Semantic Interoperability

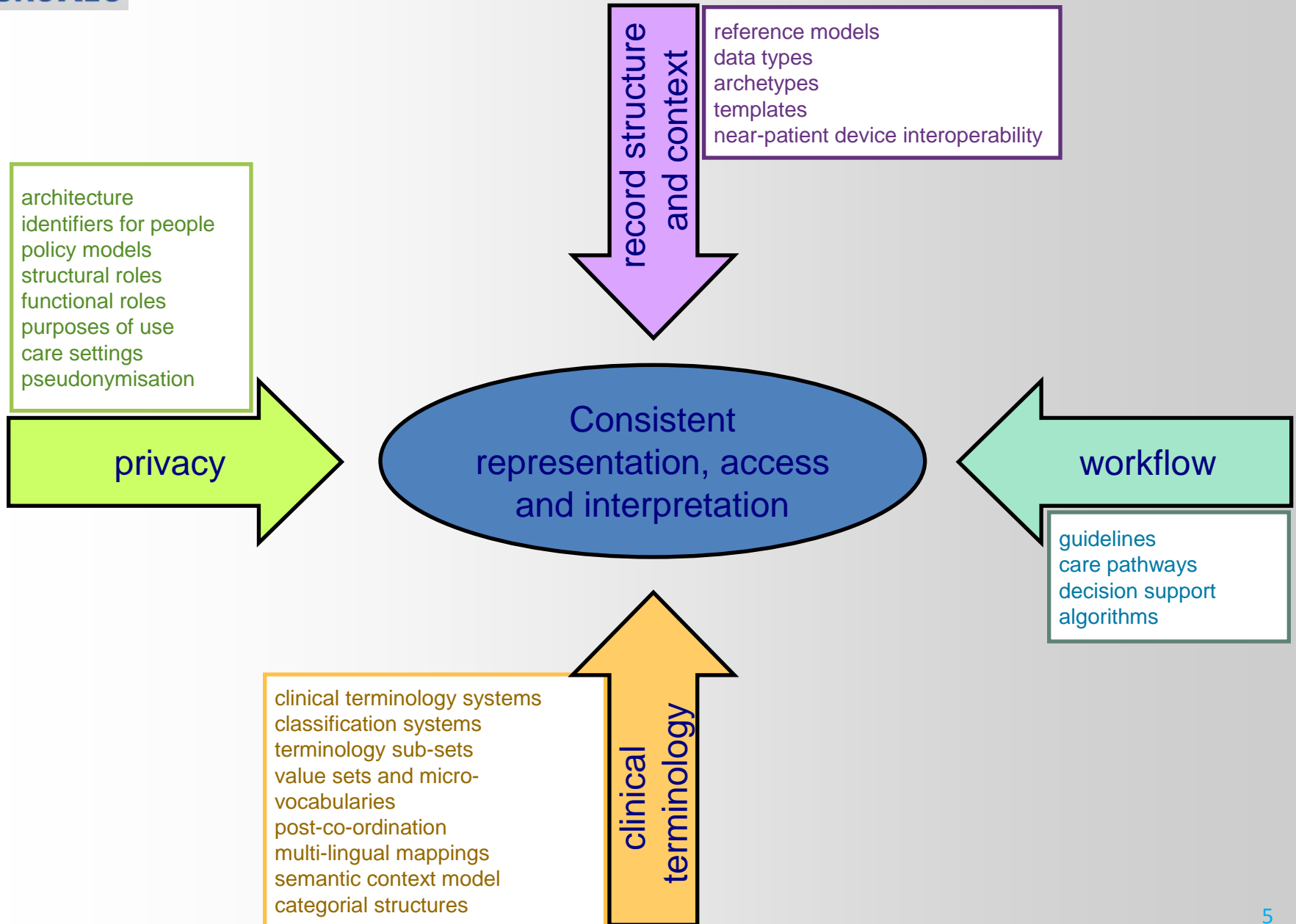## Prof. Dr. Dipak Kalra
Prof Dr. Georges De Moor

Information flows needing semantic interoperability
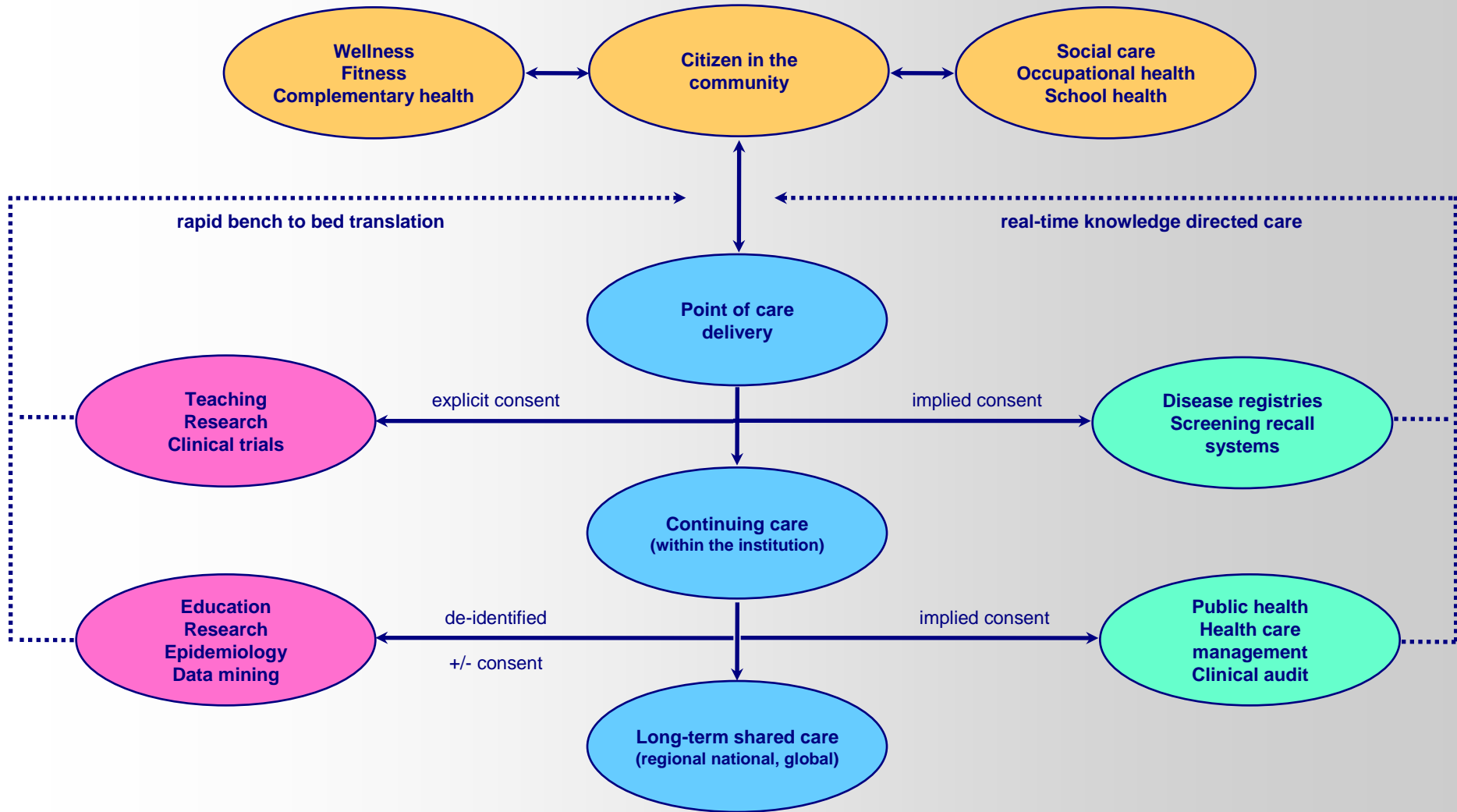
Essential interoperability needs

- Guideline and decision support systems, notification and alerting components, and analytic tools need to process <u>integrated health data</u> drawn from <u>multiple EHR systems</u> in a <u>consistent manner</u>

- Intelligent personal health guidelines <u>interoperating with PHRs and EHRs</u> need to support the centring of care on patients

- Health services, insurers and public health bodies need <u>fine grained activity and outcome data</u> to inform service planning, commissioning and prevention/wellness programmes

- New generation personalised medicine, underpinned by 'omics sciences and translational research such as the VPH, needs to <u>integrate EHRs with data from research</u>: fundamental biomedical science, clinical and population health research, and clinical trials

Resources needed for rich semantic interoperability

record structure and context
- reference models
- data types
- archetypes
- templates
- near-patient device interoperability

privacy
- architecture
- identifiers for people
- policy models
- structural roles
- functional roles
- purposes of use
- care settings
- pseudonymisation

Consistent representation, access and interpretation

workflow
- guidelines
- care pathways
- decision support algorithms

clinical terminology
- clinical terminology systems
- classification systems
- terminology sub-sets
- value sets and micro-vocabularies
- post-co-ordination
- multi-lingual mappings
- semantic context model
- categorial structures

Example: suspected lung cancer
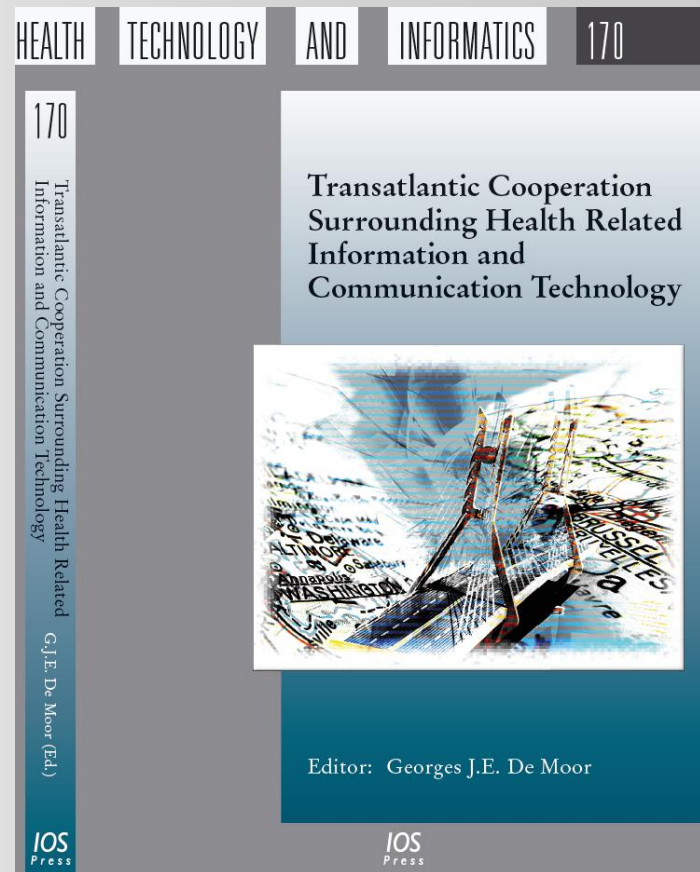
A diagnosis of COPD, documented as an EHR entry today might be:

- a new diagnosis confirmed today as a result of a lung function tests
- a diagnosis suspected today on the basis of a possible history
- one of a number of differential diagnoses being considered
- the query diagnosis written on an order for lung function tests
- a diagnosis excluded today on the basis of the tests
- documented today as the probable cause of a new complication
- the indication for a flu vaccine
- the condition from which the patient's mother suffers
- a risk because of family history or lifestyle
- a worry the patient has
- the coded diagnosis because it has a higher reimbursement than asthma
- a data entry error that has been corrected

- Foreword by Herman Van Rompuy- E.Council President

- Memorandum of Understanding signed by:
- Neelie Kroes - E.Commission Vice-President
- Kathleen Sebelius – Secretary of HHS

- Policy briefs for Transatlantic cooperation
- The current status of **Certification of Electronic Records** in the US and Europe
- **Semantic interoperabilityModelling and simulation** of human physiology and diseases with a focus on the Virtual Physiological HumanPolicy Needs and Options for a Common Approach towards **Measuring Adoption, Usage and Benefits of eHealth**eHealth **Informatics Workforce** challenges

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Transatlantic Cooperation Surrounding Health Related Information and Communication Technology

Transatlantic Cooperation Surrounding Health Related Information and Communication Technology

G.J.E. De Moor (Ed.)

Editor: Georges J.E. De Moor

IOS Press

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Semantic interoperability recommendations

Nine strategic actions that now need to be championed, as a global mission

1. Establish good practice

2. Scale up semantic resource development

3. Support translations

4. Track key technologies

5. Align and harmonise standardisation efforts

6. Support education

7. Assure quality

8. Design for sustainability

9. Strengthen leadership and governance

- European Commission sponsored Network of Excellence in Semantic Interoperability
  - Dec 2011 to Nov 2014
  - 3m Euro
  - 17 Partners
  - > 40 internationally recognised experts

SemanticHealthNet concept and objectives

- Leverage a clinically-driven work-plan
  - heart failure, exemplifying chronic disease management, evidence based care and shared care
  - cardiovascular prevention, exemplifying public health and national / global strategies

- Bring together the globally best of breed semantic resource producers including commitment from the top SDOs
  - to develop harmonised resources meeting the clinical needs, adapting their standards as necessary

- Engage stakeholders: patients, clinicians, industry, ministries, insurers, research organisations, on priorities, scope, governance, adoption

- Establish a scalable, sustainable, well-governed European Virtual Organisation for semantic interoperability

SHNet sustainability activities

- Work with the clinical, public health and patient stakeholders to define a formal process for the **governance** of semantic interoperability resources

- Design an overall **infostructure** (a virtual platform and services) that can **publish or reference** resource "bundles" and manage their maintenance

- Specify how EHR systems, public health systems, CRO systems etc. should ensure consistent and **verifiable adoption** of semantic interoperability resources

- Develop a **business plan for certifying** semantically interoperable systems

- Liaise with industry, professional bodies, ministries, insurers, SDOs on **business drivers and incentives** to foster rapid adoption of semantic interoperability resources and certification of such systems