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## **Institutional apolysis. From horizontal to vertical financial reallocation in public hospitals**

**Karl Johan Tötterman**

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© Karl Johan Tötterman

[karl.totterman@fimnet.fi](mailto:karl.totterman@fimnet.fi)

+358 50 331 5040

Distribution:

Helsinki University of Technology  
Department of Industrial Engineering and Management  
P.O. Box 5500  
FIN-02015 TKK, Finland  
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## Abstract

The process of reforming health care systems was initiated in several industrialized countries for more than two decades ago, but so far, we have limited knowledge of the outcome of the reforms.

The present study was designed to research institutional changes as a result of changes in financial reallocation. The research question was: how does a change from horizontal to vertical financial reallocation contribute to apolysis, integration and technicalization of health care services? To study institutional changes a novel concept, apolysis, was created and defined for its content covering structural, operational, contentual and contextual changes. The target for the investigation was the public specialist-based hospital care in Finland, where the financial reallocation of hospitals had been changed from a horizontal and independent to a vertical and resource dependent form. This change in financial reallocation occurred in 1992. Forty-eight of 51 eligible public hospitals were included and the study period covered 15 years, from 1988 to 2002. The period from 1988 to 1992 served as control period and the interval from 1993 to 2002 as the period of intervention.

Reallocation promoted institutional pressures and initiated a deinstitutionalization process. Structural, operational, contentual and contextual changes occurred on all levels of hospital care studied. Horizontal more than vertical integration was supported among providers of hospital care services. A previous social environment was transferred in a more technical oriented direction. The amount of ward as well as outpatient clinic services increased significantly for all disciplines of specialized care, in internal medicine and in surgery, less in gynecology. The onset of increase was closely related to the very early years after reallocation in 1992. Reallocation promoted further hospital productivity and cost-efficiency in surgery and internal medicine, but the effect was modest.

## Tiivistelmä

Useissa teollistuneissa maissa käynnistettiin terveydenhuoltojärjestelmien muutosprosessi noin 20 vuotta sitten. Uudistusten vaikutuksista meillä on kuitenkin edelleen varsin vähän tietoa.

Tässä tutkimuksessa haluttiin selvittää, minkälaisia institutionaalisia muutoksia syntyy, kun rahoituspohjaa muutetaan. Pää tavoitteena oli saada selville, miten horisontaalisesta vertikaaliseksi muuttunut rahoituspohjan muutos vaikuttaa institutionaaliseen apolyysiin, integraatioon ja teknistymiseen palveluiden tuottamisessa. Institutionaalisten muutosten mittaamiseksi luotiin uusi käsite, apolyysi, joka tarkoittaa rakenteellisia, operatiivisia, kontentuaalisia ja kontekstuaalisia muutoksia. Suomen 51 erikoissairaanhoidon tuottavasta julkisesta sairaalasta 48 sairaalaa osallistui tutkimukseen. Sairaaloissa muuttui rahoituspohja v 1992 horisontaalisesta ja riippumattomasta vertikaaliseksi ja

riippuvaiseksi. Tutkimus käsitti 15 vuotta, vuodesta 1988 vuoteen 2002, ja se jakaantui kahteen osaan: kontrollijakso 1988-1992 ja tutkimusjakso 1993-2002.

Rahoituspohjan muutos aiheutti institutionaalisia paineita ja käynnisti sisäisen muutosprosessin. Rakenteellisia, operatiivisia, kontentuaalisia ja kontekstuaalisia muutoksia tapahtui kaikissa eri tason sairaaloissa. Sairaalapalveluissa ilmeni enemmän horisontaalista kuin vertikaalista integraatiota. Sairaaloiden sosiaalinen tehtävä muuttui teknisemmäksi.

Palveluiden määrä kasvoi merkittävästi koko erikoissairaanhoidon vuodeosastoilla ja poliklinikoilla, yhtälailla kirurgian ja sisätautien aloilla, vähemmän gynekologian alalla. Kasvua tapahtui enintään ensimmäisten vuosien aikana sen jälkeen kun rahoituspohja oli muutettu. Kirurgian ja sisätautien aloilla rahoituspohjan muutos edisti jonkin verran tuottavuutta ja kustannustehokkuutta.

## **Abstrakt**

En reformering av hälsovårdssystem påbörjades i flertalet industrialiserade länder för snart 20 år sedan, men till dags datum har vi mycket begränsade kunskaper om vad förändringsprocessen har inneburit.

Denna studie initierades för att studera institutionella förändringar som en följd av en förändring i finansiell reallokering. Grundfrågan som studien skulle besvara var: hur bidrar en förändring i reallokering från ett horisontellt till ett vertikalt läge till apolys, integration samt teknikaliserings av hälsovårdsservice? För att studera institutionella förändringar skapades och definierades ett nytt koncept, apolys, omfattande strukturella, operativa, kontentueella samt kontextuella förändringar. Föremålet för studien var den offentliga specialist-baserade sjukhusvården i Finland, där finansieringen av sjukhus hade förändrats från en horisontell och oberoende allokering till en vertikal samt beroende allokering. Denna förändring skedde år 1992. Av 51 potentiella sjukhus inkluderades sammanlagt 48 sjukhus och undersökningen omfattade 15 år från 1988 till 2002. Perioden före reallokeringen (1988 till 1992) utgjorde en kontrollfas för studieperioden mellan 1993 och 2002.

Reallokering gav upphov till institutionella tryck och initierade en deinstitutionaliseringprocess. Strukturella, operativa, kontentueella samt kontextuella förändringar skedde på alla nivåer av sjukhusvård. Horisontell mer än vertikal integrering ägde rum mellan enskilda sjukhus och serviceproduktion. En social intern sjukhusmiljö fick allt mera tekniska drag vid produktion av service. Mängden av service på bäddavdelningar samt på polikliniker ökade signifikant inom den totala specialist-baserade sjukhusvården, inom kirurgi samt inremedicin, men däremot mindre inom gynekologi. Förändringen i mängden av service skedde främst under de närmaste åren efter reallokering. Inom inremedicin samt kirurgi skedde även under studietiden en moderat förbättring av produktivitet samt kostnadseffektivitet för producerad service.

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## Abbreviations

CEA	Cost efficiency analysis
CE	Cost efficiency
DEA	Data envelope analysis
DFA	Deterministic frontier analysis
DRG	Diagnosis related groups
FinDRG	Finnish version of the HCFA DRG-grouping
HCS	Health care services
ICD-10	International coding for diagnoses, version 10
MI	Malmquist index
SSA	State Subsidy Act
SFA	Stochastic frontier analysis
TFP	Total factor productivity
WHO	World Health Organization

# 1 Introduction

## 1.1 Background

The process of reforming the health care system and the outcomes thereof has major consequences for the economic resources of a society. It is therefore important to understand the fundamental parts, mechanisms and outcomes of a reforming process.

Reforming of national health care systems was initiated for more than two decades ago, and has spread to most western countries (OECD 1994a, Twaddle 1996). Spain, Australia, Italy and Germany introduced major systemic reforms during the late 1980s and are contemplating further changes (WHO 1992, Chernichovksy 1995, Taylor-Goodby 1996). The Netherlands, Australia, New Zealand and Israel have proposed and launched reforms (Dekker 1994, Peabody et al. 1995, WHO 1997). The United States have been struggling with the introduction of health care reforms (Lundberg 1994) and despite no generally accepted concept, several local changes have been introduced (Miller & Luft 1995, Lundberg 1994, Drake 1997). After years of discussions, Prime Minister Thatcher proposed in 1989 the White Paper a concrete step to reform the National Health Service (HMSO 1989). Sweden was soon to follow England as a forerunner, though it had more experience of the reforming content (Saltman 1991, Bradshaw & Bradshaw 1994, Glennester & Matsaganis 1994, WHO 1997). In Finland, the Hiltunen plan from 1989 called for a replacement of the existing national plan tied subsidy system for health and social services. The new plan was based on Danish and Norwegian experiments, and proposed a system for block grants based on a funding formula (Saltman & von Otter 1992). This proposal was legally confirmed in 1992 through the State Subsidy Act (SSA), the current basis for the present Finnish health care reform (Laki sosiaali- ja terveydenhuollon sunnittelusta ja valtionosuudesta 1992, Hermanson et al. 1994).

Regardless of the basic system for health care - social security, social insurance or private - the health care sector in the industrialized world is currently characterized by changes. Important demands are related to improved management of the present

resources and to avoidance of cost-escalations in the future. In several countries the costs of providing health care have for decades grown faster than the Gross Domestic Product, and in turn taking an increasing share of societal resources (Normand 1991, Eddy 1994, Elola 1996). Aging of the population, increasing proportions of chronic diseases and disability, new treatments and technologies and rising public expectations have all exerted an upward pressure on health care expenditures (WHO 1992, OECD 1994a, Saltman 1994a, WHO 1997). "This clash between, on the one hand, the moral imperative of maintaining solidarity and the social good character of health care and, on the other hand, the fiscal imperative of cost control has been the driving force for introduction of new solutions and reforming of health care" (WHO 1997). In other words, in order to handle the emerging health care problems, normative, economic and organizational reforming and restructuring are essential to promote more efficient micro- (institutional) and macroeconomic (societal) control of resources (Phelps 1995, Peabody 1996, Tabbush & Swanson 1996).

Although different countries share the same goals, to promote micro- and macro-efficiency, to cope with cost containment, to enhance equity and choice of services, their proposed and implemented reforms vary (Chernickovsky 1995, Elola 1996, Taylor-Goodby 1996). The central role of the state has remained in all systems and several reforms reflect national, cultural, social, historical and political circumstances (Saltman 1994b). In general, countries with the same system of health care have approached the same way by those once pioneered (OECD 1994a). Countries having a social insurance system have set out to centralize power and to control financial resourcing (van de Ven 1996). By contrast, countries with social security have promoted decentralization and introduction of competitive forces among health care service providers (OECD 1994a). Furthermore, in the latter group, planned markets have been proposed, with a number of publicly owned and operated competitors.

Health care reforms have in particular pushed the hospital sector to demand changes. This applies to both individual hospitals and the whole hospital organizational field. (Scott 1991, Scott 2000). DiMaggio (1983) describes organizational fields by structural equivalence and isomorphism. Vertical and horizontal linkages between similar and dissimilar institutions are well represented in health care organizations and the societal

sector (Scott 1991). Changes in environment, arising from changes in allocation, in power, in resources and dependency will give rise to disequilibrium and disturbances in isomorphic structures (Oliver 1992). This is in particular the case in health planning models which require a stable environment to perform well: “a stable knowledge base regarding the services to be provided; a stable organizational and equipment base from which to deliver those services; a stable personnel base to staff facilities; and stable expectations from patients as to the services they will receive” (Saltman & von Otter 1992). Unfortunately in all these core assumptions, important changes have taken place. For instance, therapeutic treatments and diagnostic procedures have improved extensively demanding for new capital investments, combined with an increasing number of elderly citizens and a better awareness of the consumers for health care services (OECD 1994a). Consequently, the professional context of health care services has been confronted with constrained economic considerations and pressures for reform.

A common feature for several implemented reforms is the general lack of understanding of the outcome. The reforms have been harder to implement than anticipated (Saltman 1994b) and often led to unintended consequences (Chernikovsky 1995). Neither the content and processes, nor the contexts or the macroeconomic expectations, the political environment, the societal values and external influences have conclusively confirmed and supported the ongoing reforms of health care services (Kirkup & Donaldson 1994, Peabody 1996, Rathwell 1997). Reasons for inadequate implementations are many. Among them are the problems with the complexity of reforms, lack of clearly defined goals, lack of skills and management, lack of resources and information systems. Attitudinal resistance among employees, professionals and politicians have proved challenging, too (Rathwell 1997, Light 1998).

In the European context, England, a pioneer in health care reforming set out with a minimum of research (“The Big Bang”) before introduction of the reform of the National Health Service (Klein 1995, Gladstone & Goldsmith 1995). Sweden was among the very few countries carrying out research into specific areas of reforming before it initiated its changes (Saltman 1991, WHO 1997). In most countries, - so also in Finland – experiences from reforming has mainly been gathered retrospectively within specific areas (Niskanen 1997, Enckell 1998, Linna 1999, Linna et al. 2006).

Therefore, there is the need to create a better understanding of the ongoing health care reforms and outcomes of taken measures. It is necessary to explore general as well as specific measures in detail and their impact on health care services so far.

### *The intended study*

In order to explore the initiated reforming process of the Finnish health care system, its impact on specialist-based hospital care services will be studied. Not only clinical, but also theoretical and economic considerations and perspectives will be taken into account in health care structures. Also changes in long-term hospital performance will further be a part of the study. The intended study will promote understanding in four main ways. *Firstly*, the study will help to understand factors determining health care structures and services. *Secondly*, it will analyze and evaluate changes in hospital structures and services as a result of financial reallocation. *Thirdly*, it will therefore contribute to understanding of the impact of financial reallocation on public hospital health care structures and processes. *Fourthly*, it will enhance to a deeper understanding of the promoted reforming process and its outcome. The present study will contribute to the body of research and theories of environmental changes and their impact on institutional (organizational) structures (Pfeffer & Salancik 1978, DiMaggio 1983, Oliver 1992, Selznick 1996).

For the purpose of studying effects of financial reallocation a *novel measuring instrument* is constructed. This instrument, namely *apolysis*, comprises dimensions of structural, operational, contentual as well as contextual organizational changes. Due to its nature, financial reallocation is expected to give rise to a changed era in hospital service, and accordingly a suitable measuring instrument is needed.

Several features make public specialist-based hospital care appropriate for the present study. First, hospital care is one of the main targets for the reforming process. The environment of hospital care is clearly defined and for decades, several authorities have systematically collected annual data on costs, personnel, patient discharges, activities etc that are associated with public hospital care. Furthermore, the stable environment before

the initiation of the reform, the features of financial reallocation and the limited amount of research and knowledge of the outcome are important issues. Finally, the period since the introduction of the reallocation is long enough to enable a meaningful retrospective analysis.

The specialist-based public hospital care system has been built during a long period of time to ensure structural equivalence and a high degree of isomorphism. Based on the values of a welfare state, political, bureaucratic and legislative measures have ensured a nationwide horizontal and vertical equity of health care services and access to care regardless of income. Horizontal cost-oriented allocation of public hospital care has anchored an independent, often monopolistic provider of health care services. The environment has for decades been secured supporting a strong institutionalization and building of a professional hierarchical vertical structure. The problems associated with public bureaucracy aside, the costs for hospital specialist-based services have been moderate and the level and standard of quality of care has been good (Hermanson et al. 1994).

A combination of the State Subsidy Act and the impact of an economic recession at the time of introduction of the health care reform challenged the previous stable environment (State Subsidy Act 1992). This change in the environment of specialist-based hospital care generated some research into the reforming process. Questions regarding values (Niskanen 1997), organizational cultures (Enckell 1998) and productivity, micro- and macro-efficiency (Linna 1999) have partly been studied in relation to the reforming process in Finnish public hospitals. Changes in organizational as well as in institutional structures have so far not been explored. The present study will describe this specific area by applying known theories of organizational research. Institutional – deinstitutionalization theories are important (Scott 1987, DiMaggio 1986), due to changes in financial reallocation and pressures for change (Selznick 1957, Oliver 1992). The specialist-based hospital care environment based on professionalism, (Scott 1965, Wallace 1995, Scott 2000) is now challenged through economic steering mechanisms (Kurunmäki 1999). The means of raising revenues for clinical activities push specialist-based hospital care into a new area of power relationship regarding resources, i.e. into a resource dependent position. This new dependency is likely to impact on

interorganizational relationships and might in turn contribute to structural changes (Aldrich & Pfeffer 1976, Hannan & Freeman 1989). Active control and management of this dependence plays a role in the survival both short and long term (Pfeffer 1981). The role of specialist-based hospital care as agents providing services to the primary health care (principal) emerges new relationships, information systems and control of quality provided in order to cope with the asymmetry of knowledge between partners involved (Jensen & Meckling 1976, Williamson 1985).

The previously briefly mentioned organizational theories support central areas for analyzing changes in organizational health care structures as a result of the health care reforming process. There are other theoretical frameworks of interest but with less direct relationships and therefore they are left out of the scope. Theories of strategic management, transaction cost, contingency and population ecology are recognized as potential tools for the study but they, likewise, are not used.

## 1.2 Research questions

The interest in this study is focused to organizational changes as a result of financial reallocation, and the target for investigation is the public specialist-based hospital care. This interest is transformed into one main question: *How does a vertical financial reallocation of specialist-based public hospital care contribute to apolysis, integration and technicalization of health care services?*

*Vertical reallocation* of health care relates to the changes in financial allocation promoted through the State Subsidy Act of 1992. This Act transformed the financial support for specialist-based public hospital health care from a horizontal independent resource-needed structure to a vertical and resource-dependent structure. The Act was introduced in order to promote reforming of the Finnish health care system through transferring responsibility for health care services from the state to the municipalities. Along with the Act, market forces were in principle enforced by enhancing the split between purchasers and providers of services. Competition between suppliers should promote cost-containment of escalating costs on micro- as well as on macroeconomic



level. Productivity, efficiency as well as effectiveness became important objectives for providers' of health care services.

In this study the concept *apolysis* is used to investigate internal and external debundling in the present hierarchical archetype for institutional public health care. Due to the close relationship between the environment and institutions, debundling, or i.e. apolysis is expected to occur when institutions are exposed to new surroundings. Apolysis in the present study is defined by structural, operational, contentual and contextual debundling of institutions.

*With integration* is contemplated a reconfiguration in provision of health care services. It is unlikely that hospitals will continue to provide services in the same mode and manners as occurred before the introduction of reallocation, due to the decisive changes in economic dependency associated with services and markets for services. By contrast, the propensity for changes in interorganizational relationships are more likely, and then, two perpendicular directions of integration can be hypothetically expected, vertical and horizontal or a combination of these. Dissociation would further be an option. This is however, unlikely due to the ownership of hospitals and their relationship to the market they serve. A third dimension would be to retain and continue in the same way as before the reallocation.

*Integration* means a closing of the gap between individual health care providers regardless of the level served.

*Horizontal integration* means improvements in interorganizational domains already served. The intention is to ensure the scale of the market. This can take place through, negotiations and agreements on services, through new types of cooperation, alliances, networks, increased purchaser control, sharing of services and investments, customizing of services and modes of delivery, and other forms of information change.

*Vertical integration* refers to an extension of the market served by changes in the scope. This can occur by upgrading of services, increasing specialization, outsourcing of non-

core services, delivering of services at the site of purchaser, downward integration along the value chain into related services supporting the previous mix of services provided.

Particularly interesting for this study is the role of integration in the rearrangement of hospital services produced and provided as a result of reallocation. Hypothetically integration is expected to occur, but more interesting, is the main direction of the integration.

The Finnish health care system of public hospitals is like a pyramid with hierarchical levels of hospital care. If vertical integration occurs in public hospitals, then the height will increase in relation to the basis. By contrast, horizontal integration will mean an extension of the basis in relation to the height. The present study is thus interested of changes in the shape of the public hospital system.

A transitional institutional change from *social to technical environment* is expected to occur due to the importance of revenues derived from services provided and delivered. This points to an increasing importance of assessing resources, materials, input and output functions, production systems, use of personnel, delivering of services and markets served. The previous social environment with values of social obligation will become under threat and will be forced to adapt to changes and demands of new economic reality. This present study sets out to assess this potential transition, because within its introduction are the seeds for far reaching changes beyond economy.

- *how does financial resourcing influence institutions for health care?*

Allocation plays an important role in the use of health care services and thus has a strong impact on health care structures. The way financial allocation is controlled and steered, affects expenditures for care. Differences in financial support for hospitals, in payment of physicians, in reimbursement of patients all result in large variations of costs for care. Allocation affects all levels of individual and institutional care, within services, between prevention and cure, between hospital and outpatient care. Thus, allocation has a major effect on structures for health care. Due to its central importance, the allocation mechanism is used by governments to promote productivity for more effective and efficient services. Since these factors play a role in the reforming process, it is of importance to discuss this matter based on new empirical evidence.

- *how does financial reallocation promote changes in structures?*

The previous question suggests that any change in allocation for health care can be expected to be reflected in the structures providing services. Thus, not only does the perpendicular change of direction of financial allocation from horizontal to vertical generate changes in the environment, but simultaneously so does the replacement of the previously independent resources with dependent resourcing. In order to answer this question, the new situation for specialist-based public hospital care can be analyzed through a theoretical framework of several economic theories, among them the institutional and deinstitutionalization theories dealing with factors related to institutional structures and environment. The resource dependent and the agent theories are further useful in the study of changes induced by financial reallocation. Answering this question from theoretical perspectives gives the present study a firm basis for an explorative empirical investigation.

- *what kind of changes can be discerned?*

In order to answer this sub-question an empirical study is performed in an appropriate number of public hospitals. The number of hospitals will be sufficient to strengthen the predictive power of the study. Four distinctive areas of institutional changes will be described through an empirical study, i.e. structural, operational, contentual and contextual changes. An answer to this sub-question tests the theoretical framework and contributes to a better understanding of the reforming process and its consequences.

- *how are the changes related to the reforming process?*

This sub-question binds theoretical and empirical data into a structural framework and explains them as a central part of the reforming process. An analytical answer to this sub-question gives a firm basis from which to return to the main focus of the study: the impact of financial reallocation and institutional apolysis.

### 1.3 Objectives

The objective of the present study is to create a better understanding of the impact of financial reallocation on institutional changes.

In order to reach the objective of the present study, the following sub-objectives will be emphasized.

- *to explore the outcome of vertical reallocation on institutional pressures in public hospitals.*
- *to develop a new concept, apolysis, for the analysis and to test its applicability in an empirical study.*
- *to analyze the effects of financial reallocation on integration and technicalization of service provision in public hospitals.*
- *to analyze the effects of reallocation on hospital performance.*

### 1.4 Scope and assumptions

Health care has an important function in the society and requires a proper share of human as well as economic resources. Any implemented reform in this area will have consequences for many sectors of the society.

This present study concentrates on *institutional changes* affecting providers of specialist-based hospital care as a result of changes in the financial allocation process within the health care system. Financing and raising of tax revenues for health care is left out of the scope as well as the allocation process itself.

Structural reforms should, if possible, be distinguished from incremental changes. Reforms are not only directed to promote productivity or efficiency (Linna 1999), they also concern the defining of priorities, refining policies and reforming of institutional structures (Cassels 1995).

As a result of reforming, it is assumed that the direction for restructuring will be progressively integrative, due to the increased importance of the services themselves rather than to the physical sources providing those services.

*The State Subsidy Act* from 1992 is the legal basis for reforming of public health care in Finland, and brought in several significant changes. Above all, the Act decentralized responsibility for health care to municipalities. It also introduced a priori market forces into health care by promoting purchaser-provider split, and thirdly, changed the direction of allocation for health care from horizontal to vertical (*State Subsidy Act* 1992). At the same time, however, several legal and other obligations remained unchanged, obstructing introduction of normal competitive forces in the provision of health care services. Beyond that, specialized care is still regulated through the *Specialized Hospital Act* and the ownership of hospitals is unchanged (*Specialized Hospital Act* 1989). As a result, municipalities have turned out to be simultaneously purchasers as well as providers of health care services, thereby impeding their willingness to buy services elsewhere. Importantly further, the right for hospitals to extra funding at the end of the year in order to cover negative budgets has only recently been withdrawn. Finally, the role of hospitals as local important employers can not be neglected.

The *public specialist health care* will be covered in the empirical part of the present study. The study is thus carried out in public hospitals providing specialist-based acute and chronic health care services. Private health care, public military hospitals as well as psychiatric hospitals are not included in the study population.

There was a keen interest to include in the present study other countries belonging to the same category of health care system. This option was, however, rejected due to fundamental differences in health care systems between different countries, which makes comparison difficult in a study of this nature (Niemelä & Jämsén 1995, Elola 1996).

The *time frame* for the study is of importance, particularly the length of the study period. The preallocation period should be long enough to research the level and variation of

hospital services provided. The period after financial reallocation should be long enough to enable the study of changes in hospital structures, changes in services and changes in hospital performance long-term. From this view, a period of 15 years of observation was regarded appropriate, or five years for the preallocation period and ten years for observation of changes.

## 1.5 Structure of the study

The structure of the dissertation is presented in Figure 1. The model for the study can be illustrated as an hourglass having three distinctive phases, each consisting of several sections of research to be explored. The model encompasses a converging phase, a plateau, and finally a diverging phase. The converging phase initiates the study and introduces the individual parts, with the focus being on the target for research. The following phase or the plateau defines the hypotheses for the study. The third phase describes the empirical research and examines the findings in the context of the theoretical framework. The diverging phase pulls together the knowledge of the area of research, and thus expands the perspectives of the research.

Each phase can further be subdivided into specific areas for the study process. Thus, the converging phase opens with an introduction describing briefly the area of research and its importance. The conceptual analysis enhances a deeper understanding of individual concepts used in the study. The concepts are defined and interlaced into a new paradigm. The section on approaches to the research discusses the alternative analytical instruments. Individual organizational theories are conceptually explained through the empirical literature supporting their central meaning and secondly extended to cover the present area under research. Finally, the approaches are summarized and discussed contextually in relation to the theme of the present study. Analysis of the literature and organizational theories enables a firm base from which to enter the plateau stage, in which the hypotheses are envisioned and appropriate instruments selected for the study. The diverging phase is initiated through an empirical study related to the theme.

For this purpose an appropriate amount of hospitals will be included. The results are analyzed, weighted and tested against hypotheses earlier set. The last part of the diverging phase is devoted to discussion and conclusion. This part will include a discussion of the central findings related to the hypotheses as well as their contribution to the theoretical framework for the study.

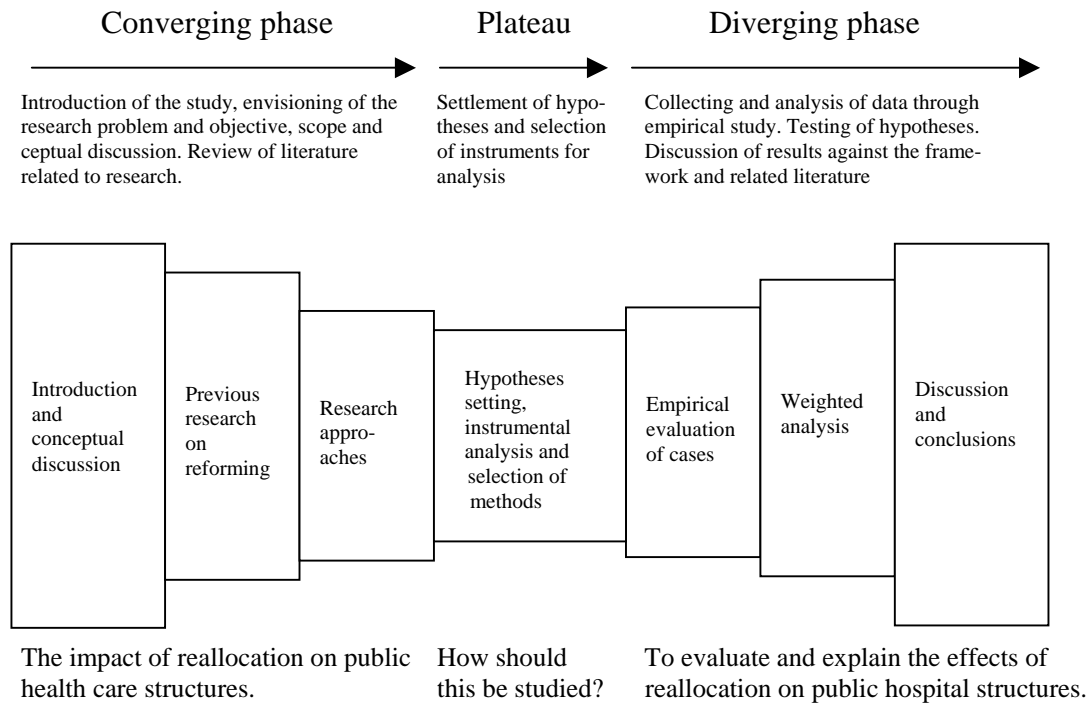


Figure 1. The hourglass structure of the present study

## 2 Conceptual discussion on reforming of hospital care

To facilitate later the analysis and discussion of the present study it is of importance to early enough discuss concepts related to health care reform. These concepts are health care reform, the State Subsidy Act, the hospital environment, allocation and reallocation of hospital care as well as changes in hospital structures.

### 2.1 Health care reform

Despite no consistently accepted definition of reform, this term is widely used in connection with changes in health care. The target with most health care reforms has been dealing with escalating costs for care. The reforms have either covered all parts of health care, financing, allocation and providing of services or they have aimed to embrace a specific part with the reforms impacting on other areas too. Most reforms have been introduced through explicit political decisions and confirmed through legislation (Saltman 1994b).

Cassels emphasizes health care reforms as confirming of priorities, refining policies and restructuring of institutions (Cassels 1995). His proposal has a broad basis and endorses a continuous incremental change. An OECD study, by contrast, sees a distinction between a reform, which defines as a radical structural change, and incremental evolution. Difficulties persist, however, in distinguishing between evolutionary and incremental changes from contextual structural reforms (OECD 1994a). The distinction between these two entities is arbitrary and subjective. A reform refers often to a political concept that involves a top-down process of structured change (State Subsidy Act 1992). However, important structural and organizational changes can take place without interventions by authorities. They may be caused by other factors such as introduction of new technologies or economic scarcity (Drummond 1994, The Lancet 1995). Berman discusses health care reform as a process where changes must aim to achieve a series of policy objectives (Berman 1995). Important further is, to promote long-term and sustained changes rather than short-term achievements.



Views of health care reforms differ, thus, significantly. More than being a single homogeneous entity, reforms are reflected through a multitude of processes and objectives, which have to be defined separately. Important further is to understand the differences in values of reforms for individual countries.

World Health Organization (WHO 1997) define a health care reform “as a process that involves sustained and profound institutional and structural change led by government and seeking to attain a series of explicit policy objectives” Accordingly, the authors divide key elements in the reform into processual and contentual elements;

Characteristics of processual elements are

- \* structural rather than incremental or evolutionary changes
- \* changes in policy objectives followed by institutional changes, rather than redefinition of objectives alone
- \* purposive rather than haphazard changes
- \* sustained and long-term rather than one-off changes
- \* a political top-down process led by national, regional or local governments.

Characteristics of contentual elements are

- \* diversity on measures adopted
- \* determination by country-specific characteristics of health systems

The concept of health care reforms in this present study goes along with the vision presented by WHO (1997).

Processually, the present study deals in particular with institutional and structural changes. Along the with the concept, the empirical case analysis is designed to study purposive reasons for change and the time period of observation contributes to understanding of effects long-term.

Contentually, the case-analysis of the present study employs a large population of hospitals to describe the diversity of measures adopted by local or regional, central and

university hospitals. The empirical part of the present study is performed in Finland and is thus country-specific.

## 2.2 The State Subsidy Act

In most countries with a public tax-based health care, legislation has been the official impetus for initiation of health care reforms. In Finland, a reform was executed with the State Subsidy Act in 1992. The main concepts with the SSA were to *decentralize* state exercised top-down control of public social- and health care and to *promote municipal financial and political responsibility* of these functions (OECD 1994b, Preusker 1996). Decentralization, the underlying principle declared, should empower municipal authorities and their residents to decide on health - and social care according to their specific local needs.

In principle, *decentralization* encourages flexibility, promotes efficiency and innovativeness, and also, generates more commitment and productivity at the workplace (Mills 1994). Decentralization however, may induce risks as well through fragmentation of services, inequity, weakening of safety and difficulties in monitoring, assessing and analyzing basic information required for determining health policy (Borgenhammer 1993). In order to be successful, decentralization needs sufficient local administrative and managerial capacity, ideological certainty in implementation of tasks and readiness to accept several interpretations of one problem. As a consequence of a reform, institutions are requested to create new internal cultures (Borgenhammer 1993).

To promote *municipal financial responsibility*, the target and basis for state funding was changed accordingly. The municipalities became the targets for block-based funding that was based on a formula rather than earmarked tax revenues, which was the case before. For public hospital care, the SSA changed the direction of financial allocation from a horizontal resource-needed and independent to a vertical and resource-dependent. The income for hospitals was tied in with services provided and competition between providers was enhanced. The integrated model became partly obsolete and a new competitive contracting scheme was proposed. The economic independence was broken

and replaced with a new system where patients became suddenly the material, the revenue and capital for specialist-based public hospital care. Claims for extra funding at the end of the year to cover negative budgets was not anymore allowed. Cost budgeting was replaced by cost saving and cost-containment became the new tools for managing increasing expenditures and restricted income.

A key promoting an “internal market ” among public and private suppliers of health care services was the introduction of market forces (Enthoven 1980, 1994). Through competitive markets the integrated model for services was to be dismantled by competition among suppliers. The purpose was to make resource allocation more efficient, more innovative and more responsive to consumer’s preferences while maintaining equal access as well as equity of care (OECD 1994b, van de Ven 1996). The aim was that market mechanisms would further improve productivity, promote micro-efficiency and macro-efficiency and increase the quality of services (Tabbush & Swanson 1996).

*As a concept*, the SSA has authorized and empowered municipalities to take more local decisions regarding health care services and simultaneously changed the allocation mechanism for institutional hospital care. The impacts of the SSA on institutional care have to some extent already been researched. Niskanen has evaluated the effects of market-oriented modes of operations on the values in public health care, emphasizing the difficulties to adapt to a new surrounding (Niskanen 1997). Enckell has discussed changes in cultures among personnel in selected cases of Finnish hospitals (Enckell 1998). Linna has measured hospital performance i.e. productivity, efficiency and costs of teaching and research in Finnish hospitals in connection with the SSA (Linna 1999). Linna’s study revealed a significant productivity progress as a result of the State Subsidy Act. Despite these important explorations much is still unknown about the effects of financial reallocation on institutional care, on hospital structures, on outcomes of reforming in general.

### 2.3 The hospital environment

Hospitals represent a specific area of the social environment. From the point of view of organizational research, hospitals are characterized by their environmental level, by the domain they serve and by the services they provide. For the study of hospitals and their domains, concepts as “organizational field” described by DiMaggio & Powell (1983) or the “societal sector“ (Scott & Meyer 1991) have been proposed (Scott et al. 2000). According to DiMaggio & Powell (1983) an organizational field is characterized by a recognized area of institutional life that produces similar services and products. Organizational fields have horizontal as well as vertical dimensions, shared cultural rules and meaning systems (Scott 1998). The field attribute, refers implicitly to the perception that organizations, even if they are not directly linked to work under similar conditions, present far-reaching similarities in structures and types of relationships. A notion for this congruence is structural equivalence or isomorphism (DiMaggio 1986). Strong correlation in structural form refers usually to a given time period for its founding or to an important impact of public steering. Culture as created and structures as adapted have a propensity to retain for life and thus prone to inertia (Hannan & Freeman 1984).

Another view to describe the hospital environment is to characterize hospitals by their organizational domain. The domain consists of the range of products or services and the types of clients served (Thompson 1967). Hospitals are providers of services and the clients served primarily patients and physicians, other health care institutions and third-party payers (van de Ven et al. 1994). Organizational field and domain are usually related but may be different for individual hospitals depending on the level of care and ways of patient referral.

Organizations can be distinguished according to technical and institutional features. Historically, hospitals have more elements of institutional features characterized by human and social systems providing health care services with ethic and symbolic values (Scott 1998). Accordingly to Scott, “institutions consist of cognitive, normative and regulative structures and activities providing stability and meaning to social behavior” (Scott 1995). Organizations with technical features are task oriented, encompass

materials, production, inputs and outputs, efficiency, resources, markets and thus deal with dependency and uncertainty. Organizations with institutional features are characterized more by expedience or social obligations (North 1990). Outputs from organizations with technical features are assessed according to technical rationality (Pfeffer & Salancik 1978) whereas outcomes from organizations with institutional features by formal rationality (Boyd et al. 1993). The availability of objective measurements differs, thus, for each respective organizational feature. Objective measurements are the rule in technical features (Pfeffer & Salancik 1978). Subjective or perceptive measures are of importance for institutional features (Boyd et al. 1993). This distinction between these two different features is important to understand when investigating reforms of public health care.

The theoretical concepts and the framework presented above can be applied to the Finnish hospital system. The structure of the Finnish health care and hospital system can be illustrated with a triangle. At the base, is the primary health care, above which are secondary and tertiary levels of public hospital care (Jamison et al. 1993). The individual levels reflect professional knowledge and skills of the providers. Specialized care is primarily bound to public hospitals and institutionalized. The professional context is also mirrored in the management of hospitals where physicians have traditionally had a prominent position. To ensure vertical, horizontal and geographical equity of services, hospitals have been bundled to districts and care has been taken to support each level of hospitals with equal technological resources and professional personnel (Specialized Hospital Act 1989). Through legislative measures, isomorphism and structural equivalence have been ensured. Hospitals belonging to the same level have accordingly got the same structure, the same services and the same type of management. Internal culture concords with the level of care. Every municipality, alone or in association with other municipalities, has been obliged to organize primary as well as for specialized hospital care. This has led to municipal ownership of hospitals (Specialized Hospital Act 1989, OECD 1994b). The model of provision of services has been an integrated model. The role of hospitals as important local employers coupled with municipal responsibility for covering costs for care has further encouraged local use of public hospitals. In many rural areas public hospitals have become monopolies supported by a monopsonist purchasing system.

Before 1993, the coverage of public hospital care was based on annual estimations of expenditures and revenues. Revenues came from billing individual municipalities for the actual patient days and outpatient visits utilized. The established units of billing were average running costs per bed and costs per visit. Capital costs were covered through a separate funding program (Preusker 1996). Extra funding at the end of the year was allowed in order to cover negative budgets. The revenues were thus horizontal, each level received an independent and appropriate share of income. There were neither transaction costs nor any thresholds between individual levels of care. The state maintained a strong position in the hospital system because it controlled running costs, capital investments as well as positions for professional personnel.

*Conceptually*, a split between purchasers and providers, introduction of competitive contracting and service related revenues for care, changed the economic environment for Finnish hospital care. Previously, thresholds presented boundaries between different levels of care and patients could freely move across the borders accordingly to their medical needs. These boundaries were provided with economic values. The introduction of the State Subsidy Act pushed public hospital care into a new institutional era – into resource dependence (Friedland & Alford 1991, Scott et al. 1998b). Structural isomorphism and equivalence are demanded by changes in resources and power. Organizational domains are demanded by changes in patient flow and institutional environments arising from the increased impact of technical values and ideas. This theoretical discussion presented gives a background exploring the effects of the changed environment on hospital structures.

## **2.4 Allocation and reallocation of hospital care**

Health care structures can be divided into three distinct parts: raising of revenues for services, allocation of resources for production and providing of services. An analysis of the concepts of health care reforms can be extended to their impact on these three core areas of a health system. Interventions in one field are used to influence another area. The effects of reallocation on health care can thus be measured through its impact on providing of services for care (Saltman 1994b).

Of all of the individual health care sectors, hospital care requires the lion's share of resources i.e. 45 – 70 percent of all expenditures (Edwards et al. 1997). Any health care reform approaching major cost-containment must thus involve hospital care. Of the various instruments pursuing this goal, reallocation has turned out to be a most important one (Saltman 1994b). Financial reforms have neither promoted competition between insurance carriers (Enthoven 1994, Dekker 1994) nor sufficiently enhanced alternatives to affect the supply of health care services (van de Ven 1996, Light 1998). Reforms purely related to providers of services have usually been carried out by first improving the structures supporting them, financing and allocation (Edwards et al. 1997). Reallocation in health care is intended to change in the existing financing allocation mechanism, function or target in order to promote changes in service production or supply. Governments choosing reallocation as an instrument of reform do so to encourage more efficient and effective provision of health care services (Saltman 1994b). Key elements are the creation or promotion of internal markets for services (Enthoven 1978, 1980), centralization or decentralization of allocation (Dekker 1994, State Subsidy Act 1992), and such supporting strategies as mechanisms of contracting (Savas et al. 1997), payment systems for providers of services (Edwards et al. 1997), purchasing mechanisms for pharmaceuticals (Mossialos 1997) and capital for investments in health care (Anell & Barnum 1997). Of these five supporting strategies, three are important for the present study: contracting, payment systems and capital for investments. These will accordingly be discussed in more detail.

The notion of “internal markets or managed competition” goes among others back to Enthoven (1978, 1980) who proposed regulated competition among private providers of health care. Adopted by Thatcher through the White Paper in 1989 (HMSO 1989) and introduced in Sweden and Finland some years later (State Subsidy Act 1992), the concept spread to tax-based health care based on models of integrated delivery of services. This principle of internal markets or managed competition states that the integrated model should be split by separating purchasers from providers of services and by enhancing competition among providers (Enthoven 1980). A tacit expectation is that competition will lead to price competition, to innovative allocation mechanisms for providers and to more efficient and effective care (Kirkman-Liff 1991). Responsiveness to consumers is, furthermore expected to be improved (van de Ven 1996). The basic

principles of equity and access to services are to be retained (Chernikovsky 1995). An implicit view of the concept is, that health care services are to some extent commodities free to be bought and sold (Kirkup & Donaldson 1994). Negotiations on price and quality, including risk taking, should ensure provider compliance. Commitments are to be linked to financial resources (Savas et al. 1997).

There is some evidence supporting the positive effects of creating internal markets in health care systems. Fund-holding general practitioners in England appear to have obtained lower prices and better service for their hospital patients (Glennester et al. 1992). In another example, a higher proportion of health care maintenance organizations in California have led to lower health insurance premiums (Feldstein & Wickziger 1995). Additionally, increased competition among providers in Stockholm has enabled a substantial increase in productivity (WHO 1997). However, the implementation of internal markets has not been without problems (Mason & Morgan 1995). Neither the effects of purchasing (Enthoven 1994) nor the effects of provider competition have been simple to implement. Blurred goals and lack of strategies has continued to be a central problem (Light 1998). Further problems arise from the lack of research evidence of the effects of internal markets (Wildt et al. 1996). As a result, in countries with previous integrated systems the trend is presently to achieve rather a regulated than a free competition between providers of services (van de Ven 1996). In countries already having a split between purchasers and providers (social-insurance), internal markets should further increase competition between providers by shifting the power to purchasers (Light 1998).

Decentralization as well as centralization have accordingly been introduced as a result of implementation of internal markets. Decentralization has been encouraged in order to support markets in integrated systems (OECD 1994a). On the one hand, decentralization promotes flexibility and innovation, better efficiency and commitment via attention to local needs (Borgenhammer 1993). Centralization, on the other hand, has been the trend in insurance-based health care to increase the number of persons with mandatory insurance, to promote purchasing power and to cope with increasing costs (Dekker 1994, van de Ven 1996). Decentralization has shown that several issues of importance (e.g. general monitoring, public safety, framework for health policy) cannot be decentralized



(Borgenhammer 1993) and too much decentralization weakens the purchasing power (OECD 1994b). Only large-scale purchasers have enough negotiation power to force providers of health care services (Light 1998). Too much centralization, by contrast, weakens the effects of competition between insurance carriers and increases the risk for monopsonies (Twaddle 1996).

For hospitals pursuing in an integrated model, introduction of contracting for services means explicitly a new environment. Contracting means here that revenues will be directly related to services provided. Hospitals are financially responsible for providing a specified volume, quality or mix of services at negotiated or regulated prices (Savas et al. 1997). Simultaneously contracting provides a direct link between planning and resource allocation and contributes thus to changes in management.

Contracts have developed along three different lines. Firstly, contracts might primarily be based on blocks or on a budget for defined service (Kirkup & Donaldson 1994). Secondly, contracts may be cost-based or volume-based, where the payment is related to a specific service offered (Savas et al. 1997). Thirdly cost-per-case, where the cost is set on each item delivered (Hughes & Yule 1992). A general trend has been to proceed from universal to more individual and selective contracting with specific providers, and from contracts based on volume and quality to sophisticated contracts including cost-containment, risk sharing and quality assurance (Savas et al. 1997). With more advanced contracting the reliance on more efficient information systems has become more essential. The implications of investments in human resources as well as the role of raising transaction costs with more sophisticated contracting have become more visible (Enthoven 1994). Empirical studies emphasize the size of purchasers (Robinson & Casalino 1995), the need to contract for integrated care or for the entire course of illness (Light 1998). Contracting without good comparative data on price, product, quality and service is not efficient (Miller & Luft 1995). Limited data lead to insufficient purchasing. Patient responsiveness is important but the patient cannot be the purchaser due to the asymmetry of knowledge (Light 1998). Purchasers need an excellent training in order to deal efficiently with contracting mechanisms (Enthoven 1994). Creation of organizations for purchasing takes time and needs investments. Purchasers' needs must be taken into consideration and monitored in order to avoid large variations in use of

resources (Bevan 1998). Both purchaser organizations and other partners involved must be accountable (Enthoven & Singer 1996).

Payment systems for hospitals play an important role in how hospitals use resources. Reallocation of payment mechanisms can contribute to more cost-efficient management of services (Leidl 1995). To cover costs for care, hospital service providers use either prospective or retrospective instruments.

In prospective budgeting global budgets are provided for the hospital for a given period of time. Budgets may be calculated according to the actual costs of a provider unit, historical spending patterns, bed provision, and the population covered or the volume of services provided (Wiley 1997). In retrospective budgeting payments are based on reimbursements for the volume of actual services (fee-for-service payment), patient-days (per diem) or patients treated (case-mix payment) (Maynard 1994, Henshall & Drummond 1994, OECD 1994a, Levaggi 1996).

In prospective budgeting, payment levels for service provision are determined in advance for a predefined period. For cost, both prospective annual budgets and daily-rate payment systems are open-ended. Neither system encourages reductions in the length of stay. Thus, in order to ceil costs induced through hospital stay, case-mix, activity-adjusted, service-based payment and fixed-price methods have been introduced. The main principle is to bind prices to diagnoses (Diagnose Related Grouping, DRG) and to promote incentives for shorter hospital stay (Fetter 1980).

Retrospective budgeting, or payment of resources used, is mainly based on fee-for-services provided and patient-days, and is applied via reimbursement systems (Wiley 1997). Both systems are open-ended regarding total costs and include thus the propensity to maximize income (Rasell 1995).

Reallocation mechanisms deal with incentives for performance-related payment systems in order to reduce the negative features embodied in the two main types of remuneration (Leidl 1995). Thus activity-adjusted prospective budgeting takes into account costs for bed-days or cases as a measure for activity (OECD 1994a). Costs for patients treated in

less time than the mean value for individual cases or more patients treated than estimated, provides the hospital with increased revenues (Leidl 1995). Case-mix-adjusted prospective budgeting emphasizes the activities of hospitals as well as severity of cases treated enabling a more flexible budgeting for individual hospitals (Fetter 1980, Lauharanta et al. 1997). Of case-mix-adjusted systems the Diagnosis Related Grouping (DRG) is the most well-known (Fetter 1980). Originally created in the US, it has been adopted in several European countries including the Scandinavian countries (Lauharanta et al. 1997). The recognition that efficiency can best be assessed where resource deployment is directly related to service production is an important factor in the choice of payment model (Linna 1999). Service-based payment includes the opportunity to measure technical efficiency of allocation (Wiley 1997). When payment is only bound to volume of services, innovativeness and technical efficiency can create potential revenues for the provider. A negative feature is, however, the open endedness of the payment system. Generally, insurance companies and governments support prospective flexible payment systems including incentives for activities.

Capital reflects the infrastructure supporting hospitals, clinics and other technical facilities necessary for providing of health care services. The role of capital for investments in health care has through the reforming process come under new considerations (Anell & Barnum 1997). Changes in investments will thus determine much of the future structure of health care services. At any given point, health care service comprises a mix of technology accompanying current knowledge and understanding of the diseases to be treated.

In particular the development of medical technology and effective treatments with modern drugs have changed clinical routines and thus structures in many areas of hospital care (Davies et al. 1994 Drummond 1994, WHO 1997). For example, mini-invasive surgery has enabled day care surgery, which has in turn removed patients from ward care to home care following their operations (Abel-Smith & Mossialos 1994). Another example is inventional imaging techniques which have made several earlier structures obsolete (Lee 1995b). Modern drugs especially, have changed the picture of patients treated in hospital wards (The World Bank 1993, WHO 1997). Beyond that, advances in medical technology have further impacted on the structures for capital

investments (Anell & Barnum 1997). The capital allocation process for hospitals varies according to structures of ownership and styles of public regulation. In most countries, national (United Kingdom, Finland) or regional governments (Sweden) determine the location and service characteristics of major hospital investments (in Finland the Specialized Hospital Act 1989). In contrast to public-based care, where the role of public authorities has remained, in health care financed by social insurance several models have emerged between state, insurance companies and private funding of investments (Elola 1994, Leidl 1995).

Most of the structures for investments have been developed over decades and are prone to substantial inertia against any changes. In a stable environment, inertia would be a minor problem but in the health care sector faced with rapid change, technology is confronted with economic constraints and structures which impede investment (Drummond 1994). However, simultaneously with development of new emerging technologies, critical voices are raised about the uncontrolled use of modern medical technology and the lack of evidence of cost-benefit and allocative efficiency (Drummond 1994, Edwards et. al. 1997).

The effects of hospital productivity and efficiency have been measured in several studies using different techniques (Linna 1999). Earlier non-frontier measurements (Feldstein 1967) have been replaced with parametric and non-parametric frontier techniques (Seiford & Thrall 1990). While the majority of non-parametric studies have estimated technical efficiency, the parametric techniques are often used to estimate cost or allocative efficiency (Linna 1999). Some studies have used frontier analysis to estimate hospital productivity. Färe et al. (1994) studied productivity changes during the period 1975-1980 using Malmquist indices. In Finland, Harkki (1994), Linna and Häkkinen (1995), and Linna (1995) have studied technical respective cost efficiency. Alander et al. (1990) and Pekurinen et al. (1991) have studied hospital productivity in Finnish hospital care. Most studies related to productivity and efficiency cover earlier time periods and are not connected to the time of the reforming process.

Studies combining efficiency and productivity with health care reforms are few. Tambour & Rehnberg (1997) found higher technical efficiency in hospitals with

performance-based reimbursement. Gerdtham et al. (1999) were accordingly able to measure increased technical efficiency resulting from internal markets. Söderlund et al. (1997) demonstrated an increased productivity in English hospitals during the first three years of internal markets. However, Magnussen & Solstad (1994) could not find any significant relationship between the means of allocating and efficiency in Norwegian hospitals. Linna (1999) using Malmquist productivity indices was able to measure a significant productivity increase in the year 1993-1994 i.e. during the first year of the reform in Finnish public hospitals. Most studies in these matters have covered a relative short observation period.

*Conceptually*, financial reallocation in health care has mainly been introduced in order to enhance more efficient provision of services. The concept of internal markets has been introduced in several countries. Despite an early onset there is still much to research. There is a lack of clearly defined goals, lack of appropriate strategies and research regarding internal market efficiency. Results from decentralization and centralization of health care services should be critically evaluated and discussed. Introduction of contracting or improved contracting as well as purchasing systems have preliminarily proved to increase the commitment of providers of services but simultaneously disclosed several areas for further investigation (Light 1998). New investments in health care are confronted with a clash of old structures and demands for use of new technologies (Anell & Barnum 1997). There is a need for a more comprehensive understanding of the role of new technologies in health care systems. Finally, changes in hospital productivity, technical and allocative efficiency measured by different methods, points on a positive effect of financial reallocation (Linna 1999). Most studies however, cover only a short observation period and more systematic knowledge is needed long-term.

## 2.6 Changes in hospital structures

The total number of beds for acute hospital care has fallen in several western countries during the past two decades (OECD 1996, Marjomäki et al. 1996). In most cases there has been a real reduction of beds. In other cases there has been a redistribution of beds between other providers of care (OECD 1996). Reductions in hospital beds have been promoted through several reasons such as: changes in ordinary services and improved medical technology (Drummond 1994), changes in payment systems for hospital services (Savas et al. 1997), introduction of gate keeping (Toon 1994), changes in hospital discharge routines (Lawrence & Hall 1999), development of alternative social and medical care and institutions (Warner 1996, van Beekum & Haerkens 1992) and focusing on core functions in hospital care. Whereas reduction in beds due to changes in ordinary services has been taking place for a longer time, all other categories driving reductions of hospital beds have strongly been promoted through the reforming process of the health care system. The most impressive reductions in the numbers of hospital beds have occurred in the Eastern European countries where the health care reform has changed the whole attitude to hospital care (WHO 1997)

Refinement of basic diagnostic and therapeutic services have enabled changes in treatments and in reduction of necessary hospital stay (Lawrence & Hall 1999). A better empirical knowledge of diseases treated and their outcome has in many cases reduced the need for hospital stay. For example, patients with acute myocardial infarction, once treated for 6 - 8 weeks in hospitals can now safely be discharged within a week (Madsen 1983). Developments of new drugs have more than any other medical intervention changed the needs for hospital referral and length of hospital stay (Butwell et al. 2000). As a result some patient groups have almost disappeared from hospitals and in other cases the length of hospital stay has been reduced to a minimum as compared to previous treatment modes (Pottick et al. 2000). Improved treatments and new drugs have not only shortened the hospital stay and thus the need for beds, they have accordingly changed the population of patients treated in hospitals (Butwell et al. 2000).

Development in medical technology for diagnostic and therapeutic purposes has reduced

the need for hospital stay. For example, computerized tomography and magnetic resonance imaging have both shifted hospital dependent diagnostic procedures to outpatient clinics contributing to a reduction of hospital beds (Lee 1995b). Another example is local dilatation of coronary artery stenosis. Percutane transluminal angioplasty of stenosed coronary arteries has in short time become an important alternative to coronary bypass surgery in patents with ischemic heart disease, reducing the needs of hospital resources (Heikkilä et al. 2000). Furthermore, dialysis or treatment of patients with severely impaired kidney function is now in many cases used by patients at home or in outpatient clinics (Dimkovic & Oreopoulos 2000).

Day case procedures have been adopted in several countries to improve efficiency (Abel-Smith & Moissalos 1994). Mini-invasive surgery has enabled shortening of hospital stay. Experience from minimal access techniques offers a shift in production of hospital services, from wards to outpatient clinics and from inpatient care to community aftercare (Abel-Smith & Moissalos 1994). What is uncertain, however, is whether day-care represents a real cost saving compared with previous care procedures. It is probable that some of the increased admissions to hospital care are due to increased use of new techniques, through supplier-induced demand (Edwards et al. 1997).

It is well known that inappropriate use of hospital beds and services remains. In a survey including European countries 0.7 – 14.6 % of admissions and 2.0 – 62.0% of hospital beds are in inappropriate use (Baré 1995). This great variation arises from to the nature of hospitals, the clinics evaluated and the measurement techniques. Within countries, too, huge differences exist in the use of hospital beds and accordingly also difference in their inappropriate use (Roland et al. 1994). A major reason is the variation in inappropriate clinical use of services for care. However, the variation cannot be explained only on medical grounds, it is probably also a consequence of individual clinical judgement (Winell et al. 1993).

Measures to improve the appropriateness of admissions as well as discharges from hospitals have been emphasized. Gate-keeping has been supported by the primary care (Elwyn & Scott 1994, Lindström et al. 1994). Improvements in drug treatment and use of modern medical technologies have reduced the need for hospital admissions

(Edwards et al. 1997). Vertical downward integration of specialist-based care and services into primary care have in general meant a reduction of patients referred for hospital care (Connett 1993, Rossi 1993, Swift 1993).

Discharges from hospitals have been promoted through improvements in clinical management and measures to expedite discharge once appropriate (WHO 1997). Use of DRG has enhanced early discharge (Lauharanta et al. 1997, Cots et al. 2000). More effective are measures improving discharges of patients not benefiting from hospital care (Rathwell 1997). As a result, the role of post-hospital care either as community care in nursing homes or equivalent means such as home care has developed rapidly in many countries (Warner 1996). In some countries, penalties for community care have been imposed for delays in dealing with patients in good time (Rathwell 1997). Improved after care, either based on community care or home care have reduced the demand for hospital beds and led to an increase of beds in the primary care. The impact of hospital displacement of patients on total health care costs has not convincingly been evaluated (Kane et al. 1998).

Cost-containment demands coupled with achievements in reducing transaction costs have spurred several hospitals to outsource non-core hospital functions. Accordingly, sources and personnel related to cleaning, laundry, catering and maintenance functions as well as to accounting have become targets for evaluation.

Despite decades of reforming hospital care and structures, there are still gaps in evidence and knowledge of hospital planning (Rathwell 1997). The role of economies of scale, i.e. centralization and advantages of greater size need further investigation (Department of Health 1995). The relationship between quality of outcome and volumes of services provided remains unclear (Fram 1989). The effects of reforming on hospital productivity and efficiency should be established by long-term studies (Linna 1999). There is still no agreed definition of what constitutes an effective hospital (WHO 1997). The role of new medical technology on care and costs need more dissemination before acceptance or replacement of older structures (Davies et al 1994, Drummond 1994).

*Conceptually* hospitals have undergone several changes during the last two decades and the reasons therefore are many. In particular the numbers of beds have been reduced due



to changes in ordinary services, through changes in medical treatments and improved technology. Changes in discharge routines, development of alternative medical care institutions have further resulted in a reduction of hospital beds. Day case procedures have displaced several treatment procedures from in hospital stay to outpatient clinics, shortening further the need for ward treatment. Much of the structural changes in hospitals are results of improvements in medical treatments and technology. Important further are the increased pressures on cost-containment induced by health care reforms. Structural changes in hospitals as a result of health care reforms are easily observable, but more knowledge is needed to understand of the long-term effects and outcomes of the reforms.

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### **3 Theoretical approaches**

This chapter reviews the literature relevant for the present study of apolitical changes of hospital health care institutions. It is of importance to review literature of interorganizational relationships, since these relationships play a central role for static as well as for dynamic functions of institutions and their structures. A knowledge of interorganizational forces forming structures will implicitly also deepen our understanding of the role of debundling vectors. This part also establishes a context for more specific reviews related to individual parts of the present study is established. The themes to be reviewed are

- institutional theory
- deinstitutionalization theory
- professional theory
- resource dependent theory
- agency theory

Each approach is, primarily, reviewed through its empirical literature supporting its central meaning and, secondarily, extended to cover the topic of the present study. Finally, the approaches are summarized and discussed in the context of the theme of the present study.

### 3.1 Overview of research on environmental structural relationships

Organizations of different nature are a typical feature of the modern state. Various organizations are involved in all parts of society and in a most diversified matter. To fulfill their commitments, organizations have different goals, values, norms, roles, interests, actors, participants and structures in accordance with the environment they serve.

Typologies characterizing organizations often divide them into rational, natural and open systems (Scott 1998). Of those, the open system view of organizations is particularly useful for studying environmental structural relationships. The view emphasizes openness and close relationship and dependence on environmental influences. Viewing organizations as open systems, Scott states: “ Organizations are systems of interdependent activities linking shifting coalitions of participants; the systems are embedded in – dependent on continuing exchanges with and constituted by – the environments in which they operate” (Scott 1998). This view does not only emphasize the environment, but it simultaneously recognizes the importance of the environment for viability, performance and survival of the organization. Organizations reflect the environment where they exist and they take actions to adapt to their environments. Simultaneously, organizations influence their environments (Evan 1966).

Due to the great variety of organizations and numerous environments, research into organizational relationships and behaviors has a diversified nature (Pfeffer & Salancik 1978, Oliver 1990, Mintzberg & Quinn 1991). From the view of research, it is therefore important to early enough define the level of environment for investigation, since strategies and structures are determined by the level defined. A social psychological environmental level highlights interaction of individuals (Leavitt 1965). A structural environmental level is related to interventions on structural features or organizations (Bourdieu 1985). The ecological level envisions the organization as a larger entity or actor in a comprehensive system of relationships (Hannan & Freeman 1989, Baum 1996).

The present study deals in principle with two levels of the environment, the ecological and the structural level. Of these two, the ecological level is the primary focus affected by environmental demands and changes in the structural level follow accordingly. To enable a more meaningful study of the ecological level, Evan (1966) discusses the organizational set whereas DiMaggio and Powell (1983) focus on the organizational field. Organizational set reflects a single organization and its domain (Thompson 1967) and is useful for the study of individual institutional organizations (Porter 1980). The organizational field, on the other hand, covers a recognized area of institutional life and organizations producing similar services and products (DiMaggio & Powell 1983). The concept of organizational field is, thus, useful for the study of groups of institutions expressing a comprehensive structural equivalence and isomorphism (DiMaggio 1986, Scott 1995, Ruef et al. 1998, Scott et al. 2000). The two environmental ecological levels, organizational set and organizational field give an appropriate research approach to the present study of individual hospitals (set) as well as groups (field) of hospitals (Scott 1993, Ruef et al. 1998).

Of interest for the present study are environments impeding on organizational structures promoting technical and institutional features (Meyer & Scott 1983, Meyer et al. 1983, Scott 1995). Institutional features include primarily symbolic and cultural factors affecting organizations. Technical environments are more related to resources and the use of them (Scott 1998a). Moreover, technical environments are more connected to production or transforming of inputs into outputs and, thus, dependent on materials and resources for a certain market (Scott 1993). In health care organizations and in organizations of sociology, institutional features of environments are the tradition, but with the changing demands in the society the importance of technical environments have been emphasized (Scott 1993, Robinson 1994, WHO 1997). A change from institutional to technical environment, even in a modest proportion means a change in the corresponding organizational structure (Alexander & D'Aunno 1990).

There is a comprehensive body of literature about environmental reasons that promote structural changes in organizations. The role of the government (DiMaggio & Powell 1983) and of professions (Scott 1985) pursuing structural influence through legislation, rules, values and cultures have been confirmed. Changes in internal or external resources

such as personnel, knowledge, material and financing create tensions and promote structural adaptation (Pfeffer & Salancik 1978). Demands on organizational legitimacy (Meyer & Rowan 1977, Meyer & Scott 1983), conflicts between social and economic objectives enhance deinstitutionalization and structural changes (Oliver 1992). Changes in institutional culture and value systems are mirrored in structures (Zucker 1983). Changes in interorganizational relationships through, mergers, acquisitions, forming of joint ventures or other forms of cooperation are reflected in the organizational structure (Oliver 1992). New technologies require organizations to structurally adapt, increased competition promotes heterogeneity of environments and debundling of isomorphic structures (Hannan & Freeman 1989). Changes in goals and tasks are natural sources for structural changes (Oliver 1992). The impact of politics cannot be neglected as a reason for structural changes (Lucas 1987). The vast literature on environmental structural relationships confirms the close dependency on environment and organizational structures. Organizations viewed as open systems are not only influenced by their environments but depend on the interactions with elements outside their boundaries as a condition of their continued viability (Scott 1993).

This overview has briefly discussed some essential issues of environmental structural relationships and emphasized the level of environment, entities of structural features and the multitude of environmental changes that impact on structures. From the point of research, its therefore important to clearly enough define each category under investigation.

### 3.2 Institutional theory

Through the years several institutional theories have emerged (Selznick 1957, Scott 1987, Zucker 1987, DiMaggio 1991). Selznick's study of "institutionalization as a process of instilling value beyond the technical requirements of the task at hand" held a central position in the early theories of institutions (Selznick 1957).

Berger & Luckmann (1967) focus on institutionalization as a process of creating reality through moments of externalization, objectivation and internalization. Externalization reflects actions taken to support an institutional approach; objectivation represents a shared vision of actions; and internalization an internal consciousness and commitment to a common goal (Wuthnow et al. 1984). Meyer & Rowan (1977), support the view of Berger & Luckmann and emphasize institutionalization as a process of social character including rationalized institutional elements or "rational myths". Zucker (1983) contributes to the view of institutionalization by discussing the problems of conformity for common understandings about what is appropriate and meaningful behavior. Meyer & Rowan (1977) elaborate even further in their analysis of institutions by emphasizing institutionalization as a class of elements. Institutions as organizational environments have also symbols, cognitive systems, normative beliefs in contrast to technical elements, which must be considered as important elements (culture) of individual institutions (Meyer & Rowan 1977). An extension of these ideas are the concepts developed by DiMaggio & Powell (1983) describing the conformity or isomorphism of similar institutions. According to DiMaggio & Powell (1983) conformity is further promoted through coercive, mimetic and normative processes supporting features of isomorphism as an impetus for organizational fields.

Institutions as distinct social spheres have further roots in the traditional early view of sociology (Hughes 1939). Based on social beliefs or socially organized practices, for instance family and religion, institutions have a strong cognitive and normative character or institutional logic. Accordingly, organizations are deeply rooted in the tradition of the society (Hertzler 1961, Friedland & Alford 1991).

Where early "institutionalists" are more oriented to values (Selznick 1957) and to the process of creating realities (Berger & Luckmann 1967), new institutionalist give more

weight to “structured cognition” (Selznick 1992). The formal structure of institutions must itself be an adaptive product, responsive to environmental influences, including cultural definition of propriety and legitimacy (Selznick 1996).

Other empirical studies center more on institutional arguments explaining features of organizational structure. Scott unerringly describes the present status of interest: “while there is little disagreement among analysts that institutional elements affect the structural characteristics of organizations, a review of the current literature suggests that there is little agreement as to how, and why and where – in what parts of the structure - such effects occur” (Scott 1987). Accordingly he identifies seven different accounts of structural influence, accounts that primarily impact on single elements of institutions, on causal mechanisms and on specific aspects affecting organizational structure.

Until the introduction of institutional conceptions, organizations were viewed primarily as production or exchange systems and their structures were shaped by their technologies, their transactions or dependency relations as a result of interorganizational relationships (Oliver 1991). Organizational environments of this nature have traditionally been adopted as “technical” (Scott 1995). More recently institutional research has recognized also other main forms of environments with more symbolic and cultural factors affecting organizations and structures (Scott 1995). Depending on the view of institutional systems, either regulative (North 1990), normative (North 1990, Williamson 1994), cognitive (DiMaggio & Powell 1983) or cognitive-cultural (Powell & DiMaggio 1991) features and structures are emphasized. Institutional features are common in organizations with social functions, in health care (Scott 1993) and in organizations related to education (Meyer, Scott & Deal 1987).

Several factors influence modern institutional forms and structures. DiMaggio & Powell (1983) recognize in particular the states and professions as main contributors. Given the power, states exercise influence through legislation, rules, coercion, obligations, politics and other forces to gain centralized control and create bureaucratic arrangements (Simon 1983). Professional contexts in contrast, strive for more decentralized power and control of resources (Scott 1993).

Institutionalization is primarily an adaptive process, either active (March & Simon 1958, Rødsvik 1996) or passive (Selznick 1957). Selznick characterizes institutionalization as a process by which an organization “takes on special character and achieves a distinctive competence or a trained or built-in capacity” (Selznick 1996). Institutionalization as well as structural changes within institutions are prone to inertia (Hannan & Freeman 1977, 1989). Constraints to change have a complex background due to cultural, structural, hierarchical, financial, personnel and other factors resisting incurred habits (Hannan & Freeman 1989). Therefore, according to Mezas and Glynn (1993) and Ruef (1996) changes in institutions and structures are often incremental, reflected in refinements of existing systems and technologies.

### **3.3 Deinstitutionalization theory**

Alongside the theory of institutionalization, a counter theory has evolved, namely the theory of deinstitutionalization (Oliver 1992). Thus, whereas the former theory explains the theoretical framework of how institutions form, the latter explains the forces debundling prevailing institutional structures.

Deinstitutionalization is expected to occur when forces diversifying or promoting change exceed the ideas and values supporting the present structure. A rejection of the dominant belief system defining how resources are allocated and how authority and power are distributed (symbolic capital) contributes to deinstitutionalization (Benson 1975, Bourdieu 1985). Hence, changes in environmental factors play, thus, an important role driving the deinstitutionalization process. However, forces impeding debundling can originate not only from external but also from internal sources.

Oliver divides antecedent mechanisms promoting deinstitutionalization into political, functional and social pressures (Oliver 1992). She further distinguishes organizational and environmental levels of analysis. Organizational political pressures arise from mounting performance crisis (Bartunek 1984), from internal conflicting interests (Meyer & Rowan 1977), from increased innovation (Zucker 1988) and from political pressures caused by changes in external dependency (DiMaggio & Powell 1983, Oliver 1992).

Changing economic utility (Covaleski & Dirsmith 1988), increasing technical specificity (Meyer & Scott 1983), changes in resources (Scott 1983), increased resource dependency (Perry & Rainey 1988), emerging events and new data (Oliver 1992) will promote functional pressures and deinstitutionalization (Rødsvik 1996). Societal pressure arises through changes in values and rules for institutional function (Tolbert 1988), through increasing social fragmentation and structural disaggregation (Walter 1985) and through decreasing historical continuity (DiMaggio 1986). Changes in legitimacy and societal acceptance, changes in power i.e. finance, knowledge or position within societal networks, will induce deinstitutionalization forces and restructuring (Becker 1999).

Among the external environmental pressures, changes in governmental regulations are likely to deinstitutionalize past practices (DiMaggio & Powell 1983, Oliver 1990). Changes in resources, in external financial support and economic dependency are, thus, strong forces impeding deinstitutionalization. Conflicts between social and economic objectives will lead to deinstitutionalization when the technical and economic operations are increasing. This can occur through changes in environmental demands, or by intensified competition among organizations, which emphasizes the importance of efficiency, effectiveness and productivity over organizational success (Oliver 1992).

Against the many forces causing debundling, several resisting or moderating forces emerge once the process has been initiated. Tushman & Romanelli (1985) discuss the role of organizational inertia built in institutions and organizations through values and culture. Similarly Hannan & Freeman (1989) have pointed out that there is resistance to change or inertia as a result of investments in fixed assets, whereas Miller & Friesen (1984) emphasize the role of internal coordination requirements as a source for inertia. Pfeffer & Salancik (1978) discuss inertia as a mode to deal with uncertainty. Zucker further emphasizes entropy as an opposing force on the organization in moderating the pace or velocity of deinstitutionalization (Zucker 1988).



### 3.4 Professional theory

Complexity, uncertainty and interdependence of work have each an important role in formation of organizations and structures (Mintzberg 1998). Technical complexity, however, does not a priori give rise to more complex organizations and structures. In many cases complex organizations and structures can be replaced by persons with extraordinary skills and knowledge i.e. that is by professionals (Etzioni 1969, Maister 1998). A high degree of uncertainty and low action of interdependence is conceptually a task for a professional person. With increased complexity, uncertainty and interdependence, professionals tend to formalize more organizational structures reflecting division of labor and specific skills (Abbot 1988). Having different professions within institutions leads often to hierarchical structures and to organizational cultures of specific professions, which want to control and to legitimize power dominance (Etzioni 1969, Saltman 1987).

Professions promote a structural organization but beside this, they support a certain degree of individual freedom based on specialized and theoretical knowledge (Freidson 1970). Scott distinguishes two professional entities of organizational performance, the autonomous and the heteronomous (Scott 1965). Autonomous professionals have a high degree of autonomy, including rights to set their goals and standards of performance. Examples of autonomous organizations are universities, scientific institutes and hospitals (Wallace 1995). Heteronomous organizations have less autonomy, and are usually more subordinated to officials and administration (Scott 1965). Examples of heteronomous organizations are previous autonomous organizations, which are subordinated for some reasons. Thus, whereas in the past physicians and lawyers for example, worked as independent practitioners, today they are more often members of a larger group of experts and tied in with health care centers or law offices respectively.

Professional organizations exercise their control usually through cognitive and normative processes. More than other groups, professional organizations are prone to rule and control by belief systems and myths (Meyer & Rowan 1977). Control is exercised by defining reality and ontological frameworks, positioning distinctions, creating typifications, principles or guidelines for action (Scott & Backman 1990).

### 3.5 Resource dependent theory

The resource dependent theory is an extension of the social exchange theory, dealing with power and dependency in interorganizational relationships (Pfeffer & Salancik 1978) in particular in short-term relationships. The theory emphasizes the adapting of management and processes by firms or other organizations to environmental changes and dependencies.

Organizations are dependent on their environment and resources available. Structures and organizations can, thus, not be understood and studied without knowledge about the environment where they operate (Aldrich & Pfeffer 1976). Changes in environment due to political, legal, financial, material or other reasons will have an impact on organizational structures and the behavior of organizations when they deal with these challenges (Hannan & Freeman 1989). The dependency on external resources gives rise to repercussions in both the external and the internal characters of organizations.

The importance and scarcity of resources is reflected in the dependency or power relationships between organizations. This power is directly related to the importance of the resource and indirectly to the number of potential suppliers (Pfeffer & Salancik 1978, Hannan & Freeman 1989). Active control and management of this game of dependency are important for survival short-term and long-term (Pfeffer 1981). Active buffering and selection of environmental resources rather than adaptation is reflected in internal structures of organizations (Aldrich & Pfeffer 1976). Principles and mechanisms of active change are, thus, important cornerstones of the resource dependent view.

Due to the variation of environments, there is a wide diversity of research into resource dependence. Among those well known is the view presented by Pfeffer & Salancik (1978) about the external control of organizations. Rooted in the view of open systems, the structure and behavior of organizations is based on their environment. Their dependency on the environment is the obverse to power (Emerson 1962, Pfeffer & Salancik 1978).

### 3.6 Agency theory

Agency theory focuses on interrelationships between partners linked in a form of agency. The agency theory deals with contracting and how to deal with uncertainty in contracts (Eisenhardt 1988).

Agency relationships arise between individuals, customers, organizations, institutions, firms and others. To form an agency relationship at least two partners are necessary, the principal who engages and the agent who performs the task agreed (Jensen & Meckling 1976). Principal and agent relationships usually include some freedom of action for the agent to act. Due to the necessary freedom for the agent and the asymmetry of knowledge, the interests of the partners may diverge or cause goal incongruence. This asymmetry might result in two main types of problems; moral hazard and adverse selection (Eisenhardt 1988). Both problems are related to the agent. In moral hazard the agent purposefully does not act as agreed, by over- or undercutting the agreement (Lee 1995a). In adverse selection the agent does not have the skills to fulfill the agreed commitment.

Risk sharing and managing of information in order to cover the asymmetry of knowledge play therefore an important role in contracting procedures. Observed from this point of view agreements often lend support to and sustain systems of complex cooperation. Also principals are interested in monitoring actively the actions or the outcome of an agent (Dranove & White 1987). The agency theory supports efficiency-maximizing arrangements through incentive alignments (Williamson 1985)

### 3.7 Interlacing of theoretical approaches to the present study

The theoretical approaches presented in the present study contribute to the study of theoretical and as well as of practical apolitical changes in public hospitals as institutional organizations, which result from environmental change. The individual approaches touch upon different aspects of expected institutional dissipation and together endorse a better understanding of apolysis.

The *institutional theory* envisions the public hospitals as homogeneous isomorphic institutions. Public hospitals have a long tradition. Their structures, functions and personnel have for years been steered centrally promoting a high degree of conformity to ensure equity of care as a social good. Constraining and normative processes underpinned by a strong professionalism have contributed to an internal culture based on traditions and legends. The hospital functions have been ensured through tax-based financial support and social authenticity. The environment has been unchanged for decades ensuring institutional stability.

Institutional theory presents hospitals as institutional organizations (Scott 1993, Ruef et al. 1998, Scott et al. 2000). Not only their culture, values, norms and rules but also myths are characteristic for a specific institutional environment, in addition, their tasks, functions, structures etc. too, all have been studied in the light of institutional theory (Scott 1993). Buckley was among the first discussing hospitals as open systems communicating with their environments (Buckley 1967). Freidson has emphasized the occupational environment of medical systems and hospitals as institutions (Freidson 1970, Freidson 1984). Scott underlines the role of medical science and technical achievements in forming of hospitals as institutions (Scott 1993). The role of legislation and views of social politics have been recognized in all forms of health care systems and for hospitals as specific institutional environments (Specialized Hospital Act 1989, Niemelä & Jämsen 1995).

The major health care reforms in the industrialized world have initiated a discussion on the values and ideas of the present institutional hospital function (WHO 1997). Due to the content of the reforms, which place demands on efficiency, effectiveness and

increased productivity combined with cost-containment, the institutional environment of hospitals is challenged through more technical environments (Scott 1993, Ruef, Mendel & Scott 1998, Kurunmäki 1999). The reforms have ushered in a new era, one with a different institutional logic (Scott 1998), where the direction is known but so far the knowledge about the outcome is conspicuously restricted. The institutional theory as an appropriate tool for evaluation of the initiated changes is therefore used to promote a deeper understanding of the structural changes in the hospital organizational field. The theory provides a lens to study the present hospitals and similarly a tool to evaluate changes in hospitals as institutional organizations.

The *antecedents of deinstitutional forces* contribute to understanding of reasons rejecting previous institutional features and structures (Oliver 1992). According to the theory, the forces originate either from the internal (organizational) or the external environment both of which affect values and constructs of institutional life. Rejection occurs when dissipating forces exceed those promoting institutional conformity. Empirical studies evaluating long-term effects of deinstitutionalization mechanisms and outcomes in hospitals are few in relation to numbers of ongoing reforms of health care systems in the industrialized world (Scott 1993, WHO 1997). An important reason is the relative short time period since introduction of reforms of health care systems (Rathwell 1997, Light 1998, Scott et al. 2000). Where earlier reasons for deinstitutionalization were mainly internal and based on changes in medical treatments of individual diseases (often infections) or improved medical technology (Abel-Smith & Mossialos 1994), recent reasons are more external and connected with measures resulting from economic scarcity (WHO 1997). Thus, more effective treatment methods of several infectious diseases have resulted in reductions of beds or closing of whole hospitals. Accordingly improved medical technologies have challenged the need for in-house medical investigations by transferring the procedures for diagnostic search and treatments to small and effective outpatient clinics. As a result of this development, an important driving force for hospital deinstitutionalization is financial (Saltman & von Otter 1992, WHO 1997) often supported by legislative measures (HMO 1989, State Subsidy Act 1992) and changes in authority control (Saltman & von Otter 1992, Preusker 1996). Scott et al. have in a study emphasized deinstitutionalization factors

and their influence on hospital size, institutional boundaries, on new vertical and horizontal linkages (Scott et al. 2000).

The *role of professionals* in hospital care is important. Hospitals, originally built for care of seriously sick patients have from early times been the place where medical knowledge is accumulated, learned and used to treat patients. Thus, they have gathered together highly skilled people, among them physicians, into institutions where interdependence of work plays an important role in formation of the organizations and structures. Hierarchical complexity, ethical values and rules have been intimately interwoven and formalized to a normative behavior. Legitimacy through services provided, financial independence over decades and authorization through legislation, have further affirmed the structures of hospitals. A central role of professionals has also been mirrored in the management of hospitals (Scott 1993, Mintzberg 1998).

Increased economic constraints and economic scarcity have generated pressures for changes in hospital professional cultures on several levels. A managerial corporate culture has been proposed (Alexander & D'Aunno 1990) due to increasing demands and market orientation (Dent 1993, 1995). Scott et al. have confirmed a decline in professional dominance long-term and its replacement with managerial control and market mechanisms. Increased specialization, increased concentration, increased integration and diversification are now characteristic features of the changing health care system in North America. The autonomy of professional culture has faded on its way from individual to group- and networking, and from general to more specialist-oriented context of health care services (Scott et al. 2000). Outsourcing and increased privatism have increased at the cost of a previous mixed culture.

Changes in financial allocation, changes in power and resource dependency for services, demand for a new era of “institutional logic” (Scott et al. 1993), where managerial skills and features become more important. Demands for efficiency, effectiveness and increased productivity and promotion of micro economy through competition are instruments widely employed in general by other professionals than physicians. The professional theory gives a tool to understand the distinctive nature of professional

hospital culture, and the emerging forces debundling previous structures, functions and processes for hospital services.

Hospitals and health care services in general are appropriate targets for research related to resource dependence (Alexander & Morrissey 1988). Alexander & Morrissey (1988) examined the determinants for hospital entry into contract management. Van de Ven & Walker (1984) discuss how the role of consensus of resource dependence determines the outcome of interorganizational relationships. Zinn et al. (1998) evaluated the role of total quality management in nursing homes. Zakus (1998) extended his study to primary health care services and to the configuration of services to local needs. Ruef et al. (1998) compared dependency of hospital and home health agencies. Local resource environments interact with interdependencies of provider populations.

Reallocation of specialist-based public hospital care from a planning allocation system to a competition-based resource dependent system has destabilized the platform for hospital care (State Subsidy Act 1992). For public hospitals, providing health care services is not anymore feasible without knowing the source of payment. Problems with income budgeting have resulted in problems with covering the expenditures, and requirements on increased economic control of costs and restructuring of frameworks for providing hospital services.

Health care services have all the features of multilevel agency relationships, from dyadic relationships between patients and physicians to interactions between health care organizations and third party payers (Dranove & White 1987, Blomqvist 1991, Lee 1995b, van de Ven et al. 1994). In health care systems based on social insurance the role of third party payers as principals for patients has been broadly recognized and discussed (Enthoven 1978, 1994, van de Ven et al. 1994, Tabbush & Swanson 1996, Wiley 1997). In social security systems, the agency relationship has less been a target for discussions. As long as services have not been connected to transactions of payments or with symbolic payments, providing of services have been more an agent relationship between patients and physicians, based on ethic and professional values. Monitoring and information systems have more been governed by moral importance than by the needs to

control functions. The asymmetry of knowledge has been a less serious problem, since the main intention has been to provide the patients optimal well being and health.

Contracting and transactions of payments for health care services provided have changed the agent-principal relationship. Services are bound to economic values, increasing the need to cover the asymmetry between the partners involved (Dranove & White 1987). In order to overcome gaps of information and asymmetry of knowledge, agents have developed DRG-systems (Fetter 1980), quality programs and accreditations by public officials (Saltman & von Otter 1992). Normative treatment standards (The Cochrane Library 2005, Käypä hoito 2004) have been supported by several societies of physicians in order to control the content, the standards and the processes of health care services. For many public and private agents, the role of gate keeping has been enforced (Franks et al. 1992). Sharing of medical investigations and treatments between principals and agents have in some cases replaced a previous system with a single agent providing the whole set of services. Introduction of penalties for inefficient displacement of patients in public health care has altered the responsibility of principals.

The theoretical approaches discussed above contribute to different theoretical issues raised as a result of financial reallocation of public hospital care. The perspectives are complementary and they contribute to a better understanding of hospital adaptation and new structures emerging as a result of adapting to a changed environment. The institutional and deinstitutionalization theories are a priori contradictory but complementary in their task to explain the importance of institutional adaptation to environments. The professional theory contributes to understanding of the new institutional logic and culture emerging, whereas the resource dependent and agent theories help to understand the adaptation to changed power balance.

The theories together form the framework and basis for the development of research hypotheses confirming different natures of apolysis. The purpose of the hypotheses is to achieve a more comprehensive view of financial reallocation of public hospital health care and explicitly on its apolitical impact.



## 4 Apolysis as a concept in organizational change

Apolysis derives from the Greek language and describes a phenomenon of debundling, separation or setting free. Apolysis is a word created for the present study from the prefix *apo* = derived from or implying separation, and *lysis* = dissolution, setting free. Apolysis has to some extent been used to describe the separation of the old exoskeleton from the underlying epidermal cells in arthropods, but in relation to organizational behavior it's now used for the first time. The word apolysis is here used in a far much broader sense.

Apolysis is used to describe a change from a previous condition, status or position. A proper use of the word should describe the preliminary condition as well as the change(s) taken place. The prevailing condition gives us the basis for analysis and the content of apolysis is reflected in such issues as: has it occurred (yes or no), what has occurred (outcome), how has it occurred (process), to what extent (magnitude) and what are the consequences (association, causality, significance). Applying the concept of apolysis to the present study means to describe a priori the environment for research, the dimensions of the concept and the framework. The content and meaning of observed changes will be fulfilled through the empirical part of the present study and discussed accordingly later in the study.

### 4.1 The environment

The environment for the present study is the specialist-based public hospital care in Finland. The ecological level of organizations explored consists of groups of hospitals (organizational field) (DiMaggio & Powell 1983).

## 4.2 Dimensions of apolysis

The changes that are researched are the transitional stages of public hospitals as a result of financial reallocation. A debundling and a deinstitutionalization is expected to occur on several levels and the challenge therefore is, to approach the context on a broad basis. In order to understand the content of the concept “apolysis”, it is studied in four dimensions: structural, operational, contentual and contextual changes.

*Structural*, this concerns *physical properties and proportions of institutional structures*. Conceptually institutions can be divided into *internal* and *external* structures. In a case of a hospital the *internal* structure is the services provided and expressed in the departments for health care, by the physical properties of wards and numbers of beds and by the characteristics of outpatient clinics. Concurrent with departments for health care there are several other internal units and divisions of decisive importance for proper functioning of hospitals, such as units for laundry services, catering, cleaning, logistics, departments for hospital technology and the offices for management. Important components of structure are the staff and the distribution of personnel.

In addition to the internal physical structures of institutions, *external* structures of institutions are expressed in the structures and the limits of their activity. For hospitals, these consist of patients served, the area or market provided, the purchasers of services, partners involved, authorities, other firms and enterprises in relationships with hospitals and the governance reflecting the legitimacy of hospital functioning and societal acceptance. For hospitals, the structure has, thus, a complex multi-dimensional framework, which is closely adapted to their functions and tasks. A sudden change in financing of hospitals changes the basis for confidence by introducing external power and resource dependency, and the accompanying problems of how to deal with uncertainty. The institutional pressure introduced threatens the long-term stable environment of hospitals, and as a consequence demands new solutions for a continued existence. Structures, internal as well as external, are in focus for apolysis and reconstruction.

*Operational*, this concerns changes in *policy objectives, changes in strategic planning and managerial functions*, and changes in *demands on performance*.

Induced resource dependency is directly related to the number and type of services provided and emphasizes the need for new goal setting and, accordingly, a new strategy. The changed environment advocates a different type of management because of the increased role played by the “production” of services. Resources needed and used for providing of services, i.e. the incurred costs, must closer than before be covered by the revenues earned by selling services. For public hospitals, the tacit knowledge of costs and economy places the provision of health care services as social good in a new setting.

In theory, institutional features of hospitals will be replaced with more technical features, and price setting and packaging of services provided. This also sows the seed for health care services to become commodities. Introduction of concrete resource dependency presents, in principle, a threat for the previous institutional era characterized by social equity of health care resources; also, it introduces a new institutional era of managerial control and market mechanism.

*Contentual apolysis*, or functional apolysis is used to describe *changes in services, in the content and in the mix of services and modes of services provided*. Conceptually contentual or functional apolysis is closely related with structural (physical) apolysis since structures are usually purposely build to fulfill the demands for exerted activities. Thus, hospitals stand contentually for different functions: they carry out diagnostic investigations, they perform therapeutic interventions and treatment procedures. Furthermore, hospitals play an important role in controlling and following up of severely ill patients and for consultative activities. Beyond these, several hospitals are involved in education of personnel and students and some hospitals, especially university hospitals, are research institutions, too.

Reallocation is expected to influence the content, i.e. the mix of services, together with the delivery. Both services demanded and services not exposed to competition are expected to be enhanced by suppliers in order to ensure revenues. By the same token, less attractive services and high cost services and services exposed to intense competition will probably be less supported. Similarly, services which can easily be

produced by customers will demand a change in the mix of services produced. The gate-keeping function of present and potential customers will probably have an impact on the service mix. Increased cost-awareness will force providers to look for alternatives to produce the same services at more competitive prices than before. The packaging of services having a price tag transfers the risk for increased expenditures to the provider. Opening of the service packages and a partial fulfillment of, for example, endoscopic day-surgery followed by post-operative care elsewhere, reduces transaction costs. New ways of vertical and horizontal co-operation, integration, alliances, networking related to the provided services can be expected.

With *Contextual* apolysis is meant a change from the present institutional *goals, rules, value and culture of institutions, to a changed view of services provided.*

For public hospitals, the isomorphic archetype of hospitals with physicians being relatively autonomous professionals with normative, cognitive and believe systems are expected to gradually dissipate and be replaced with more heterogeneous structures and personnel. As a consequence, a new era of managerial and market mechanisms might launch a new institutional logic and governance for legitimacy. Changes are expected to occur on the level of individual hospitals as well as within the whole sector of public hospitals. Less certain, however, is how these changes will contribute to a promoted *micro- and macroeconomy*, which was a central intent for introducing of health care reforms in the industrialized world.

The content of apolysis includes some elements of the WHO view (WHO 1997) for a health care reform, but it is further extended to cover structural and contextual elements too. Apolysis is, furthermore, concerned with organizational changes whereas the WHO 1997 view is more related to systemic changes. The WHO view is, furthermore, bound to reforming of health care, whereas apolysis has been defined to be applicable for the study of institutional changes in general.

### 4.3 The framework

The four dimensions of conceptual apolysis discussed above cover issues expected to be affected by financial reallocation. Other dimensions can as well be studied but they lie beyond this present study. To evaluate the four dimensions of apolysis, appropriate instruments are necessary and they should be anchored in the previous theories of organizational behavior. The theories used should closely repercuss the environment under investigation and be related to the situation. 1. The institutional theory is highly applicable to hospitals as institutions. 2. The professional theory reflects the nature of hospitals or a specific knowledge-based environment of skilful employees. 3. The deinstitutionalization theory gives a valuable tool to understand the dissipating power of reallocation on hospital environments. 4. Resource dependent theory explains the changes in the balance of financial power due to introduction of concrete purchasers and providers of health care services. 5. The agent theory discusses the uncertainty raised due to the asymmetry between principals and agents in a dyadic relationship.

## 5 Development of hypotheses and the research model

### 5.1 The hypotheses

The aim of this chapter is to develop hypotheses from the theoretical approaches discussed in the previous chapter, and to build a research model for the study. The hypotheses are used to research the target under investigation, i.e. public specialist-based hospital care to be appropriate and useful for the study of apolysis.

The main ideas of each theoretical approach are presented in Table 1 and in accordance with them hypotheses are extracted for research purpose. Hypotheses are set with the purpose to a) affirm the appropriateness of organizational theories in the area of public hospitals and organizational behavior and b) to underline the usefulness of organizational theories in evaluation of institutional pressures as the very first threat of imposed by financial reallocation. A proving of hypotheses set should further be a support for the concept apolysis. The institutional theory describes institutions as stable structures with values beyond the technical requirements of the task at hand (Selznick

1957). Meyer & Rowan (1977) emphasize symbols, culture, cognitive systems and normative beliefs in institutional life contributing to “rational myths”. Institutes created at the same time and belonging to the same organizational field, express explicitly a high degree of isomorphism (DiMaggio & Rowan 1983). Hospitals, as other social institutions and universities are in principle characterized by institutional features encompassing more symbolic and human values achieving to fulfill social obligations (Scott 1998).

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Table 1. Main ideas of theories and hypotheses extracted related to the effects of financial reallocation on specialist-based public hospital care.

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<b>Theory</b>	<b>Main ideas of theory</b>	<b>Hypotheses extracted</b>
<b>Institutional</b>	Institutions are stable, with values, cultures and rational myths	Financial reallocation creates institutional pressures and promotes institutional changes
	Similar institutions have structures characterized by isomorphism	Financial reallocation enhances heterogeneous structures
	Hospitals have institutional features	Financial reallocation promotes changes from social to technical institutional features
<b>Deinstitutionalization</b>	Deinstitutionalization occurs when institutional practice erodes	Financial reallocation enhances political, functional and social pressures and organizational dysequilibrium
<b>Professional</b>	Hospitals are characterized by professional culture	Financial reallocation transforms the professional culture to a managerial culture
	Hospitals have a strong hierarchial structure	Financial reallocation results in apolysis of hierarchial structures
<b>Resource dependent</b>	Dependency on external resources requires adaptation	Financial reallocation promotes strategical, managerial, functional and structural adaption to external power
	Control of external resources is important	Financial reallocation enhances vertical and horizontal integration in order to manage dependence (external power) and enhance control of resources
<b>Agency</b>	Asymmetry of knowledge promotes control functions	Financial contracting of hospital services requires monitoring and information systems, internal and external control

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From the viewpoint of institutional theory financial reallocation poses a threat for institutional stability and can hypothetically give rise to several hypotheses among them:

*Hypothesis 1 Financial reallocation creates internal pressure and promotes institutional changes*

Since the environment and institutions operate in close relationship, any change in the environment is expected to be reflected in the institutions as well. Reallocation is a serious challenge for institutions prevailing earlier in an environment of financial independency. Introduction of resource dependency is a challenge causing managerial, strategical, structural and processual changes (Oliver 1992).

*Hypothesis 2 Financial reallocation enhances heterogeneous structures*

Reallocation, resource dependency and introduction of competitive contracting for services promote structural change (Oliver 1992). Hospital structures come under pressure to adapt to local needs in order to cooperate with external power and external resources (Scott et al. 2000). The role of microeconomic factors is expected to be strengthened. As a result of financial reallocation efficiency, effectiveness and productivity are anticipated to increase (Linna 1999). Also accounting, internal control and information systems are expected to be developed. Beyond that, it is expected that new light will be shed to the meaning of accountability to external sources (Dranove & White 1987). These changes listed above are, accordingly, expected to be reflected in structures providing the services. Due to the locality of hospitals, due to their individual level as providers of hospital services in a hierarchical system and due to competition for revenues, it is expected that traditionally isomorphic structures will partially dissipate and be replaced with more heterogeneous features.

*Hypothesis 3 Financial reallocation promotes changes from social to technical institutional features*

Through financial reallocation the income of hospitals will be tied to services sold and provided. The role of economic efficiency will demand institutions to review structures that are used to produce services. Since the income of hospitals is directly tied to the type and amount of services sold and provided, market- and production-related actions become more important than before. Interactions with the market require a particular set of activities. Factors associated with transforming of inputs into outputs, such as

materials, resources, personnel, costs, logistics, accounting etc. become more important, i.e. the technical features of hospitals as institutions are expected to be supported through reallocation.

*Hypothesis 4 Financial reallocation enhances political, functional and social pressures and, thus, organizational dysequilibrium*

Reallocation will hypothetically induce a range of organizational pressures. These include: political pressures brought about by changes in external dependency of resources or revenues require hospitals to reevaluate their performance. Increased production of services as well as pressures to enhance innovation in order to survive, acquire a new meaning and support changes in previous strategies and management. However, in turn changes in production and increased demands on effectiveness and efficiency lead to conflicting internal interests among individuals and groups of personnel. Functional pressures, brought by increased demands on economic utility of used resources and reorientation from social to more technical organizations. Social pressures, through internal social fragmentation among personnel and management in achieving for new tasks and goals. Introduction of new rules and values support structural disaggregation and decreases historical continuity.

*Hypothesis 5 Financial reallocation transforms the professional culture to a managerial culture*

Specialist-based public hospitals have features, functions, structures, motives, rules and values closely in agreement with the professional theory. Physicians, being not just producers of services to the customers, but also managers, has placed them centrally in all hospital functions. Not only intra-hospital but also inter-hospital structures have got a strong hierarchy, one which is based primarily on the level of provided services and supported by ownership and legislation. Introduction of external dependency of resources places increased requirements on micro-efficiency and promotion of production. The newly emerging market-based regime challenges the old professional-based structure and calls for the construction of a new managerial culture.



*Hypothesis 6 Financial reallocation results in apolysis of hierarchial structures*

As a result of enhanced competition between hospitals a debundling of earlier relationships is expected to occur. Each lower level of care, be it primary health care or hospital care, is expected to primarily extend its range of services in order to reduce expenditures for services produced elsewhere. Gate keeping and economic control will appear to avoid inappropriate use of services on an inappropriate level of care. Increased control of patient flow accompanying increased competition will distance hospitals from each other in a hierarchical system.

Also important in the process of debundling of structures, is the increasing value of services themselves as compared to the physical site delivering them. Improved medical technology and increased skills of professionals will displace several health care services from hierarchical hospital structures to smaller or local hospitals or even to outpatient clinics.

Increased competition on medical services and the needs to ensure revenues through marketing and production of services lead to new strategies and management. Access to services, increased production of services, extension of the service-mix, and extended customizing of services generate more attention from consumers, increasing the need for local adaptation. The organizational field of hospitals with isomorphic features will dissipate as hospitals adapt to meet the need of local customers.

*Hypothesis 7 Financial reallocation promotes strategical, managerial, functional and structural adaption to external power*

Changes in external financing require internal adaptations to fit the new environment. Changes in strategy are necessary, in other words to deal with the new situation of service bound revenues and competition between providers. Managerial changes are needed to handle the increased requirements exerted by micro-economic efficiency and effectiveness, functional changes cooperate with increased requirements of production and technical features of produced services. The central purpose with all promoted

changes is to control external dependency as much as possible in order to ensure internal stability and survival.

*Hypothesis 8 Financial reallocation enhances vertical and horizontal integration in order to manage dependence and to enhance control of resources*

Financial reallocation is expected to enhance vertical as well as horizontal integration among public hospitals and providers of health care in general.

Vertical integration, that is along the value chain, in order to control the market or sources referring patients to the hospital. Downward integration by the way of dealing with services. It is also anticipated that hospitals will increase cooperation with public health care centers in order to manage the inflow of patients. Mergers, joint ventures, strategic alliances, associations, task agreements and other bridging strategies are expected to occur over time. Important will be cooperation related to post-hospital care of patients, enabling hospitals to focus on their core business. Shortening of hospital stay will contribute to cost-reduction of services and to increased competitiveness.

Horizontal integration is expected to occur on several levels. Services will, thus, be transferred from in-hospital delivery to outpatient clinics promoting cost-efficiency and increased productivity. Secondly, it is expected that hospitals will consider whether in-house services unrelated to the core function should be outsourced. A network of supporting subcontractors will appear to take care of laundry, logistics, catering, cleaning, information technology and other functions, thereby allowing hospitals to concentrate on their core areas. Horizontal cooperation between local hospitals can also be expected. Increased specialization requires horizontal agreements between hospitals in order to best serve patients. Good control of vertical and horizontal connections together with an efficient fulfillment of related obligations is expected and contribute to the enhanced provision of hospital services.

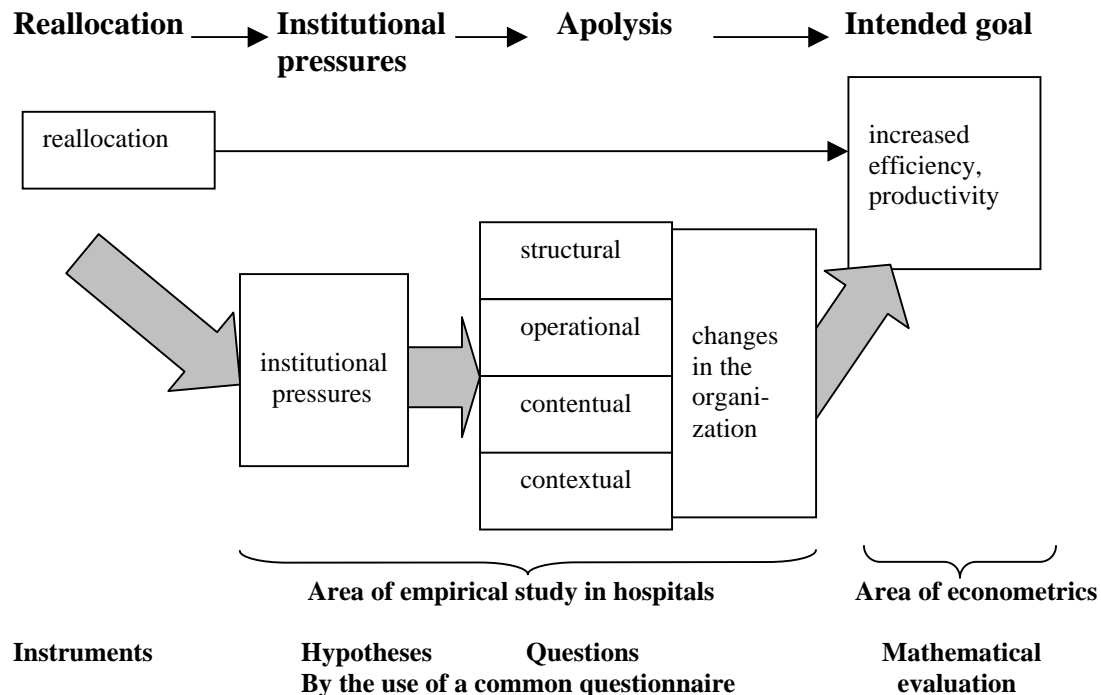
A split of purchasers from providers sets demands for new instruments bridge the gap of asymmetry of knowledge between the partners involved. The agency theory provides an opportunity to understand this interaction.

*Hypothesis 9 Contracting of hospital services requires monitoring and information systems, internal and external control*

Financial reallocation is expected to support competitive contracting. Competition requires that providers of services adhere to high standards of services delivered. In order to ensure quality of services, monitoring of internal procedures and information systems must be constructed. Knowledge must be gathered along the value chain to understand the role, costs and individual value of each factor contributing to the services provided. Monitoring of internal functions facilitates the process of decision making and development of internal dexterity. Information supports marketing activities and bridging of knowledge asymmetry between principals and agents. By way of monitoring and utilizing of internal information, factors related to efficiency and effectiveness can better be controlled and the provider of services can thereby strive for externally recognized accountability.

## 5.2 The research model

The research model (Figure 2) comprises of four individual parts and three interactions. The individual parts are reallocation, institutional pressures, apolysis and finally the intended goal. The interactions are indicated by the arrows in the figure. Below the



**Figure 2.** The research model for the present study. Financial reallocation is expected to enhance efficiency and productivity in specialist-based public hospitals. The structural space between these two entities is, however, less well known and is the target for exploration.

figure are the instruments used during different phases of the study. Institutional pressures, apolysis and changes in hospitals, will all be studied by using a questionnaire with predefined questions for each individual part. Finally the intended goal of reallocation or enhanced efficiency and productivity will be studied using econometrics. Reallocation of the Finnish health care system was introduced and defined through the State Subsidy Act in 1992, and it included instruments to promote changes within the health care sector. An important aim with the SSA was to increase municipal rights to decide upon health care services. However, the simultaneous economic recession in Finland during that time period increased the pressures on enhanced productivity and

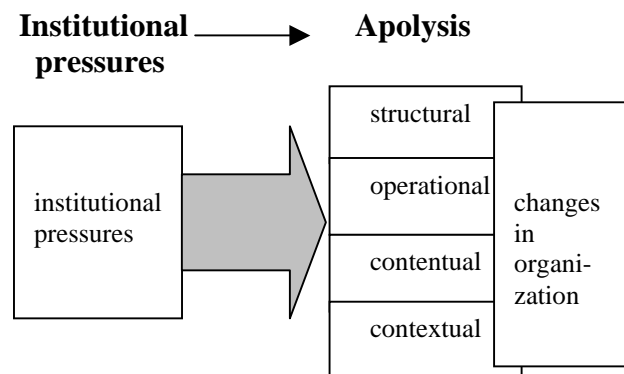
efficiency of public health care services - and to that end financial reallocation was an important step. The initial step as well as the intended goals were thus supported by the SSA, leaving the area in between – i.e. the implementing of the tasks - into the hands of municipalities. Since this area is less well researched, yet concurrently contributes to the outcome, it is of interest to study it, not only the individual parts but also the interactions between them. The intended goal can better be understood by exploring the functional and physical structures supporting it.

To facilitate an analysis of the empirical study of hospitals, this part is subdivided into two distinct entities: institutional pressures and apolysis. On the one hand, institutional pressures reflect several views of initial tensions generated by a sudden environmental change. A number of different phases can be identified during the initial tensions: a phase of initial upheaval, a phase of analysis and learning, a phase of settlement and a phase of outlining of preliminary strategies. On the other hand, apolysis is characteristically a phase of deconstruction and reconstruction of a framework supporting the intended target(s). Even if these two parts are intimately interwoven, in this present study they are analyzed separately. In order to study the first part, the hypotheses of institutional pressures were constructed by the use of well-established theories of organizational behavior. A confirming of the hypotheses would emphasize the presence of institutional pressures, a prerequisite for institutional reorganization. Furthermore, a confirming of these hypotheses would also indicate that the approach of the present study may be applied to the examination of organizational environmental behavior. There was, in addition, an aspiration to extend the analysis to include institutional pressure variables proposed by Oliver, but this analysis would have diverted the study away from its target, namely apolysis (Oliver 1992).

Institutional pressures are expected to induce changes in institutional behaviour as well as in structures, in functions and in processes. These pressures will have an impact on several levels due to the complexity of hospitals as health care service providers. Present structures and functions that are obsolete and require improved competitive competence will have to be revised. There are, thus, several stages and levels of internal evaluation and a complex framework to handle. In order to enhance an analysis of internal apolysis and in order to create new tools for achieving the intended goals of the present study,

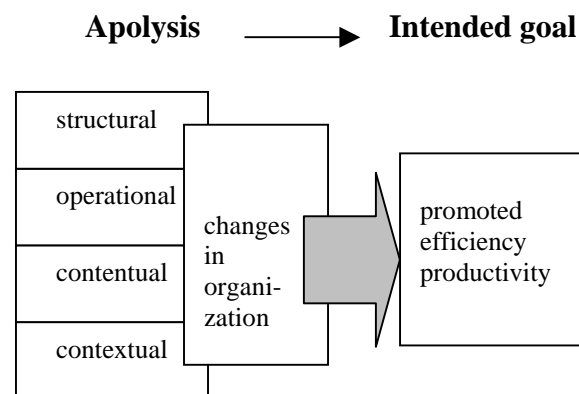
this part of analysis is divided in structural, processual, contentual and contextual apolysis (Figure 3).

Based on the apolysis of hospital structures an analysis will also be carried out to include changes in hospitals after the apolysis. Two things are of particular interest here: changes in services and the ways services are delivered. Also, two questions arise: (i) has integration in the organization increased or not, and (ii) has the institutional environment changed to be more technical.



**Figure 3.** The impact of institutional pressures on institutional apolysis

Finally, the study will be extended to cover the intended goals of the healthcare reform: improved efficiency and productivity (Figure 4.). Even if improved efficiency and productivity was not particularly highlighted in the State subsidy act, they became at a very early stage an important part of the health care reform due to escalating expenditures for hospital health care. It is therefore of importance to measure changes in efficiency as well in productivity vis-a-vis reallocation.



**Figure 4.** The impact of apolysis on hospital efficiency and productivity

## 6 Research methodology

### 6.1 Hospitals included in the study

Only public hospitals providing specialist-based services were included in the study. Hospitals for mental health, military hospitals and private hospitals were excluded. Three hospitals did not respond to the request to take part in the study, thus, the final number of respondents was 48 out of a maximum of 51 eligible hospitals. The data available on those three non-responders revealed no differences compared to the hospitals included. The study thus embraced altogether 4 university hospitals, 16 central hospitals and 28 regional or local hospitals. The distribution of hospitals covered the whole country. Data were collected from hospital statistics published annually by the Association of Finnish Local Authorities and from the Finnish National Discharge Register. The observation period extended from 1988 to 2002. Data were thus collected over a period of 15 years embracing five years before and 10 years after introduction of the State Subsidy Act in 1992.

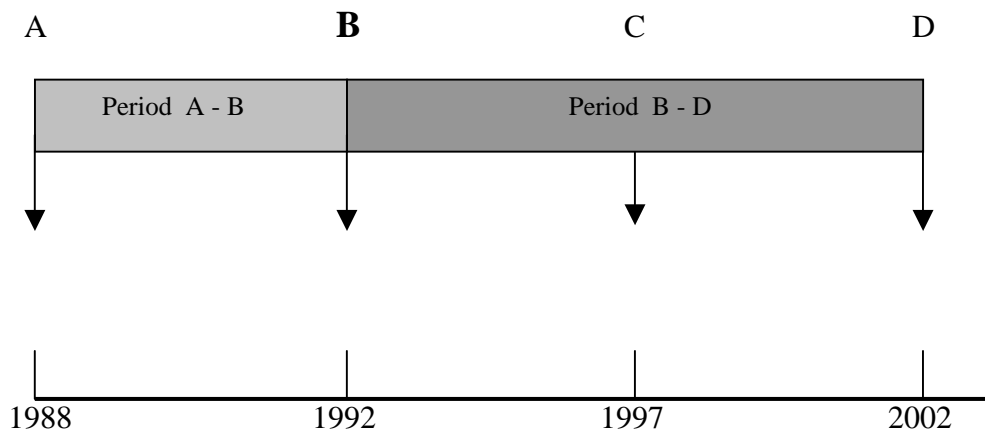
The Discharge Register includes comprehensive information of each hospitalized patient including data for admission and discharge, primary and secondary diagnoses as well as surgical interventions performed. Working hours by each employee category and input prices were obtained from the wage statistics for 2005 collected by Statistics Finland.

A list of hospitals included in the present study is given in the Appendix on page 200.

### 6.2 Periods and points for measurement

The present study covered altogether 15 years, from 1988 to 2002. Introduction of the State Subsidy Act in 1992 (**B**) divided the study into two important periods, i.e. the period before financial reallocation from 1988 to 1992 (period A-B) and the period after financial reallocation from 1993 to 2002 (period B-D). The period before reallocation served as the control period and the period after reallocation as period for intervention.

In the empirical part of the study these two periods were compared and analyzed.



**Figure 5.** The study periods (A-B, B-D) and points of measurement (A, B, C and D)

For the study of changes in services and hospital performance data were collected and analyzed at defined points of measurement (A, B, C and D). Results from the points A and B present thus the period before financial reallocation, and results from the points C and D the period after reallocation. The length of the period before reallocation covered five years and was regarded long enough to ensure the level and the variation of provided services and hospital performance. Accordingly, a ten year long period of intervention was accepted to be long enough to ascertain potential changes induced by financial reallocation. The measurements performed at point C in 1997 divided the period after reallocation into two five year long parts, enabling a better insight into time-related changes of services and hospital performance.

### 6.3 Statistical methods

Statistical analyses were used to analyze the data from the questionnaires and also data obtained from authorities related to the study period, from 1988 to 2002.

Frequency and descriptive distribution were used to get an overview of the data. Mode, median, skewness and kurtosis were calculated for each variable. The non-parametric Wilcoxon rank sum statistics was used to test ordinal variables in the questionnaire. In the Wilcoxon rank sum test, the median for the test sample is compared to the zero



median (Figures 6a and 6b). Results for individual measurements are ranked and summed up and the Z-value is calculated according the formula;

$$Z = \frac{W^* - E(W^*)}{D(W^*)}$$

where  $W^* = W_+$  (= sum of positive ranks) or  $W_-$  (= sum of negative ranks).  $E$  = expected value and  $D$  standard error. A zero value for  $Z$  underlines, that the null hypothesis can not be rejected. By contrast, a large difference between the medians (zero vs. sample median) results in a large value for  $Z$  and supports a rejection of the null hypothesis.

Statistical analyses were performed on three groups of hospitals; i.e. on the whole material (48 hospitals), on university and central hospitals together (20 hospitals) and on local or regional hospitals (28 hospitals). A division into three different groups enabled a view of the total population of hospitals and also a view of hospitals representing different levels of care. The subdivision of hospitals was meaningful since the two levels of hospitals serve, in principle, different areas or markets of the society. All individual groups were big enough to facilitate analysis. Individual hospitals were not analyzed. The number of statistically significant results in the analyses is high as the relatively high number of observations allows to interpret even smaller absolute differences as real differences of statistical significance.

Services produced on wards and outpatient clinics were studied in four different groups of hospital care: all disciplines of specialized care, internal medicine, surgery and gynecology including obstetrics. The specific categories of specialized care chosen for the analysis were present in every hospital included in the study. They represent the majority of services provided for the sample of hospitals. A division into hospital level of service providing was not done. The intention was to get a view of all disciplines providing specialist-based care and, furthermore, of the most important categories of specialist-based care. Another point was that the individual categories represented a cross-section of hospital services. Surgery is mainly an operative mode of services, internal medicine is more related to conservative approaches of services and gynecology lies in between. The paired t-test was the statistical method used to test for significances

related to changes in hospital services. In this way of analysis, each hospital served as its own control and changes in services were compared at defined time periods.

A  $p$ -value of 0.05 or less was regarded as statistically significant in a two-tailed test.

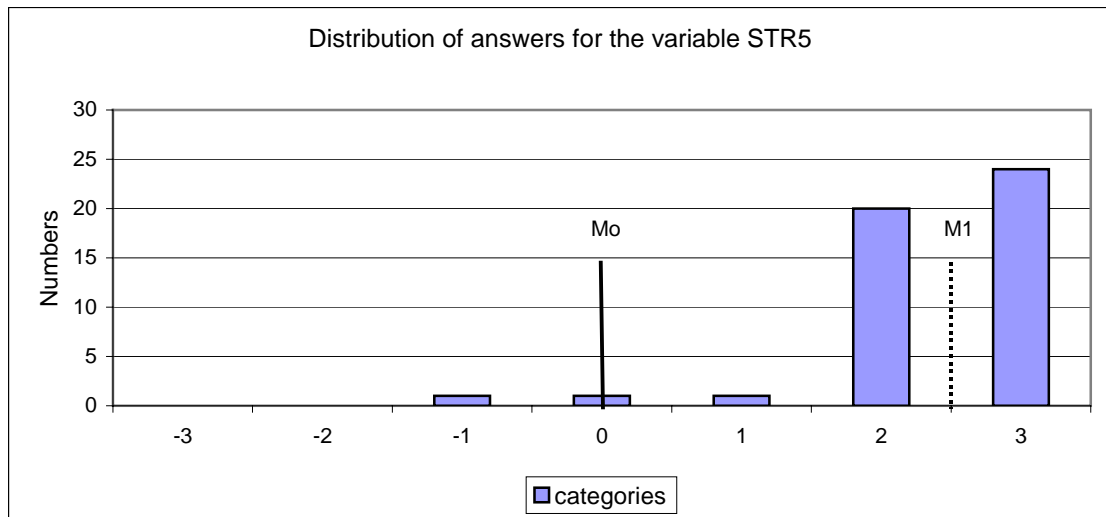


Figure 6a. Distribution of answers for 48 hospitals for the question STR 5. Mo median at zero. M1 median in the sample of answers.  $Z = 6.123$ ,  $p < 0.0001$ .

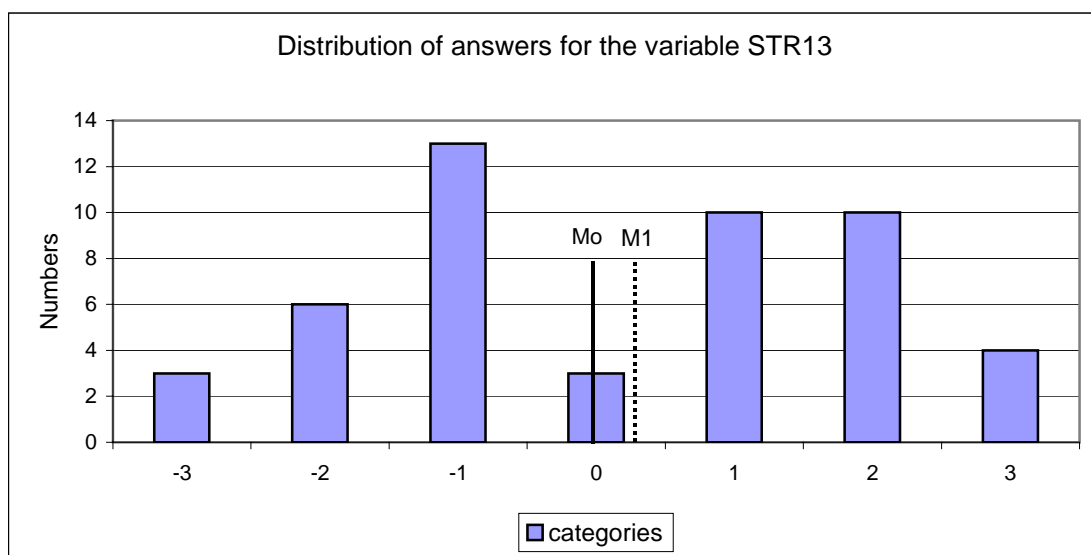


Figure 6b. Distribution of answers for 48 hospitals for the question STR 13. Mo median at zero. M1 median in the sample of answers.  $Z = 0.742$   $p = 0.458$ .

#### 6.4 Measurement of key concepts in the study

In order to study the effects of financial reallocation on institutional pressures and apolysis, personal interviews were carried out in all hospitals included in the study. The interviews were performed during spring 2005. In every hospital the chief physician was interviewed. In one hospital, where the managing director was not a physician the chief administrative physician was interviewed. The purpose was to collect empirical data from leading physicians in charge with long-term experience of hospital administration and of clinical work. The interviews included unstructured discussions on the research topic in conjunction with the use of a questionnaire with closed ended questions (see Appendix page 193) The questionnaire comprised altogether 130 questions and statements. The questionnaire was tested three times before the empirical study in order to exclude ambiguous questions. Each question had been allocated to measure a specific task (hypothesis, apolysis, integration, technicalization e.g.). Since the same question could be used to measure different purposes of interest, no statistical analysis was carried out between individual parts. Questions were randomly mixed and blinded for the test individuals. Thus, the respondents, were not aware of which matters each question was intended to measure. Every question had this statement attached to it: “ *Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;*”. Thus, the respondent had to assess which changes had been brought about by reallocation; which were the results of the natural evolution of care, of delivery of services, of technology; and which had been a result of other causes.

Of the 130 questions, 81 predefined questions were used to either confirm or reject the hypotheses concerning institutional pressures. For the study of individual hypotheses, a set of 6 – 12 questions per hypothesis was used to confirm or reject of the increased institutional pressures.

All 130 questions were used for the study of apolysis. Of those, 24 questions were allocated to structural apolysis, 40 to operational apolysis, 23 to contentual apolysis, and 43 to contextual apolysis. The direction of integration of hospitals services after apolysis was examined by 46 questions. For analysis of technicalization of institutional environments 79 questions were selected from the questionnaire.

A scale of agreement accompanied each question (likert scale). The scale ranged from degrees of disagreement (-3,-2,-1) to degrees of agreement (+1,+2,+3) with 0 indicating “I don’t know” (see page 199).

Statistical analyses were performed on three groups of hospitals; i.e. on the whole material (48 hospitals), on university and central hospitals together (20 hospitals) and on local or regional hospitals (28 hospitals). Medians, Z-values and p-values for variables in the three hospital groups are presented on pages 202 to 216.

## 6.5 Changes in services

In order to analyze changes in efficiency and productivity of the hospitals, data on services performed were obtained from official sources. Data on all special disciplines of hospital care were collected: for internal medicine, surgery and gynecology including obstetrics. Analyses were performed on each category and furthermore, also on ward and outpatient services separately. Ward services were analyzed on annual basis with variables such as, numbers of annually treated patients, numbers of treatment episodes, length of hospital stay, total numbers of annually used treatment days, severity of illness of treated patients (diagnose related groups, DRG) and case-mix. Outpatient services were as well studied on annual basis and included variables such as numbers of visits to the emergency unit, numbers of primary and secondary visits, consultations and the total numbers of visits to the outpatient clinic. The amount of events was calculated for each year of the whole study period, from 1988 to 2002. However, for comparison, only data with five-year intervals were drawn for analysis.

Thus, data at four points on the time scale were analyzed: point A, i.e. the beginning of the observation period (1988), point B (1992), i.e. the last year before the introduction of the SSA, and point C and D, i.e. five and ten years respectively following the SSA. The reference point was point B, and results are discussed in relation to this point (see Figure 5, page 72)

## 6.6 Methods to measure hospital productivity and efficiency

A major intention with health care reforms in western countries has been to improve hospital performance. Factors measuring hospital productivity, efficiency, and effectiveness thus, hold a central position. Productivity reflects the ratio between the outputs and the inputs. Efficiency emphasizes opportunities for production, in other words the difference between the realized and an optimal production. Effectiveness measures the actual output of a given input. Effectiveness is closely related to productivity and enhanced effectiveness to productivity change (PC). Effectiveness is estimated and discussed in terms of productivity and productivity change.

### 6.6.1 Productivity

Hospital productivity can be measured at a certain point in time with cross-sectional data, but more often in terms of productivity change related to time. Methods measuring productivity changes take factors related to efficiency or technological change into consideration. Time-related productivity uses, in particular, frontier analysis and distinguishes between concurrent, sequential and intertemporal frontiers for technology (Tulkens & van den Eckhaut 1995). Total factor productivity (TFP) is the most commonly used method for estimating overall productivity (Diewert 1981). Lovell has compared alternative frontier methods for evaluating of productivity change, i.e. deterministic frontier analysis (DFA), stochastic frontier analysis (SFA) and data envelopment analysis (DEA). He emphasizes that each method should be able to distinguish between the components contributing to productivity or technical change, efficiency change (technical, or technical and allocative) and economies of scale (Lovell 1996). The Malmquist index (MI) is in particular suitable for analyzing public sector productivity, since the index does not require assumptions regarding profit maximization or cost minimization. Bjurek has further modified the Malmqvist index by introducing indexes for input and output, enabling also reliable calculations for productivity in variable returns on scale (Bjurek 1996).

To calculate productivity as well as cost-efficiency for public hospitals in the present study all cost as well as production data for wards and outpatient clinics were required.

Data for treatments on hospital wards as well as data for visits to the outpatient clinics were fairly well covered from the outset to the end of the observation period, but for costs related to care services, complete series could be obtained from 20-21 of the total sample of 48 hospitals. Three university hospitals, eight central hospitals and ten regional hospitals were thus included in the calculation of productivity and cost-efficiency. To ensure that the group selected for the study of hospital performance was not different from other hospitals, control calculations were performed using mean values for missing variables. No differences could be obtained compared to the selected group. The results from the selected group can thus be used to mirror changes in productivity and efficiency more general.

For calculation of output of ward services the annual numbers of diagnosis related groups (DRG) were used (Figure 14). For each category of hospital (university, central, regional) a cost weight for mean actual costs was calculated and multiplied by the number of cases in each DRGs. Outputs for outpatient clinic visits were classified into two groups: 1) emergency visits and 2) other scheduled visits. Cost weights were thus, calculated for emergency as well as for other visits, for each level of hospital, university, central and regional hospital and, moreover, for each type of specialized care, i.e. surgery, internal medicine and gynecology. To obtain the output of outpatient clinics, cost weights accrued were multiplied by the numbers of emergency visits and other visits for each category and speciality. Ward and outpatient clinic output were added to generate the department output. The outputs calculated reflect thus department level of care.

To obtain input for department level of speciality, net operating costs including capital costs were used. The net costs were multiplied with a deflation factor to correct for annual inflation.

### **6.6.2 Efficiency**

Efficiency is a general term and comprises several sub-classes of efficiency, which can be taken into account and estimated individually when necessary. Cost-efficiency,

technical efficiency, allocative efficiency and scale efficiency are all important components covered by the broader term. Cost-efficiency measures the ratio of minimized cost to observed costs. Allocative efficiency can be obtained as the ratio of measured cost-efficiency to the Farrel input of technical efficiency (Farrell 1957). Koopmans (1951) describes technical efficiency accordingly: “technical efficient is a producer if an increase in any output requires a reduction in at least in one other output or an increase in at least one input or a reduction in at least one output”. Efficiency describes, thus, a close relationship between the input and the output. To evaluate efficiencies of different nature, input and output distance functions are typically used. In order to study cost-efficiency an efficiency index (EI) was calculated where explicit cost weights ( $w$ ) were used in the aggregation of outputs. The index EI for each department  $k$  was defined as

$$EI_k = E_k / \max E_k$$

where  $E_k$  is

$$E_k = \sum_i w_{ik} \cdot y_{ik} / C_k$$

The department with the leading productivity for each year ( $\max E_k$ ) was given the number 1.0 and the rest of departments were ranked in relationship to the leading edge (Linna et al. 2006).  $\sum_i w_{ik}$  is sum of cost weights for the wards,  $y_{ik}$  is the sum of cost weights for the outpatient clinic and  $C_k$  stands for observed cost for the department. Correction for inflation (cost/price) was taken into account to ensure a proper comparison between different time points of measurement.

### 6.6.3 Output variables and the level of aggregation

Output measurements in the present study were of the intermediate type related to discharges and outpatient visits. Inpatients and outpatients were, thus, calculated separately even if in several cases the care episode in the hospital was followed by one or more outpatient visits. Since the outpatient visits usually lacked data and codes for diagnoses it was not possible to follow sub-sequential an in-hospital patient through to

the outpatient clinic. Total “episodes of care” including ward treatment and outpatient clinic visits were not calculated.

The Finnish version (Fin-DRG) of the Health Care Financing Administration (HCFA) DRG grouping system (Virtanen 1995) was used to describe the discharged hospital patients. This system enables grouping of patients into meaningful output categories. The Fin-DRG system takes into account treatments according to their cost intensity or treatments varying according to the illness, the different treatments employed and technologies needed. The DRG groups were weighted with the actual average costs incurred by each discharge.

The costs of outpatient clinics have previously been negligible as compared to the costs for inpatient care, but with the intensified use of day-surgery coupled with other advanced medical techniques the costs of outpatient care and diagnostic procedures has grown steadily. In order to study outpatient clinics, patient visits were classified into two groups: 1) emergency visits and 2) other scheduled outpatient visits.

The level of data aggregation is important for analyses in the present study. This was taken into consideration at an early stage of the study. Due to the heterogeneous nature of hospitals, the output categories were restricted to a limited number, produced by all hospitals regardless of organizational level. The level of aggregation was chosen to represent the hospital output on department level, and the departments chosen were surgery, internal medicine and gynecology including obstetrics. Department level gives a deeper understanding of in-hospital changes of production and thus about structures, strategies and management support services. Moreover, the department level was subdivided into in-hospital wards and outpatient clinics to ensure a closer look at the development of services within each category of department.



## 7 Results of the study

### 7.1 Institutional pressures

In order to evaluate institutional pressures a separate questionnaire was preliminarily prepared. This questionnaire was condensed during testing of the questionnaires for the empirical study down to a single questionnaire covering all areas of empirical study. This condensing was necessary because of the close semantic relationship of questions. Indeed, most questions were identical, with only spatio-temporal differences. The questions in the tables are therefore in the present and not in the intended mode, which in case of institutional pressures would have been more appropriate. The questions in this temporal modus can as well be used for the study of institutional pressures since what has happened is a result of institutional pressure to push something in a certain direction and for a certain purpose. The questions were assigned to each hypothesis prior to the empirical study

Hypotheses about institutional theory are presented in tables 2 and 3. The Wilcoxon rank sum test has been applied and the results (p-values) are presented for three groups: in the total population of hospitals (Total), in university and central hospitals (UniC) and in regional or local hospitals (Region). The numbers of hospitals included in each group are given in bracelets. The number of statistically significant results in the analyses is high as the relatively high number of observations allows to interpret even smaller absolute differences as real differences of statistical significance.

**Table 2. *Financial reallocation creates institutional pressure and promote institutional change (Hypothesis 1)***

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
Wards are today more segmented	0.080	0.087	0.398
Services produced at outpatient clinics are more advanced than before	0.000	0.000	0.000
Management of expenditures and revenues is applied	0.000	0.000	0.000
The external bodies for accountability are purchasers	0.000	0.000	0.010
The turnover of patients in wards has increased	0.001	0.000	0.000
Services are produced according to predetermined rules	0.000	0.035	0.011
Restrictions on recruitment of new personnel are in use	0.000	0.000	0.000
The values of the organization (hospital) emphasize now productivity	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

*Karl Johan Tötterman, Institutional apolysis. From horizontal to vertical financial reallocation in public hospitals. Doctoral dissertation. Helsinki University of Technology, Department of Industrial Engineering and Management.*

Hypothesis 1 (Table 2) was extracted from the institutional theory, which emphasizes that: institutions are stable, with rules, values and cultures. The results of statistical analyses confirm increased institutional pressures and necessary changes of institutional behavior arising from a need to adapt to changes in the environment. The previous institutional behavior is threat as a result of financial reallocation and a revision of the institutional profile is necessary. Looking at the column for the total population of hospitals, results from most questions have a statistically significant p-value. The same is observed in the two other groups of hospitals, which confirms a general institutional pressure for changes in hospitals regardless of the level of care. Increased institutional pressures have promoted at least to some extent a restructuring of hospital wards and increased activities at outpatient clinics. The role of purchasers has increased in matters related to production and delivery of health care services. New services have to be introduced. The turnover of patients has to be enhanced. The increased role of economy, its management and its impact on services can be observed. Outpatient clinics provide more advanced services promoted also by reallocation. Productivity is enhanced. Restrictions on recruitment of new personnel is expected as a result of increased pressures on cost-containment. Only for the first variable in the table (segmentation of wards) there are no statistically significant differences in any group of hospitals compared to the period before reallocation. For the rest of the variables, regardless of the group analyzed, highly statistically significant changes are obtained, pointing at increased pressures for changes at every level of hospital care.

Hypothesis 2 (Table 3) is derived from institutional theory and the principle, that similar institutions have structures characterized by isomorphism. Analyses support the view that reallocation increases pressures for more local adaptation. Reallocation enhances increasingly heterogeneous structures. The expected role of reallocation on hospital economy and its impact on hospital structures is assessed by the variables in hypothesis 2. For all variables, the statistical significance supports the presence of internal pressures and changes as a result of increased dependence on service-related revenues. A sudden change in the income for public hospitals, from an independent financial support to a resource dependent allocation is a threat to earlier structures in terms of service providing, and delivery. A strengthened economy leads to increased control of

expenditures, of service production, selection of patients and control of use of personnel. Services, the service mix and the service production are strongly bound to hospital

**Table 3. Financial reallocation enhances heterogeneous structures (Hypothesis 2)**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
The same personnel is used for different purposes	0.000	0.003	0.008
Local politicians are a central body for governance	0.000	0.001	0.000
Revenues are directly related to the amount of services sold	0.000	0.013	0.000
Changes in service mix have been introduced	0.000	0.000	0.000
A more purposeful selection of patients for individual services has been promoted	0.000	0.000	0.001
The values of the organization (hospital) emphasize now cost-efficiency	0.000	0.000	0.000
The values of the organization (hospital) emphasize now effectiveness	0.000	0.000	0.000
Isomorphic structures are not anymore enhanced and controlled	0.000	0.001	0.000
Health care services provided have locally changed hospital structures	0.000	0.001	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

structures. Changes in their content will accordingly promote heterogeneous structures. Public hospitals are institutions driven by medical professionals, with rules, values, aims and cultures reflecting social institutions. Public hospitals in particular fulfill their tasks by professional skills and through social obligation, and gather acceptance from their community through public appreciation. Reallocation might change this situation for hospitals and promote a transition from institutional to more technical institutions, ones which possess new features of rules, goals and values. This transitional threat and its effects are the essence of hypothesis 3 (Table 4). Most variables are related to technical features and confirm statistically increased pressures for technicalization of a previous institutional environment. Increased quality control, cost-efficiency, strategic planning, introduction of a managerial culture, rules and norms for interaction between providers and purchasers are all variables related to technical orientation of activities. Implicitly they reflect standardization of services and assessment of inputs against outputs. Inputs consist of material and other resources used in chains of service production. Statistical analyses revealed significant changes for all variables in the total and regional hospital populations (Total, Region) and for most variables in the group of the university and central hospital group (UniC). A reason for the difference in levels of significances

between the UniC and Region groups might be the difference in the size of the hospital groups. Another important reason is that they represent different levels of specialized care. Regional hospitals are closer to the primary health care and thus exposed to a different environment from that of university and central hospitals.

**Table 4. Financial reallocation promotes changes from social to technical institutional features (Hypothesis 3)**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
Quality control of health care services is in use	0.000	0.000	0.000
The outcome of complications of services is registered and reported	0.000	0.000	0.000
Requirements on cost-efficiency have changed the provided HCS mix	0.000	0.000	0.000
Goals are now confirmed in the annual strategic planning	0.000	0.000	0.000
Institutional features (social obligation) have been replaced with technical features	0.025	0.310	0.042
Rules and norms of interaction between providers have become more specified	0.000	0.002	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HCS = health care service.

Pressures on cost-efficiency have changed the service mix in all groups of hospitals, quality control has been introduced and rules for interaction revised. Reallocation has increased pressures for changes on several levels of hospital activity regardless of which hospital group was analyzed.

Oliver extends antecedent factors promoting deinstitutionalization into internal and external, political, functional and social pressures. According to the theory deinstitutionalization occurs when institutional practice erodes. The role of financial support to hospitals and its impact on hospital structures has already earlier been studied. Accordingly, it can be expected that financial reallocation of public specialist-based hospitals should increase pressures to enhance structural and operational changes. These issues are highlighted in hypothesis 4 (Table 5).

**Table 5. *Financial reallocation enhances political, functional and social pressures and organizational dysequilibrium (Hypothesis 4)***

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
Wards have undergone changes in size	0.000	0.000	0.016
Services produced at outpatient clinics are more diversified than before	0.000	0.000	0.000
The use of team working has increased in providing health care services	0.000	0.001	0.000
New positions are bound to financial and economic accountability	0.000	0.014	0.002
Health care services resemble now commodities	0.056	0.005	0.888
Municipal monopsonies have been established	0.666	0.773	0.470
The view of hospitals as whole service deliverers has changed to be a member of a service delivery chain	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

The variables chosen to confirm or reject the hypothesis 4 have their roots in views of the deinstitutionalization theory. Municipal monopsonies represent political pressure, while team working, services produced at outpatient clinics represent functional pressures and economic accountability, size of wards, services as commodities as well as the nature of delivery chains are parts of social pressures. Many more variables could have been chosen from the questionnaire, but already in this scale it is obvious that there have been many different pressures supporting dissipation from previous isomorphic structures. The statistical significances shown in the table 5 confirm the hypothesis in particular for the total group of hospitals but also for the two other groups. Increased pressures for municipal monopsonies have not been felt in any group of hospitals. This is understandable, since public hospitals have for decades been supported by the state and municipalities.

Hospitals are built to care for patients who are too ill to be treated at home. Resources, personnel and facilities are gathered to enable an appropriate level of care and to restore health when possible. Medical care is in the hands of professionals and were they work together, a specific institutional atmosphere is built up over time. Reallocation with its impact on economic accountability, on increased demands on control of income and output is expected to increase pressures on the professional hierarchical culture. Hypothesis 5 (Table 6) deals with pressures for a transition of professional to managerial

culture. Hypothesis 6 (Table 7) is devoted to analyze pressures of debundling of hierarchical hospital structures. Both hypotheses are offsprings of the professional theory.

**Table 6.** *Financial reallocation replaces the professional with a managerial culture (Hypothesis 5)*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
A managerial culture has been introduced in hospitals	0.005	0.002	0.147
New personnel groups have been established	0.000	0.025	0.000
Investigations and treatments can be bought separately	0.000	0.043	0.000
Leadership is primarily connected with economic control	0.002	0.022	0.024
The input of resources used for each specific service has been standardized	0.000	0.001	0.000
Health care services are delivered at negotiated prices	0.000	0.000	0.000
A new goal for hospitals is efficient micro-economy	0.203	0.213	0.008
Professional goals are continuously weighted against economic performance	0.000	0.000	0.000
Managerial leadership has replaced academic meritocracy	0.000	0.001	0.001
Hospital micro economy is in continuous crisis	0.130	0.420	0.191

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

The results presented in table 6, support institutional pressures to dispatch from a professional to a managerial culture reflecting production of services were managing of financial instruments plays an increased role. The services have been standardized, the inputs have from the begin on been taken into account, the services have negotiated prices, and services can be split. These changes are similar to those in the manufacturing industry. Analysis of the total group of hospitals reveals statistically significant changes from the previous state for almost all variables. Reallocation has promoted institutional pressures in these areas to force a change. In the two groups of hospitals, university-central hospitals and regional hospitals most variables show as well highly statistical significant changes from a previous situation. In some variables, there is a positive trend for change even if the results are not statistically significant. A reason for this might be, that the services they provide, on the one hand, regional or local hospitals and, on the other hand, university and central hospitals do not fully overlap. They overlap to a great extent but simultaneously there are important differences regarding the complexity and content of health care services. The role of micro-economy has been understood in every

group of hospitals but it is obvious that this pressure has not been experienced as a continuous crisis.

**Table 7. Financial reallocation results in apolysis of hierarchial structures (Hypothesis 6)**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
Strategic planning is done according to budgets	0.000	0.006	0.004
Revenues are related to the content of the service mix	0.000	0.001	0.000
Changes in hospital structures have been more purposeful than evolutionary	0.012	0.018	0.307
Changes in hospital structures have been more incremental than discontinuous	0.000	0.001	0.194
State control of health care services has decreased	0.000	0.000	0.003
Municipal control of health care services has increased	0.000	0.000	0.000
New personnel with specific tasks are involved in interactions concerning HCS	0.000	0.000	0.000
A specialization in providing of health care services has taken place	0.000	0.000	0.000
Changes in services provided have changed borders for health care services	0.000	0.007	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HCS = health care services.

Reallocation will hypothetically lead to a closer relationship between purchasers and providers of health care services and thus influence earlier thresholds between hospitals. Finnish hospitals have for decades been purposely built to ensure horizontal and vertical equity of care all over the country. State control of hospital structures and employment of physicians have resulted in a hierarchical hospital system, with primary health care at the bottom, local or regional and central in the middle and university hospitals at the top. Due to withdrawal of state control and the increased importance of revenues from services provided, it is expected that the hospital structures will be debundled. These issues i.e. institutional pressures, and the results of these pressures are examined in hypothesis 6 (Table 7). The statistical analyses confirm on several levels dissipation from previous structures. Efficient micro-economy is a central issue for all hospitals. Revenues are related to the service mix. Withdrawal of the state promotes municipal control on care structures. Changes in services have as well changed the borders for hospitals.

According to the resource dependent theory, “increased dependency of external resources requires adaptation.” Providers of health care services must take the purchasers’ views into account, and accept changes to their service mix or ways of delive-

ing services according to the purchasers-view. This is the matter under investigation in hypothesis 7 (Table 8). According to it, hospitals are expected to incur pressures to

**Table 8.** *Financial reallocation promotes managerial, strategical, functional and structural adaptation to external power (Hypothesis 7)*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
Wards have been closed	0.000	0.000	0.005
Health care services have been redistributed to outpatient clinics	0.000	0.000	0.000
The size of outpatient clinics has increased	0.000	0.000	0.000
Old personnel groups have been abolished	0.122	0.615	0.154
Internal transfer pricing is now in use	0.000	0.005	0.000
Services produced are exposed to competition through bidding procedures	0.000	0.016	0.001
Centralization of economic power has taken place in the organization	0.863	0.878	0.742
Networks have been build to provide specific services	0.000	0.000	0.000
Chronic ill patients are referred to a more appropriate level of HC	0.000	0.000	0.000
Changes in hospital structures are now steered through external resource dependency	0.000	0.004	0.001
Control and bureaucracy of health care services have increased	0.001	0.075	0.006
Providers of health care services are more diversified	0.062	0.007	0.824

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HC = health care.

change a multitude of functions in order to adapt to external power. Analyses of variables show statistically significant changes within several activities of hospitals. Due to increased institutional pressures for cost-containment, structural changes have occurred. Wards have been closed and services have been redistributed to outpatient clinics. Old personnel groups have to some extent disappeared, more in regional than in university-central hospitals. The service mix has changed and networks have been built. Managerial function has been promoted and the accompanying financial control, care taking of bidding procedures and internal transfer pricing are in use. Strategic measures related to economy have got more importance. Regardless of which hospital group is being studied, decisive changes from the previous state are conspicuous. Neither university-central hospitals nor regional hospitals have felt pressure to diversify further. For one other variable further, namely centralization of economic power, and regardless of hospital group, no pressure for change has been felt. The p-value for the variable emphasize that the medians for the samples in each groups is very close to zero. In fact, the distribution of answers shows two populations of hospitals in each group. Hospitals



were centralization has taken place and hospitals were this has not been the case. This is the reason for medians being close to zero in each group.

The variables in hypothesis 7 are related to pressures with impacts on internal changes and variables in hypothesis 8 are related to external factors and directions of adaptation. Vertical upward adaptation is expected to be important in order to introduce new services, whereas vertical downward integration ensures flow of patients or revenues. Horizontal expansion is also expected to be important, in order to increase the market share of potential purchasers of health care services.

**Table 9.** *Financial reallocation enhances vertical and horizontal integration in order to manage dependence (external power) and control of resources (Hypothesis 8)*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
Authorities controlling health care services have partially changed	0.000	0.000	0.000
Repetition of similar investigations has been reduced	0.000	0.001	0.003
The waiting lists for several services have been shortened	0.138	0.237	0.346
Certain services are delivered at the physical site of the purchaser	0.001	0.005	0.030
Certain services have been outsourced to the purchaser	0.001	0.032	0.011
Providing of health care services is more integrated than before	0.000	0.000	0.000
Larger investments can be shared among providers	0.332	0.351	0.656
New purchasers of health care services have appeared	0.059	0.354	0.095
Vertical integration has reconfigured structures for individual HCS	0.000	0.000	0.000
Splitting of services has resulted in horizontalization of structures for HCS	0.001	0.097	0.006

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HCS = health care services.

Variables presented in table 9 emphasize that institutional pressures have forced public hospitals to change vertically as well as horizontally. The influence of local authorities has increased, which is reflected in significant changes in the total group of hospitals as well as in the group of local or regional hospitals. Vertical integration has been intensified by improving access of individual services for purchasers, by avoiding of overlapping investigations, by outsourcing and delivering of specific services at the site of purchasers. Splitting of services has expanded horizontally the value of individual providers of services, equalizing them in the value chain for services. Similarly, sharing of larger investments promotes horizontal integration and expands the market for services. Sharing of investments has occurred, but more in the university-central hospital

group than in the regional hospital group. Acceptance of new local purchasers reflects a desire to expand the market for services. Pressures for shortening of waiting list for health care services has been recognized on all levels of hospital care.

One of the main intentions with the SSA was to split purchasers from providers of health care services. According to the agent theory, splitting means simultaneously that instruments must be built, calibrated for validity, and used to cover the gap between the two or more partners involved. Hypothesis 9 (Table 10) is extracted from the agent theory, and aims to study institutional pressures along with an increased need for monitoring systems and information systems of internal and external nature. The variables show that numerous instruments have been introduced in order to increase internal monitoring and control of functions and costs. Cost-centers play an important role in controlling costs associated with production of services. Cost-centers monitor and gather information to enable an efficient providing of services at acceptable expense. The amount of partners sharing health care services or chains of providers has increased the necessity for internal as well as external control. New information channels have been developed and the exchange of information has increased. Accreditation has for decades been an official tool in the industry to ensure a certain standard of activities in line with general accepted rules and values. However, accreditation for hospitals or for activities within hospitals (e.g. work in laboratories and in radiology departments) has not been a common tool before, but with a split of providers from purchasers it has become an increasingly valuable instrument. Introduction of the Fin-DRG-system offers a tool to promote a mutual insight into cost-calculation of services provided. Pressures for accreditation as well as introduction of the Fin-DRG-system were more widespread in the university-central hospital group. The variables used to confirm or reject the hypotheses, favor confirming the existence of institutional pressures related to the agent theory. Reallocation has promoted instruments and necessary control measures to enhance a mutual trust in a dyadic relationship. The role of rules for clinical work was expected to be launched in all groups of hospitals. Rules related to cost saving were experienced on all levels, whereas rules for clinical work more common in the regional hospital group. Sharing of health care services has proved more of a pressure for university and central hospitals than regional hospitals.

**Table 10.** *Contracting of hospital services requires monitoring and information systems, internal and external control (Hypothesis 9)*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Questions</i>	<i>p</i>	<i>p</i>	<i>p</i>
Cost-centers have been introduced	0.000	0.000	0.000
The internal bodies for accountability are cost-centers	0.000	0.000	0.000
Accreditation of services has been introduced where possible	0.015	0.015	0.300
An officially acknowledged Fin-DRG-system is in use	0.154	0.116	0.538
Exchange of information between providers and purchasers has increased	0.000	0.000	0.000
New information channels have been introduced between purchasers and providers	0.000	0.000	0.000
The amount of partners sharing health care services has increased	0.000	0.005	0.000
Chains of providers have replaced single providers for some HCS	0.018	0.005	0.515
Working rules are now closely related to cost-saving	0.000	0.000	0.000
Working rules means now control of clinical work	0.012	0.349	0.014

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HCS = health care services.

Nine different hypotheses were set up for five recognized organizational theories. One part of the study was to confirm the target area of public specialist-based hospitals in Finland as a suitable object for research in this field, and the findings of these analyses confirm this fact. Further, confirmation of hypotheses set, affirm the existence of institutional pressures resulting from reallocation. In addition, they further confirm pressures within several areas, but particularly those related to the importance of proper management of revenues and resources. Financial reallocation has turned out to be an instrument of discontinuous nature introducing institutional pressures on several areas and enhancing organizational change in public specialist-based hospitals.

## 7.2 Apolysis

Apolysis is a new concept or instrument created for the study. The aim with the concept is to evaluate organizational changes in four different dimensions namely structural, operational, contentual and contextual changes. Apolysis is here used to measure organizational changes in public hospitals that result from changes in the direction of financial allocation of hospitals.

### 7.2.1 Structural apolysis

According to the definition, structural apolysis focuses on changes in physical properties and proportions of internal as well as external organizational structures. In the present study, the nature of structures may vary, ranging from physical changes in wards and outpatient clinics to changes in personnel, in served patients and purchasers of services. Due to the close relationship between structures and services provided, changes in the service content mean implicitly also changes structures. Table 11 shows the variables describing changes in structures arising from reallocation. Of nine variables in the total group of hospitals, eight are statistically significant, i.e. they indicate changes from a previous state, and the ninth variable supports a trend for statistical significance.

**Table 11.** *Changes in structures for services*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Changes in structures</i>	<i>p</i>	<i>p</i>	<i>p</i>
Wards are today more segmented	0.080	0.398	0.087
Wards perform today more diversified tasks	0.000	0.001	0.001
Wards have undergone changes in size	0.000	0.016	0.000
Wards have been closed	0.000	0.005	0.000
Health care services have been redistributed to outpatient clinics	0.000	0.000	0.000
The size of outpatient clinics has increased	0.000	0.000	0.000
Services produced at outpatient clinics are more diversified than before	0.000	0.000	0.000
Services produced at outpatient clinics are more advanced than before	0.000	0.000	0.000
Non-core businesses are often outsourced	0.000	0.014	0.004

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

Almost the same results can be observed in the group of regional or local hospitals as well as in the university-central hospital group. Reallocation has induced changes in structures, not only concerning wards but for out-patient clinics as well. The services provided by outpatient clinics have been expanded: in addition the numbers and content of those services have been developed, too. Wards have undergone changes in size, more often in hospitals belonging to the regional group. Some wards have been closed and the nature of wards dedicated to only one purpose or discipline of medicine has changed. Increased segmentation of wards has occurred to some extent, more in the regional hospital group. Outsourcing has led to a focusing on specific tasks or services.

The changes in the services structures described above were accompanied in staffing structures (Table 12). For instance, some personnel groups were abolished and others created. Flexible labor is one means of keeping costs down because it avoids unnecessary employment. Beyond that, outsourcing of internal operations, such as laundry, catering, logistics is another tool for creating flexibility. New groups of personnel and also new enterprises have appeared under the same roof. However, the

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**Table 12. Changes in personnel**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Personnel</i>	<i>p</i>	<i>p</i>	<i>p</i>
The same personnel is used for different purposes	0.000	0.008	0.003
New personnel groups have been established	0.002	0.079	0.002
Old personnel groups have been abolished	0.122	0.615	0.154
The proportion of temporary working persons has increased	0.568	0.594	0.878

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Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

proportion of temporary employees has not increased to any significant degree. This can be due to the already large number of temporary employees working in hospitals already before financial reallocation was implemented.

Public hospitals have traditionally been institutions with a high degree of social obligation. However, reallocation is expected to require shifts in these deeply rooted basic functions as result of setting of prices on all activities with the purpose of controlling

expenditures and costs to the revenues incurred through services provided or produced. The variables in table 13 show structural changes on many levels. An increased internal control of services has been actively introduced through creation of cost-centers and internal transfer pricing. The use of teamwork in the provision of services has in many cases replaced the contribution of a single provider. New task force-oriented personnel and new enterprises taking care of traditionally hospital work supporting functions promote shifts from an earlier institutional period. Through reallocation, external control of services is also expected to increase. Providers are at least to some extent bound by agreements and services are exposed to competition.

**Table 13. Increased control of services**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Increased internal control of services</i>	<i>p</i>	<i>p</i>	<i>p</i>
Internal transfer pricing is now in use	0.000	0.000	0.005
Cost-centers have been introduced	0.000	0.000	0.000
The use of team working has increased in providing health care services	0.000	0.000	0.001
In hospitals more task force personnel are at work	0.000	0.000	0.000
The amount of new enterprises within hospitals has increased	0.003	0.025	0.059
<i>Increased external control of services</i>			
Services provided are based on agreements	0.002	0.007	0.134
Services produced are exposed to competition through bidding procedures	0.000	0.001	0.018
Investigations and treatments can be bought separately	0.000	0.000	0.025
<i>Changes in external dependency</i>			
External gate keeping is used to control referral for hospital care	0.001	0.005	0.002
Patients have been bound to specific local providers of health care services	0.818	0.305	0.089
Authorities controlling health care services have partially changed	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

Autonomous providing of services according to internal rules and traditions is demanded through consideration of the source purchasing services. Splitting of services, by separating medical investigations from treatments is expected to occur when possible. Purchasers of services are interested to get a correct diagnosis for the patient, but at the same time ready to take care of the treatment when possible if that contains costs. Changes in external dependency can further be expected through gate keeping and

increased constraint to specific providers of services. However, neither external gate keeping has been supported nor important changes in the boundedness to specific health care service providers. Changes in governance and in authorities controlling health care has been the result of reallocation, increasing the obligation of municipalities to extend responsibility for providing health care. Due to the administrative proximity of regional or local hospitals to municipalities, it is expected that these hospitals will experience even more the changes in governance of health care.

### **7.2.2 Operational apolysis**

Due to the increased demands on efficient micro-economy through reallocation, changes in policy objectives and accordingly in strategic planning are expected to take place. For that purpose more managerial functions than before are needed to take care of increased demands on performance.

The variables in table 14 deal with the importance of hospital revenues and the instruments needed to handle health care finances in an appropriate manner. The providing of services before reallocation was less tied to economy. Financial reallocation has highlighted the risk of specific expensive treatments (e.g. treatment of hemophilia, or rare inherited diseases) in particular. This risk has been more felt in regional hospitals, the source of payment for expensive patients treated elsewhere, usually in university or central hospitals. New budgeting as well as accounting systems have been necessary and cost-calculations has been changed to include all expenditures, also costs for capital investments. Strategic planning is now closely related to budgets, and management of expenditures and revenues are closely monitored as a result of reallocation. Earlier, hospitals could annually apply for financing based on mean costs for hospital bed and outpatient clinic expenditures. Now, by contrast, hospitals have to earn their money, and appropriate instruments are in turn needed to support this function. Also, changes in leadership have occurred. Although leading physicians within public hospitals have essentially kept their positions, but the content of their daily work has shifted to embrace financial management (Table 15). Moreover, regardless of the level of management, the management's tasks now include financial control.

**Table 14. Changes in policy**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Increased meaning of economy</i>	<i>p</i>	<i>p</i>	<i>p</i>
Providing of services is bound to increased economic risk taking	0.091	0.819	0.013
Management of expenditures and revenues is applied	0.000	0.000	0.000
New budgeting systems have been developed	0.000	0.003	0.000
New accounting systems have been developed for hospitals	0.000	0.003	0.000
Cost-calculation has been changed to incur all costs	0.000	0.007	0.001
Strategic planning is done according to budgets	0.000	0.006	0.004

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

**Table 15. Changes in management**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Changes in leadership</i>	<i>p</i>	<i>p</i>	<i>p</i>
Leadership is primarily connected with economic control	0.000	0.043	0.000
New positions are bound to financial and economic accountability	0.000	0.014	0.002
New coalitions and coordination among decision makers have been developed	0.000	0.003	0.000
Centralization of economic power has taken place in the organization	0.863	0.878	0.742

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

The central role of hospital's economy has also lead to changes in controlling bodies, which in turn have to be operatively taken into account. A centralization of economic power was expected to occur, due to the increased needs to control the balance between expenditures and revenues. The findings of the analysis does, however, not support any further centralization of economic power in any hospital group.



**Table 16. Changes in control bodies**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Control bodies</i>	<i>p</i>	<i>p</i>	<i>p</i>
The internal bodies for accountability are cost-centers	0.000	0.000	0.000
The external bodies for accountability are purchasers	0.000	0.007	0.010
Local politicians are a central body for governance	0.000	0.001	0.000
Purchaser – control is applied in daily operations	0.340	0.939	0.183

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

The role of local politicians and the importance of local purchasers changed from the view of hospitals. Their decisions are the key to the provision of hospital revenues. Without their support, providing of services is not feasible (Table 16). However, their presence is recognized but not felt in daily operations, in particularly in university and central hospitals.

To secure revenues, changes in operative performance are expected within many different areas of organizational activity (Table 17). In addition to the numbers of services sold the service mix plays an important role for income. However, the efficiency of the mix must be reviewed to ensure an adequate income in relation to the used resources. Personnel are resources, and their flexible use for different purposes can save unnecessary expenditures. Beyond that, an increased turnover of patients is important, not only in hospital wards but also in outpatient clinics. Cuts in the length of hospital stay will in general promote cost saving. Patients are discharged as soon as possible, either to be transferred to another hospital, or home. This has been enabled through increased resources for homecare. The combination of early discharge from hospitals and huge medico-technical development has displaced several in-hospital services to outpatient clinics, resulting in more new services and an increased need to control patients. Increased performance orientation is usually connected with standardization of functions and services. Thus, quality control is more common, accreditation has been recognized as a tool for efficient production. An officially acknowledged Fin-DRG-system is in use in some hospitals to support cost-calculations of services, and is more common in the university-central hospital group.

**Table 17. Changed demands on performance**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
	<i>p</i>	<i>p</i>	<i>p</i>
<b>Sources for resources</b>			
Revenues are directly related to the amount of services sold	0.000	0.013	0.000
Revenues are related to the content of the service mix	0.000	0.001	0.000
Changes in service mix have been introduced	0.000	0.000	0.000
Cost-saving measures (personnel, material) are in use	0.000	0.000	0.000
<b>Increased turnover</b>			
Production of health care services has increased	0.000	0.000	0.001
The turnover of patients in wards has increased	0.000	0.000	0.000
The length of hospital stay has decreased	0.000	0.000	0.000
Patients are discharged from the hospital as soon as possible	0.000	0.000	0.000
The number of patients investigated and treated in outpatient clinics has increased	0.000	0.000	0.000
The number of patients controlled in outpatient clinics has increased	0.000	0.000	0.000
<b>Standardization</b>			
Quality control of health care services is in use	0.000	0.000	0.000
Accreditation of services has been introduced where possible	0.015	0.015	0.300
An officially acknowledged Fin-DRG-system is in use	0.154	0.116	0.538

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

Comparing the two groups, regional versus university-central hospitals, does not suggest any important statistically significant difference between the groups. Hospitals in the both groups have faced the same threats and the same changes. Increased performance orientation enhances technicalization of services and promotes changes in operative activities. This in turn leads to enhanced control of resources and management of services provided (Table 18). Cost budgeting has been widely introduced in all groups of hospitals. Production of services has acquired more rules and regulations than before. Services are produced at more suitable locations, and the input needed to produce and deliver a specific service is controlled and more standardized. The content of services is better predefined. Services are furthermore negotiated as packages with a fixed price in regional hospitals. Financial sanctions are to some extent applied in cases of agreement violations and are more a problem in regional hospitals.

The purchaser of services pay fine to the provider, if the purchaser is not able to assume responsibility for the patient in due time. The analyses show that financial sanctions are more common at lower levels of care. The awareness of patients and purchasers on content of services has increased, resulting in more complaints than before. A more purposeful selection of patients for individual services has been promoted. Service mix has changed – and often extended – in some hospital groups to have a more cost-efficient mix vis-à-vis the resources and the expectations of purchasers. The lack of any difference between the two hospital groups is conspicuous despite the differences in the

**Table 18. Control of resources and services**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Control of resources</i>	<i>p</i>	<i>p</i>	<i>p</i>
Cost-budgeting is in use	0.000	0.001	0.000
Services are produced according to predetermined rules	0.001	0.035	0.011
Services are provided at predefined and purposeful places	0.000	0.003	0.001
The input of resources used for each specific service has been standardized	0.002	0.022	0.024
<i>Control of services</i>			
The content for each service has been better predefined	0.000	0.000	0.000
Health care services are negotiated as packages	0.023	0.580	0.010
Health care services are delivered at negotiated prices	0.000	0.001	0.000
Financial sanctions are applied in case of agreement violations	0.388	0.985	0.331
<i>Control of resources and services</i>			
The outcome of complications of services is registered and reported	0.000	0.000	0.000
The numbers of patients complaining on services have increased	0.000	0.003	0.000
A more purposeful selection of patients for individual services has been promoted	0.000	0.000	0.001
Requirements on cost-efficiency have changed the provided HCS mix	0.000	0.000	0.000
Restrictions on recruitment of new personnel are in use	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HCS = health care service

service-mix provided and in the market served. The “market” for regional or local hospitals other the one hand and for central and university hospitals, on the other hand, is different for content and for volume. Hospitals closer to the primary health care have more opportunities to change or adapt to their environments.

The closeness of the two hospital groups with regard to their actions taken, highlight the importance of the effects of reallocation on all hospitals regardless of level.

### 7.2.3 Contentual apolysis

Contentual apolysis describes changes in services, in the content and in the mix of services and modes of services provided. Tables 19-20 present the variables used to assess contentual apolysis.

Financial reallocation is expected to induce changes in services provided. One aim is to be more sensitive to the customers needs. Thus, not only the content of services but also the modes of delivery must be clear. Accordingly to the analyses, services have become more customized and new cost-efficient technologies have been introduced to support cost-containment. Redistribution to day case services has been promoted, along with better access to clinical consultations. Overlapping of medical investigations has been reduced and networks for care have to some extent replaced single service providers. Shortening of waiting lists for services - a recognized problem within public specialist-based hospital care – has become an important issue. However, waiting times have been cut to a greater extent than have the waiting list for services. The present situation is better but there are still problems in several areas. New and more efficient channels for information have been developed between providers and purchasers. A closer interaction between purchasers and providers of services will lead to changes in the content of services and in handling of patients. Interaction between actors can lead to both vertical and to horizontal integration in the service field (Table 20). An example of vertical integration is the referring of chronic ill patients to a more appropriate level for long-term care, and delivering of services at the site of the purchaser. Further examples of vertical integration are outsourcing of services (eg. stress exercise test) to the purchaser to be performed before the patient is accepted for certain investigational services (eg. coronary angiography). To the same category belong introduction of certain upstream services along with the engaging of primary health care in the service

**Table 19. Refining of services and modes for delivery**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Refining of services</i>	<i>p</i>	<i>p</i>	<i>p</i>
Services are customized to the needs of individual purchasers	0.061	0.115	0.236
New cost-efficient technologies are in use	0.000	0.000	0.000
The proportion of day case services has increased	0.000	0.000	0.001
The access to clinical consultations has increased	0.000	0.000	0.060
Repetition of similar investigations has been reduced	0.000	0.003	0.003
<i>Refining modes of delivery</i>			
Networks have been build to provide specific services	0.000	0.000	0.000
The waiting lists for several services have been shortened	0.138	0.648	0.346
The waiting time for several services has been cut down	0.024	0.115	0.082
Exchange of information between providers and purchasers has increased	0.000	0.000	0.000
New information channels have been introduced between purchasers and providers	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

chain. Horizontal extension of services occurs, when from the hospitals' point of view the amount of partners sharing services increases. When for example a patient with coronary surgery is transferred to a local hospital for postoperative care and later to a center for rehabilitation, then from the viewpoint of service (i.e. successful coronary surgery) every individual provider has an important and equal value in the service chain. Sharing of expensive investments to serve an extended service market and changes in the number of more diversified purchasers means an expansion of a potential market to be served. What actually happened was that sharing and integration of services was enhanced but sharing of larger investments among providers was less influenced by reallocation. Agreements between providers became more common. New purchasers and more diversified purchasers appeared more often around regional hospitals than university-central hospitals. Even if the analyses did not show statistical significance, they indicate a trend in this direction.

**Table 20.** *Promotion of vertical and horizontal integration*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Vertical integration</i>	<i>p</i>	<i>p</i>	<i>p</i>
Chronic ill patients are referred to a more appropriate level of health care	0.000	0.000	0.000
Certain services are delivered at the physical site of the purchaser	0.001	0.005	0.030
Certain services have been outsourced to the purchaser	0.001	0.032	0.011
Certain up-stream services have been newly introduced	0.000	0.001	0.038
Other providers have been engaged in the service provision	0.000	0.001	0.000
<i>Horizontal integration</i>			
The amount of partners sharing health care services has increased	0.000	0.005	0.000
Chains of providers have replaced single providers for some HCS	0.018	0.005	0.515
Providing of health care services is more integrated than before	0.000	0.000	0.000
Co-operation among health care providers is based on agreements	0.000	0.001	0.000
Larger investments can be shared among providers	0.332	0.351	0.656
New purchasers of health care services have appeared	0.059	0.354	0.095
The total number of purchasers of health care services has increased	0.626	0.859	0.432
The purchasers are more diversified than before	0.092	0.729	0.074

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

#### 7.2.4 Contextual apolysis

In contrast to the apolysis of structure, operation and content which cover pragmatic and practical matters of debundling, contextual apolysis focuses more on views or goals, rules, values, culture related to hospital services. Tables 21-24 presents variables for contextual apolysis. Reallocation, i.e. a change in financial support is a challenge for integrated public specialist-based hospital care, because it requires changes on several levels. Changes in goals, rules, values and culture are presented in table 21. Changes of other nature are discussed in table 22 and changes in control, competition and economy of hospital performance in table 23. Finally interaction, structures and boundaries are discussed through the variables in table 24.

The placing of the economy for the hospitals is visible in the many variables. Thus an efficient micro-economy plays a new and central role regardless of the hospital group.

Pressures on economy might lead to internal conflicts between managing the finances and ethical values, and if not, then, professional goals are weighted against economic performance. Even if conflicts do not occur frequently, the results still point at influence of economy on professional work. According to the findings, this pressure is more felt in regional than in their university and central hospitals counterparts. Strategic planning and the annual budget remind hospital care providers of the role of economy. Rules are accordingly influenced by economy. Cost saving typically governs activities wherever services are produced and delivered. The values for the hospitals as institutions

**Table 21.** *Changes in goals, rules, values and cultures*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Changes in goals</i>	<i>p</i>	<i>p</i>	<i>p</i>
A new goal for hospitals is efficient micro-economy	0.000	0.000	0.000
Social and ethical goals are confronted with economic goals on daily basis	0.211	0.203	0.577
Professional goals are continuously weighted against economic performance	0.203	0.213	0.008
Goals are now confirmed in the annual strategic planning	0.000	0.000	0.000
Goals are tied to the annual budget	0.000	0.000	0.000
<i>Changes in rules</i>			
Working rules are now closely related to cost-saving	0.000	0.000	0.000
Working rules mean now control of clinical work	0.012	0.349	0.014
<i>Changes in values</i>			
The values of the organization (hospital) emphasize now productivity	0.000	0.000	0.000
The values of the organization (hospital) emphasize now cost-efficiency	0.000	0.000	0.000
The values of the organization (hospital) emphasize now effectiveness	0.000	0.000	0.000
The values of the organization (hospital) emphasize now core-business	0.000	0.000	0.075
<i>Changes in culture</i>			
A managerial culture has been introduced in hospitals	0.000	0.000	0.000
Managerial leadership has replaced academic meritocracy	0.000	0.001	0.001
The culture has changed from social obligation to emphasizing service production	0.000	0.001	0.000
Institutional features (social obligation) have been replaced with technical features	0.025	0.310	0.042
Health care services resemble now commodities	0.056	0.005	0.888

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

providing social services have changed as a result of reallocation. Values are now connected to productivity, cost-efficiency, and effectiveness with focus on the hospital's own core business. Regardless of the level of care, hospitals have adopted these values, and even if the variables analyzed in the present study do not show on every occasion statistical significance, there is a trend for this view of values.

Goals, rules and values have an influence on culture. In order to handle economy, a managerial culture has been introduced. Thus, where earlier academic meritocracy played a central role in determining leadership, now managerial features are preferred. The culture for fulfillment of social obligation has to some extent shifted, with the emphasis being now on service production. Institutional features have been replaced with technical features and competences. As a result health care services resemble commodities. This is the view in particular in the university-central hospital group and in about half of the hospitals belonging to the regional group. Since reallocation, services have actively been developed to serve the purchasers' needs. This has led to hospital operations being managed to ensure revenues and to serve customers. In public hospitals changes have usually been incremental, i.e. executed by adapting to reforms in organizational surroundings, and less through decisive steps in new directions. Obviously, there has been only modest token resistance and the pace of change has been acceptable.

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**Table 22. Institutional vision I**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<b>Changes</b>	<b><i>p</i></b>	<b><i>p</i></b>	<b><i>p</i></b>
Changes in hospital structures are now steered through external resource dependency	0.000	0.004	0.001
Changes in hospital structures have been more purposeful than evolutionary	0.012	0.018	0.194
Changes in hospital structures have been more incremental than discontinuous	0.000	0.001	0.003
Changes in hospital structures have been more internal than external	0.001	0.005	0.047
Inertia to changes in services has been more severe than expected	0.460	0.985	0.324
Structural changes have taken place more slowly than expected	0.299	0.377	0.525

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.



State control of hospitals and their services has decreased as laid down in the State Subsidy Act (Table 23). This change has resulted in an increased freedom to change structures for services and to adapt them to local needs. Employment for physicians has been changed, new positions introduced where necessary and in general an increased flexibility has been enabled. Municipalities have replaced the state with regard to control and financial functions, resulting in new rules and regulations and often with more concerns about hospital economy. Despite this fact, municipal monopsonies have not been introduced. Competition in the field of health care services has not been realized, in turn, no market for health care services has not been established. Indeed, problems with hospital micro-economy have continued and costs for health care have not diminished. Nevertheless, the rising health care costs are neither due to the State Subsidy Act nor due to reallocation of specialist-based hospital care. Whatever the cause, the increase in health care costs has probably increased the difficulties for municipalities to handle their own economy and thus their support to medical care. As a result of reallocation, changes of contextual nature have occurred also in other areas than hospital health care services. For example, the numbers of alternative providers for services have increased (Table 24), and hospitals with specific services (eg. orthopedics) have been built. Regional or local hospitals are not anymore tightly bound to central hospitals, if the price and content of services are not competitive. Interactions between providers of services are

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**Table 23. Institutional vision II**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Control, competition and economy</i>	<i>p</i>	<i>p</i>	<i>p</i>
State control of health care services has decreased	0.000	0.000	0.000
Municipal control of health care services has increased	0.000	0.000	0.000
Control and bureaucracy of health care services have increased	0.001	0.075	0.006
Municipal monopsonies have been established	0.666	0.773	0.470
Competition in health care services is not in proper use	0.004	0.632	0.001
A market for health care services has not been established	0.000	0.008	0.001
Hospital micro-economy is in continuous crisis	0.130	0.420	0.191
Cost for health care has not decreased	0.000	0.020	0.000

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Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

undergoing continuous changes. Changes in relationships between providers need new rules and norms of more specified character, and as result of changes new personnel with specific tasks are needed on many levels. Increased demands on economy have led to the abandoning of control of isomorphic hospital structures regardless of the type of hospital. The physical locality of hospitals and their relationships to local customers have promoted adaptiveness to customer needs. Vertical integration, in particular down stream, has reformed individual health care services, whereas splitting of services into smaller parts have resulted in horizontalization of structures for service providing. The boundaries have accordingly for many hospitals been extended, and one of the main drivers has been the service provided. Hospitals once relative autonomous in their way of providing services have become more heteronomous members in a chain of health care service production.

**Table 24.** *Interaction, structures and boundaries*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Interaction</i>	<i>p</i>	<i>p</i>	<i>p</i>
The number of providers of health care services has increased	0.003	0.178	0.004
Providers of health care services are more diversified	0.062	0.007	0.824
Interactions between providers in HCS have contentually changed	0.000	0.001	0.001
Rules and norms of interaction between providers have become more specified	0.000	0.002	0.000
New personnel with specific tasks are involved in interactions concerning HCS	0.000	0.000	0.000
<i>Structures</i>			
Isomorphic structures are not anymore enhanced and controlled	0.000	0.001	0.000
Health care services provided have locally changed hospital structures	0.000	0.001	0.000
Vertical integration has reconfigured structures for individual HCS	0.000	0.000	0.000
Splitting of services has resulted in horizontalization of structures for HCS	0.001	0.097	0.006
A specialization in providing of health care services has taken place	0.000	0.000	0.000
<i>Boundaries</i>			
New ways of working between providers have extended boundaries for HCS	0.000	0.005	0.000
Changes in services provided have changed borders for HCS	0.000	0.007	0.000
The view of hospitals as whole service deliverers has changed to be a member of a service delivery chain	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HCS = health care services.

*Apolysis.* The concept apolysis was created to study structural, operational, contentual as well as contextual structural changes in organizations that arise from environmental change. In the present study this concept was applied to study changes in public specialist-based hospital care as result of a change in the direction of resource allocation. This concept was used to assess the many domains affected by the mechanisms of reallocation.

The structure of public hospitals have changed considerably. Not only have wards undergone purposeful physical as well as functional adaptation, but also services have been displaced to more diversified outpatient clinics. Changes in personnel, increased internal and external control of services and changes in governance structures are results of financial reallocation. Most variables used to assess structural apolysis revealed a good level of statistical significance in the total group of hospitals as well as in the two groups used in the present study. This is indicating on a comprehensive structural change in the whole field of public hospitals.

Changes in allocation from independent to dependent and from horizontal to vertical is a challenge in particular for the management. Changes have been occurred in policy objectives, in the management practices as well in internal and external control bodies. Performance orientation has become more explicit in every area contributing to production of services. In performance orientation, not only is cost-containment an important matter of course, but changes in the service mix and an increased turnover of patients and production of hospital services as well. Finally, the services produced must have recognized quality standards. They have to be competitive on a growing market for health care services. All these changes mentioned promote internal shifts in hospitals from mainly social institutions towards in a new role, one possessing more technical features. Changes in hospital structures and operational management are not enough to ensure that public hospitals will be able to continue their operations. Service as well as the delivery modes must be refined in order to be competitive and attractive to purchasers. Providers of services must be able to customize their services. New technologies are needed. New delivery modes are needed and information networks. Vertical as well as horizontal integration becomes more important, for the reasons to control flow of patients.

The many changes already discussed contribute to contextual apolysis, i.e. to changes in goals, rules, values and cultures. Reallocation has changed many areas in public specialist-based hospital care of cognitive behavior to be replaced with more regulative concepts. The base for a previous compliance, i.e. social obligation, has been provided with a price label and accordingly has expedience and more legally sanctioned views been obtained.

The concept of apolysis was used in the present study to analyze four different areas of expected debundling in public specialist based hospitals. The analyses show fundamental changes and point on a new era of institutional logic.

### 7.3 Integration

The term integration, either vertical or horizontal, means in this context a period of “hospital change” together with the measures taken by the hospitals after an initial period of institutional pressures and apolysis. This period is not an on-off entity, merely changes are taking place all the time parallel with apolysis.

This part is of particular interest and gives at hand how public hospitals deal with uncertainties or with relationships with purchasers and other providers of health care services. Integration can in principle be studied on several levels of interest: as an arrangement for providing and delivering of health care services; as an internal hospital rearrangement of hospital functions (e.g. from ward to outpatient clinic, diversifying of wards); as an external integration of hospitals through fusions, merging, alliances, associations etc. with other hospitals or health care centers, and finally as executed through increased linkages between health care organizations. In the present study, the interest is focused on vertical and horizontal integration of providing and delivering of services.

Horizontal integration is usually considered to mean an extension of the scale of a market or the area to which the services are delivered, whereas vertical integration describes the scope of services, or an extension of new markets.

Having in mind the view of public primary health care and regional-central-university hospitals consisted of hierarchical autonomous providers, it is of interest to look into this structure. The questions of interests are: A) will integration of providing and delivering of services take place and B) if integration appears, will it then be more horizontal (scale) than vertical (scope) oriented?

Extending these questions and answers to the previous metaphor of a pyramid, vertical or horizontal extensions will mean a change of its shape and borders of interaction. Increased vertical integration or in some cases also dissociation will contribute to raising the height of the structure and increased horizontal integration of services results in a broadening of the basis. The findings of this part of the study deal thus more with the

shape of the public hospital system less with individual hospitals and their local arrangements.

In order to answer these questions, variables dealing with each issue were selected from the questionnaire prior to the study. As with other questions, variables related to this theme appeared in random order, and the persons answering were not aware about the purpose of the questions. All questions related to this area were included in the analysis. Of 130 potential questions 46 preselected variables are presented in tables 25 to 29 and discussed accordingly.

Outsourcing of non-core business, might be good for cost-containment and efficiency reasons, but may simultaneously generate a propensity for an increased dependency on the organizational environment. Outsourcing is primarily an instrument promoting scope i.e. a vertical integration depending on the purpose of the action. Services provided by agreements for their content and price is an instrument to bound providers more closely to purchasers, especially if agreement violations are punishable by financial sanctions. Competition among services promotes efforts to listen to purchasers and their interest in services in particular since purchasers are an important external body for accountability.

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**Table 25. Integration as a result of structural apolysis**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Changes in structures for services</i>	<i>p</i>	<i>p</i>	<i>p</i>
Non-core business is often outsourced	0.000	0.014	0.004
<i>Increased external control of services</i>			
Services provided are based on agreements	0.002	0.007	0.134
Services produced are exposed to competition through bidding procedures	0.000	0.001	0.016
Investigations and treatments can be bought separately	0.000	0.000	0.025
<i>Changes in external dependency</i>			
External gate keeping is used to control referral for hospital care	0.001	0.005	0.002
Authorities controlling health care services have partially changed	0.000	0.000	0.000

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Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

These three variables emphasize the role of horizontal integration or an ambition for increased market share. External gate keeping is an external threat from the purchaser to control inappropriate use of health care services. Purchaser satisfaction or local politicians cannot be disregarded since they represent the source of revenues for public hospitals. Taken to extreme, in some cases the role of purchasers can be mirrored in daily operations. The content of services is better defined and has been negotiated with purchasers. The SSA has changed the role of municipal politicians to a source of local governance controlling hospital activities. To ensure revenues, hospitals have felt the pressure to cooperate with the body of local politicians.

An increased control and refining of services are used to support activities related to marketing (Tables 26 and 27). Customizing and packaging of services imply negotiations on providing and delivering of health care services. As a result of closer relationships, access to clinical consultations has improved along a shortening of long waiting lists. These variables highlight the view of increased integration with the purchasers and since the services are delivered to the same market, the direction of integration is horizontal. New channels for information and increased exchange of information predicate the same view of integration as well as sanctions related to agree-

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**Table 26.** *Integration as a result of operational apolysis*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Changes in control bodies</i>	<i>p</i>	<i>p</i>	<i>p</i>
The external bodies for accountability are purchasers	0.000	0.007	0.010
Local politicians are a central body for governance	0.000	0.001	0.000
Purchaser – control is applied in daily operations	0.340	0.939	0.183
<i>Control of services</i>			
The content for each service has been better predefined	0.000	0.000	0.000
Health care services are negotiated as packages	0.023	0.580	0.010
Health care services are delivered at negotiated prices	0.000	0.001	0.000
Financial sanctions are applied in case of agreement violations	0.388	0.985	0.331

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

ment violations. Variables in table 28 are directly related to two perpendicular directions

of integration. Chronically ill patients are referred to more appropriate places for long-term care refers to vertical integration, the same can be noted regarding chains for services.

**Table 27. Integration as a result of contentual apolysis I**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Refining of services</i>	<i>p</i>	<i>p</i>	<i>p</i>
Services are customized to the needs of individual purchasers	0.061	0.115	0.236
The proportion of day case services has increased	0.000	0.000	0.000
The access to clinical consultations has increased	0.000	0.000	0.060
Repetition of similar investigations has been reduced	0.000	0.003	0.003
<i>Refining modes of delivery</i>			
Networks have been build to provide specific services	0.000	0.000	0.000
The waiting lists for several services have been shortened	0.138	0.648	0.346
The waiting time for several services has been cut down	0.024	0.115	0.082
Exchange of information between providers and purchasers has increased	0.000	0.000	0.000
New information channels have been introduced between purchasers and providers	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

**Table 28. Integration as a result of contentual apolysis II**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Vertical integration</i>	<i>p</i>	<i>p</i>	<i>p</i>
Chronically ill patients are referred to a more appropriate level of health care	0.000	0.000	0.000
Certain services are delivered at the physical site of the purchaser	0.001	0.005	0.030
Certain services have been outsourced to the purchaser	0.001	0.032	0.011
Certain up-stream services have been newly introduced	0.000	0.001	0.038
Other providers have been engaged in the service provision	0.000	0.001	0.000
Chains of providers have replaced single providers for some HCS	0.000	0.005	0.000
<i>Horizontal integration</i>			
The amount of partners shearing health care services has increased	0.000	0.005	0.000
Providing of health care services is more integrated than before	0.000	0.000	0.000
Co-operation among health care providers are based on agreements	0.000	0.001	0.000
Larger investments can be shared among providers	0.332	0.351	0.656
New purchasers of health care services have appeared	0.059	0.354	0.095
The total number of purchasers of health care services has increased	0.626	0.859	0.432
The purchasers are more diversified than before	0.092	0.729	0.074

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.  
HCS = health care services.



Services, which are physically delivered at the site of the purchaser or have been outsourced to be executed by the purchaser as a part of a diagnostic procedure or treatment, are both examples of vertical integration in the value chain of service production.

Introduction of up-stream services implicit vertically forward integration, or extension of the scope. Other providers have been engaged in the service provision can be considered as well vertical as horizontal. In this case, it is notified as vertical since other providers means an alternative for the present provider.

Horizontal integration implies an extension of the market, i.e. the scale of service providing. In other words, more partners sharing services, more intense integration among providers and shared investments as well as an increased number of new and diversified purchases.

**Table 29.** *Integration as a result of contextual apolysis*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
<i>Interaction, structures and boundaries</i>	<i>p</i>	<i>p</i>	<i>p</i>
<b>Interaction</b>			
The number of providers of health care services has increased	0.003	0.178	0.004
Providers of health care services are more diversified	0.062	0.007	0.824
Interactions between providers in HCS have contentually changed	0.000	0.001	0.001
Rules and norms of interaction between providers have become more specified	0.000	0.002	0.000
<b>Structures</b>			
Health care services provided have locally changed hospital structures	0.000	0.001	0.000
Vertical integration has reconfigured structures for individual HCS	0.000	0.000	0.000
Splitting of services has resulted in horizontalization of structures for HCS	0.001	0.097	0.006
A specialization in providing of health care services has taken place	0.000	0.000	0.000
<b>Boundaries</b>			
New ways of working between providers have extended boundaries for HCS	0.000	0.005	0.000
Changes in services provided have changed borders for HCS	0.000	0.007	0.000
The view of hospitals as whole service deliverers has changed to be a member of a service delivery chain	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HCS = health care services.

Most variables in the table 29 emphasize increased service integration among providers.

In all cases the direction is not entirely clear. More interaction between providers will

usually lead to more services and an extended use of individual providers, or to increased scale-effect. Vertical integration as well as specialization are examples of scope effects whereas splitting of services have given rise to horizontalization. A similar reasoning can be extended to local changes of hospital structures as a result of adaptation to the requirements of environment.

Boundaries have been changed as a result of new definitions of work and content of services, mainly in a horizontal direction through extensions or changes in the content of services. The vision of a member in a delivery chain has features of vertical and horizontal integration. Vertical since the scope has changed by contributing a specific part of the whole service, horizontal through the increased importance of all individual members in the chain.

To answer to the first question - will integration of providing and delivering of services take place? – yes it will, and on many levels. Variables from different areas show integration of hospitals.

The second question - if integration occurs, will it then be more horizontal (scale) than vertical (scope) related? – can be answered as well. Leaving the variables measuring direct vertical and horizontal integration aside (13 variables, Table 28) and counting the rest of variables for the direction of integration they point to, reveals a majority for more horizontal than vertical integration (26 versus 6). This difference should not, however, be interpreted as an absolute proof of direction, more as a general trend of integration. Furthermore, we have to keep in mind that the targets under investigation, i.e. public hospitals were not entirely free to make their moves in one or another direction due to municipal ownership. However, their way of working has changed as a result of reallocation in a more integrative direction with more horizontal than vertical features.

Integration has occurred and with more horizontal than vertical features, the basis and lower layers of the pyramid have expanded on the cost of the height. The top and the basis of the structural metaphor have become closer.

## 7.4 From social institutional to technical environments

To study a potential change of social to technical institutional environments variables were preselected prior to the empirical study and grouped into seven different areas measuring technical change. The areas are presented in the tables and includes themes as: changes in resources and material, changes in turnover and changes in personnel and management, changes in economic control and in production, and finally changes in governance. It would have been appropriate to include variables related to markets, but

**Table 30.** *Changes in resources and materials related to production of services*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
	<i>p</i>	<i>p</i>	<i>p</i>
Wards are today more segmented	0.080	0.398	0.087
Wards perform today more diversified tasks	0.000	0.001	0.000
Wards have undergone changes in size	0.000	0.016	0.000
Wards have been closed	0.000	0.005	0.000
Health care services have been redistributed to outpatient clinics	0.000	0.000	0.000
The amount of new enterprises within hospitals has increased	0.003	0.025	0.059
Institutional features have been replaced with technical features	0.025	0.310	0.042
Health care services resembles now commodities	0.056	0.005	0.888
Working rules means now control of clinical work	0.012	0.349	0.014

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

since the State Subsidy Act did not change the ownership of health care providers and the municipals continued to keep funding and providing of public services in their hands, the view of new emerging markets is not appropriate and left out of scope.

A better control of resources related to production of services is a typical feature of technicalization (Table 30). Accordingly, wards have undergone changes reflecting changes in uses of resources and adaptiveness to more efficient production of services. Wards are more segmented, or on the same ward, patients can be treated for diseases belonging to different disciplines of medicine. As a result, wards now perform more diversified tasks, and the size of wards has been streamlined to fulfill the practical needs. In some cases wards have even been closed. Production of health care services has been redistributed to outpatient clinics when appropriate to reduce unnecessary expenditures associated

with service production. New enterprises or subcontractors within hospitals have been established to take care of functions earlier handled by hospital personnel. A split of earlier hospital functions underpins the meaning of increased importance of core functions within health care services.

**Table 31.** *Changes in turnover, redistribution and control of production of services*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
	<i>p</i>	<i>p</i>	<i>p</i>
Production of health care services has increased	0.000	0.000	0.001
The turnover of patients in wards has increased	0.000	0.000	0.000
The length of hospital stay has decreased	0.000	0.000	0.000
Patients are discharged from the hospital as soon as possible	0.000	0.000	0.000
The number of patients investigated and treated in outpatient clinics has increased	0.000	0.000	0.000
The number of patients controlled in outpatient clinics has increased	0.000	0.000	0.000
Quality control of health care services is in use	0.000	0.000	0.000
Accreditation of services has been introduced where possible	0.015	0.015	0.300
An officially acknowledged Fin-DRG-system is in use	0.154	0.116	0.538
Services are produced according to predetermined rules	0.001	0.035	0.011
Services are provided at predefined and purposeful places	0.000	0.003	0.001
The input of resources used for each specific service has been standardized	0.002	0.022	0.024
Cost-saving measures (personnel, material) are in use	0.000	0.000	0.000
New cost-efficient technologies are in use	0.000	0.000	0.000
Working rules are now closely related to cost-saving	0.000	0.000	0.000
The culture has changed from social obligation to emphasizing service production	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

Results of increased control of resources and materials - regardless of the level of hospital - emphasize that institutional features of social obligation have been confronted with technical features.

Changes in turnover, in redistribution and control of production are features with technical character. Increased production of services, increased turnover of patients, decreased length of hospital stay caused by early discharge from hospital are all variables related to service output and support of more efficient treatments and technology. As earlier noted, patient service has been redistributed to outpatient clinics, but the content of services has changed as well. Quality control and accreditation have been introduced where possible and they are acknowledged. Rules for production at

predefined and dedicated places for providing of services reflect increased control of used resources. The same can explicitly be said of standardization of inputs in services, to the use of cost-saving measures and cost-efficient technologies. As a result, the internal culture of hospitals has changed to emphasize service production. Regardless of group analyzed in the present study, there is a propensity to move towards a technicalization of institutional environment.

Personnel are a part of technology in hospital environment, since services provided are tied with the skills of employees. Therefore, changes in personnel reflect partly simul-

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**Table 32.** *Changes in personnel and management of services*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
	<i>p</i>	<i>p</i>	<i>p</i>
The same personnel is used for different purposes	0.000	0.008	0.003
New personnel groups have been established	0.002	0.079	0.002
Old personnel groups have been abolished	0.122	0.615	0.154
In hospitals more task force personnel are at work	0.000	0.000	0.000
New personnel with specific tasks are involved in interactions concerning HCS	0.000	0.000	0.000
Leadership is primarily connected with economic control	0.000	0.043	0.000
New positions are bound to financial and economic accountability	0.000	0.014	0.002
A managerial culture has been introduced in hospitals	0.000	0.000	0.000
Managerial leadership has replaced academic meritocracy	0.000	0.001	0.001
New coalitions and coordination among decision makers have been developed	0.000	0.003	0.000

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Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals. HCS = health care services.

taneous changes in technical environment (Table 32). In several hospitals changes in hospital employment have occurred. The same personnel can be used for different purposes, new personnel groups have appeared and some old groups disappeared mirror a changed view of human resources. The proportion of task force personnel has increased and new intermediaries have appeared to meet new requirements. Changes in management have been the consequence of an increased importance of economic control related to service production. As a result, in many hospitals academic leadership has been replaced with management oriented leadership. The professional paradigm of physicians as leaders for all activities in hospitals has changed.

Economic aspects, in particular control of finances is intimacy interlaced with features of technical institutional environments. Increased control means usually a promotion of technical features. Based on the variables and the significances in each hospital group

**Table 33.** *Changes in economic control*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
	<i>p</i>	<i>p</i>	<i>p</i>
Cost-centers have been introduced	0.000	0.000	0.000
Internal transfer pricing is now in use	0.000	0.005	0.000
Management of expenditures and revenues is applied	0.000	0.000	0.000
Centralization of economic power has taken place in the organization	0.863	0.878	0.742
New accounting systems have been developed for hospitals	0.000	0.008	0.000
Cost-calculation has been changed to incur all costs	0.000	0.007	0.001
Strategic planning is done according to budgets	0.000	0.006	0.000
Goals are now confirmed in the annual strategic planning	0.000	0.000	0.000
New budgeting systems have been developed	0.000	0.003	0.000
Cost-budgeting is in use	0.000	0.001	0.000
Goals are tied to the annual budget	0.000	0.000	0.000
A new goal for hospitals is efficient micro-economy	0.000	0.000	0.000
Professional goals are continuously weighted against economic performance	0.203	0.213	0.008
The values of the organization (hospital) emphasize now productivity	0.000	0.000	0.000
The values of the organization (hospital) emphasize now cost-efficiency	0.000	0.000	0.000
The values of the organization (hospital) emphasize now effectiveness	0.000	0.000	0.000
The values of the organization (hospital) emphasize now core-business	0.000	0.000	0.075
Revenues are directly related to the amount of services sold	0.000	0.013	0.000
Requirements on cost-efficiency have changed the provided health care service mix	0.000	0.000	0.000
Changes in service mix have been introduced	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

under investigation, it is obvious that several measures have been taken in Finnish public specialist-based hospitals encourage a movement in direction of technicalization of services provided. The explicit attendance of economic control has been recognized to enhance more efficient use of resources in production of health care services.

Cost-centers have been introduced, transfer pricing is in use. Management of expenditures and revenues as well as centralization of economic power and new accounting systems are all important variables reflecting economic control. Through increased requirements on micro-economic efficiency cost calculations have been changed to include all costs. Hospital activities have been bound to economic values and rules through several different instruments promoting efficient micro-economy. The

service mix has been changed to guarantee revenues. As a result of increased requirements on hospital performance, there is a risk of conflict between the interest of professional achievements and economic steering.

**Table 34.** *Changes in production and delivery of services*

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
	<i>p</i>	<i>p</i>	<i>p</i>
The content for each service has been better predefined	0.000	0.000	0.000
Health care services are negotiated as packages	0.023	0.580	0.010
Health care services are delivered at negotiated prices	0.000	0.001	0.000
Services provided are based on agreements	0.002	0.134	0.007
Services are customized to the needs of individual purchasers	0.006	0.129	0.236
Investigations and treatments can be bought separately	0.000	0.000	0.000
Non-core business are often outsourced	0.000	0.004	0.014
Networks have been build to provide specific services	0.000	0.000	0.000
Exchange of information between providers and purchasers has increased	0.000	0.000	0.000
New information channels have been introduced between purchasers and providers	0.000	0.000	0.000
Certain services are delivered at the physical site of the purchaser	0.001	0.005	0.030
Other providers have been engaged in the service provision	0.000	0.001	0.000
Chains of providers have replaced single providers for some HCS	0.018	0.005	0.515
The view of hospitals as whole service deliverers has changed to be a member of a service delivery chain	0.000	0.000	0.000
Interactions between providers in health care services have contentually changed	0.000	0.001	0.001
Rules and norms of interaction between providers have become more specified	0.000	0.002	0.000
Financial sanctions are applied in case of agreement violations	0.388	0.985	0.331

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

Due to an increased role of service production and changes in modes of service delivery several hospitals have felt the pressure to refine the content of services as well as their delivery modes (Table 34). The actions taken have changed to a large extent the interactions between purchasers and providers. The content as well as the price of health care services is now known to principals and agents. Services can be bought as packages and if necessary they can be customized to a certain degree. New channels for information have been built and existing channels improved to ensure a closer dyadic relationship and openness. Accordingly, rules and norms in interactions have been refined, and financial sanctions introduced in case of violations of rules. A closer relationship has led to relocation of some services to the purchaser or to sharing of the service between

different providers. Service networks have been enhanced, too. All these steps, related to production, delivery and improved information of services contribute to a more efficient use of resources and to a support of technical environments.

As a result of changes in the institutional environment, also the bodies - internal and external- controlling hospital activities have partially changed (Table 35). Internally through introduction of cost centres and accounting procedures, externally in particularly through abate of state control. The authorial body controlling has devoluted from a distant state control to a local municipal control and to some extent by purchasers.

**Table 35. Changes in governance**

	<b>Total (N 48)</b>	<b>UniC (N 20)</b>	<b>Region (N 28)</b>
	<i>p</i>	<i>p</i>	<i>p</i>
Authorities controlling health care services have partially changed	0.000	0.000	0.000
The internal bodies for accountability are cost-centers	0.000	0.000	0.000
The external bodies for accountability are purchasers	0.000	0.000	0.000
Local politicians are a central body for governance	0.000	0.000	0.000
Purchaser – control is applied in daily operations	0.340	0.939	0.183
State control of health care services has decreased	0.000	0.000	0.000
Municipal control of health care services has increased	0.000	0.000	0.000

Total = all hospitals. UniC = university and central hospitals. Region = regional or local hospitals.

The variables used to demonstrate a potential change from a social to a technical institutional environment reveal that this has taken place not only theoretically but also in practice. Most variables show high statistical significances supporting the view of a change from a previous environment. The changes that have occurred emphasize the strength of reallocation and its impact on institutional restructuring. Despite the failings of the State Subsidy Act to create free markets for health care services, several public hospitals have changed their ways of producing and delivering health care services in a more efficient technical way. The technical change has permeated not only individual hospitals (organizational set) but as well groups of hospitals (organizational field) and the whole public specialist-based hospital system.



## 7.5 Changes in services

Data were collected for all special disciplines of hospital care, and for internal medicine, surgery and gynecology. Analyses were performed in each category and furthermore for ward and outpatient services separately. Results were calculated for each year of the whole study period from 1988 to 2002. However, for comparison in this study, data for analysis were drawn at five-year intervals. In other words, from the beginning of the observation period i.e. 1988; from the last year before introduction of the State Subsidy Act i.e. 1992; from 1997 and, finally, from 2002. The State Subsidy Act of 1992 was the cut off point for observations, and results are discussed in relation to this act. Changes in ward and outpatient events are discussed separate. All data in the figures represent *total* annual values, whereas data in the tables are *mean* annual values. This is to enable statistical comparison at defined points of intervals. Complete series of data for all disciplines of specialized care was available from 44-45 of the total sample of 48 hospitals, as well as for wards and for visits to the outpatient clinics. Data for internal medicine, surgery and gynecology was obtained from 42-43 of 48 hospitals in respect of ward events and in 36-43 of 48 hospitals in respect of visits to the outpatient clinic. In four smaller regional hospitals no outpatient data were available for internal medicine, surgery and gynecology for any period during the whole study period.

### 7.5.1 All disciplines of specialized care

Before 1992, there was a steady decrease in the amount of days needed to treat patients on wards (Figure 7). The reason for this trend was a progressive shortening of length of stay from 6.6 days in 1988 to 5.5 days in 1992 (Figure 8). Therefore, the total amount of treatment days for all disciplines of specialized care decreased from 3.3 million in 1988 to 2.9 million in 1992, whereas numbers of patients treated remained nearly unchanged (Figure 7). After 1993, the total amount of treatment days started to increase and reached a maximum of 3.1 million days in 1997. Most of the change took place during 1993 and 1994. After an initial rapid increase, the amount of treatment days declined and in 2002 the level of treatment days was below the numbers of treatment days in 1992.

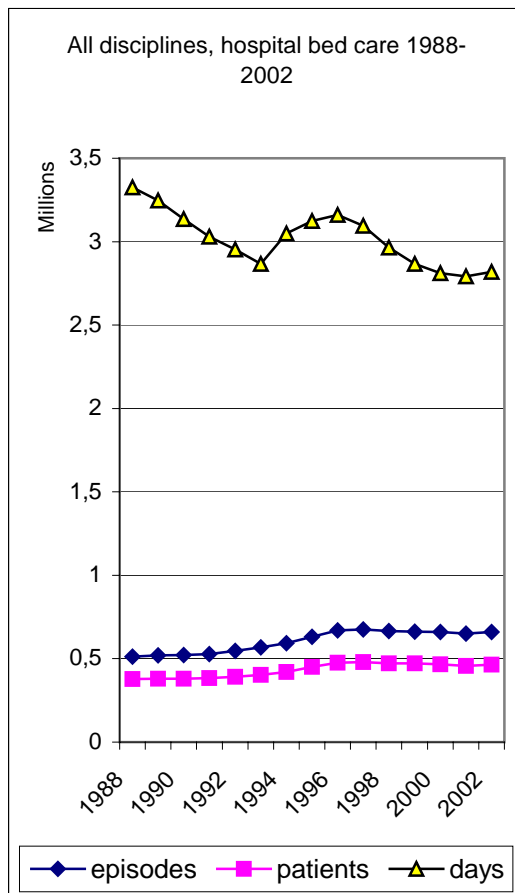


Figure 7. Annual treatment days, treated patients and treatment episodes in all disciplines of specialized care

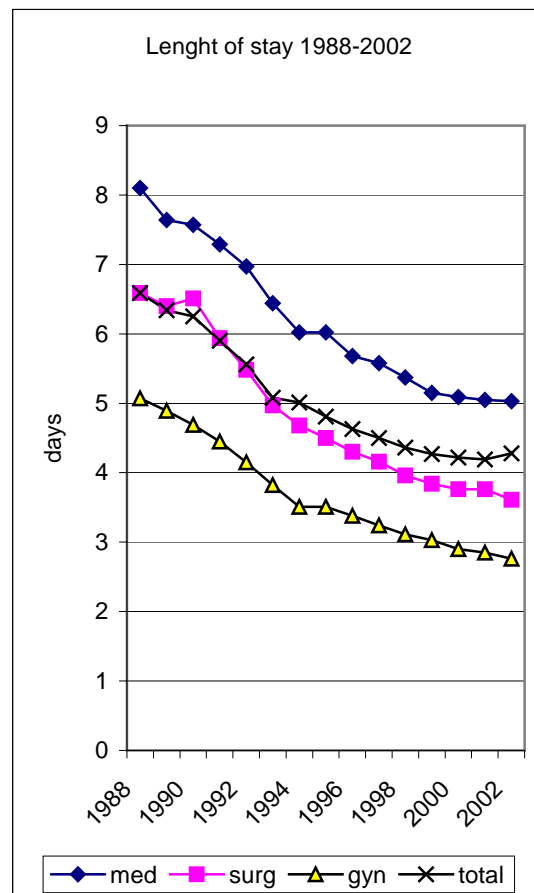


Figure 8. Mean length of stay in internal medicine, surgery, gynecology and all disciplines of specialized care

The increase in treatment days is due to an increase in numbers of treatment episodes and due to more patients being treated. This change started in 1993 and reached a maximum in 1996 (Figure 7). The later descending of annual treatment days is due a continuous shortening of the length of stay during the years of observation.

Between 1988 and 1992, the numbers of treated patients was almost stable with an annual variation between 378 000 – 395 000 patients/year. The amount of patients treated on wards started to increase after 1992-1993, and increased by 21 percent over five years between 1992 and 1997 (Figure 9). Five years later, the amount had increased to 480.000 patients/year and remained on this new level till the end of the observation period. As a result of more treated patients on wards, the numbers of treatment episodes increased accordingly (Figure 9).

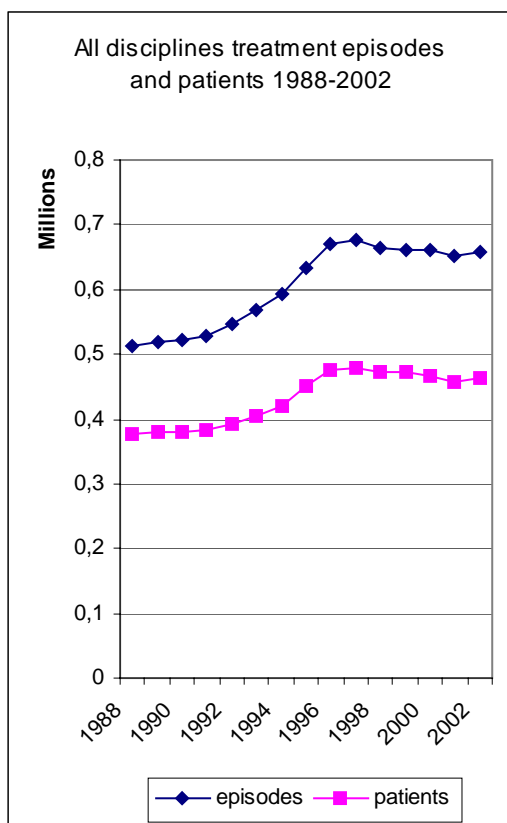


Figure 9. Numbers of patients and treatment episodes in all disciplines of specialized care

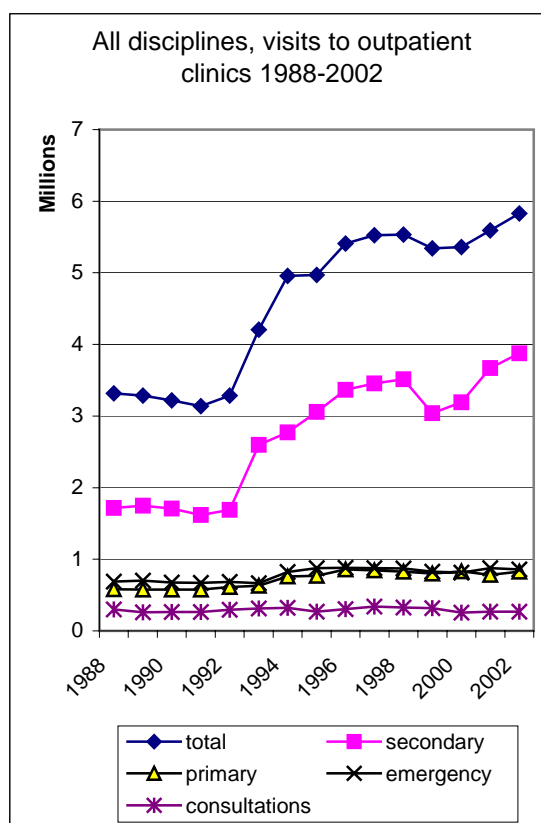


Figure 10. Type and frequencies of annual visits to the outpatient clinics in all disciplines of specialized care

Financial reallocation of public hospitals in 1992 resulted in an increased number of treated patients on wards and accordingly in an increase of numbers of treatment days. An explanation could be that reallocation induced external resource dependency and forced accordingly providers of health care services to increase their production in order to ensure revenues. Since many hospitals had for years had long waiting lists for several services, the first target in increasing services were most likely patients on waiting lists. This could explain the rapid adaptation to the changed external environment.

Changes in outpatient clinic visits occurred as well, closely related to the years after 1992. One of the main changes was a sudden and extensive increase in secondary visits to the outpatient clinics (Figure 10). The figure shows clearly that the total number of secondary visits had for at least five years (1988-1992) before the reallocation in 1992,

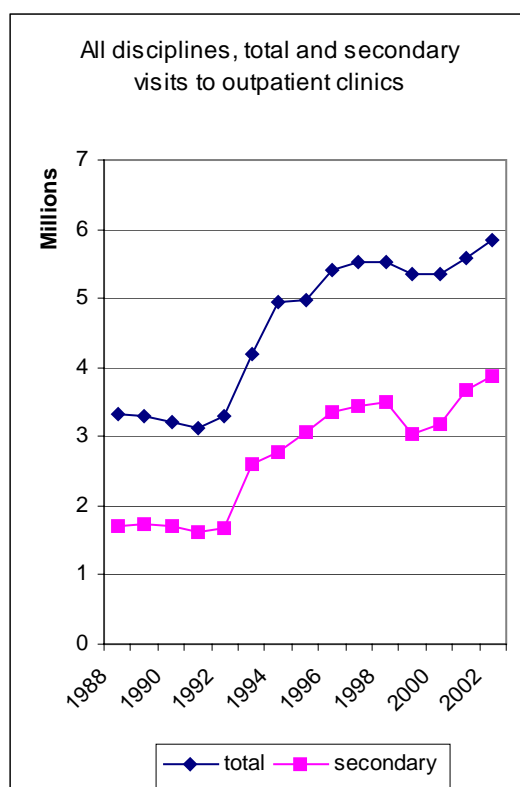


Figure 11. Total- and secondary visits in all disciplines of specialized hospital care

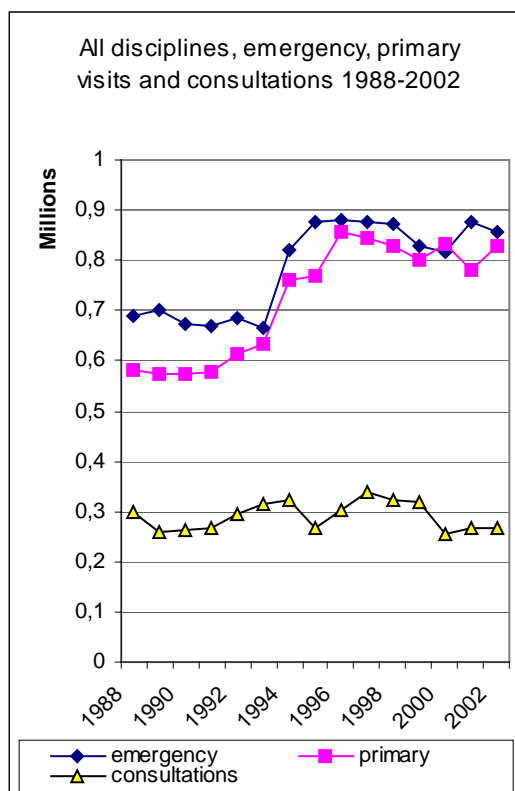


Figure 12. Emergency, primary visits and consultations in all disciplines of hospital care

been very stable, with annual visits between 1.6 and 1.7 million. In 1993 the numbers of visits had increased to 2.6 million, in 1994 to 2.8 million and in 1997 to 3.4 million secondary visits. The number of secondary visits thus, rose by 105 percent within five years. Changes in the number of secondary visits were the main reason contributing to changes in the total numbers of outpatient clinic visits during the same time period. The total number of annual visits in 1992 was 3.3 million and increased to 5.5 million in 1997, which is a 68 % increase (Figure 11).

Changes in the frequency of acute emergency hospital visits and primary visits to the outpatient clinics occurred as well but with a modest delay, compared to the immediate changes in secondary visits after reallocation (Figure 12). The total number of acute emergency visits rose from 684 000-664 000/year in 1992-1993 to 821 000-874 000 in 1994-1995, and up to 877 000/year in 1997. Acute emergency visits rose with 28 percent within five years. A similar trend is seen in the total numbers of primary visits to the outpatient clinics. The modest delays in time between increases in secondary visits versus primary and acute emergency visits might be due to the fact that secondary visits

were in-house controlled, and acute emergency visits as well as first visits to the outpatient clinics were externally controlled by referring physicians. Thus, the numbers of visits to the outpatient clinics either continued to increase during the study period (total and secondary visits) or increased to a new level (emergency and primary visits). Only consultations remained unaffected by the reallocation mechanism.

Table 36 present statistical calculations for ward events and outpatient clinic visits. Values are presented as mean annual ward events or mean annual outpatient visits with five-year intervals, in 1988 (A), in 1992 (B), in 1997 (C) and in 2002 (D). The p-values present cross-sectional comparisons between endpoints of intervals A vs. B, B vs. C and B vs. D. Of particular interest is point B: the State Subsidy Act was passed in 1992 and came into force in the early spring 1993. Changes before 1992 (A vs. B) served thus as the control period for changes appearing after 1992 (B vs. C and B vs. D)

**Table 36. Ward and outpatient clinic events and visits, in all disciplines of specialized care between 1988-2002**

	Mean A	Mean B	p value	Mean B	Mean C	p value	Mean B	Mean D	p value
<b>Ward events</b>									
Length of stay	6.59	5.56	p<0.0001	5.56	4.50	p<0.0001	5.56	4.28	p<0.0001
Treatment days	79160	67119	p<0.001	67119	68773	p=0.552	67119	67102	p=0.334
N. of patients	9007	8903	p=0.118	8903	10655	p<0.0001	8903	11046	p=0.01
N. of treatment episodes	11252	12526	p=0.001	12526	15026	p<0.0001	12526	15695	p=0.008
DRG	11000	11669	p=0.001	11669	14216	p=0.0001	11669	15356	p<0.001
Case-mix	0.84	0.88	p=0.103	0.88	0.89	p=0.319	0.88	0.92	p<0.0001
<b>Outpatient clinic</b>									
Emergency visits	15727	14875	p=0.802	14875	19074	p<0.013	14875	18501	p=0.023
Primary visits	12933	13322	p=0.503	13322	18373	p<0.0001	13322	17447	p=0.011
Secondary visits	38164	36731	p=0.353	36731	75113	p<0.0001	36731	65820	p=0.001
Consultations	6914	6580	p=0.948	6580	7380	p=0.484	6580	5262	p=0.270
Total visits	73686	71374	p=0.466	71374	120061	p<0.0001	71374	107031	p<0.0001

Mean A; the mean value for 1988, Mean B; for 1992, Mean C; for 1997 and Mean D; for 2002. DRG = diagnosis related groups.

Before the reallocation in 1992 (Mean A vs. Mean B.) there was a significant decrease in annual ward treatment days due to the shortening of the length of stay. The numbers of treatment episodes increased modestly but statistically significant between 1988 and

1992 or in the period before reallocation. The numbers of treated patients on wards remained unchanged. Case-mix was unaffected during this time period, but in DRG a statistically significant change was observed. This is partly due to the way DRG is calculated and the result is influenced by changes in numbers of treatment episodes.

After reallocation (Mean B vs. Mean C and Mean B vs. Mean D), the number of treatment days, as well as the length of stay continued to decrease statistically significant compared to the preallocation period. The numbers of treated patients increased significantly and remained in this new level until the end of the observation. Significantly more treatment episodes occurred as well. The amount of treatment days was at the end of the study period (Mean D) on the same level as in 1992 (Mean B).

The same table shows the statistical results for visits to the outpatient clinic presented, and compares changes in three intervals during the study period (1988-2002). The table shows a stable level for visits in all categories between 1988 (Mean A) and 1992 (Mean B), with no statistical differences. After 1992, the numbers of annual visits increased resulting in highly significant changes (Mean B vs. C and Mean B vs. Mean D) as compared to the period before reallocation. Most of the changes in visits occurred during 1993 and 1994.

Changes in the magnitude of hospital services, ward services, as well as outpatient clinic visits, occurred mainly in the early years after reallocation. The increase in ward services was more gradual and reached a new level of activity within five years and remained thereafter on this new level. The early increase can best be explained by the then existing long waiting lists for services. Waiting lists had for a long time been a very common problem for decades in public health care. After the reallocation it was easy to increase the number of patients treated by taking new patients from the already existing waiting lists. The observed achievement of a new level of activity can either be due to the fact that the maximal capacity for ward services had been reached or due to the fact that a new balance between demand and supply had been attained.

The changes in outpatient clinic services were even more impressive. Where as the ward services achieved a new level of activity, the outpatient visits has continued to increase from 1993 on, to the end of the study period. This is particularly true for the

total number of visits as well as the number of secondary visit. However, for primary care and emergency care there only seems to be a shift in the number of visits to a new higher level. This discrepancy might be due to the different reasons for visits. The shift from primary care and emergency care visits to the outpatient clinics might more be a rearrangement of services between different health care providers. Other reasons could be an increase in the incidence of acute diseases or a shift in the way diseases are treated. These two options are, however, unlikely. Since primary care and emergency care visits are mainly controlled by referring physicians, a rearrangement between providers of health care services is the most probable explanation. The reasons for a continuous increase in secondary care visits, and thus in the number of total visits, have obviously a more multifaceted background. Since these visits are 'in-house controlled', a major change in the number of visits must be due to changes in hospital routines. Shorter hospital stays have certainly contributed to an increased need to control patients after hospital discharge. Increased use of day-case interventions has displaced patients from wards to outpatient clinics. More outpatient clinic visits before hospitalization contribute to an increase in secondary visits.

### **7.5.2 Subgroups of disciplines, internal medicine, surgery and gynecology**

In order to examine subgroups of specialized hospital care, specific subgroups were selected, ones representing conservative (internal medicine), operative (surgery) and conservative as well as operative (gynecology including obstetrics) features of specialist based hospital health care. The three subgroups represented an important share (60-80 percent) of all disciplines, and they all were present in the hospitals included.

#### **Internal medicine**

Changes in ward events and visits to the outpatient clinics of internal medicine were similar to changes observed in all disciplines of specialized hospital care. Thus, the number of annual treated ward patients rose rapidly by more than 32 percent, from

86.000 patients in 1992 to 114.000 patients in 1997 (Figure 13). A similar change was observed in the numbers of treatment episodes, showing an increase of 33 percent. “In internal medicine the numerical increase in patients on wards as well in treatment episodes reflects an increased frequency of treated patients. Reallocation initiated an intensified turnover of patients and services within several areas of specialized care, so also in internal medicine.

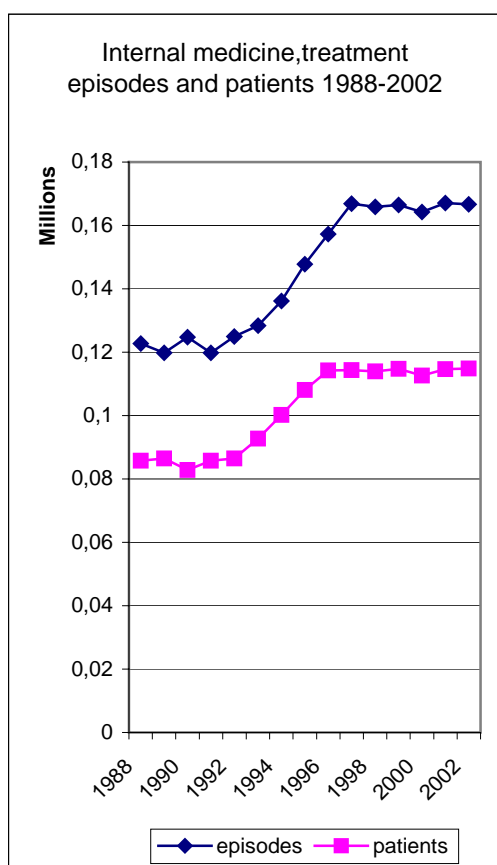


Figure 13. Annual treated patients and treatment episodes in internal medicine

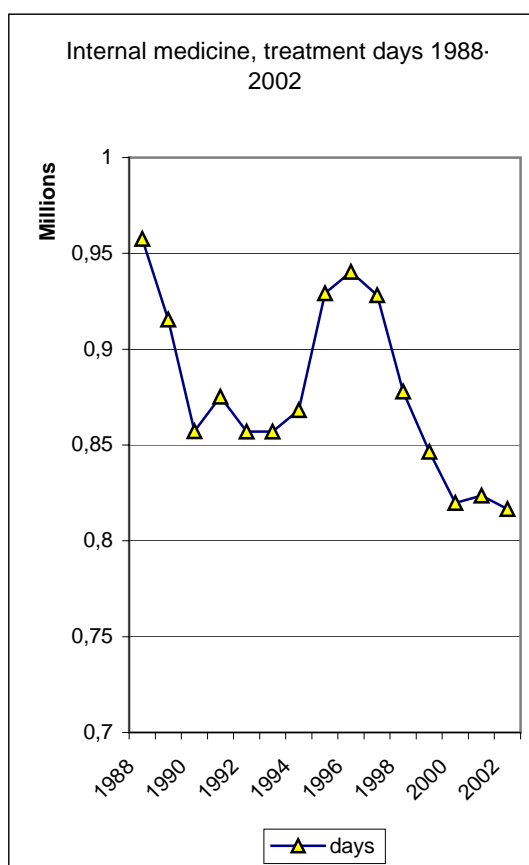


Figure 14. Annual ward treatment days in internal medicine

The changes were induced by reallocation and continued during a period of four to five years to reach a new stable level. The total number annual treatment days showed at begin of the observation period a rapid decrease due to shortening of the length of stay (Figure 14). From 1993 on, the amount of treatment days started to climb for a short period but this rise then turned into a rapid fall. The reason for this decrease is the combined effect of a natural shortening of the length of stay and an increase in the number of treatment episodes which result from patients being treated.



Figure 15 presents changes concerning Diagnosis Related Groups (DRG). Diagnosis Related Groups were created in order to get a better view of hospital activities. DRG can be used for comparison of hospital activities as well as for calculations of costs. To some extent DRG can also be used to indicate the level of hospital care. The curves in the figure represent the product of DRG and numbers of treatment episodes in four categories of cases. In all disciplines of specialized care, and in surgery and internal medicine, the numbers of DRG increased during the observation period, whereas DRG in gynecology remained unchanged between 1988-2002. However, the close concordance of the DRG curves with curves for treatment episodes in individual groups (all disciplines, internal medicine, surgery, gynecology), emphasize that the DRG curves must be used cautiously to mirror changes in the level of care. The changes reflect more an intensified turnover of patients treated.

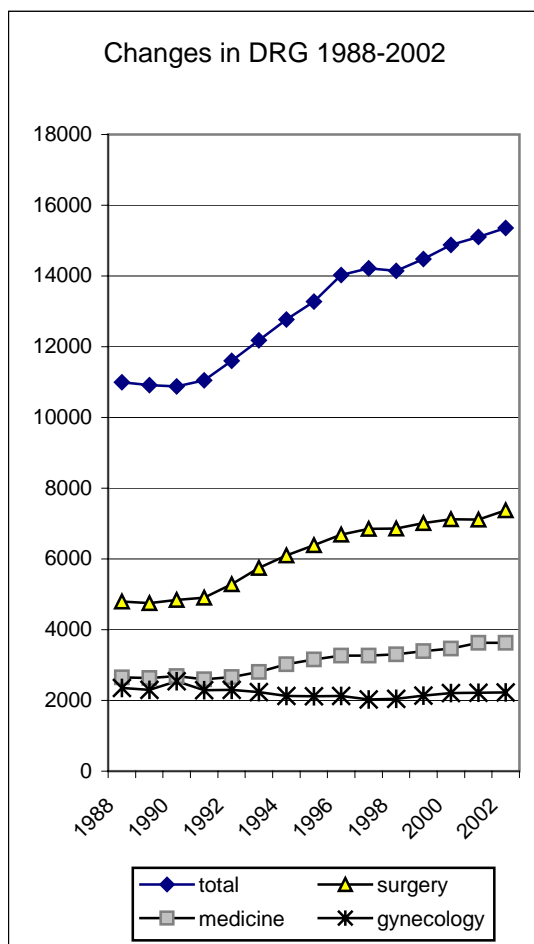


Figure 15. Diagnose related groups in four categories of specialized care. The curves present the product of DRG and the treatment episodes.

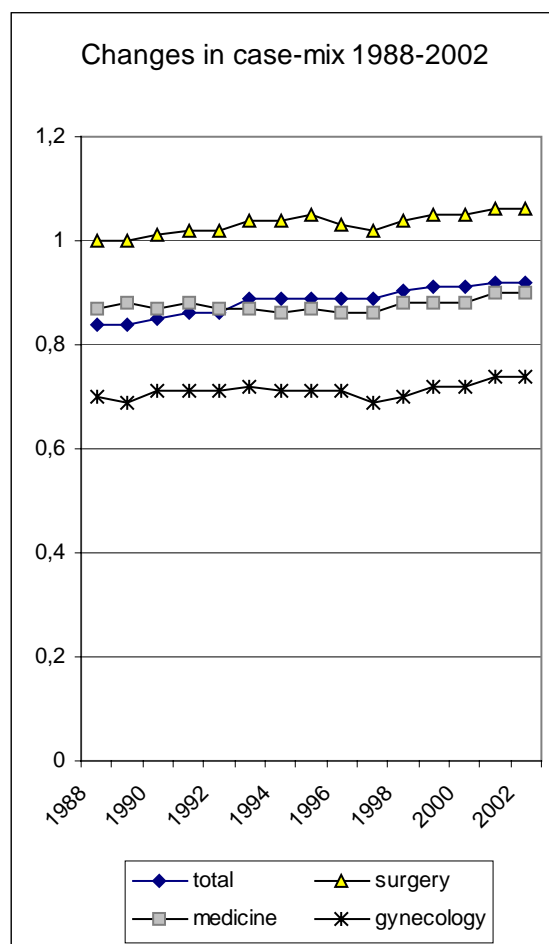


Figure 16. Case-mix in four categories of specialized care

Changes in the case-mix (sum of DRG groups), better reflect changes in the level of care. For all disciplines of specialized care and for surgery a modest increase is observed (Figure 16). Mean values for case-mix shows in each group a modest increase during the study period, but no changes as a result of the reallocation in 1992.

Changes in visits to the outpatient clinic for internal medicine are presented in figures 17 – 19 and in table 37. A closer look at the visits in each category reveals that the amount of annual visits had remained almost unchanged between 1988 and 1992 (Figure 17). After 1992, the number of secondary visits started to increase, and rose from 340 000 to 520 000 visits between 1992 and 1997, which is 53 percent. The total numbers of annual visits increased also and most of the increase was due to changes in secondary visits. Total as well as secondary visits continued to rise throughout the period from 1993 to 2002 (Figures 17 and 18). Primary visits were as well affected by the reallocation

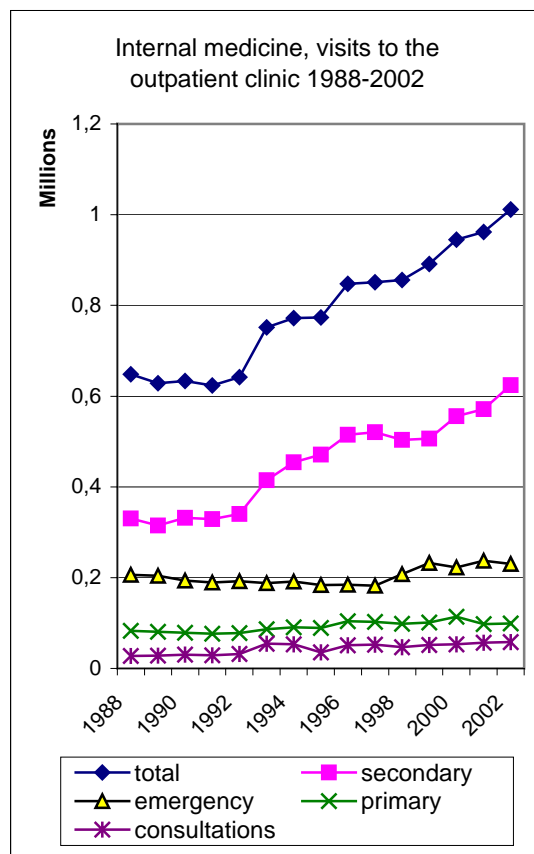


Figure 17. Categories and frequencies of annual visits to the outpatient clinics for internal medicine

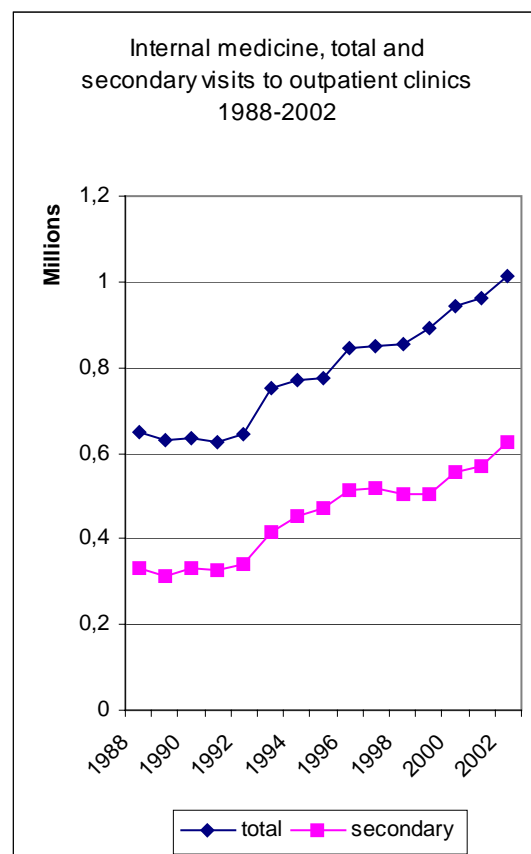


Figure 18. Changes in total and secondary visits to the outpatient clinics for internal medicine

mechanism. They started to increase in 1993 and rose from 77 800 in 1992 to 102 300 visits in 1997, which is 31 percent (Figure 19). Acute emergency visits declined slightly overall until 1998 and rose then rapidly. The numbers of primary visits was thus affected by the reallocation mechanism. By contrast, it is difficult to see a connection between the reallocation and changes in numbers of emergency visits.

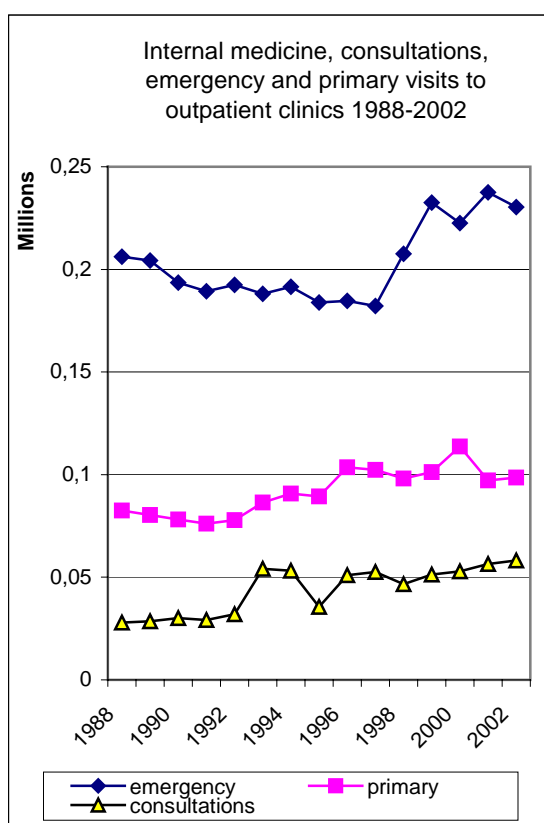


Figure 19. Annual visits to the outpatient clinics in three categories of internal medicine

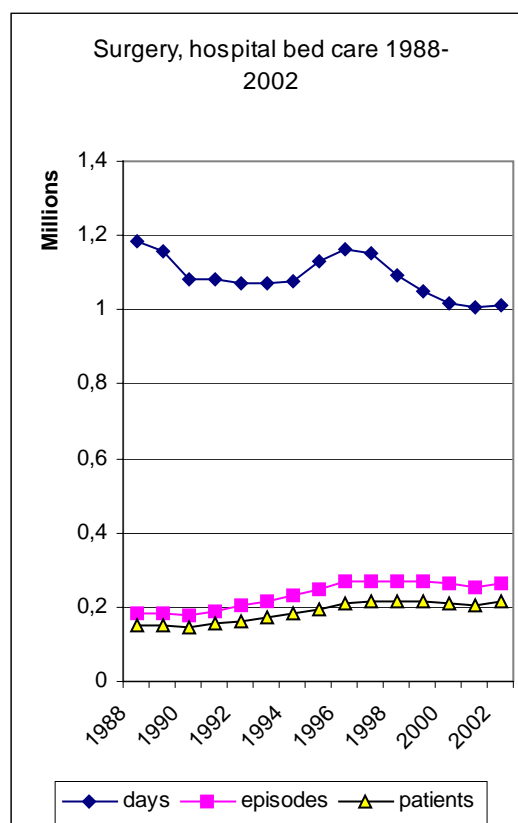


Figure 20. Annual treatment days, treated patients and treatment episodes in hospital bed care for surgery

Results in table 37 show that the most significant changes for ward events and visits to the outpatient clinic occur in the period after reallocation in 1992. For ward events, there are highly significant changes in length of stay, numbers of treated patients and treatment episodes as well as in DRG. For outpatient clinic visits, significant increases in nearly all categories of visits are evident from the year 1992 onwards.

The mean length of stay decreased during the whole study period. The numbers of treatment days decreased in particularly in the preallocation period and remained there after on the same level with only minor variation. However, a direct comparison of mean

**Table 37. Ward and outpatient clinic events and visits in internal medicine between 1988-2002**

	Mean A	Mean B	p value	Mean B	Mean C	p value	Mean B	Mean D	p value
<b>Ward treatment</b>									
Length of stay	8.01	6.97	p<0.000	6.97	5.58	p<0.0001	6.97	5.03	p<0.0001
Treatment days	23356	19930	p=0.001	19930	20624	p=0.980	19930	19440	p=0.226
N. of patients	2092	2011	p=0.567	2011	2542	p<0.0001	2011	2735	p<0.0001
N. of treatment episodes	2993	2986	p=0.505	2986	3714	p<0.0001	2986	3967	p<0.0001
DRG	2648	2662	p=0.374	2662	3265	p<0.0001	2662	3631	p<0.0001
Case-mix	0.87	0.87	p=0.650	0.87	0.86	p=0.590	0.87	0.90	p=0.057
<b>Outpatient clinic</b>									
Emergency visits	5027	4692	p=0.114	4692	4671	p=0.871	4692	5616	p<0.0001
Primary visits	2014	1898	p=0.095	1898	2434	p<0.0001	1898	2403	p=0.202
Secondary visits	8063	8294	p=0.647	8294	12392	p<0.0001	8294	15220	p<0.002
Consultations	796	842	p=0.429	842	1250	p<0.026	842	1419	p<0.031
Total visits	15821	15666	p=0.678	15666	20259	p<0.0001	15666	24660	p<0.0001

Mean A; the mean value for 1988, Mean B; for 1992, Mean C; for 1997 and Mean D; for 2002. DRG = diagnosis related groups.

annual treatment days at different points of measurement should be done with caution due to the many factors influencing them. Numbers of mean annually treated patients was on the same level before reallocation (Mean A vs. Mean B) and rose statistically significant after reallocation (Mean B vs. Mean C and Mean B vs. Mean D). The same was observed for the numbers of treatment episodes. The case-mix did not changes significantly. The DRG, however, increased significantly after reallocation.

Several statistically significant changes were observed in the mean numbers of visits to the outpatient clinics for internal medicine in the period after reallocation. The most important increases were observed in total visits and in secondary visits to the outpatient clinic.

## Surgery

Changes in ward events for surgery were analysed in the same manner as earlier presented for other disciplines of specialized hospital care. (Figure 20). Length of hospital stay decreased steadily during the whole study period from 6.6 days in 1988 to 3.1 days in 2002, in other words, an average of 0.2 days for every year of observation (Figure 8), and was not influenced by reallocation in 1992. The total numbers of patients treated on wards and the total numbers of treatment episodes increased from 1991-1992 on and reached the peak in 1997 (Figure 21), after which it remained at this level until the end of the observation period. The numbers of treatment episodes increased accordingly with more treated patients on wards (Figure 21). The numbers of patients treated increased by 33 percent and treatment episodes increased by 34 percent between 1992 and 1997. The curve for treatment days exhibit a very similar shape to that of internal medicine and is explained by the relationship between shortening of treatment episodes and the increase in the numbers of treatment episodes (Figure 22).

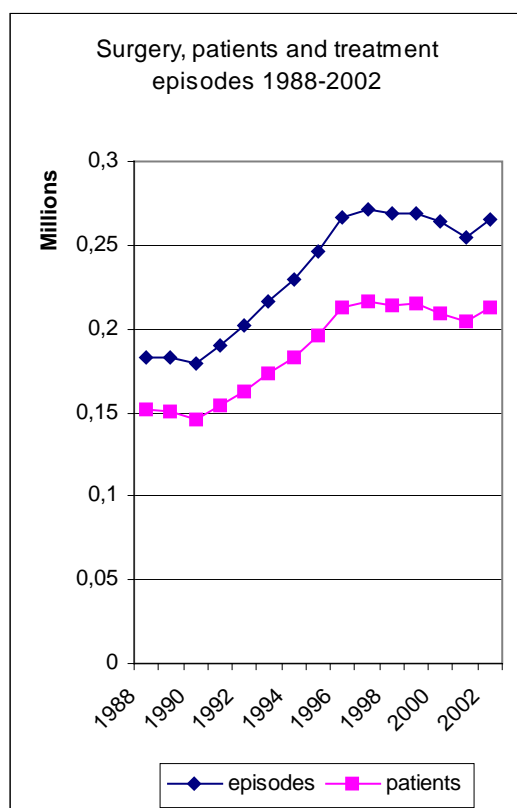


Figure 21. Annually treated patients and numbers of treatment episodes on wards for surgery

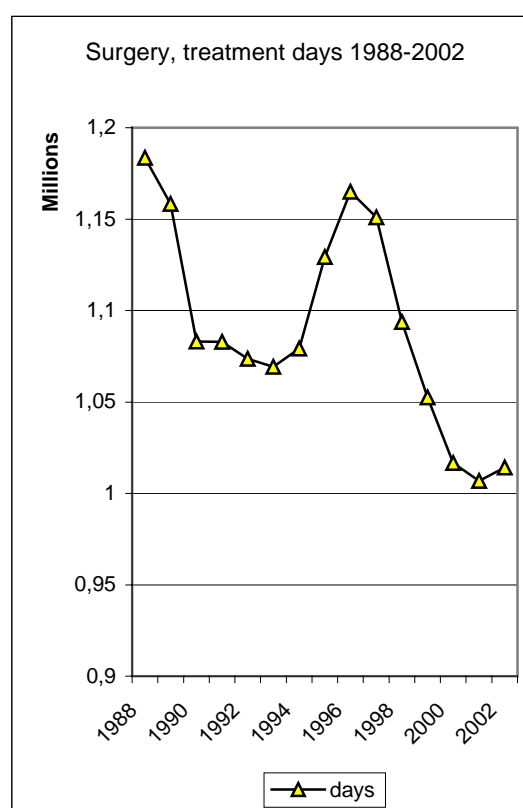


Figure 22. Annual treatment days on wards for surgery

Changes in outpatient visits and consultations occurred during the study period, but they were less related to the reallocation than the changes in internal medicine (Figures 23 and 24). Primary visits to the outpatient clinic rose steadily but modestly at defined

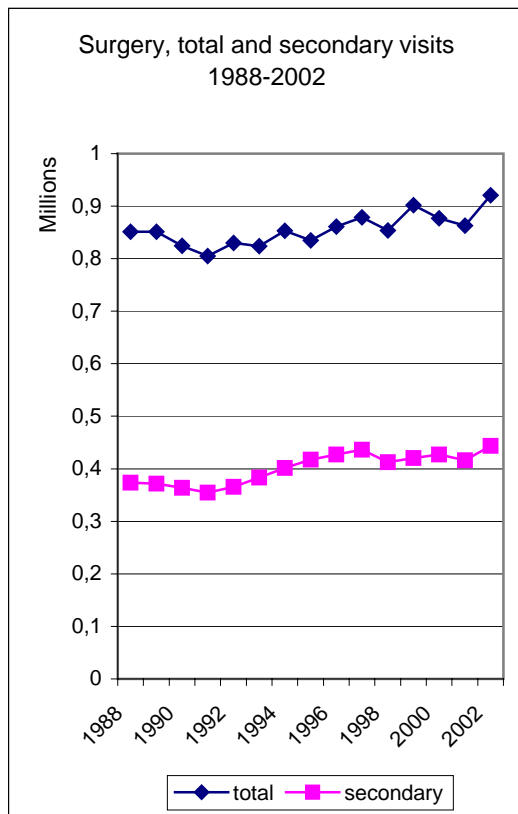


Figure 23. Total and secondary visits to the outpatient clinics for surgery

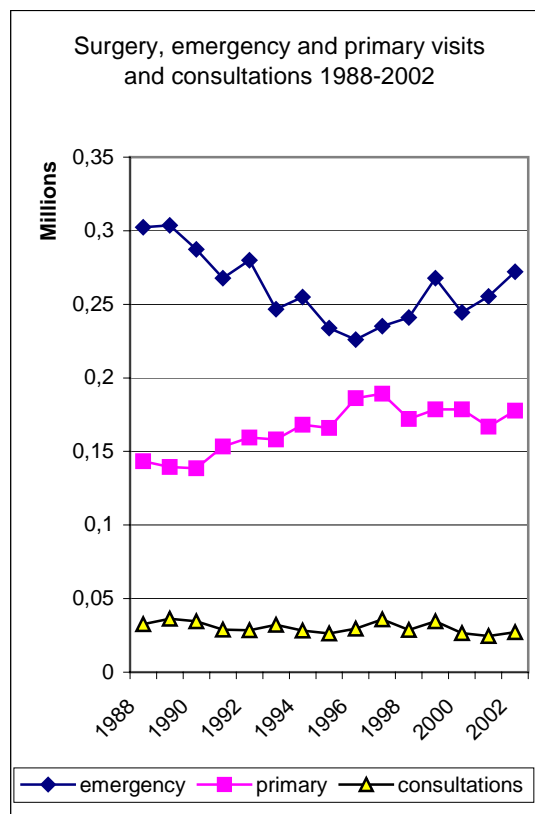


Figure 24. Emergency, primary visits and consultations to the outpatient clinics for surgery

study intervals (Table 38). Changes before 1992 are more related to a natural development of treatment procedures during recent years, i.e. from 1990 on, and this progression was not changed by the State Subsidy Act in 1992. Secondary visits increased as well between 1992 and 1997, but the increase was moderate when compared with internal medicine for the same category of visits, i.e. 18 versus 53 percent. The total numbers of outpatient visits show an increase, but the changes were not significant when compared at defined intervals. Visits to the acute emergency clinics shows during the study period a generally decreasing trend till 1996. The amount of consultations remained unchanged during the whole study period.

The reallocation resulted more in changes of events on the wards, and fewer events in the outpatient clinics. In the outpatient clinics, secondary visits increased steadily and to some extent also primary visits, but in general, these changes were moderate.

Table 38 presents ward events and outpatient clinic visits in surgery between 1988-2002. Already at an early stage, i.e. before reallocation in 1992 (Mean B), statistically significant changes took place. Even if the numeric differences are small for some variables the systematic change in events in most hospitals provide significances in

**Table 38. Ward and outpatient clinic events and visits in surgery between 1988-2002**

	Mean A	Mean B	p value	Mean B	Mean C	p value	Mean B	Mean D	p value
<b>Ward treatment</b>									
Length of stay	6.59	5.48	p<0.001	5.48	4.16	p<0.0001	5.48	3.61	p<0.001
Treatment days	28867	24964	p=0.005	24964	25578	p=0.775	24964	24146	p=0.366
N. of patients	3695	3791	p=0.018	3791	4818	p<0.0001	3791	5065	p=0.001
N. of treatment episodes	4452	4707	p<0.001	4707	6016	p<0.0001	4707	6311	p=0.001
DRG	4798	5832	p<0.001	5832	6847	p<0.0001	5832	7378	p<0.0001
Case-mix	1.00	1.02	p=0.126	1.02	1.02	p=0.576	1.02	1.06	p=0.026
<b>Outpatient clinic</b>									
Emergency visits	7 373	6830	p=0.065	6830	5489	p<0.028	6830	6635	p=0.175
Primary visits	3498	3887	p<0.038	3887	4503	p<0.009	3887	4333	p=0.416
Secondary visits	9107	8925	p=0.498	8925	10393	p<0.0001	8925	10826	p=0.064
Consultations	908	770	p=0.232	770	856	p=0.354	770	660	p=0.639
Total visits	20769	20249	p=0.431	20249	20917	p=0.122	20249	22456	p=0.347

Mean A; the mean value for 1988, Mean B; for 1992, Mean C; for 1997 and Mean D; for 2002.

DRG = diagnosis related groups.

a pair T-test analysis. The length of stay continued to decrease statistically significant throughout the study period and was not influenced by the reallocation. The mean annual treatment days decreased statistically significant at an early phase in the preallocation period, but remained there after fairly unchanged. The numbers of treated patients increased statistically significant in the preallocation period (Mean A vs. Mean B) but the increase was far much more noticeable after the financial reallocation (Mean B vs. Mean C and Mean B vs. Mean D). The case-mix changed modestly at the end of the study interval. The DRG increased throughout the study period, and is mainly explained through the increase in treatment episodes.

For outpatient clinic visits, the most important change was observed in the increase of secondary visits during the first period after the reallocation (Mean B vs. Mean C).

## Gynecology

Changes in gynecology were not affected to any important degree by the reallocation. Looking at the events on the wards, shows, that the total amount of patients treated as well as the number of annual treatment episodes remained nearly unchanged (Figure 25). Numbers of annual treatment days continued to decrease in line with a continuous shortening of the treatment episode in gynecology.

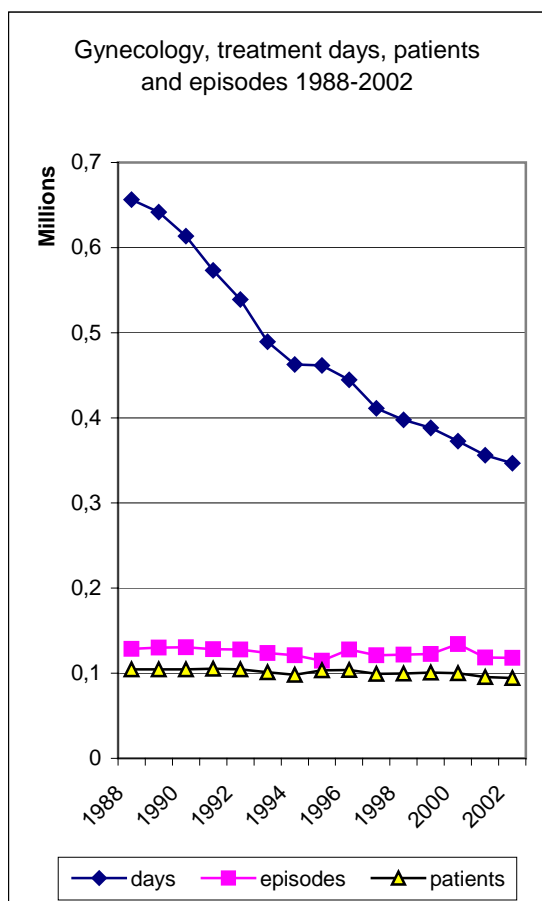


Figure 25. Annual treated patients, treatment days and treatment episodes in gynecology

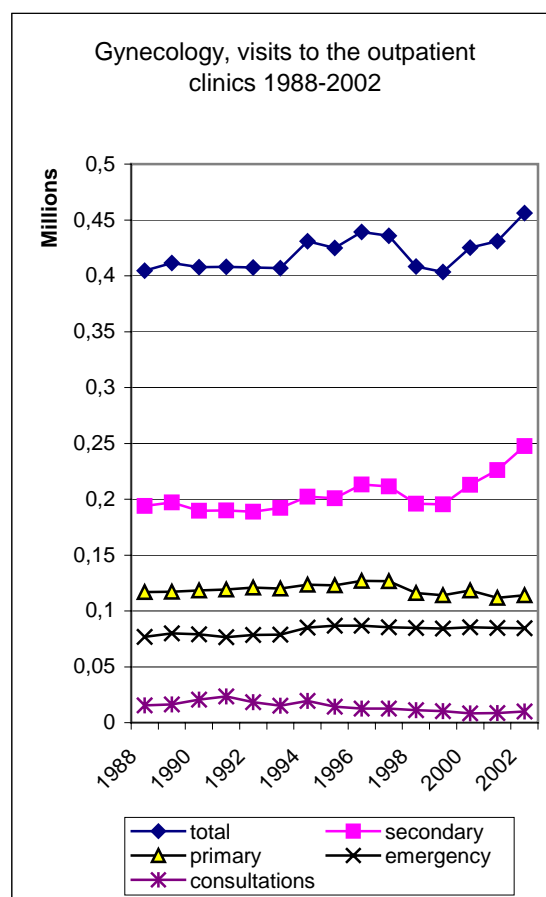


Figure 26. Types and frequencies of annual visits to the outpatient clinics for gynecology

Changes in the numbers of individual visits to the outpatient clinics in gynecology were modest (Figure 26), and only for secondary visits and total visits temporary significant



increases could be observed during the time interval from 1992 to 1997 (Mean B vs. Mean C). At the end of the study period a new increase in secondary visits was observed, unrelated to the reallocation in 1992. Calculations for statistical significances

**Table 39. Ward and outpatient clinic events and visits in gynecology between 1988-2002**

	Mean A	Mean B	p value	Mean B	Mean C	p value	Mean B	Mean D	p value
<b>Ward treatment</b>									
Length of stay	5.07	4.15	p<0.0001	4.15	3.24	p<0.0001	4.15	2.76	p<0.0001
Treatment days	16830	13145	p<0.0001	13145	9560	p=0.087	13145	8669	p=0.085
N. of patients	2283	2553	p=0.726	2553	2312	p=0.415	2553	2362	p=0.691
N. of treatment episodes	3298	3122	p=0.600	3122	2819	p=0.446	3122	2951	p=0.777
DRG	2357	2297	p=0.273	2297	2025	p=0.394	2297	2229	p=0.863
Case-mix	0.70	0.71	p=0.100	0.71	0.69	p=0.224	0.71	0.74	p<0.02
<b>Outpatient clinic</b>									
Emergency visits	1922	1965	p=0.426	1965	2032	p<0.049	1965	2060	p=0.097
Primary visits	2914	3019	p=0.767	3019	3013	p=0.293	3019	2980	p=0.791
Secondary visits	4849	4722	p=0.299	4722	5031	p<0.001	4722	6040	p<0.280
Consultations	445	491	p=0.579	491	297	p=0.158	491	247	p<0.006
Total visits	10114	10186	p=0.939	10186	10374	p<0.014	10186	11122	p=0.074

Mean A; the mean value for 1988, Mean B; for 1992, Mean C; for 1997 and Mean D; for 2002.

DRG = diagnosis related groups.

are presented in table 39. Statistical significances are related to changes in the length of stay, treatment days, in secondary and total visits and furthermore to changes in the case-mix during the study period.

The effects of reallocation on specialist-based hospital services for gynecology was different from the effects on internal medicine, surgery as well as in all disciplines of specialized hospital care. This discrepancy has obviously several reasons; the patients represents only half of the adult population and several services in this field have been declining or unchanged for years (births). As a result demand and supply of services have been more or less at equilibrium.

A further explanation could be, that the proportion of private outpatient services is far more common in gynecology than in internal medicine and surgery. Gynecology in

public hospitals was, thus less demanded by reallocation than internal medicine and surgery.

### **7.5.3 Summary of changes in services in relationship to reallocation**

The reallocation of specialist-based hospital care was introduced in Finland by the State Subsidy Act in 1992. This measure in turn changed the number of ward services (treatment days, numbers of patients and treatment episodes) and outpatient clinics (numbers of different visits) in most categories of specialized hospital care that were studied. Changes in frequencies of services were observed in all disciplines of specialized hospital care, in internal medicine and surgery, and also in gynecology, but only to a modest degree.

The changes brought about by reallocation were observed almost immediately after the State Subsidy Act came into force in spring 1993. The magnitude of change was considerable in many ward events and numbers of visits to the outpatient clinic of important magnitude (tables 36-39). Observed increases in several events exceeded 30 percent, and in one group of patients, the increase of secondary visits to the outpatient clinics was more than 105 percent. In view of the numbers of patients treated and services provided, the changes must be regarded important.

The effect of reallocation on ward events resulted a rapid increase of treated patients and an increased amount of treatment episodes. The first changes in events coincided with the introduction of reallocation and the increase continued for 4-5 years to reach a new level of activities more than 30 percent above the level before the reallocation. Furthermore, the activities remained at the new level until the end of the observation period. There was a significant shift in activities in all disciplines of specialized care, in internal medicine and in surgery. The initial rapid increase in events after reallocation can be explained through the use of existing repositories of patients on waiting lists for services, and the increased level by activities through shortening of waiting time for services.

Changes in the frequency of several categories of outpatient visits were important, in particularly for all disciplines of specialized care and internal medicine but less so for surgery and gynecology. Total and secondary visits rose immediately after the reallocation, with primary and emergency visits experiencing a modest delay. The immediate changes in secondary visits after reallocation can be understood as an internal change in hospital routines but also includes the increasing transfer of patients from wards to outpatient clinic services. This transfer of patients contributes certainly to the steepness of the increases in total and secondary visits and further for the continuous increase in visits through to the end of the study period.

The different categories of specialized care tended to behave differently as regard to the reallocation. All disciplines of specialized hospital care and internal medicine, showed important changes in ward events and in changed frequencies of different categories of visits to the outpatient clinic. In surgery, the main response to reallocation was a change in ward events, whereas in gynecology few changes were observed.

The observed changes in services as a result of the reallocation are mirrored in the results obtained from the questionnaire concerning hospitals. Structural apolysis has occurred on wards as a result of increased turnover of patients and shortened episodes of treatment. Outpatient clinics have expanded through an increase in visits and through more diversified tasks and services. Operative apolysis is confirmed through changes in the changes of services in many ways. The rapid changes in many services must be managed and controlled for efficiency and resources used. Increased turnover increases the needs for intensified control and standardization. Contentual apolysis is presented through the many changes experienced in services, in access to services, in vertical and horizontal integration and increased technicalization that has occurred as a result of more diversified services according to the customers needs. Contextual apolysis, i.e. changes in rules, norms, goals and values related to health care service providing is the result of intensified service turnover and the increased demands for efficient micro-economy.

In table 40 are results from regression analyses presented of changes in hospital ward events and outpatient clinic visits in four groups of specialist-based hospital care during

the time period from 1988 to 2002. In the formula  $y = \alpha + \beta x$ , the  $\beta$  stands for the slope and direction of changes in services during the follow up period. The results from the regression analysis are consistent with the results from the pair T-test analyses of changes in services after reallocation.

**Table 40. Regression analysis of ward events and outpatient clinic visits in four groups of specialist-based hospital care between 1988 and 2002**

	All disciplines		medicine		surgery		gynecology	
	$\beta$	p-value	$\beta$	p-value	$\beta$	p-value	$\beta$	p-value
<i>Ward treatment</i>								
Length of stay	-0.960	0.040	-0.984	0.016	-0.998	0.002	-0.985	0.015
Treatment days	-0.735	0.265	-0.788	0.212	-0.819	0.181	-0.962	0.038
N. of patients	0.931	0.069	0.923	0.074	0.955	0.045	-0.047	0.953
N. of treatment episodes	0.977	0.023	0.951	0.049	0.963	0.037	-0.820	0.180
DRG	0.984	0.016	0.966	0.034	0.984	0.016	-0.575	0.427
Case-mix	0.967	0.033	0.618	0.382	0.926	0.074	0.610	0.390
<i>Outpatient clinic</i>								
Emergency visits	0.800	0.200	0.546	0.454	-0.560	0.440	0.987	0.013
Primary visits	0.863	0.137	0.825	0.175	0.877	0.123	0.470	0.530
Secondary visits	0.811	0.189	0.970	0.030	0.926	0.074	0.859	0.141
Consultations	-0.602	0.398	0.970	0.030	-0.777	0.223	-0.892	0.108
Total visits	0.796	0.204	0.956	0.044	0.808	0.192	0.829	0.171

DRG = diagnosis related groups. Case-mix sum of DRGs.  $\beta$  is the slope and direction of change.

## 7.6 Changes in hospital performance

Local improvement of health care services was one main goal of the State Subsidy Act, but its coincidence with economic recession in Finland in the early years of the 1990's, soon highlighted the need for more efficient production of health care services, too. Hospital performance became explicitly important, and for that reason, this study also embraces the measurement of productivity and efficiency.

### 7.6.1 Productivity

Productivity refers to the relationship or the balance between output and input. Changes in productivity are thus due to changes in either variable. Increased productivity is the result of either increased output in relation to input or of an unchanged output and a reduced input. For hospital services, reallocation was intended to promote more an increased output vis-a-vis the resources required for the input.

In figure 27, the annual total productivity is presented in three categories of specialized care, surgery, internal medicine and gynecology. The curves for productivity in surgery and internal medicine are broadly similar and parallel throughout the study period. During the same period, the curve for gynecology is, however, rather different: it remains almost constant, with only minor fluctuations. In surgery and in internal medicine, costs were increasing in relation to the output of services during the early years of the study period or from 1988 to 1991, which led to falling productivity. Almost

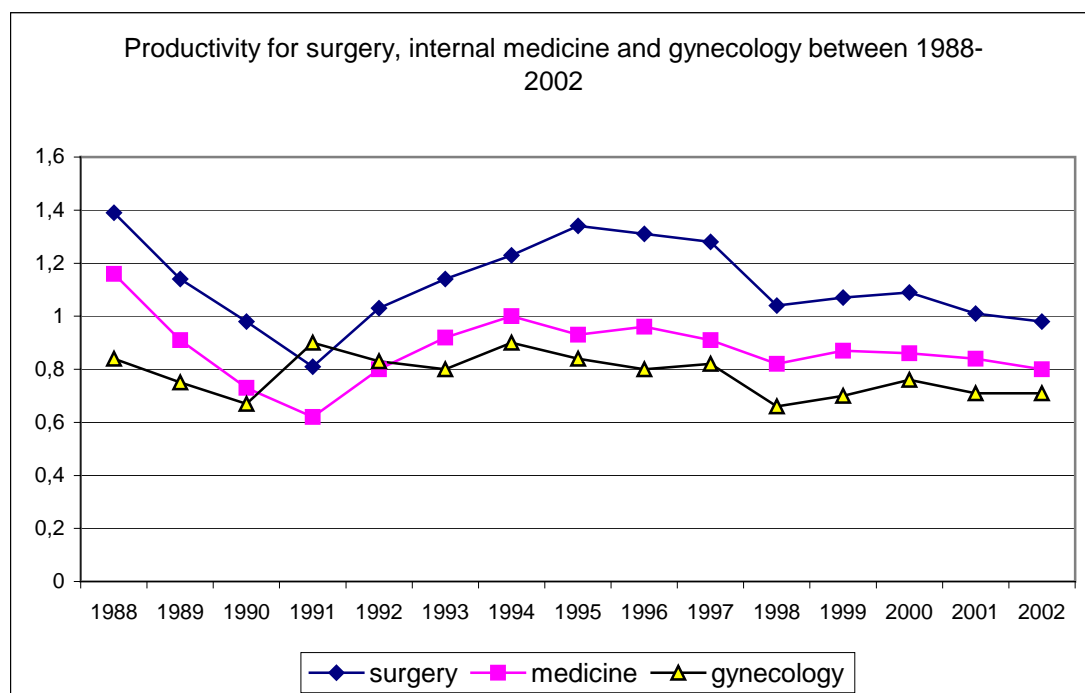


Figure 27. Productivity for surgery, internal medicine and gynecology during the study period from 1988 - 2002. Each point represents the annual total productivity for 21 hospitals.

coincident with this period, i.e. from 1990 to 1992 Finland went into a period of economic recession. On top of that, the State Subsidy Act, passed in 1992, came into force in early spring 1993. In 1991 productivity of surgery as well as of internal

medicine reversed, turning from a negative trend into a positive direction. The reasons for this change are obviously several. Partly, the increased productivity was due to diminished expenditures for care and an increased production of services (Figures 9 and 10). This period of increased productivity continued till 1997, but thereafter productivity showed a decreasing trend in productivity in all individual specialities. The reason therefore is an almost constant or unchanged production of services (Figures 13, 21 and 25) set against increasing costs for services. For all individual categories of care a 10 - 12 % decrease in productivity was observed between 1997 and 1998. The reason for this phenomenon is a change in the way costs are recorded, not a change in production of services. At this point of time capital costs were moved and became part of total hospital costs resulting in a corresponding shift in productivity due to increased expenditures (input) vis-a-vis an unchanged volume of services (output).

Table 41 shows mean values for productivity calculated for four time points of measurement namely 1988 (Mean A), in 1992 (Mean B), in 1997 (Mean C) and in 2002 (Mean D). Statistically significant changes in productivity were obtained for surgery and internal medicine between Mean A and Mean B respectively Mean B and Mean C. For gynecology no statistical significant change was observed, but there is at least a trend for a change between Mean B and Mean C. Regarding point Mean D, at the end of the

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**Table 41. Changes in productivity for surgery, internal medicine and gynecology between 1988-2002**

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	Mean A	Mean B	p value	Mean B	Mean C	p value	Mean B	Mean D	p value
Surgery	1.08±0.13	0.95±0.16	p<0.005	0.95±0.16	1.07±0.24	p<0.03	0.95±0.16	0.87±0.18	p=0.072
Medicine	0.95±0.81	0.79±0.17	p<0.001	0.79±0.17	0.90±0.19	p<0.02	0.79±0.17	0.77±0.08	p=0.408
Gynecology	0.76±0.12	0.78±0.08	p=0.747	0.78±0.08	0.83±0.09	p=0.09	0.78±0.08	0.76±0.12	p=0.705

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Mean A; the mean value for 1988, Mean B; for 1992, Mean C; for 1997 and Mean D; for 2002

observation period, we have to keep in mind that the mean values are influenced by the measures taken by hospitals in 1997-1998, when capital cost were included in total annual expenditures, which contributed to a decrease in productivity caused by increased

costs. These mean values should therefore be interpreted with caution when compared to other points of measurement.

### 7.6.2 Efficiency

In micro-economic terms, efficiency means the prevailing productivity or ratio of the present relationship of output to input compared to the maximal relationship of output to input.

In the present study, the annual cost-efficiency was calculated for all departments belonging to the same discipline of specialized care. The results are presented as curves in the figure 28 and show a modest decrease in cost-efficiency between 1988 and 1991, and followed thereafter by a modest increase. After the State Subsidy Act, in other words, from the year 1993 on, the trend is modestly decreasing for surgery, increasing for internal medicine and almost unchanged for gynecology. In general, the level of cost-efficiency lies between 60 and 82%. The calculations show a lessening of the

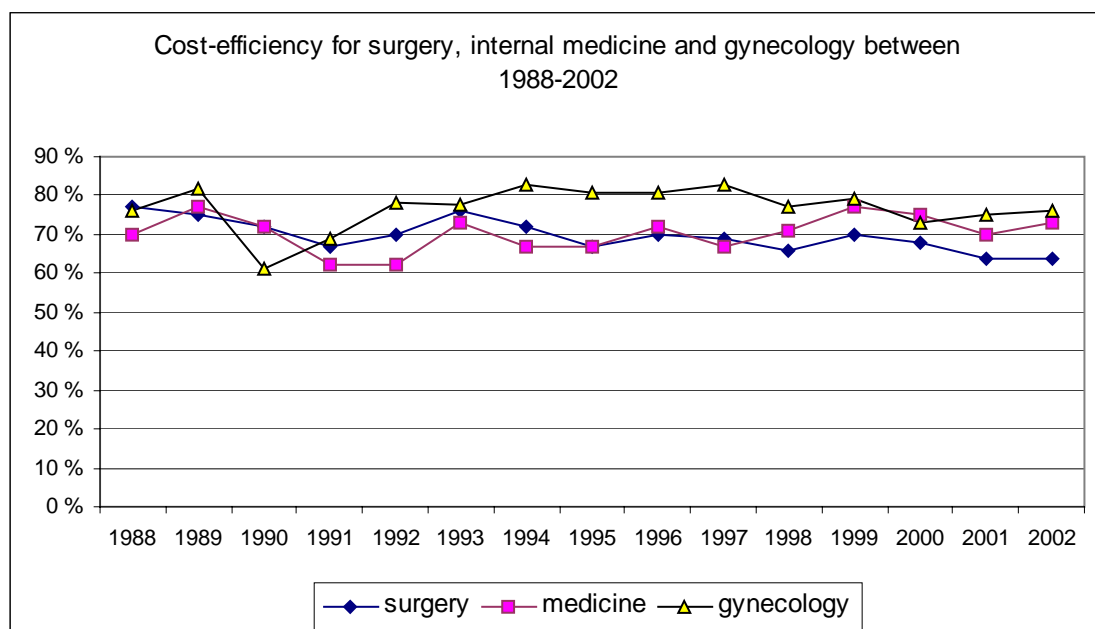


Figure 28. Cost-efficiency for surgery, internal medicine and gynecology during the study period from 1988 to 2002

variation in cost-efficiency towards the end of the study period. This means a closing of the gap in cost-efficiency between individual subgroups of specialized care.

In table 42 are mean values calculated and compared at the same time points of measurement, in 1988 (Mean A), in 1992 (Mean B) in 1997 (Mean C) and at the end of the study in 2002 (Mean D). A statistical analysis confirms a significant decrease in cost-efficiency for surgery and internal medicine between 1988 and 1992 (Mean A vs. Mean B). At the end of the study period cost-efficiency increases statistically significant for internal medicine while there is a decreasing but not significant trend for surgery. In gynecology, small changes are observed, but they are not statistically significant when compared at any interval of measurement.

**Table 42. Cost-efficiency for surgery, internal medicine and gynecology between 1988-2002**

	Mean A	Mean B	p value	Mean B	Mean C	p value	Mean B	Mean D	p value
Surgery	77±9	70±12	p<0.014	70±12	69±15	p=0.773	70±12	64±14	p=0.088
Internal medicine	70±14	62±14	p<0.026	62±14	67±14	p=0.241	62±14	73±8	p<0.028
Gynecology	76±12	78±8	p=0.747	78±8	83±9	p=0.09	78±8	76±12	p=0.705

Mean values in percent. Mean A; the mean value for 1988, Mean B; for 1992, Mean C; for 1997 and Mean D; for 2002

In table 43 are regression analyses presented for productivity and cost-efficiency in three groups of specialist-based hospital care for the whole study period between 1988 and

**Table 43. Regression analysis of changes in productivity and cost-efficiency in three groups of specialist-based hospital care between 1988 and 2002.**

	surgery		medicine		gynecology	
	$\beta$	p-value	$\beta$	p-value	$\beta$	p-value
Productivity	-0.251	0.749	-0.002	0.998	-0.300	0.700
Cost-efficiency	-0.348	0.652	0.985	0.015	-0.300	0.700

$\beta$  is the slope and direction of change.



2002. In productivity, no important or significant changes can be obtained in any of the three groups. In cost-efficiency, a significant positive change occurred in internal medicine.

## **8 Reliability and validity of the study**

The present study focuses only on public hospitals providing specialist based services, which therefore excludes hospitals for mental health, military and private hospitals. Hospitals for mental health were excluded since changes in this field have not been dependent on the State Subsidy Act, and military hospitals due to the gradually closing down of the few military hospitals during recent years. Private hospitals were excluded since they were not affected by the State Subsidy Act. Of 51 eligible 48 hospitals participated in the study, i.e. 94 % of all hospitals. Non-responding hospitals were evaluated for available data to ensure their compatibility with hospitals included. No differences could be obtained. Thus, nearly all eligible public specialist-based hospitals in Finland were included.

The questions in the questionnaire were tested three times before the investigation to remove any questions that were either ambiguous or too difficult to answer. All questions were of closed-end type. Prior to the empirical study, the questions were defined for each area of investigation. Since an individual question could be assigned to measure more than one area of investigation, no statistical analyses were performed between individual areas to avoid the risk with carry over effects. To improve the reliability of the empirical study, questions were randomly allocated to avoid group effects of questions focusing on the same area. The respondents were not aware to which area the question focused on. The empirical study was carried out during spring 2005, and the investigator personally interviewed all respondents. The questionnaire was completed during that meeting.

Analyses of the empirical part of the study were performed in the total population of hospitals and in predefined groups of hospitals but not on the level of individual hospitals. This grouping of hospitals was performed in order to study the effects of

financial reallocation on different levels of hospitals care. The groups selected for analysis were, all hospitals, university and central hospitals and finally regional hospitals.

Changes in services and in hospital performance were analyzed in four groups of hospital care. The groups were; all specialized care, surgery, internal medicine and gynecology including obstetrics. This division was done to get an insight into changes in the total specialized hospital care and, furthermore, into three main disciplines of different nature of hospital care and present in all hospitals. A further subdivision into university and central hospitals versus regional hospitals was not carried out. The results present thus, total changes in different disciplines of medicine, i.e. all specialized hospital care, surgery, internal medicine and gynecology including obstetrics during the study period from 1988 to 2002. Each hospital served thus as its own control.

Complete series of services for all disciplines of specialized care was available from 44-45 of 48 hospitals, as well as for wards and for visits to the outpatient clinics. Data for internal medicine, surgery and gynecology was obtained from 42-43 of 48 hospitals in respect of ward events and in 36-43 of 48 hospitals in respect of visits to the outpatient clinic. In four smaller regional hospitals no outpatient data was available for internal medicine, surgery and gynecology for any period during the whole study period.

Hospital performance, i.e. changes in productivity and cost-efficiency was analyzed in a group of hospitals where all service and cost data could be obtained from outset of the study until the end on the study period. Accordingly, twenty to twenty-one hospitals fulfilled the criterias for inclusion. Of those hospitals three were university hospitals, eight central hospitals and nine to ten regional hospitals. Calculations were performed to ensure that the selected group of hospitals used for measurements of hospital performance did not deviate from the total group of hospitals in the present study.

## 9 Discussion

Health care systems in all industrialized countries have for almost two decades been under pressure for reform. Regardless of the allocation system for health care, the need for health care reforms has become apparent if further escalation of costs is to be constrained (Saltman & von Otter 1992, Phelps 1995, Peabody 1996). Costs have risen due to many reasons. For example, the population is ageing accompanied by a concomitant rise of chronic diseases. Improved and new medical technologies have resulted in extended use of more efficient diagnostic tools and new treatment modes. Beyond that, a better awareness of individuals of their rights for access to health care has enhanced the pressure for more health care services. As a result, increased demand for health services have highlighted the need to find a balance between costs for health care and other societal expenditures (Saltman & von Otter 1992, OECD 1994).

Most measures in health care reforms have been extended to promote cost-containment of health care services and to increase efficiency for care and delivery of services (WHO 1997). The primary intention has been to increase micro-economic efficiency (institutional) to be extended on a macro-economic level (society). State, national, cultural, social, historical and political circumstances have contributed to health care reforms, and to the instruments chosen and used. In general, countries with the same system of health care allocation have followed a similar approach (OECD 1994). Thus, countries with social insurance systems have promoted centralization of allocation, whereas countries with a social security system have handed down responsibility for allocation, power and control more close to the providers of health care services (OECD 1994). Different versions of decentralization or deconcentration, devolution and delegation have been promoted in countries with social security systems. This has been done with the intention to introduce some form of planned markets (Saltman & von Otter 1992). The purpose with decentralization has been to reduce the need for central administrative bodies, to improve local decision-making and to encourage innovativeness and to enhance faster implementation (Borgenhammer 1993).

## 9.1 Health care systems as a target for reform

From the view of sociology, health care reforms have created fields for research into organizational environmental changes. This area is interesting for many different reasons. Health care organizations have a central role in all societies, and their economic share of societal expenditures is important. The size of health care systems is usually significant, and several different organizations are involved in providing of health care services. Each organization contributes to the provision of health care services through their specific tasks, and the professional personnel involved is important to its function and its size. A sudden change in this area has thus an extended impact not only on local levels, but as well for the society as a whole.

In most countries, health care has for decades been bound to professional institutions, i.e. to hospitals with their own culture and history (Scott 1987). In the development of hospital care, allocation has had a central role, which is tied in with the social, cultural and political circumstances of the society. Possibly more than to any other aspect, allocation has contributed to the structure of health care (WHO 1997). Allocation has an impact on providers of health care services, on their role and on their contribution to health care, on the balance between different aspects of care, cure and prevention, between hospital and ambulatory care, between public and private providers (Saltman 1994b). In general, we distinguish between four distinct directions of allocation: social security, social insurance, private financing and a mixture of social and private financing (Dekker 1994).

Most health care systems have grown up incrementally to fulfill a medical need for care and prevention. The changes have been more evolutionary than discontinuous. Characteristic to the changes has been improving the existing system and by extending of new functions to old structures (Scott et al. 2000). Discontinuous changes have occurred as well. Scott et al. (2000) discuss three discontinuous eras in the development of the American health care with own institutional logic and governance systems. The development proceeds from an era of professional dominance (1945-1965), to federal involvement (1966-1982) and finally to the last era of managerial control and market mechanisms (1983 – to present). Quality of services governed by professional standards

and norms characterized the professional era. Access and equity of health care came into focus during the era of federal involvement. During the last period a deregulation of governmental influence has occurred combined with promotion of efficiency in providing and delivering of health care services (Scott et al. 2000).

Despite the fact that there is no conclusive definition of a health care reform, most countries and health care systems have set out to restrain further escalation of costs for health care. They are engaged in promoting more efficient use of resources. Pressures for reform have thus come from outside of the field of health care, being generated by increased competition on societal resources and restricted tax revenues. However, simultaneous pressures have been exerted on the inside, too, by the need to adopt to restricted budgets. For countries having a social security system, a health care reform has usually been introduced by political coercive means, that is through legislative measures (State Subsidy Act 1992). An intention has been to move from integrated models of provision to separating purchasers from providers of health care services, executed by means of contracting mechanisms (Enthoven 1978, Enthoven 1994). The strategic tools sought have been planning markets for health care services and increased public competition (Saltman & von Otter 1992, Enthoven 1994). For this purpose changes in the allocation mechanism as well as in the targets for allocation has been introduced - likewise also in Finland.

Reallocation mechanisms are usually used to support incentives for more efficient and effective production of health care services (WHO 1997). Of different instruments used to steer health care reforms, changes in allocation have turned out to be most efficient (Saltman 1994b). Hospitals have often been the target for reforms due to their large share of health care expenditures (Edwards et al. 1997). Changes related to financing have not sufficiently enhanced competition enough between insurance companies (Dekker 1994) nor endorsed alternatives enough for the supply side of health care services (Light 1998). On the contrary, reallocation has proven to be an appropriate instrument for authorities to support incentives for more efficient and effective measures in health care services, while simultaneously leaving the implementing of activities to health care professionals (Saltman 1994b). In countries with a tax-based social security allocation, a central issue with reallocation has been to create “internal markets or

planned markets” (Enthoven 1980, HMSO 1989, WHO 1997, Savas et al. 1997). An intention has been to untie the integrated health care delivery system, by enhancing purchaser-provider split (Enthoven 1980). The tacit meaning has been to enhance price competition, in order to increase efficiency and productivity of health care services, without impeding on the access and equity of care (Chernikovsky 1995). In the Nordic countries, so also in Finland, reallocation has undeniably promoted a stronger market orientation. On a gliding scale between fully-planned and fully-market oriented, the Finnish health care system has moved to the latter end of the scale while Finland as a whole is at present in the middle, in a region called “planned markets” (Saltman & von Otter 1992). Planned markets are characterized by publicly owned and operated competitors, which have limited and selected use of market instruments. Decentralization has taken place, to promote more local freedom and incentives for services, but market control is still in the hands of public authorities or municipalities.

Since the introduction of the SSA and accordingly reallocation, more than a decade has passed, but so far only a few systematic studies have examined reallocation-induced changes, and some of the published ones do not directly focus on reallocation. Niskanen (1997) discusses in a local group of hospitals (3 hospitals) changes in values as an increased self-interest in personal and organizational behavior. Values related to equity of care and democracy are declining, whereas values related to economy have gained momentum. Enckell (1998) has studied organizational cultures of Finnish hospitals undergoing change. He highlighted a transition from an initial triplicate organizational culture via a political-performative culture and finally into a holistic organizational culture. In a study of policy solutions in finance, production and administration of Finnish health care, Vohlonen (1997) discusses the problems of managing of market failure and preventing government failure. Linna (1998), has measured changes in productivity in Finnish hospitals after reallocation. Even if the follow-up period covers only two years directly after the financing reform, the study already points out changes of strengthened efforts to improve hospital performance. In a recent study comparing cross-sectional data of hospital cost efficiency in Norway and Finland, Linna et al. (2006) were able to detect a 17-25% improved cost efficiency for Finnish hospitals. Linna studied hospital performance in public hospitals using the whole population of hospitals, whereas the previously discussed Finnish studies are based on local or just a

few public hospitals. The existing knowledge from studies of reallocation-induced changes (values, culture, hospital performance) is thus, either based on some hospitals (Niskanen, Enckell) or based on a short period (Linna 1998) or cross-sectional results (Linna et al. 2006). Finnish studies on reallocation induced changes in hospital performance or structural changes long-term (10–15 years) have so far not been carried out. Since changes in professional organizations are often prone to inertia caused by employees and others (Hannan & Freeman 1984) it is of interest to look into changes long-term.

## 9.2 Institutional pressures

Oliver divides institutional pressures supporting deinstitutionalization into three entities: political, functional and social pressures. Based on the origin of the pressures she defines two levels: the organizational level and the environmental level (Oliver 1992).

A part the objectives was, to ensure the appropriateness of the target for research of organizational behavior. For that purpose well-known theories related of organizational behavior were selected. From the specific theories, hypotheses were derived to study the likelihood of existent institutional pressures for institutional change caused by financial reallocation. Confirming of the hypotheses constructed would provide support for institutional pressures for changes. Results from the nine hypotheses confirmed induction of institutional pressures on all levels of public hospital care as a result of financial reallocation. The target for investigation was thus appropriate and financial reallocation accordingly an indicator promoting changes in public hospitals.

Reallocation increases pressures on several levels and one of the main drivers is the introduction of external resource dependency and its management (Alexander & Morrisey 1988, Scott et al. 1998). For professional organizations with resource needed independent allocation, changes in dependency as well as in financial allocation are important mechanisms enhancing organizational change (van de Ven & Walker 1984). These features are well seen in the three hypotheses derived from institutional theory. Accordingly, reallocation promoted institutional change and heterogeneous structures as

a way to transform institutional features from social to a more technical. A technicalization has earlier been confirmed in other studies (Scott 1993) and it is viewed as being a result of a rational connection between revenues and services provided. Reallocation promotes productivity as well technical efficiency. These two are important management tools with technical features (Ruef et al. 1998, Kurunmäki 1999). Increased efficiency puts accordingly pressures on structures and the use of personnel shifts from form isomorphic to more heterogeneous structures.

Reallocation increases political, functional and social pressures. Reallocation induces instability through increased demands for new goals, new roles and values (Oliver 1992). Instability means increased tension between groups of personnel, between wards and outpatient clinics, between purchasers and providers of services. Partly this happens because individual members in health care service providing will be the subject to new roles and increased demands (Oliver 1992). The professional culture represented by physicians, nurses and other personnel come under pressure due to the increased emphasis on economy. In many cases managerial leadership will replace academic leadership (Scott et al. 2000). Ethical values are confronted with values related to economy (Kurunmäki 1999). Physicians who are used to autonomous decision making on care procedures will be more and more faced with economic scarcity in their decisions on treatment modes. Their autonomous role will come under pressure, thereby increasing the propensity for heteronomous features (Scott 1993).

External resource dependency increases pressures for an improved internal control and for the use of resources to ensure proper revenues. Managing the over-all resources and the general administrative functions are less a tasks for physicians, and include more features of managerial culture (Alexander & D'Aunno 1990, Mintzberg 1998, Scott et al. 2000). Increased dependency of external resources increases the pressures to adapt to external power. The needs of purchasers of services and changed governance structures require new efforts from the hospitals, in order for them to be an appropriate and attractive health care service provider in an increasingly competitive field. Increased integration, horizontal as well as vertical are one of the many ways hospitals can ensure the necessary flow of patients and accordingly revenues (Scott et al. 2000). Hypothesis number eight emphasizes the pressures for increased integration, and thus the need to



deal effectively with increased resource dependency. One part of this is the increased pressures for internal monitoring of activities, quality assurance systems and external accreditation, new or improved information channels and increased needs for exchange of information. These needs have their roots in the split of purchasers from providers and thus in the need to cover the gap of information in an agent-principal relationship (van de Ven 1994).

Hypotheses extracted from recognized organizational theories strongly confirm public hospital care as an appropriate target for the study of organizational changes due to reallocation. The institutional pressures created, furthermore the needs to adapt to a changing environment.

### **9.3 Apolysis as a concept**

In the present study, the concept of apolysis was developed to study organizational changes in four different directions. The concept was applied to public hospitals to study the effects of financial reallocation. Apolysis as a concept, should however, not be bound to hospitals. In the present study, changes in public hospitals were only the driver in the search for a concept and these changes became simultaneously the object for research.

As a result of the State Subsidy Act, not only individual hospitals came under pressures for change, but the hospital system as a whole and further the relationships between hospitals. Changes were thus expected in internal structures and in the management of daily routines and also in relationships and interactions with other providers of health care services, namely primary health care providers and other hospitals. The instrument needed for measurement of changes in institutional environment should therefore include many aspects to create an understanding of the initiated process.

WHO proposed in 1997 key elements characterizing health care reforms as processual and contentual, emphasizing the areas where changes are expected to take place (WHO 1997). Apolysis was created to include processual as well as contentual elements but at

the same time extended to embrace structural as well as contextual changes. In contrast to the views of WHO, apolysis was defined to measure tangible changes in organizational behavior, and not be constrained to descriptive and discursive elements of change. Thus, apolysis was defined to measure structural, operative, contentual and contextual changes in institutions. Other areas of change could have been included as well, but these four dimensions were regarded sufficient to contribute an extension of the existing views for understanding institutional change.

Institutions or organizations as open systems are in close relationship with the environment. They interact with the environment in a bi-directional manner. They are strongly influenced by the environment but simultaneously they contribute to changes in their surroundings (DiMaggio and Powell 1983, North 1990). Changes in the environment promote thus also changes in the institutional content, which consists of cognitive, normative and regulative structures (Scott 1995).

Changes in government regulations, increasing the pressure between social and economic institutional success in turn increase fundamentally the propensity to dispatch past practice, and support deinstitutionalization (Oliver 1992). In particular attempts to furnish public sector providers with private sector instruments for performance and increased requirements on efficient use of public resources will promote an institutional change to greater accountability, to an increased technical and to efficiently oriented performance (Perry and Rainey 1988, Oliver 1992). Introduction of changes in accounting systems are important thresholds in supporting technical features in an institutionally defined belief system (Scott 1995). The State Subsidy Act fulfilled, thus, all central requirements enforcing institutional changes in public hospitals. Of major importance was the introduction of resource dependency, by connecting hospital revenues direct to services provided. The cognitive conceptions of public hospitals came under pressures and enforced in a more normative and regulative direction.

Structural changes were expected as a result of reallocation, due to the needs for cost-containment and the prerequisites of economic control along the many different chains of service provision (Alexander & Morrisey 1988, Zakus 1998). Changes in personnel and in wards were expected as well as a propensity to displace provision of health care

services to more cost-efficient structures or to outpatient clinics. Changes in operational behavior were obvious due to the increased importance of economy and management of services, increasing tension in a professional culture (Alexander & D'Aunno 1990, Scott et al. 2000). The service mix was to be changed to ensure appropriate revenues, therefore an instrument was needed to cover the content of services as well as delivery of services (WHO 1997). Finally, increased external resource dependence and requirements for efficient micro-economy were expected to promote changes in values, rules, goals and culture or in the context of hospitals (Scott et al. 2000).

A result of financial reallocation, the present study confirms important changes in structural, operational, contentual as well as in contextual dimensions, i.e. in all dimensions of apolysis. The several changes occurred point at fundamental changes in public hospitals.

#### **9.4 Apolysis or normal evolution**

All changes occurred in the hospitals during the study period were not due to financial reallocation. The effects of new medical technologies and treatments as well as general evolution during the study period should be taken in to a weighted account. Since innovation and evolution have an impact on hospital structures, it is important to discuss these matters to get a more objective view of the role of reallocation-induced apolysis.

Innovation in medical technology and pharmacology has changed ways of diagnostic procedures and treatment modes in modern medicine (Lawrence & Hall 1999). New drugs and treatments have reduced or contributed to the disappearance of several patient groups in hospital care (Butwell et al. 2000). For example, the improved drug treatment of tuberculosis has made hospitals for lung diseases in many areas obsolete. Similarly, effective new drugs for treating such disorders as gastric ulcers have greatly reduced the numbers of patients who earlier would have been treated in hospitals (Pottick et al. 2000, Butwell et al. 2000). These kinds of developments have occurred within almost every area of medicine, and since the way patients are treated is closely associated with the

various care structures (e.g. hospitals), hospitals have undergone structural changes in accordance with changes in care.

Development of medical technologies has modified hospital structures. Modern invasive coronary interventions have strongly reduced the need for coronary bypass surgery (Heikkilä et al. 2000). Endoscopic surgery has made it possible to displace surgical interventions from operating theaters to outpatient clinics and day surgery. Developments in radiology, such as computerized tomography and magnetic resonance have enabled more advanced studies with far less burden for the patients. Their use, therefore, have expanded markedly in pre-hospital and hospital phases of diagnostic interventions (Lee 1995b). All these technology-based tools have had an impact on hospital structures. They have furthermore contributed to shorter hospital stays and to a reduction of treatment days. As a result, the number of beds on wards has decreased.

Hospital evolution is accompanying changes in treatment modes and mirrors the introduction of new drug treatments, new treatment modes and the rational use of new technology. However, development within medical care is not uniform and varies within individual disciplines across time and contributes to a gradual evolution of hospital structures. Even in changes of discontinuous nature, such as in the case of introduction of modern antituberculosis drug treatment, hospital treatment was gradually reduced. So, even in major developments of medicine, changes in hospital care and services are, by nature, more continuous and gradual.

In contrast to continuous hospital evolution, reallocation affects all levels of hospital care, and it can contribute to hospital evolution, by the introduction of new technology or new and more efficient treatments when available. More likely, however, is that reallocation and cost containment demand changes beyond medicine.

During the study period, endoscopic investigations and procedures became an important new tool for many interventions in surgery and gynecology, enabling more treatment and care at outpatient clinics. However, expanded use of endoscopy only partly explain changes that have taken place during the study period. The same assertion can be extended to other medical fields and the use of new technologies (e.g. computerized

tomography, magnetic resonance assessments) or new drug treatment modes. Neither introduction of endoscopic surgery, nor enhanced use of new technologies and drug treatments can by themselves explain the many institutional changes and dimensions of apolysis. Rather the changes observed simultaneously in structural, operational, contentual and contextual apolysis during the study period may best be explained by the financial reallocation. Accordingly, with the previous assertion, the onset of changes in ward and in outpatient clinic services is due to reallocation, but for the magnitude of change, introduction of new technologies and treatment modes, play their important contribution. An important factor further, and related to natural evolution, is the shortening of the length of treatment periods with impacts on the need of hospital beds.

Due to the fact that all Finnish hospitals were subject to the financial reallocation, no control group could be established in the present research study. It is therefore acknowledged that also other changes in the society could have contributed to the quantity and quality of observed changes in hospital services. Among the other contributors to the changes observed in the health care sector is the deep economic recession which hit Finland at the beginning of the 1990's. The gradual recovery from this recession was taking place during the observation period of the present study. However, since the increase in services provided was far faster than the recovery from economic recession, it is unlikely that the recovery from the recession could explain the changes in these services. Although Finland was hit hard by the recession, during the deep recession no changes occurred in the provision of specialist-based hospital services. This is a further indication that economic recession has a stronger direct effect on other sectors of society than on health care sector.

## 9.5 Integration of services

The Finnish public health care system has from begin on been integrated with purchasers and providers of health care services under the same roof. Nevertheless, despite this same ownership, individual providers of health care services have had a considerable freedom. Transactioncosts have not been used between providers of services. Each part

has been able to provide services according to an appropriate and professional competence. The situation has been stable for decades and financial support has been ensured through resource-needed allocation. Cooperation between hospitals has mainly been achieved by hierarchical treatment procedures of patients with specific diseases or on voluntary basis.

Reallocation changed the perception of services by the introduction of resource dependence and demands for cost-containment. From the view of hospitals, patients became suddenly the source of revenues and tied to services provided. Reallocation introduced transaction costs and their management became important. This increased dependence brought changes in the behavior between providers of health care services.

Literature from other areas has earlier emphasized the importance of controlling resources (Pfeffer & Salancik 1978, Hannan & Freeman 1989) for survival short-term and long-term (Pfeffer 1981). This active buffering promotes further changes in internal structures (Aldrich & Pfeffer 1976, Hannan & Freeman 1989).

Results from the present study confirm that internal as well as external changes have occurred on several levels of the public specialist-based hospital care system. Internal changes have already been discussed through the aspects of apolysis. External changes have occurred as well either through physical or through functional changes among individual service providers. Physical integration between providers occurred in some cases in particular on the level of regional hospitals. During the study period some smaller regional hospital were integrated with the local primary health care and some regional hospitals were more tightly tied into central hospitals. More important than physical integration seems to be the operative integration. The many variables used to study a potential integration emphasize the existence of a closer relationship between hospitals and between hospitals and primary health care service providers. Improvements in the access for care have occurred, the waiting lists have been cut, new information channels have been introduced, networks have been build to promote communication. Rules and norms concerning interactions have been clarified. Sharing of services has become more common. New providers have appeared and they have been integrated. Health care and social care have in many areas become closer. Some providers, for instance nursery homes and home care service, have, furthermore become important elements of the health care service chain. Operatively, integration has

extended in vertical as well as in horizontal direction, but the integration has been more horizontal than vertical. Concomitant with increased specialization of services, the service chain has become more decentralized and more horizontal.

Reallocation has forced providers of hospital care to closer and more integrated relationships in their service production. All of the integration is, however, not the result of reallocation. The role of concurrent contemporary technical advances and their implementation are important. The above notwithstanding, improved and new technologies, however, cannot alone explain the far-reaching changes in integration among healthcare providers.

## **9.6 From social to technical environment**

Organizations can be distinguished according to their technical and institutional features. Historically, hospitals have many elements of institutional features characterized by human and social systems providing health care services with ethic and symbolic values (Scott 1998). Organizations with technical features are task-oriented and focus on materials, production, inputs and outputs, efficiency, resources, markets to deal with dependency and uncertainty. On the contrary, institutional features are more related to expedience or social obligations (North 1990). Technical rationality is used to assess outputs from organizations with technical features (Pfeffer & Salancik 1978) and formal rationality for outcomes from organizations with institutional features (Boyd et al. 1993). The accessibility of objective measurements differs thus depending on whether the organization has either technical or social features. Objective measurements are the rule in technical features (Pfeffer & Salancik 1978). Subjective or perceptive measures are further of importance for institutional features (Boyd et al. 1993).

Changes in the allocation mechanism by introduction of resource dependency, induce economic uncertainty and an increased pressure on enhanced production of services. This new situation emerged in specialist-based public hospitals as a result of the State Subsidy Act in 1992. From the view of public-hospitals, the situation could have been even more demanding if a real purchaser provider split had occurred. However, hospitals

came under economic distress with pressures on more efficient micro-economy. Cost-containment became important and for that purpose new instruments were needed to control expenditures and to ensure revenues. Production of healthcare services assumed a new meaning including the propensity for technicalization of the hospital environment.

Technology is often understood as the hardware (equipment, machines, instruments etc.) used by an organization to perform its work (Orlikowski 1992), but in a broader sense technology also include the skills and knowledge of workers (Scott 1998). Hospitals represent a very specific environment, using high technology and highly trained professional workers performing their tasks with an important degree of autonomous integrity. However, the changes in the technical environment are intended to generate a change through revision of rules, norms and goals in the ways work is performed.

Results concerning several areas of the study confirm a technicalization of the public specialist-based hospital environment. Changes in the control of materials and other resources needed for production of services occurred in every hospital subgroup analysed and for most variables used. Changes in turnover, in redistribution and in the control of providing of services were observed in all subgroups of hospitals, thus, underlining a general change. Changes in personnel and in management of services were carried out to support a more technical approach of services production. Changes in economic control as well as changes in production and delivery of services support the perception of increased technicalization of institutional features. Standardization of inputs, increased quality control, accreditation, the view of services as commodities are all variables, among several others, supporting shifts away from the existing state. Reallocation has thus supported a transformation of hospitals characterized by institutional features to ones having more technical characteristics.

Most, but not all of the changes discussed above are a result of reallocation itself. A natural change in the ways physician's work has occurred as well. Scott et al. (2000) highlight in their long-term study (50 years) of institutional changes in health care organizations the changes that have taken place through increased concentration, specialization, integration, diversification, privatisation and increased market orientation. Several changes observed have, however, gradually permeated the health



care structure, whereas reallocation has in a relatively short period of time given rise to changes within several areas, among them, a technicalization of the hospital environment.

## 9.7 Changes in services

Changes in services resulting from reallocation are expected due to their increased importance as a source for income for hospitals. Even if the ownership of hospitals remained unchanged and providing of services continued to be integrated, the explicit binding of hospital income to health care services provided are expected to be reflected in the amount and the content of services and in changes of the service-mix.

In order to evaluate this part of the study, changes in ward events and changes in visits to the outpatient clinic were studied in four categories of hospital care, namely in all disciplines of specialist-based hospital care, in internal medicine, surgery and gynecology including obstetrics. This analysis was carried out in a total population of specialized care and in the three most important subgroups present in every hospital. Together, the subgroups stood for 60 – 80 percent of all hospital services (depending on hospital size). The subgroups represented conservative, operative as well as a mix of operative and conservative activities and services. The analyses covered the production of services in hospitals across a period of 15 years. Data were collected from 1988 – 2002, i.e. five years before the reallocation in 1992 and 10 years thereafter. The time period was chosen so that it should be long enough to ensure a reliable view of service providing before and after reallocation.

Regardless of the subgroup studied, - all-specialities, internal medicine, surgery or gynecology - results from the analysis revealed that the amount of services provided had remained almost unchanged for several years before reallocation in 1992. This was the case for ward and for outpatient clinic services. Only the length of hospital stay had gradually decreased for ward care, which resulted in a reduction of total annual treatment days needed for care. A shortening in the length of hospital stay was observed in all groups during the study period and reallocation did not influence the length of

hospital stay in any of the subgroups analyzed. The reduction in the length of stay varied between 35 to 46 percent throughout the whole period of observation, and was more pronounced in the operative subgroups (surgery, gynecology) than in the conservative subgroup (internal medicine).

A reduction was anticipated as a result of a general improvement of diagnostic interventions and treatment procedures (WHO 1997). Reasons for the shortening of the hospital stay are many among them improved efficiency and better appropriateness of hospital care. Introduction of day case surgery, improvements in diagnostic procedures, changes in discharge policy resulting from early displacement of hospital patients, changes in admissions by way of improved home care or gate keeping etc. have all contributed to a shorter hospital stay (WHO 1997). All these measures together have resulted in a pronounced reduction of hospital beds in most European countries, in particularly in the eastern areas of Europe.

Reallocation resulted in a rapid increase of patients treated on wards in all groups except gynecology and this effect sustained to the end of the observation period. The increase in patients treated, compared to the period before the reallocation, varied between 31 and 33 percent. Most of the change took place within two to three years after the reallocation and its unlikely that any other reason would have caused such change within so many areas of specialized hospital care. For all disciplines of specialized care an increase of 21 percent translated into 80 000 – 85 000 more treated patients annually on wards. A similar shift in patients treated was observed in surgery: 50 000 – 55 000 more patients treated annually. In internal medicine the corresponding figure was 25 000 – 30 000. Furthermore, taking into account the duration of the effects, this means a significant change in patients treated on wards long term. In gynecology no effects associated with reallocation could be observed. The reasons might be the nature of this speciality, the population (half of all adults) and the proportion of obstetrics, which was not expected to be influenced by reallocation. As a result of more patients on wards, the number of treatment episodes and the number of annual treatment days rose accordingly.

The use of existing patient waiting lists can partly explain the rapid and significant increase of patients treated on wards. Waiting lists for services is a well-known

phenomenon within public health care and they have existed for decades. New patients generated by changes in rules for treatment procedures (day case surgery, extended use of coronary angiography etc.) and changes in the content of treatment procedures (day case surgery) have certainly also contributed to more treated patients on wards. A change in the registration policy of ward patients could further give rise to changes in the numbers of ward patients. In such a case the onset of change would be sudden and not incremental was observed in this study. There are certainly many reasons behind the increasing numbers of patients on wards, but the onset for increase is best explained through the reallocation.

A reduction in the length of hospital stay between 35 and 46 percent combined with a simultaneous increase of between 21 and 33 percent in treated patients contributed to an intensified turnover of patients treated on wards. Reallocation was not the reason for the shortening of the length of hospital stay, but for more patients treated on wards. The fact that these developments took place simultaneously resulted in a real shift in the workload in service provision.

The numbers of visits to the outpatient clinics had for at least five years before reallocation been fairly stable with only modest annual variation. Reallocation induced changes in several categories of visits. Changes in the frequency of visits to the outpatient clinics were observed in particular for all disciplines of specialized care as well as for visits in internal medicine. In surgery, the changes in the numbers of visits were moderate and in gynecology modest. Changes in visits occurred especially for secondary visits, which contributed to an important increase in total visits as well. Primary visits and emergency visits increased but to a lesser extent than secondary visits.

Primary visits and emergency visits represent the first appointment at an outpatient clinic and are by nature influenced externally by referring physicians or by the patient him/herself. An increase in primary and emergency visits reflects a range of reasons: an increase in the incidence of disease, changes in the views of treatment or changes in referring of patients, or a reorganization of services between health care providers. Important changes in primary as well as in emergency visits were seen in particular in

all disciplines of specialized care and in internal medicine. In addition, changes were to some extent also seen in surgery for primary visits. In some subgroups, the increase of emergency visits occurred within a short period of time, which points to a reorganization of services among providers. For primary visits, the increase was more gradual (internal medicine, surgery), so other reasons than only reorganization of services are obvious.

The effect of the reallocation on visits to the outpatient clinics was most clearly seen in the increase of secondary visits. Most of the increase in secondary and total visits occurred in 1993, which is one year after the reallocation came into force. In 1997, i.e. at the end of the first point of measurement after reallocation, secondary visits had increased by 6 % in gynecology, by 18 % in surgery, by 53% in internal medicine and by 105 % in all disciplines of specialized care. The increase in secondary visits in the three subgroups is conspicuous and contributes for more than 80 percent of the increase in secondary visits for all specialized-based disciplines.

The reallocation has certainly changed intra-hospital routines but simultaneously the continuous shortening of hospital stay has underlined the increased need to control patients following their discharge from hospital. Therefore, more patients treated on wards in general accounts for some of the increase in secondary visits. Another contributing factor is the increasing number of day-case interventions, in turn resulting in an increased need for controls of the outcome. A doubling of secondary visits for all disciplines of specialized care from about 1.7 million annual visits to 3.4 million visits within a time period of five years is an important change. Most of the increase took place during the first five-year interval after reallocation or from 1993-1997, but continued still during the second five year of observation – albeit at a more moderate pace. The rapid onset of increase is thus time-related to the early years after reallocation. The continued increase in secondary visits later on together with a reduced pace of increase indicate that in addition to those reasons discussed above there must be others contributing to the increase in secondary visits. All these changes in numbers of visits concord well with responses received in the interview part of the present study.

The financial reallocation induced several changes in specialist-based hospital services and different groups of specialities were affected variously. All disciplines of specialized

hospital care and internal medicine showed important and similar changes in ward events and in changed frequencies of different categories of visits to the outpatient clinic. In surgery, the main response to the reallocation was a change in ward events, whereas in gynecology few changes were observed. Effects on ward events were mainly due to an increase in patients treated, which also led to changes in other variables analyzed. In the outpatient clinics, reallocation induced an increase in most categories of visits, in particular in secondary and total visits. For wards and for outpatient clinics, most of the change occurred in 1993, which is the first year after reallocation. The effect of reallocation on ward events endured - once initiated - at a new level through to the end of the observation period. Effect of reallocation on outpatient visits was rapid and the magnitude of the increase was large in all disciplines of specialized care and internal medicine. Furthermore, the number of outpatient visits continued to increase during the study period.

The huge increases in ward as well as in outpatient clinic services as a result of the reallocation make the results from the empirical part more understandable and reliable. The results from both parts of the study support the view of structural, operational, contentual as well as contextual organizational change or apolysis.

## **9.8 Reallocation and changes in hospital performance**

Reallocation was expected to improve hospital performance. Factors contributing to changes in hospital performance were many. Among them were the increasing demands for cost-containment intensified by the continuously increasing costs for health care and the economic recession in Finland at that time. The coincidence of the State Subsidy Act and the economic recession led thus, at the same time to increased expectations on hospital performance.

Hospital performance has received increasing attention during recent decades (Linna 1999). Performance indicators are usually related to changes in productivity and to

variables of efficiency, but indicators for patient satisfaction or quality of care have been used as well (Feldstein 1967, Seitford & Thrall 1990, Färe et al. 1994).

Health care performance indicators have been used in connection with health care reforms, to assess the effects of measures taken and to compare the relative performance of various health systems (Linna et al. 2006). From this point of view, Linna studied short-term changes in productivity as well as in cost-efficiency in public hospitals arising from reallocation (Linna 1999). Long-term studies are, however, still lacking. Furthermore, existing studies give only little insight into changes of hospital performance concerning individual departments of specialized care.

The present study revealed that the financial reallocation has increased productivity in particularly in surgery and in internal medicine. Important increases in the amount of services, for ward as well as for outpatient services, were already earlier observed for individual disciplines, but reallocation did, in addition, also simultaneously introduce positive productivity changes, namely an improved ratio between the output and the resources needed for that output. Thus, reallocation resulted in increased production and in improved productivity. Whereas an increased production of services continued to the end of the study period, productivity tended to decrease in all groups studied. The main reason was increasing costs in relation to the amount of services produced. However, another important reason was a change in the accounting system, which led to capital costs being included in the total annual hospital expenditures. This measure was taken in 1997-1998, resulting in a sudden shift in productivity in all individual groups studied due to increased costs in relation to services. A further reason, which might have an impact on productivity is the introduction of the ICD-10 coding system. This occurred at the same time, as capital costs became a part of hospital expenditures. Since the coding system deals with diagnoses and thus with costs, a change into this system would have effected accounting of costs as well.

The reallocation did not influence cost-efficiency in the same manner and magnitude as it affected productivity. Before the reallocation, there was a decreasing trend in cost-efficiency due to increasing costs in relation to the amount of services produced.

Reallocation changed this trend to some degree, but the change was different in different categories of hospital care.

After an initial increase in cost-efficiency in all categories, cost-efficiency then decreased in surgery through to the end of the study period. By contrast, it increased steadily in internal medicine till the end of the same period, but remained unchanged in gynecology. A reason for the difference in cost-efficiency between individual categories might be due to their specific cost structures and due to changes in production of services under the study period. In gynecology all kinds of services - ward events and outpatient clinic visits - remained almost unchanged and unaffected by reallocation, whereas services in surgery and internal medicine changed significantly. During the same time period, day surgery was introduced, and took an increasing share of surgery procedures. Internal medicine changed as well, through splitting of internal medicine into smaller units of sub-specialities.

The results from the present study show that the level of cost-efficiency in different departments of specialized health care is on the same level as the cost-efficiency in the total specialized care in general (Linna et al. 2006). The level varied between 62 to 78 percent. Cost-efficiency data are an important part of the view of hospital performance, but they should be interpreted with care in particularly in long-term studies, where several factors can occur impeding on the results. The values for changes in efficiency long-term, might further underestimate the real efficiency that arises from changes in the product or service.

## **10 Conclusions and implications**

The hospital environment had for decades been stable before introduction of the financial reallocation by the State Subsidy Act in 1992. Before the reallocation, every level of hospital care received an appropriate and independent share of annual income and there were no transaction costs between providers of care. A strong professional culture had gradually established itself within a hierarchical structure of hospitals.

The State Subsidy Act transformed the existing horizontal process of allocation in public hospitals into a vertical process. Municipalities and the primary health care sector became the targets for government grants and the financial support of hospitals was bound to the services they provided. After decades of financial independency, public hospitals were pushed into a new power relationship, into a resource dependent position.

Oliver states that reallocation is a powerful instrument of discontinuous character for introducing deinstitutionalization and institutional changes, particularly if increased production and increased efficiency are required (Oliver 1992). Her statement presents important implications for the Finnish Health care reform, its features and goals, and yet more than a decade since the introduction of the reform, a good understanding of the outcomes remains limited.

There are several features making public specialist-based hospital care feasible for study. Of all structures in the Finnish health care system, the specialist-based hospital care was the target for changes through the State Subsidy Act. The hospital environment was well defined and had been stable for decades. Furthermore, appropriate information was available, since authorities collect systematically annual data of public hospital care. The demanding nature of the financial reallocation and the limited amount of long-term research into its outcomes made the study desirable. Beyond that, the time since introduction of the reallocation was long enough to enable an appropriate retrospective study. Finally, the number of hospitals was sufficient to enable meaningful analyses.

In the present study changes in public hospitals were the prime target for evaluation. The reallocation was expected to promote organizational changes in several areas and therefore a corresponding measuring instrument was needed. For this purpose a novel concept i.e., *apolysis* was thus constructed. Important for the concept was, that it should simultaneously cover several areas to give a comprehensive view of the phenomenon under research. Apolysis was defined to include dimensions of structural, operational, contentual and contextual organizational changes. The present study should be a test for the concept, as well as create understanding of changes undergone by target. Besides an assessment of apolitical changes, the study should assess changes in integration and technicalization of organizational environment. Reallocation was expected to promote



integration among hospital health care service providers as a result of increased dependency. Further, due to intensified pressures on increased production and enhanced efficiency, technicalization of the institutional environment was expected. Hospital performance had become an important part in health care reforms and it was therefore included as an integral part of the present study.

Results from the study show the strength of the influence of financial reallocation on desinstitutionalization in public specialist-based hospitals. Reallocation primarily brought about institutional pressures for change and in turn confirmed the salability of the public hospital environment as a subject for research of organizational change.

Reallocation has resulted in far-reaching changes in all aspects of apolysis, namely in structural, operational, contentual as well as in contextual directions.

Public hospitals have changed structurally, wards have not only undergone purposeful physical but also functional adaptation. Services have been removed to outpatient clinics and the hospitals provide a greater diversity of tasks than before. The reallocation has resulted in increased internal and external control of services, changes in personnel and in governance structures. Non-core functions have been outsourced and new subcontractors have appeared in hospitals. Cost-centers have been set up, internal transfer pricing is common. Additionally, the findings of this study show that most structural changes have occurred across the whole field of public hospitals.

Increased external resource dependency, i.e. changes in economic uncertainty induce operative apolysis. Changes in policy objectives have become necessary, changes in the management as well. Internal and external control bodies are necessary. Performance orientation is important in areas contributing to production of services. The awareness of cost-containment is obvious. Leadership is bound to economic control. All these above-mentioned changes have promoted internal changes in hospitals, through increased control of resources and services. Operative apolysis has occurred at every level of hospitals.

In addition to changes in hospital structures and operational management, the content of services as well as the delivery modes have been refined in order to be competitive and attractive to the purchasers. Providers must be able to customize services, new technologies have been introduced and used for production. New delivery modes have been created, information networks as well, and vertical as well as horizontal integration are more important to control the flow of patients. Contentual apolysis has been confirmed in public hospitals and in services. In addition delivery modes of services have undergone purposeful changes.

The many changes expressed contribute in a natural way to contextual apolysis or to changes in goals, rules, values and cultures. Reallocation has challenged the basis for a previous compliance, i.e. social obligation as well as the basis for legitimacy. Health care services have got their price label and accordingly has expedience and legally sanctioned views been obtained. Hospitals have gradually adapted more normative, appropriative behavior including instruments concerning certification and accreditation. New rules, sanctions and coercive means related to control mechanisms have been adopted. The analyses of the present study show several contextual changes and point out changes in institutional logic.

The present study confirms that integration has occurred among different kinds of health care providers. Physical integration between providers has occurred in some cases, but more important is the operative integration of services. New information channels have been introduced and networks have been built. Access for care has improved and waiting lists for care have been shortened. Rules and norms have changed in interaction between providers of services and an operative integration has taken place. Integration has extended in vertical as well as in horizontal direction, albeit being more horizontal than vertical. Concomitant with increased specialization of services, the service chain has become more horizontal.

Several variables evaluated in the present study confirm technicalization of the public specialist-based hospital environment. Introduction of cost-centers, changes in budgeting and accounting procedures, redistribution of service production, increased turnover, standardization of inputs and outputs, increased quality control, changes in working rules, managerial leadership characterize institutional environments with technical

features. As a result, the professional institutional environment has gradually changed and been replaced by managerial values.

The financial reallocation induced several changes in specialist-based hospital services and different categories of specialities were affected variously. All disciplines of specialized hospital care and internal medicine showed important changes in ward events as well as in changed frequencies of different categories of visits to the outpatient clinic. In surgery, the main response to reallocation was a change in ward events, in gynecology only minor changes were observed. Increases in ward events were mainly due to an increase in treated patients, which resulted also in changes in other variables analyzed. In the outpatient clinics, reallocation induced an increase in most categories of visits, in particular in secondary and total visits. For wards as well as for outpatient clinics, most of the changes occurred in 1993 or during the early years after reallocation. Ward events rose to a new level and remained there to the end of the observation period. Effects on outpatient visits varied for each speciality, but in general reallocation induced an increase in the numbers of total and secondary visits, which both continued to increase during the study period. The increase in ward events and visits to the outpatient clinics highlighted the role of reallocation. For several specialities, the changes were conspicuous and significant.

Reallocation improved hospital performance in surgery as well as in internal medicine. The effect on gynecology was less pronounced. Similarly, productivity was promoted in surgery and in internal medicine. Accordingly the ratio between services produced and resources used for production of services was improved to a statistical significant degree. The effect of improved productivity lasted for 5 to 6 years before experiencing a modest downturn. This decrease was the result of increasing costs in relation to practically unchanged level of production of services. Data for cost-efficiency revealed similar results as for productivity but the changes in cost-efficiency were less distinct.

All in all, the financial reallocation has given rise to a multitude of changes in public specialist-based hospitals during the decade since its introduction. Most of the changes took place during the early years after reallocation, but the effects continued to the end of the observation period. Important increases in production of ward and outpatient

clinic services took place in most groups analyzed. Productivity was enhanced, whereas the effects on cost-efficiency were less obvious. Important too were all the organizational changes i.e. apolysis, which took place as a result of reallocation.

## 11 Summary

Financial reallocation of public health care in Finland was introduced by the State subsidy act in 1992. With this Act, the financial support of public hospitals changed from horizontal and independent to vertical and resource dependent.

To study the effects of reallocation all public hospitals providing specialist-based care in Finland were selected. Of these 51 potential hospitals, 48 agreed to participate in the study. In order to evaluate institutional changes, a novel concept or apolysis was created to study organizational dissipation. The concept of apolysis addresses organizational debundling in four aspects: structural, operational, contentual and contextual changes. A questionnaire with 130 questions was prepared. The questionnaires were filled in during personal interviews of leading physicians in all hospitals in the study. To study the effects of reallocation on changes in productivity and efficiency, data for ward events and outpatient visits were obtained from authorities. Data covering a time period of 15 years or from 1988 to 2002 were collected and analyzed. Because reallocation was introduced in 1992, the period from 1988 to 1992 served as a control period and the interval from 1993 to 2002 as the period of intervention.

Results from the present study confirmed that reallocation induces institutional pressures and accordingly that public hospitals are an appropriate target group for studying organizational changes. Reallocation resulted in structural changes in hospitals. Wards were restructured, the outpatient clinics were expanded for size and the services became more diversified. Cost-centers were introduced, transfer pricing came into use, and new subcontractors appeared in hospitals. All were changes that confirmed that structural apolysis had happened. Changes in policy objectives became necessary, performance orientation more important, cost-awareness as well. All these changes made necessary to implement enhanced internal and external controls. Managerial features in leadership

became more important. In addition several other variables supported the view that operational apolysis had taken place.

The financial reallocation brought changes in services as well as in delivery modes. Services were shared when possible, new information channels were build and exchange of information was improved. Thus, contentual apolysis had taken place. As a result also contextual apolysis occurred through changes in rules, values, goals and hospital culture. Apolysis as a tool to measure changes in four different directions of deinstitutionalization proved to be a valuable measuring instrument. By its use, changes in organizational dissipation can better be understood.

Integration among hospital health care service providers became more common as a result of reallocation. A technicalization of the institutional environment occurred.

Changes in the provision of services occurred soon after reallocation. The changes were of different magnitude in different categories of specialist-based hospital care. Increases in ward events and outpatient visits were important for all disciplines of specialist-based hospital care and internal medicine. In surgery, changes in ward events were more obvious but occurred in outpatient visits as well, whereas in gynecology changes were modest. Dependent on the category of care, the reallocation resulted in an increase of 21-33 percent more patients treated annually on wards, and this level remained steady to the end of the observation period. Taking into account the concurrent shortening of the length of hospital stay by 35 to 45 percent, the total effect of all changes meant an increase in the turnover of patients and an increased workload on personnel.

The effects of reallocation on numbers of outpatient clinic visits resulted in an increase during the study period in most categories of visits and especially in the very early years immediately following reallocation. This was particularly so for all disciplines of specialized care as well as for internal medicine, too, though less for surgery and only modestly in the case of gynecology. The most impressive change occurred in secondary visits for all disciplines of specialized care, where the numbers of visits increased from 1.7 million to 3.4 million. The onset of the increase is due to reallocation but the magnitude of change has several causes. Among them are shorter hospital stays and

more day-case surgery, resulting in an increasing need for post-ward control. The variation in the response to reallocation between different subgroups of specialties is explained by their nature. Thus, changes in internal medicine and surgery were of similar kind and direction, whereas effects of the reallocation on the numbers of gynecology services were modest or negligible. The results from the questionnaire study and the results from analyses of changes in services are in good agreement and they support each other.

The reallocation enhanced changes in hospital performance, measured in terms of improved productivity and improved cost-efficiency. Changes were observed in surgery as well as internal medicine but less so in gynecology. The improvements in efficiency effected by reallocation on hospital performance lasted for 5-6 years before turning into a modest decline which was caused by increasing costs in relation to the number of services produced.

The effects of reallocation were studied in public hospitals under an observation period of 15 years, from 1998 to 2002. Results from the study indicate, that financial reallocation strongly promoted structural, operational, contentual as well as contextual changes in hospitals. The novel instrument – apolysis - was created and tested in the present study. Reallocation promoted integration among public hospitals and technicalization of institutional environments. Important changes in ward events and in the numbers of visits to the outpatient clinic took place as a result of reallocation. Hospital performance was improved in the areas of surgery and internal medicine.

In the present study the concept apolysis was used to study organizational changes in public specialist-based hospitals as a result of financial reallocation. The concept should by no means be bound to hospital reorganization, on the contrary, it can be used to study any reorganization from the views of structural, operational, contentual and contextual change. Further, new dimensions can be included to the quadrinomial central core of apolysis to extend the concept into directions of research interest.

## 12 References

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## 13 Appendix

### THE QUESTIONNAIRE

#### **Institutional apolysis. From horizontal to vertical financial reallocation in public hospitals**

**Karl Johan Tötterman**

Helsinki University of Technology, Department of Industrial Engineering and Management

Place \_\_\_\_\_ date \_\_\_\_/\_\_\_\_/2005

Person interviewed \_\_\_\_\_

position \_\_\_\_\_

address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

phone \_\_\_\_\_

mobile \_\_\_\_\_

e-mail \_\_\_\_\_

## QUESTIONNAIRE

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 1 Wards are today more segmented
- 2 Internal transfer pricing is now in use
- 3 Revenues are directly related to the amount of services sold
- 4 Cost-budgeting is in use
- 5 Services are customized to the needs of individual purchasers
- 6 Chronic ill patients are referred to a more appropriate level of health care
- 7 A new goal for the hospitals is efficient micro-economy
- 8 Changes in hospital structures are now steered through external resource dependency
- 9 State control of health care services has decreased
- 10 Wards perform today more diversified tasks

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 11 Providing of services is bound to economic risk taking
- 12 Revenues are related to the content of the service mix
- 13 Services are produced according to predetermined rules
- 14 New cost-efficient technologies are in use
- 15 Certain services are delivered at the physical site of the purchaser
- 16 Social and ethical goals are confronted with economic goals on daily basis
- 17 Changes in structures have been more purposeful than evolutionary
- 18 Municipal control of health care services has increased
- 19 Wards have undergone changes in size
- 20 Cost-centers have been introduced

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 21 Management of expenditures and revenues is applied
- 22 Changes in service mix have been introduced
- 23 Services are provided at predefined and purposeful places
- 24 The proportion of day case services has increased
- 25 Certain services have been outsourced to the purchaser
- 26 Professional goals are continuously weighted against economic performance
- 27 Changes in hospital structures have been more incremental than discontinuous
- 28 Control and bureaucracy of health care services have increased
- 29 Wards have been closed
- 30 The use of team working has increased in providing of health care services

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 31 New budgeting systems have been developed for specialist based hospital care
- 32 Cost-saving measures (personnel, material) are in use
- 33 The input of resources used for each specific service has been standardized
- 34 The access to clinical consultations has increased
- 35 Certain up-stream services have been newly introduced
- 36 Goals are now confirmed in the annual strategic planning
- 37 Changes in hospital(s) structures have been more internal than external
- 38 Municipal monopsonies have been established
- 39 Health care services have been redistributed to outpatient clinics
- 40 In hospitals, more task force personnel are at work

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 41 New accounting systems have been developed
- 42 Repetition of similar investigations has been reduced
- 43 Other providers have been engaged in the service provision
- 44 Goals are tied to the annual budget
- 45 Inertia to changes in services has been more severe than expected
- 46 Competition on health care services is not in proper use
- 47 The size of outpatient clinics has increased
- 48 Cost-calculation has been changed to incur all costs
- 49 Production of services has increased
- 50 The content for each service has been better predefined

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 51 Networks have been build to provide specific health care services
- 52 The amount of partners shearing health care services has increased
- 53 Working rules in health care are closely related to cost-saving
- 54 Structural changes of hospitals have taken place more slowly than expected
- 55 A market for health care services has not been established
- 56 Services produced at outpatient clinics are more diversified than before
- 57 The amount of new enterprises within hospitals has increased
- 58 Strategic planning is done according to budgets
- 59 The turnover of patients in wards has increased
- 60 Health care services are negotiated as packages

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 61 The waiting lists for several services have been shortened
- 62 Chains of providers have replaced single providers for some health care services
- 63 Working rules means control of clinical work
- 64 Hospital micro economy is in continuous crisis
- 65 Services produced at outpatient clinics are more advanced than before
- 66 Services provided are based on agreements
- 67 Leadership is primarily connected with economic control
- 68 The length of hospital stay has decreased
- 69 Services are delivered at negotiated prices
- 70 The waiting time for several services has been cut down

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 71 Providing of health care services is more integrated than before
- 72 Costs of health care services have not decreased
- 73 Non-core business is often outsourced
- 74 New positions are bound to financial and economic accountability
- 75 Patients are discharged from the hospital as soon as possible
- 76 Exchange of information between providers and purchasers has increased
- 77 Co-operation among health care providers are based on agreements
- 78 The values of the organization (hospital) emphasize now productivity
- 79 The number of providers of health care services has increased
- 80 The same health care personnel is used for different purposes

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 81 Services produced are exposed to competition through bidding procedures
- 82 New coalitions and coordination among decision makers have been developed
- 83 The number of patients investigated and treated in outpatient clinics has increased
- 84 Financial sanctions are applied in case of agreement violations
- 85 New information channels have been introduced between purchasers and providers
- 86 Larger investments can be sheared among providers
- 87 The values of the organization (hospital) emphasize now cost-efficiency
- 88 Providers of health care services are more diversified
- 89 New personnel groups have been established
- 90 Investigations and/or treatments can be bought separately

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 91 Centralization of economic power has taken place in the organization
- 92 The number of patients controlled in outpatient clinics has increased
- 93 The outcome of complications of services is registered and reported
- 94 New purchasers of health care services have appeared
- 95 The values of the organization (hospital) emphasize now effectiveness
- 96 Interactions between providers in health care services have contentually changed
- 97 Some personnel groups have been abolished
- 98 External gate keeping is used to control referral for hospital care
- 99 The internal bodies for accountability are cost-centers
- 100 Quality control of health care services is in use

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 101 The numbers of patients complaining on services have increased
- 102 The total number of purchasers of health care services has increased
- 103 The values of the organization (hospital) emphasize now core-business
- 104 Rules and norms of interaction between providers have become more specified
- 105 The proportion of temporary working persons has increased
- 106 Patients have been bound to specific local providers of health care services
- 107 The external bodies for accountability are purchasers
- 108 Accreditation of services has been introduced where possible
- 109 The purchasers are more diversified than before
- 110 A managerial culture has been introduced in hospitals

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 111 New personnel with specific tasks are involved in interactions for health care services
- 112 A more purposeful selection of patients for individual services has been promoted
- 113 Local politicians are a central body for governance
- 114 An official acknowledged Fin-DRG-system is in use
- 115 Requirements on cost-efficiency have changed the provided health care service mix
- 116 Managerial leadership has replaced academic meritocracy
- 117 Isomorphic hospital structures are not anymore enhanced and controlled
- 118 Authorities controlling health care services have partially changed
- 119 Purchaser – control is applied in daily operations
- 120 Restrictions on recruitment of new personnel are in use

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

- 121 The hospital culture has changed from social obligation to emphasize service production
- 122 Health care services provided have locally changed hospital structures
- 123 Institutional features (social obligation) have been replaced with technical features
- 124 Health care services resembles now commodities
- 125 Vertical integration have reconfigured structures for individual health care services
- 126 Splitting of services has resulted in horizontalization of structures for health care services
- 127 A specialization in providing of health care services has taken place
- 128 New ways of working between providers have extended boundaries for health care services
- 129 Changes in provided services have changed boundaries for health care services
- 130 The view of hospitals as whole service deliverers has changed to be member of a service delivery chain

**The model used for answering questions in the questionnaire**

**ANSWERS**

**Reallocation of public health care in 1992 has led to several changes in public based hospital care, among them;**

<b>question</b>	<b>not agree</b>			<b>agree</b>			<b>don't know</b>
<b>1</b>	-3	-2	-1	+1	+2	+3	0
<b>2</b>	-3	-2	-1	+1	+2	+3	0
<b>3</b>	-3	-2	-1	+1	+2	+3	0
<b>4</b>	-3	-2	-1	+1	+2	+3	0
<b>5</b>	-3	-2	-1	+1	+2	+3	0
<b>6</b>	-3	-2	-1	+1	+2	+3	0
<b>7</b>	-3	-2	-1	+1	+2	+3	0
<b>8</b>	-3	-2	-1	+1	+2	+3	0
<b>9</b>	-3	-2	-1	+1	+2	+3	0
<b>10</b>	-3	-2	-1	+1	+2	+3	0

**Please encircle the right number with a ring. Only one answer per row.**

**Hospitals eligible for the study****University hospitals ( N 5 )**

Helsinki university hospital  
 Turku university hospital\*  
 Tampere university hospital  
 Kuopio university hospital  
 Oulu university hospital

**Central hospitals ( N 16 )**

Satakunnan KS  
 Kanta-Hämeen KS  
 Päijät-Hämeen KS  
 Kymenlakson KS  
 Etelä-Karjalan KS  
 Etelä-Savon KS  
 Savonlinnan KS  
 Pohjois-Karjalan KS  
 Keski-Suomen KS  
 Etelä-Pohjanmaan KS  
 Vaasan KS  
 Keski-Pohjanmaan KS  
 Kainuun KS  
 Länsi-Pohjan KS  
 Rovaniemen KS  
 Ålands CS

**Regional hospitals ( N 30 )**

Hyvinkään aluesairaala  
 Lohjan aluesairaala  
 Länsi-Uudenmaan aluesairaala  
 Porvoon sairaala  
 Peijaksen sairaala  
 Jorvin sairaala  
 Helsingin kaupungin sairaalat  
 Loimaan aluesairaala  
 Salon aluesairaala  
 Turunmaan sairaala  
 Vakka-Suomen sairaala  
 Rauman aluesairaala\*  
 Forssan aluesairaala  
 Riihimäen aluesairaala  
 Valkeakosken sairaala  
 Mäntän sairaala  
 Vammalan sairaala  
 Kuusankosken aluesairaala  
 Iisalmen aluesairaala  
 Varkauden aluesairaala  
 Pietarsaaren sairaala  
 Selkämeren sairaala\*  
 Raahen sairaala  
 Oulaskankaan sairaala  
 Kemijärven sairaala  
 Imatran sairaala



Ähtärin sairaala  
Pieksämäen sairaala  
Raisio sairaala  
Jämsä-Jokilaakson sairaala

\* did not respond (5.9%) and thus excluded from the study

## TOTAL POPULATION OF HOSPITALS

### Structural apolysis

#### 1 Increasing heterogenensis

<i>Changes in structures for services</i>	median	Z	p-value
1. Wards are today more segmented	1.00	1.748	0.080
2. Wards perform today more diversified tasks	2.00	4.766	0.000
3. Wards have undergone changes in size	2.00	4.122	0.000
4. Wards have been closed	2.00	4.669	0.000
5. Health care services have been redistributed to outpatient clinics	3.00	6.123	0.000
6. The size of outpatient clinics has increased	2.00	5.758	0.000
7. Services produced at outpatient clinics are more diversified than before	3.00	5.753	0.000
8. Services produced at outpatient clinics are more advanced than before	2.00	5.917	0.000
9. Non-core business are often outsourced	1.00	3.694	0.000
<i>Changes in personnel</i>			
10. The same personnel is used for different purposes	1.00	3.932	0.000
11. New personnel groups have been established	1.00	3.055	0.002
12. Old personnel groups have been abolished	1.00	1.546	0.122
13. The proportion of temporary working persons has increased	1.00	0.571	0.568

#### 2 Increasing hierarchical dissipation

<i>Increased internal control of services</i>			
14. Internal transfer pricing is now in use	0.50	4.612	0.000
15. Cost-centers have been introduced	2.00	6.342	0.000
16. The use of team working has increased in providing health care services	3.00	5.080	0.000
17. In hospitals more task force personnel are at work	2.00	5.653	0.000
18. The amount of new enterprises within hospitals has increased	2.00	2.937	0.003
<i>Increased external control of services</i>			
19. Services provided are based on agreements	1.50	3.083	0.002
20. Services produced are exposed to competition through bidding procedures	1.00	3.964	0.000
21. Investigations and treatments can be bought separately	1.00	4.285	0.000

#### *Changes in external dependency*

22. External gate keeping is used to control referral for hospital care	-1.00	4.143	0.000
23. Patients have been bound to specific local providers of health care services	-1.00	0.229	0.818
24. Authorities controlling health care services have partially changed	2.00	6.068	0.000

## TOTAL POPULATION OF HOSPITALS

### Operational apolysis

<b>3 Changes in policy objectives</b>	<b>median</b>	<b>Z</b>	<b>p-value</b>
25. Providing of services is bound to increased economic risk taking	1.00	1.692	0.091
26. Management of expenditures and revenues is applied	2.00	5.915	0.000
27. New budgeting systems have been developed	2.00	5.431	0.000
28. New accounting systems have been developed for hospitals	2.00	4.785	0.000
29. Cost-calculation has been changed to incur all costs	2.00	4.370	0.000
30. Strategic planning is done according to budgets	2.00	3.930	0.000
<i>Changes in management</i>			
31. Leadership is primarily connected with economic control	1.00	4.075	0.000
32. New positions are bound to financial and economic accountability	1.00	3.884	0.000
33. New coalitions and coordination among decision makers have been developed	1.50	4.696	0.000
34. Centralization of economic power has taken place in the organization	-1.00	0.173	0.863
<i>Changes in control bodies</i>			
35. The internal bodies for accountability are cost-centers	2.00	5.326	0.000
36. The external bodies for accountability are purchasers	1.00	3.645	0.000
37. Local politicians are a central body for governance	2.00	5.329	0.000
38. Purchaser – control is applied in daily operations	-1.00	0.995	0.340
<b>4 Increasing performance orientation</b>			
<i>Changed demands on performance</i>			
39. Revenues are directly related to the amount of services sold	2.00	4.494	0.000
40. Revenues are related to the content of the service mix	2.00	5.378	0.000
41. Changes in service mix have been introduced	2.00	5.896	0.000
42. Cost-saving measures (personnel, material) are in use	2.00	6.083	0.000
<i>Increased turnover</i>			
43. Production of health care services has increased	2.00	5.090	0.000
44. The turnover of patients in wards has increased	3.00	5.908	0.000
45. The length of hospital stay has decreased	3.00	5.847	0.000
46. Patients are discharged from the hospital as soon as possible	2.00	5.538	0.000
47. The number of patients investigated and treated in outpatient clinics has increased	2.50	5.706	0.000
48. The number of patients controlled in outpatient clinics has increased	2.50	5.769	0.000
<i>Standardization</i>			
49. Quality control of health care services is in use	2.00	5.465	0.000
50. Accreditation of services has been introduced where possible	1.00	2.437	0.015
51. An officially acknowledged Fin-DRG-system is in use	1.00	1.424	0.154

## 5. Increasing technicalization

<i>Control of resources</i>	median	Z	p-value
52. Cost-budgeting is in use	2.00	5.559	0.000
53. Services are produced according to predetermined rules	1.00	3.199	0.001
54. Services are provided at predefined and purposeful places	1.00	4.349	0.000
55. The input of resources used for each specific service has been standardized	1.00	3.033	0.002
<i>Control of services</i>			
56. The content for each service has been better predefined	2.00	5.388	0.000
57. Health care services are negotiated as packages	1.00	2.276	0.023
58. Health care services are delivered at negotiated prices	2.50	5.731	0.000
59. Financial sanctions are applied in case of agreement violations	0.00	0.863	0.388
<i>Control of resources and services</i>			
60. The outcome of complications of services is registered and reported	2.00	5.458	0.000
61. The numbers of patients complaining on services have increased	2.00	4.679	0.000
62. A more purposeful selection of patients for individual services has been promoted	1.00	4.936	0.000
63. Requirements on cost-efficiency have changed the provided health care service mix	2.00	5.956	0.000
64. Restrictions on recruitment of new personnel are in use	2.00	6.130	0.000

## TOTAL POPULATION OF HOSPITALS

### Contentual apolysis

#### 6 Refining of services and modes for delivery

<i>Refining of services</i>	median	Z	p-value
65. Services are customized to the needs of individual purchasers	1.00	1.873	0.061
66. New cost-efficient technologies are in use	2.00	5.606	0.000
67. The proportion of day case services has increased	2.00	4.752	0.000
68. The access to clinical consultations has increased	1.00	3.832	0.000
69. Repetition of similar investigations has been reduced	1.00	4.437	0.000
<i>Refining modes of delivery</i>			
70. Networks have been build to provide specific services	2.00	6.009	0.000
71. The waiting lists for several services have been shortened	1.00	1.485	0.130
72. The waiting time for several services has been cut down	1.00	2.249	0.024
73. Exchange of information between providers and purchasers has increased	2.50	5.898	0.000
74. New information channels have been introduced between purchasers and providers	2.00	5.520	0.000

#### 7 Promotion of vertical and horizontal integration

##### *Vertical integration*

75. Chronic ill patients are referred to a more appropriate level of health care	2.00	5.667	0.000
76. Certain services are delivered at the physical site of the purchaser	2.00	3.369	0.001

77. Certain services have been outsourced to the purchaser	1.00	3.285	0.001
78. Certain up-stream services have been newly introduced	1.00	3.717	0.000
79. Other providers have been engaged in the service provision	2.00	5.590	0.000

### *Horizontal integration*

80. The amount of partners shearing health care services has increased	1.00	4.749	0.000
81. Chains of providers have replaced single providers for some health care services	1.00	2.372	0.018
82. Providing of health care services is more integrated than before	1.50	5.344	0.000
83. Co-operation among health care providers are based on agreements	2.00	5.361	0.000
84. Larger investments can be sheared among providers	0.00	0.971	0.332
85. New purchasers of health care services have appeared	1.00	1.889	0.059
86. The total number of purchasers of health care services has increased	0.00	0.488	0.626
87. The purchasers are more diversified than before	1.00	1.686	0.092

## **TOTAL POPULATION OF HOSPITALS**

### **Contextual apolysis**

#### **8 Changes in goals, rules, values and cultures**

<i>Changes in goals</i>	<b>median</b>	<b>Z</b>	<b>p-value</b>
88. A new goal for hospitals is efficient micro-economy	3.00	6.074	0.000
89. Social and ethical goals are confronted with economic goals on daily basis	1.00	1.250	0.211
90. Professional goals are continuously weighted against economic performance	-1.00	1.273	0.203
91. Goals are now confirmed in the annual strategic planning	2.00	5.518	0.000
92. Goals are tied to the annual budget	2.00	6.138	0.000
<i>Changes in rules</i>			
93. Working rules are now closely related to cost-saving	3.00	5.692	0.000
94. Working rules means now control of clinical work	1.00	2.505	0.012
<i>Changes in values</i>			
95. The values of the organization (hospital) emphasize now productivity	2.00	5.572	0.000
96. The values of the organization (hospital) emphasize now cost-efficiency	2.00	5.497	0.000
97. The values of the organization (hospital) emphasize now effectiveness	2.00	5.592	0.000
98. The values of the organization (hospital) emphasize now core-business	1.00	3.997	0.000
<i>Changes in culture</i>			
99. A managerial culture has been introduced in hospitals	1.00	5.157	0.000
100. Managerial leadership has replaced academic meritocracy	1.00	4.801	0.000
101. The culture has changed from social obligation to emphasizing service production	2.00	5.712	0.000
102. Institutional features (social obligation) have been replaced with technical features	-1.00	2.244	0.025
103. Health care services resembles now commodities	1.00	1.910	0.056

#### **9 Institutional vision I**

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*Karl Johan Tötterman, Institutional apolysis. From horizontal to vertical financial reallocation in public hospitals. Doctoral dissertation. Helsinki University of Technology, Department of Industrial Engineering and Management.*

*Changes*

104. Changes in hospital structures are now steered through external resource dependency	2.00	4.393	0.000
105. Changes in hospital structures have been more purposeful than evolutionary	1.00	2.523	0.012
106. Changes in hospital structures have been more incremental than discontinuous	2.00	4.360	0.000
107. Changes in hospital structures have been more internal than external	1.00	3.363	0.001
108. Inertia to changes in services has been more severe than expected	-1.00	0.740	0.460
109. Structural changes have taken place more slowly than expected	1.00	1.039	0.299

**10 Institutional vision II***Control, competition and economy*

	<b>median</b>	<b>Z</b>	<b>p-value</b>
110. State control of health care services has decreased	2.00	5.552	0.000
111. Municipal control of health care services has increased	2.00	5.992	0.000
112. Control and bureaucracy of health care services have increased	1.00	3.271	0.001
113. Municipal monopsonies have been established	-0.50	0.431	0.666
114. Competition in health care services is not in proper use	1.00	2.879	0.004
115. A market for health care services has not been established	1.00	4.317	0.000
116. Hospital micro economy is in continuous crisis	2.00	1.514	0.003
117. Costs of health care services have not decreased	1.00	4.750	0.000

*Interaction, structures and boundaries**Interaction*

118. The number of providers of health care services has increased	1.00	2.975	0.003
119. Providers of health care services are more diversified	-1.00	1.864	0.062
120. Interactions between providers in health care services have contentually changed	1.00	4.840	0.000
121. Rules and norms of interaction between providers have become more specified	2.00	5.499	0.000
122. New personnel with specific tasks are involved in interactions concerning health care services	1.00	5.684	0.000

*Structures*

123. Isomorphic structures are not anymore enhanced and controlled	2.00	5.114	0.000
124. Health care services provided have locally changed hospital structures	2.00	5.375	0.000
125. Vertical integration has reconfigured structures for individual health care services	2.00	5.801	0.000
126. Splitting of services has resulted in horizontalization of structures for health care services	1.00	3.249	0.001
127. A specialization in providing of health care services has taken place	2.00	5.724	0.000

*Boundaries*

128. New ways of working between providers have extended boundaries for health care services	1.00	4.823	0.000
129. Changes in services provided have changed borders for health care services	1.00	4.600	0.000
130. The view of hospitals as whole service deliverers has changed to be a member of a service delivery chain	2.00	5.898	0.000

## UNIVERSITY AND CENTRAL HOSPITALS

### Structural apolysis

#### 1 Increasing heterogeneity

<i>Changes in structures for services</i>	median	Z	p-value
1. Wards are today more segmented	1.50	0.845	0.398
2. Wards perform today more diversified tasks	2.00	3.455	0.001
3. Wards have undergone changes in size	2.00	2.414	0.016
4. Wards have been closed	3.00	2.815	0.005
5. Health care services have been redistributed to outpatient clinics	3.00	4.643	0.000
6. The size of outpatient clinics has increased	3.00	4.165	0.000
7. Services produced at outpatient clinics are more diversified than before	3.00	4.131	0.000
8. Services produced at outpatient clinics are more advanced than before	2.00	4.488	0.000
9. Non-core business are often outsourced	1.00	2.467	0.014
<i>Changes in personnel</i>			
10. The same personnel is used for different purposes	1.00	2.650	0.008
11. New personnel groups have been established	1.00	1.757	0.079
12. Old personnel groups have been abolished	0.00	1.427	0.154
13. The proportion of temporary working persons has increased	0.00	0.533	0.594

#### 2 Increasing hierarchical dissipation

<i>Increased internal control of services</i>			
14. Internal transfer pricing is now in use	2.00	3.680	0.000
15. Cost-centers have been introduced	3.00	4.792	0.000
16. The use of team working has increased in providing health care services	2.00	3.761	0.000
17. In hospitals more task force personnel are at work	2.00	4.063	0.000
18. The amount of new enterprises within hospitals has increased	1.00	2.244	0.025
<i>Increased external control of services</i>			
19. Services provided are based on agreements	1.00	2.712	0.007
20. Services produced are exposed to competition through bidding procedures	1.00	3.273	0.001
21. Investigations and treatments can be bought separately	1.00	3.852	0.000
<i>Changes in external dependency</i>			
22. External gate keeping is used to control referral for hospital care	-1.50	2.811	0.005
23. Patients have been bound to specific local providers of health care services	-1.00	1.025	0.305
24. Authorities controlling health care services have partially changed	2.00	4.622	0.000

## UNIVERSITY AND CENTRAL HOSPITALS

### Operational apolysis

	median	Z	p-value
<i>3 Changes in policy objectives</i>			
25. Providing of services is bound to increased economic risk taking	0.00	0.229	0.819
26. Management of expenditures and revenues is applied	2.00	3.613	0.000
27. New budgeting systems have been developed	2.00	3.019	0.003
28. New accounting systems have been developed for hospitals	2.00	2.940	0.003
29. Cost-calculation has been changed to incur all costs	1.50	2.693	0.007
30. Strategic planning is done according to budgets	2.00	2.730	0.006
<i>Changes in management</i>			
31. Leadership is primarily connected with economic control	2.00	2.027	0.043
32. New positions are bound to financial and economic accountability	2.00	2.464	0.014
33. New coalitions and coordination among decision makers have been developed	2.00	3.010	0.003
34. Centralization of economic power has taken place in the organization	-1.00	0.153	0.878
<i>Changes in control bodies</i>			
35. The internal bodies for accountability are cost-centers	2.00	3.878	0.000
36. The external bodies for accountability are purchasers	1.00	2.717	0.007
37. Local politicians are a central body for governance	2.00	3.327	0.001
38. Purchaser – control is applied in daily operations	0.00	0.077	0.939
<b>4 Increasing performance orientation</b>			
<i>Changed demands on performance</i>			
39. Revenues are directly related to the amount of services sold	2.00	2.491	0.013
40. Revenues are related to the content of the service mix	2.00	3.196	0.001
41. Changes in service mix have been introduced	2.00	3.894	0.000
42. Cost-saving measures (personnel, material) are in use	2.00	3.003	0.000
<i>Increased turnover</i>			
43. Production of health care services has increased	2.00	3.708	0.000
44. The turnover of patients in wards has increased	3.00	4.089	0.000
45. The length of hospital stay has decreased	3.00	4.056	0.000
46. Patients are discharged from the hospital as soon as possible	2.00	3.841	0.000
47. The number of patients investigated and treated in outpatient clinics has increased	3.00	4.008	0.000
48. The number of patients controlled in outpatient clinics has increased	3.00	4.008	0.000
<i>Standardization</i>			
49. Quality control of health care services is in use	2.00	3.633	0.000
50. Accreditation of services has been introduced where possible	1.00	2.440	0.015
51. An officially acknowledged Fin-DRG-system is in use	1.00	1.571	0.116



## 5. Increasing technicalization

<i>Control of resources</i>	median	Z	p-value
52. Cost-budgeting is in use	2.00	3.406	0.001
53. Services are produced according to predetermined rules	1.50	2.114	0.035
54. Services are provided at predefined and purposeful places	2.00	2.978	0.003
55. The input of resources used for each specific service has been standardized	2.00	2.294	0.022
<i>Control of services</i>			
56. The content for each service has been better predefined	2.00	3.616	0.000
57. Health care services are negotiated as packages	1.00	0.554	0.580
58. Health care services are delivered at negotiated prices	2.00	3.261	0.001
59. Financial sanctions are applied in case of agreement violations	1.00	0.019	0.985
<i>Control of resources and services</i>			
60. The outcome of complications of services is registered and reported	2.00	3.915	0.000
61. The numbers of patients complaining on services have increased	2.00	2.971	0.003
62. A more purposeful selection of patients for individual services has been promoted	1.00	3.785	0.000
63. Requirements on cost-efficiency have changed the provided health care service mix	2.00	3.971	0.000
64. Restrictions on recruitment of new personnel are in use	2.00	3.971	0.000

## UNIVERSITY AND CENTRAL HOSPITALS

### Contentual apolysis

#### 6 Refining of services and modes for delivery

<i>Refining of services</i>	median	Z	p-value
65. Services are customized to the needs of individual purchasers	1.00	1.517	0.129
66. New cost-efficient technologies are in use	2.00	3.923	0.000
67. The proportion of day case services has increased	2.00	3.356	0.001
68. The access to clinical consultations has increased	2.00	3.641	0.000
69. Repetition of similar investigations has been reduced	1.00	3.324	0.001
<i>Refining modes of delivery</i>			
70. Networks have been build to provide specific services	2.50	3.999	0.000
71. The waiting lists for several services have been shortened	1.00	1.183	0.237
72. The waiting time for several services has been cut down	1.00	1.417	0.157
73. Exchange of information between providers and purchasers has increased	3.00	3.817	0.000
74. New information channels have been introduced between purchasers and providers	2.00	3.803	0.000

## 7 Promotion of vertical and horizontal integration

### *Vertical integration*

75. Chronic ill patients are referred to a more appropriate level of health care	2.50	3.999	0.000
76. Certain services are delivered at the physical site of the purchaser	1.00	2.830	0.005
77. Certain services have been outsourced to the purchaser	1.00	2.145	0.032
78. Certain up-stream services have been newly introduced	2.00	3.218	0.001
79. Other providers have been engaged in the service provision	1.50	3.280	0.001

### *Horizontal integration*

80. The amount of partners shearing health care services has increased	2.00	2.837	0.005
81. Chains of providers have replaced single providers for some health care services	1.00	2.804	0.005
82. Providing of health care services is more integrated than before	1.50	3.615	0.000
83. Co-operation among health care providers are based on agreements	2.00	3.223	0.001
84. Larger investments can be sheared among providers	0.00	0.933	0.351
85. New purchasers of health care services have appeared	1.00	0.928	0.354
86. The total number of purchasers of health care services has increased	-1.00	0.177	0.859
87. The purchasers are more diversified than before	1.00	0.346	0.729

## UNIVERSITY AND CENTRAL HOSPITALS

### Contextual apolysis

#### 8. Changes in goals, rules, values and cultures

<i>Changes in goals</i>	median	Z	p-value
88. A new goal for hospitals is efficient micro-economy	2.50	3.951	0.000
89. Social and ethical goals are confronted with economic goals on daily basis	1.00	1.274	0.203
90. Professional goals are continuously weighted against economic performance	1.00	1.245	0.213
91. Goals are now confirmed in the annual strategic planning	2.00	3.587	0.000
92. Goals are tied to the annual budget	2.50	4.021	0.000
<i>Changes in rules</i>			
93. Working rules are now closely related to cost-saving	2.50	4.056	0.000
94. Working rules means now control of clinical work	1.00	0.936	0.000
<i>Changes in values</i>			
95. The values of the organization (hospital) emphasize now productivity	3.00	3.806	0.000
96. The values of the organization (hospital) emphasize now cost-efficiency	2.00	3.817	0.000
97. The values of the organization (hospital) emphasize now effectiveness	2.00	3.795	0.000
98. The values of the organization (hospital) emphasize now core-business	2.00	3.803	0.000
<i>Changes in culture</i>			
99. A managerial culture has been introduced in hospitals	1.50	3.783	0.000
100. Managerial leadership has replaced academic meritocracy	2.00	3.403	0.001
101. The culture has changed from social obligation to emphasizing service production	2.00	3.378	0.001
102. Institutional features (social obligation) have been replaced with technical features	-1.00	1.015	0.310
103. Health care services resembles now commodities	1.00	2.824	0.005

## 9 Institutional vision I

### *Changes*

104. Changes in hospital structures are now steered through external resource dependency	2.00	2.872	0.004
105. Changes in hospital structures have been more purposeful than evolutionary	1.00	2.368	0.018
106. Changes in hospital structures have been more incremental than discontinuous	2.00	3.214	0.001
107. Changes in hospital structures have been more internal than external	1.50	2.808	0.005
108. Inertia to changes in services has been more severe than expected	-1.00	0.019	0.982
109. Structural changes have taken place more slowly than expected	1.00	0.884	0.377

## 10 Institutional vision II

### *Control, competition and economy*

	<b>median</b>	<b>Z</b>	<b>p-value</b>
110. State control of health care services has decreased	2.00	3.709	0.000
111. Municipal control of health care services has increased	2.00	3.841	0.000
112. Control and bureaucracy of health care services have increased	1.00	1.781	0.075
113. Municipal monopsonies have been established	-1.00	0.289	0.773
114. Competition in health care services is not in proper use	1.00	0.479	0.632
115. A market for health care services has not been established	1.50	2.656	0.008
116. Hospital micro economy is in continuous crisis	1.00	0.806	0.420
117. Costs of health care services have not decreased	1.50	2.325	0.020

### *Interaction, structures and boundaries*

#### *Interaction*

118. The number of providers of health care services has increased	1.00	1.346	0.178
119. Providers of health care services are more diversified	-1.00	2.706	0.007
120. Interactions between providers in health care services have contentually changed	2.00	3.378	0.001
121. Rules and norms of interaction between providers have become more specified	2.00	3.042	0.002
122. New personnel with specific tasks are involved in interactions concerning health care services	1.00	3.781	0.000

#### *Structures*

123. Isomorphic structures are not anymore enhanced and controlled	2.00	3.438	0.001
124. Health care services provided have locally changed hospital structures	1.00	3.329	0.001
125. Vertical integration has reconfigured structures for individual health care services	1.50	3.684	0.000
126. Splitting of services has resulted in horizontalization of structures for health care services	1.00	1.659	0.097
127. A specialization in providing of health care services has taken place	2.00	3.795	0.000

#### *Boundaries*

128. New ways of working between providers have extended boundaries for health care services	1.00	2.830	0.005
129. Changes in services provided have changed borders for health care services	1.00	2.676	0.007
130. The view of hospitals as whole service deliverers has changed to be a member of a service delivery chain	2.00	3.994	0.000

## REGIONAL OR LOCAL HOSPITALS

### Structural apolysis

#### 1 Increasing heterogenensis

<i>Changes in structures for services</i>	median	Z	p-value
1. Wards are today more segmented	1.00	1.712	0.087
2. Wards perform today more diversified tasks	2.00	3.374	0.001
3. Wards have undergone changes in size	1.50	3.635	0.000
4. Wards have been closed	2.00	3.779	0.000
5. Health care services have been redistributed to outpatient clinics	2.00	4.064	0.000
6. The size of outpatient clinics has increased	2.00	4.018	0.000
7. Services produced at outpatient clinics are more diversified than before	2.00	4.035	0.000
8. Services produced at outpatient clinics are more advanced than before	2.00	3.985	0.000
9. Non-core business are often outsourced	1.00	2.881	0.004
<i>Changes in personnel</i>			
10. The same personnel is used for different purposes	1.00	2.976	0.003
11. New personnel groups have been established	1.00	3.065	0.002
12. Old personnel groups have been abolished	1.00	0.502	0.615
13. The proportion of temporary working persons has increased	0.50	0.154	0.878

#### 2 Increasing hierarchical dissipation

##### *Increased internal control of services*

14. Internal transfer pricing is now in use	2.50	2.806	0.005
15. Cost-centers have been introduced	3.00	4.177	0.000
16. The use of team working has increased in providing health care services	1.00	3.444	0.001
17. In hospitals more task force personnel are at work	2.00	3.985	0.000
18. The amount of new enterprises within hospitals has increased	1.00	1.890	0.059

##### *Increased external control of services*

19. Services provided are based on agreements	2.00	1.498	0.134
20. Services produced are exposed to competition through bidding procedures	1.00	2.367	0.018
21. Investigations and treatments can be bought separately	1.00	2.234	0.025

##### *Changes in external dependency*

22. External gate keeping is used to control referral for hospital care	-1.00	3.161	0.002
23. Patients have been bound to specific local providers of health care services	1.00	1.703	0.089
24. Authorities controlling health care services have partially changed	2.00	3.976	0.000

## REGIONAL OR LOCAL HOSPITALS

### Operational apolysis

<b>3 Changes in policy objectives</b>	<b>median</b>	<b>Z</b>	<b>p-value</b>
25. Providing of services is bound to increased economic risk taking	1.00	2.481	0.013
26. Management of expenditures and revenues is applied	2.00	4.720	0.000
27. New budgeting systems have been developed	2.00	4.529	0.000
28. New accounting systems have been developed for hospitals	1.50	3.861	0.000
29. Cost-calculation has been changed to incur all costs	2.00	3.465	0.001
30. Strategic planning is done according to budgets	2.00	2.896	0.004
<i>Changes in management</i>			
31. Leadership is primarily connected with economic control	1.00	3.704	0.000
32. New positions are bound to financial and economic accountability	1.00	3.054	0.002
33. New coalitions and coordination among decision makers have been developed	1.00	3.664	0.000
34. Centralization of economic power has taken place in the organization	-1.00	0.330	0.742
<i>Changes in control bodies</i>			
35. The internal bodies for accountability are cost-centers	2.00	3.720	0.000
36. The external bodies for accountability are purchasers	1.00	2.570	0.010
37. Local politicians are a central body for governance	2.00	4.168	0.000
38. Purchaser – control is applied in daily operations	-1.00	1.331	0.183
<b>4 Increasing performance orientation</b>			
<i>Changed demands on performance</i>			
39. Revenues are directly related to the amount of services sold	2.00	3.758	0.000
40. Revenues are related to the content of the service mix	2.00	4.428	0.000
41. Changes in service mix have been introduced	2.00	4.451	0.000
42. Cost-saving measures (personnel, material) are in use	2.00	4.635	0.000
<i>Increased turnover</i>			
43. Production of health care services has increased	2.00	3.441	0.001
44. The turnover of patients in wards has increased	3.00	4.311	0.000
45. The length of hospital stay has decreased	3.00	4.265	0.000
46. Patients are discharged from the hospital as soon as possible	2.00	4.027	0.000
47. The number of patients investigated and treated in outpatient clinics has increased	2.00	4.134	0.000
48. The number of patients controlled in outpatient clinics has increased	2.00	4.224	0.000
<i>Standardization</i>			
49. Quality control of health care services is in use	2.00	4.118	0.000
50. Accreditation of services has been introduced where possible	0.50	1.037	0.300
51. An officially acknowledged Fin-DRG-system is in use	1.00	0.615	0.538

## 5. Increasing technicalization

<i>Control of resources</i>	median	Z	p-value
52. Cost-budgeting is in use	2.00	4.411	0.000
53. Services are produced according to predetermined rules	1.00	2.533	0.011
54. Services are provided at predefined and purposeful places	1.00	3.260	0.001
55. The input of resources used for each specific service has been standardized	1.00	2.250	0.024
<i>Control of services</i>			
56. The content for each service has been better predefined	2.00	4.006	0.000
57. Health care services are negotiated as packages	1.00	2.570	0.010
58. Health care services are delivered at negotiated prices	3.00	4.743	0.000
59. Financial sanctions are applied in case of agreement violations	-1.00	0.972	0.331
<i>Control of resources and services</i>			
60. The outcome of complications of services is registered and reported	1.50	3.766	0.000
61. The numbers of patients complaining on services have increased	2.00	3.648	0.000
62. A more purposeful selection of patients for individual services has been promoted	1.00	3.324	0.001
63. Requirements on cost-efficiency have changed the provided health care service mix	2.00	4.502	0.000
64. Restrictions on recruitment of new personnel are in use	2.50	4.712	0.000

## REGIONAL OR LOCAL HOSPITALS

### Contentual apolysis

#### 6 Refining of services and modes for delivery

<i>Refining of services</i>	median	Z	p-value
65. Services are customized to the needs of individual purchasers	1.00	1.186	0.236
66. New cost-efficient technologies are in use	2.00	3.998	0.000
67. The proportion of day case services has increased	2.00	3.457	0.001
68. The access to clinical consultations has increased	1.00	1.883	0.060
69. Repetition of similar investigations has been reduced	1.00	3.017	0.003
<i>Refining modes of delivery</i>			
70. Networks have been build to provide specific services	2.00	4.484	0.000
71. The waiting lists for several services have been shortened	0.50	0.943	0.346
72. The waiting time for several services has been cut down	1.00	1.747	0.082
73. Exchange of information between providers and purchasers has increased	2.00	4.580	0.000
74. New information channels have been introduced between purchasers and providers	2.00	4.041	0.000

#### 7 Promotion of vertical and horizontal integration

##### *Vertical integration*

75. Chronic ill patients are referred to a more appropriate level of health care	2.00	3.997	0.000
76. Certain services are delivered at the physical site of the purchaser	1.00	2.176	0.030

77. Certain services have been outsourced to the purchaser	1.00	2.536	0.011
78. Certain up-stream services have been newly introduced	1.00	2.071	0.038
79. Other providers have been engaged in the service provision	2.00	4.543	0.000

#### *Horizontal integration*

80. The amount of partners shearing health care services has increased	1.00	3.985	0.000
81. Chains of providers have replaced single providers for some health care services	0.00	0.651	0.515
82. Providing of health care services is more integrated than before	1.50	3.959	0.000
83. Co-operation among health care providers are based on agreements	2.00	4.286	0.000
84. Larger investments can be sheared among providers	0.00	0.466	0.656
85. New purchasers of health care services have appeared	1.00	1.668	0.095
86. The total number of purchasers of health care services has increased	0.00	0.785	0.432
87. The purchasers are more diversified than before	1.00	1.788	0.074

## **REGIONAL OR LOCAL HOSPITALS**

### **Contextual apolysis**

#### **8 Changes in goals, rules, values and cultures**

<i>Changes in goals</i>	<b>median</b>	<b>Z</b>	<b>p-value</b>
88. A new goal for hospitals is efficient micro-economy	3.00	4.652	0.000
89. Social and ethical goals are confronted with economic goals on daily basis	1.00	0.557	0.577
90. Professional goals are continuously weighted against economic performance	-1.00	2.660	0.008
91. Goals are now confirmed in the annual strategic planning	2.00	4.212	0.000
92. Goals are tied to the annual budget	2.00	3.768	0.000
<i>Changes in rules</i>			
93. Working rules are now closely related to cost-saving	2.00	4.043	0.000
94. Working rules means now control of clinical work	1.00	2.458	0.014
<i>Changes in values</i>			
95. The values of the organization (hospital) emphasize now productivity	2.00	4.050	0.000
96. The values of the organization (hospital) emphasize now cost-efficiency	2.00	3.941	0.000
97. The values of the organization (hospital) emphasize now effectiveness	2.00	4.131	0.000
98. The values of the organization (hospital) emphasize now core-business	1.00	1.778	0.075
<i>Changes in culture</i>			
99. A managerial culture has been introduced in hospitals	1.00	3.553	0.000
100. Managerial leadership has replaced academic meritocracy	1.00	3.418	0.001
101. The culture has changed from social obligation to emphasizing service production	2.00	4.666	0.000
102. Institutional features (social obligation) have been replaced with technical features	-1.00	2.038	0.042
103. Health care services resembles now commodities	0.50	0.141	0.888

## 9 Institutional vision I

### *Changes*

104. Changes in hospital structures are now steered through external resource dependency	1.50	3.321	0.001
105. Changes in hospital structures have been more purposeful than evolutionary	1.00	1.300	0.194
106. Changes in hospital structures have been more incremental than discontinuous	2.00	2.975	0.003
107. Changes in hospital structures have been more internal than external	1.00	1.985	0.047
108. Inertia to changes in services has been more severe than expected	-1.00	0.986	0.324
109. Structural changes have taken place more slowly than expected	1.00	0.636	0.525

## 10 Institutional vision II

### *Control, competition and economy*

	<b>median</b>	<b>Z</b>	<b>p-value</b>
110. State control of health care services has decreased	2.00	4.167	0.000
111. Municipal control of health care services has increased	2.00	4.615	0.000
112. Control and bureaucracy of health care services have increased	1.50	2.758	0.006
113. Municipal monopsonies have been established	0.00	0.722	0.470
114. Competition in health care services is not in proper use	1.00	3.394	0.001
115. A market for health care services has not been established	1.00	3.443	0.001
116. Hospital micro economy is in continuous crisis	1.00	1.307	0.191
117. Costs of health care services have not decreased	2.00	4.058	0.000

### *Interaction, structures and boundaries*

#### *Interaction*

118. The number of providers of health care services has increased	1.00	2.870	0.004
119. Providers of health care services are more diversified	1.00	0.222	0.824
120. Interactions between providers in health care services have contentually changed	1.00	3.411	0.001
121. Rules and norms of interaction between providers have become more specified	2.00	4.588	0.000
122. New personnel with specific tasks are involved in interactions concerning health care services	2.00	4.295	0.000

#### *Structures*

123. Isomorphic structures are not anymore enhanced and controlled	1.50	3.796	0.000
124. Health care services provided have locally changed hospital structures	2.00	4.239	0.000
125. Vertical integration has reconfigured structures for individual health care services	2.00	4.512	0.000
126. Splitting of services has resulted in horizontalization of structures for health care services	1.00	2.749	0.006
127. A specialization in providing of health care services has taken place	2.00	4.320	0.000

#### *Boundaries*

128. New ways of working between providers have extended boundaries for health care services	2.00	3.950	0.000
129. Changes in services provided have changed borders for health care services	1.00	3.740	0.000
130. The view of hospitals as whole service deliverers has changed to be a member of a service delivery chain	2.00	4.380	0.000