Clinical Study*

Lionel Pazart
Inserm, CIC-IT, Besançon, France

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VISION

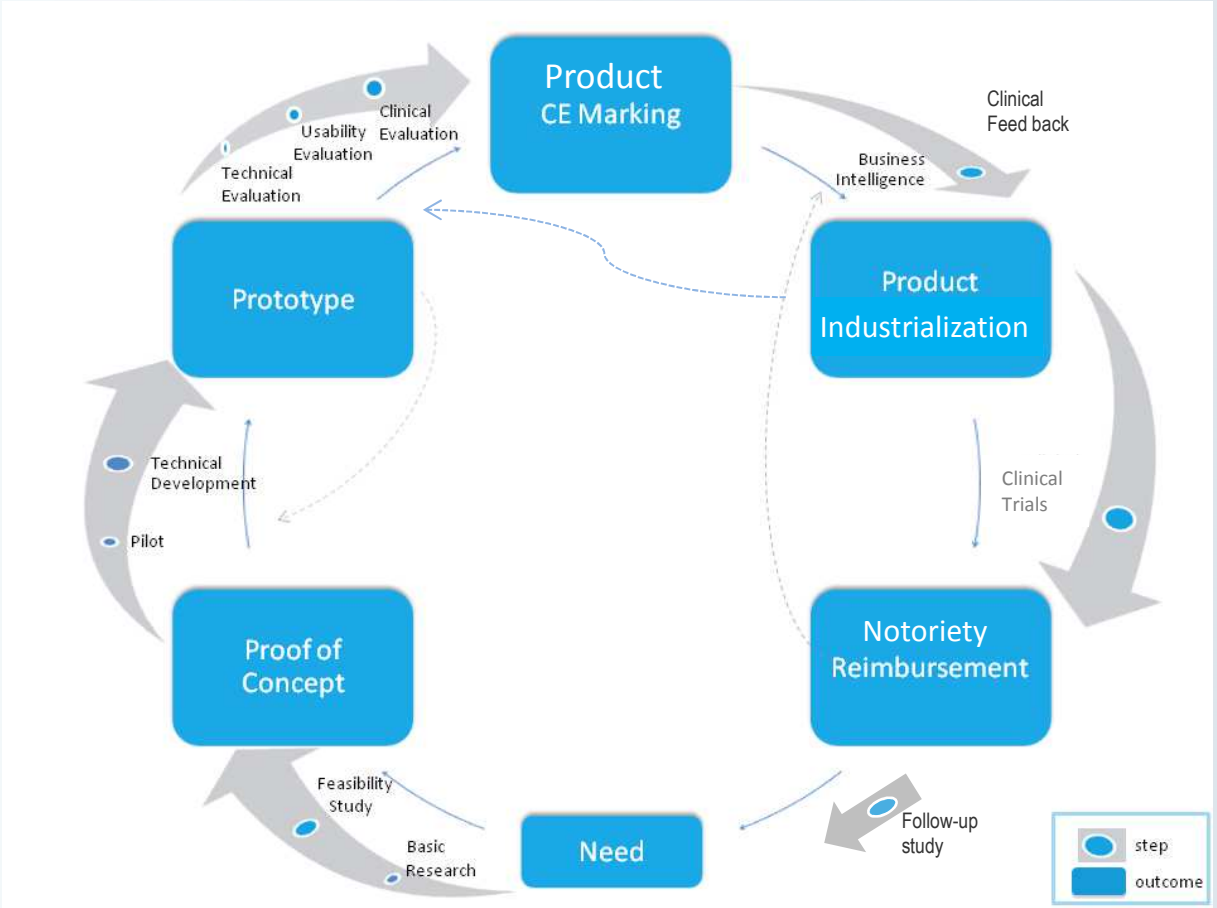
- Diversity of new technological innovations (such as eHealth, connected objects, 3D-compounds, robots, nano-technologies etc.) open unexplored fields to anticipate.
- The development plan and clinical study protocols used to perform the investigations must be appropriate to the device under examination.
- The development plan and clinical study protocols should be adapted to the clinical constraints of use, industry perspectives and added value expected by the society.
- A specific culture of development plan and clinical studies for Medical Devices and eHealth applications should be differentiated from drugs assessment among clinicians, academics, industrials and stakeholders.

WHAT

Perform clinical studies at each development step of a new medical device:

- **Compilation of basic research studies** supporting assumptions and specifications for the design of the new product constitute an essential part of pre-clinical package
- **Clinical investigation** with the new product is more often needed to get CE Marked
- **Well conducted comparative Clinical Trials** are mandatory for reimbursement in countries which have a formal procedure
- **Follow up studies** cover many european countries after market launch of the product

WHAT



The ITECH model of Idea-to-Market process

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Support the different dimensions of the evaluation of the Medical Devices:

- **The claimed function and the clinical intended use**
- **Technical Evaluation** (biocompatibility, robustness, fiability etc.)
- **Ergonomics and Human Factors Engineering** (including Human-Machine Interface)
- **Clinical Benefits-Risk** Evaluation
- **Variability of users skills**
- **Medico-economical** assessment
- **Improvements** of the product by the clinical feed back

Take into account the specificities and novelty of the Medical Devices and eHealth

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WHY

Clinical studies should be adapted to the specificities of medical devices on:

- **the diversified intended use**: diagnosis, prevention, monitoring, treatment, alleviation or compensation of an injury or handicap, investigation, replacement or monitoring of the anatomy or a physiological process, control of conception (Medical Devices Directive 93/42/EEC)
- **the predictability of performance** (ex: a stick, gloves, conductive gels, non-invasive electrodes (for EEG or ECG), image intensifying screens, etc.)
- **the equivalence with a predicate**: substantial equivalence is established with respect to intended use, design, energy used or delivered, materials, chemical composition, manufacturing process, performance, safety, effectiveness, labeling, biocompatibility, standards, and other characteristics (ex: coronary stent or hip prosthesis).
- **the operator/MD interaction**; (operator dependent nature, learning curve, technical platform, organizational dimension, etc.)
- **the diversity of users** (clinician, paramedics, the patient himself)
- **the short track of development** and the reduced life cycle;
- **the small size of target population** (orphan medicinal product) and the MD “custom” design (ex: facial bone substitute from 3D printing)

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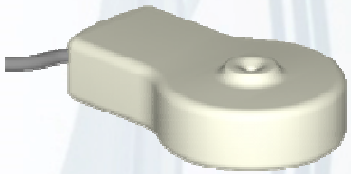
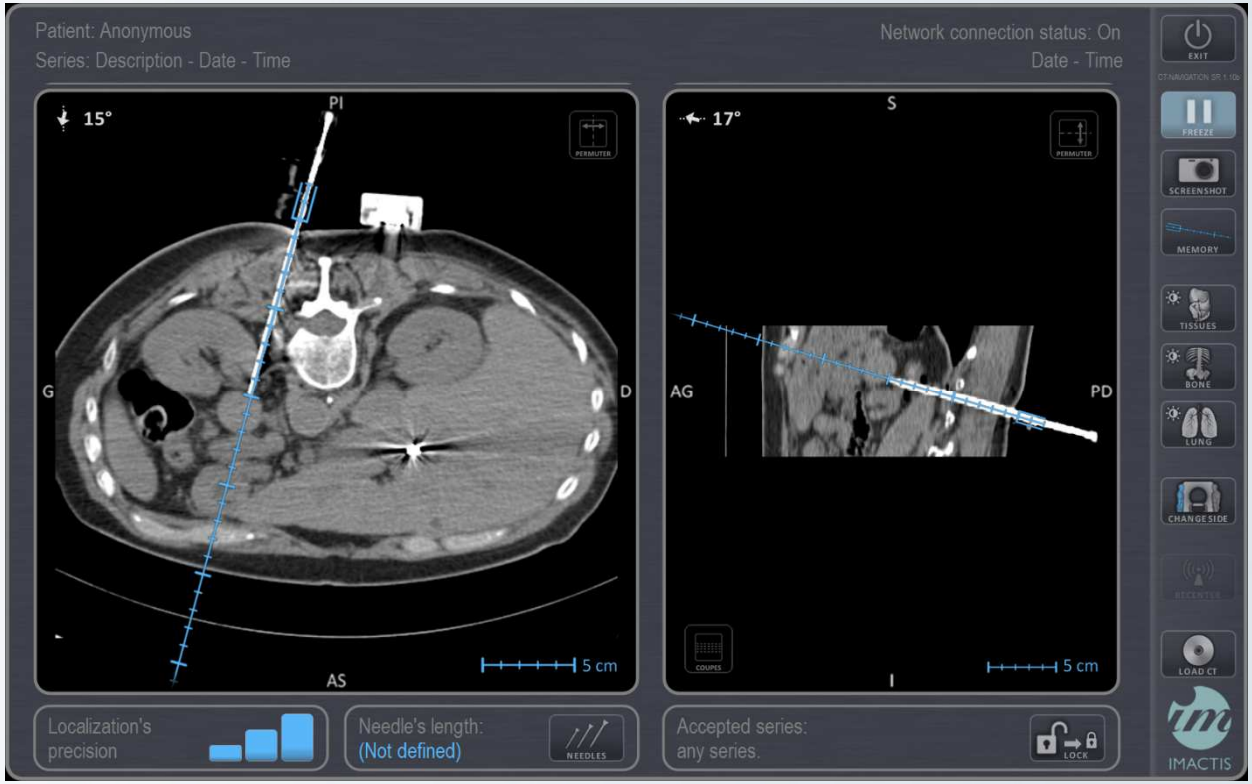
Example of Monitoring:
CT-NAVIGATION for Interventional Radiology

European Commission



3D mouse and needle guide

Dynamic tracking of the advance path of the needle in two reconstructed sections



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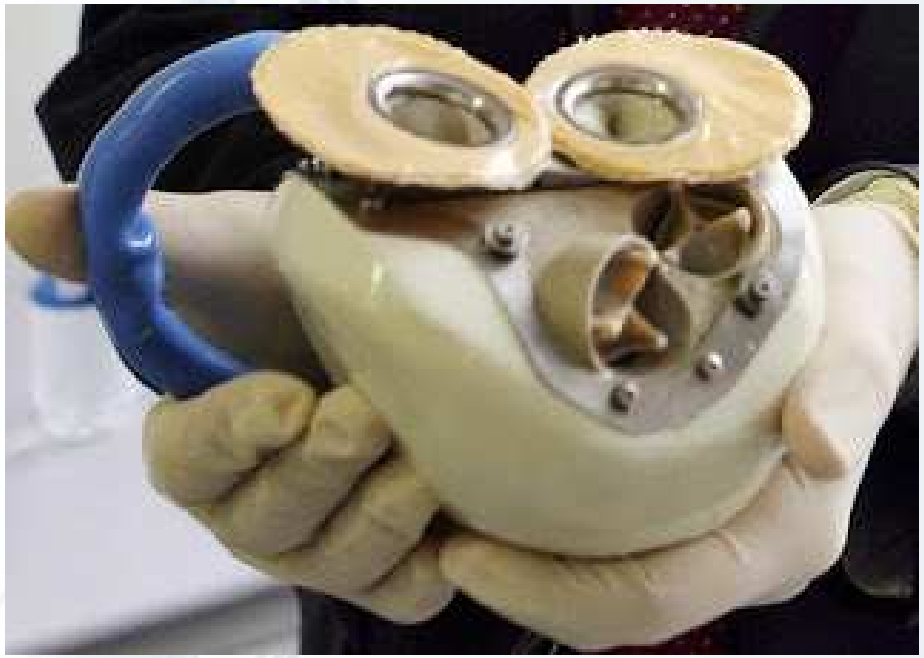
Example of medical devices for treatment:

Artificial heart / Nasal irrigation kit



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WHY

Clinical studies on Medical Devices and eHealth are poorly developped:

- This requirement is more recent than for drugs and follows different steps, but investigators, regulators and stakeholders are inspired by drugs regulation.
- European regulation and guidelines are generic and leave great uncertainty about the data gathered during the clinical investigation along with relevant pre-clinical, technical and design data to give to a Notified Body.
- Few academic sites offer good knowledge of studies on medical device and eHealth
- There is little clinical research skills within the companies or in the Notified Bodies.
- There is no policy for supporting the cost of well-conducted clinical trials in the domain of Medical Devices, despite most of the companies in the domain are SMEs.
- A lot of technical innovations spread in practice before any real clinical evaluation (ex: Da Vinci Robot, breast prothesis, connected smartphone apps etc.)

HOW

Define a clear european guidance of Clinical investigation according to :

- the status of the device
  - Significant modification of an existing device for a same function
  - Existing device proposed for a new function (e.g. 'off-label' investigations).
  - New device similar to an existing one (equivalence with a predicate).
  - Drug-device combination products
  - New devices where the device components, features and the methods of action are previously unknown *and could be adapted during the study*.
- the intended use of the device
- the degree of risks and invasiveness of the device
- the body location/disease in which the device is used
- the experience from the use of similar devices
- custom-made devices
- *In-vitro* diagnostic devices

ACTIONS

1. **Create a methodology taskforce** promoting standardised methodological issues for the clinical studies of medical devices and eHealth Applications

2. **Provide methodological guidance for the clinical studies of Medical Devices and eHealth applications**:
   - Typology of main categories of devices from a development plan perspectives
   - Pre-requisite for the first in man test
   - Methodology of clinical study *(design, outcomes, population, size, biostatistics, etc.)*
   - Usage and Usability

3. **Harmonize clinical procedures across Europe**
   - Regulation and ethics
   - Management of information and data *(confidentiality, security)*
   - Review process and follow up study

4. **Identify funding sources** to cover the large research costs for the clinical evaluation of Health Technologies

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ACTIONS

5- Introduce specificities in European legislation relating to clinical investigation

- ICH Guideline of EMA, and the Regulation 536/2014 on clinical trials on medicinal products
- Medical Device Directive (93/42/EC) amended by 2007/47/EC, and other specific directives (ex: Active Implantable Medical Device Directive 90/385/EC)
- In-vitro Diagnostic Devices Directive (98/79/EC), *no legislation relating to clinical study*

6- Extend the ECRIN initiative structuring European research capacities on med device:

- establishment of a hub coupled to centres / networks in each european country
- Inventory of investigators and facilities for participation in clinical trial
- use this infrastructure to conduct multinational clinical studies on medical devices

7- Pursue the database on outcome measures for medical device trials initiated by international institutions involved in Health Technology Aassessment (e.g. members of INAHTA, EUnetHTA and non-profit members of HTAi) and reinforced by ECRIN.

8- Initiate an ITECH 2 extension with a broader panel from academics, industry, clinicians, stakeholder, and european regulatory representatives

Thank you for your attention

Lionel PAZART
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