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Comparing National Patterns of Medical Specialization: A Contribution to the Theory of Professions

MPIfG Discussion Paper, No. 92/6

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Suggested Citation: Döhler, Marian (1992) : Comparing National Patterns of Medical Specialization: A Contribution to the Theory of Professions, MPIfG Discussion Paper, No. 92/6, Max-Planck-Institut für Gesellschaftsforschung, Köln

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Comparing National Patterns of Medical Specialization: A Contribution to the Theory of Professions

Marian Döhler

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MPIFG Discussion Paper 92/6
ISSN 0933-5668
Juli 1992

92/4236
Max-Planck-Institut
für Gesellschaftsforschung
Bibliothek
PLA-7/9206

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(PSI):	PSI%4505011006::MPI		

Abstract

This paper examines the causal factors behind the increase of medical specialization in Great Britain, Germany and the U.S. Current research into professions usually explains the phenomenon of growing specialization by referring to innovations in medical science and technology, competition among physicians, the differentiation of research institutions and medical schools, government intervention and organizational changes in the delivery of health care, but it does not pay sufficient attention to the mediating impact of institutional contexts on these independent variables. The analysis shows first that the causal relevance of these independent variables varies considerably across countries, and second that this variance can be explained by examining the role of institutional contexts as an intervening variable. Regulatory systems affecting the growth of medical specialization are given particular emphasis.

* * * * *

Im Mittelpunkt dieses Papiers steht die Frage nach den Ursachen für die zunehmende Spezialisierung der medizinischen Profession in Großbritannien, Deutschland und den USA. In der Professionsforschung wird das Phänomen der wachsenden ärztlichen Spezialisierung vor allem mit dem medizinisch-technischen Fortschritt, dem Konkurrenzdruck innerhalb der Ärzteschaft, der Ausdifferenzierung medizinischer Forschungs- und Ausbildungseinrichtungen, direkten staatlichen Eingriffe sowie organisatorischen Veränderungen im Medizinbetrieb erklärt, ohne jedoch den Einfluß von institutionellen Rahmenbedingungen auf die kausale Relevanz dieser unabhängigen Variablen hinreichend zu berücksichtigen. Im Rahmen der Untersuchung wird zunächst gezeigt, daß die Bedeutung der unabhängigen Variablen je nach Land variiert, um anschließend den Einfluß des institutionellen Kontextes als intervenierender Variable herauszuarbeiten. Besonders hervorgehoben werden dabei jene Mechanismen, die die Zunahme der medizinischen Spezialisierung regulieren.

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* I am indebted to Nick Bosanquet, Ellen M. Immergut, Philip Manow-Borgwardt, Renate Mayntz, Heinz Rothgang, Fritz W. Scharpf, Uwe Schimank, Jürgen Wasem, Raymund Werle and David Wilsford for their comments on two earlier versions of this paper.

1. Introduction

The theory of professions has undergone some profound changes during the past three decades. The first wave of research in the 1950s and 1960s strongly emphasized the question of the attributes which constitute a profession and distinguish professionals from other occupations (Greenwood 1957). This "essentialist" approach was superseded in the 1970s by studies which concentrated on the strategy of professions to monopolize segments of the labour market (Berlant 1975; Larson 1977). More recently research has again shifted its focus towards national paths and peculiarities of professionalization. This new shift in the focus of research was strongly influenced by findings such as Rueschemeyer's comparative analysis of U.S. and German lawyers (Rueschemeyer 1973), where he showed that American lawyers differ from their German counterparts particularly through their stronger entrepreneurial orientation. This difference is explained by virtue of the greater significance of state bureaucracies for the professionalization process in the German case.

A major contribution of this more recent approach was to emphasize the national variations between professionals, rather than the similarities of their successes, and thereby shifting attention to the impact of diverging contexts on the process of professionalization. Although country-specific paths of professionalization have been widely recognized (Heidenheimer 1989; Burrage/ Jarausch/ Siegrist 1990), the theory of professions still lacks a coherent perspective as to the question of how particular national contexts influence the professionalization process. This paper, therefore, takes the differentiation of the medical profession into various specialties as an example, in order to analyze the impact of varying institutional contexts on the emergence of national patterns of the medical profession. To this purpose, the influence of those independent variables which are most commonly stressed as major causal factors behind specialization are compared in three countries with diverging systems of health care: Britain with its National Health Service (NHS), Germany with a semi-public and self-administered health insurance system, and the U.S. with a system dominated by private health care providers. Even though these system properties refer to financing and ownership structures without any obvious relation to medical specialization, the considerable range of institutional variance will prove to be an important element of explanation.

2. Conceptual Framework

For the most part, social scientists have paid only scant attention to the phenomenon of medical specialization. The medical profession is usually treated as a unitary actor so that little room is left to discuss the causes or effects of medical specialization, even in influential studies such as Freidson (1979: 85), Parry and Parry (1976), or Larson (1977). Since homogeneity, and not internal differentiation, is viewed as a basic requirement for achieving the status of a mature profession (Johnson 1972: 53), specialization is often equated with the division of labor between *several* occupations and it is not regarded as an *intra*professional process.

Medical historian George Rosen was one of the first researchers to stress specialization as an important step in the medical profession's development (Rosen 1972). His starting point was the observation that the American medical profession itself, especially general practitioners, mobilized resistance against the emerging tendency of specialization during the mid-19th century. After this initial period, acceptance among physicians began to grow slowly for two reasons (Rosen 1972: 111). Aside from the growth of the medical knowledge base, Rosen attributed the changing attitude to the economic benefits generated by the rise of patients' demand for specialist service, which allowed specialists to charge higher fees.

In the following decades, the dominant explanation of specialism, certainly reflecting the faith in technological progress during the postwar period, was the growth of medical science and technology (Galdston 1959; Goode 1969: 285; 293 f.; Gritzer/ Arluke 1985: 2 ff.). Specialization was conceived as an "historically inevitable process" (Luce/ Byyny 1979: 377) which is forced upon the medical profession. The persistence of this technology-determinist perception was logical because the tremendous growth of the medical knowledge base remains manageable for physicians only by their concentrating on particular fields of diagnosis and treatment, i.e. by becoming a specialist. However, as there are studies documenting that several specialties have developed without a pre-existing body of knowledge (Gritzer 1981: 256), the model cannot claim universal validity. In addition, it fails to explain why certain medical specialties have developed in one country and not in another, despite similar levels of scientific and technological development.

While the explanations above all regard the medical profession as being virtually passive, only reacting to external pressure, Bucher and Strauss conceptualize a more active picture of professions, which are regarded as "loose amalgamations of segments which are in movement" (Bucher/ Strauss

1961: 333). These professional segments are considered to be conscious, strategy-pursuing groups with the clearly defined goal of claiming a territory (Bucher 1962: 119). Medical specialties are formed in order to exploit new technologies or to acquire a professional identity derived from an expanded knowledge base. For the first time, this model introduced the element of strategic choice into the realm of medical specialism. Even though Bucher and Strauss still adhered to the tradition of medical progress as the main determinant of specialization, their concept of professional segments as interest-driven groups which seize an opportunity to stake a claim to a piece of medical terrain represented an obvious improvement when compared to older functionalist approaches.

More recently, the impact of market forces on specialization gained ground in professionalization theories. The rise of the medical profession is regarded as a "collective project" of upward mobility (Larson 1977: 66 ff.), which is achieved through gaining a legitimate monopoly for service provision and an ensuing control over the market for medical care. Based on these general assumptions, specialization is interpreted as originating out of intraprofessional conflicts over the legitimate exploitation of market segments (Gritzer 1981; Gritzer/ Arluke 1985). The driving force in this model is the economic self-interest of the profession, which leads single professional segments to use specialization as a vehicle of claiming a legitimate monopoly over a medical field. The demand-pull version of the market model, in contrast, again stresses a defensive adaptation to market changes, according to which medical specialties are created as a response to increasing patient demand, which is stimulated in turn by massive resource transfers into the health sector (Hofoss 1986: 207).

In addition to these dominant theories of specialization, several explanations were developed with a stronger orientation towards the organizational environment of the medical profession. Kendall, for example, has convincingly demonstrated that the rapid increase of U.S. governmental subsidies to medical research during the 1950s not only produced an institutional demand for specialized researchers, but also contributed to the creation of highly prestigious research careers in medicine, thus creating a powerful incentive for physicians to engage in specialized research (Kendall 1971: 472 ff.). According to these considerations, medical specialization developed as a by-product of the specific interests of researchers and medical schools, not seldom influenced by incentives set by the state.

Direct government intervention is another factor which has been confirmed as a cause for specialization. This has been the case, for example, with the

specialty of rehabilitation medicine, which was actively supported by the U.S. federal government in order to provide qualified medical personnel for the government's medical system for veterans (Berkowitz 1981; Starr 1982: 356 ff.). In some countries the state even seems to be the dominating force shaping the system of medical specialties, either by granting the medical profession the right to self-regulation or by bringing the specialization process under governmental control (Heidenheimer 1980). However, it should be borne in mind that government intervention as an independent variable has to be separated from the role of regulatory systems, which must be conceptualized as an intervening variable with a transmission and/ or transformation function for the independent variables.

Yet another factor influencing medical specialization is seen in organizational attributes of health service delivery. Halpern (1988: 28 ff.), who most forcefully argued in favor of this variable, suggests that organizational change in hospitals and clinics, particularly their increasing specialization and their application of new medical techniques often precedes the emergence of medical specialties and therefore can be identified as a major cause for medical specialization. In summary, five major variables have been stressed as being of causal relevance for the growth of medical specialization:

1. Progress and innovations in medical science and technology, which lead physicians to concentrate on increasingly narrower fields of knowledge.

2. Market forces, which produce inter- or intraprofessional competition and thereby increase the incentives to monopolize certain market segments by means of specialization.

3. The impact of very rapid differentiation into special fields of activity at research institutions and medical schools.

4. The role played by governments, either as direct facilitators of specialization or, more indirectly, as the shapers of the health care system in which medical specialization takes place.

5. Finally, organizational aspects of health care delivery such as the changing structure and size of hospitals or medical practices, which have an impact on the process of specialization.

This short overview is not exhaustive but already reveals some of the major problems of previous research on medical specialization. First of all, most inquiries have been predominated by the case study approach, with a focus

on the emergence of single medical specialties such as pathology (Bucher 1962), rehabilitation medicine (Gritzer/ Arluke 1985), pediatrics (Halpern 1988) or community medicine (Lewis 1986). By contrast, comparative studies are as rare as studies which include more than one specialty, and combinations of both are even more exceptional. This frequent lack of a comparative perspective[1] was highly consequential for the explanatory models. In most cases, one or several of the above mentioned independent variables are stressed as determinants of the specialization process with no questions being made, however, of their range of validity.

The frequently neglected impact of diverging environmental contexts on independent variables is a second weakness of previous research. If, for example, the proliferation of new medical technologies varies among equally developed industrial countries, this is not simply a reflection of varying stages of scientific development. Rather, it would be appropriate to assume a similar stage of scientific development, but different institutional frameworks, which diverge according to their capacity for controlling the proliferation of medical technologies. A more specific example would be the finding that economic competition between physicians is the decisive variable which propels the increase of specialization. Since it is known that competition forces are only allowed to play a role at varying degrees in different countries (Döhler 1991), it follows that this independent variable is not equally valid as an explanation across different cases. This is not to say that the independent variables stressed in earlier research are irrelevant. They remain indispensable elements of any explanatory endeavor. But their relevance must be considered in relation to the institutional context that is peculiar to each country. Thus, if we want to generate more elaborate explanations as to the causes and dynamics of medical specialization, the proper question should be no longer "What are the variables that shape specialization among physicians?", but "What are the conditions which allow these variables to play a role in the process of specialization?"

A third deficiency of previous research is the almost exclusive focus on *expanding* forces and a concomitant neglect of *restrictions*. A good illustration which runs counter to the routine assumption that medical specialization is unidirectionally expansive, is Heidenheimer's reference to the case of Danish junior doctors, who successfully allied with government bureaucrats in the late 1970s, to *reduce* the number of specialties from 32 to 21, because

1 Two exceptions are the comparative studies by Doan (1977) and Bussche (1986), both of which, however, are only descriptive and not concerned with the *causes* of medical specialization.

this was expected to provide greater flexibility for junior doctors in a narrowing labor market (Heidenheimer 1980: 379). This suggests that institutional contexts provide different potentials for restricting or expanding the specialization process.

The idea that diverging institutional contexts have an impact on the development of medical specialization is not entirely new. Some students of medical professionalization have mentioned regulatory systems as an important factor in the process of specialization (Stevens 1971; Halpern 1988: 25), yet without using this variable in a systematic fashion. Institutional contexts have also been dealt with in the realm of differentiation theory.[2] For example, Ben-David (1960) and Stichweh (1987: 241-245) have both stressed the existence of different rules of differentiation *within* medicine. The division is seen between scientific medicine, on the one hand, and medical practice on the other. Despite a common epistemological inheritance, the disciplines of academic medicine are differentiated between knowledge-based fields such as anatomy or bacteriology, whereas practical medicine is characterized by a client-oriented process of specialization such as pediatrics or obstetrics and gynecology. Of course, these different points of reference for specialization are patterned after institutional peculiarities of university-based research and office-based or hospital-based medical care. But neither this causal dimension nor the implications for comparative research have played a visible role for differentiation theorists.

As there are few doubts concerning the relevance of institutional configurations as an intervening variable which transforms the independent variables into incentives or constraints, the problem now is: how can the institutional context be conceptualized as an intervening variable? The institutional environment surrounding medical specialization is certainly too complex a variable to be reduced to a small number of indicators. However, for the present analysis, it seems sufficient to concentrate on the national systems of specialty regulation, because this element of the institutional context reflects the way in which historical struggles within the medical profession have been resolved in order to handle the problem of medical specialization,

2 Since medical specialization is a process of functional differentiation, we should expect a strong interest in processes of occupational specialization among scholars of modern differentiation theory. This school of thought, however, has generally remained quiet on the issue (cf. Mayntz 1988; Alexander/ Colomy 1990). Differentiation theory has concentrated instead on societal macro phenomena such as the transition from stratificatory to functional differentiation or, more recently, the emergence of social subsystems.

and therefore appears as a promising starting point for assessing the relevance of the independent variables for each country.

The following analysis of how medico-technological innovations, market forces, research and education, governmental support, and the organization of medical care have influenced the development of medical specialism is organized as follows. In section 3, medical specialization as the dependent variable is defined more closely and problems of comparability are discussed. In section 4, an historical account of the emergence of specialty regulation systems is provided (4.1), which is followed by an analysis of the institutionally grounded incentives to *expand* medical specialism (4.2), and an inquiry into *restrictive* factors (4.3). These two sections will show the impact of the five independent variables which are summarized and discussed in section 5. Taken together, these analytic steps will provide a fairly complete picture of the mechanisms which structure the conditions for individual and institutional interests in relation to the issue of specialization.

3. Specialization in Different Institutional Contexts

Medical specialization, as a dependent variable, often remains nebulous. Sometimes it even appears as if the meticulousness of historical accounts correlates with the vagueness of what is to be explained. Only rarely the question is raised whether specialty status is achieved when a new area of medical knowledge has "emerged", or when specialist societies or journals are founded, or when the field is integrated into medical education. In order to avoid such a lack of clarity, subsequently the term "specialty" is applied to formally certified or approved fields of specialization. This focus on officially acknowledged specialties should be not confused with the availability of special medical services. Those diagnosis and treatment procedures which belong to the domain of a particular specialty in one country, may belong to a different specialty in another country. Therefore, a large number of medical specialties is not necessarily an indicator of the scope of medical services.

A second point deserving elaboration concerns an equally diffuse usage of terms. When talking about medical specialization, a distinction is needed between the percentage of specialists among all physicians, on the one hand, and the creation of new medical specialties, on the other. Although this paper focuses on the creation of new formally acknowledged specialties, both

aspects are intertwined, and therefore a simultaneous consideration is required at some points of the argument.

3.1 Comparing Variances of Specialty Development

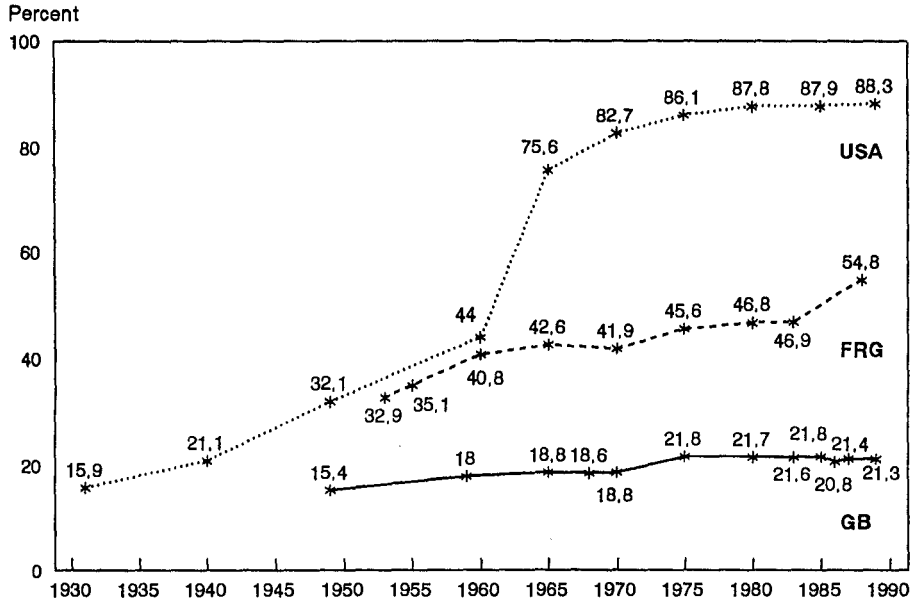
Each comparison requires an operationalization of the dependent variable, which allows one to make assumptions about the causal relationship with the independent variables. At first sight, medical specialization appears as a fairly convenient variable, but, as the following analysis will reveal, comparative measurements of medical specialization are too often employed without considering problems of equivalence and contextual interference. The single most important indicator for measuring medical specialization has been the percentage of specialists among physicians (Doan 1977; Starr 1982: 356 ff.; Hollingsworth 1986: 101 ff.; Rueschemeyer 1986: 130), certainly because of their convenient availability in national health manpower statistics. As seen from a comparative perspective, however, such data are seldom of reliable quality.

Most U.S. statistics, for example, rely on data compiled by the American Medical Association, including not only board-certified physicians but also "self-designated specialists", who in other countries, due to their lack of a formal specialist qualification, would not be counted as specialists. An alternative source for the U.S. is the ABMS Directory of Medical Specialists, but again these data are of limited value, since all physicians who are certified by a non-ABMS board are excluded, which by no means could be regarded as an indicator of inferior specialist status. The calculation of the percentage of British specialists raises measurement problems as well. It is not appropriate, for example, to count all hospital physicians as specialists[3] because this would include all training positions. According to the British concept of medical specialists, it is only appropriate to count consultants and the so-called "non-training grades", i.e. associate specialists and SHMOs. Although an unknown percentage of senior registrars have completed their postgraduate training, this grade is seen in Britain as a training grade, subject to a consultant's supervision. If one bears in mind all these restrictions of data quality, a much more cautious use of statistics is advised. Because data rely on national concepts of specialty definition, the clear differ-

3 As apparently did Hollingsworth (1986: 41) - no details about the calculation procedure are provided.

ences in specialty ratios (cf. Figure 1) has to be interpreted against the background of their relative equivalence.

Figure 1: Specialty Ratios as a Percentage of Active Physicians



Source: Cf. Appendices I + II for data sources and calculation procedure.

Similar qualifications are necessary with respect to another seemingly reliable indicator for measuring the dependent variable: the number of approved specialties. When the three cases are compared (Appendix III), the most striking difference is the number of approved specialties. The addition of all subcategories reveals that American physicians have as many as 81 fields of specialization, German physicians may specialize in 64 different specialty categories, whereas British physicians have to content themselves with 54 specialties. However, this procedure would only lead to valid assumptions if the sum of the different categories did not viclate the requirement of an empirically grounded cross-national equivalence. Obviously it is not appropriate to give equal weight to full specialties, subspecialties and added qualifications, especially since there is no such formal differentiation in Britain. The problem with these categories is that the comparability of research units requires that descriptive categories are invariant with respect to their constituting attributes. The use of specialist ratios is a research strategy which "renders phenomena comparable by asserting that they inhere in a common context" (Smelser 1976: 168). Yet it is this very requirement that is not fulfilled when national statistics of specialist/ generalist ratios are grouped

together because they are constructed on the basis of system-specific criteria. These problems lead one to question whether there are other, more reliable terms of measurement.

An almost completely neglected mode of description is the historical timing of the introduction of single specialties. Comparing the differences and similarities can reveal some interesting aspects such as the chronological discrepancies that are to be observed in the case of public health as an approved medical specialty. While public health became a specialty in Britain as early as 1887 (Stevens 1966: 48), it was not until 1960 and 1976 respectively that it became a specialty in the U.S. (Rosen 1977: 73) and Germany (Sewering 1987: B1600). Although it is clear that public and preventive health services were provided independently of the existence of an appropriate specialty, a cumulative analysis of a larger number of specialties could provide some insights into country-specific priorities of health care.

Another way of measuring specialty development that tends to run in a similar direction is to construct a ranking order of the most highly staffed specialties. Some of the observable differences are then not surprising, since variations in the organization of health services can be expected to have some repercussions on specialty development. This is the case, for example, with internal medicine, which is the most highly staffed specialty both in the U.S. and in Germany, but is only ranked third in Britain. Obviously, this is a result of the primary care function of GPs in Britain. They perform much of the internal medicine services which are rendered by office-based internists in the two other countries. A more surprising difference is to be found with respect to anesthesiology. In Germany and the U.S. this specialty is ranked 4th and 7th respectively, whereas in Britain it is the most frequent specialty (for data sources, cf. Appendix I). A possible explanation is that British anesthesiologists, due to the high relevance of pain relief in British medicine, enjoy a much higher status within the hierarchy of medical specialties. Consequentially, "no British surgeon would be allowed to operate without the services of a specialist anesthesiologist, in contrast to the situation in other countries, such as the United States, where anesthesia is sometimes given by nurse anesthetists" (Payer 1988: 115).

Yet another indicator is a comparison of absent medical specialties. As shown in Appendix III, there are remarkable differences by which specialties are formally recognized. Although it should be borne in mind that *formal* specialization may differ from *de facto* specialization, it is possible to link the contents of country-specific specialty systems with the more general argument of "national styles" in science and technology. As Jamison (1987) has con-

vincingly pointed out, such national styles have their foundation not only in the sphere of philosophical reasoning about "root metaphors of nature" (Jamison 1987: 150), but also in diverging paths of industrialization and institutionalization of scientific research. As Payer (1988) in her, rather anecdotal, but nonetheless valuable comparison of national medical cultures has pointed out, medicine is no exempt from the existence of country-specific characteristics. Medical science tends to focus on particular parts of the human body, physicians tend to have their pet disease and technologies, and the same illness, against all text-book knowledge, is treated in different ways in equally developed nations. Such varying patterns obviously are embodied in the specialty orientation and focus of a country. American physicians' with their tendency on aggressive therapy, have the most elaborated system of surgical specialties and subspecialties; in Germany, where physicians are strongly occupied with diseases of the heart and of blood circulation, internal medicine has the largest number of subspecialties, and British physicians, with a comparatively strong orientation towards social medicine and prevention, appear to favor specialties with psycho-social components.

As interesting as the insights that are stimulated by such empirical categories may appear, neither the alternative modes nor the routinely used terms of measurement for the dependent variable can fulfill the invariance requirement of their constituting attributes. If all these categories for measuring the dependent variable cannot be used without serious reservation, how is it possible then to construct an equivalent category for describing national variances?

Maybe it is helpful to reconsider that all these data problems have a common background: the tension between "culture-bound" and "non-culture bound" conceptualizations of variables inherent to most comparative research (Smelser 1976: 178). Usually comparativists deal with such problems by simply increasing the level of abstraction until the variables achieve a sufficient degree of cross-cultural equivalence (Armer 1973: 55 f.). Because it is only on the basis of variance of the dependent variable that the impact of independent variables can be tested, the properties of the variable should allow the description of cross-national differences. As the previous discussion has shown, the indicators which constitute the dependent variable are not identical across systems. The measurement of variance must therefore ensure that measurement statements are not a result of contextual interference. Przeworski and Teune have pointed out that cross-national equivalence could be achieved by using *different* indicators to measure the *same* variable. Their technique of "inferred measurement" (Przeworski/ Teune 1970: 114 ff.) requires that system-specific, i.e. dissimilar, indicators must have a similar

structure of relations. Equivalence of variables across systems is achieved if at least two indicators in each system, chosen on the basis of a theoretical assumption, are interrelated and this interrelation is found to be similar across systems (Przeworski/ Teune 1970: 114-116).

Although this procedure appears a more sophisticated method for establishing cross-national equivalence than the use of a more abstract language, it can not be applied to the present example. First, this technique requires quantitative data which allows one to test similarity of relations by means of correlating the frequency of indicators. Second, and this explains why no such data are available, Przeworski and Teune implicitly require that different indicators must be functionally equivalent. This, in turn, demands exchangeable variables. For example, if political violence is the dependent variable, it could be measured through a variety of different indicators such as strikes, urban riots or violent action during elections. In the case of specialization, however, the number of indicators (i.e. formal training requirements, separation between specialists and general practitioners or limitation of practice) is restricted and cannot be simply exchanged.

But at least the underlying assumption that the basic problem of comparative research is "to incorporate into measurement statements the contexts within which observations are made" (Przeworski/ Teune 1970: 13) remains valuable because it leads to the conclusion that, for the purpose at hand, empirical measurements of the dependent variable have to take into consideration country-specific contexts out of which specialty definitions emanate. This is not to say that the frequently applied "more or less"-categories for measuring varieties of medical specialism are entirely worthless. Since they reflect to a certain extent the impact of regulatory systems, they remain useful for illustrative purposes. In the meantime, however, more detailed information about the institutional context of medical specialism is required.

3.2 The Definition of Specialty Status

The definition of specialty status differs remarkably between the three countries. The most clear-cut mode of definition is to be found in the FRG. The approved areas of specialization are stipulated in the guidelines for postgraduate training (Weiterbildungsordnung - WBO).[4] Due to the fact that

4 As a matter of fact, there are separate WBOs for each regional chamber of physicians, but they adhere closely to the WBO issued by the federal chamber

the regional chambers of physicians are authorized to enact law-like statutes that apply to each licensed physician, the specialty definitions laid down in the WBO are legally binding. Analogous to Britain and the U.S., there is a clear separation between undergraduate medical education ("Ausbildung") and postgraduate training ("Weiterbildung") (Schagen 1989: 100 f.). Not until the medical student has finished his/ her education, excluding a post-internship practicum, and has been licensed to practice ("Approbation") by the chamber of physicians, is he/ she entitled to start with postgraduate training (§ 3 Abs. 1 WBO) leading to the certification of specialist status.

There are three categories of medical specialization: specialties (Gebiete), subspecialties (Teilgebiete) and added qualifications (Zusatzbezeichnungen), ordered in a hierarchical way. Only the full specialty qualification, which on average requires postgraduate training of four years, leads to the status of a "Facharzt" (specialist). The acquisition of a subspecialty, which roughly takes two years, is only permitted subsequent to the completion of a full specialty training. The added qualification, by contrast, may also be acquired by general practitioners. Often these qualifications only require a part-time training of several months, but the length of training varies considerably, extending from four weeks (homeopathy) to several years (psychoanalysis). A peculiarity of the German case is the strict regulation of combinations between specialty designations. If a physician has qualified for more than one specialist certificate, only those combinations are permitted which are related ("verwandt") or have an evident connection ("erkennbarer fachlicher Zusammenhang") (Narr 1989: 237 ff.). Despite these vague formulations, each and every permitted combination is laid down in the WBO.

Although in the U.S. there is no monopoly for defining specialist status, the certifications granted by a member organization of the private American Board of Medical Specialties (ABMS) have generally become accepted as a reliable source of specialty qualification. Due to the dominating influence of ABMS rules and procedures, the following considerations will concentrate on the ABMS system. The ABMS bylaws contain three specialty categories: the certificates of *general* qualification, the certificates of *special* qualification, and the certificates of *added* qualifications (DeLisa 1989). As in the German case, physicians may only acquire these qualifications after graduating from medical school. While most general qualifications require an average of four to five years in post-residency training, for special and added qualifications there is a minimum of one year (DeLisa 1989: 173). In contrast to the German WBO, special and added qualifications may be acquired independ-

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of physicians, which has only the status of a proposal.

ently of a general certificate, and there are no rules for combinations. The most striking difference, however, concerns the legal character of specialty titles. While in Germany the WBO regulations are mandatory, and thus no physician without completed postgraduate training is permitted to use a specialist designation, certificates in the U.S. are voluntary so that each American physician "is free to describe himself as a specialist in any branch of medicine without further state licensing or control" (Grad/ Marti 1980: 13).

Defining a specialist in Britain remains somewhat ambivalent. Stevens, in her seminal work, remarked that it is unclear whether the term specialty applies to a postgraduate examination, a position in the hospital, or a field of practice (Stevens 1966: 107). By and large, this has to do with the traditional separation into general practitioners (GPs), who are office-based, and specialists (consultants), located almost exclusively in the hospital. Whereas the division between these two status groups is marked, different specialties among the consultants are more vaguely separated. As opposed to Germany and the U.S., where postgraduate degrees and examinations have developed a uniform shape, in Britain there is a plurality of postgraduate degrees. After graduation a physician may acquire nearly one hundred different postgraduate training degrees (Dowie 1987: 120 f.). The universities and the British Conjoint Board, a joint organization of the Colleges and the universities, grant their own specialist diplomas and certificates (Stevens 1966: 370 ff.). Yet, the prestigious membership and fellowship examinations held by the Royal Colleges, the academic and educational arm of the British medical profession, are the dominating form of postgraduate qualifications because they are adopted by NHS hospitals as job categories.

The minimum time of postgraduate training before a physician may take a Royal College examination varies between four and seven years (Dowie 1987: 121 ff.). With some minor exemptions, only Royal College degrees are generally accepted as postgraduate education leading to a full specialist status. The most commonly held postgraduate qualifications are the DRCOG (Diploma of the Royal College of Obstetricians and Gynaecologists), the MRCP (Member of the Royal College of Physicians) and the FRCS (Fellowship of the Royal College of Surgeons). M.D. and Ph.D. degrees for physicians only play a subordinate role in Britain.

After completing their postgraduate examination, the aspiring specialist has to overcome another, possibly even more difficult hurdle. Whereas GPs, independent of any postgraduate degree, have no opportunity to achieve

specialist status,[5] hospital physicians have to move up the career ladder of British hospitals. In the hospital hierarchy, only the highly sought-after consultant positions and the less prestigious non-training grades (associate specialists, senior house medical officers [SHMOs]) correspond to a full specialist status. In a substantial number of cases, however, physicians working in a senior registrar position (the fourth rank in the hospital hierarchy after completing training as house officer, senior house officer and registrar) have already completed their College examinations but, due to a lack of vacancies for consultant positions, are forced to stay in this lower hierarchical rank. In Britain, therefore, achieving the status of a specialist is linked to an appointment in a hospital and is not only an outcome of postgraduate training. In the following table, the most salient differences of specialty definitions, i.e. the variances of the dependent variable in the three countries, are summarized.

Table 1: Attributes of Specialist Status

	United States	Germany	Great Britain
Formal training requirements for full specialty status	no	yes	yes
Separation between specialists and general practitioners	no	yes	yes
Limitation of practice	no	yes	no
Specialist status restricted to hospital positions	no	no	yes

5 A survey conducted during the mid-seventies shows that roughly 80% of British medical graduates have obtained a postgraduate degree (Parkhouse/ Ellin 1989: 348), which implies that a large number of GPs, on top of their mandatory 3-year clinical training, have also taken part in some sort of specialty training. An increasing number of GPs is also using the opportunity to work as part-time "clinical assistants" or "hospital practitioners", mainly in smaller rural hospitals. However, these hospital positions have no specialty status.

When reconsidering the problems discussed above to measure the dependent variable, it could be assumed that a more proper category for describing national variances among medical specialties is the stringency of specialty regulations. As indicated in Table 1, neither a formal training requirement nor any other restriction on becoming a specialist is enforced in the U.S. case. By contrast, in Britain and in Germany barriers to becoming a specialist are notably higher, albeit with a completey different focus. The British restriction on specialist positions to hospitals is certainly a constraint on numbers, whereas the German limitation of practice has no effect on quantities, but rather on work patterns. The fact that regulatory systems aim at different attributes of the professionalization phenomenon is important in order to understand their impact as an intervening variable. Apparently, in the U.S. case, as opposed to Britain and Germany, the intervening variable has no restrictive effect on the transformation of the independent variables. This means that the U.S. case of medical specialism is most properly characterized as a system geared for expansion. This variance was built into regulatory systems from their very beginnings.

4. Expansive Interests and Regulative Institutions

4.1 Historical Origins of Regulatory Regimes

In Germany, the WBO emerged out of three sources (Huerkamp 1985: 182-192; Eulner 1967). First, there was the competition between general practitioners and specialists. Because practitioners since the late 19th century had increasingly experienced an encroachment of unregulated specialists into their terrain, they demanded a limitation of practice that would restrict the specialist to his field. Second, the Prussian government authorities were concerned about the effect of insufficiently qualified specialists on patients and recommended a solution in the form of professional regulations in 1908. In 1924, the German physician assembly finally agreed upon the first guideline for medical specialties, known as the "Bremer Richtlinie" (Sewering 1987). This guideline not only stipulated the length and content of required postgraduate training for 14 different specialties, but already included a limitation of practice (Fachgebietsbeschränkung), which prohibited the specialist from rendering general practitioner services and obliged him to practice in one specialty only.

This comparatively early adoption of a regulatory framework in Germany was only in part a direct response to the specific problems emanating from

de facto specialization of medical work. Already at the 1924 physicians' assembly in Bremen, there was concern that, due to a lack of regulations, specialization might result in a fragmentation of the medical profession (Sewering 1987: 1596). This particular sensitivity - which is the third source behind the introduction of a regulatory system - was undoubtedly amplified by the protracted conflicts between German physicians and the health insurance funds, which reached another point of culmination exactly at the turn of the year 1923/24. The unity of the profession, a topic that British and American physicians hardly paid much special attention to, has been perceived ever since as a vital asset of the profession in Germany.

Notwithstanding several revisions and extensions, the "Bremer Richtlinie" remained basically intact for more than forty years. The first major innovation, the introduction of subspecialties, was included into the "Weiterbildungsordnung" - as it has been called since 1956. This was in 1968 accompanied by a further tightening of the limitation of practice. For the first time, the WBO stipulated what range of activity "belongs to each specialty and where its boundaries are" (Sewering 1987: 1597). These restrictions prompted two physicians to file a law suit contesting the physician chambers' right to interfere in professional practice to such an extent. Although the Federal Constitutional Court ("Bundesverfassungsgericht") in 1972 ruled in favor of the physician chambers' right to impose such restrictions, the court also demanded the federal states ("Länder") to provide a more detailed legislative framework containing at least the "status-determining norms", such as the requirements and procedures for specialty accreditation, by which medical specialties are approved, and length of postgraduate training (Starck 1972: 1492). On the one hand, this decision relieved the medical profession's anxiety that postgraduate training might become a responsibility of the federal government; on the other hand, the "Länder" had a real opportunity to restrict the profession's grip on the specialization issue. Despite initial ambitions in this direction, the "Länder" left the medical professions' extensive leeway for specialty regulations basically untouched. Only some minor restrictions, such as the prohibition to advertise more than one specialty, were relaxed (Sewering 1976). By way of summary, specialty regulation in Germany, in particular the limitation of practice, appears to serve as means of market segmentation for the single specialist, and, when seen from the collective perspective, as an instrument of intraprofessional coordination that serves to insure peaceful coexistence of potentially conflicting professional segments.

Arrangements for specialty regulation have often been influenced by the peculiarities of medical care organization. In Germany, for example, the

whole issue of specialization was perceived as a problem of office-based physicians, because the closed-staff model of German hospitals has from the beginning excluded the potentially competitive forces from this sector. In this respect the U.S. case is different. Traditionally, American hospitals did not operate on the basis of salaried hospital physicians. The majority of physicians are located in private practice and work in the hospital part-time, on the basis of so-called "hospital privileges" allowing them to treat their patients there (Stevens 1971: 51 f.). No technical or organizational restrictions on the performance of more complex services were imposed on the office-based physician as medical progress exploded in the early decades of the twentieth century. This was particularly true for surgical procedures. As most medical specialties, including general practitioners, were accustomed to performing surgical operations, specialized surgeons were often forced into "fee splitting" arrangements, in which the referring physician receives a percentage of the surgeon's fees (Stevens 1971: 83 ff.). This was the context out of which the U.S. system of specialty regulations developed.

The foundation of specialist societies granting a specialist certification to their members, such as the American College of Surgeons in 1913 or the American Board of Ophthalmology in 1916, was at first an effort by specialists to create a hierarchical division modelled on the example of the British Royal Colleges. But there was a decisive difference between the two countries. The Royal Colleges in Britain had an effective monopoly on determining who was to become a specialist, because only their members and fellows had a chance of a consultant appointment. The American specialist societies were not able to use similar levers and, therefore, developed a different sense of mission. Instead of defining medical specialists through an elite status, the American specialist societies focused mainly on upgrading the quality standards for *every* physician (Stevens 1971: 87, 95).

Furthermore, no single medical organization was able to dominate specialty regulation. Lacking an elite institution like the Royal Colleges, the American specialty societies had to compete with other organizations, such as the American Medical Association or the National Board of Medical Examiners. Without the established physician chambers or Royal Colleges, which served as a "logical" governance institution for specialty regulation in Germany and Britain, the U.S. medical profession was forced to create a new legitimized institutional vehicle. This was to become the American Board of Medical Specialties in 1933, which emerged out of an organizational coalition among those organizations interested in the field of medical specialization, most notably the American Hospital Association, the Association of American Medical Colleges, the Federation of State Medical Boards, the AMA

Council on Medical Education, and the National Board of Medical Examiners (ABMS 1990: 99; Stevens 1971: 212 ff.). If today's system for specialty regulation has the image of a "morass of interlocking committees, councils, and associations" (Carboni 1982: 122), this has to do with its origins in a concerted effort made by the U.S. medical profession. This impression, however, should not be taken as an indicator of tight professional control. Rather, it seems as if the integration of almost all relevant professional segments into the decision making arena has more of an expansive than a restrictive effect on the growth of medical specialties.

As opposed to the diverse and pluralistic anatomy of U.S. physicians' organizations, the British medical profession has "retained pre-modern segmentations" (Heidenheimer 1989: 535). The existence of a medieval status hierarchy including physicians, surgeons and pharmacists was not levelled off in the period of emerging professionalism during the 19th century. The institutional base for medical elitism was the two Royal Colleges of physicians and surgeons, which, as a result of their royal charter, had a monopoly on medical examination and therefore on market access for physicians (Waddington 1977: 164 f.). By the mid-nineteenth century, it appeared as if the political pressure from the ranks of the disadvantaged practitioners would lead to a gradual elimination of the consultants' elitist position. As a result of the Medical Act of 1858, a single licensing body, the General Medical Council (GMC), was founded and charged with the authority to control entry into the medical profession through a register in which each physician had to enroll. Because the education requirements for registration, defined by the GMC, were not restricted to Royal College examinations, but also included examinations from medical schools attached to hospitals and universities, the Royal Colleges lost their control over market entry.

The strategic response by the consultants was to redefine their realm of hegemony "by instigating 'postgraduate' ranks" (Sadler 1978: 192). Exercising their influential position in the hospitals, the consultant elite managed to make a Royal College degree, i.e. postgraduate training, a necessary requisite for a hospital appointment, thus devaluating the GMC license to such an extent that it only qualifies a physician for office-based practice. Although this was the constellation out of which today's "referral system" developed (Parry/ Parry 1976: 138 f.), according to which consultants receive their patients almost exclusively from a referring GP, the separation into two market segments did not automatically mean a whole-hearted commitment towards specialization by hospital physicians. Interestingly, quite the opposite was the case.

In the second half of the nineteenth century, specialization was refused by the Royal Colleges because it was incompatible with their internal mode of differentiation, which was hierarchical in nature and not functional, aiming at the control over medical practice (Sadler 1978: 194-200). In addition, the medical body of knowledge which was required for a college examination was tailored to the needs of the consultants. It was confined to the main hospital-based techniques and to illnesses prevalent among the consultants' wealthy clients. The rise of medical specialism, therefore, posed a threat to the dominant position of the Royal Colleges. Of course, the Colleges were not able to suppress the increasing specialization of medicine which, for example, took place in small "special hospitals" initiated by GPs to serve the middle class (Sadler 1978: 197). After an initial period of resisting specialization through the promotion of the concept of "scientific generalism" (Sadler 1978: 195), the consultant elite responded with a similar move, as in the case of medical education reform: medical specialism was absorbed into the hospital and thereby installed as an exclusive trait of consultants.

The particular development of British hospital specialism was largely shaped by the non-existence of the government and universities as actors in shaping the system of specialty regulation. Particularly the fact that medical education remained under the control of the upper professional echelon and was not, as in most other countries, assimilated by the universities, helps us to understand why pressure for expanding medical specialism remains subordinated to the slower pace of the differentiation mode of the Royal Colleges. Even though the introduction of the NHS "gave a massive boost to the expansion of scientific medicine" (Sadler 1978: 207) by pouring tax money into hospital-based research,[6] it was a long time before physicians in the technical-oriented specialties such as pathology or radiology could overcome their "back-room boys" image (Sadler 1978: 199). It goes without saying that the consultants today are no longer opposed to specialization. Yet to a certain extent, scientific generalism is still influential, as is reflected in the commonly used "joint appointment" in NHS hospitals, according to which a consultant is expected to practice as an internist in the morning and as geriatrist in the afternoon (Brocklehurst 1989). Thus, what is perceived as "boundary encroachment" in one system is elsewhere supported even as a means to achieve a flexible use of medical manpower.

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6 The impact of the NHS on the development of medical specialties in general, however, is less clear. Stevens (1966: 86), for example, remarked: "The strong relationship between the Ministry of Health and the Royal Colleges left its mark on all aspects of specialist staffing; it undoubtedly discouraged formal fragmentation into specialties."

Obviously, the creation of these regulatory systems had the function of settling some basic interest conflicts over medical specialization, that already had country-specific peculiarities. In Germany, the medical profession achieved control about the boundaries between specialties and their internal structure, but no control over the number of specialists. The very same thing happened in Britain, where intraprofessional tensions emerged as a conflict over social status and access to the hospital. The reinforcement of the distinction between GPs and consultants meant that British consultants established control over access to medical specialism. An entirely different pattern of regulation developed in the case of the U.S.. Unable to exclude any physician from specialization, U.S. specialty boards made *universal specialism* which includes *all* physicians their central mission. In order to develop analogous terms of description for the British and German cases, additional information is required.

4.2 Incentives for Expansion

Incentives and restrictions in this analysis have the status of descriptive categories, which indicate the two possible causal directions of the independent variables on medical specialization. The use of these two terms makes it possible to give short, summarizing descriptions without being obliged to mention the impact of each single independent variable. In the three cases under consideration, the U.S. represent the system with the most powerful incentives for medical specialization. For practicing physicians, the board certification has become a "passport to prosperity" (Owens 1989: 60; Olson 1990), as is indicated by the distribution of income. Board-certified M.D.s in 1987 had an annual gross income (before taxes) of $123,080, whereas non-certified M.D.s only earned an average of $88,850 (Owens 1989: 62). The reason for these differences is basically to be found in the higher fees charged by specialized physicians. Similar to the individual physician, for whom becoming a specialist is almost vital for surviving in a strongly competitive environment, segments of the profession are eager to establish new specialties in order to gain a competitive edge over their colleagues and to upgrade their field of expertise.

The peculiarity of the U.S. case, especially when compared with Germany, is that physicians, once they declare themselves as specialists, are not forced to stay within the realm of their discipline. Even in cases of far-reaching specialization, the specialist thus retains the opportunity to provide generalist services (Menken 1988: 16 ff.; Fryer 1991: 219-221). This is impossible in

Germany, at least in legal terms, where a limitation of practice is rigorously enforced (Narr 1989: Rz 407-425)[7].

Another striking variation which sets apart the U.S. case from both other cases is the role played by the university. Medical schools are not only the province of physician-researchers who, almost by definition, have a marked interest in achieving status, legitimacy and financial support for their particular field of research; in the U.S., medical schools and teaching hospitals themselves are eager to foster the process of medical specialization. In the post-war period the U.S. medical school became the object of a variety of external stimulations which propelled the trend towards specialization. Of prime importance was the rapid expansion of (mainly public) research expenditure which completely altered the incentive structure of medical schools (Kendall 1971: 472 ff.; Stevens 1971: 348 ff.). The pre-war medical school was primarily dedicated to teaching. The post-war medical school, however, responded to the expanding opportunity for earning large sums of research money by adapting its objective to meet this external stimulus. Thus, medical schools during the 1950s and 1960s increasingly developed a strong research orientation which, at the same time, altered their financial and institutional requirements. By once having adapted its internal operations to external stimuli, the medical school not only became dependent on research grants, but also developed a need for medical specialists who are engaged in research and research-fund raising. Also, due to the high professional status of researchers, physicians from outside demanded more residency positions in teachings hospitals, which would allow them to fulfill the requirement of training that they become certified specialists with career opportunities in research. Hospitals, in turn, were willing to increase the number of residency positions because this staff group was needed to serve as a functional equivalent to salaried physicians by fulfilling day-to-day routine medical services (Stevens 1989: 238). Some of these external stimuli have been virtually transformed into self-reinforcing processes. For example, the growth of residency positions meant educating an increasing number of specialists who raised the number of hospitalized patients. The more hospital beds were created, the more residency positions were installed by hospitals to deal with the growing number of patients, and so on (Hollingsworth 1986: 104).

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7 Interestingly, the limitation of practice has a much lower relevance in German hospitals, where competition, based on specialty knowledge, is largely excluded through the system of salary payment. As a hospital physician has pointed out, "we never ask a colleague about his specialty, but about his capability" (Ärzte Zeitung, May 7, 1991).

Aside from such self-reinforcing processes of producing increasing numbers of specialists, researchers in U.S. medical schools have also an interest in expanding the number of certified specialties since a new specialty increases the credibility of a particular research area, which, in turn, enhances the ability of the academic physician to earn more research grants. By assuming that the rules for the internal differentiation of academic research into new areas of knowledge are much more dynamic than in the field of medical practice, the hypothesis is supported that U.S. medical schools have had a much greater influence on specialization than their British and German counterparts.

Although incentives to acquire research money are also present in the UK and Germany, this driving force remains much stronger in the U.S. because research is not only in the interest of the *individual* researcher, but also in the *institutional* interest of medical schools, who even advertise their post-graduate training programs in order to attract more residents (Czinkata/ Johnson/ Jelly 1980). Thus, sponsoring coalitions may emerge between single research entrepreneurs and influential organizations such as the American Association of Medical Schools, which directly participate in the process of creating new medical specialties.

An example for the relevance of coalition building is geriatric medicine. Its introduction as a separate clinical specialty has been blocked for decades by a coalition of academic organizations on grounds such as the lack of research programs and the apprehension that a new specialty may deplete other scarce resources (King 1989: 308; Carboni 1982). Only very recently was this resistance overcome by another coalition between the boards of Family Practice and Internal Medicine, who managed to introduce a Certificate of Added Qualification for Geriatric Medicine in 1987 (King 1989: 319). There is some reason for interpreting this move as a deliberate decision by family practitioners and internists to absorb and control the increasing market for geriatric care. The added qualification, teaching guidelines and examination requirements defined jointly by the Boards of Family Practice and Internal Medicine, are well suited to becoming a typical area of specialization for both specialties. It was possible for these professional segments to persuade the academic faction at a time of gradual increase in the number of geriatric research and teaching programs. Thus a declining resistance of researchers coincided with a growing positive interest by practitioners. In sum, therefore, the U.S. medical schools should be included among the major factors contributing to the increase in medical specialization (Fryer 1991: 217 f.).

A less important, but still stimulating role in encouraging specialization can be attributed to organizational factors of medical practice. In this respect the U.S. differs again from both other cases. Whereas in Britain the concept of the District General Hospital was more a restrictive force, in Germany neither the organizational peculiarities of hospitals nor those of medical practice played a visible role. In the U.S., according to Reiser (1978: 150 f.), the emergence of large group practices, which eventually matured into prosperous Health Maintenance Organizations (HMOs) the 1970s, allowed in the first place an increasing number of general practitioners to concentrate on a special field of medicine outside the hospital, so that "the generalist could extend his own knowledge and skills by integrating with an organization of specialists, which might also enhance his prestige within medicine" (Reiser 1978: 154).

With the exception of this organizational factor, the incentive structure for German physicians appears to be quite similar at first sight. Despite the fact that income varies considerably among specialties, it is evident that becoming a specialist in Germany is the superior career choice. This assumption is valid both for physicians in hospitals and for physicians in ambulatory care settings. However, while, for hospital physicians, postgraduate training is required because the hospitals' internal structure, which is organized along the lines of departments for specialist services, has no room for general practitioners, the incentives for office-based physicians are set by income opportunities. The fee schedule, according to which the vast majority of office-based physicians in Germany are paid (Liebold 1988), has a built-in incentive towards specialization. The services reimbursed by the health insurance funds are divided into basic services ("Grundleistungen") and special services ("Sonderleistungen"). Whereas the first category comprises services which could be provided by any type of physician, the second category has a large share of services for which only assigned specialists are reimbursed. This payment system is advantageous for most specialty groups, particularly in a period of fairly tight health budgets. The relevance of economic motives surrounding the issue of specialization are regularly raised when new medical techniques are introduced and become the object of intense conflicts about which a single specialty is legitimated to monopolize the application of the new technique (Ärzte Zeitung, May 7, 1991: 24). Because the German health care system has instituted no significant barriers against the proliferation of new diagnostic and therapeutical technologies, medical progress serves as an important opportunity for professional segments to promote the introduction of new fields of specialization.

However, the incentives to become a specialist differ radically from those which possibly support the creation of any new specialty. The payment system causes a vital interest among the existing specialties *against* the introduction of a new specialty which will potentially demand its slice of the fee pie. An observation in support of this hypothesis was made by Krähe, who argued that since 1956, when the above mentioned payment system was already in effect, those specialties which have been introduced have been typically located in hospital or research settings (Krähe 1978: 218). Although this only applies to full specialties and not to subspecialties and added qualifications, which also justify an entitlement to be reimbursed for special services, the observation remains relevant since it reveals that economic competition as a motive to create new areas of specialization may also result in the suppression of new specialties.

Thus, the incentives for practicing physicians in Germany to promote new specialties are at best mixed-motive games with a tendency against any further differentiation. As far as German researchers are concerned, they are exposed to an ambivalent incentive structure as well. In contrast to their U.S. colleagues, German research physicians are more oriented towards patient care because this area of activity, as a result of the financing system, is more beneficial for the medical school and for the individual researcher (Braun 1990: 55). This may suggest a less compelling interest in new specialties because there is less pressure to earn research money, rendering the creation of a new specialty less useful. However, it is a commonly held opinion that the research physician faction is the driving force behind increasing specialization (Bochnik/ Demisch 1985: 203 ff.). As a matter of fact, the specialty societies are the most energetic actors in promoting new specialties.[8] A recent survey conducted by the peak organization of specialty societies, the "Arbeitsgemeinschaft der Wissenschaftlich Medizinischen Fachgesellschaften", revealed that there are attempts to introduce no less than 45 new areas of specialization (AWMF 1988: 25). Even though German researchers may thus develop a strong interest in expanding formal specialization, they are different from their U.S. colleagues in that their opportunities to succeed against the resistance of practitioners are much less developed.

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8 The motives were described as follows: "A professor's promotion from C3 to C4 (the highest available payment position for German university professors, M.D.), his raise in salary and even the academic reputation of his department or medical school can all depend on his field advancing from a subspecialty to specialty. This is why research physicians strongly urge the inclusion of more specialties in the WBO" (Ärzte Zeitung v. 3./4.5.1991: 2).

In Britain, physicians are situated within a completely different incentive structure. Medical progress is not allowed to play a decisive role in the British NHS. As a result of strict resource limitations, the diffusion of new technologies takes place at a much slower pace than in Germany or the U.S. (Aaron/ Schwartz 1984; Hollingsworth 1986). British physicians, therefore, are not primarily technology-oriented but rather have developed a less aggressive approach to medical treatment with a stronger emphasis on socio-psychological factors. It is plausible to assume that this more holistic view of illness, which corresponds to the concept of scientific generalism, does not support specialization in small technology-related fields of practice.

The single most important factor influencing medical specialization is the division between GPs and hospital consultants. Due to the existence of two separate market segments, specialist status is not available to GPs and, therefore, becoming a specialist is no factor of competition between office-based practitioners. This is equally true for hospital consultants who work exclusively on a referral basis. The stability of this arrangement was secured by the expanding institutions of collective financing, including the NHS, which supported the market separation because the gate-keeper function of the GP proved to be an efficient rationing instrument (Honigsbaum 1979). This particular division of the medical profession resulted in the creation of two homogeneous physician groups, in which intraprofessional competition was excluded to a very large extent.

By contrast, in Germany and in the U.S. specialization is potentially an instrument for gaining competitive advantage in a *patient market*, whereas in Britain specialists, i.e. aspiring consultants, compete in a *job market*. These varying functional points of reference are reflected in the way specialist titles are constructed. In Germany and the U.S., at least in theory, specialist titles have to operate as *market signals* which guide patients into the doctors' office (Schagen 1989: 109). In contrast, British specialist qualifications are used as *status titles* which reflect the physician's positioning in the medical hierarchy. Because there is no need for a marketable codification, British titles, such as the MRCP or the FRCS, do not necessarily include further details about the discipline in which the physician has specialized. For practicing physicians in general, the whole issue of specialization is of fairly low significance.

If there is any positive incentive for British physicians to promote specialization, it must emerge from the ranks of researchers. Some evidence for this assumption is provided by the Royal Commission, which argues that "at present the creation of new specialties is too often seen by the health

departments as a way of correcting neglect in particular fields, and the medical profession appears sometimes to be too ready to accept the claims of small sectional interests" (Royal Commission 1979: 217). Even though it seems plausible that specialist groups encourage the creation of new specialties, these activities must be stimulated mainly by status interests in view of the absence of any direct economic benefit. As is the case in Germany, medical schools in Britain are primarily financed through institutional funds (Dowie 1987: 268 ff.). For the present analysis, this characteristic and the mixture of funding sources is decisive. Aside from the University Grants Committee, which mainly relies on money from the Department of Education and Science, the NHS regional health authorities are the second large source of funds. Because the financing system is based on the philosophy of "uncosted mutual assistance" (Dowie 1987: 270), according to which a clear charging between funding source and spending purpose is rejected, medical schools and teaching hospitals are obliged to participate in patient care. Most university teachers hold honorary contracts as consultants with a regional health authority so that research and patient care are closely intermingled and no clear-cut research orientation has emerged. It may be very well in the interest of a British medical researcher to foster the development of a new specialty, but it is questionable whether this will increase the credibility or the resource endowment of a specialty field.

4.3 Restrictions on the Expansion of Specialization

As outlined above, there is no reason to expect only expansive mechanisms to affect the process of medical specialization. It appears that the institutionalized rules and procedures, which constitute the process of specialty certification, could be employed as a lever against the proliferation of new medical specialties. In this respect, Britain stands apart from both the other two cases. In contrast to the U.S. and German systems, there is no particular institution for overseeing the introduction of a new medical specialty in Britain. The Royal Colleges and the universities are free to announce new specialty qualifications (Royal Commission 1979: 215). However, whether such initiatives are translated into employment opportunities within the NHS depends on a two-level decision-making process. Each recommendation needs the agreement of the Department of Health, which then makes its decision after consulting with NHS management and other medical organizations (written communication, Department of Health 1991). After having reached a general consensus about the introduction of a specialty, Health Authorities are in a position to offer training and consultant positions in this new

employment category. This brings into play the second level of decision-making, the NHS manpower planning process. Since 1972 each new consultant position, after having passed no less than six "examination points" (Long/ Mercer 1987: 126), must be finally approved by the Department of Health on the advice of the physician-dominated Central Manpower Committee (National Audit Office 1985: 8 ff.).

This suggests that the central government has at least the opportunity to veto the proliferation of new specialties. However, a closer look at NHS manpower planning shows that the whole machinery is "used almost solely as a means of improving the grade balance" (National Audit Office 1985: 8). This is reflected in the problem orientation of the various commissions on medical education and postgraduate training, which were primarily concerned with the development of a proper career structure for hospital physicians (Dowie 1987: 28 ff.). Although it is true that manpower controls in previous years were used by health authorities to recruit physicians in shortage specialties, and although there is some evidence that the Ministry of Health discouraged specialty proliferation in the early days of the NHS (Stevens 1966: 86 f.), it would be misleading to assume that governmental agencies have consciously intervened in specialty development. If specialty increase in Britain is embedded in a comparatively restrictive environment, then this is a by-product of the NHS financial straightjacket, which in general restrains the growth of physician manpower. Likewise, an unintended and indirect restriction on the development of new specialties resulted from an organizational factor. Since the early 1960s the NHS hospital service has been dominated by the concept of the District General Hospital, a usually small-sized community institution, which is not suited to harbour narrowly defined medical specialties.

Whereas in Britain the creation of a new specialty requires two steps, in both other countries this is a one-step procedure. Once a new specialty is announced, there are no systemic barriers against its expansion. In the U.S. as well as in Germany, procedures to create new specialties are the exclusive responsibility of professional self-control. In Germany the starting point is the standing committee on postgraduate training, which is attached to the federal physician chamber. Each group of physicians, in most cases specialty societies desiring the introduction of a new specialty, the upgrading of a subspecialty, or any other modification of the WBO, has to submit an application to the standing committee. These applications are broadly circulated among medical organizations attaching particular importance to the statements from other specialty societies. If an application receives enough support, it is elaborated into a concrete proposal, which is then presented

to an annual general physicians' assembly. If a majority of the delegates agrees on the proposal, the assembly makes a recommendation to modify the guidelines for post-graduate training. Although this recommendation is voluntary, the regional physician chambers routinely adhere to federal advice.

A decision to modify the WBO is always a tightrope walk between conflicting professional interests and an obvious tendency to preserve the status quo for office-based physicians. This is indicated in the requirements each application has to comply with (Bundesärztekammer 1986: 137). First, a new area of specialization must have a sufficient scientific base of knowledge. Second, it must be relevant for patient care (not for science). Third, it must be economically sound. A fourth, more implicit, but by no means irrelevant requirement is the unity of the medical profession ("Einheit des Arztberufes") which must not be put in jeopardy through increasing specialization. Despite the vagueness of these requirements, it is evident that these criteria, especially the third and the fourth, may be employed as an emergency brake against applications that have a disturbing impact on the income distribution of fund physicians.

This is the very reason why discussions about each modification of the guidelines for postgraduate education are seriously politicized in Germany. The danger that the WBO may degenerate "into an instrument of fee distribution" (Weissauer/ Opderbecke 1988: 106) has already become a reality. Only recently, the federal physician chamber has been worried about the increasing tendency to employ specialty demarcations of the WBO as a means of deciding which services can be reimbursed by each specialty (Bundesärztekammer 1988: 305). While the specialty demarcations are becoming a growing source of conflict between office-based practitioners, this physician group is still united against any expansion of specialties. Even highly reasonable applications are denied. This has been the case, for example, with a recent attempt to introduce the specialty of geriatrics at the 94th Physician Assembly in 1991. Despite the widely acknowledged inadequacy of medical services for the elderly, to which the lack of qualified specialists has contributed considerably,[9] the proposal was rejected, mainly due to resistance from general practitioners and internists who where afraid of loosing a substantial

9 The non-existence of geriatrics as a medical specialty should not be confused with a general lack of geriatric medicine. Of course there are geriatric beds and departments in German hospitals, but even their introduction during the mid-1970s encountered resistance from the medical profession, which was afraid that a specialty might materialize in the hospital for which no PGT guidelines existed (Ärzte Zeitung 1991, March 6).

segment of their patients (Ärzte Zeitung, May 3/4, 1991). Several other proposals to create new specialties, such as physical and rehabilitation medicine or psychotherapy, were rejected as well. The only new specialty to find the agreement of a majority of delegates was human genetics (Ärzte Zeitung, May 6, 1991), a field of specialization which will certainly not disturb the fee distribution of ambulatory care physicians. Although the upgrading of some surgical subspecialties into full specialties was also denied, the general tendency in Germany is in accordance with the afore mentioned hypothesis that the pressure for more specialties, as a result of resistance from office-based practitioners, is primarily channeled into the hospital.

In the U.S., a quite similar procedure is laid down in the bylaws of the ABMS. Each ABMS member, i.e. medical board, has the right to submit a proposal to introduce a new type of certification or to modify an already existing certification (ABMS bylaws, sect. 9.4 (a)). This proposal is submitted to all ABMS members, who may agree by a two-third majority. The decision is based on assessing the "professional and scientific status" (sec. 9.4 (b)(3)) of the proposed area of specialization. Similar to the German requirements, the ABMS bylaws require (1) the "existence of a body of medical knowledge" which should be distinct from existing certifications, or more detailed, (2) a group of physicians working in the proposed area of specialization, (3) support by national medical organizations, and (4) the existence of educational opportunities for the new field.

It was repeatedly asserted that the American medical profession, not least due to the ABMS system, is in a strong position to control the introduction of new specialties (Carboni 1982: 122 ff.; Havighurst/ King 1983: 141). But this opinion does not seem to be well founded. First, there is a large number of medical boards who grant certification without being members of the ABMS (Koska 1989). As can be seen from the example of the specialty of medical management, which recently has launched its own certifying board (Montgomery 1990: 196), a newly coalesced specialty can proliferate without ABMS recognition. However, more relevant for the market value of a specialist designation is the incapacity of the average consumer to make solid judgments about the difference between a specialty granted by an ABMS-member board or an independent medical board. Second, aside from the board certificate, a physician's hospital privileges are a regularly used indicator of his medical competence (Havighurst/ King 1983: 145). The authority of ABMS certifications has been undermined since courts have repeatedly turned down board certification as an eligibility criteria for granting hospital privileges (Starr 1982: 357; Hall/ Ellmann 1990: 165). Third,

even the capacity of the ABMS itself to restrict the growth of medical specialties does not have a very impressive record. Although the last general qualification to be recognized by the ABMS was emergency medicine back in 1976, a look at the increase of special and added qualifications indicates that the dynamics of expanding the realm of medical specialism remain unabated. It is likely that the ABMS agrees with the introduction of new subspecialties because most member boards use this as a competition parameter. It should be noted, however, that economic competition may produce varying results. In both the U.S. and the German cases, there is a competitive motive to introduce new specialties. However, whereas the U.S. system of regulation lacks an opportunity for slowing down the increase of specialties, those segments among German physicians who are interested in blocking the introduction of new specialties have at their disposal an effective regulatory mechanism for vetoing new specialties, so that the German case can be characterized as *controlled specialism*. As expected, regulatory systems play an important role in the creation of new medical specialties. The relevance of this intervening variable, however, is clearly overestimated if it is regarded as a sufficient explanatory factor in itself, because some of the independent variables exert an influence without being connected with the regulatory system. Some aspects of this problem will be raised in the following discussion.

5. Concluding Discussion

This paper has argued that the impact of variables, which are commonly assumed to influence the phenomenon of medical specialization, has to be assessed by considering the mediating effect of country-specific institutional frameworks. This kind of contextual analysis always poses the problem of working against general explanations, because of the complexity of interactions between independent variables and the institutional environment. In the present case, for example, some of the independent variables work in different directions at the same time, because they influence either different segments of the medical profession or different levels of the institutional context. Instead of resorting to generalization, the following discussion will therefore, as far as possible, concentrate on the relation between the independent variables and the institutional context. In Table 2 the impact of the main independent variables is summarized. For each variable an approximate positive and/or negative causal direction is indicated, expressed as a ranking order extending from no impact (0), minor impact (+), medium impact (++), to strong impact (+++).

Table 2: Impact of Independent Variables on Medical Specialization

	USA	FRG	UK
1. Progress of medical technology and knowledge	| +++ Strong technology orientation; unrestricted proliferation supports specialization	| ++ Fairly strong technology orientation	| 0 - + Dominance of social medicine over medical technology
2. Market forces, intraprofessional competition	| +++ Competition pervades all sectors of the health care system; specialization explicitly used as a competition parameter	- - | + Moderate competition among office-based physicians; specialization used as one of several competition parameters, sometimes transformed into restriction	0 | 0 Competition almost non-existent; specialization is not used as a competition parameter
3. Research and education; professional status	| +++ Researchers and educational institutions strongly oriented towards specialization; specialism highly prestigious	| + - ++ Single researchers interested in specialization, but no institutional support by medical schools	| + Only minor incentives for researchers and educational institutions to push forward specialization
4. Governmental support	| 0 - + Except in cases of single specialties, government plays no role	0 | 0 Governmental influence restricted to providing legislative framework for medical selfadministration	| + Only indirect influence of the central government, especially through its authority to regulate the number of hospital positions
5. Organization of medical care	| + - ++ Proliferation of large group practices/ HMOs and specialization of hospital departments has stimulated medical specialization	| + No strong incentives through organizational factors, specialization in hospitals mainly supported through the regulatory system	- | Concept of District General Hospital has worked against the creation of new specialties

(1) Progress in medical and technological knowledge has supported specialty proliferation in all cases. The rating of the causal relevance of this variable is essentially based on the degree of restriction which the diffusion of medical and technological innovations have to face. The U.S. health care system is unusually receptive to new technologies: almost no constraints are imposed on the application of new diagnostic and therapeutical procedures and devices. In Britain, on the other hand, the dissemination of medical technologies is slowed down by the NHS administrative machinery, in which purchase

decisions have to pass through a fairly complex structure of committees (Stocking 1988: 159-163) which are charged with enforcing the financial constraints of the NHS.[10] In the German case, regulations on medical technologies proved to be not very efficient, particularly in slowing down the diffusion of large-scale medical devices. Thus researchers and specialty societies may seize the opportunity to adopt the mold of new technologies. The degree to which this variable supports specialization therefore depends on the institutional capacity of health care systems to restrict the proliferation of new medical technologies.

(2) As the previous discussion has emphasized, physicians in the three countries are exposed to market competition to varying degrees. In Britain, competition for patients, as a potential cause of specialization, is almost nonexistent for hospital specialists. Although GPs in private practice may exercise some economic competition with colleagues, they cannot utilize specialist skills or status for gaining a competitive advantage, due to the referral system which restricts the specialist status as well as the provision of special services to consultants. In the German case, office-based physicians have an incentive to engage in a specialty and do so. However, due to the vigorously enforced limitation of practice, which restricts the specialists' activities to his field, becoming a specialist has its economic limitations. This is the decisive difference to the U.S., where it is possible to link the status and income opportunities of a medical specialty with the ability to treat all patient categories. With regard to this variable, the institutional positioning of physicians and systems of payment are responsible for the extent to which competition will influence medical specialism.

(3) A somewhat similar condition can be found with regard to medical research and education as causal factors for specialization. In the U.S., both individual researchers and medical schools are pushed forward by the "grants economy", which fosters an escalation of specialization. Even subspecialties are highly prestigious in the U.S., mainly because research grants are acquired by those highly specialized researchers who are working on the most promising medico-technological innovations (Fryer 1991: 218). In contrast, the situation of research and education in Britain and Germany is oriented towards patient care, thus generating only minor or moderate incentives for specialization. In both cases, individual researchers may be interested in venturing into a new field of specialization, but they cannot count on the institutional support of the medical school. Germany's slightly higher rating than Britain's in this

10 The different approach to technology between Britain and the United States is extensively discussed by Hollingsworth (1986) and Payer (1988).

case can be attributed to the activities of the specialty societies that are at least lobbying for new specialties. This leads to the assumption that the relevance of this variable is strongly determined by the institutional separation or integration of research and patient care inside medical schools.

(4) Governmental support for specialty proliferation remains of low significance in each of the three countries. Despite the fact that the formation of specialties such as pediatrics and rehabilitation medicine in the U.S. (Halpern 1988: 73 f.; Berkowitz 1981), geriatrics in Britain (Carboni 1982: 81), and public health in Germany came about with active governmental support, this variable remains of limited relevance. Government activities had only an indirect impact on specialty development in Germany, where there is but a rough legislative framework, and Britain, where the Central Government has the authority to determine the number of consultant positions. It should be conceded, however, that separating governmental impact on specialization from other independent variables is sometimes difficult. In the British case, for example, restrictions imposed on medical specialism that emanate from the NHS could be regarded as government-related as well as organization-related.

(5) Such organizational factors had the most positive impact on specialization in the U.S. Aside from the growth of specialized hospital care, it was in particular the proliferation of large group practices and HMOs which provided an organizational opportunity for physicians to specialize in the area of ambulatory care. No equivalent organizational consequences have emerged in British or German ambulatory care. In the latter case, however, there is some evidence that the hospital, as the organizational harbour of most sophisticated diagnosis and treatment techniques, has increased the drive towards medical specialization, whereas in Britain the concept of the District General Hospital has rather transformed this organizational factor into a restraining force.

These diverging patterns of medical specialism make it very difficult to reach some sort of generalization since it runs the danger of violating the complexity of causal relations. Nonetheless, the analysis has revealed a major implication, which is particularly worthwhile for comparative research into professions, especially the medical profession. Specialization among physicians raises very different interests or intraprofessional conflicts. In Britain, no visible conflicts about medical specialism have occurred since a two-tiered professional structure has been established. By contrast, in Germany specialization-linked conflicts are intensifying due to their importance for income distribution. In the U.S., finally, despite fierce competition among physicians, in which specialization

plays an important role, the issue does not raise serious conflicts, obviously because no regulatory levers such as those used in Germany are available.

Thus the medical profession develops quite different interests across countries in relation to aspects which are generally assumed to take a uniform shape. This is not peculiar to the present analysis. Furthermore, other important facets of the medical profession such as clinical autonomy (Schulz/ Harrison 1986) or preferences vis-à-vis private practice (Immergut 1991), are regarded from remarkably different points of view across nations. This assumption does not make research about professions any easier. On the contrary, it requires a greater amount of awareness, and recognition of the fact that, in comparative research, the things that often appear similar are, in reality, very different.

Appendix I: Data Sources for Figure 1

Great Britain: DHSS, *Digest of Health Statistics for England and Wales.* London: HMSO 1969 [1949 - 1971]; DHSS, *Health and Personal Social Services Statistics for England,* London: HMSO, various editions [1972 - 1989].

United States: The President's Commission on the Health Needs of the Nation, *Building America's Health,* Vol. III. Washington, DC: GPO [1931 - 1949]; National Center for Health Statistics, *Health Resources Statistics,* Health Manpower and Health Facilities 1976-77 Edition, DHEW Pub. No. (PHS) 79-1509, Hyattsville, MD 1979 [1950 - 1970]; Rosemary Stevens, *American Medicine and the Public Interest.* New Haven/ London: Yale University Press 1971 [1931 - 1960]; Gene Roback/ Lilian Randolph/ Bradley Seidman, *1990 Edition. Physician Characteristics and Distribution and Distribution in the U.S.* Chicago: American Medical Association [1965 - 1989].

Germany: Statistisches Bundesamt, *Berufe des Gesundheitswesens,* Fachserie 12, Reihe 5. Stuttgart: Kohlhammer, various editions.

Appendix II: Calculation Procedure for Figure 1

Great Britain: Community health physicians were excluded because they appear as a separate category as late as 1974, in the aftermath of the 1974 NHS reorganization. Data on hospital physicians are whole-time equivalents, data on GPs are absolute numbers. Data for 1949 - 1971 include England and Wales, data for 1972 ff. only include England. The specialist ratio for 1949 is based on an estimate of GPs by the Royal Commission 1979: 209. The following physician categories where added up and then calculated as a respective percentage of all GPs and all hospital medical staff: consultants and senior hospital medical officers (SHMOs) with allowance, associate specialists (formerly medical assistants), other staff and SHMOs without allowance. Regarding the status of the excluded categories such as clinical assistants and hospital practitioners, cf. Dowie 1987: 54.

Germany: Specialist ratios are calculated as a percentage of approved specialists ("Ärzte mit Fachgebietsbezeichnung") plus specialists in family practice ("Fachärzte für Allgemeinmedizin").

United States: Specialist ratios for 1965 - 1989 are calculated as a percentage of self-designated specialists in relation to general practitioners plus specialists in family practice. Earlier years are based on data about "full-time specialists", which have been calculated as percentage of all active MDs. Doctors of Osteopathy (DOs) are excluded.

Appendix III: Formally Approved Medical Specialties (including dates of inauguration)

ABMS Certificates

Aerospace Medicine	1953
Allergy and Immunology	1972
Diagnostic Laboratory Immunology	1986
Anatomic & Clinical Pathology	1936
Blood Banking/ Transfusion Medicine	1973
Chemical Pathology	1950
Cytopathology	1989
Dermatopathology	1974
Forensic Pathology	1959
Hematology	1952
Immunopathology	1983
Medical Microbiology	1949
Neuropathology	1947
Pediatric Pathology	1990
Radioisotopic Pathology	1974
Anesthesiology	1941
Critical Care Medicine	1986
Colon and Rectal Surgery	1934
Dermatology	1932
Dermapathology	1974
Dermatological Immunology/ Diagnostic and Laboratory Immunology	1985
Diagnostic Radiology	
Emergency Medicine	1976
Family Practice	1969
Internal Medicine	1936
Cardiac Electrophysiology	1992
Cardiovascular Disease	1941
Critical Care Medicine	1987
Diagnostic Laboratory Immunology	1986
Endocrinology and Metabolism	1972
Gastroenterology	1941
Geriatric Medicine	1988
Hematology	1972
Infectious Disease	1972
Medical Oncology	1973
Nephrology	1972
Pulmonary Disease	1941
Rheumatology	1972
Neurology	1934
Child Neurology	
Neurological Surgery	1940
Critical Care Medicine	
Nuclear Medicine	1971
Obstetrics and Gynecology	1930
Gynecologic Oncology	1974
Maternal & Fetal Medicine	1974
Reproductive Endocrinology	1974
Critical Care	
Occupational Medicine	1955
Ophthalmology	1916
Orthopedic Surgery	1934
Hand Surgery	1989
Otolaryngology	1924
Pediatrics	1933
Diagnostic Laboratory Immunology	1986
Pediatric Cardiology	1961
Pediatric Critical Care Medicine	1987
Pediatric Endocrinology	1978
Pediatric Hematology-Oncology	1974
Pediatric Nephrology	1974
Pediatric Pulmonology	1986
Neonatal-Perinatal Medicine	1975
Physical Medicine & Rehabilitation	1947
Plastic Surgery	1937
Hand Surgery	1990
Public Health & Preventive Medicine	1960
Psychiatry	1934
Child and Adolescent Psychiatry	1959
Geriatric Psychiatry	1991
Radiology	1934
Nuclear Radiology	1957
Radiation Oncology	
Surgery	1937
Pediatric Surgery	1975
Surgery of the Hand	1989
Surgical Critical Care	1986
General Vascular Surgery	1982
General Vascular Surgery	1988
Thoracic Surgery	1948
Urology	1935

Sources: ABMS Annual Report & Reference Handbook - 1990. Evanston, Ill.: ABMS, 1990, 62ff.; George Rosen, Preventive Medicine in the United States 1900 - 1975. New York: Prodist., 1977, 231; Rosemary Stevens, American Medicine and the Public Interest. New Haven/ London: Yale University Press, 1971, 73.

Medical Specialties in Germany

Allergologie	
Allgemeinmedizin	1968
Anästhesiologie	1956
Arbeitsmedizin	1976
Augenheilkunde	1892
Balneologie u. Medizinische Klimatologie	1956
Betriebsmedizin	1976
Chirurgie	1892
Gefäßchirurgie	1976
Kinderchirurgie	1968
Plastische Chirurgie	1976
Thorax- und Kardiovaskularch.	1976
Unfallchirurgie	1968
Chirotherapie Flugmedizin	1987
Frauenheilkunde und Geburtshilfe	1892
HNO-Heilkunde	1924
Phoniatrie und Pädaudiologie	1978
Haut- und Geschlechtskrankheiten	1892
Homöopathie	1937
Hygiene	1978
Innere Medizin	1892
Endokrinologie	1976
Gastroenterologie	1924
Kardiologie	1968
Lungen- und Bronchialheilkunde	1924
Hämatologie	1976
Nephrologie	1976
Rheumatologie	1976
Kinderheilkunde	1892
Kinderkardiologie	1972
Kinder- und Jugendpsychiatrie	1968
Klinische Pharmakologie	1968
Laboratoriumsmedizin	1956
Medizinische Genetik	1976
Medizinische Informatik	1976
Mikrobiologie u. Infektionsepidemologie	1978
Mund-Kiefer-Gesichtschirurgie	1924
Naturheilverfahren	1956
Neurochirurgie	1956
Neurologie	1892
Neuropathologie	1987
Nuklearmedizin	1976
Öffentliches Gesundheitswesen	1976
Orthopädie	1892
Rheumatologie	1976
Pathologie	1968
Pharmakologie und Toxikologie	1968
Physikalische Therapie Plastische Operationen	1937
Psychiatrie	1892
Psychoanalyse	1987
Psychotherapie	1956
Radiologische Diagnostik	1924
Kinderradiologie	1987
Neuroradiologie	1987
Rechtsmedizin	1976
Sozialmedizin Sportmedizin	1987
Stimm- u. Sprachstörungen	1956
Strahlentherapie	1976
Transfusionsmedizin Tropenmedizin	1937
Urologie	1924

Source: Internal document of the Bundesärztekammer; Weiterbildungsordnungen 1976 and 1987.

NHS-Hospital Specialties

Accident & Emergency	1973	Medical Handicap	
Anaesthesiology	1935	Medical Illness/ Psychiatry	1886
Audiological Medicine	1976	Nephrology	1968
Blood Transfusion		Neurology	
Cardiology		Neuropathology	1971
Cardio-thoracic Surgery		Neurosurgery	
Chemical Pathology		Nuclear Medicine	1970
Child and Adolescent Psychiatry		Obstetrics and Gyneacology	1931
Clinical Cytogenetics	1989	Occupational Health	1974
Clinical Genetics	1979	Old Age Psychiatry	1989
Clinical Neurological Physiology		Ophtalmology	1920
Clinical Pharmacology &		Otolaryngology	1920
Therapeutics	1974	(General) Pathology	1950
Clinical Physiology		Paediatrics	1935
Dermatology		Palliative Medicine	1989
Diabetes & Endocrinology	1975	Pediatric Neurology	1980
Forensic Psychiatry	1972	Paediatric Surgery	
Gastroenterology	1975	Plastic Surgery	
General Medicine		Psychotherapy	1975
Genito-urinary Medicine		Radiology	1932
Geriatric Medicine		Radiotherapy	1944
Haematology		Reumatology	
Histopathology		(General) Surgery	
Immuno-pathology	1971	Traumatic and Orthopaedic Surgery	
Infectious Diseases		Thoratic Medicine	
Medical Microbiology	1923	Urology	1922
Medical Oncology	1976	Virology	1989

Sources: Health and Personal Social Services Statistics for England (various editions); Rosemary Stevens, Medical Practice in Modern England. New Haven/ London: Yale Univ. Press 1966 passim.

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