework to improve implementation

(CFIR, ENT, RE-AIM ..................)

https://cfirguide.org/
Main recommendations

• Implement important innovations research-based and make an implementation plan according to recommendations in scientific research;

• If applicable, develop (as part of the implementation plan) a patient engagement plan, a network plan, a plan for training, or a stakeholder plan and use validated frameworks;

• Organize ownership for everyone that can make the innovation work.
Building knowledge on innovation implementation

Thank you!