Socioeconomic and Technological Factors in Trends of Physicians to Specialize

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THE PROPORTION of specialists engaged in the practice of medicine has increased dramatically in this century. For example, among doctors of medicine in the United States, the ratio of full-time specialists to all physicians grew from 11 percent in 1923 to 41 percent in 1957. Among physicians in private practice, general practitioners comprised 64 percent of the total in 1949 and 52 percent in 1957, a decline of 12 percentage points in 8 years (*1*).

This trend in the medical profession to specialization is given a sharper focus when the type of practice of physicians is examined at comparable points in their careers. Weiskotten and Altenderfer (*2*) reported that 41 percent of the 1915 U.S. medical school graduates were engaged in specialty practice, while 74 percent of the 1954 class were full-time specialists after an equal number of years of practice. The trend to increasing specialization in medicine is the result of a complex set of factors which are difficult to deal with empirically. One way to categorize sets of these factors so as to provide a broad analytical framework is to identify the expanding technological base of medical practice as one set of factors in specialization and to consider broad economic cycles and social events (such as the Great Depression and World War II) as a second set. This level of treatment, of course, can only serve as a crude first approximation of a rather complex set of considerations. Despite the broadness of this approach, certain observations can be made which stem from the basic dichotomy between technical and socioeconomic factors of change.

First, the vast increase in medical knowledge has made it impossible for one person to be skilled in all phases of applied medicine (*3*). Second, newly emerging fields of knowledge are attractive areas of study to many persons. It would, therefore, be reasonable to expect that a higher proportion of those physicians who began medical practice in the 1950's would be specialists than physicians who began their practice in the 1920's, 1930's, or even as late as the 1940's.

Further, economic and social conditions appear to have affected the rate of change from general to specialty practice. And each decade of this century has presented a distinctly different set of economic and social conditions. Those which confronted the physicians beginning their practice in 1920 were very different from the conditions faced by physicians beginning their practice in the 1930's. Since many physicians who entered medical practice in the 1940's did so in a military setting, more constraints were probably placed on their professional activities than if they had been in private practice. The physician beginning his practice after World War II entered an era—and, in fact, he was socialized for this era (*4*)—in which the rising expectations of the population created a demand for a more sophisticated level of medical care than had previously been available.

The proportion of physicians who engage in specialty practice is also increased by physicians who shift their career lines. While the most recent en-

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trants into private medical practice are more likely to start as specialists, many older physicians who started as general practitioners have shifted to a full-time specialty for a variety of reasons. The extent to which this type of shift has contributed to the population of medical specialists in private practice has not been studied extensively. Terris and Monk (*5*) have presented data which bear on this question. They determined the extent of change for the graduates of one U.S. medical school and examined the extent of time between a physician's entry into medical practice and his shift to specialty practice. Their data suggest that shifts to specialization occur throughout the careers of each graduating class and that "the causes . . . are . . . found primarily in developments in medical science and the changing conditions of medical practice in the community." An extension to this line of inquiry would be to ask how such career shifts are linked to the changing social and economic context of medical practice. There is no clearcut answer to this question available in the literature.

A last, but by no means unimportant, consideration is the effect of the trend to specialization on the quantity of physicians' services available within a specified area. The majority of specialists tend to be younger and the majority of general practitioners older and, as Ciocco and Altman (*6*) have pointed out, a high degree of negative correlation exists between the productivity of the physician and his age. Therefore, as new entrants to the medical community increasingly engage in a specialty practice, the quantity of medical services available is probably more disproportionately weighted toward services rendered by specialists than the ratio of specialists to general practitioners would indicate.

The trend to specialization has many components, and delineating them contributes to an understanding of the changes occurring in the composition of the medical profession, as well as of the implications of these changes for the general public. The objectives of my study are to delineate some components of the changes occurring in physicians' career lines.

Method and Data

The technique of cohort analysis developed by demographers is perhaps one of the most powerful tools devised for the study of social change. In my study, cohorts are defined as physicians who started the private practice of medicine during 10-year periods beginning in 1914.

For each cohort thus defined, changes in the proportion of physicians engaged in the full-time practice of a specialty were observed. The observations were made at the time of the physician's entry into private practice as well as at the end of each 10-year period for which there were data. Thus, changes in the proportion of full-time specialists in each cohort were traced over a span of years. Such a study design provides two alternative bases of comparison—(*a*) among cohorts at the same point in time and (*b*) at the same stages in the careers of members of the various cohorts. The first set of comparisons (intracohort) is focused on the proportion of specialists in each cohort in the same period. The second set of comparisons (intercohort) is focused on differences between cohorts after they have been in practice the same number of years.

Table 1.—Number and percent of physicians practicing in Windsor, Canada, in 1963, by decade they started

Decade of start	Number	Percent
Total	314	100.0
1914–23	17	5.4
1924–33	36	11.5
1934–43	40	12.6
1944–53	105	33.5
1954–63	116	37.0

The data for my analysis are taken from a 1963 survey conducted by B. J. Darsky and H. A. Weeks (School of Public Health, University of Michigan, Ann Arbor) of 326 physicians practicing in the city of Windsor, Ontario, Canada. Windsor's population in 1961 was 193,365 (*7*). Responses were obtained from 314, or 96 percent of the total active physicians. From a statistical viewpoint, these 314 physicians included almost all of the practicing physicians in the community in 1963. Since my analysis pertains only to this group, the data are treated as representative of an entire population. Thus, all the differences reported are regarded as showing changes that are "statistically significant." The data presented were derived from records which show, for each physician practicing in Windsor, his mode of practice (general practitioner or specialist) from the time he started the private practice of medicine through the year 1963.

The Windsor physician practiced in a solo fee-for-service setting. Although there was a large voluntary prepayment insurance plan available to residents of the city, which paid for both inpatient hospital services and out-of-hospital physicians'

services, subscribers were free to choose their own physician. Further, the plan was sponsored by the local medical society. The medical care system was dominated by the society. There were 98 full-time specialists in Windsor among 314 active physicians at the time of the survey. These specialists represented 31.2 percent of the total number of physicians in Windsor. The proportion compares closely to the percentage of 34.7 reported for communities in the United States with populations of 100,000 to 249,999 in 1965 (*8*).

Results

Practicing medical community in 1963. Among the 314 physicians in Windsor in 1963 were 17 whose records indicate they started practice in the decade 1914–23. This group, defined as the first cohort, constituted 5.4 percent of the total physicians practicing medicine in Windsor in 1963. Of these 17, the eldest was then 71 years of age. The physicians who comprised this cohort and the cohorts for each subsequent decade are shown in table 1.

Possible bias in data. The nature of the data impose two constraints on the analysis. The first stems from the relatively small number of physicians in the earlier cohorts. A shift from general to specialty practice by one member of these cohorts thus resulted in a larger percentage change than a shift of the same number in the later cohorts. Although subsequent analysis showed a remarkable constancy in the percentage of change, some caution regarding the stability of these data must be advised. The second constraint derives from the assumption that physicians in the earlier cohorts accurately represented the career patterns of their total cohort. To what extent this assumption introduces a bias in the data cannot be determined.

Nevertheless, the possibilities for a bias that would understate changes in the career patterns of the older physicians should be considered. Each cohort studied was comprised of the geographically stable survivors of the total cohort (that is, of those physicians who had always practiced in Windsor) plus physicians who had migrated to the area. Physicians who had moved away from the Windsor area or left the practice of medicine because of death or retirement were not included; changes in career lines could not be determined for this group.

Under the assumption, however, that the experience of the survivors of the cohorts closely approximated the experience of the total cohort, I determined the proportion of physicians engaged in full-time specialty practice for each 10-year period from 1914 through 1963 for each cohort (table 2).

Inter- and intracohort comparison of specialists. Each column of table 2 shows the separate history of a cohort in terms of specialists and nonspecialists and forms the basis for an intracohort comparison of the changes within each cohort at the same periods in its members' careers. Each row provides the basis for an intercohort comparison among the cohorts during the same decade. The diagonals of table 2 show the percentage of the Windsor medical community who were specialists for each 10-year period for which there were observations.

The first two cohorts, 1914–23 and 1924–33, had approximately the same percentage of physicians who began practice as full-time specialists. In both of the next two cohorts, 30.0 percent of the physicians began as specialists. In the latest cohort, 51.6 percent began as specialists.

The period covered by the first two cohorts spans the years of World War I to roughly the middle of the Great Depression. It is highly likely that two separate factors, the level of medical technology and socioeconomic conditions, both operated strongly against specialization during this 20-year period. The relative level of medical technology at the beginning of this period, a level which continued to a great extent throughout the 20 years, seems to have presented the practicing physician with only a limited opportunity for specialization. Also, many of the now common surgical and medical techniques were as yet unknown. In fact, the medical schools were not then oriented toward specialty training. Thus, the impetus for concentration in a specialty was at a low level compared with today.

A second deterrent to the practice of specialty medicine was the depression which covered the last

Table 2.—Percentage of physicians practicing in Windsor, Canada, in 1963 who were engaged in specialty practice

Years of practice	Period physicians began practice				
	1954–63	1944–53	1934–43	1924–33	1914–23
0–9	51.6	30.2	30.0	16.7	17.6
10–19		43.8	32.6	27.8	23.5
20–29			40.0	30.6	29.4
30–39				30.6	29.4
40–49					29.4

part of the period 1914–33. Although the separate effects of the depression and the level of medical technology cannot be distinguished by using these data, a comparison of beginning specialists in the earlier 20-year period with those in the two decades 1934–43 and 1944–53 provides further inferential evidence that there are strong links between the trend to specialize and the social and economic context within which such practice is carried out.

Table 2 shows that when the cohorts of 1934–44 and 1944–53 entered private practice 30 percent of their members were specialists, an increase of 12 percentage points over the two preceding cohorts. This increase coincides with the start of World War II, a period characterized by a large expansion of industrial activity and a rise in the population's ability to purchase medical care. Also, the marked increase in medical technology seems to have been strongly related to the increase in the number of beginning specialists. This relationship can be crudely measured by using the number of specialty boards established in the period as a criterion of increasing medical knowledge. Fifteen of the 36 specialties now recognized by the American Medical Association were established between 1930 and 1940.

A level of beginning specialists of approximately 30 percent persisted throughout the 1944–53 decade. The next increase in the percentage of beginning specialists occurred in the 1954–63 cohort. Of these physicians, 51.6 percent started practice as full-time specialists—approximately a 22-percentage point increase over the two preceding decades. This dramatic shift in the beginning mode of practice of new physicians coincided with the rapid expansion of technological skills in medicine after World War II. This increase, however, seems to have stemmed as much from pressures exerted by the consumer of medical care as by the proliferation of knowledge.

In short, the proportion of physicians who began their medical practice as full-time specialists did not increase gradually over the 50-year period covered by these data, but in three distinct phases. From 1914 through 1933, less than 20 percent of the beginning practitioners engaged in a full-time specialty. This period was characterized by relatively low levels of medical technology. The second period, 1934–53, was characterized by an expanding war-based economy and an increasing technological base for applied medicine. During this period, 30 percent of the beginning physicians were full-time specialists. In the last period covered by the survey data, 1954–63, almost 52 percent of all beginning practitioners were engaged in full-time specialty practice. This relatively recent period was characterized by a rapid expansion both in medical skills and in the purchasing power and consumer demand necessary to support an increasingly complex medical care system.

Shift of general practitioners to specialties. General practitioners are the second source of specialists. The general practitioner may, for various personal or professional reasons, shift to a full-time specialty. In the oldest cohort of physicians, those who entered medical practice in the period 1914–23, 17.6 percent were engaged in specialty practice (table 2). By the end of this decade, however, 23.5 percent of these physicians reported they were full-time specialists. At the end of the second decade, 1924–33, the proportion of physicians who reported they were specialists rose to 29.4 percent. Thus, the total change in the proportion of specialists was 11.8 percentage points.

To facilitate interpretation of these shifts in career lines, the differences in percentage points within each cohort for each decade within which the shifts occurred are shown in table 3.

As can be seen, the patterns of change among the cohorts differ. In the 1914–23 cohort, an equal number of physicians changed to a specialty in both the first and second decades of their practice. Thus, almost 12 percent of the members of that cohort who had started their practice as generalists became specialists during their first 20 years of practice but, surprisingly, none of the other physicians in the cohort changed their career lines in the subsequent 30 study years.

The 1924–33 cohort showed an 11.1 percent shift from general to specialty practice in its first decade of practice, but less than a 3 percent shift in the second decade, and no change in the subsequent decade. In all, 13.9 percent of this cohort changed from general to specialty practice at some point in their careers.

The third cohort, composed of physicians starting private practice in the period 1934–43, reflects a third pattern. Less than 3 percent of these physicians changed to full-time specialty practice in their first decade of activity, while 7.4 percent shifted in the second. Thus, 10.0 percent of this cohort changed their mode of medical practice in the course of their careers. In the one observation period available for the 1944–53 cohort, 13.6 percent shifted to specialty practice.

Table 3.—Percentage of cohorts of physicians in Windsor, Canada, in 1963, who had shifted from general to specialty practice, by decade of shift

Decade of shift	Period physicians began practice			
	1944–53	1934–43	1924–33	1914–23
Total	13.6	10.0	13.9	11.8
1914–23				5.9
1924–33			11.1	5.9
1934–43		2.6	2.8	0.0
1944–53	13.6	7.4	0.0	0.0

The proportion of practitioners who changed their career lines varied within a small range—less than 4.0 percentage points over all cohorts—from a minimum of 10 percent to a maximum of 13.9 percent among cohorts for which there were two or more observations. Moreover, the patterns of change show a clear link between the timing of change and the impact of the depression and World War II. The percentage of physicians who shifted to a specialty practice was not only relatively constant but also finite. That is, these Windsor cohorts did not exhibit further shifts after their first 20 years of active practice.

The physician's place of practice seems to be an influential determinant of change. The many structural factors which are associated with highly developed medical care systems in larger urban centers are not present in the smaller community. Physicians who have located in a smaller urban area such as Windsor therefore may be less likely to be confronted with the inducements to specialty practice that physicians in larger urban centers face. Also, physicians locating in smaller communities may deliberately pursue a stable career pattern.

Despite the lack of information on why physicians change to specialty practice, the study data indicate that physicians' career patterns in Windsor are highly stable. The range of 14 to 10 percent in the proportion changing to a specialty once active private practice began is supported by earlier data from Darsky and co-workers on essentially the same group of physicians (*9*). Only 11.7 percent of a cross-section of Windsor physicians whom these authors surveyed replied affirmatively to the question, Are you planning to restrict your practice to a specialty in the future? The "future" to which Darsky and co-workers referred extended beyond the range of the observations in 1963. Nevertheless, these earlier data support, to a great extent, the notion of career stability in Windsor.

A general conclusion from the study data is that, while the ranks of the general practitioner provide some manpower for specialty practice, the percentage of physicians who will shift to a specialty practice in cities the size of Windsor is between 10 to 15 percent. While the data for Windsor show that the shifts to specialty practice occurred in the first 20 years of the physicians' activity, the time of change was clearly linked to social and economic conditions. For example, as shown in table 3, the proportion of the 1924–33 cohort shifting from general to specialty practice in their first decade of activity was 11.1 percent; 5.9 percent of the 1914–23 cohort shifted to specialty practice in the same decade, that is, in the second decade of their practice. Part of this 20-year period was the era of post-World War I prosperity. The economy was expanding, and to some degree there was an increased demand for medical care. The impact of the depression is noted in the smallness of the shifts to specialty practice during the 1934–43 period; the only shifts were 2.8 percent in the 1924–33 cohort and 2.6 percent in the 1934–43 cohort. During the 1944–53 decade, no movement to specialty practice was recorded for the 1924–33 cohort, whose members were then in their third decade of activity. In this decade, however, 7.4 percent of the 1934–43 cohort shifted to a specialty, as well as 13.6 percent of the 1944–53 cohort.

The difference between these two cohorts in the time of the shifts is significant. Most of the physicians in the 1924–33 cohort who changed to a specialty (11 percent) did so in the decade 1924–33—and presumably in the late twenties; only 2.8 percent shifted in the 1934–43 decade.

The 1934–43 cohort made its major shift to specialty practice after the depression. Only 2.6 percent shifted between 1934 and 1943, but 7.4 percent shifted in the second decade of their private practice, that is, in the years 1944–53. Of all the cohorts studied, the depression seems to have affected the movement of the 1934–43 cohort into specialty practice most adversely, since the smallest proportion of its members shifted to a specialty of all cohorts studied.

Implications of shifts in type of practice. The proportion of specialists contributed by each cohort of Windsor physicians from 1914–23 through 1954–63 (table 2) reflects the impact of social and economic events. In the 1954–63 decade, 51.6 percent of the 1954–63 cohort, 43.8 percent of the 1944–53

cohort, 40.0 percent of the 1934–43 cohort, 30.6 percent of the 1924–33 cohort, and 29.4 percent of the 1914–23 cohort were full-time specialists. Clearly, a disproportionate number of the younger physicians comprised the specialty pool in 1963. This composition of the Windsor medical community is also a recent phenomenon, for the proportion of specialists in the 1944–54 decade was approximately the same in each cohort. It arises because of the increasing percentage of physicians in each new cohort who were specialists and the shifts to specialty practice within the older cohorts.

In the period 1954–63, specialists were heavily represented in the latest cohorts. The majority of specialists in this period appear to have been younger than the majority of general practitioners. Since, as Ciocco and Altman indicate (*6*), younger physicians provide more services on the average than their older colleagues, the actual medical care available to the consumer is now moving toward a preponderance of specialty care over general.

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Cohorts of physicians practicing in Windsor, Canada, were studied to determine the effects of changes in medical technology and of social and economic events on the proportion of physicians practicing a specialty. The career patterns of 314 physicians who began practicing in Windsor from 1914 through 1963 were analyzed.

The results suggest that the trend to specialty practice in medicine can be accounted for both by technological factors and by the social and economic context within which the practice is carried out. The percentage of practitioners in Windsor who began their practice as specialists increased markedly over the years 1914–63. From 1914 through 1933, approximately 18 percent of the beginning practitioners were specialists. From 1934 through 1953, 30 percent began private medical practice as specialists. From 1953 through 1963, 52 percent began as specialists. These data suggest that the developing medical technology affected the beginning mode of physicians' practice to a greater extent than social or economic trends.

Physicians who change to a full-time specialty practice after beginning as general practitioners also add to the physicians engaged in specialty practice. Such shifts in practice are affected more by social and economic events than by changes in technology. The data on the cohorts show that changes from general practice to a specialty were restricted to a relatively narrow range—from a minimum of 10 to a maximum of 14 percent of all cohorts. Significantly, the patterns of change varied in accordance with the economic cycles generated by the depression of the thirties and World War II, as well as with those arising from the post-war expansion. As would be expected, the depression slowed the flow of general practitioners into specialty practice, and World War II and the post-war periods of expansion increased the percentage of general practitioners who changed to a specialty.

Thus, past changes in the beginning mode of practice of physicians, as well as changes of general practitioners to specialty practice, have a long-term effect on the availability of medical services.