



Productivity of pharmaceuticals in society: Disease-specific research approach

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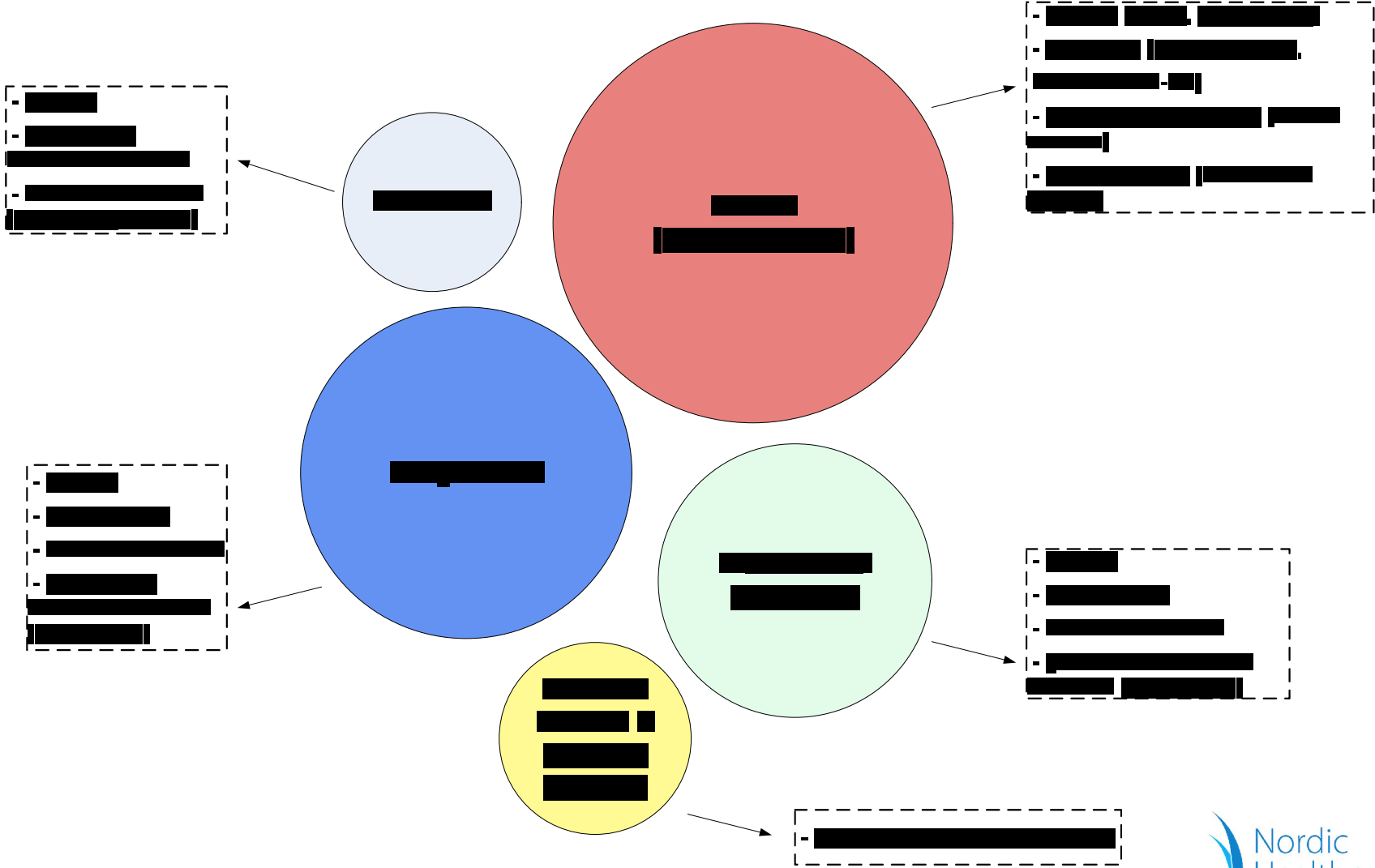
2. Types of Studies

GENERAL

- ❑ Nordic Healthcare Group has pioneered a new approach to applying industrial management methodologies in determining the **total costs of a disease for society**.
- ❑ Slightly **different from conventional health economics**: copes with uncertainty and incomplete data, not as accurate, decision-making oriented, studying broad issues possible
- ❑ The approach **combines data** on drug expenditure, reimbursements, various types of healthcare service provision, pensions and absenteeism.
- ❑ Pharmaceutical industry associations and companies have taken interest in this **time-based approach**.
- ❑ The method is based on **Patient-in-Process** (TM) thinking that maps patient processes and episodes and attributes costs to them.
- ❑ Typically combination of **top-down** and **bottom-up** methodologies
- ❑ Research frontier = **presenteeism, efficacy**

COST TYPES AND STAKEHOLDERS

COSTS



DIFFERENT TYPES OF COSTS

- ❑ Total healthcare costs
 - Hospital treatment of outpatients
 - Medicines
 - Primary health care (inpatient)
 - Surgical operations
 - Hospital care (inpatient)
 - Cost of screening programmes

- ❑ Total direct costs for the society
 - Sickness benefits
 - Disability pensions
 - Total healthcare costs

- ❑ Total costs for the society
 - Indirect costs (Lost productivity)
 - Total direct costs for the society

RESEARCH OBJECTIVES

- ❑ Significant diseases (in terms of public health and public economy)
- ❑ Benefits due to developed medicines and care processes
- ❑ Long-term perspective
- ❑ Total costs of disease for society
 - ❑ direct – medicines, costs of health services, sickness benefits, disability pensions
 - ❑ indirect – lost productivity due to inability to work (absenteeism)
 - ❑ presenteeism and immaterial costs excluded

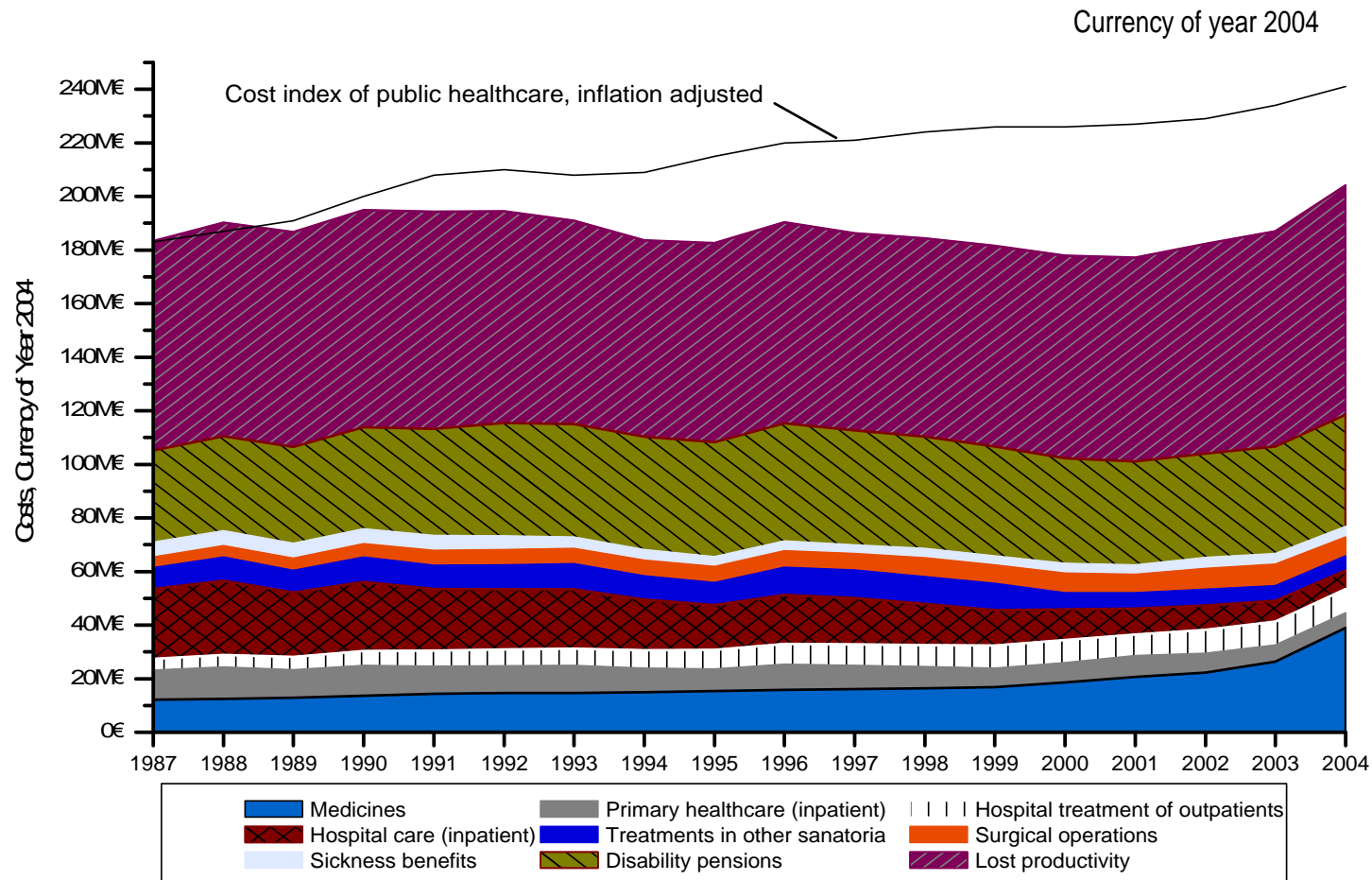
1. Introduction

TYPES OF STUDIES IN INDUSTRIAL PHARMACOECONOMICS

1. Comparisons of treatments and care forms
 - ❑ Typically old vs. new, orthodox vs. unorthodox, conservative vs. operative etc.
2. Price / reimbursement level applications
 - ❑ Typically top down, relatively macroeconomics oriented
3. Applications to national programs and reimbursement schemes
 - ❑ Typically including modelling healthcare work
4. EMEA / FDA / country specific approvals and MAs
 - ❑ Typically comparative
5. Firm-specific R&D-related studies
 - ❑ Typically future oriented, investment appraisal calculus
6. General societal and political discussion
 - ❑ Selection typically judgment-based

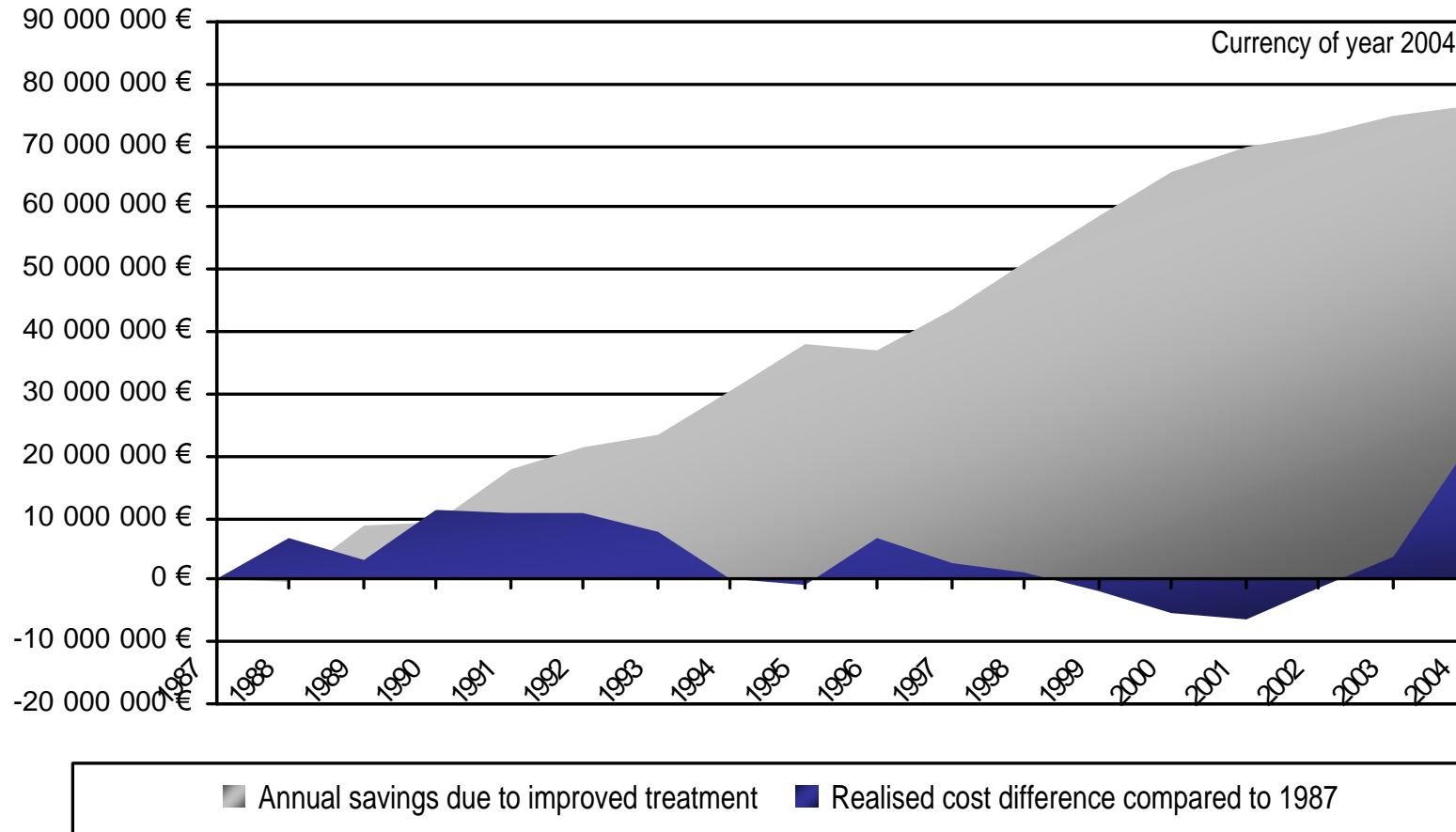
3. Lessons from Case Studies

TOTAL COSTS OF RHEUMATOID ARTHRITIS FOR THE FINNISH SOCIETY



Sources: The National Research and Development Centre for Welfare and Health and its publications, SLD pharmaceutical sales data, The Finnish Bureau of Statistics, The Social Insurance Institution of Finland, The Local Government Pensions Institutions and academic journal articles and expert interviews.

COST DIFFERENCE OF RHEUMATOID ARTHRITIS AND ACHIEVED SAVINGS COMPARED TO YEAR 1987



The grey area in the graph represents achieved savings compared to situation where inpatient hospital care days and work disability would have continued at level that existed in 1987. The blue area shows actual realised cost difference compared to 1987.

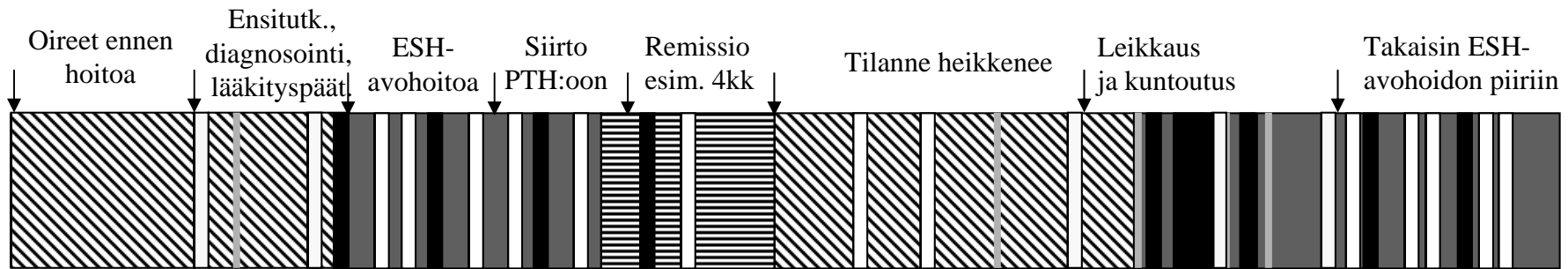
Sources: The National Research and Development Centre for Welfare and Health and its publications, SLD pharmaceutical sales data, The Finnish Bureau of Statistics, The Social Insurance Institution of Finland, The Local Government Pensions Institutions and academic journal articles and expert interviews.

DIRECT COSTS OF RHEUMATOID ARTHRITIS ARE ONLY 1/3 OF THE TOTAL COSTS

- ❑ Care changed from inpatient-oriented to outpatient-oriented**
- ❑ Direct costs only about 1/3 of total costs for society**
- ❑ Costs have remained stable despite general inflation and even faster rising healthcare costs**
- ❑ The change is due to development in care processes and new improved medicines**

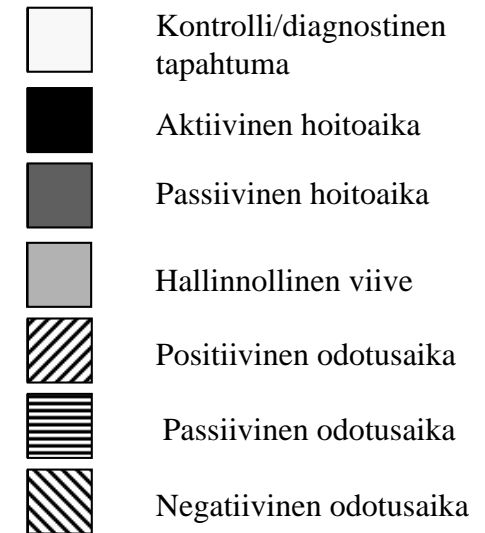
ANNUAL SAVINGS 55 M€ IN FINLAND

- ❑ **Without new medication and treatment methods the annual costs of rheumatoid arthritis would be 55 M€ higher annually**
- ❑ **Changes in sickness benefits, work disability pensions and lost productivity show up with a five-year delay due to slowly progressing and chronic nature of the disease**
- ❑ **Cost-effectiveness of biological drugs cannot be verified yet with top-down approach – the results will be supplemented with a bottom-up study.**
- ❑ **The top-down approach investigates phenomenon at macro level and thus direct conclusion of cause-consequence relations of discovered changes cannot be made**

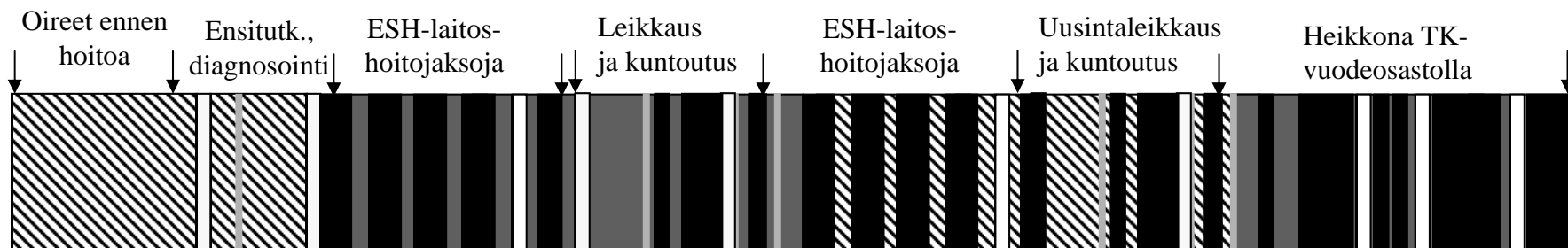


2000-luku, esim. 18 avohoitokäyntiä, 1 leikkaus, 10 vuodehoitopäivää 5 vuoden aikana

1. Hoitoprosessi alkaa mahdollisimman nopeasti avohoidon piirissä suoritettavalla lääkityksellä
2. Potilaat selviävät lääke- ja erikoissairaanhoidon avohoidon piirissä pidempään
3. Hoitotulosten parantumisen myötä laitoshoitajaksot ovat vähentyneet, myöhentyneet ja lyhentyneet
4. Kirurgiset toimenpiteet ovat tyypillisesti kevyempiä, myös kuntoutus keventynyt ja lyhentynyt
5. ESH:sta perusterveydenhuollon avohoidon piiriin siirtyvien potilaiden määrä on lisääntynyt.
6. Tilapäisten taudin remissioiden suhteellinen määrä on kasvanut

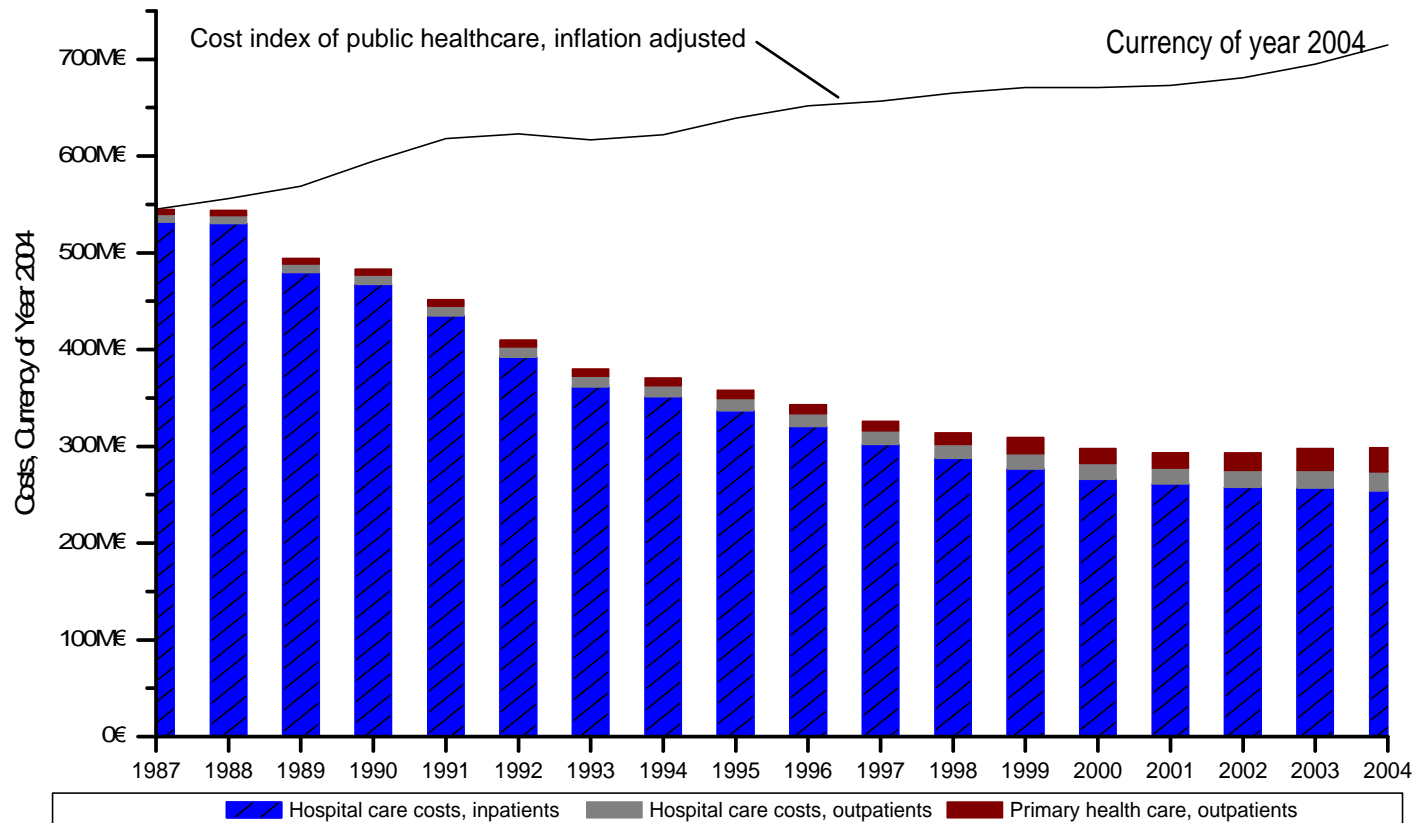


1980-luku



1980-luku, esim. 15 laitoshoitajaksoja, 2 leikkausta, 270 vuodehoitopäivää 5 vuoden aikana

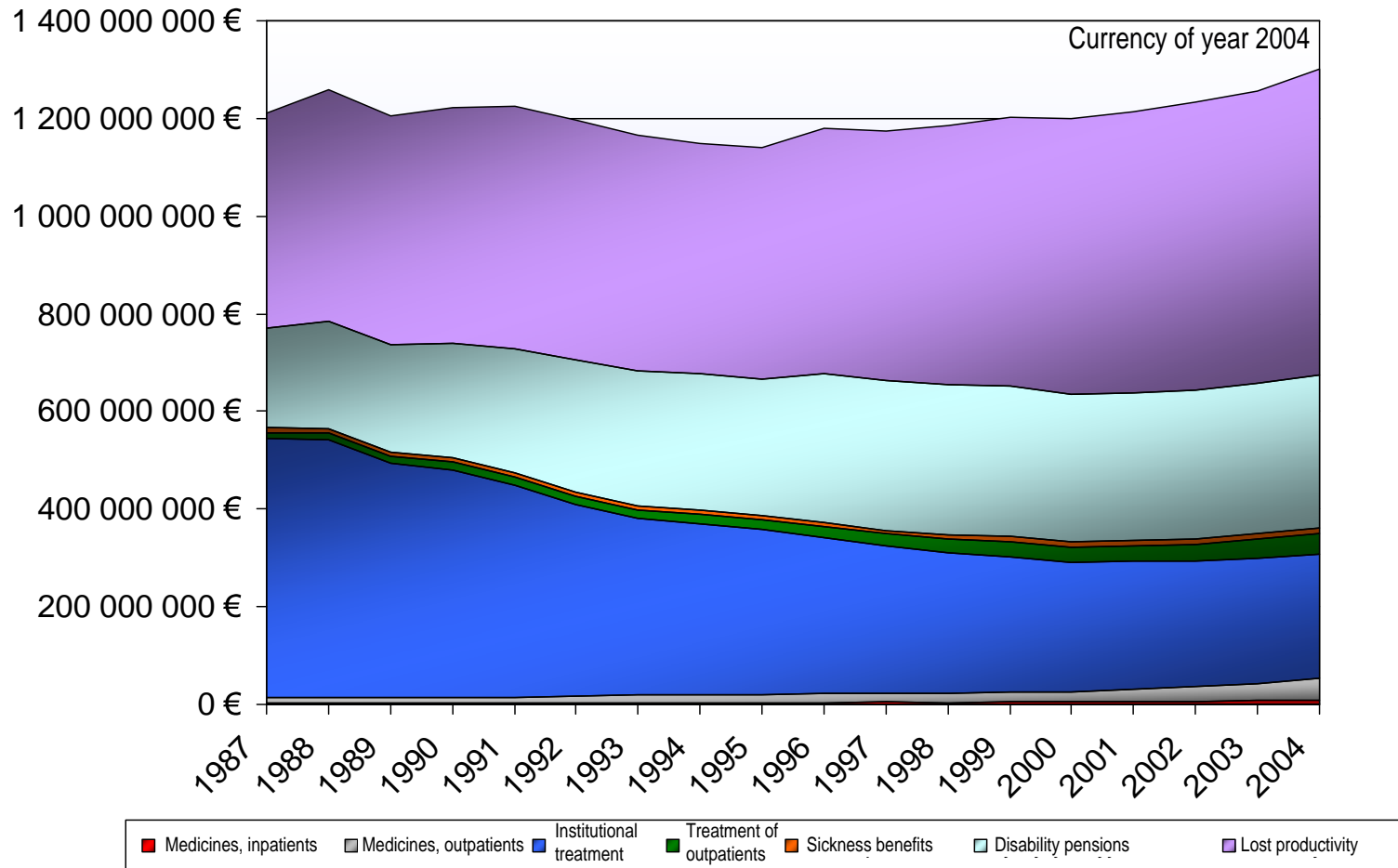
COSTS OF SCHIZOPHRENIA IN HEALTHCARE INSTITUTIONS



The costs of institutional care of schizophrenia have been strongly reduced because number of inpatient hospital days has decreased 59% from 1987 to 2004.

Sources: The National Research and Development Centre for Welfare and Health and its publications, SLD pharmaceutical sales data, The Finnish Bureau of Statistics, The Social Insurance Institution of Finland, The Local Government Pensions Institutions and academic journal articles and expert interviews.

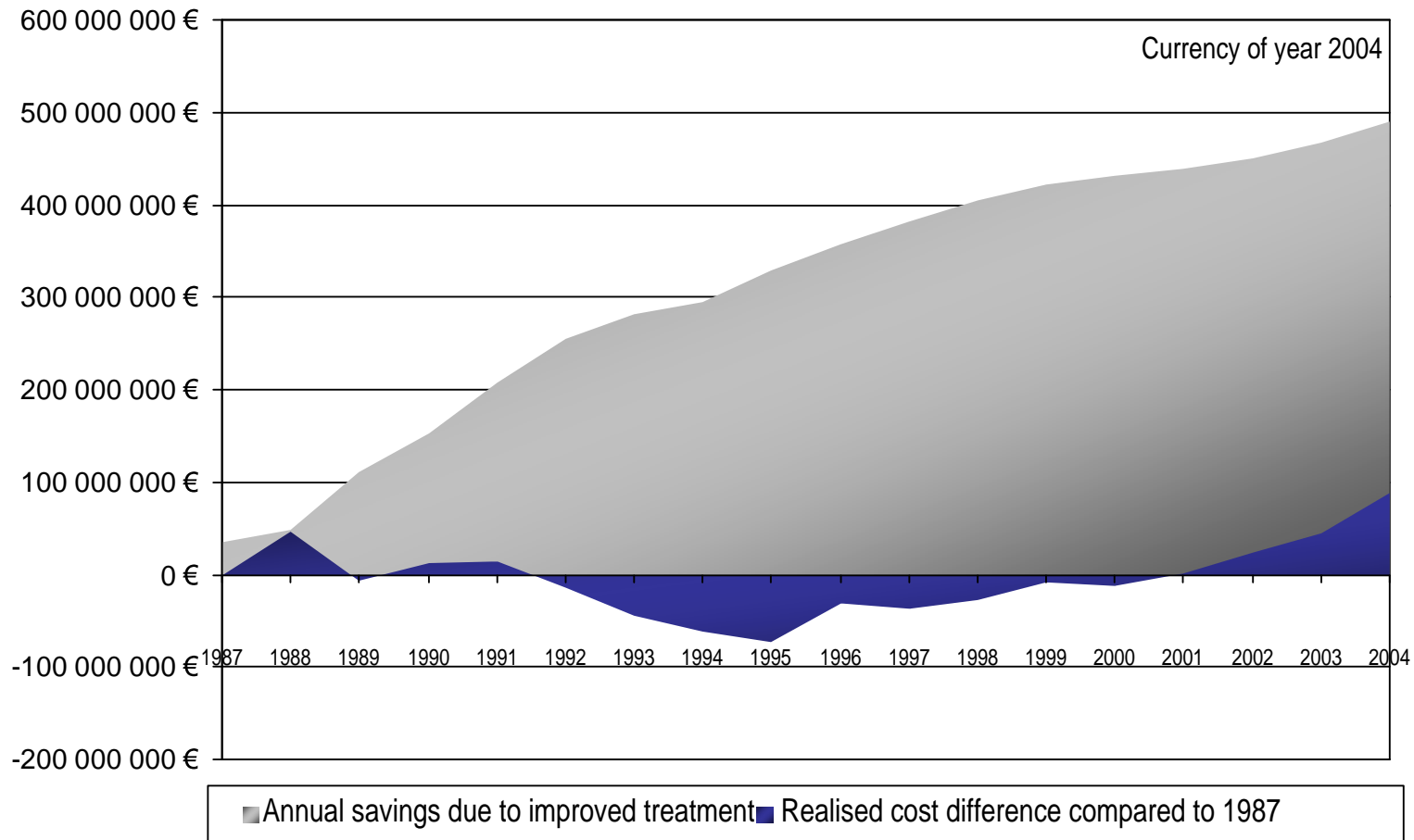
TOTAL COSTS OF SCHIZOPHRENIA FOR THE SOCIETY



The graph shows the total costs of schizophrenia for the society. Lost productivity is the most significant element.

Sources: The National Research and Development Centre for Welfare and Health and its publications, SLD pharmaceutical sales data, The Finnish Bureau of Statistics, The Social Insurance Institution of Finland, The Local Government Pensions Institutions and academic journal articles and expert interviews.

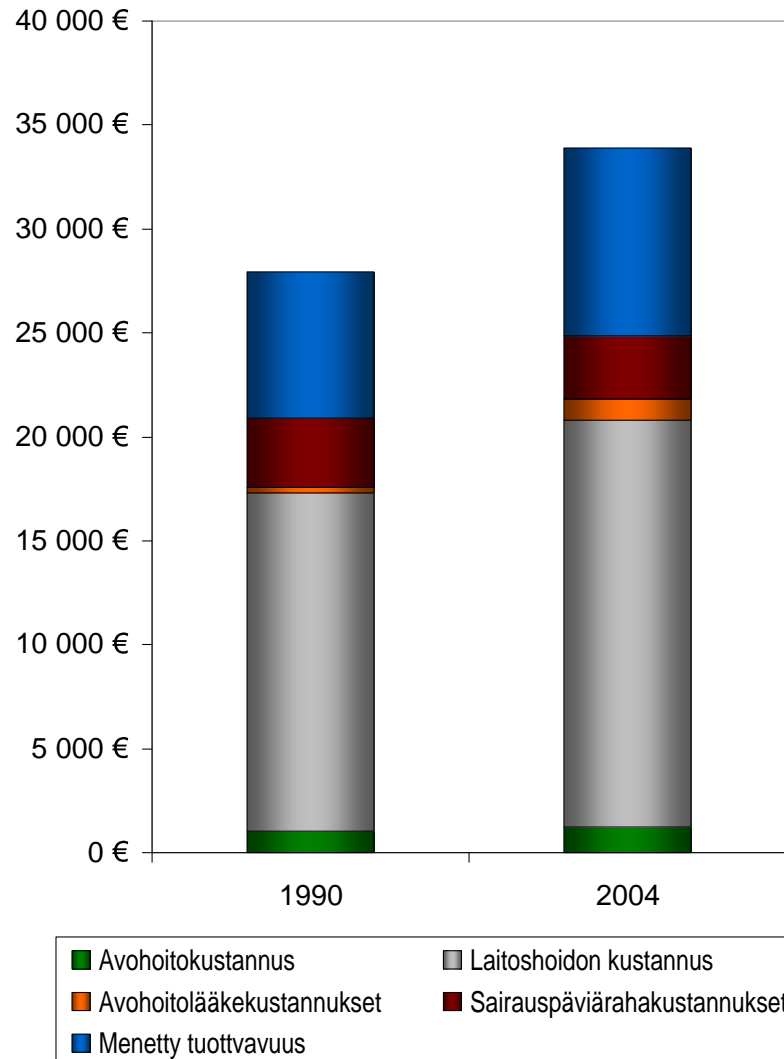
COST DIFFERENCE OF SCHIZOPHRENIA AND ACHIEVED SAVINGS COMPARED TO YEAR 1987



The grey area in the graph represents achieved savings compared to situation where inpatient hospital care days would have continued at level that existed in 1987. The blue area shows actual realised cost difference compared to 1987.

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Bottom-up: Patient case comparison



Lähde: Stakesin tilastot ja hoitoilmoitustietokanta, Lillrank & Co laskenta
17th of October, 2007

Patient with one inpatient episode in 1990 and 2004

- Inpatient duration 67 days, absent 100 days, uses outpatient prescription medicines through the entire year.
- Costs in 1990 around 27 000€ and 2004 around 35 000€
- Cost of pharmaceuticals accentuates in certain patient cases

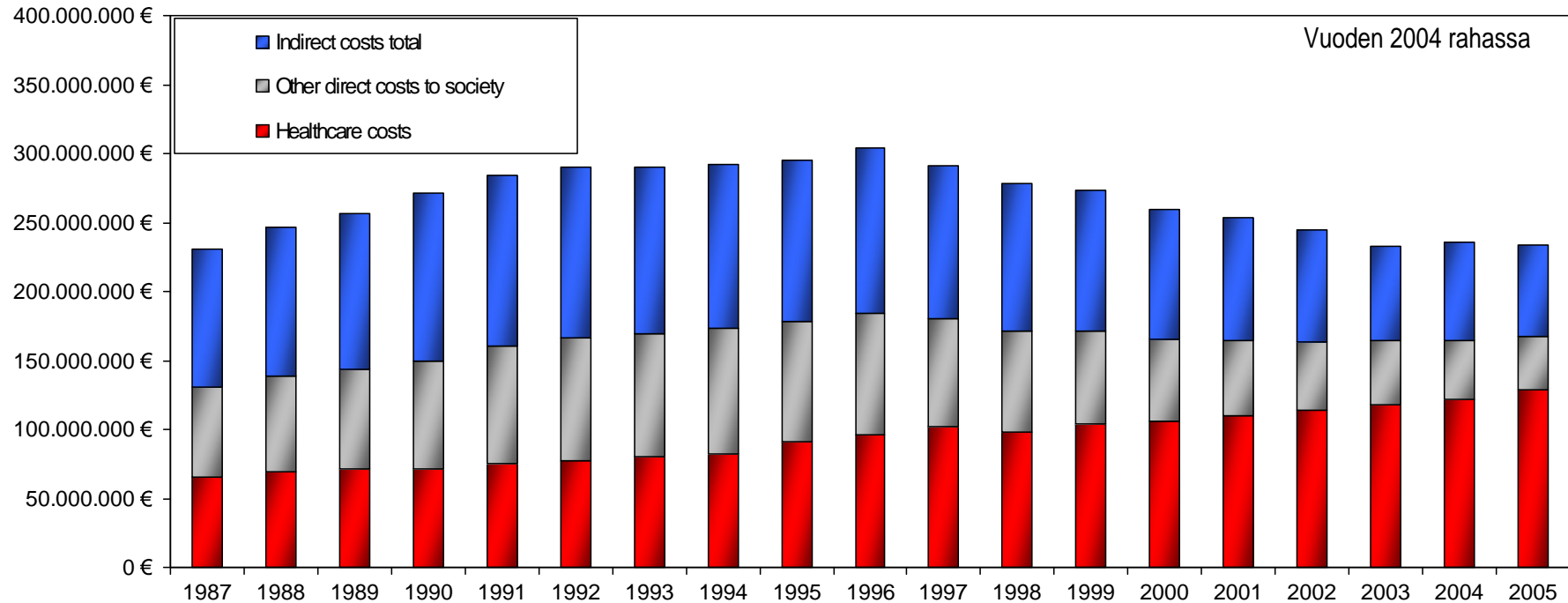
SCHIZOPHRENIA CAUSES SIGNIFICANT COSTS

- ❑ **Schizophrenia causes very significant costs for society. Direct and indirect costs summed up to 1300 M€ in 2004. Direct costs 700 M€, share of health care costs 400 M€.**
- ❑ **During the period investigated, the real costs of schizophrenia have risen notably less than the general price development, only about 100 M€. Direct costs have decreased 90 M€.**
- ❑ **The costs of health care system due to schizophrenia have reduced about 210 M€ meanwhile generally costs of public healthcare have risen 30%.**

CHANGES IN SCHIZOPHRENIA TREATMENT HAVE BEEN VERY SIGNIFICANT

- ❑ **During the research period, the treatment of schizophrenia has changed very strongly from institutional inpatient to outpatient oriented care**
- ❑ **Without this development the annual costs in 2004 would have been 400 M€ higher**
- ❑ **The change is due to developments in treatment processes and particularly the availability of new medicines**

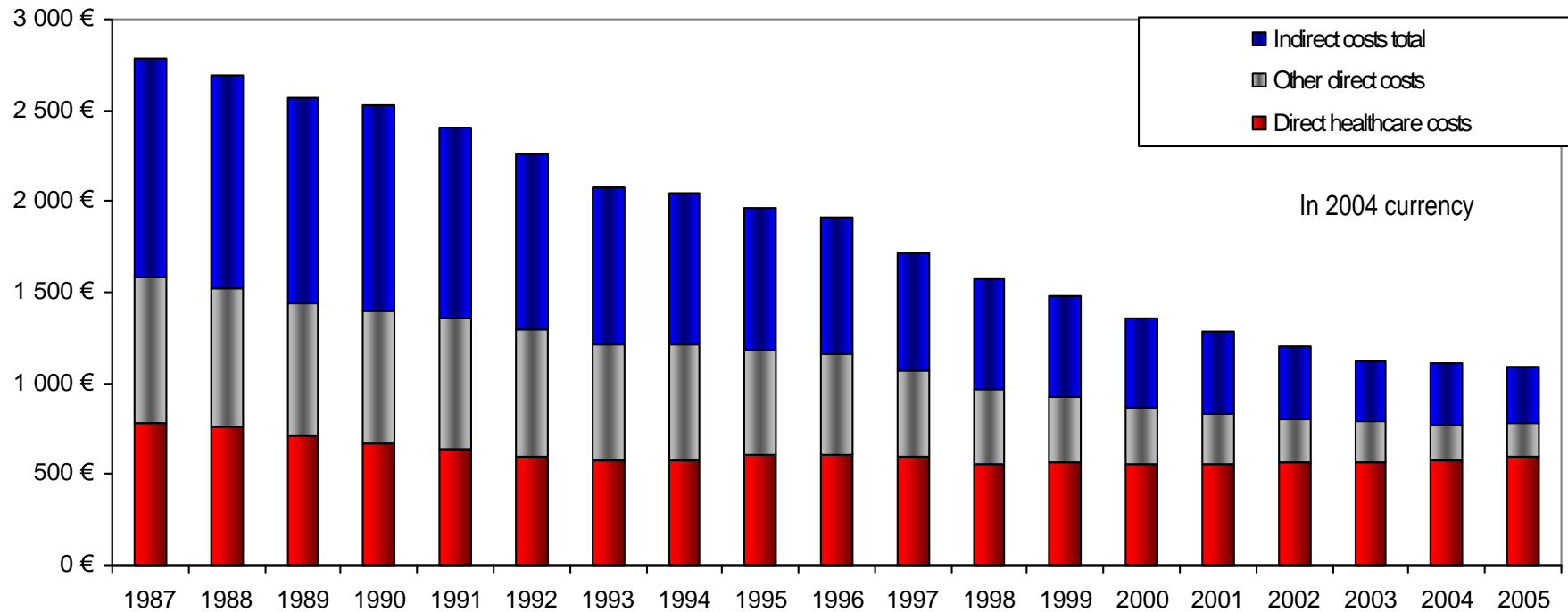
Total Cost to Society from Asthma



Sources: The National Research and Development Centre for Welfare and Health and its publications, SLD pharmaceutical sales data, The Finnish Bureau of Statistics, The Social Insurance Institution of Finland, The Local Government Pensions Institutions and academic journal articles and expert interviews.

- Total costs have remained fairly stable. Healthcare costs have risen steadily throughout the study period due to the increase in asthma patients and increases in the costs of pharmaceuticals. From the mid 1990s onwards, other indirect and direct costs have decreased dramatically. The main factor is the fall in disability pensions.
- Real costs in healthcare have risen by 30% during the study period.

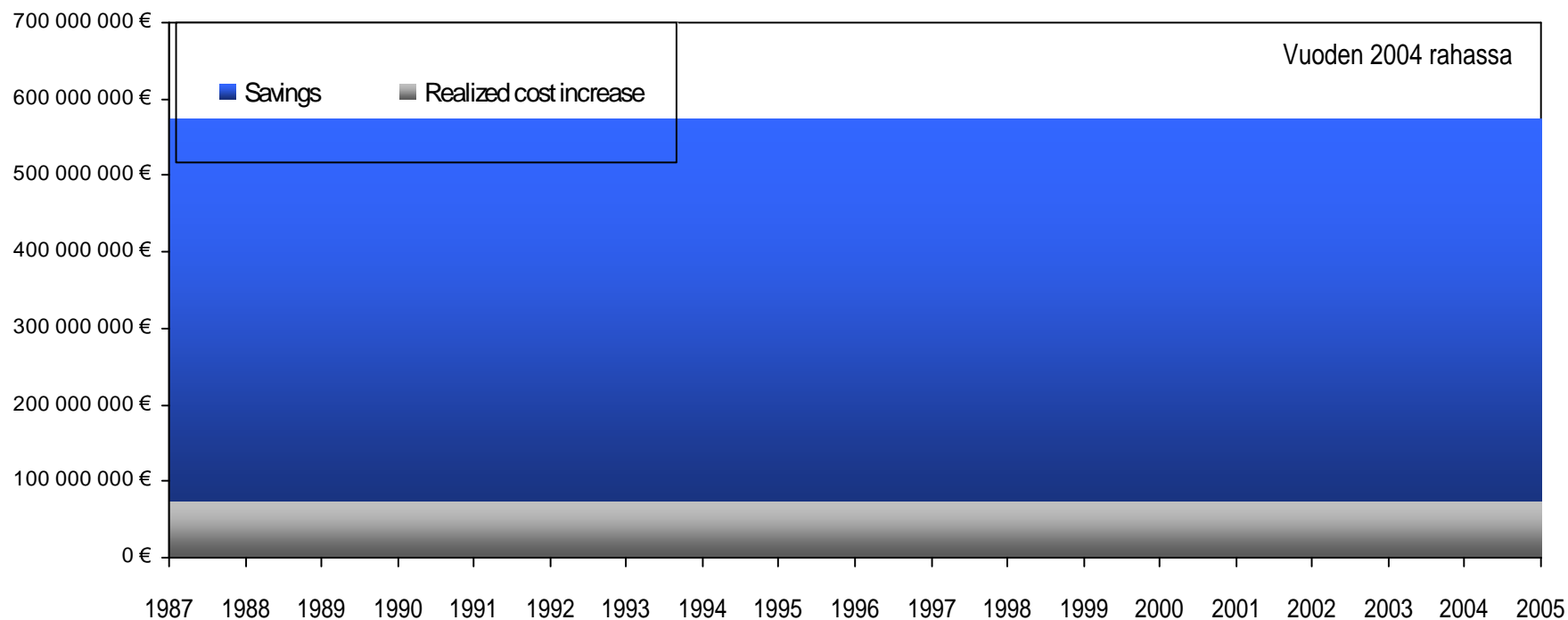
Total Costs per Asthma Patient



Sources: The National Research and Development Centre for Welfare and Health and its publications, SLD pharmaceutical sales data, The Finnish Bureau of Statistics, The Social Insurance Institution of Finland, The Local Government Pensions Institutions and academic journal articles and expert interviews.

- ❑ The figure illustrates the total costs of asthma per patient. The number of patients is based on number of social security codes with special reimbursement rights..
- ❑ During the study phase, patient-specific costs have reduced by 60%.

Total costs if cost per patient had rise according to general healthcare cost index and patient numbers had developed as they had



Sources: The National Research and Development Centre for Welfare and Health and its publications, SLD pharmaceutical sales data, The Finnish Bureau of Statistics, The Social Insurance Institution of Finland, The Local Government Pensions Institutions and academic journal articles and expert interviews.

- There is a remarkable difference between the realized and modeled cost development. In 2005, the theoretical savings would be 570 meur.

KEY RESULTS FROM ASTHMA STUDIES

- ❑ Total costs now 240 meur.
- ❑ Number of patients has three-folded (underestimated)
- ❑ Total costs remained stable, lot of variance within cost categories
- ❑ Healthcare costs doubled
- ❑ Costs per patient decreased dramatically (60%)
- ❑ Major savings = 70 - 570 meur annually depending on modeling approach

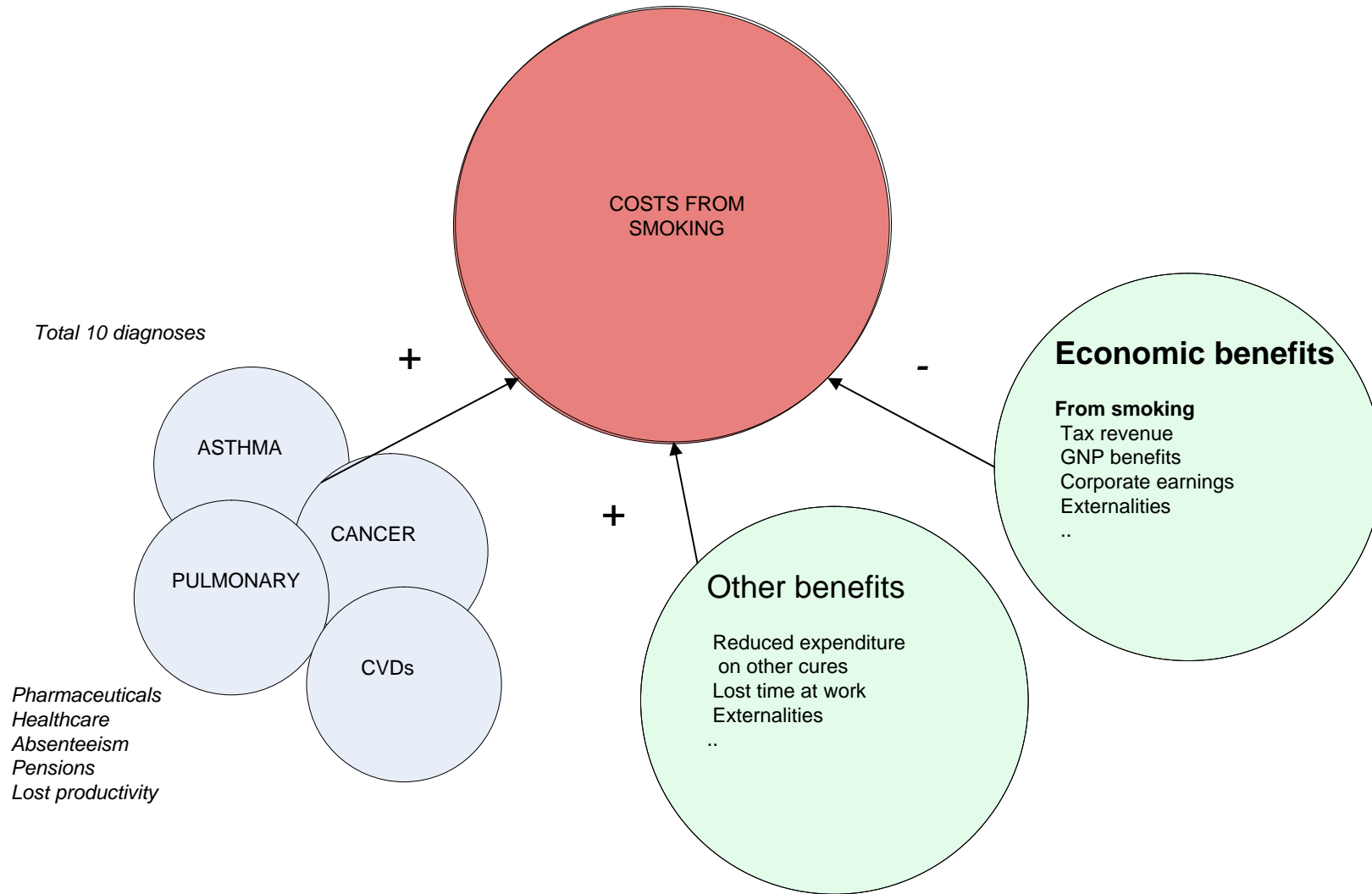
CASE BREAST CANCER: KEY RESULTS

- ❑ Incidences have been on the rise: 1987 to 2005 up 80% (now 4000 new per year)
- ❑ Prevalence doubled (patients alive after 5-year diagnosis), now 18 000
- ❑ Total costs have doubled during the study period – direct up 90%, indirect 30%
- ❑ Total costs per patient stable (up 0,3%), healthcare and other direct costs down, indirect up
- ❑ Compared to normal cost index development, breast cancer is now costing 44meur more per year (2005)
- ❑ Accounting for increases in incidence and prevalence, however, there is a saving of 44meur per year (2005)
- ❑ Indirect costs relatively small in this case – generally cost category understanding important
- ❑ Has the society done the right thing (investing in diseases causing more costs) or the wrong thing (not investing enough on breast cancer)?

CASE: SMOKING

- Tri-partite research approach
 - Current costs
 - Future scenarios
 - Scenario 1: Status quo
 - Scenario 2: Medication under national reimbursement, 3 models
 - Scenario 3: Comparison between medications
 - Scenario 4: Comparison to nicotine replacement
 - Scenario 5: Comparison to health promotion activities
 - Return-on-Investment based on comparative approach
 - Combining total efficacy picture
 - Calculating reimbursement and other cost factors
 - Producing the estimates with critical confidence intervals

CASE: SMOKING



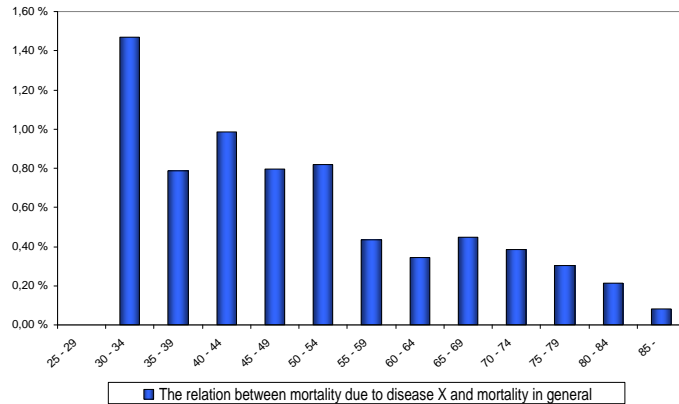
CASE: NEW DDS

- ❑ Scrutinizing the relative differences of care forms
 - Changes in the benefits due to developed equipment, drug delivery systems and care processes
- ❑ Comparison between traditional interval type care vs. new treatment system facilitated by new DDS
- ❑ Comparison in terms of current patient-specific process and patient life-cycle cost
- ❑ Long-term, short-term and future perspectives
- ❑ Combination of process cost results with QUALY delta analysis → € / QUALY

- ❑ Total costs of disease approach:
 - ❑ direct – medicines, costs of health services, sickness benefits, disability pensions
 - ❑ indirect – lost productivity due to inability to work (absenteeism)
 - ❑ presenteeism and immaterial costs excluded, mortality not given € figure

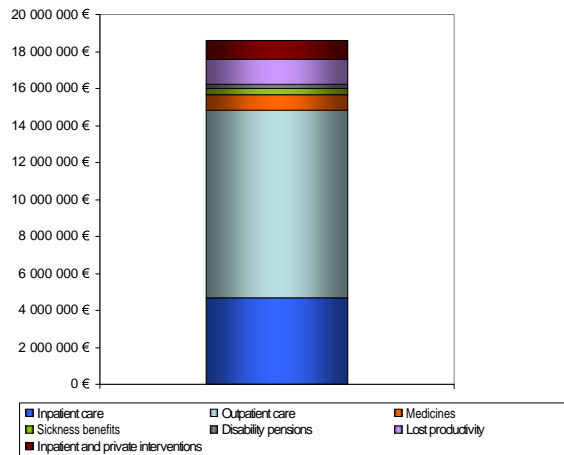
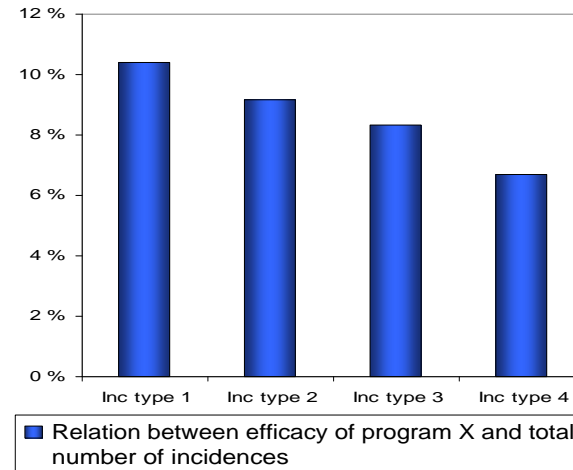
CASE: APPLICATION OF VACCINE TO A NATIONWIDE PROGRAM

AGE COHORT IMPACT



+

RELATIVE EFFICACY OF PROGRAM



+

CHANGES IN COST CATEGORIES OF TOTAL COST FOR SOCIETY

= ROI X % FOR PROGRAM
(with estimated risk interval $X_0 - X_1$)

4. Prerequisites for Conducting the Research

ABOUT COMMISSIONING STUDIES

❑ Prerequisites

- Data quality, availability
- Expert / clinician support
- Readiness to accept results
- Ability to define and demarcate research question

❑ Organization and resources

- Support for the team (a couple of hours a week)
- Financials: price set at 'inexpensive consulting' – typically between 10 and 100 keur per assignment
- Duration and completion: typically 3-4 months - some unpredictability, be prepared to wait for 1+ months

❑ European-wide cooperation coming up?

- Many European countries reorganizing public research on pharmacoeconomics
- Possible to conduct studies in cooperation with PIF and potentially EFPIA

CONCLUSIONS

- ❑ **A holistic investigation into (all) major diseases reveals:**
 - ❑ **relative resource consumption of different diseases**
 - ❑ **real total cost of diseases for society**
 - ❑ **benefits from investments into health care**
 - ❑ **relative benefits of different care forms**
- ❑ **Partial optimization could be avoided**
- ❑ **Clinical efficacy can be combined with financial big picture for total return-on-investment understanding**
- ❑ **Optimum aggregate solutions could be reached**
- ❑ **Scarce resources could be allocated there where the largest benefit is**
- ❑ **Knowledge of return to society would encourage national health investment**