HTA: BME prospective

Dr Leandro Pecchia
University of Warwick
IFMBE HTA Division Chairman

WARWICK

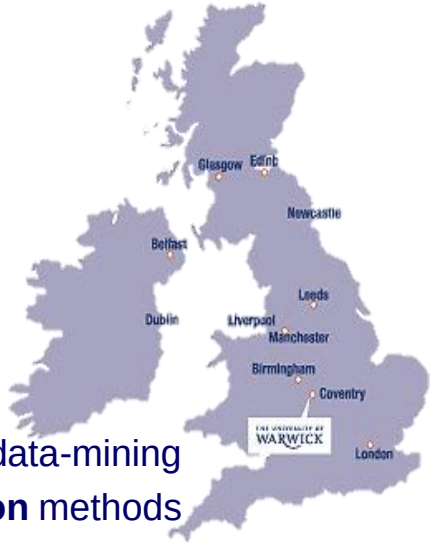
IFMBE
HTA Division

International Federation for Medical and Biological Engineering
IFMBE

RESEARCH BACKGROUND

Career path:

Since 2013: *Assistant Professor in Biomedical Engineering*, ***University of Warwick***, *UK*
2011-2013: Research Fellow (RF2), ***University of Nottingham***, *UK*
2009-2011: Research Fellow (RF1), ***University Federico II of Naples***, Italy
2005-2009: PhD in Biomedical Engineering, ***University Federico II of Naples***, Italy
May 2005: BSc+MSc in Electronic Eng., ***University Federico II of Naples***, Italy



Research interests:

- Applied ***Biomedical signal processing*** and second level pattern recognition/data-mining
- Early stage ***Health Technology Assessment*** (HTA) and **User Need Elicitation** methods

Main applications:

- *Active/healthy ageing*: chronic cardiovascular diseases and falls in elderly
- Disease Management Programs, patient pervasive monitoring and ***Telemedicine***
- *Behavioural Monitoring*

Director **Applied Biomedical Signal Processing and Intelligent eHealth Lab**

- established in 2014, 6 research studs, 6 associate Academics, 8 Visiting Researchers in 2016

International Appointments

- Chair of the Health Technology Assessment Division of the International Federation of Medical & Biological Engineering (IFMBE)
- Chair of the Public Affairs WG of the European Alliance of Medical & Biological Engineering and Sc.
- Member of the WHO working group o HTA of Medical Devices
- Secretary of the European Parliament Interest Group on Biomedical Engineering link

International Appointments

WHO Consultant for Global Forum of Medical Devices (HTA)

European Parliament Interest Group on BME, secretariat

DG CONNECT Consultant for MAFEIP tool

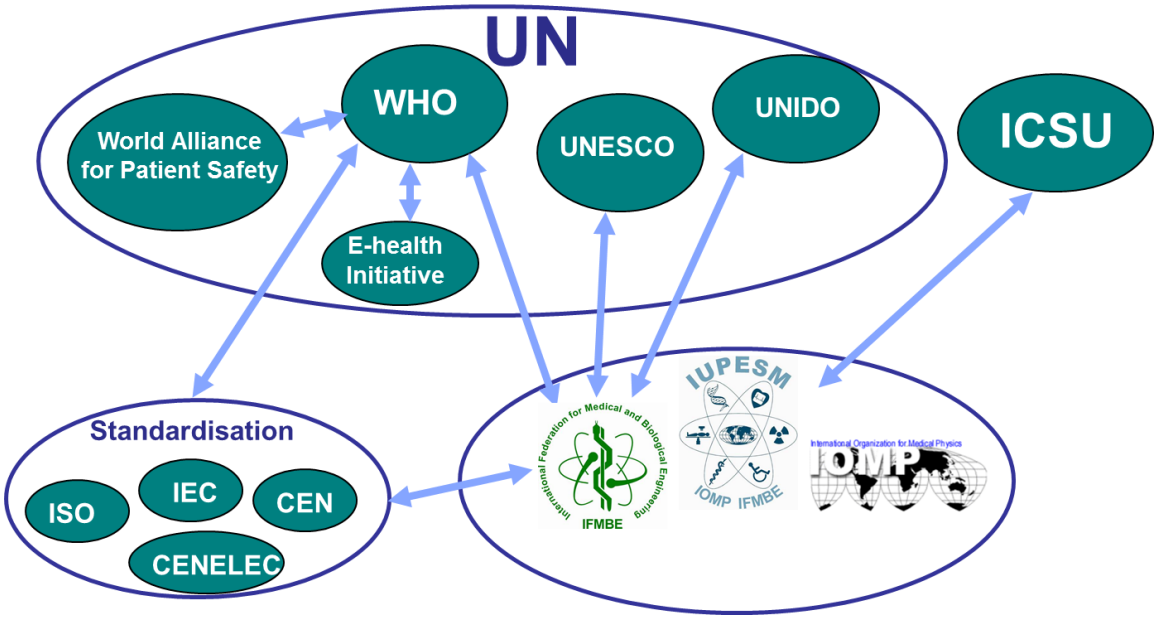
Chairman of the IFMBE HTA Division

Chairman of the Public Affair Working Group of the EAMBES

Director of the **Applied Biomedical Signal Processing and Intelligent eHealth lab, University of Warwick, UK**

International Federation for Medical and Biological Engineering (IFMBE)

- The IFMBE was established in 1959 when a group of medical engineers, physicists and physicians met in the UNESCO Building, Paris, France to create an organization entitled IFMBE
- IFMBE is recognised as NGO cooperating with UN (WHO, UNESCO, UNICEF) and is part of an eco-system working to improve health world-wide:



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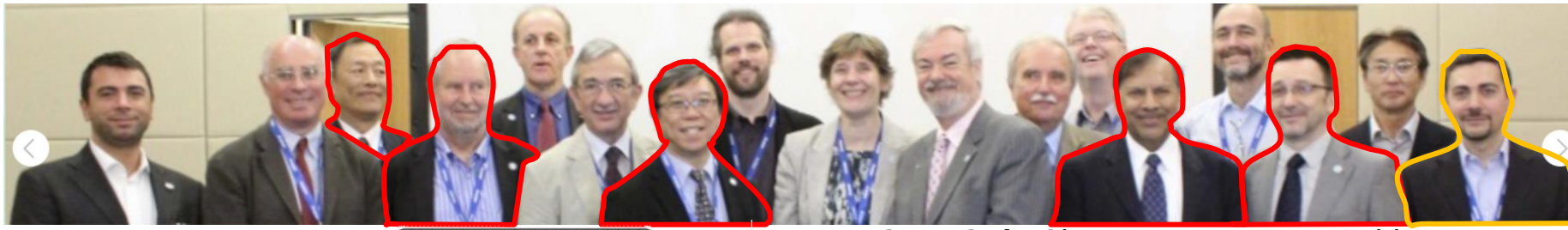
IFMBE

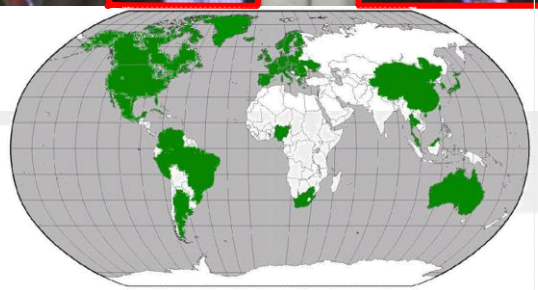
IFMBE: scientific society but very close to real problems

54 national, 7 transnational BME societies 120k members



James C. H. Goh, Singapore, IFMBE President
Shankar M. Krishnan, USA, IFMBE President Elect
Kang Ping Lin, Taiwan, Secretary General
Marc Nyssen, Belgium, Treasurer
Ratko Magjarevic, Croatia, Immediate Past President

Divisions



Clinical Engineering Division (CED)

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Ernesto IADANZA (Italy, 2012-2018)

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Tom JUDD, Secretary (USA, 2015-2021)
Mladen POLUTA, Treasurer (South Africa, 2015-2021)
Saide CALIL, Elected Member (Brasil, 2012-2018)
Tony EASTY, Elected Member (Canada, 2012-2018)
Paolo LAGO, Elected Member (Italy, 2015-2021)
Ewa ZALEWSKA, Elected Member (Poland, 2012-2018)
Yadin DAVID, Coopted Member (USA, 2015-2018)
James WEAR, Coopted Member (USA, 2015-2018)

Health Technology Assessment Division (HTAD)

Board Members

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Leandro PECCHIA, UK

Members
Patricia TRBOVICH, Secretary, Canada
Marjan HUMMEL, Treasurer, The Netherlands
Nicolas PALLIKARAKIS, Past Chairman, Greece
Mladen POLUTA, South Africa
Mario MEDVEDEC, Croatia
Lennart PHILIPSON, Sweden

IFMBE HTAD Members

IFMBE HTA Division

Patricia TRBOVICH
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Treasurer (2012-18)

Marjan HUMMEL,
The Netherlands
Secretary (2015-21)

Kalliroi STAVRIANOU,
Greece
Member (2015-21)

Rosanna TARRICONE,
Italy
Co-opted Member (2015-21)

Nicolas PALLIKARAKIS,
Greece
Past-Chair (2012-18)

Mladen POLUTA,
South Africa
Member (2015-21)

Mario MEDVEDEC,
Croatia
Member (2015-21)

Leandro PECCHIA,
UK
Chair (2012-18)

…?
Patients, ONG…

Julie POLISENA,
CANADA/CADHT
Collaborator

Dan CLARK,
UK/NICE/NHS
Collaborator

Oriana CIANI,
Italy
Collaborator

Giuseppe Fico,
Spain
Collaborator

EAMBES Council 2016-7

President Jari Hyttinen, Finland

Past President, membership WP lead Birgit Glasmacher, Germany

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Councillor of Education: Richard Reilly, Ireland

Councillor of Institutions Karin Wardell, Sweden

Councillor Societies and clinical collaboration: Andreas Melzer, UK

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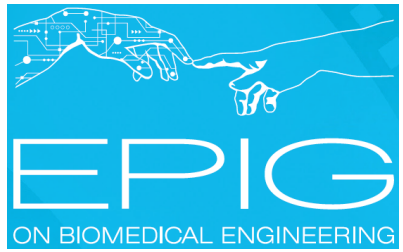
BME in EU


European Alliance for
EAMBES
Medical and Biological Engineering & Science
Modern Medicine – Product of Biomedical Engineers
EPIG
Professor Jari Hyttinen
President of EAMBES

BME in EU



BME
is the main enablers of modern medicine
impacting on quality of life, safety, European economy

VISION				
ENABLING VALUES	KNOW-HOW	MULTI-disciplinary (R&D, hospital, agencies)	INTER- disciplinary (eng., medicine, biology, HTA)	
FOCUS AREAS	Professional recognition (e.g. who manage MD in Hospitals??)	Independent research area (e.g. "…*6 or 9?*")	Representation in panels/EC (e.g. ERC, FET, MCSK, EIP, EIT, JRC, Horizon…)	Contribution to directives (e.g. medical device… …need any help?)
EPIG (possible) action points	1) Ask Commission and Council to insert BME in the Professional Qualifications Directive: *…or patient safety in hospital would remain uncertain and procurement not cost-effective!*			
	2) Act on Commission to be sure BME are involved in Medical Devices Coordination Groups: *OK, directive is almost done (?), but there will be technical annexes to write…*			
	3) Act on Commission to recognize BME as an independent research area in Horizon 2020: *..or we will be lagging behind USA and Japan!*			

MISSION

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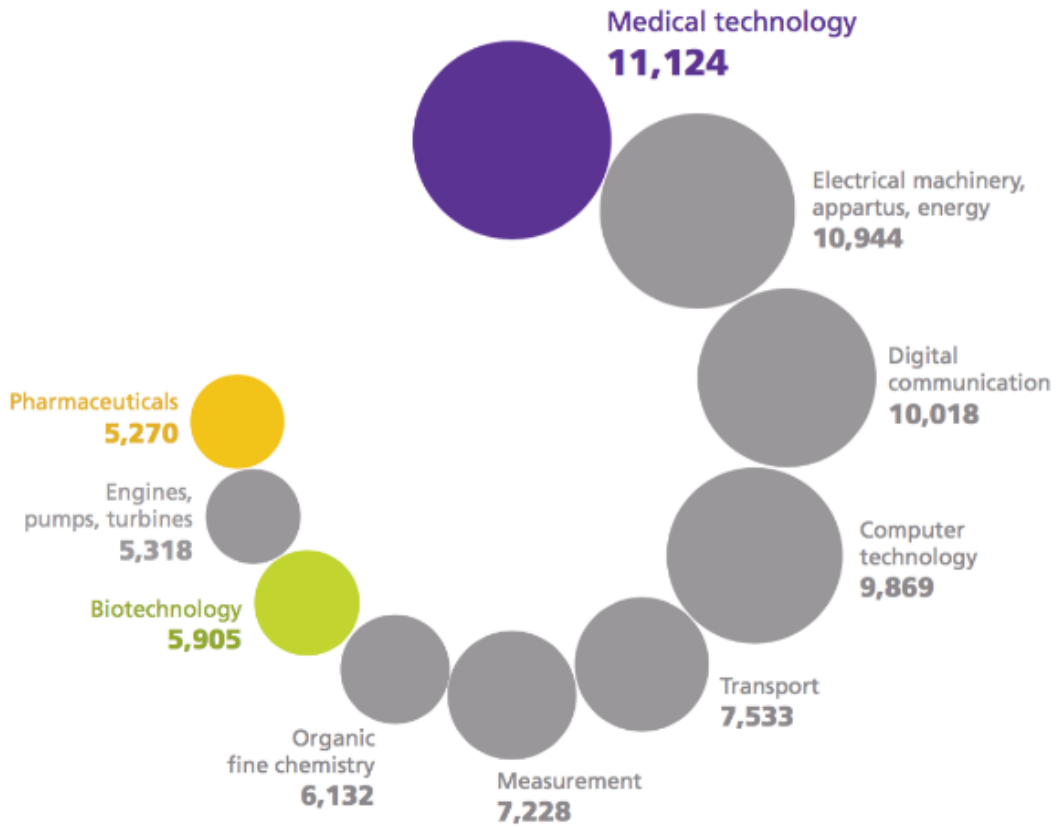
BME outcomes in 10 years

Medical Technologies are 1st for IP



*MedTech Europe, *The European Medical Technology Industry. In Figures. Brussels, 2015.*

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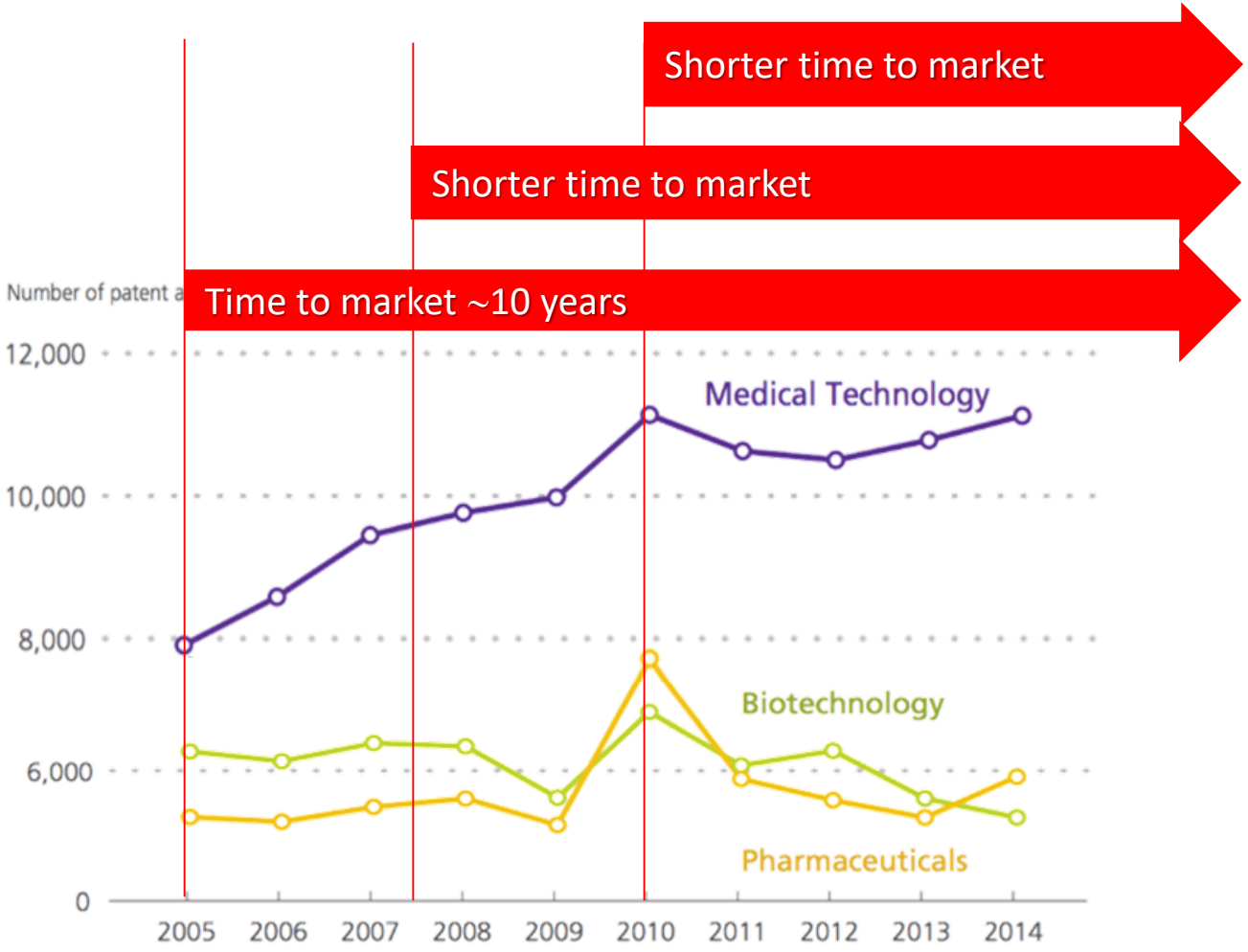
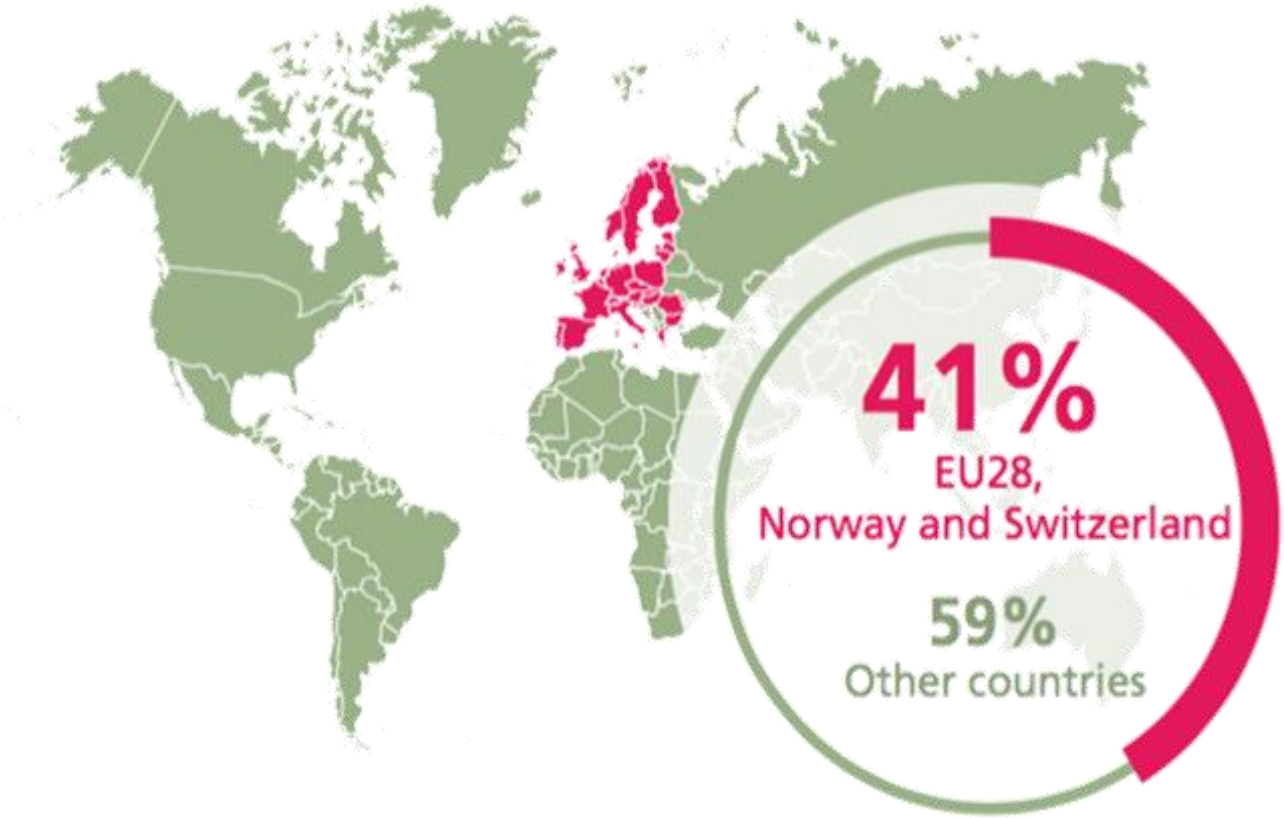
BME outcomes in 10 years



*MedTech Europe, *The European Medical Technology Industry. In Figures. Brussels, 2015.*

BME outcomes in 10 years

41% of Patents from EU



***MedTech Europe**, *The European Medical Technology Industry. In Figures. Brussels, 2015.*

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BME impact

HTA: into

Dr Leandro Pecchia – 14/1/2016

Lecture goal

- *Introduce the concept of Market*
- *Discuss why healthcare is not an ideal market (…why we need HTA?)*
- *HTA recall*
- *Early stage HTA*

BME&MP and HTA

- *BMEs are increasingly involved in HTA*, collaborating with economists, medical doctors, nurses, pharmacologists, patients, healthcare managers.

- BMEs contribution to HTA is peculiar because *BMEs are involved also in the design* of health technologies and particularly medical devices

- The *European Economic and Social Affairs Committee's* (EESC) of the *European Commission* stated recently that:
  - *"Biomedical Engineering is not simply a subset of modern medicine. Modern medicine predominantly secures important advances through the use of the products of biomedical engineering"**

* EESC, *Promoting the European single market combining biomedical engineering with the medical and care services industry*, 23rd April 2015, http://www.eesc.europa.eu/?i=portal.en.ccmi-opinions.32831

Definition of health technology

- **Health Technology,** according to WHO definition, refers to any application of organized knowledge and skills in the form of medicines, medical devices, vaccines, procedures and systems developed to solve a health problem and improve quality of life.

- **Health technology assessment (HTA)** refers to the systematic evaluation of properties, effects, and/or impacts of health technology. It is a multidisciplinary process to evaluate the social, economic, organizational and ethical issues of a health intervention or health technology. The main purpose of conducting an assessment is to inform a policy decision making.

- *"the "problem" of the assessments is considered only when the technology is close to its placing on the market and not during R&D process"* (WHO*)

*WHO web site (last access 15.09.2012): http://www.who.int/medical_devices/assessment/en/

Healthcare is not and ideal market

What is it a market?

"human beings have unlimited wants but limited resources with which to meet those wants. Given the limited resources, human beings constantly make decisions that require trade-off."

- **Market:** The term market refers to a situation where buyers (consumers) and sellers (producers) interact (directly or through intermediaries) to trade goods and services.
- **Supply** is the total amount of a product (good or service) that producers (sellers) are willing and able to sell at a specified price.
- **Demand** is the total amount of a good or service that consumers are willing and able to purchase at a given price.
- **Market forces** of supply and demand represent the aggregate influence of self-interested buyers and sellers on prices and quantities of goods and services offered in a market: demand and supply interact to determine prices of goods and services being exchanged.

Healthcare is not and ideal market

What is it a ideal market?

A market is ideal under several conditions (perfect competition):

- Perfect market information
- No participant with market power to set prices
- Non intervention by governments
- No barriers to entry or exit
- Equal access to factors of production
- Profit maximization
- No externalities (other benefits/costs for non choosing a product/service)

According to the general equilibrium theory, on the assumption of Perfect Competition, and some technical assumptions about the shapes of supply and demand curves, *it is possible to prove that a market will reach an equilibrium* (Pareto optimum), in which sellers and consumers are at the best possible level of utility.

Healthcare is not and ideal market

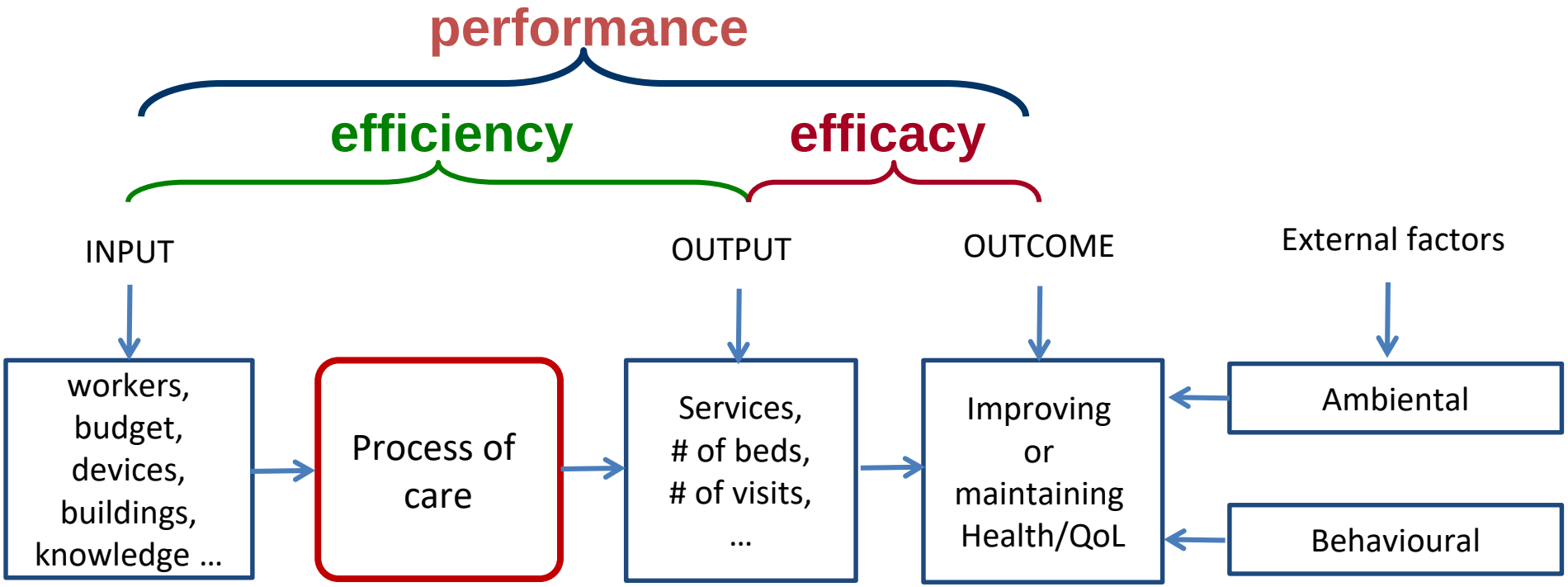
- **Market structure:**
  - number and size of firms
  - Access to market for firms
  - Product differentiation
- **Demand derivation**
  - Not “satisfaction” but “health preservation”
  - The final achievement (health) is not marketable (cannot be passed to other)
  - Low market force (demand does not affect the prices or quantity)

Healthcare is not and ideal market

- **Information asymmetry:**
  - Medical Doctors:
    - Have a deep knowledge of the medical problem, but not of all the patients and not of all the technologies
    - Cannot be 100% sure of results
    - Are the suppliers, but they also act on behalf of the patient…

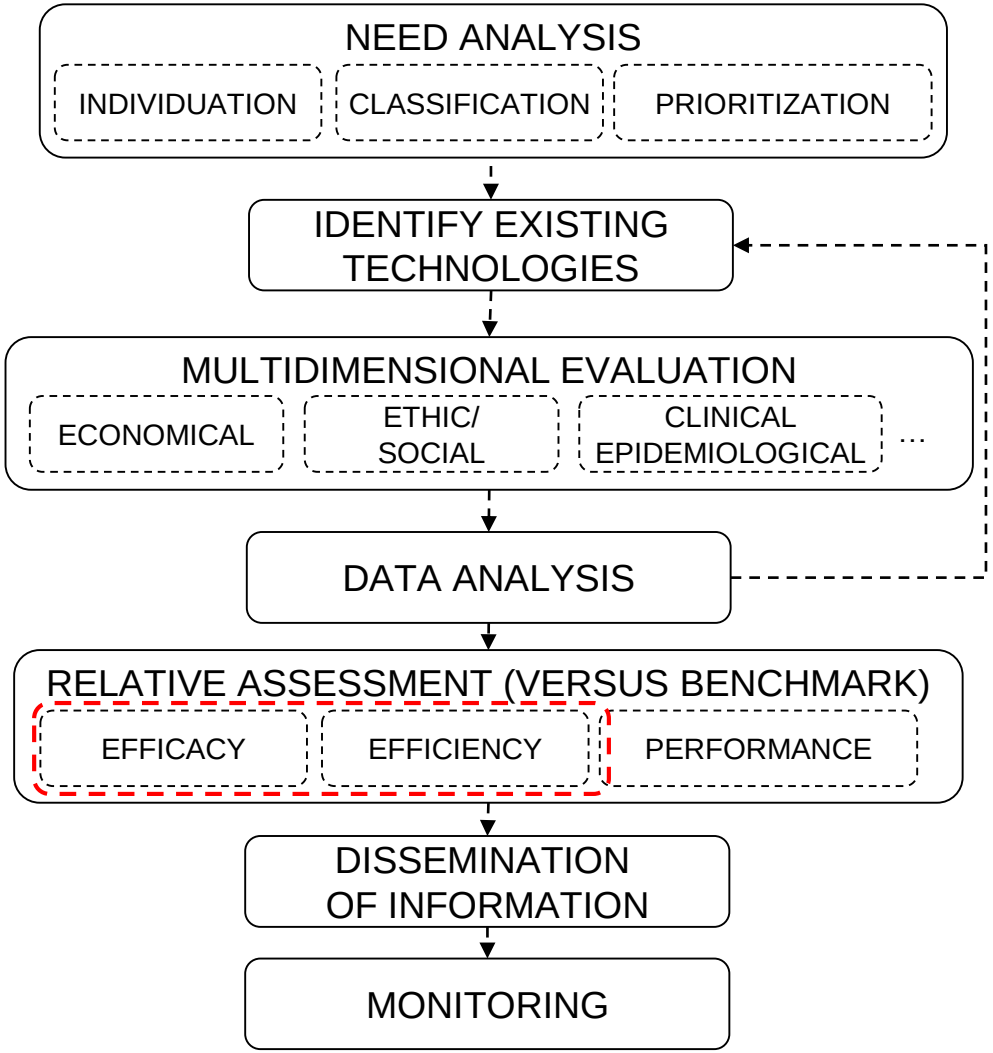
      … demand and supply are jointly determined
  - The patients
    - they lack necessary information about their illness
    - they lack necessary information about the effective healthcare technologies
    - Not completely free of choosing
    - Are not consistent, non stationary, not fully transitive (A>B, B>C, A?C)
    - Final users of the healthcare technology, but not those that directly pay for it
  - Suppliers
    - Not all are profit-oriented (e.g. hospitals)

HTA
Performance, efficiency, efficacy



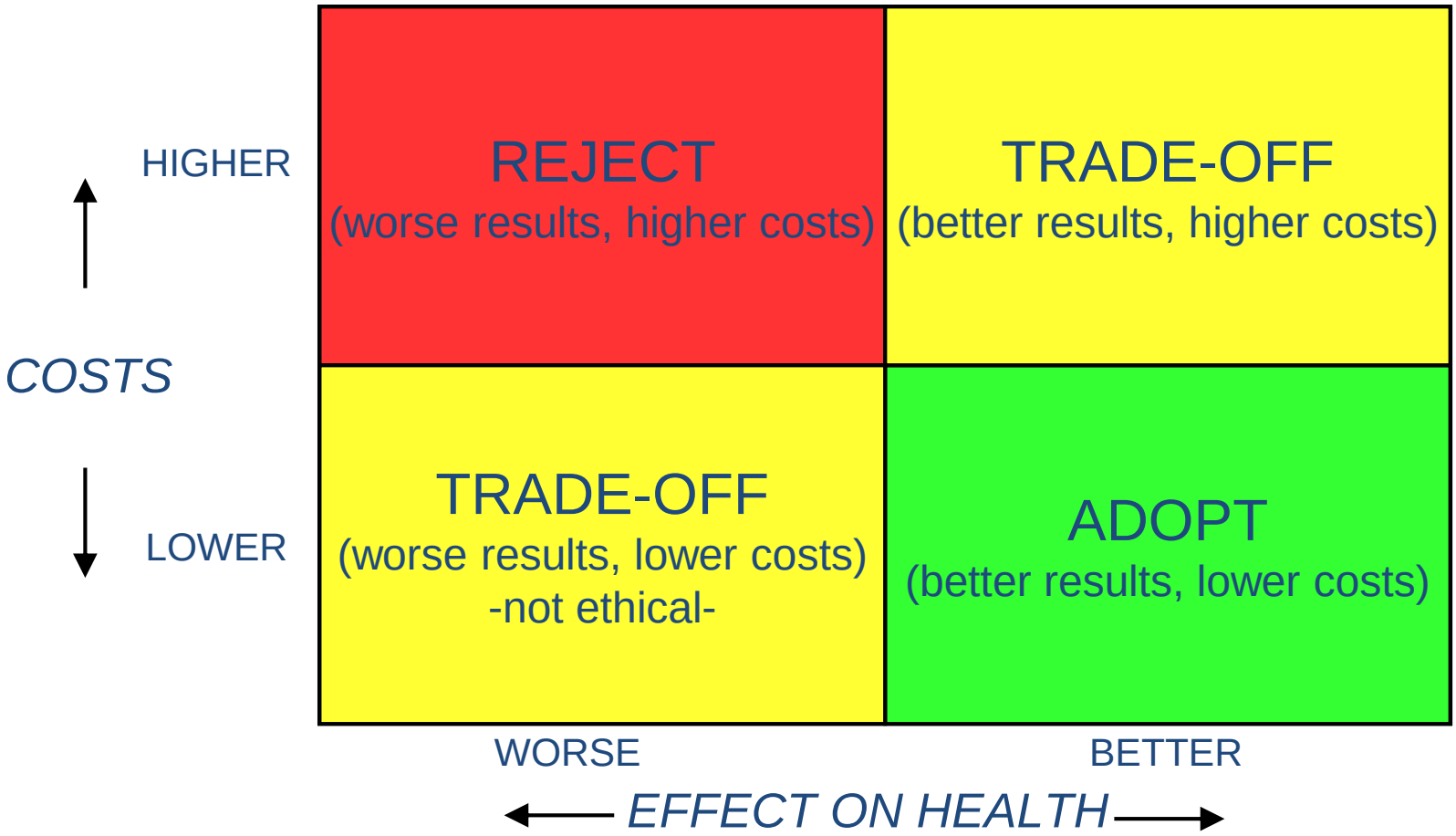
$$Efficiency = \frac{output}{input} \qquad Efficacy = \frac{outcome}{output} \qquad Performance = \frac{outcome}{input}$$

HTA
standard methods



HTA

Possible results of complete analyses



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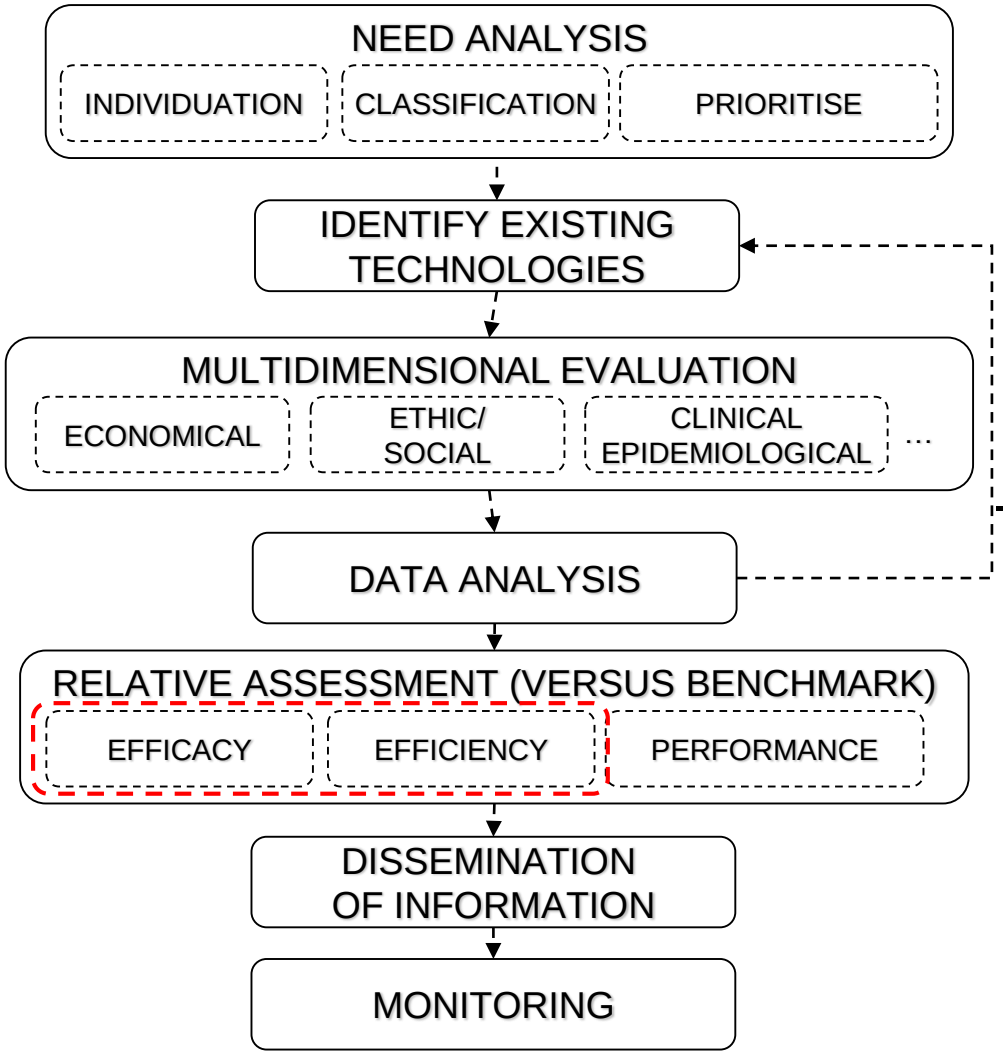
HTA
standard methods

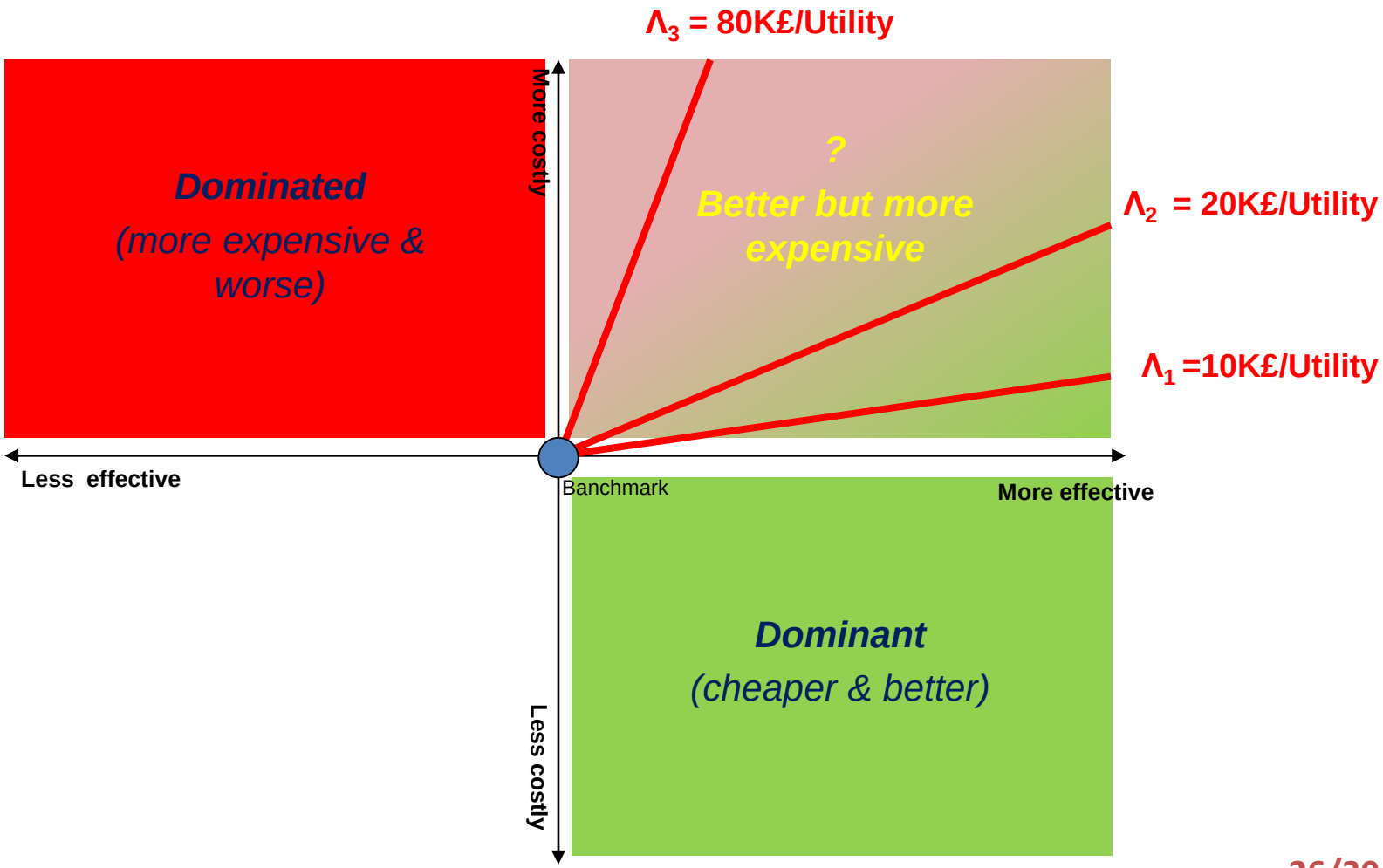


*

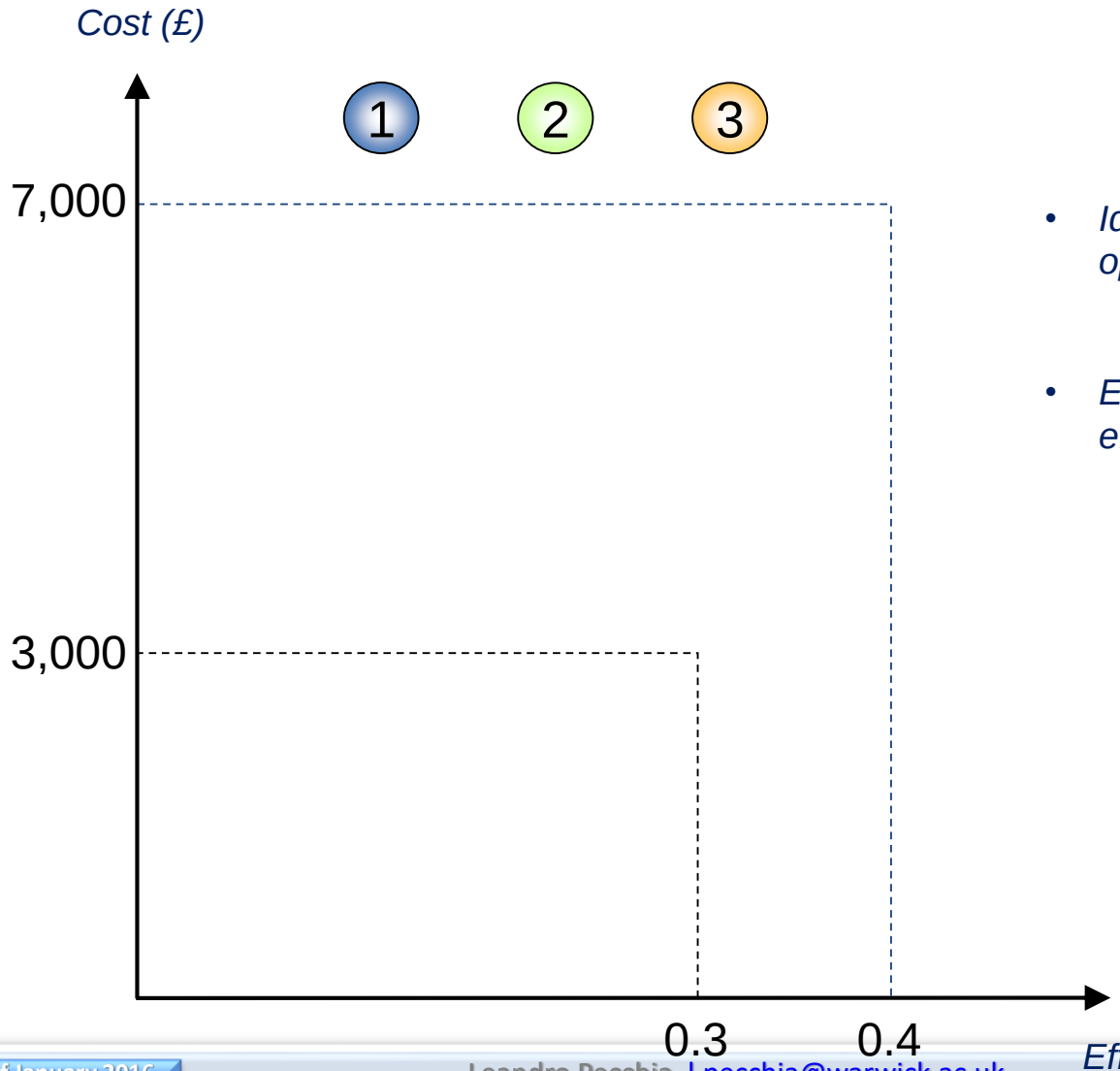
* NHS NICE willingness-to-pay 'threshold' range of £20,000-£30,000 per QALY.

Example Examples of reimbursement

HTA
Willingness to pay

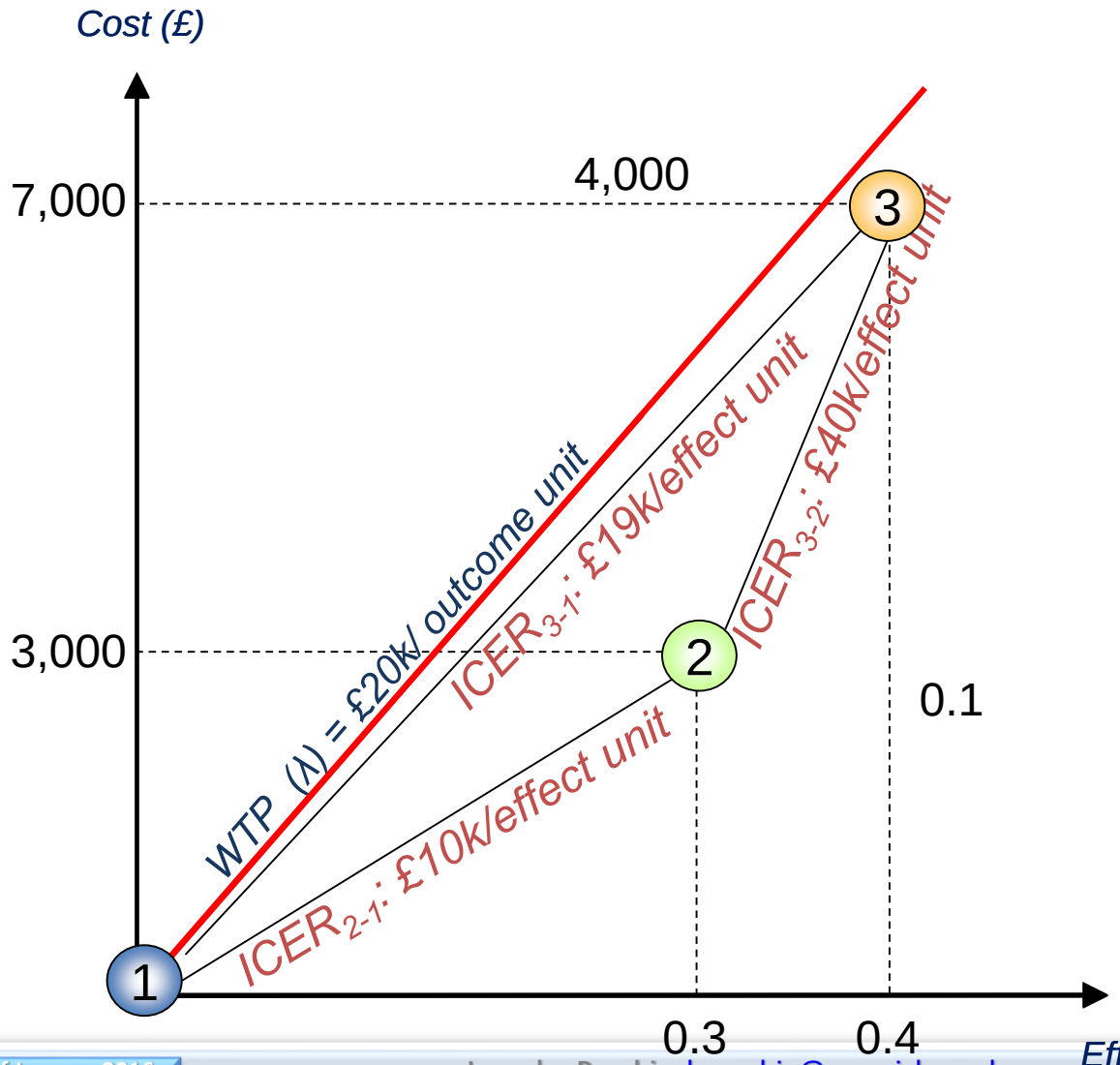


HTA
standard methods



- *Identify all feasible treatment options for a given patient group*
- *Estimate the costs and health effects of each and plot on graph*

HTA
standard methods



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		COSTS & CONSEQUENCES?		
		NO		YES
2 OR MORE ALTERNATIVES?	NO	PARTIAL ASSESSMENT (ONLY CONSEQUENCES) DESCRIBE RESULTS (outcome)	PARTIAL ASSESSMENT (ONLY COSTS) DESCRIBE THE COSTS OF THE PROBLEM (input)	PARTIAL ASSESSMENT (NO BENCHMARK) ANALYSIS COST-CONSEQUENCES (input-outcomes)
	YES	PARTIAL ASSESSMENT (ONLY CONSEQUENCES) CLINICAL TRIAL (outcomes of 2 or more technologies)	PARTIAL ASSESSMENT (ONLY COSTS) COST ANALYSIS ABC (Activity Based Costing) (input of 2 or more technologies)	VALUTAZIONE COMPLETA COST-EFFICACY COST MINIMIZATION COST-UTILITY COST-BENEFIT (Δoutcomes/ Δinput of 2 or more technologies)

Typologies of complete analyses

Analysis	*Resources (Input)*	*Consequences (outcome)*	*How we measure the outcome?*	*Advantages*	*Limits*
Cost Minim.	£	• 1 result • assumed equally for each alternative	Not needed -ΔC-	• Univocal result • First step for the other analyses	•No effect measured
Cost Eff.	£	• 1 result • 1 technology perform better	Physical units (ages gained, pain) -iCER-	• Can measure univocally clinical results as far as are it is the same for all the technologies	• non heterogeneous effects • efficacy≠effectiveness; • no universal scales can measure the iCER
Cost Util.	£	• >1 results • 1 technology perform better	QALY -iCUR-	• Measure heterogeneous clinical results, by introducing an objective function (i.e. QALY)	• only clinical results • no universal scales to measure the iCUR
Cost Ben.	£	• >1 results not only medical • 1 technology perform better	£ -iCBR-	• Measure heterogeneous results (not only clinical), by converting their impact in £	• difficult to quantify the value of results in £ • less than the 4% of studies

HTA
Typologies of complete analyses

	COST-MINIMIZATION	COST-EFFECTIVENESS	COST-UTILITY	COST-BENEFITS
Costs	•monetary units	•monetary units	•monetary units	•monetary units
Consequences	•equal in both programs	•clinical outcomes	•QALY	•monetary units
Measuring	•differences in costs (ΔC)	•iCER	•iCUR	•iCBR
Advantage	•direct measurement •necessary for the other	•direct measurement •uniform clinical outcomes	•indirect measurements •mixed clinical outcomes •multidimensional analysis	•indirect measurements •mixed outcomes •multidimensional analysis
Limits	•no consequences	•one-dimensional analysis •data table missing in many national health services	•indirect measurement •data table missing in many national health services	•indirect measurement •monetization of value of life •ethical limits

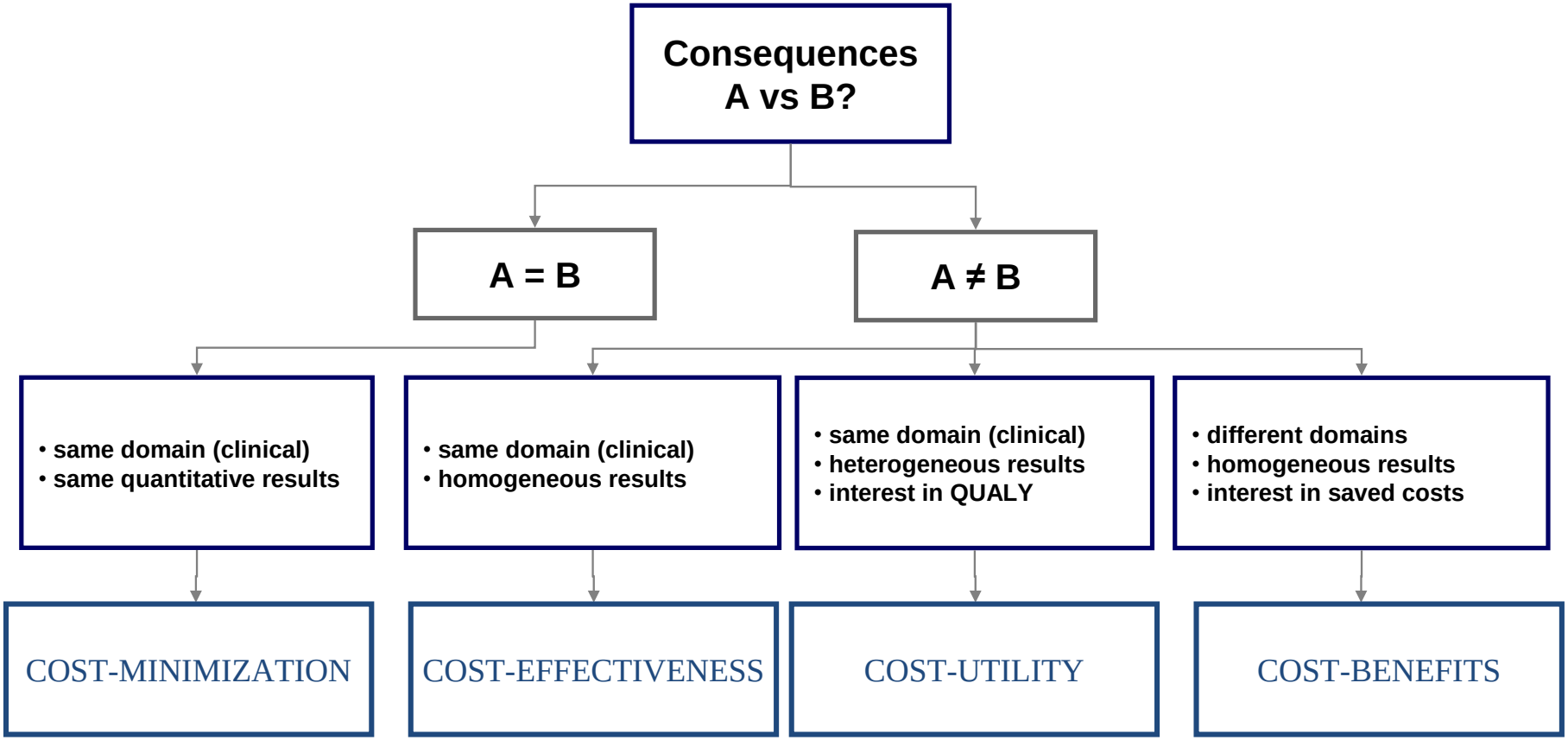
HTA
Quality of Life

- Five attributes (5 dimensions):
  - Mobility
  - Self-care
  - Independency
  - Pain
  - Anxiety depression
- 3 level for each attribute
  - No problem (0)
  - Some problems (1)
  - Significant problems (2)

243 possibile states of health (3^5)
+ 1 for uncontious
+ 1 for death
(total of 245 possible health statuses)

- This tool is standardise by a no-profit group: http://www.euroqol.org/
- Profiles of EuroQol exist for pathology, age, gender…

HTA
How to chose the analysis?



HTA

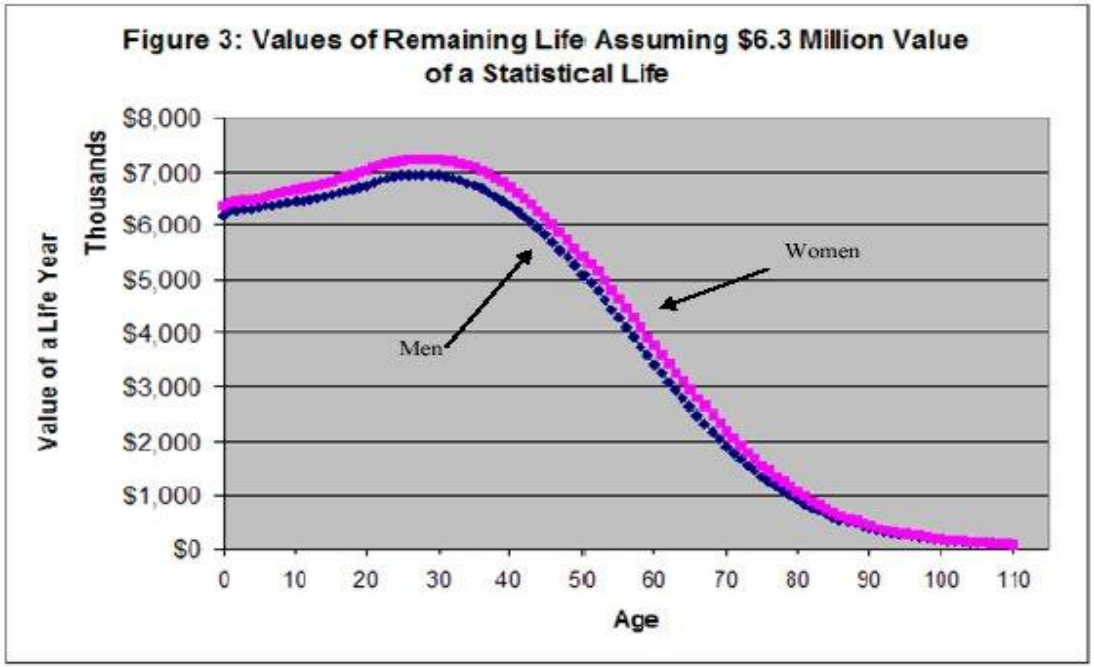
When the incremental analysis is needed?

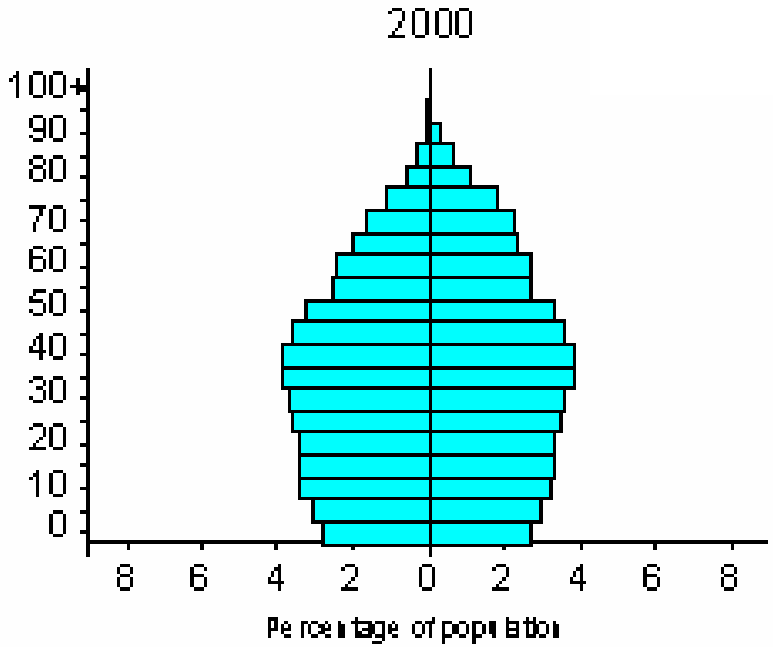
Costs	Consequences	Result
$C_A \geq C_B$	$X_A < X_B$	DOMINANCE. A is more expensive and less effective/utile than B. B continues to be the standard.
$C_A \leq C_B$	$X_A > X_B$	A IS COST-SAVING. A is less expensive and more effective/utile than B. The new technology A is introduced gradually in the NHS.
$C_A \geq C_B$	$X_A > X_B$	INCREMENTAL ANALYST IS REQUIRED. A is more expensive and more effective/utile than B. The new technology A may be introduced gradually in the NHS if the cost for unit of effectiveness/utility is less than the last one introduced into the NHS for the same problem: $iRCX = \frac{C_A - C_B}{X_A - X_B}$ $\quad X = \begin{cases} E \\ U \\ B \end{cases}$

Incremental Ratio in £

Can we convert (quality of) life in £ ?

Value of Life (VoL)





Valore of a QALY (VoQ) = VoL/max(Qaly)

If (RICX > VoQ) => A is accepted

Incremental Ratio in £

Can we convert (quality of) life in £ ?

Table 2. Cost per QALY of healthcare interventions (adapted from references 2–4)

Intervention	£/QALY at 1990 prices
Cholesterol testing and diet therapy (all adults aged 40–69)	220
Neurosurgical intervention for head injury	240
GP advice to stop smoking	270
Neurosurgical intervention for subarachnoid haemorrhage	490
Antihypertensive treatment to prevent stroke (ages 45–64)	940
Pacemaker implantation	1,100
Hip replacement	1,180
Valve replacement for aortic stenosis	1,410
Cholesterol testing and treatment (all adults aged 40–69)	1,480
Docetaxel (as opposed to paclitaxel) in treatment of recurrent metastatic breast cancer	1,890*
CABG (left main-vessel disease, severe angina)	2,090
Kidney transplantation	4,710
Breast cancer screening	5,780
Heart transplantation	7,840
Cholesterol testing and treatment incrementally (all adults aged 25–39)	14,150
Home haemodialysis	17,260
CABG (one-vessel disease, moderate angina)	18,830
Hospital haemodialysis	21,970
Erythropoietin treatment for anaemia in dialysis patients (assuming 10% reduction in mortality)	54,380
Addition of interferon-α2b to conventional treatment in newly diagnosed multiple myeloma	55,060[5]
Neurosurgical intervention for malignant intracranial tumours	107,780
Erythropoietin treatment for anaemia in dialysis patients (assuming no increase in survival)	126,290

HTA of Medical Devices

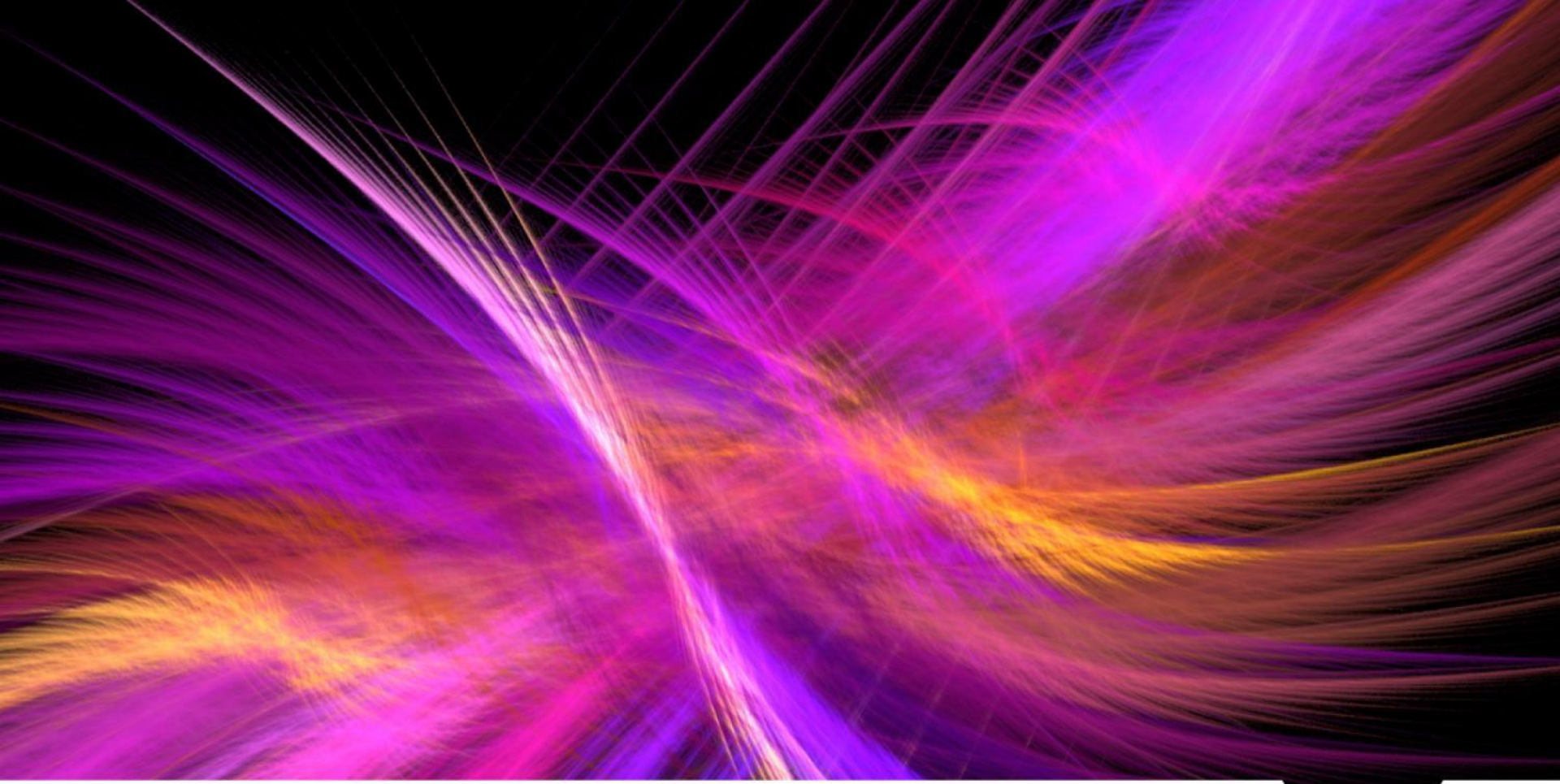
Medical devices vs Drugs

Devices	VS	Drug

…for MD, HTA should assess the whole process, not only the procurement and many more dimensions than efficacy, safety and costs.

(MCDA?)

L Pecchia, MP Craven, "*Early stage Health Technology Assessment (HTA) of biomedical devices. The MATCH experience*". World Congress on Medical Physics and Biomedical 2012, 26-31 May 2012, Beijing, China.



HTA of MD

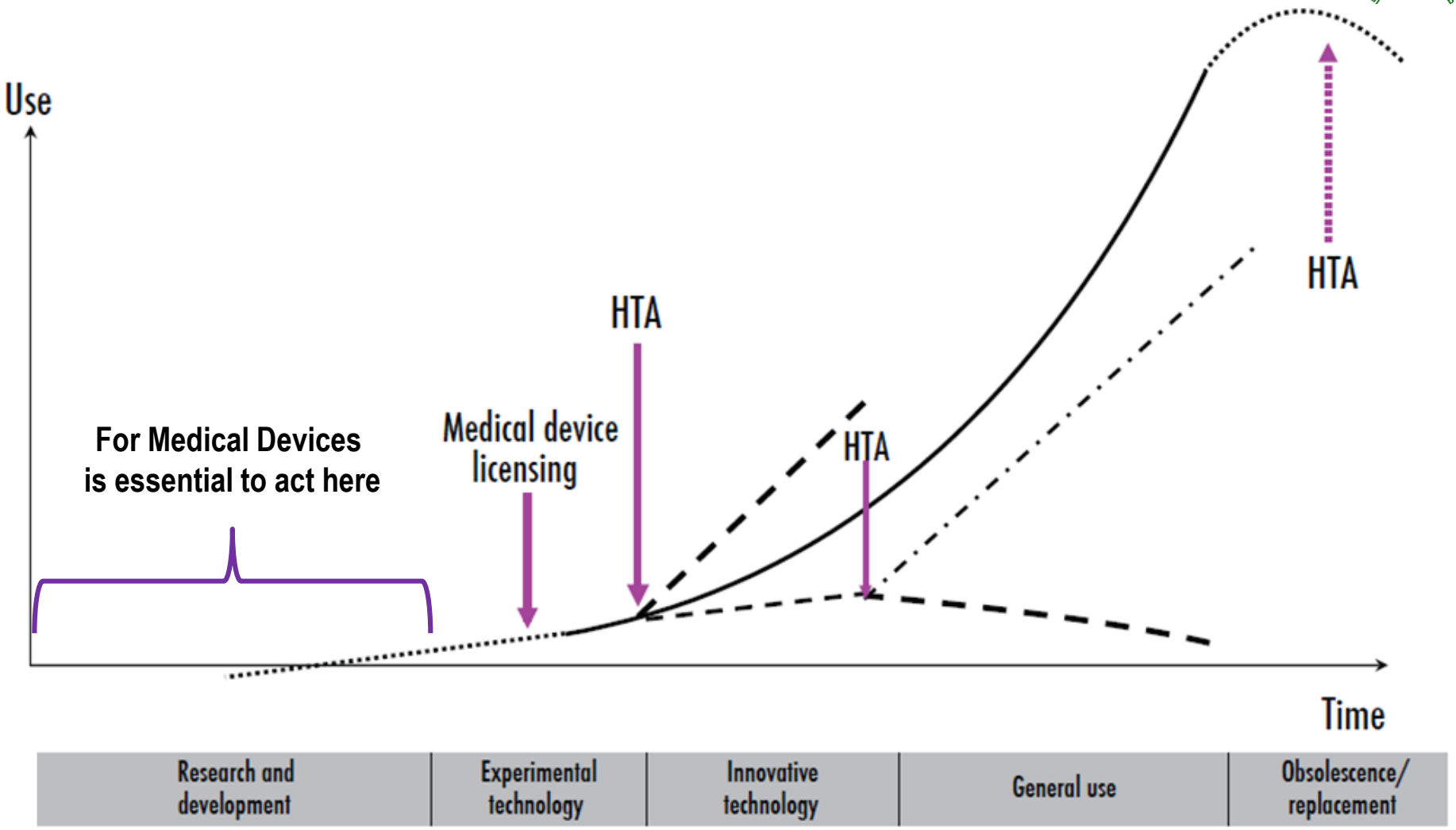
WARWICK

Dr Leandro Pecchia – 12/04/2017
Roma

Health Technology Assessment (HTA)

- *Sfide ~~in Europa~~ nel Mondo:*
  - *Focus: shift dal farmaco al dispositivo medico.*
    - *Metodologie*
    - *Risorse umane (e.g. NICE, CADHT)*
    - *R&D: barriera o guida?*
    - *Training*
    - *Contenimento spesa*
    - *Up-take*

HTA during design



*WHO web site (last access 15.09.2012): http://www.who.int/medical_devices/assessment/en/

FDA approach

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

THE CHANGING FACE OF CLINICAL TRIALS

Jeffrey M. Drazen, M.D., David P. Harrington, Ph.D., John J.V. McMurray, M.D., James H. Ware, Ph.D., and Janet Woodcock, M.D., *Editors*

An FDA Viewpoint on Unique Considerations for Medical-Device Clinical Trials

Owen Faris, Ph.D., and Jeffrey Shuren, M.D., J.D.

1350

N ENGL J MED 376;14 NEJM.ORG APRIL 6, 2017

FDA approach

SUMMARY OF SAFETY AND EFFECTIVENESS DATA (SSED)

I. GENERAL INFORMATION

Device Generic Name:	Implantable Pacemaker System
System Trade Name:	Revo MRI™ SureScan™ Pacing System
Applicant's Name and Address:	Medtronic, Inc. Cardiac Rhythm Disease Management 8200 Coral Sea Street Mounds View, MN 55112
Date of Panel Recommendation:	March 19, 2010
Premarket Approval Application (PMA) Number:	P090013
Date of FDA notice of approval:	February 8, 2011

Medtronic Revo MRI pacemaker system: approved in 2011 as the first pacemaker indicated to allow patients implanted with the device to undergo magnetic resonance imaging (MRI)
(75% of implanted patients can expect to have a clinical indication for MRI over the lifetime of their device)

*FDI report: https://www.accessdata.fda.gov/cdrh_docs/pdf9/P090013b.pdf

FDA approach

MR safe		The device or implant is completely nonmagnetic, nonelectrically conductive, and nonradiofrequency reactive, therefore eliminating all the primary potential risks during MRI scanning
MR conditional		The device or implant may contain magnetic, electrically conductive, or radiofrequency-reactive components that are safe for operation in proximity to the MRI, provided the conditions for safe operation are defined and observed (both for the MR scanner and the device itself)
MR unsafe		Objects that are significantly ferromagnetic and pose a clear and direct threat to persons and equipment within the magnet room

HTA of MD: emerging methods

Re-engineered regulation of medical devices. What role for *in silico* trials?

C. Federici[1], O. Ciani[1,2], L. Pecchia[3] and R. Tarricone[1]

[1]Centre for Research on Health and Social Care Management (CERGAS) – Bocconi University
[2] Institute of Health Research, University of Exeter Medical School
[3] University of Warwick

Patient in HTA

- *Round table @WHO III Global Forum on Medical Devices, Ginevra (May 2017)*
- *Invite Talck @AfricaHealth2017, Johannesburg, S. Africa (June 2017)*
- *Invited Session @EMBEC2017, Tampere, Finlandia (June 2017)*
- *Pannel Session @HTAi2017, Roma (June 2017)*

Tank you for your attention!

Applied Biomedical Signal Processing and Intelligent eHealth (ABSPIE) Lab

PhD Students

Rossana Castaldo
Signal processsing/ Machine learning
(2014)

Luiss Montesinos
Balance/falls
(2015)

Tim Siu Wang
Behavioural modelling
(2016)

Michaela Porumb
Signal processing/ data analytics
(2017)

Marina Gilic
HTA in LMIC
(2017)

Carlo Federici
eHTA
(2017)

2015/2016 Visiting Students/Researchers/Academics

Dr Paolo Melillo
Second University of Naples

Dr Giovanna Sannino
Italian CNR

Mariangela Caserta
Federico II

Claudio Guerra
Univ. of Parma

Davide Piaggio
Politecnico Torino

Hummel
Phylips

Tarricone
Bocconi

Polisena
CADHT

Clark
NICE

Ciani
Bocconi

Fico
Madrid

Velazquets
WHO

Böhler
European Commission

Leandro Pecchia. l.pecchia@warwick.ac.uk

IFMBE HTAD Training

Dr Leandro Pecchia

University of Warwick

IFMBE HTA Division Chairman

WARWICK

IFMBE HTA Division

International Federation for Medical and Biological Engineering

IFMBE

HTAD

IFMBE HTAD resources on HTA

WARWICK

IFMBE HTA Division

- **IFMBE HTAD:**
  - http://htad.ifmbe.org/
- **IFMBE HTAD eLearning:**
  - http://htad.ifmbe.org/elearning/

HTAD

IFMBE HTAD resources on HTA

WARWICK

IFMBE HTA Division

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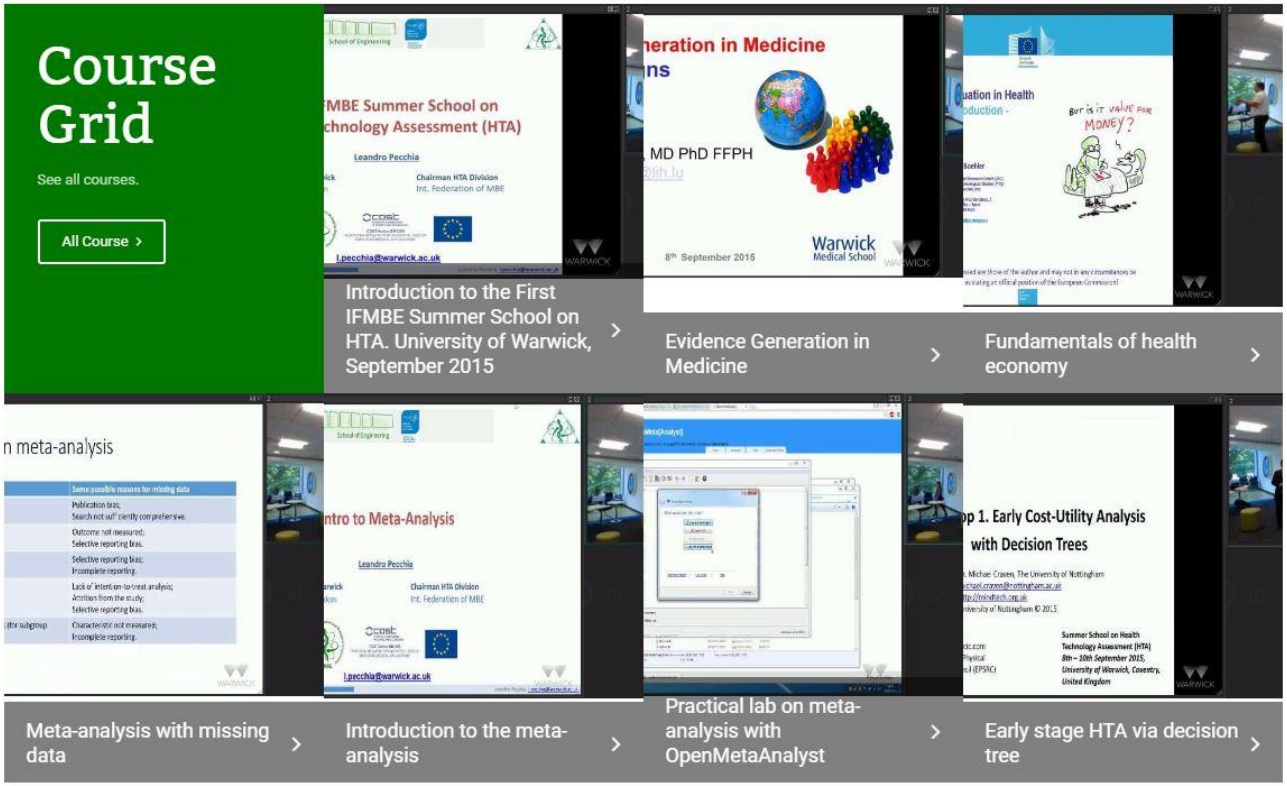
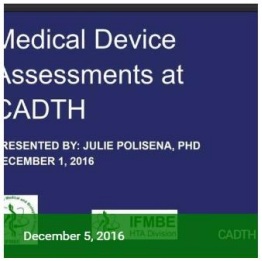
eLearning Contact Us

eLearning HOME



HTAD

IFMBE HTAD resources on HTA



Medical Device Assessments at CADTH

Dr Polisena presented the procedure currently adopted at CADTH for medical devices. Julie Polisena, Canadian Agency for Drugs and Technologies in Health, Canada. IFMBE HTAD Meeting, University of Warwick, 25th-28th November 2016.

Details ›

AHP in user need elicitation for HTA

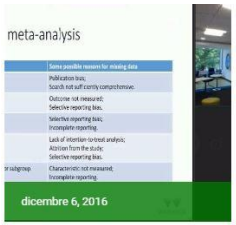
Dr Pecchia report on his expertise in using MCDA to gather user experience, requirements and needs in a HTA or during design. Invited talk at the ISAHP2011. Dr Leandro Pecchia, University of Warwick, UK IFMBE HTAD Chairman. ISAHP2016, London, 4-7 August 2016.

The use of multi-criteria decision analysis in early health technology assessment

Dr Hummel presents her experience on how to use MCDA for early stage HTA. Invited talk at the ISAHP2011. Dr Marjan Hummel, Philips Research. ISAHP2016, London, 4-7 August 2016

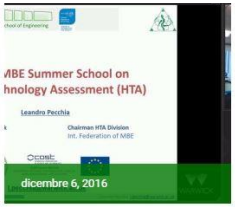
Multicriteria Decision Analysis (MCDA) for early HTA

Dr Hummel introduces how to use MCDA for the assessment of medical devices during design and development. Dr Marjan Hummel, Philips Research. First IFMBE Summer School on HTA, University of Warwick, 8-10 September 2015.



Meta-analysis with missing data

Dr Paolo Melillo, covered some advance topics relevant for meta-analysis, why it is needed and what are main advantages and limits. Dr Paolo Melillo, Second University of Naples, Naples, Italy. First IFMBE Summer School on HTA, University of Warwick, 8-10 September 2015.



Introduction to the First IFMBE Summer School on HTA. University of Warwick, September 2015

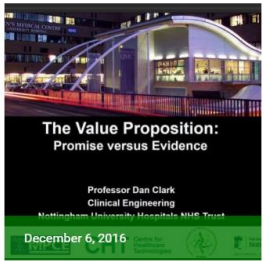
This talk introduced the IFMBE Summer School on HTA. After welcoming the attendees, Dr Pecchia (IFMBE HTAD Chairmen) introduced the aims of the school and presented the panel of organizers and

Fundamentals of health economy

Dr Boehler introduces the main concepts of health economy that are fundamentals for HTA. Dr Christian Boehler, European Commission, Joint Research Centre, Seville, Spain. First IFMBE Summer School on HTA, University of Warwick, 8-10 September 2015.

Practical lab on meta-analysis with OpenMetaAnalyst

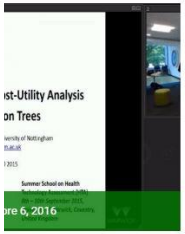
Dr Paolo Melillo, covered some advance topics relevant for meta-analysis, why it is needed and what are main advantages and limits. Dr Paolo Melillo, Second University of Naples, Naples, Italy. First IFMBE Summer School on HTA, University of Warwick, 8-10 September 2015.



The Value Proposition: promise versus Evidence

The Value Proposition: promise versus Evidence. Dan CLARK, Head of Clinical Engineering, Nottingham University Hospital NHS Trust, United Kingdom. IFMBE HTAD Meeting, University of Warwick, 25th-28th November 2016.

Details ›



Early stage HTA via decision tree

Dr Craven introduces the use of decision tree for premarket and early stage HTA, with particular focus on medical devices. Dr Michael Craven Senior Research Fellow, University of Nottingham, UK. First IFMBE Summer School on HTA, University of Warwick, 8-10 September 2015.

Details ›

Introduction to the meta-analysis

Dr Leandro Pecchia, introduces the aims and the goals of a meta-analysis, why it is needed and what are main advantages and limits. Dr Leandro Pecchia, University of Warwick, UK IFMBE HTAD Chairman. First IFMBE Summer School on HTA, University of Warwick, 8-10 September 2015.

Details ›

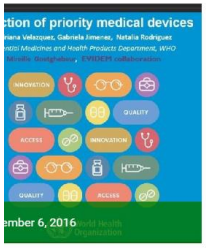
Evidence Generation in Medicine

Prof Saverio Stranges, Chair of Epidemiology and Statistic at the Schulich School of Medicine and Dentistry, introduced the attendees to the concept of evidence and covered systematically, the different study designs and how each is used to cover reach the desired level of evidence in medicine. Prof Saverio Stranges, Chair of Epidemiology and Statistic, Schulich […]

The role of BME to develop appropriate technologies for low-middle income countries and settings

Adriana Velazquez gives a talk on what to consider to designing and developing medical devices for low-middle income countries and settings. Adriana Velazquez, Senior Advisor and Focal Point on Medical Devices, World Health Organization. IFMBE HTAD Meeting, University of Warwick, 25th-28th November 2016.

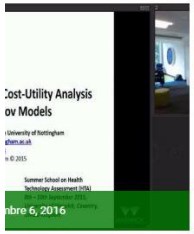
Details ›



Selection of priority Medical Devices

After introducing the WHO leadership priorities, Adriana Velazquez explained how WHO used MCDA to priorities medical devices for cancer management for the book to be published in 2017. Adriana Velazquez, Senior Advisor and Focal Point on Medical Devices, World Health Organization. ISAHP2016, London, 4-7 August 2016.

Details ›



Early stage HTA via Markov Models

Dr Craven introduces the use of Markov Models for premarket and early stage HTA, with particular focus on medical devices. Dr Michael Craven Senior Research Fellow, University of Nottingham, UK. First IFMBE Summer School on HTA, University of Warwick, 8-10 September 2015.

Details ›