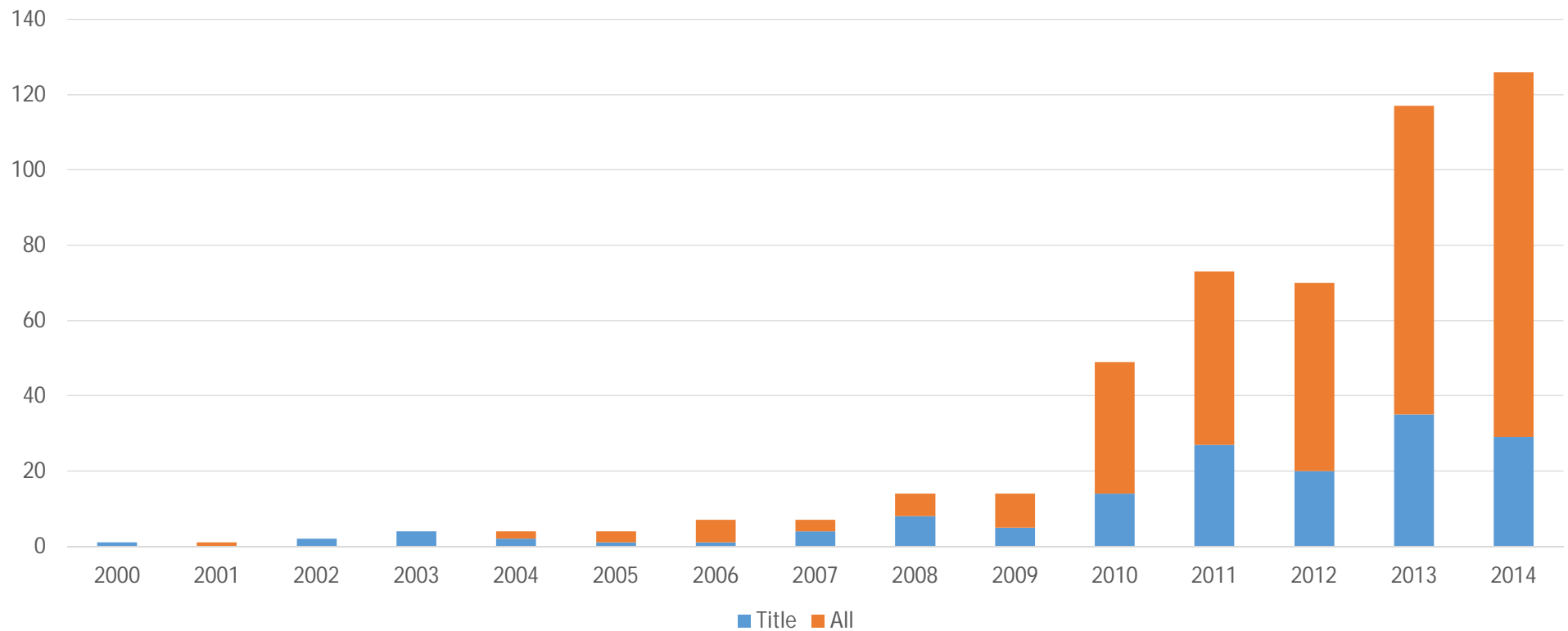


Personalized medicine:  
What it is what it could be?  
A concept analysis

Anssi Auvinen

# 'Personalised medicine' articles in PubMed



# Personalized medicine

- Medicine

- Not (bio)medical research, but medical patient care, clinical work

- Dictionary

- The science or practice of the diagnosis, treatment and prevention of disease (often excludes surgery) [Oxford]
  - the science and art dealing with the maintenance of health and the prevention, alleviation, or cure of disease (Merriam-Webster)
  - the branch of medicine concerned with the nonsurgical treatment of disease (M-W)
- A drug or other preparation for the treatment or prevention of disease [Oxford]
  - a substance or preparation used in treating disease [Merriam-Webster]
- Less pertinent: a spell, charm or fetish believed to have healing, protective or other power (among North American Indians and some other peoples)

# Personalized

- Literally 'made personal', directed or adjusted to a specific individual
- Dictionary: adjective
  - Concerned with or emphasizing personal rather than general or abstract matters
  - Concerning a particular person, his/her private life and personality
- To personalize:
  - To change or design something for a particular person
  - To become concerned with or emphasize individual persons or personal feelings
  - Less pertinent: to represent as a person, or as having human attributes (to personify); To make a thing identifiable to a particular person, esp. marking by initials (customize)

# Personalised

- Person: Psychological dimension, self, identity, human being, subject
- Agency: Acting, behaviour and importantly believing, reasoning, rational thinking leading to behavior, self-determination
- Mental processes: Understanding, consciousness, awareness, reflection, intentions and motivations (e.g. fears and desires)
- Processing meanings: Constructing interpretations, narrative view of self (self-biography), life history, 'making of self'
- Dynamic nature – choices, reactions, adaptation, changes
- Relationships to others, interactions, socio-cultural context, membership in groups and communities
- Experiential, subjective, integrative nature
- Not bodily, physiological, biological
- Personality: Character
  - Unique combination of traits and features
  - Personality type: Temperament, constant features (five dimensions)

- Individualized: Focus on individual (single person)
  - Do something so that it fits each person's need
    - Adapt to the needs or circumstances of an individual
  - Particularize
  - Synonyms: singular, unique, private
  - Unique features, distinctive character, suitable for a specific person
    - Being different in some way
  - Not collective, shared, considered separately, not part of a group

# What is the current usage of 'personalized medicine'?

- Tailoring treatment to a specific case of disease
- Particularly using molecular level data to characterize disease, and target altered function (molecular profiling)
- Mechanistic analysis of pathogenetic process leading to 'rational targeting of therapy'
- Use of genomic screening, epigenetics, -omics
- Use of antibodies developed against specific
- Initially: targeting drugs for genetic profile (pharmacogenomics)

# Academy of Finland: Personalised Health – From genes to society

- The Academy of Finland's research programme Personalised Health explores the application of genome data and other personal health information to maintain and promote an individual's health and to prevent and treat diseases
- In addition, the programme will look into the medical, treatment-related, technological, judicial, ethical, social and societal issues and impacts with regard to data generation, collection, storage and use
- The tentative themes of the research programme are:
  - to produce data and tools to understand individual characteristics at molecular level, and to use these data and tools for health promotion
  - to study and analyse the judicial, social and ethical issues related to the use, collecting and integrating of personal health data
  - to promote the use of IT, data management, biocomputing and bioinformatics in meeting the needs of personalised medicine



# Academy: Personalised Medicine

- The research programme is centred on the concept of *personalised medicine*, a new, comprehensive line of health research that is changing healthcare all over the world
- Personalised medicine involves a completely new approach to understanding, categorising, diagnosing, preventing and treating diseases and promoting good health
- This approach is based on the definition of an individual's genome, its function, cellular biochemistry and physiology, as well as on the utilisation of this information in individual medical treatment, disease prevention and nutritional profiling
- Personalised medicine has revolutionised medicine and health in particular thanks to developments in genetic engineering and analytical and IT-based biomolecular science
- An in-depth knowledge of individual health factors can help in targeting drugs and treatments correctly to those that need them
- In a broader perspective, personalised medicine also helps in charting and identifying a person's lifestyle and environmental factors in order to use these in individually targeting health and nutritional guidelines and, at the same time, promoting physical activity and personal responsibility for health management
- In addition, knowledge of personal health factors can give rise to excellent new tools and innovations in the area of pharmaceutical technology.

# Further excerpts

- Individually tailored technology enables a much closer monitoring of patients
- Individually tailored technology enables a much closer monitoring of patients
- Development of computer-aided adaptation of conclusions and recommendations, a process that combines health and illness data with molecular data, and secure long-term data storage with reliable rights management
- Active personal involvement by an individual in their treatment
- Emphasise the patient's autonomy and participation in planning treatment
- The position of patients and clients, understanding the special characteristics of genetic information, and various ethical, moral, judicial and economic dimensions

# Objectives of the research programme

- Implemented in the best interests of basic research and to help individuals and society benefit from using genetic information and genetic health data
- Studies that move from basic research to research targeting individuals, the healthcare system, business companies or society at large while reformulating existing operating models and concepts

# Personalized medicine: What it is?

Constitutional traits: Polymorphisms, metabolic variants etc.

## Clinical

- Stage

## Pathological

- Grade
- Proliferation

## Genetic

- Aberration profile

## Molecular

- Gene expression, RNA, proteomics
- Epigenetics

Tumor heterogeneity

# EBM and scientific medicine

- Objective, quantitative
  - Abstract knowledge, factual propositions
- Observations: Extensive data, large groups of patients, average effects
- Assuming uniform and universal applicability
  - Inclusion/exclusion criteria of trials as main limitation
  - Quantitative: treatment outcomes compressed into deaths, information extracted as counts, least common denominator
- Scientific medicine minimizes the personal aspect of medicine
- EBM is necessary, but not sufficient for good medical care
  - Scientific understanding of disease does not detach or surpass personal experience of it

# Personalised medicine

- A person has a sense of self, a notion of the future and the past, can hold values and make choices
- A person possesses his own point of view on things
- Creates for himself a life-plan, makes choices,
- A person interacts with others, can address a wide range of issues, and constitutes own interpretations
- What is medicine was centered around such concepts?

Clinical reality: Patient-physician encounter → research question

Compression, reduction, objectivisation

Clinical trial,  
medical research

Application

Clinical reality: Patient-physician encounter

# What it could be?

- Humanisation of medicine
- Emphasis on person as unique individual
- Experiences, interpretations, → meaning
- Life situation, conditions → context
- Health status, comorbidities, medical history → framing
- Preferences in setting treatment goals, choosing
- N-of-1 trial
- Complementing EBM that focuses on probabilistic reasoning, comparative effectiveness research, 'scientific medicine'



# Personal aspects of medical practice

- Medical expertise beyond research evidence
  - Judgement
  - Experience
  - Practical wisdom
  - Tacit knowledge
  - Sense of proportion
  - Perspective
- Interpersonal and communication skills
  - Knowing the patient: Context, information needs, communication styles,
  - Interpreting the patient's views, priorities
  - Presenting the therapeutic options
  - Communicating the potential gains and risks
  - Communicating the uncertainty

# Which way should we go?

- Disease-centered
- Molecular biology
- Mechanistic, basic science
- Disease heterogeneity
- No two diseases are the same
- Patient-centered
- Humanities
- Hermeneutics
- Patient heterogeneity
- No two persons are the same